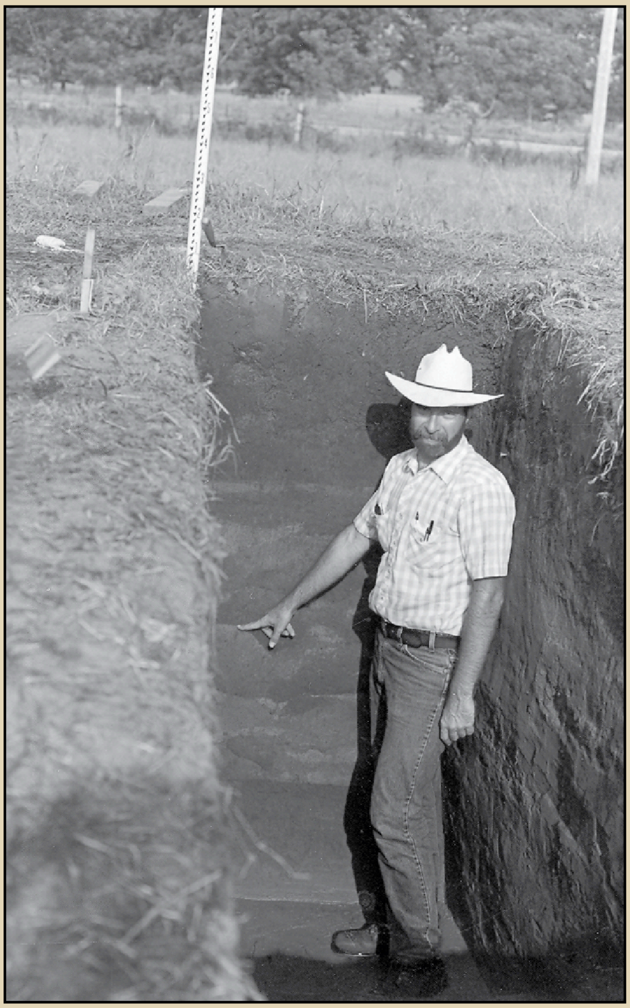
Collected Papers from Past Texas Archeological Society Summer Field Schools



Special Publication No. 5

TEXAS ARCHEOLOGICAL SOCIETY

2008

Collected Papers from Past Texas Archeological Society Summer Field Schools

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Introduction

Timothy K. Perttula

This volume contains five separate articles that present the archeological findings from four different Texas Archeological Society Field Schools held in different parts of the state in 1977, 1991-1992, and 1999. The Texas Archeological Society has conducted an annual and very successful Field School since 1963, beginning at the Oblate site in Comal County, Texas, at various sites and locales across the state (see Richmond et al. 1985 for a history of the 1962-1982 Field Schools), as well as a "group dig" in the summer of 1962 at the Gilbert site in Rains County, Texas (Jelks 1967:iii). These Field Schools have obtained significant archeological information about the prehistory and history of Texas and its earlier inhabitants, and each new field school provides the opportunity for grizzled veterans and newcomers to work together to explore Texas' past. In recent years, the field schools have been an annual host to at least 300-400 participants.

It has sometimes been a struggle, because of the massive amounts of archeological information (features, artifacts, records, photographs, etc.) recovered from each field school, to complete the timely reporting and publication of the archeological findings. Without a final report, it is hard to gauge the ultimate success of the field school endeavors. It is crucial that the archeological discoveries and archeological materials recovered during each field school receive the analysis, publication, and dissemination of a final report so that members of the Society and others interested in the archeology of the state learn of the results.

Attesting to the concerted efforts of the society, the results of many past Texas Archeological Society Field Schools held across the state have been published in the *Bulletin of the Texas Archeological Society* and Special Publications of the society, as well as in other venues. Work accomplished at prehistoric and historic Indian sites includes: an Historic Wichita Indian site in Limestone County (Smith 1993); prehistoric Caddo mound, village, cemetery, and salt-making sites (Corbin and Hart 1998; Perttula et al. 2001; Turner and Smith 2002); an Archaic and Late Prehistoric habitation site on the Brazos River (Wright 1997); prehistoric shell middens in Southeast Texas (Aten and Bollich 2002; Few et al. 1999, 2002); burned rock middens in Central Texas (Houk and Lohse 1993; Mueggenborg 1994; Baker 2003); broad-scale surveys in Edwards Plateau Canyonlands as well as the investigation of hot rock features (Moore 1983; Dickens and Moore 2004); the Lubbock Lake Landmark site (Johnson et al. 2002) and other locales on the Southern High Plains (Litwinionek et al. 1997; Baxevanis et al. 1997); habitation sites in the Texas Panhandle (Couzzourt and Schmidt-Couzzourt 1996; Word 1991), including Wolf Creek (Hughes 1991); a technological analysis of lithic assemblages from the 1970 Field School in the Guadalupe Mountains (Boisvert 1985) as well as ceramics (Phelps 1974) and rock art (Clark 1974); burned rock middens and a rock shelter in Crockett County (Word 1971); archeological survey and rock art recordation at Devils River State Natural Area in the lower Pecos region (Turpin and Davis 1993); and detailed investigations of hearths and middens in the Trans-Pecos (Cason 2005).

Historic archeological investigations have also been an important part of Field School research, and a diverse range of sites have been investigated by the society and the results published. Among these are 18th century Spanish Colonial missions and presidios (Fox and Tomka 2006; Walter et al. 2005a, 2005b; Walter 1999, 2007; Wolf 2005), acequias (Rinker et al. 1999), 19th century sugar plantations (Few 1999), and the Thomas F. McKinney homestead and mill complex in Travis County (McEachern and Ralph 1980, 1981).

The Texas Archeological Society is committed to the publication of a final report on each field school, no matter how long it may take, and the Special Publication before you (and on CD) is one result of that commitment. The Society has made, and will continue to make, a concerted effort to insure that final reports of the field schools are done in a timely manner.

The Texas Archeological Society is especially grateful to The Summerfield G. Roberts Foundation for providing the funding to publish this special publication of field school reports.

As editor of this Special Publication, I would like to first acknowledge the hard work and dedication of all the authors that have contributed to this publication, several years in the making. The Reports and Curation Committee of the Texas Archeological Society, led by Ron Ralph, has provided yeoman service in finding authors to complete the analysis and write-up of past field schools. Finally, the Board of Directors and Executive Committee of the Texas Archeological Society, as well as Pam Wheat, Executive Director, have been fully supportive of this project from its first beginnings. She also provided useful comments on an earlier version of this Foreword.

REFERENCES CITED

Aten, L. E. and C. N. Bollich
2002 *Late Holocene Settlement in the Taylor Bayou Drainage Basin: Test Excavations at the Gaulding Site (41JF27), Jefferson County, Texas*. Studies in Archeology 40, Texas Archeological Research Laboratory, The University of Texas at Austin, and Special Publication No. 4, Texas Archeological Society, San Antonio.

Baker, E.
2003 1989 University of Texas and 1990 Texas Archeological Society Excavations at 41UV132, the Smith Site, Uvalde County, Texas. *Bulletin of the Texas Archeological Society* 74:1-30.

Baxevanis, S. E., E. Johnson, B. Buchanan, and W. T. Shannon
1997 Test Excavations within the Plow Zone at the Hogue Site (41TY2), a Playa Site on the Southern High Plains of Texas. *Bulletin of the Texas Archeological Society* 68:337-386.

Boisvert, R.
1985 A Technological Analysis of Lithic Assemblages from Guadalupe Mountains National Park, Texas. *Bulletin of the Texas Archeological Society* 54:1-103.

Cason, S. S.
2005 Prehistoric Archeological Investigations at Perdiz Creek. *Bulletin of the Texas Archeological Society* 76:61-102.

Clark, J. W., Jr.
1974 Rock Art of the Guadalupe Mountains National Park Area. *Bulletin of the Texas Archeological Society* 45:97-119.

Corbin, J. E. and J. P. Hart
1998 The Washington Square Mound Site: A Middle Caddo Mound Complex in South Central East Texas. *Bulletin of the Texas Archeological Society* 69:47-78.

Couzzourt, J. and B. A. Schmidt-Couzzourt
1996 The 1969 Texas Archeological Society Field School at Blue Creek, Moore County, in the Texas Panhandle. *Bulletin of the Texas Archeological Society* 67:1-113.

Dickens, W. A. and W. E. Moore
2004 Archeological Survey at Musk Hog Canyon in Crockett County, Texas: The 1976 Texas Archeological Society Field School. *Bulletin of the Texas Archeological Society* 75:1-60.

Few, J.
1999 Lake Jackson State Archeological Landmark (41BO172): Report of the 1994 and 1995 Texas Archeological Society Field Schools and Additional 1996-1998 Excavations. *Bulletin of the Texas Archeological Society* 70:489-510.

Few, J., K. E. Fustes, and W. L. McClure
1999 The Prehistoric Component at the Lake Jackson State Archeological Landmark (41BO172), Brazoria County, Texas. *Bulletin of the Texas Archeological Society* 70:541-546.

Few, J., R. Brewington, K. E. Fustes, W. L. McClure, and B. Penhaker
2002 Investigations at the Follet Lake Site (41BO138): The 1994 and 1995 TAS Field Schools. *Bulletin of the Texas Archeological Society* 73:99-114.

Fox, A. A. and S. A. Tomka, with contributions by H. J. Shafer, H. Dockall, J. Hunziker, M. Wolf, K. Ulrich, and C. Calhoun
2006 Excavations at Presidio Nuestra Senora de Loreto de la Bahia del Espiritu Santo. *Bulletin of the Texas Archeological Society* 77:33-159.

Houk, B. A. and J. C. Lohse
1993 Archeological Investigations at the Mingo Site, Bandera County, Texas. *Bulletin of the Texas Archeological Society* 61:193-247.

Hughes, D. T.
1991 Investigations of the Buried City, Ochiltree County, Texas, With an Emphasis on the Texas Archeological Society Field Schools of 1987 and 1988. *Bulletin of the Texas Archeological Society* 60:107-148.

Jelks, E. B. (editor)
1967 The Gilbert Site: A Norteno Focus Site in Northeastern Texas. *Bulletin of the Texas Archeological Society* 37:1-248.

Johnson, E., B. Buchanan, M. Gill, P. J. Lewis, C. L. MacEwen, S. M. Selwood, S. E. Baxevanis, K. Hicks, and K. L. O'Brien
2002 Late Holocene Investigations at the Lubbock Lake Landmark with the Texas Archeological Society Field School of 1993. *Bulletin of the Texas Archeological Society* 73:69-97.

Litwinionek, L., E. Johnson, and M. Davis
1997 Survey at the Southeastern Edge of the Llano Estacado. *Bulletin of the Texas Archeological Society* 68:301-335.

McEachern, M. and R. W. Ralph
1980 Archeological Investigations at the Thomas F. McKinney Homestead, Travis County, Texas: An Experiment in Historical Archeology Part I. *Bulletin of the Texas Archeological Society* 51:5-127.
1981 Archeological Investigations at the Thomas F. McKinney Homestead, Travis County, Texas: An Experiment in Historical Archeology Part II. *Bulletin of the Texas Archeological Society* 52:5-55.

Moore, W. E.
1983 Archeological Investigations at Musk Hog Canyon, Crockett County, Texas: A Report of the 1976 Texas Archeological Society Field School. *Bulletin of the Texas Archeological Society* 53:13-81.

Mueggenborg, H. E.
1994 Excavations at the Blue Hole Site, Uvalde County, Texas. *Bulletin of the Texas Archeological Society* 62:1-74.

Perttula, T. K., J. E. Bruseth, N. A. Kenmotsu, D. J. Prikryl, W. A. Martin, L. Banks, J. Smith, N. G. Reese, and S. A. Iruegas
2001 Archeological Investigations on the Red River and Tributaries: Summary of the Findings of the 1991 and 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas. *Bulletin of the Texas Archeological Society* 72:165-250.

Phelps, A. L.
1974 An Analysis of the Ceramics of the Guadalupe Mountains National Park. *Bulletin of the Texas Archeological Society* 45:121-150.

Richmond, J. A., W. L. Richmond, and J. W. Greer
1985 Texas Archeological Society Field Schools, 1962-1982. *Bulletin of the Texas Archeological Society* 54:105-184.

Rinker, J., I. W. Cox, and C. B. Bousman
1999 The Dam and *Acequia* Systems of Espiritu Santo de Zuniga: Construction, Use, and Abandonment. *Bulletin of the Texas Archeological Society* 70:123-131.

Smith, J. E., II
1993 The Vinson Site (41LT1): A Norteno Focus Indian Village in Limestone County, Texas. *Bulletin of the Texas Archeological Society* 64:65-162.

Turner, R. L. and J. E. Smith, II, with contributions by T. K. Perttula, B. Nelson, M. Walters, and B. Gonzalez
2002 The Harold Williams Site (41CP10) and the Texas Archeological Society Field School of 1967. *Bulletin of the Texas Archeological Society* 73:1-68.

Turpin, S. A. and M. W. Davis
1993 The 1989 TAS Field School: Devils River State Natural Area. *Bulletin of the Texas Archeological Society* 61:1-58.

Walter, T. L.
1999 A Preliminary Report of the 1997 TAS Field School Excavations in Area A at Mission Espiritu Santo de Zuniga (41VT11), Victoria County, Texas. *Bulletin of the Texas Archeological Society* 70:97-122.
2007 *Espiritu Santo de Zuniga: A Frontier Mission in South Texas*. University of Texas Press, Austin.

Walter, T. L., V. K. Hindes, and D. K. Boyd
2005a Spanish Mission Architecture: Examples from the Second (41VT10) and Third (41VT11) Locations of Espiritu Santo, Victoria County, Texas. *Bulletin of the Texas Archeological Society* 76:1-28.

Walter, T. L., M. Wolf, and B. Kimball
2005b Spanish Colonial Presidio Architecture: An Example from Presidio San Saba, Menard County, Texas. *Bulletin of the Texas Archeological Society* 76:29-44.

Wolf, M.
2005 Presidio De San Saba: A Case Study in Colonial Evolutionary Architecture. *Bulletin of the Texas Archeological Society* 76:45-59.

Word, J. H.
1971 The Dunlap Complex in Western Central Crockett County, Texas. *Bulletin of the Texas Archeological Society* 42:271-318.
1991 The 1975 Field School of the Texas Archeological Society. *Bulletin of the Texas Archeological Society* 60:57-106.

Wright, J. F., with contributions by B. H. Butler, C. K. Chandler, B. Davidson, W. L. McClure, and R. L. Turner, Jr.
1997 The Asa Warner Site (41ML46), McLennan County, Texas. *Bulletin of the Texas Archeological Survey* 68:215-261.

Prehistoric Land Use at Amistad National Recreation Area, Val Verde County, Texas: Report on the Texas Archeological Society 1999 Field School

Jack G. Johnson and Angel Stuewe Johnson

ABSTRACT

Low water levels in the Amistad reservoir during the summer of 1999 allowed access to many sites that are typically inundated. The National Park Service and the Texas Archeological Society teamed up, taking advantage of this situation, to document and record as many new sites within the park as possible and to relocate and assess impacts to known sites. Work performed included surface survey and collection, excavation at selected sites, and rock art recording. Of the sites examined, 41VV661 with its Late Prehistoric ceramics, and the expansive hearth field of 41VV1207, proved most significant and accordingly receive the most attention in this article. We report on the procedures and findings of the 1999 Field School investigations and integrate that information into a broader look at land use patterns across the area now encompassed by Amistad National Recreation Area.

PROJECT OVERVIEW

Amistad National Recreation Area (ANRA) is located at the heart of the Lower Pecos archeological region, encompassing the lower parts of the Pecos and Devils rivers where they flow into the Rio Grande west of Del Rio in Val Verde County, Texas (Figure 1). The 1969 completion of Amistad Dam impounded these three waterways, and land up to the top of the dam (1144.3 feet above mean sea level) was condemned, ultimately becoming the ANRA.

Unusually low water levels in the reservoir during 1998-1999 exposed many sites, some previously known and others undiscovered, in areas of ANRA that are normally submerged. The value of this opportunity to document archeological sites within ANRA was not lost on either the National Park Service (NPS) or the Texas Archeological Society (TAS), and the 1999 TAS field school was planned accordingly.

By bringing the manpower of a TAS field school to bear on archeological investigations at ANRA, a variety of research goals could be pursued simultaneously. Thus, not only was new information generated about the area's prehistory, helping the NPS to better manage its archeological sites and cultural resources, but field school participants received experience in a range of different kinds of investigations in a diversity of settings. Research efforts were organized into 19 different operations, each corresponding to a different geographic area and having specific combinations of research objectives. These included survey to document new sites, relocating known sites to perform condition assessments, documentation of exposed features and rock art, and excavations at selected sites of particular importance or at immediate risk of being lost to erosion.

This article draws upon the site forms, excavation records, daily journals, and other records of the 1999 fieldwork, as well as the authors' own analysis of artifacts from the field school presently curated at the Texas Archeological Research Laboratory at The University of Texas at Austin (TARL).

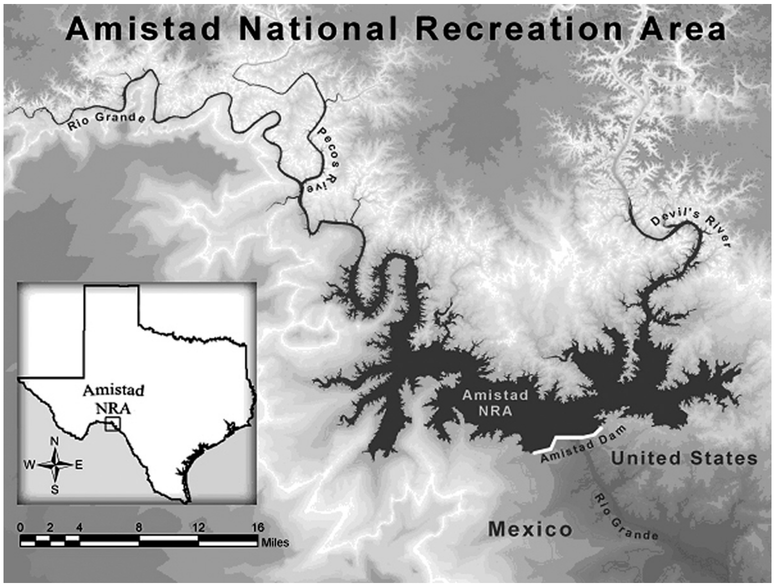

Figure 1. Location of Amistad National Recreation Area (map by Jack and Angel Johnson).

ENVIRONMENTAL SETTING OF AMISTAD NATIONAL RECREATION AREA

The smallest archeological region of Texas, the Lower Pecos has been delimited by Turpin (1995:541) as centered on the mouth of the Pecos River and extending perhaps 150 km north and south of the Rio Grande, and east-west along the Rio Grande from the city of Del Rio west to the tiny town of Langtry. These geographic boundaries are based on the distribution of cultural expressions such as the elaborate Pecos River Style pictographs, local projectile point styles, and dry rock shelter deposits (Turpin 1995:541).

The modern environment of the region is a shrub-short grass savanna (McMahn et al. 1984) that displays a distinctive admixture of characteristics of adjacent areas. It is located on the southern edge of the Edwards Plateau at the intersection of three of Blair's (1950) biotic provinces of Texas. To the north and east lie the oak and juniper woodlands of the Balconian province. The thorny brush lands of the Tamaulipan province that characterize South Texas lie to the south and east. The desert Chihuahuan province lies to the west and south. More visually striking than the mix of flora are the region's many deep limestone canyons. The minor canyons that feed into the rivers generally do not carry flowing water today except after rains, although seep springs and waterholes are not uncommon. Trees such as oaks, mesquite, little leaf walnuts, and native pecans (Dering 2005:247) live in the shelter of towering canyon walls. The rolling uplands above are covered with acacias, Texas persimmon, desert hackberry, prickly pear cactus, yucca, sotol, and lechugilla (Dering 2005:247). While the brush that now cover this part of the landscape has been present in the area for millennia, their dominance today may be due primarily to historic and modern land use. The effects of over a century of overgrazing by domestic livestock have been exacerbated by droughts and floods, tipping the balance away from once widespread grasslands (Turpin 1995:554).

Today, area ranchers supplement their income with deer leases, and the reputation of the clear waters of Lake Amistad for largemouth bass grows with every nationally televised fishing tournament. The animal resources sought by today's sportsmen were perhaps as popular prehistorically, but coprolite evidence from rock shelters in the area show that plant foods and small animals were more important to peoples' diet (Sobolik 1996; Dering 1999).

The climate of the region can be harsh and unpredictable. Although annual rainfall for the area averages 44 cm (Office of the State Climatologist 1987), rainfall within the region varies greatly and is often localized (Norwine 1995). In fact, the region has the second most variable year-to-year rainfall in the world, after northeastern Brazil (Norwine 1995:140). Rainfall peaks in the spring and fall from thunderstorms at frontal boundaries (Norwine 1995), with winter droughts from November to March and summer droughts in July and August (Office of the State Climatologist 1987). Dry years with well below average rainfall are far more common than comparatively wet years, but torrential downpours and severe flooding occur when the remnants of hurricanes and tropical storms come inland from the Texas Gulf Coast. The devastating flooding in August 1998 caused by Tropical Storm Charley is an excellent example of this, as is the infamous 1954 flood.

Average daily temperatures for Val Verde County measured in Del Rio between 1937 and 1976 ranged from a low of 10.4 degrees C for January to a high of 30.4 C in July. Average highs and lows during these months ranged from 3.4-17.5 C in January and from 23.4-37.3 C in July (U.S. Department of Agriculture, Soil Conservation Service [USDA, SCS] 1982:2 and Table 1).

PALEOENVIRONMENT AND CULTURE HISTORY

Paleoindian occupation of the area presumably began as early as 12,000 or 14,000 years ago when the climate was relatively cool and moist. Paleoindian peoples hunted large, now extinct, megafauna across this landscape, as evidenced at Cueva Quebrada (Lundelius 1984) and suggested in Bonebed 1 at Bonfire Shelter (Bement 1986). A single Clovis point is reported for Val Verde County (Greer 1968; Meltzer and Bever 1995) near a midden circle site 60 km north of Comstock. Another Clovis point was recorded just across the border in Mexico by Gonzalez Rul from "a small burned rock midden on the south side of the Rio Grande just above Ciudad Acuna, Coahuila" (Greer 1968:184).

Clear and dramatic evidence of a later Paleoindian presence in the region comes from Bonfire Shelter's Bonebed 2, where Folsom and Plainview projectile points were found associated with bones of extinct *Bison antiquus* (Dibble and Lorrain 1968). These deposits have long been regarded as evidence of the oldest and southernmost buffalo jump site in North America, although Byerly et al. (2005) suggests the bison may have merely been processed there. Later Paleoindian projectile points such as Angostura have been found at sites throughout the region.

Decreasing pine pollen in the region (Bryant and Holloway 1985) and the disappearance of buffalo from archeological deposits after 10,000 B.P. document an overall drying trend throughout the Holocene (Dering 2002). Early Archaic people began exploiting a wider variety of lower-yield resources, and earth oven cooking allowed otherwise inedible desert succulents to achieve a dietary prominence (Dering 1999). Rock shelters were used extensively, and their interior space was divided according to activity areas (Turpin 1995). The dead were buried in caves and sinkholes such as Seminole Sink (Turpin 1988), and artistic expression appears in clay figurines and painted pebbles (Turpin 1995).

Desert conditions peaked around 5000 years ago at the beginning of the Middle Archaic, evidenced by significant flooding episodes at Black Cave (Turpin 1982). Populations tended to concentrate near rivers (Turpin 1995) and low-yield plant resources like lechugilla and sotol become increasingly important (Brown 1991). Large, multi-colored, shamanic Pecos River Style pictographs appear throughout the region, and may represent increased ritual activity, perhaps as a cultural response to the desertification of the region (Turpin 1995).

The Late Archaic period began with an abrupt but surely welcome transition to a cooler and more mesic climate around 3000 years ago (Turpin 1995). Grass and pine pollen increased (Bryant and Holloway 1985) and buffalo from several sites indicated their return to the area from the Southern Plains, consequently drawing attendant hunters bearing intrusive styles of projectile points (Turpin 1995). Their interactions with the indigenous population are unclear, but the Pecos River Style rock art does not continue into the Late Archaic. Settlement patterns de-emphasize rock-shelters in favor of open terrace sites. The small, vivacious red stick figures of the Red Linear rock art style may appear at this time or (perhaps more likely) at the end of the Late Archaic period (Turpin 1995).

The grasslands and buffalo herds retreated north and arid conditions returned by around 2000 B.P., after which the drying trend in the region continued (Bryant and Holloway 1985). The appearance of the Shumla dart point style suggests that people from northern Mexico expanded into the area when the buffalo hunters left, as apparently did people from Central Texas bearing Ensor and Frio dart points (Turpin 1995:549).

The beginning of the Late Prehistoric period (Flecha subperiod) around 1300 B.P. was heralded not with any major climatic changes but with the appearance of the bow and arrow (Turpin 1995) and other cultural changes. These included changes in mortuary customs and the appearance of a fully developed rock art style, the Red Monochrome (Turpin 1995). This style of rock art depicted people armed with bows and arrows as well as depictions of important fauna such as deer, turkey, rabbit, and catfish (as at 41VV78). Red Monochrome sites are often located near springs (Turpin 1995). Another rock art style that appears is the Bold Line geometric, a style that Turpin (1995) associates with the Desert Abstract styles seen in the American Southwest and northern Mexico, hinting at possible origins for the period's new cultural characteristics. Another distinctive aspect of the Late Prehistoric archeological record is the ring midden, a thermal feature produced from processing desert succulents in pit ovens (Turpin 1995:550).

The later Infierno phase (ca. 450-250 B.P) of the Late Prehistoric period is marked by tipi rings, and a distinctive artifact assemblage that includes small stemmed arrow points, ceramics, steeply beveled end and end-side scrapers, and beveled knives. This assemblage is similar in many respects to that noted in Toyah phase sites in Central Texas but is associated in the Lower Pecos with tipi rings and not with the phase's characteristic Perdiz style arrow points. These people of the Infierno phase seem to have preferred promontories overlooking springs or permanent waterholes for their settlements (Turpin 1995:552). The appearance of these sites in the region corresponds with the return of more mesic conditions and the return of the buffalo, and they may represent seasonal buffalo hunts by intrusive groups from the plains, possibly historically documented groups such as the Apache (Turpin 1995; Kenmotsu and Wade 2002; Wade 2003). Plains Indian style pictographs appear in some rock shelters (Turpin 1995:552).

The Historic period in the Lower Pecos begins in 1535 when the shipwrecked Spanish explorer Cabeza de Vaca and his companions entered the region and recorded their experiences. Later Spanish expeditions included Coronado in 1540, De Soto-Moscoso in 1542-1543, Chamuscado-Rodriguez in 1581-1582, Espejo-Luxan in 1582-1583, and Castano de Sosa in 1590 (Kenmotsu and Wade 2002). Rock art dating to this period contains images of missions, Spaniards, longhorn cattle, and cowboys. This period saw the replacement of local groups by the Apaches by 1729 (Weddle 1968:200), who then gave way to the Comanche (Turpin 1995). Accordingly, site locations shift from deep canyons to open areas near accessible water sources, probably relating to the needs of the horses now in use (Turpin 1995:554). Under ever-increasing pressure from the U.S. Army, even these fierce Plains warriors had disappeared by the early 1880s when the Southern Pacific railroad opened the region to Anglo-American settlement (Turpin 1995:554).

Previous Archeological investigations in the Lower Pecos Region

While much of our knowledge of the region's archeology has come from the survey and salvage work done prior to the completion of Amistad Dam, the outstanding organic preservation and vibrant rock art of rock shelters in the Lower Pecos attracted archeologists as early as the 1930s. Excavations of prominent rock shelters were sponsored by museums, including the Smithsonian Institution, the Witte, and the University of Texas, at notable sites such as Fate Bell, Shumla Caves, and Eagle's Nest. Rock art recording began during this time as well, with efforts by A. T. Jackson and Forrest Kirkland.

The next wave of archeological research began in the late 1950s and was related to the impending construction of the Amistad reservoir. This necessitated several large-scale survey, testing, and excavation projects. Although many types of sites were documented, excavations focused on significant rock shelters like Bonfire Shelter (Dibble and Lorrain 1968) and large, deeply stratified terrace sites such as the Devil's Mouth site (Johnson 1964) and Arenosa Shelter (Dibble 1967).

Paleoenvironmental studies also began in the mid-1960s and proved the research value of the perishable materials found in Lower Pecos rock shelters. Subsequent studies have examined the relationships between the ancient people of the region and their environment, such as reconstructions of diet and nutrition (Bryant 1974; Sobolik 1996) and the economics of subsistence (Dering 1999, 2005).

The creation of Seminole Canyon State Park by the Texas Parks and Wildlife Department initiated a flurry of survey and research in the 1980s. Beyond cataloging the park's cultural resources (Turpin 1982), much of this work focused on mortuary practices (Turpin et al. 1986; Turpin 1988) and rock art (Turpin 1984, 1986a, 1986b). Rock art research has remained an active area of study into the present, with continuing documentation of sites as well as advances in dating (Chaffee et al. 1993, 1994; Hyman and Rowe 1997; Ilger et al. 1995; Russ et al. 1990), and meaning (Turpin 1990, 1994; Boyd 1996, 1998, 2003).

The 1999 TAS field school provided an opportunity to examine smaller and previously overlooked archeological sites as well as sites that did not receive much earlier attention because of the rush to document the larger and more complex ones before the reservoir was built. A summary of this work then should help to provide a more detailed and balanced view of the overall character of prehistoric and historic land use patterns within the region.

OBJECTIVES OF FIELD SCHOOL

The purpose of this field school was two-fold: to "make a significant contribution toward archeological site management in the recreation area as well as to select research topics in the region's prehistory" (Collins et al. 1999:1). The particular research topic selected for investigation was gaining a better understanding of Late Prehistoric open sites with wikiup stone rings and ceramics.

Towards this end, six broad categories of objectives for the investigation were laid out in the *Manual for TAS Field School Amistad National Recreation Area, Val Verde County, Texas June 12-19* (Collins et al. 1999:2-7). These objectives were "designed to gather new data on the prehistory of ANRA, assist NPS staff in managing the archeological resources, and offer the participants opportunities to learn new skills and practice old ones" (Collins et al. 1999:2). Briefly, these objectives were: (1) survey for new sites; (2) relocate previously recorded sites, assess their condition, and update the records; (3) document exposed features in detail at selected sites; (4) detailed recording of rock art; (5) test excavations at selected sites; and (6) more intensive excavations of burned rock features that might soon be lost to erosion.

The park was divided into 19 geographic areas or "Operations," each with a specific set of research objectives. These will be discussed individually in greater detail below.

FIELD METHODS OF THE TAS FIELD SCHOOL

Field methods and procedures are outlined here as prescribed in Collins et al. (1999:7-28). Objectives, conditions, and procedures varied for each operation, but several general procedures were applied to all Operations.

Teams were organized and directed by a crew chief. Relatively autonomous teams, sometimes working in isolation, relied on their crew chief to insure all equipment, records, and supplies were available for the work day, as well as a working cell phone and weather radio (especially those teams traveling by boat). Crew chiefs were also responsible for keeping a daily journal and maintaining other basic documentary records of the team, or delegating these tasks to a detail-oriented team member. Basic forms used were appended in the *Manual* (Collins et al. 1999).

The primary objectives of the field school were to record and document sites, features, and the nature of observed archeological materials. The general policy for field activities other than excavations was not to collect artifacts, but merely to document them unless deemed by the team to be of unusual importance or likely to be looted.

Both official trinomial and temporary (if a site was to be newly recorded) site numbers were employed by the field school and all data were required to be keyed to these site numbers. Crew chiefs were responsible for careful assignment of temporary numbers, which consisted of the crew chief's name followed by a numeric series beginning with 1 (i.e., Calhoun-1, Calhoun-2). For each temporary number, a site form and accurate plot of the site on a map was required, as well as a least one photograph for each site for the ANRA files.

Existing documentation was reviewed and great care was to be taken to avoid errors in either using existing feature numbers or assigning new ones. The use of feature inventory sheets kept track of feature numbers and their association with site numbers, whether temporary or trinomial. Photographic documentation of features was required for the ANRA site files. Film was issued at the Field Laboratory with the roll number already assigned to it to keep track of how many sets of photographs were generated concurrently each day. Roll and exposure numbers were recorded on photo logs.

At the end of the day in which it was completed, all documentation was turned in to the Field Laboratory, thus insuring that the records generated were in order. Site-specific bag lists were generated if collections were made, and information on each bag was to be filled out completely and accurately. A record of the next bag number was then to be made to take to the field the next day (see Collins et al. 1999:10-28).

Surveying, Recording, and Documenting New Sites and Relocating, Assessing, and Updating Known Sites

The survey team's objective was to find all sites within the Operation and obtain locational data to guide the documentation team that followed behind them. They took maps and records with them of previously recorded sites in the area along with blank survey forms. Both the USGS 7.5' quadrangle sheet and the International Boundary and Water Commission (IBWC) contour maps made of the reservoir before inundation were used in most cases to determine known, and document new, site locations.

Further information was collected on following visits by the documentation team who recorded site information on the ANRA Archeological Site Data Form. In keeping with field school objectives, extra care was to be taken in noting impacts to a site and emphasis was given to the collection of accurate and complete records. After properly identifying existing sites, documentation teams updated records that did not meet current standards or that no longer reflected the site's present condition.

Documenting Features

One of the most important activities of the field school was the documentation of features solely from surface exposure as well as through excavation. As the majority of the features to be documented were completely visible at the surface, little preparation was necessary to begin recording in most cases. Once the paperwork was in order, photographs were taken, and detailed drawing or mapping documented the feature. Scale drawings on gridded paper using visual observations were employed for small features, while larger features required triangulation drawing techniques. Very large features were mapped with either optical transits or a Total Data Station.

Test Excavations and Data Recovery Excavations

Basic procedures for both test excavations and more intensive data recovery excavations were the same; however, specific techniques were chosen for each area or feature. For example, objectives for the three test excavations at burned rock midden sites were to determine if the middens were intact and to evaluate their research value. Stratigraphic units were used for vertical provenience when discernible or in combination with arbitrary levels. Data recovery excavations sought to collect more comprehensive information to answer specific questions about an aspect of an archeological deposit or feature.

Burned Rock Feature Protocol

Burned rock features encountered, mapped, recorded, tested, and/or excavated ranged from small hearths to burned rock middens. Each Operation may have had different research and management objectives, but similar features were treated in a consistent fashion as much as possible to support the collection of comparable archeological data. To this end, any feature smaller than 3-4 m across was considered an "individual" burned rock feature, while features greater than 3-4 m across that had several layers of rock in the center were deemed "midden" features. A number of the rocks in several of the features were drilled for archeomagnetic testing by Wulf Gose.

Individual Burned Rock Feature Protocol

Burned rock features smaller than 3 m may have served a variety of specific functions, however, the data necessary to determine the specific purposes of each feature may not be evident from a surface examination. By and large, a greater number of the burned rock features encountered in this field school were probably the remains of earth ovens that were commonly reused. The *Manual* (Collins et al. 1999:14-20) includes a discussion of earth oven use and a checklist of specific research questions to guide data collection, as well as an excerpt from "Critically Recording and Observing Burned Rock Features" (Black and Ellis 1997) as an appendix. After helping participants gain an understanding of the various types of information that can and should be recorded when investigating individual burned rock features and middens, the *Manual* (Collins et al. 1999: 21-23) laid out the investigative protocol in a 14-question checklist.

After determining the condition of the feature and reviewing the associated paperwork to see if it already had been assigned a feature number in the past, a flagged stake was placed at each feature, clearly labeled with the feature number (F1, F2, etc.) in bold felt pen. Some sites required a metric grid with excavation units placed per common archeological methods. When this method of excavation was not utilized, two arbitrary reference points (Reference Point A, B, etc.) at each feature that required investigation beyond Total Data Station (TDS) mapping and photography were tied into a known datum by TDS mapping crews. On ungridded sites, 2 x 2 m excavation units were imposed as needed, numbered 1, 2, 3, etc., for each of the investigated features, and tied to the reference point for each feature. A complete reference for a given feature included site number, feature number, unit number, and level number. Recovery techniques included screening soil through 1/4-inch to 1/8-inch mesh screens, collecting matrix samples for special processing (flotation or fine screening), and/or foregoing screening in order to simply expose the feature.

Burned Rock Midden Protocol

To determine if middens contained intact hearth features, at least three 1 x 1 m units were placed in the central portion of burned rock middens. These units were hand excavated in arbitrary levels, and rocks were carefully removed to look for intact rock-lined hearth features. If these were found, they were fully exposed, documented, and left in place unless the Park Archeologist decided otherwise. Fine screen soil matrix from the units was collected and screened.

ROCK ART RECORDING PROCEDURES

The *Manual* (Collins et al. 1999) stated that Teddy Stickney, Nola Davis, and other Rock Art Committee members would provide all the necessary information and procedures to participants in the rock art recording effort. The rock art recorders set a baseline, created a 1 x 1m grid (usually 2 m high) with string and sticky tack, and documented the site with photographs and drawings of the rock art (Teddy Stickney, personal communication 2007).

LABORATORY AND ANALYTICAL PROCEDURES

The Field Laboratory processing goal was to get all bags logged into the lab, all materials washed, and ideally to get artifacts cataloged before the conclusion of the Field School. Generally the processing sequence in the *Manual* (Collins et al. 1999) was as follows: admitting and logging in bags; washing (or special handling as needed); filling out catalog forms (count and weigh artifacts); bagging for curation; completion of curation tags; labeling; boxing by site; and inventorying and final packing. Special handling was required of artifacts with residues, charcoal, matrix, flotation, and other samples, which were not to be washed. Radiocarbon samples were to be absolutely dry when stored. All faunal remains that passed through the field laboratory were identified and cataloged by Bill McClure.

Another function of the laboratory was records management. All field records were to be turned in when no longer needed in the field. Electronic data (TDS, digital photographs, GPS, etc.) were to be downloaded at NPS headquarters daily, overseen by Eddie de la Rosa.

We organized and rehoused the 1999 collections at TARL in archival bags while analyzing the artifact following TARL standards. A debitage analysis form and level summary form were developed to record and organize these data during analysis. Notable artifacts were photographed with a digital camera during analysis on cm scale graph paper for reference. These notable artifacts were separated from the rest of the collections and placed together for ease of access by future researchers.

Radiocarbon Dating

Four samples from the 1999 TAS fieldwork were submitted to Beta Analytic for dating (Table 1). Samples ANRA-1 (Beta-140481) and ANRA-2 were from 41VV1752. ANRA-1 (Beta-140481) came from the northeast corner (identified as FX2A) of hearth feature FX2. This sample returned a conventional radiocarbon age of 310 ± 40 B.P., calibrated to AD 1470-1660 at 2 sigma. Sample ANRA-2 (Beta-140482) came from feature FX4, Unit 2, at a depth of 14 cm bs. This sample returned a conventional radiocarbon age of 360 ± 40 B.P., calibrated to A.D. 1445-1645 at 2 sigma.

Samples ANRA-3 (Beta-140483) and ANRA-4 (Beta-14084) came from large pieces of wood charcoal from well-preserved basin-shaped hearth features at site 41VV1207. Sample ANRA-3 (Beta-140483) was charcoal from a layer below the rocks of feature FX33. This sample returned a conventional radiocarbon age of 1470 ±

Table 1. Radiocarbon dates from 1999 TAS Field School.

Sample	Beta #	Conventional Age	Calibrated 2 Sigma Age Range (95% Probability)	Calibrated Intercepts	Calibrated 1 Sigma result (68% Probability)
ANRA–1 (AMS)	140481	310 ± 40 BP	480-290 B.P. (A.D. 1470–1660)	420 B.P. 405 B.P. 315 B.P.	440-355 B.P and 335-305 B.P
ANRA–2 (AMS)	140482	360 ± 40 BP	505-305 B.P. (A.D. 1445 - 1645)	450 B.P.	490-425 B.P. and 390-320 B.P.
ANRA–3	140483	1470 ± 60 BP	1510-1280 B.P. (A.D. 440-670)	1340 B.P.	1405-1305 B.P.
ANRA–4	140484	2040 ± 60 BP	2140-1870 B.P. (190 B.C.–A.D. 80)	1995 B.P.	2065-1920 B.P.

60 B.P. Calibrated, this corresponds to a 2 sigma age range of A.D. 440-670.

Sample ANRA-4 (Beta-140484) came from feature FX11 matrix samples labeled “from hearth basin,” and weighed approximately 17.6 g. It returned a conventional radiocarbon age of 2040 ± 60 B.P. Calibrated, this corresponds to an age range of 2140-1870 B.P. at 2 sigma, or 190 B.C. to A.D. 80.

GRAZING IMPACT STUDY

Malof’s (1999) study quantified the effects of grazing on archeological sites at ANRA. The site recording and update forms designed for the 1999 TAS Field School included fields to record impacts to sites from domestic livestock and other disturbances such as erosion, deposition, a fluctuating shoreline, modern camping, and looting. GPS and GIS technologies were used to record and study the spatial patterning of these impacts.

As a result of the work done during the field school using these forms, Malof was able to gather data from 72 archeological sites. He found that 43 (60%) had been impacted by grazing. By setting a baseline prescriptive methodology and initial dataset, Malof (1999) established a database designed for future data entry and monitoring that will help the NPS manage and protect sites by being better able to quantify and track impacts to sites from loose livestock.

OPERATIONS

The work of the 1999 TAS field school was divided into 19 different Operations, each with its own specific research objectives within a specific geographic area (Figure 2). Objectives for many operations (Operations 3-5, 9, 11, 15, and 17-19) were to survey for new sites, record and document new sites, relocate known sites, and document exposed features. The other operations had specific objectives other than (or in addition to) survey and site documentation. We discuss each individual operation in turn, addressing the location, objectives, personnel involved, sites visited, and work performed at each site (Table 2).

Operation 1

The objective of Operation 1 was to document exposed features in detail at 41VV1723 and 41VV1724. These two sites are significant because

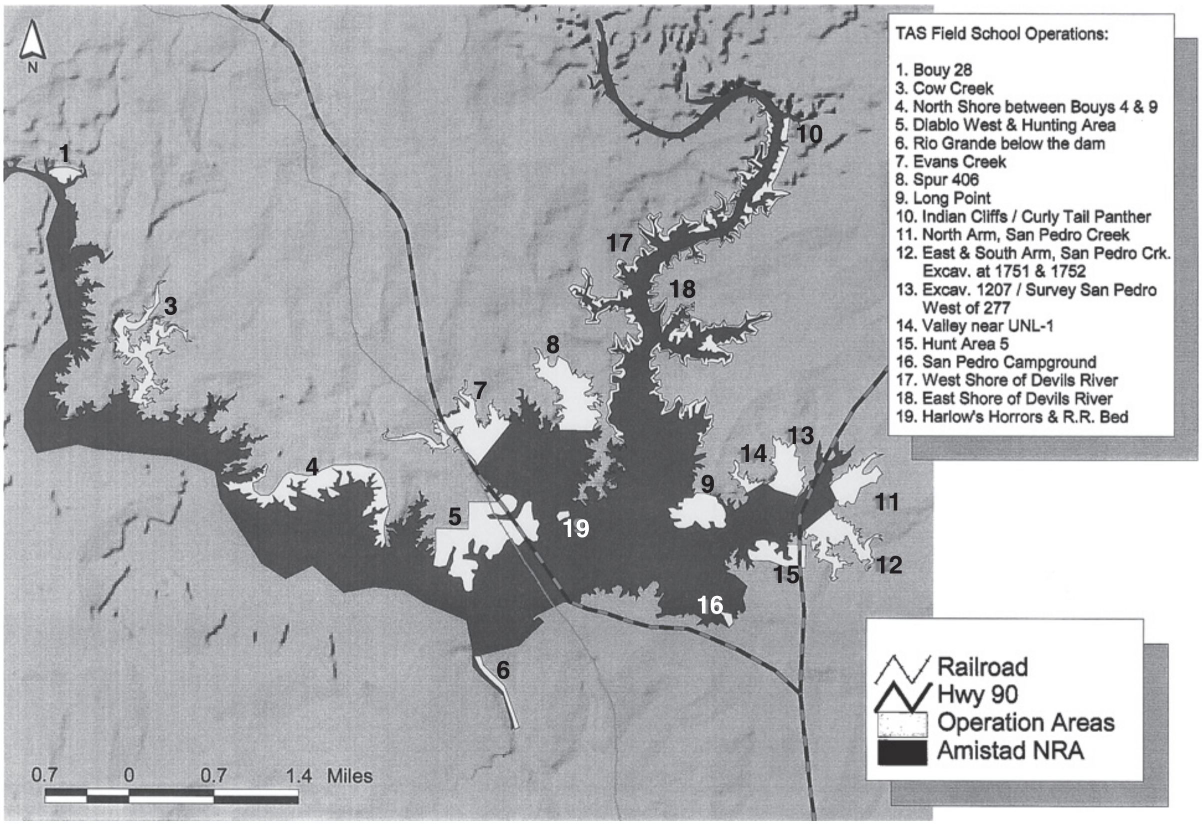

Figure 2. Map of Operations (Collins et al. 1999).

they are the only known sites in the Lower Pecos region besides Infierno Camp (41VV446) (see Operation 2) that each have over 100 rock rings, these probably representing house structures (Kenmotsu and Wade 2002:124). Notable features at these sites include wikiup rings, tipi rings, bedrock mortars, middens, and other burned rock features.

41VV1723

This site is located on a slightly sloping terrace along the Rio Grande. The site file was updated and TAS crews set out to document as many features as possible. Plan maps were made of individual features and flags were set out at features and artifacts for the TDS crew to shoot in.

In all, over 300 features, clusters of features, and surface finds were flagged and shot in with a TDS. Excepting one unspecified artifact or feature, nine modern hearths/cairns, and the brass IBWC survey marker set into concrete, these are discussed below by feature and artifact type.

A total of 20 rock rings were recorded and mapped (Table 3). Of these possible structural features, three tipi rings were individually mapped and recorded (Table 4).

A variety of thermal features (Table 5) are present, including ring middens, mounded burned rock middens (BRMs), BRMs with associated hearths, hearths, and scatters or accumulations of fire-cracked rock (FCR). Of the features listed in Table 5, five individual BRMs and at least 24 hearth features were recorded and mapped in detail (Table 6).

Ground stone bedrock features are also common at 41VV1723, and are often clustered together (Table 7). The locations of several ground stone artifacts were also mapped (Table 8).

A number of flaked stone artifacts were recovered from the surface of 41VV1723, including dart points, arrow points, a biface fragment, three scrapers, and two hammerstones (Table 9). Twelve of the flaked stone tools collected were projectile points, including a number of Archaic dart point styles as well as three Perdiz arrow points (Table 10).

Rock rings such as those present at 41VV1723 are typical of the Infierno phase of the Late

Table 2. Sites excavated in 1999 TAS fieldwork.

Site	Type	Periods (Based on diagnostics)	Features	Comments
41VV661	Open	Late Prehistoric	Midden; Unlined pit hearth/ oven?	midden dated to 660 ± 50 B.P.; lower buried pit hearth dated to ca. 1320 and ca. 1250 B.P.
41VV665	Open	Middle Archaic, Late Archaic, Late Prehistoric	Midden; Oven	Basin hearth in midden, intrusive?
41VV1207	Open	Late Paleoindian, Early Archaic, Middle Archaic, Late Archaic, Late Prehistoric	Hearths; Ovens; Rock rings	43 features; discontinuous rock rings suggest tipis rather than wikiups; two circular basin hearths dated to ca. 2040 and 1470 B.P.
41VV1717(A)	Open	Early Archaic, Middle Archaic	Midden	Near small cave
41VV1723	Open	Early Archaic, Middle Archaic, Late Archaic, Late Prehistoric	Hearths; Ovens; Middens; Ring middens; Tipi rings; Wikiup ring; Mortar holes; Grind facets	300+ features
41VV1732	Open	N/A	Midden; Hearths	No diagnostics; hearth in midden
41VV1751	Open	Early Archaic, Middle Archaic, Late Archaic	Midden; Hearths	Buried by flood deposits
41VV1752	Open	Middle Archaic, Late Archaic, Late Prehistoric	Hearths; Ovens; Rock rings?	35+ hearths/ovens; radiocarbon date on rectangular flat hearth of ca. 310 B.P.; circular basin hearth/oven dated to ca. 360 B.P.

Table 3. Rock rings and other possible structural features at 41VV1723.

Possible structural features	No.
Tipi rings	6
Wikiup rings	1
Rock rings, unspecified	10
Rocks out of place/isolated unusual rocks	3

Prehistoric. The three arrow points collected from 41VV1723 by the 1999 TAS field school were all of the Perdiz type. No ceramics were collected from the surface of 41VV1723 during the 1999 TAS field school but other classes of Infierno/ Toyah phase artifacts were found there.

One of the Perdiz points (Figure 3) was made on a curved flake, and may have broken during manufacture. The steeply beveled end scraper (weight, 18.8 g; length, 5.5 cm; width, 3.4 cm; thickness, 1.1 cm) is well made and fits naturally in the fingertips

Table 4. Individually mapped rock ring features at 41VV1723.

Designation	Structural feature type	Approximate Dimensions (N-S x E-W) in meters	Comments
WAR-253	Tipi Ring	6 x 5.5	Loose limestone boulders and cobbles with gap in northwest quadrant
WAR-73	Tipi Ring	6.3 x 5	Surrounded by bedrock
WAR-74	Tipi Ring?	4 x 4	Circular alignment of loose limestone cobbles, some stones missing, especially in northwest quadrant

Table 5. Thermal features at 41VV1723.

Thermal features	No.
Ring middens	3
Burned Rock Middens (BRMs), non-ring	5
BRMs with associated hearths	2, each with three associated hearths
Hearths	229
Fire-cracked rock scatter or accumulation	10
Total	249

(Figure 4). All edges appear used. A prismatic blade from the site has use wear and polish along approximately 2 cm of the edge (Figure 5).

An unusual artifact collected from this site was a drilled freshwater mussel shell (Figure 6). Similar drilled mussel shells were found during the excavations at Fate Bell rock shelter (41VV74) by Pearce and Jackson (1933:120) in Seminole Canyon State Park. Individual shells may have been suspended as ornaments, but they may have also had other functions. Pearce and Jackson (1933:60) report finding a cache of five pairs of drilled mussel shells that they believed had been strung together, perhaps as a rattle.

Several pieces of mussel shell, ochre, and other unspecified artifacts were shot in with the TDS. They are listed in Table 11.

The features and much of the artifact assemblage from 41VV1723 are a medley of Late Prehistoric Toyah and Infierno phase traits. The presence of Perdiz arrow points, middens, and the site's river terrace location seem more consistent with a Toyah than Infierno occupation. However, the site's many rock rings are characteristic of an Infierno phase occupation. Perhaps the site's terrace location gave its inhabitants ready access both to permanent water and upland resources (via the adjacent tributary canyon). This may have made it appealing to both Toyah and Infierno groups. Such a location would be a popular campsite in any day and age, and the remains of modern campfires here are as unsurprising as the sequence of dart points indicating that the site was also occupied throughout the Archaic period.

The thermal features at this site are another of its intriguing aspects, since several different morphological types are present and they are relatively intact. A worthwhile avenue for future

Table 6. Thermal features mapped in detail at 41VV1723.

Designation	Thermal Feature Type	Approximate Dimensions (N-S x E-W) in meters	Comments
WAR-203	Burned Rock Midden (BRM)	8.5 x 6.5	Large with slight mounded central area 20 cm above surface
WAR-137	BRM and hearths	7.5 x 9.5	Large well-formed BRM with two separate mounds of fire-cracked rock (FCR), a central depression, and associated hearths
WAR-172	BRM and hearth	BRM: 5.5 x 5.5; hearth measures 1 x 1.5	Well-formed, moderate sized, crescent-shaped BRM mounded to 25 cm above surface with a hearth to the northeast between the horns of the crescent
WAR-233	BRM and hearths	12 x 12	Large BRM with two associated hearths and three separate mounds of FCR
WAR-268	BRM and hearths	13.5 x 13.5	Very large BRM with definite mound, central depression, and associated hearths
WAR-13	Hearth	2.45 x 0.85	Stones blackened and cracked but not greatly fragmented; center mounded 18 cm
WAR-33	Hearth	1.0 x 0.80	Badly scattered, slightly mounded center
WAR-37	Hearth	0.9 x 1.4	Slight central depression, some associated debitage
WAR-45	Hearth	0.7 x 0.7	Slightly mounded center
WAR-96	Hearth	1.4 x 1.4	Pronounced mounded center to 25 cm above surface
WAR-100	Hearth	2.2 x 2.2	Large, well preserved, and made from large (>20 cm) stones; mounded center
WAR-166	Hearth	1.0 x 1.0	two layers of stones on edge around perimeter, depressed center
WAR-168	Hearth	1.1 x 1.0	Much soil in mounded center; roughly rectangular
WAR-192	Hearth	1.8 x 1.8	Good condition, may be ovate and oriented northwest-southeast, partially buried
WAR-217	Hearth	1.1 x 1.2	Distinctly mounded center ca. 30 cm above surface
WAR-142	Hearth	1.0 x 1.0	Small, fairly intact
WAR-141	Hearth	1.0 x 1.1	Small
WAR-131	Hearth	0.80 x 1.0	Circular, disturbed at surface; debitage nearby

Table 7. Ground stone bedrock features at 41VV1723.

Groundstone Features	Count
Mortar hole clusters	one cluster of 10
Mortar holes	7
Grinding facet clusters	one cluster of 12
Grinding facets	3
Mortar hole/grinding facet clusters, unspecified	one cluster of 26
	three clusters of 10
	one cluster of 7
	one cluster of 6
	one cluster of 5
	two clusters of 3
	one cluster of 2
Mortar hole/grinding facet, unspecified	2
Total	116

Table 8. Ground stone artifacts at 41VV1723.

Groundstone Artifacts	No.
Metate fragments	1
Manos and mano fragments	6

Table 9. Flaked stone tools and related artifacts at 41VV1723.

Lithics and Related Artifacts	No.
Dart points/fragments	4
Arrow points/fragments	3 (all Perdiz type)
Point bases, unspecified	2
Bifaces/fragments	1
Scrapers	3
Hammerstones	2
Total	15

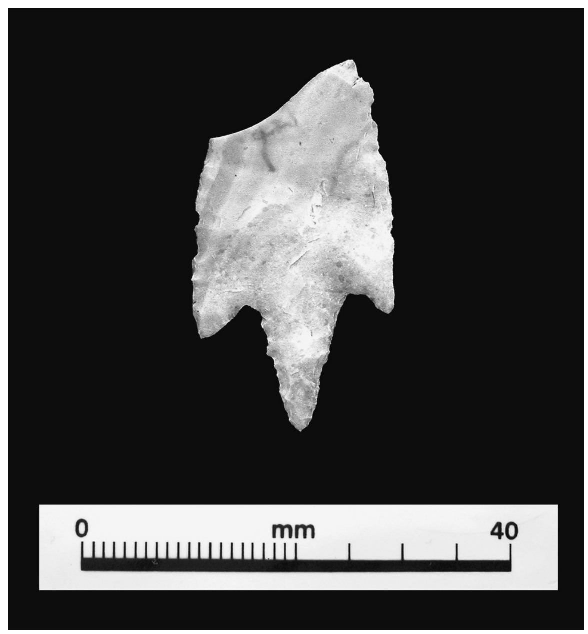

Figure 3. Perdiz point from 41VV1723.

research would be to carefully excavate features of different types at the site, taking both macrobotanical and radiocarbon samples in hopes of linking specific feature morphologies to the processing of specific resources (and perhaps artifact assemblages) at a particular time in prehistory.

Table 10. Projectile points at 41VV1723.

Point Type	Time Period	Comments	Weight (g)	Length (cm)	Width (cm)	Thickness (cm)
Pandale	Early Archaic	Basal 60%	5.4	2.8	2.2	0.8
Pandale?	Early Archaic	Alternately beveled, but unusually short and broad	14.9	5.6	3.6	0.9
Val Verde	Middle Archaic	Basal two-thirds	4.9	3.9	2.6	0.4
Shumla	Late Archaic	Missing tip, one barb, tip of other barb	5.5	4.1	3.0	0.5
Frio?	Late Archaic	Chip on shoulder	3.7	3.5	2.0	0.5
Ensor	Late Archaic	complete	3.0	2.4	2.2	0.6
Ensor	Late Archaic	Basal 60%	8.8	3.9	2.6	1.1
Ensor	Late Archaic	Basal three-fourths, heat treated	3.3	2.8	1.9	0.5
Ensor?	Late Archaic	Base only	1.8	1.7	2.0	0.5
Perdiz	Late Prehistoric	Tip of point and base broken	1.5	3.1	1.8	0.4
Perdiz	Late Prehistoric	Basal two-thirds	1.7	3.6	1.9	0.3
Perdiz	Late Prehistoric	Missing barbs	1.4	3.9	1.8	0.3

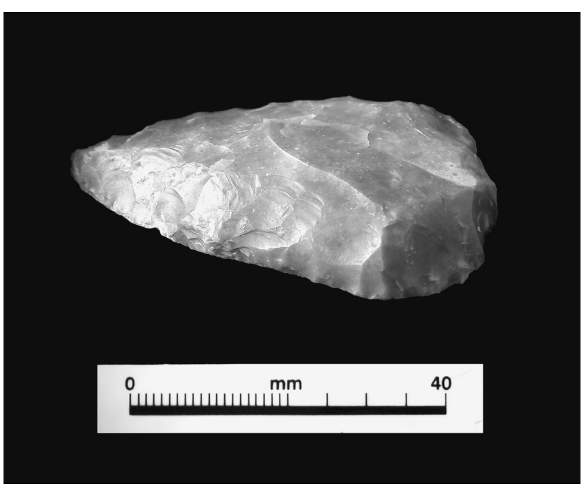

Figure 4. Steeply beveled end/side scraper.

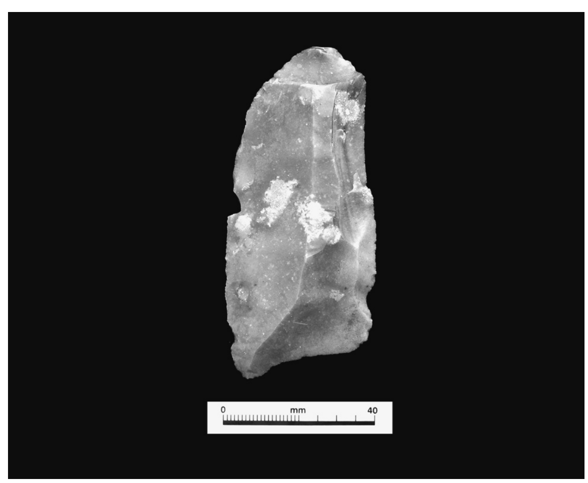

Figure 5. Prismatic blade.

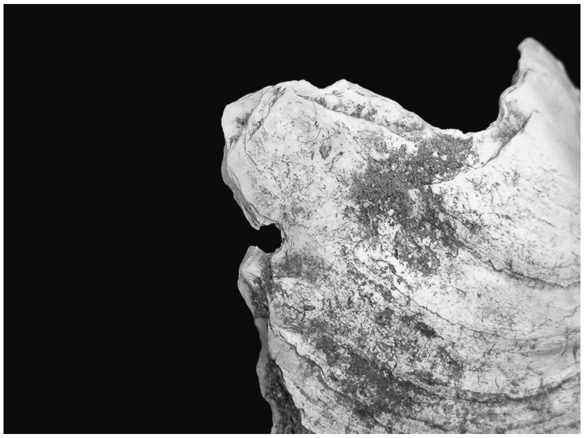

Figure 6. Drilled freshwater mussel shell.

Table 11. Miscellaneous artifacts from 41VV1723.

Other artifacts	No.
Red ochre	1
Mussel shell	3
Artifact, unspecified	6

Operation 2

Operation 2 was designed to document the 100+ wikiup rings, artifact distributions, and burned rock features present at Infierno Camp (41VV446). Elton Prewitt was crew chief for this operation. This location is the type site for the Late Prehistoric Infierno phase (Turpin 1995:552-553).

Collins et al. (2000:11-13) provide an overview of work performed at the site during the 1999 TAS field school. Briefly, Operation 2 set out to construct a detailed topographic map of the entire site, documenting the stone alignment features and assigning them permanent feature numbers, as well as to make detailed drawings of selected features. These goals were largely met, with a substantial part of the map completed and 140 features given permanent numbers and shot in with a TDS. Unfortunately, creating drawings of individual features required a great many man-hours, and the intense foot traffic around the features being recorded introduced too high a risk of potential impact to the site. Collins et al. (2000) suggested future scaled drawings of features be made in the lab using overhead stereoscopic photography to minimize site impact during recording.

Operation 3

Operation 3 covered the Cow Creek valley from lake level up to the NPS park boundary at the 1144.3 ft. amsl elevation. This area was reached by boat. The survey area included eight previously known sites: 41VV178, 41VV179, 41VV1656, 41VV1836-1838, 41VV1840, and 41VV1853. It was estimated that the TAS crews might discover as many as 20 unrecorded sites during Operation 3. The Crew Chief was Wayne Clampitt.

Site 41VV1656 was not visited, and 41VV1836 and 41VV1837 could not be relocated; 41VV179 was submerged at the time. Fieldwork was performed at a number of sites, as discussed next.

41VV178

The TAS crew mapped the site and completed a site condition/re-recording update for the site's file.

41VV1837 and 41VV1840

Site files were updated for both of these known sites.

41VV1838

The site file was updated and the site was mapped. There were 10 rock hearths, along with two possible tipi rings (4.5-6 m in diameter) located 16.5 m from the nearest hearth. FCR was present but no other artifacts. All the features were in a single east-west line along the creek terrace, and they may represent a single prehistoric occupation.

41VV1853

The site file was updated. The only materials observed at this site during the TAS visit were a modern campfire hearth and an old aluminum chair.

41VV1889

A previously unrecorded site, 41VV1889 has 25+ hearths, FCR, and tipi rings along the upper edge of eroding rock along the crest of a hillside. There were no large accumulations of FCR, and no artifacts or debitage were observed here. The hearths appear randomly spaced, suggesting a campsite occupied over many seasons.

Operation 4

Operation 4 covered the north shore of the reservoir between Rio Grande buoys 4 and 9, between the current lake level and the park boundary. The area was accessed by boat. The survey area included 20 known sites, and it was estimated that crews might discover an additional 10-15 sites. Most of the known sites (41VV195-197, 41VV300-306, 41VV310-313, 41VV1784, 41VV1786-1792) were not visited during the TAS Field School.

41VV309

The site file was updated. Roughly 95 percent of this site has been destroyed by wave action.

41VV1318 and 41VV1785

Site files were updated on both of these sites.

41VV1855

At this open site on the Rio Grande three BRMs formed a crescent shape. One of these is a large ellipse with a depression in it. Materials were collected during the 1999 TAS field school from the surface of a feature designated Hearth 3, but we could not relocate the 1999 record forms for this site so it is unclear if Hearth 3 is a feature of one of these BRMs or a nearby discrete hearth. One of the artifacts collected was a Bandy dart point or preform that appears to have suffered a manufacturing failure with one barb and part of the base completed (3.4 cm in length, 3.0 cm wide, 0.9 cm thick, and 8.4 g in weight). The other artifacts consist of a biface fragment, two cores, and 1.1 g of red ochre.

41VV1864

This is a previously unrecorded site with many scattered hearths. The highest concentration of lithics was around one of the hearths (FX3), where two biface fragments and a broken Val Verde dart point were collected (3.3 cm in length, 2.2 cm in width, 0.5 cm thick, and 3.5 g in weight).

41VV1865

A wide scatter of lithic debris, FCR, and possibly some ochre was observed at this new site. No features were observed, but there was a considerable amount of vegetation that obscured the surface. A complete Ensor dart point was collected from the surface (4.3 cm in length, 2.3 cm in width, 0.9 cm in thickness, and weighing 6.5 g).

41VV1875

This new site is south of Amistad Acres. This site is 16 x 30 m in size and consists of three or more hearths, scattered lithics and FCR, and a possible wikiup ring. Some of the hearths have been scattered by wave action. A possible point base and scraper were observed and mapped when the site was recorded.

41VV1878

The site has scattered FCR and lithics, as well as evidence of heavy recent (as of 1999) looting. An Ensor point was collected from the surface, missing its very tip and a small part of one basal corner (4.3 cm long, 2.4 cm wide, 0.6 cm thick, and weighing 6.7 g).

Operation 5

Operation 5 encompassed the Diablo West hunting area. The area was accessed by road. Crew chiefs were Darrell Humphreys and Johnny Byers. The survey area included five known sites, 41VV280, 41VV287, 41VV1225-1226, and 41VV1589; 41VV280, 41VV287, 41VV1225, and 41VV1226 were not visited. Collins et al. (2000:13) report documentation of three unrecorded sites. Unfortunately, no paperwork for Operation 5 fieldwork has been relocated and it is unclear if 41VV1589 was visited or which previously unrecorded sites were documented. Catalog records indicate that no artifacts were collected from Operation 5 fieldwork.

Operation 6

Operation 6 was located along the Rio Grande below Amistad Dam. The area was accessed by road, and objectives for the fieldwork included rock art recording and test excavations of the upper components of buried sites 41VV661 and 41VV662 for the purposes of recovering prehistoric ceramics in discrete contexts. The survey area included six known sites, 41VV660-663, 41VV672, and 41VV910. Sites 41VV662-663, 41VV672, and 41VV910 were not apparently visited during the TAS Field School.

41VV660

Brite Shelter is located on the north cliff face above the floodplain of the Rio Grande. The shelter contains burned rock, lithic debris, and red geometric pictographs similar to sites along the Rio Grande near Shumla. Solveig Turpin notes in the 1984 site record form that the pictographs were "flaking badly and covered with calcite." Pictographs at this site were recorded by the TAS Rock Art Task Force to document them before they degraded further (Figure 7).

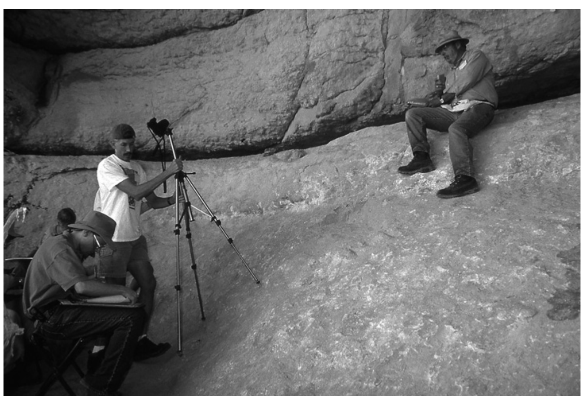

Figure 7. Rock art documentation at 41VV660.

This name of this shelter is sometimes mistakenly spelled "Bright," but the name is derived from the site's location near the NPS boundary with the Brite Ranch.

41VV661

This site is a buried midden on a terrace along the Rio Grande. In previous investigations (Gustavson and Collins 1998:37), it yielded a conventional radiocarbon age of 660 $\pm$ 50 B.P. The 1999 TAS excavations at this site produced a variety of Late Prehistoric artifacts, including a ceramic sherd, and this work is discussed in greater detail below.

Operation 7

Operation 7 encompassed the Evans Creek area. The area was accessed by road, and there were two sets of objectives for the fieldwork. Eddie Osburn and crew conducted a survey for new sites, recording and documentation of new sites, relocation of known sites, and documentation of exposed features. Reba Jones and Jerry Grubbs conducted test excavations at burned rock midden site 41VV665.

The survey area included eight known sites, 41VV552, 41VV665, 41VV955, 41VV1718-1719, and 41VV1729-1731. Sites forms for 41VV664, 41VV955, and 41VV1718 were updated, and four previously unrecorded sites were documented; 41VV552 was not relocated. It appears that sites 41VV1729-1731 were not visited.

41VV665

This site is a BRM located at the confluence of a small tributary and Evans Creek. The site form was updated, and seven units were laid out. Of the seven, five were excavated: Unit 2 and Units 4-7. A feature (FX1) was identified by an arc of rocks in Unit 4 and was found to extend into Units 5 and 7. FX1 had a basin shape with a diameter of approximately 1.2 m. Six holes were drilled in rocks around the outer perimeter of the hearth for archeomagnetic testing.

Materials recovered from the excavations at 41VV665 are listed by unit in Tables 12-16. Excavation records for Units 5 and 7 specified what materials came from inside Feature 1 versus what derived from the rest of the unit. This does not appear to have been done for Unit 4, which also contains part of Feature 1. The Feature 1 materials from Units 5 and 7 are listed in Table 16.

A Langtry dart point base was found in Unit 4, a small Frio dart point was collected from the site surface, and a Perdiz arrow point was found in Unit 2 between 10-20 cm below the surface (bs) (Figures 8 and 9). These point types indicate Middle Archaic through Late Prehistoric occupations of the site.

The quantity of debitage at 41VV665 generally decreased with depth except for within the feature, where the opposite is true. This suggests that the feature and the most intense flint knapping activity may postdate the accumulation of the lower portion of the midden. The gradation in debitage quantity may indicate an increase in

Table 12. 41VV665 Unit 2.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1		Core, Grinding slab fragment 3 modified flakes	75	Mussel fragment; Snails	
2	Perdiz arrow point (incomplete)		37.1	0.9 g Charcoal; Snails	Perdiz has serrated edges, missing tip and much of one side: 2.2 cm length x 1.8 cm width, 0.6 g.
3			13.6	Mussel fragment; 0.1 g charcoal; Snails	
4		Uniface	13.1	7.4 g charcoal; Snails	
5			28.1	5.5 g charcoal; Snails	
6			5.6	1.7 g charcoal; Snails	

Table 13. 41VV665, Unit 4.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other
1 (0-10 cm)	Langtry dart point base	unidentified thin projectile point fragment	33.2	Snails, small iron concretion
2 (10-20 cm)			88.1 (65.4 g of this is a single secondary flake)	Snails
3 (20-30 cm)		Biface fragment (thick, roughly made, glossy, shattered)	11.3	0.2 g Charcoal; Snails

stone tool production, or perhaps that much of the flint knapping postdates the midden; in that case, the debitage simply may have worked its way down between the pieces of FCR in the midden through post-depositional processes.

41VV1719

The site form was updated. Some looting has occurred in the past, but none in recent years. Some manos were observed along with a small sandstone metate, which had been turned upside down and

Table 15. 41VV665 Unit 6.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other
1 (0-10 cm)		Biface fragment (not projectile point fragment)	68.1	Snails
2 (10-20 cm)			8.7	Snails
3 (20-30 cm)			2.1	Snails

Table 16. 41VV665, Unit 7 Outside Feature.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other
1 (0-10 cm)		bifacial scraper	36.3, including one flake of agate	Snails, fossil clam, 1 piece of Red ochre (<0.1 g)
2 (10-20 cm)			28.1	Apparently unmodified piece of petrified wood (3.2 g), 0.4 g of Charcoal
3 (20-30 cm)			5.7	0.7 g Charcoal

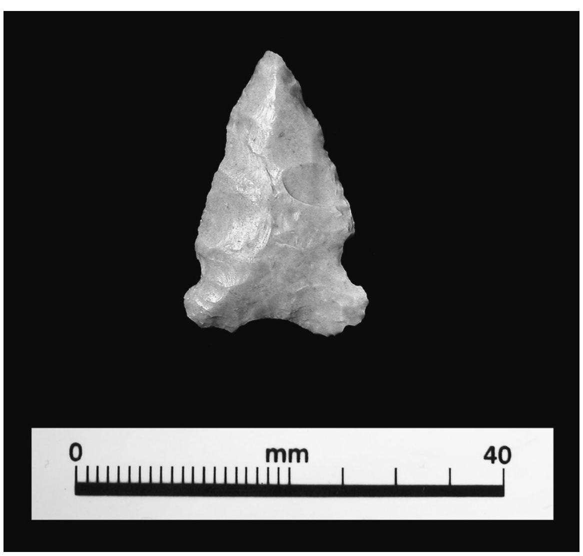

Figure 8. Frio dart point from 41VV665.

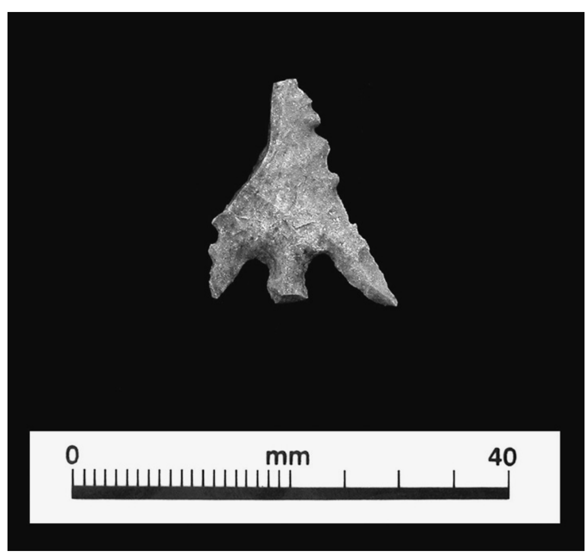

Figure 9. Serrated Perdiz arrow point from 41VV665.

left in place. This site has at least 12 hearth features and burned rock scatters.

41VV1858, 41VV1859, 41VV1863, and 41VV1884

These sites are all previously unrecorded. At 41VV1858 there is a dome-shaped BRM with an associated debitage scatter and two hearths along its southwest edge. One hearth (FX1) is 1.4 m in diameter, with some charcoal present. The other (FX2) is 1 m in diameter and eroding out of the midden with about half of its stones buried in a sandy clay loam matrix. The distal fragment of a biface was observed, but not collected.

There is a small BRM at 41VV1859 that has been impacted by slope wash, vegetation, and the dumping of limestone related to modern construction activities. The site has a low surface artifact density.

Site 41VV1863 has two small BRMs, 78 m apart, deflated and disturbed by wave action. There is a lithic scatter at the site, but no diagnostics were observed.

At 41VV1884, there is a circular rock ring feature (2.2 m outside diameter) high on the landscape in a water-eroded area of broadly scattered FCR. Cores, debitage, and tools were observed. The large rocks that make up the ring feature are interspersed with smaller stones. Sandstone slabs are inside the circle, which appear to have openings facing the valley to the northeast. Two cores were found inside the circle, and outside the circle were found a chert graver, a chert side scraper, one rhyolite flake, and one chert end scraper.

Operation 8

Operation 8 encompassed the Spur 406 (California Creek) area. A crew under the supervision of Dick Gregg performed survey for new sites, recording and documentation of new sites, relocation of known sites, and documentation of exposed features. Test excavations were performed at BRM site 41VV1717 under the direction of Max Hibbitts and at 41VV1732, supervised by Henry Mueggenborg and Beth Mendenhall.

The survey area included five known sites: 41VV251, 41VV1717, 41VV1732-1733, and 41VV1738. Sites 41VV251 and 41VV1733 were not visited.

Previously unrecorded sites 41VV1870-1874 were documented. All are recorded as modern hearths and have since had their trinomials rescinded.

41VV1717

The file for this site was updated. 41VV1717 is divided into three areas: A, B, and C. Area A is a large dome-shaped midden on the west side of California Creek, and was excavated. Areas B and C, both small BRMs or FCR scatters, were not excavated. The Area B midden is 10 m from the edge of a stone bluff with a small cave in it. Midden Area C is located immediately to the southwest of Area B. The site and cave were mapped, and a large chopper was observed on the surface of a ledge in front of the cave. Modern hearths indicate that this area of the site has been heavily used by fishermen.

Excavations at Area A were laid out in a 3 x 2 m block composed of six 1 x 1 m units (Figure 10). Archeomagnetic samples were taken from the hearth feature in the center north unit, SW5. The artifacts recovered from Area A are listed in Tables 18-23 by excavation unit.

Most of the artifacts from 41VV1717 Area A were recovered in units SW5 and SW6, at the northeastern side of the excavation block. Table 24 summarizes the artifacts found in all six excavation units by level.

Table 17. 41VV665, Feature 1 (includes parts of Units 5 and 7).

Level	Diagnostics	Other Tools	Debitage (in grams)	Other
1 (0-20 cm)			18.7	
2 (20-30 cm)			86.1	3.5 g Charcoal, Snails

Figure 10. Excavation Units at Area A, 41VV1717.

The stratigraphic position of Early Archaic dart points consistently below Middle Archaic types suggests that the midden interior is reasonably intact below 15 cm bs. Above this level, however, the midden has been deflated from wave action and disturbed by bioturbation from *Corbicula* clams. The use of this site seemed to peak and then decline during the Middle Archaic, with no diagnostic artifacts representing either the Late Archaic or Late Prehistoric periods, times when many other sites in the region have their most intense use. It would be worthwhile to determine if Areas B and C contain different artifact assemblages from Area A, and if they are contemporaneous with one another or if they represent the missing later time periods.

41VV1732

This large site is located on a peninsula along California Creek and has a variety of thermal features present. A midden or dense FCR scatter (designated feature BRM-1, measuring 8 x 3 m) is at the northeastern edge of the site. Some debitage is present on the surface near feature BRM-1. In all, 13 FCR features were recorded, most being distinct hearths (including an oven feature designated FX-A) but some had become scattered. Most of the ancient hearths are located in the central portion of the site.

Prehistoric oven feature F-XA is 2 m in diameter. Rocks on the outer edge of the feature are exposed at the surface, as are a few at the very center. Archeomagnetic samples were taken from six rocks in the outer part of F-XA.

Unit 1 was placed to test historic hearth feature H-6 atop BRM-1. This excavation showed

Table 18. Artifacts Recovered from 41VV1717 Area A, Unit SW1.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1 (333.7-333.6 m amsl)			48.9	Iron concretion	
2 (333.6-333.5 m amsl)	Langtry dart point basal half	2 modified flakes	178.5		Point fragment: L=2.8 cm, W=3.0 cm, T=0.8 cm, Wt=4.7 g
3 (333.5-333.4 m amsl)		Uniface; Biface fragment	40.5		
4 (333.4-333.3 m amsl)			30.5		
5 (333.3-333.2 m amsl)		Biface fragment; Modified flake	48.2		
6 (333.2-333.1 m amsl)			6.3		

Table 19. Artifacts Recovered from 41VV1717 Area A, Unit SW2.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1			41.4		
2		Uniface fragment?; Chopper fragment?	13.1		Step fractures along edge of chopper fragment

Table 20. Artifacts Recovered from 41VV1717 Area A, Unit SW3.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other
1	Basal two-thirds of Val Verde dart point	Modified Flake; Uniface fragment	15.7	1 snail
2			24.5	

Table 21. Artifacts Recovered from 41VV1717 Area A, Unit SW4.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1 (333.7-333.6 m amsl)		Uniface fragment	27.4		Uniface fragment is thick and patinated
2 (333.6-333.5 m amsl)			6.3		

that the feature had good preservation but little definition and few artifacts. The only cultural materials recovered from this unit were 11.0 g of debitage.

A total of eight other units were laid out to discern the extent of BRM-1. Of these, cultural materials were recovered from only two: Unit 3 (immediately east of Unit 1) and Unit 4 (immediately north of Unit 1). Unit 3 contained 20.7 g of debitage, recovered from the surface. Unit 4 contained two core fragments (together weighing 14.6 g) and 1.5 g of lithic debitage.

41VV1738

The site file was updated for 41VV1738. It is a large flat area with several BRMs, FCR scatters, and isolated hearths, but no associated lithic scatters. All features appear deflated, lacking matrix.

41VV1885

This is a previously unrecorded site on a peninsula between California Creek and a small tributary. The survey crew reported finding two adjacent circular mounds of fist-sized, unburned rock.

Table 22. Artifacts Recovered from 41VV1717 Area A, Unit SW5.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1 (333.7-333.6 m amsl)		Biface fragment	10.3		
2 (333.6-333.5m amsl)		Scraper (147.8 g); Scraper (36.3 g); Scraper (14.7 g); Scraper (3.6 g)	111.8	Fossil snails and fossil clam	82.9 g of debitage is a single primary flake; The large scraper has two opposed beveled (each 3 cm in length) scraping edges on end and a cutting edge on side
3 (333.5-333.4 m amsl)	Pedernales dart point base (6.0 g); Untyped dart point base (5.9 g)	Uniface with cutting edge; Biface fragment; Chopper; Modified flake	32.5	2 Cores	Dart point fragments may be manufacturing failures
4 (333.4-333.3 m amsl)	Pandale dart point frag (80% complete)	Modified flake	46.5		Point frag: L=4.5 cm, W=1.9 cm, T=0.7 cm
5 (333.3-333.2 m amsl)			39.9	1 piece of red ochre (0.4 g)	

The purpose of these features is unclear, but it is possible that they may date to the Late Prehistoric Infierno phase, as Collins et al. (2000:11) reported a similar "unburned circular rock pavement" at the Infierno Camp site.

Operation 9

Operation 9 was headed by Johnny Byers and encompassed the Long Point hunting area. The area was accessed by boat. The survey area included two known sites: 41VV1227-1228. We were unable to relocate the site record updates for these sites, but Collins et al. (2000:14) report that the known sites were found "about as previously documented."

Operation 10

Operation 10 primarily comprised the rock art recording efforts by the TAS Rock Art Task Force under Teddy Stickney and Nola Davis at the Curly-tailed Panther site (41VV18). Site documentation (no rock art) was also performed within the Operation 10 area at 41VV27.

41VV18

This well-known Pecos River Style site is perched high on a bluff in the Indian Cliffs area of the east bank of the Devils River, and it is owned by the Rock Art Foundation. The site is accessible only via a narrow ledge and, because the floor is

Table 23. Artifacts Recovered from 41VV1717 Area A, Unit SW6.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1 (333.7-333.6 m amsl)			31.2		
2 (333.6-333.5 m amsl)		Thin, well-made biface (37.5 g)	23.9	Fossil clam	One end of biface is reddened, looks fire fractured. L=7.5 cm, W=5.5cm, T=0.8 cm
3 (333.5-333.4 m amsl)	Langtry or Val Verde dart point fragment missing tip and end of base		46.3		Dart point fragment: end appears to have been used as a scraper, L=4.7 cm, W=2.7 cm, T=0.8 cm
4 (333.4-333.3 m amsl)	Untyped dart point fragment that is missing the base		24.3		Dart point fragment: L=5.3 cm, W=2.6 cm, T=0.8 cm, Wt=6.3 g
5 (333.3-333.2 m amsl)	Pandale dart point, distal three-quarters, alternately beveled	Ovate limestone mano (9.8 x 7.4 x 3.5 cm, 348.1 g)	19.3	Core frag	Dart point fragment: L=4.7 cm; W=2.5 cm T=0.5 cm; Wt=8.5 g

not suitable for most activities, was probably used ceremonially or ritually and was not a habitation site (Figure 11).

The site consists of two overhangs. Overhang A contains well preserved feline and other motifs, including the large “Curly-tailed Panther,” other smaller panthers, and an anthropomorphic (human-shaped) figure. A grinding facet is present at the downstream end of the overhang. Overhang B contains several bold-line geometric motifs, including zigzags and pennants, one of the latter enclosed in a rectangular outline. Other designs present may be classified with the Red Monochrome and Red Linear rock art styles.

Figure 11. Curly-tailed Panther site, photo by Joe Labadie.

Table 24. 41VV1717 artifacts by level, all units combined.

Level	Diagnostics	Other Tools	Debitage	Other
Level 1 (333.7 m)	Val Verde	Biface fragment, two Uniface fragments, Modified flake	31.2 g, 10.3 g, 27.4 g, 6.3 g, 41.4 g, 48.9 g Average = 27.6 g	Iron concretion
Level 2 (333.6 m)	Langtry	Thin biface, four Uniface scrapers, Uniface fragment, Chopper fragment, two modified flakes	23.9 g, 111.8 g, 15.7 g, 24.5 g, 13.1 g, 178.5 g Average = 61.3 g	Fossils
Level 3 (333.5 m)	Langtry/ Val Verde, Pedernales	Chopper, Unifacial knife, Modified Flake, Biface fragment, Uniface	46.3 g, 32.5 g, 40.5 g Average = 39.8 g	two cores
Level 4 (333.4 m)	Pandale	two Modified Flakes, Biface fragment	24.3 g, 46.5 g, 48.2 g, 30.5 g Average = 37.4 g	
Level 5 (333.3 m)	Pandale	Mano	19.3 g , 39.9 g, 6.3 g Average=21.8 g	Red Ochre Core

41VV27

The site file was updated and the site was mapped. This site is a BRM and lithic scatter on the north side of a drainage entering the Devils River in the area of Slaughter Bend. Val Verde and Langtry dart points, manos, and a chopper were observed. Impacts include modern fire pits, clearings for tent sites, and looter holes.

Operation 11

Operation 11 encompassed the North Arm of San Pedro Creek. The Crew Chief was Glynn Osburn. The area was accessible by road or by boat. The survey area included four known sites, 41VV1450 and 41VV1746-1748. Three previously unrecorded sites (41VV1886-1888) were also documented. Site 41VV1450 was not visited.

Sites in this operation were also assessed by Gustavson and Collins (2000) for damage from floodwaters from heavy rains brought by Tropical Storm Charley in August 1998. Gustavson and Collins also examined impacts to these sites from other natural and human sources including wave action, vandalism, and bioturbation.

41VV1746

The site was mapped and the site form updated. It is located along the north bank of the north fork of San Pedro Creek. Some of the site has been lost to flood erosion, which has also exposed additional features. The site contains approximately 20 individual ovens and hearths, and three BRMs and an extensive FCR and lithic scatter. FCR features range from 0.5-3 m in diameter. Two of the BRMs are roughly circular, while the other is linear in shape. The lithic scatter is concentrated in the area of the burned rock features. Two distal biface (projectile point?) tips, and a scraper were found. One thin, narrow, and very well-made broken biface was collected, which may represent an Angostura manufacturing failure. This biface (Figure 12) has use wear and polish along about 1 cm of one side.

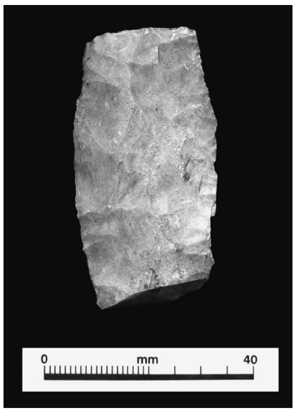

Figure 12. Thin biface from 41VV1746.

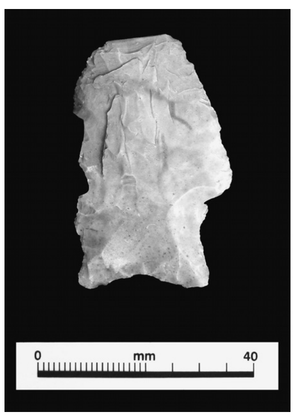

Figure 13. Dart Point from 41VV1746, Point #2, Gower type.

Figure 14. Dart Point from 41VV1746, Point #3, Coñejo type.

Not counting the biface above, 12 projectile points were collected (Figures 13-14), but only one (Point #1, a Palmillas) was complete (Table 25). Ten of these projectile points were found in the western 100 m of the site.

Projectile point #10 appears to be a preform, possibly a Bandy point because of its slightly bifurcated base. Otherwise it resembles the Almagre type, considered by Turner and Hester (1999:69) to be preforms of Langtry dart points.

411VV1747

The site form was updated. This is an open site with 12 FCR features (hearths and ovens), plus a BRM measuring 4 x 3 m.

41VV1748

This site has been obliterated and effectively destroyed. Some widely scattered FCR is still present, but no features or lithic artifacts remain; the site form was updated.

41VV1886

This site is a rock shelter located in a limestone bluff along the north fork of San Pedro Creek. There is a mound of flood deposits, limestone, and burned rock at the entrance, which is 11 m across. Burned rock is eroding out of the dirt at the base of the shelter, and there is a possible hearth at the entrance to the shelter. Charcoal may be eroding from the earth wall at the back of the shelter, and several sharpening grooves are present on walls and boulders. A possible serpent-shaped petroglyph is also present here. Lithic debitage is present on the floor of the shelter, but no diagnostic artifacts were found. There is a hearth about 30 m to the southeast of the shelter.

41VV1887

This is an extensive FCR and lithic scatter measuring 50 (east-west) x 20 m (north-south), located on a ridgeline about 70 m from 41VV1886. Four preforms and much debitage were seen, but no distinct features or diagnostic artifacts were observed. The site was recorded and mapped by the TAS.

Table 25. Projectile points collected from surface of 41VV1746 by 1999 TAS FS by field number.

No.	Point Type	Age	Length (in cm)	Width (in cm)	Thickness (in cm)	Weight (g)	Comments
1	Palmillas	Middle-Late Archaic	5.8	2.6	0.8	11.4	complete
2	Gower	Early Archaic	3.2	3.1	0.6	4.9	Missing tip and one barb, heat treated
3	Coñejo	Late Archaic	3.1	3.4	0.6	6.1	Missing distal 40%, heat treated
4	Val Verde?	Middle Archaic	3.1	2.5	0.7	5.1	Missing distal tip
5	Coñejo	Late Archaic	3.6	3.3	0.8	7.9	Missing distal 33%
6	Coñejo	Late Archaic	3.2	3.2	0.7	5.1	Chipped shoulder, resharpened
7	Bandy	Early Archaic	4.7	3.0	0.8	10.4	Missing tip and shoulders
8	Bandy	Early Archaic	2.8	3.5	0.9	7.8	Missing distal 33%, chipped shoulders
9	Coñejo	Late Archaic	3.0	2.8	0.5	3.6	Missing distal 25%, chipped shoulders, fire-reddened but not glossy
10	Bandy preform or Almagre	Late Archaic	4.8	3.2	0.8	11.2	Manufacturing failure
11	Travis or Comstock	Middle Archaic	5.2	2.5	0.6	7.4	Tip missing
12	Bandy	Early Archaic	–	–	–	–	Fragment missing distal 50%, barbs, and one side of base

41VV1888

This is a lithic scatter on the south side of the North Fork of the San Pedro drainage. One FCR feature measuring 2 x 1 m is present on the west side of the site, but no other discrete features were observed. Debitage was present but no other artifacts were observed.

Operation 12

Operation 12 had two separate crews working in the East and South arms of San Pedro Creek. The first crew was headed by Steve Black, with Deborah Beene as assistant Crew Chief. This crew worked in the East Arm of San Pedro Creek. The area was accessible by road, and their objectives were the documentation of exposed features as well as data recovery excavations to mitigate damage to burned rock features 41VV1751 and 41VV1752 caused by the flood of August 1998.

The second crew in Operation 12, headed by Johnny Byers, worked in both the East and South arms of San Pedro Creek. The area was accessible by road, and objectives for the fieldwork included survey for new sites, recording and documentation of new sites, relocation of known sites, and documentation of exposed features. The survey area included five known sites, 41VV1749-1753, but this crew did not visit any of them.

41VV1751

This is an open site on a bend of the East arm of San Pedro Creek. When this site was first recorded in 1996, it was described as having a large BRM and a few discrete hearths in a large scatter of FCR. Several dart points (Baker, Pandale, Langtry, Shumla, Edgewood, and Frio types), two manos, and a mano fragment were collected at that time.

The crew for the 1999 TAS excavations consisted of Steve Black, Nancy Porter, Beth Aucoin, Jim Scheider, Carol Nicklaus, Michelle Roberson, and Louise Stone. The site was heavily impacted by August 1998 flooding, with obvious erosion and gravel deposition (almost 1 m thick over parts of the site). Few intact features were visible, although several FCR scatters and diffuse concentrations were present. Shallow excavations conducted at three of these features by the TAS revealed numerous gravels amid the burned rocks, indicating the heavy impact of the August 1998 flood as well as by previous floods.

A test pit measuring 2 x 3.5 m was dug into the gravel bar over the "Hidden Midden," encountering a layer of burned rock (the presumed top of the midden) at a depth of 97 cm bs. Many burned rocks were also observed in the gravel bar downstream, suggesting that much of the original upper surface of the midden may have eroded away prior to gravel deposition.

A second test pit (Unit 1) was set out measuring 1.5 x 1.5 m over a feature designated FX1. This feature was excavated to a depth of 5 cm bs, but proved to consist of scattered burned rock with no coherent pattern. An Ensor dart point (missing its tip, one shoulder, and the opposite basal corner) was found in Unit 1. It was 3.9 cm long, 2.0 cm wide, 0.6 cm thick, and weighed 3.9 g. Other artifacts recovered in Unit 1 included four modified flakes, snails, charcoal, and 116.0 g of lithic debitage.

Unit 2 (1 x 1 m) was set up diagonally to Unit 1. This proved to contain a scatter of burned rock with no apparent pattern. The unit was excavated to a depth of 5 cm and then abandoned after exposing the rocks. Snails and 3.5 g of debitage were recovered from this unit.

Feature 4 was a nearby humped cluster of burned rock. A 1 x 1 m unit was laid out over it. Although the rocks of this feature were more tightly clustered than those of the other features, there was still no coherent pattern to them. Four modified flakes, two freshwater mussel shell fragments, snails, and 53.0 g of debitage were recovered from Feature 4.

Artifacts observed at the site included a fragment of a mano made from dark, metamorphic material, a large flake tool, 3-5 pieces of debitage, and a small Ensor dart point. The dart point was collected from the gravel bar just downstream from the eroding features, and measured 4.0 cm in length, 2.3 cm in width, 0.7 cm in thickness, and weighed 5.1 g. An unidentified arrow point was found and surface-plotted by the GIS team.

The jumbled burned rocks mixed with gravels exposed by these excavations suggest it is unlikely that any exposed features at this site remain intact. It is unclear if some of the larger rocks remained in place or if all the rocks were in a secondary context. It is also possible, but unlikely, that no intact features remained prior to the 1998 flooding.

41VV1752

This site is located on a sloping to flat alluvial terrace on the east side of the South Fork of San Pedro creek. The site contains over 35 hearths/ovens, isolated lithics, and large, non-burned manuport stones that may have been part of wikiup or tipi rings, although no coherent patterning and few Late Prehistoric artifacts were found at the site. Features FX1, FX2, FX3, FX4, and FX7 were located along the cut bank of the creek and were in danger of complete obliteration during the next flood. Feature FX3 was opened and cleaned, but not fully excavated. Features FX1, FX2, FX4, and FX7 were excavated and the matrix was screened through 1/4-inch mesh on-site. Archeomagnetic samples were taken from rocks in hearth features FX1, FX2, and FX4.

Six projectile points (Table 26), a biface, a uniface, and a secondary flake (possibly a preform for an arrow point), were collected as isolated surface finds from 41VV1752. The arrow point was collected near a dispersed feature on the south end of the site above the creek (Figure 15).

Feature FX1 was a hearth, U-shaped in plan and relatively flat, and not basin-shaped in profile. Charcoal was present under many of the rocks. It measures 1.55 m northwest-southeast x 1.7 m northeast-southwest, and appears to have been reused repeatedly (Gustavson and Collins 2000:41). It was excavated to a depth of 23 cm bs in one level. The south-central portion of this hearth was relatively intact and consisted of large, fossiliferous limestone rocks laying flat, whereas much of the other FCR in this feature was globular and lying at various angles. This unit produced one biface fragment, 15.8 g of charcoal, two snails, and 8.5 g of debitage. Three charcoal samples were also collected from the feature. Six archeomagnetic samples were taken from rocks in this unit and showed that the feature was intact; the rocks had been heated to between 550˚C and 575˚C and then cooled in place (Gustavson and Collins 2000:41).

Feature FX2 was a diamond-shaped hearth, flat in profile, measuring 180 x 120 cm in size (Gustavson and Collins 2000:41). This hearth was constructed of tightly packed, large, flat pieces of fossiliferous limestone. The northeast corner of the feature (FX2A) was excavated to a depth of 14 cm bs. One snail shell and 1.0 g of debitage were collected and four carbon samples were taken from within the feature. A second lot of artifacts also labeled FX2 Level 1 (perhaps from the rest of the unit outside the feature?) contained two biface fragments.

One of the FX2 charcoal samples (Lot 1, Sample SW) was sent for AMS dating as sample ANRA-1 (Beta-140481) and returned a conventional radiocarbon age of 310 ± 40 B.P., calibrated to AD 1470-1660 at 2 sigma (see Table 1).

Table 26. Projectile points from 41VV1752.

Type	Age	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Comments
Langtry	Middle Archaic	5.0	3.3	0.8	9.3	Tip broken
Langtry	Middle Archaic	3.0	2.7	0.4	2.7	Missing distal 33%
Langtry	Middle Archaic	3.9	3.5	0.5	5.7	Missing distal 25%
Frio	Late Archaic	3.7	1.8	0.9	5.1	Chipped shoulder
Ensor	Late Archaic	3.6	1.7	0.6	3.8	Tip broken
Untyped arrow point	Late Prehistoric	3.6	1.6	0.3	1.7	Complete and made on flake

Figure 15. Untyped arrow point.

Archeomagnetic samples were collected from FX2 rocks and showed the feature to be intact (Gustavson and Collins 2000:30). The many unbroken rocks and the absence of small fragments suggest that the feature was not used more than a few times (Gustavson and Collins 2000:42).

Feature FX3 was within a 1x 2 m unit that was cleaned to expose the feature but it was not excavated below the surface. Matrix from cleaning the feature produced 15.7 g of debitage, one modified flake, two snail shells, and 3.6 g of orange-brown ochre.

Feature FX4 was a roughly circular and basin-shaped FCR feature, excavated in two 2 x 2 m units, each a single level deep. FX4, Unit 1, produced a Fairland type dart point (4 cm in length, 3 cm wide and weighing 5.8 g). It is nearly complete with damage only to the barb and the basal corner on one side. Other artifacts included 74.4 g of debitage, four modified flakes, 5.1 g of charcoal, 0.6 g of red ochre, snails, and an *Exogyra* fossil. An additional 0.3 g in situ carbon sample was also collected from Unit 1. FX4, Unit 2, produced 34.1 g of debitage, one modified flake, 12.7 g of charcoal, snails, and a 1.6 g in situ carbon sample. A second in situ carbon sample (Lot 32, Sample 2) was recovered from a depth of 14 cm bs. This sample was sent to Beta Analytic for AMS dating as sample ANRA-2 (Beta-140482) and returned a conventional radiocarbon age of 360 ± 40 B.P., calibrated to A.D. 1445-1645 at 2 sigma (see Table 1). The four rocks drilled for archeomagnetic testing at this feature suggest some disturbance, perhaps from shifting of the rocks during use (Gustavson and Collins 2000:43).

Feature FX7 was a roughly circular and basin-shaped accumulation nearly 2 m in diameter of 10-15 cm diameter pieces of fire-cracked limestone, many apparently fractured in place. Most of these rocks were located around the perimeter of the feature. Feature FX7 was excavated in a single 20 cm level. The only materials recovered from this feature were 1.8 g of charcoal.

41VV1867

This is a previously unrecorded site. It extends for 200 m on the north side of a point bar in a tributary to San Pedro Creek. Floodwaters appear to have scattered FCR over the entire site. A BRM (FX-1) is located in the center of the site, measuring 21 x 15 m. Debitage included some large cortical flakes, but consisted mainly of large interior flakes. Three diagnostic dart points or fragments (Pandale, Palmillas, and Bandy types), a preform fragment, and an untyped medial dart point fragment were collected from the surface of the site. The Bandy dart point is missing its tip and barbs (3.5 cm long, 3.0 cm wide, 0.7 cm thick, and weighs 7.2 g). The Palmillas point is missing about 40 percent of its distal end and has an alternately beveled base (3.5 x 2.6 x 0.7 cm in length, width, and thickness, and weighs 8.4 g). The Pandale point is missing the distal half but is very well made with a pronounced corkscrew bevel. It measures 3.1 x 2.4 x 0.8 cm in length, width, and thickness, and weighs 7.0 g.

41VV1868

This previously unrecorded site is 30 m west of 41VV1752. It is an FCR scatter with a few burned rock features/hearths in the floodplain of the San Pedro drainage. Two features were identified. The first, FX-1, is a disturbed but still partially buried (revealed by probing) hearth measuring 1.5 x 1.5 m. The second feature (FX-2) is a thin, linear FCR scatter measuring about 1.5 x 0.30 m. This shape may be due to reworking by 1998 floodwaters.

41VV1869

This is a narrow and buried site with FCR and a hearth located in a cut bank immediately west and across the channel from and probably contemporaneous with 41VV1751; it was previously unrecorded. A chert gouge was eroding out of the hearth in the cut bank, and a chert side scraper/graver was recovered from the surface.

Operation 13

Operation 13 was divided between two crews, both working in the San Pedro drainage on the north side of Lake Amistad, west of Highway 277. The area was accessed by road.

The first crew was led by Jimmy Smith, and focused on 41VV1207, a hearth field damaged by sheet wash erosion. Objectives of this crew were to document exposed features in detail, conduct test excavations on exposed burned rock features, and conduct data recovery operations in selected burned rock features.

The second crew was tasked with surveying the San Pedro drainage for new sites, recording and documenting new sites, relocating known sites, and selecting the best sites to document exposed features in detail. Twenty-nine sites were previously recorded within this operation.

41VV1207

This site is an expansive hearth field, 90 x 265 m in size. The site contains 43 recorded features, including possible house structures, slab-lined basin-shaped hearths, ovens with basins, and perhaps ovens without basins. Radiocarbon dates on two of the basin-shaped hearths placed them within Turpin's (1991) Blue Hills subperiod of the terminal Late Archaic. Diagnostic projectile points found at the site date from the Late Paleoindian to Late Prehistoric period. Excavations at this site are reported in detail in a separate section below.

41VV1768

This site was mapped and the site file updated. The site is on a large, low terrace on the west side of an unnamed secondary tributary of San Pedro Creek. This site has both prehistoric and historic/modern occupations.

The prehistoric component consists of 18+ hearths, 10+ FCR scatters on a series of low terraces, and 5+ BRMs. Several of the hearths and middens have a distinctly circular form. A Pandale dart point was recorded at the site in 1996.

The site also contains the rock foundations of a ca. 1950s ranch house and barn with associated water troughs and trash pile. The 1999 TAS fieldwork at this site focused on documenting and mapping these features. Glass, china, horseshoes, and various bottles were observed in the trash pile, and a medicine bottle was observed at the "kitchen" area at the southwest corner of the house.

Operation 14

Operation 14 also took place in the San Pedro drainage on the North side of Lake Amistad west of Highway 277. The area is downstream of the Operation 13's hearth field (41VV1207) and was accessed by road. The objective of Operation 14 was to dig a geological/archeological test trench across the valley near 41VV1770. Crew Chief for this project was Tom Gustavson.

Site 4VV1770 lies in the cut bank at the north end of an unnamed secondary drainage of San Pedro Creek. It is an isolated BRM and lithic scatter exposed and heavily impacted by erosion.

While no diagnostic artifacts were found in the trenching, Operation 14 demonstrated that stratified, buried sites existed along smaller drainages and not only in the major canyons.

Operation 15

Operation 15 encompassed the south side of Amistad Reservoir, west of the Highway 277 Hunt Area. The area was accessible by road. The survey area included 11 known sites: 41VV428-429, 41VV767, 41VV1222-1224, and 41VV1754-1758. Sites 41VV428, 41VV1755, and 41VV1758 were not relocated. The following sites had their files updated and/or were mapped, but no new features or diagnostic artifacts were observed: 41VV429, 41VV767, 41VV1222-1224, 41VV1754, and 41VV1756-1757.

41VV1862

A previously unrecorded site, 41VV1862 is a flat, level, and somewhat rocky open campsite and lithic scatter on a ridge top west of 41VV429. No features were observed, but some scattered FCR was present. A quartzite mano/hammerstone was noted, and several chipped stone tools were collected. These included a spokeshave, a drill, two biface fragments (one appears to be part of a dart preform, the other perhaps part of a wide drill or narrow point), and a uniface. Two projectile points were found. The first of these was a Langtry point missing 25 percent of the distal end, measuring 3.8 cm long, 2.4 cm wide, and 0.6 cm thick; it weighed 7.5 g. The second projectile point (with characteristics of both the Ensor and Frio types) was missing only one basal ear (4.1 x 2.1 x 0.5 cm in length, width, and thickness), and weighed 4.5 g.

41VV1876

41VV1876 is a previously unrecorded rock alignment located on the west bank of a small intermittent drainage near the stone circle that is 41VV429. This rock alignment may not be a feature.

41VV1877

41VV1877 is a previously unrecorded lithic scatter on a hilltop above and running parallel to San Pedro creek. There is a panoramic view of the canyon below. Many of the flakes observed had been retouched. Three pieces of a highly polished grainy red quartzite ground stone tool were also found, probably a mano.

Operation 16

Operation 16 encompassed the San Pedro Campground area. Objectives were to survey the campground for new sites, and to conduct educational test excavations (the Youth Dig) at an exposed burned rock feature in a mowed, grassy area of the campground. This area was included in 41VV1743, although this prehistoric site is in fact more than 0.75 miles to the north.

Assistant Crew Chief for the excavations was Joan Few, and her notes show that this fieldwork accomplished something far more important than the site's artifact assemblage—a few pull-tabs and such—might suggest: introducing archeology to a new generation!

The first day began with an introductory lecture about why we do archeology—what are we looking for, and what questions do we want to answer? The following questions and objectives for excavations were established: (a) are the rocks on the surface a cultural feature? A hearth? Students concluded that for features 1, 2, and 3 the surface information was not enough to make an identification. In Feature 4, students could see burned rock in a loose circle, as well as a can, a metal fragment, and a burned lime fruit, suggesting a modern hearth used fairly recently; (b) has the area been disturbed? Students observed that the area had been mowed and that all around the area there were broken rocks, possibly from mowing action. Students also observed that it was a camp area and that people could have moved rocks on the surface; and (c) why do people camp here now? Long discussion followed on modern camping habits. Why would Indians choose to camp here? Why would Indians build a fire? Why would everyone choose to build a fire within a stone circle? What can hearths tell us about people and their technology?

41VV1743

Four 2 x 2 m excavations were opened over features within the San Pedro tent camping area. The four 1x 1 m quadrants of each of these were labeled from the southwest corner clockwise as A, B, C, and D.

All rocks of the four exposed features were mapped, and Features 1, 2, and 4 were photographed, showing the surface before excavation. Grasses were then cut (not pulled). The units were photographed again before excavation.

Excavations of half of the historic hearth (FX4) revealed that there was no subsurface component of the hearth and no prehistoric hearth below (Figure 16). This hearth contained only modern/historic artifacts such as pull-tabs, cans, and metal. The other excavated features (FX1, FX2, and FX3) proved to be no more than FCR scatters without intact structure. No prehistoric artifacts were recovered from the 1999 TAS youth excavations at this site.

41VV272

41VV272 is recorded as a large, discontinuous, but thin open midden in and around the stock pen

Figure 16. Excavation at 41VV1743 (San Pedro Campground).

about 1 mile west of the old Brite Ranch house. It is important to note that the work performed by the 1999 TAS field school at "41VV272" took place at the old ranch house, not at 41VV272 proper. The Brite Ranch house site consists of several concrete house foundations and concrete pads, water troughs, barn structures, and a cistern dated 1950 adjacent to a well and windmill foundation. Minimal disturbance was noted, and the 41VV272 site file was updated to include the ranch house (Future investigations should record the old ranch house as a separate site and distinguish it from the original VV272 open midden). Several historic artifacts were collected from the surface around the ranch house:

> Specimen 1: Base of large clear glass jar with "345-128" centered below the cursive "Ball" mark. Below that and centered is an "H9." Some iridescence in glass; Specimen 2: Jar or jug base? with cursive "Duraglas" mark on the side above the base. To the right of this is "E 2_ _ _"; the last three digits are unclear. The first missing position is either 3, 5, or 9. The second missing position is either 1 or 7. The last position could be an 3, 5, 6, 8, or 9 – but whichever it is, it is different from the number in the first missing position. On the base and opposite "Duraglas" is a "1" with a circle around it. Another "1" is directly above this, and to the left is a "0;" Specimen 3: Jar mouth, clear glass with lightly textured shoulders. Threaded for screw-top, no markings. Inside diameter of jar mouth is 6.0 cm, outside diameter 6.3 cm; Specimen 4: Top of clear glass bottle, appears to have mold lines. Iridescence on surface. Narrow (4 mm) opening, threaded for screw cap. Neck about 2.4 cm diameter; and Specimen 5: Two fragments of clear insulator glass. One has an embossed "Hemingray" on it and the other has "Made in U.S.A." with "33" centered below; outside diameter about 10 cm.

These artifacts are consistent with the 1950 date on the cistern and what one might expect from a mid-20th century domestic ranch structure.

41VV1860

This is a previously unrecorded alignment of unburned rocks of unknown age. Features include 33 percent of a circle consisting of 11 rocks 50-75 percent buried in the ground; 2 m north of this is a grouping of five unburied stones. To the northeast of the circle is a large (25 cm across) rock. Eighteen m northeast of the circle are five more large stones, evenly spaced in a row and also 50-75 percent buried. Thirty meters to the east-southeast are six large rocks scattered in a wide arc.

41VV1861

This previously unrecorded site has a surface burned rock hearth of unknown age on San Pedro peninsula, but it appears to be intact. Only burned rock was observed, with no debitage or diagnostics.

Operation 17

Operation 17 encompassed the west side of the Devils River from Buoy J to Satan Canyon. The area was accessed by boat. The survey area included 22 known sites: 41VV455, 41VV671, 1463-1464, 1660, 1665, 1696-1703, 1709-1711, 1716, 1720-1721, 1740, and 41VV1769. Of these, 41VV671, 41VV1463-1464, 41VV1698, 41VV1700-1703, 41VV1709-1710, 41VV1716, 41VV1720-1721, 41VV1740, and 41VV1769 were not visited. It is unclear if sites 41VV1660 and 41VV1665 were visited by the TAS.

41VV455

This is a rocky terrace site on the north side of a tributary to the Devils River with many rocks and boulders. Large midden deposits and scattered hearth features are present here. Artifacts observed included a possible pestle, numerous manos, one core, one perform, and much debitage. One Ensor dart point was collected from the surface, missing 0.8 cm of the distal tip (4.5 x 2.6 x 0.8 cm in length, width, and thickness, and it weighs 9.2 g). It is made on a curved flake, and is probably a manufacturing failure.

41VV1696, 41VV1697, and 41VV1711

Site files were updated on these three sites.

41VV1699

This site is a dome-shaped accumulation of FCR with a light scatter of lithics (mostly tertiary flakes, some of which are edge-modified and some thermally altered). No wikiup or tipi rings were noted, but the present elliptical shape of the midden and the spatial distribution of artifacts may be the result of wave action, as the midden is often inundated by the waters of Lake Amistad. Two cores, three manos, and five bifacial performs were observed. One Montell dart point was collected from the surface of this site, missing its tip and one "foot" of the base. It is a manufacturing failure, as it was not pressure-flaked above the base, which was finished first; length: 4.6 cm, width: 3.2 cm, thickness: 0.9 cm, and weight: 9.0 g.

41VV1879

This is a large and previously unrecorded BRM and lithic scatter sitting on a bluff overlooking the Devils River to the east. The midden covers about 87 x 42 m.

41VV1880

This previously unrecorded site consists of at least 15 hearths, a lithic scatter, and at least three BRMs, the largest measuring about 18 x 9 m. The hearths are located around and between the BRMs. No wikiup or tipi rings were noted here. No artifacts were collected, but the distal end of a knife, a large possible perform, and modified flakes were observed.

41VV1881

41VV1881 is previously unrecorded. This site consists of at least five hearths and two possible wikiup rings measuring approximately 2.6- 2.8 m across, each with a large rock in the center and a possible opening to the east-southeast. The site is on a bluff on the west side of the Devils River. There is a light scatter of debitage throughout the site.

41VV1882

A number of lithic artifacts were collected from the surface of this previously unrecorded site. Two bifaces were recovered, the first a scraper with an edge step-fractured from use, and the other the blade of a sotol knife (Figure 17).

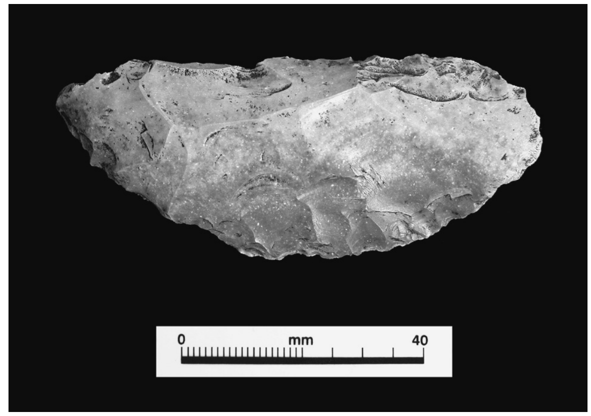

Figure 17. Sotol knife.

Two projectile point fragments were collected (both of apparently the same type) resembling the Shumla and Coñejo types with a short, narrow contracting stem, basal notches, and convex lateral edges. Perhaps the most interesting object from this site is a complete Angostura dart point (Figure 18) that appears to have been resharpened while hafted, as evidenced by alternate beveling on the distal end and a corresponding change in the angle of the lateral edges.

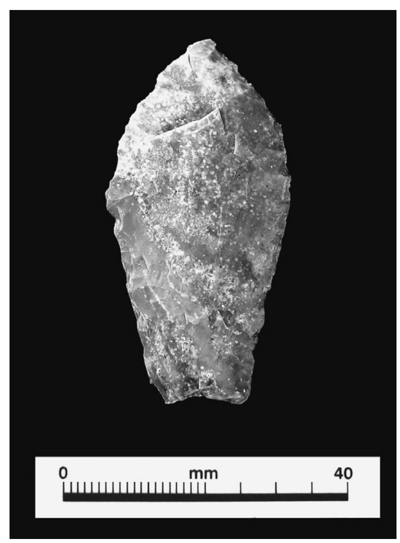

Figure 18. Angostura point.

41VV1887

This is a previously unrecorded site on the top of a hill on the west side of the Devils River. The site consists of three BRMs and scattered lithics. Artifacts collected from the surface of this site include an Angostura point, two fractured dart points, a knife, and a preform.

Operation 18

Operation 18 was a mirror-image of Operation 17, stretching along the east side of the Devils River from Buoy J to Satan Canyon. The area was accessed by boat. The survey area included 38 known sites: 41VV11, 41VV15-18, 41VV20-28, 41VV44, 41VV46, 41VV764, 41VV766, 41VV796, 41VV904-906, 41VV1310-1312, 41VV1438-1439, 41VV1444, 41VV1470, 41VV1495, 41VV1546, 41VV1548, 41VV1550, 41VV1694-1695, 41VV1704, and 41VV1706-1707. Documentation on the following sites was updated: 41VV44, 41VV46, 41VV1444, 41VV1470, 41VV1495, 41VV1548, 41VV1550, 41VV1694, 41VV1704, and 41VV1707.

Operation 19

Operation 19 included Harlows Horrors and the railroad bed along the north shore of Lake Amistad east of Highway 90. The area was accessed by boat. The survey area included four known sites, 41VV5-7 and 41VV1215. Of these, sites 41VV5-7 were underwater during the 1999 investigations and not visited.

41VV1215

The site form was updated for this site.

41VV1883

This is a previously unrecorded quarry site on a large knoll littered with cores and broken pieces of chert.

EXCAVATIONS AT 41VV661

Site Overview and Stratigraphy

41VV661 is a BRM located on a terrace along the north side of the Rio Grande at the confluence of a small side canyon, about 100 m from the present channel of the river. Most of this midden was destroyed by the excavation of a borrow pit during railroad construction. The TAS excavations at this site were undertaken to learn what kinds of artifacts were associated with this buried midden. The site record form filled out by Solveig Turpin in 1984 indicated two separate occupation levels buried by flood deposits that were visible at approximately 60 cm and 170 cm bs; she noted that the depth of these archeological materials was not an indication of great age due to the potential for rapid burial in this setting.

Gustavson and Collins (1998:37) examined the stratigraphy of the 4 m deep borrow pit in greater detail and reported as many as five buried soils and seven different probable hearth features. Two of these hearth features contained charcoal, and a charcoal sample (Beta-108178) from the uppermost hearth (at a depth of ca. 1.5 m bs) produced a conventional radiocarbon age of 660 ± 50 BP (Gustavson and Collins 1998:37). An Ensor dart point was found in the wall borrow pit stratigraphic section number 5 at a depth of about 1.25 m (Gustavson and Collins 1998:37). This upper hearth is the midden excavated by the 1999 TAS field school.

The lower hearth is buried at a depth of about 2 m and is a lens (or basin)-shaped feature about 1 m across. It contained 30 cm of wood ash, charcoal, and sediment, and the underlying terrace sediments had been reddened by heating and oxidation. Two radiocarbon samples were taken from this feature, returning conventional dates of 1320 ± 40 B.P. on wood ash and 1250 ± 50 B.P. on charcoal (Gustavson and Collins 1998:37). Another, as yet undated hearth is present 1.5 m below this hearth (i.e., ca. 3.5 m bs).

Excavations

Field school excavations targeted the upper hearth that Gustavson and Collins (1998) had dated to a conventional radiocarbon age of 660 ± 50 B.P. The 1999 TAS site map showed the midden to be elliptical in form, extending along the terrace about 3 m from where it was truncated by the southeast

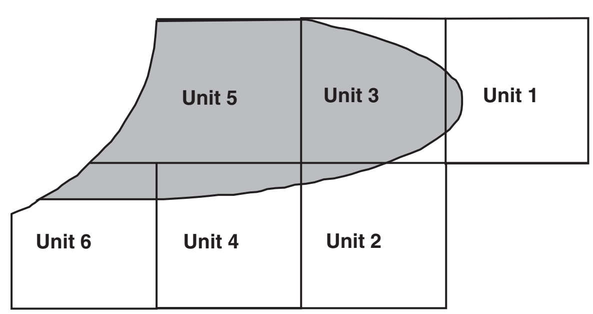

Figure 19. Excavations at 41VV661.

face of the borrow pit (Figure 19). Based on the curvature of the ellipse, the original dimensions of the midden may have been about 5 x 1.5 m.

The remaining portion of the midden was divided into six excavation units. Units 5 and 6 along the edge of the borrow pit had slightly irregular shapes. The southern edge of Unit 5 was about 1.5 m long, extending west to the edge of the borrow pit. Unit 6 had no northwest corner. Units 1-4 were back from the edge of the borrow pit and were 1 x 1 m squares.

While we did not locate paperwork explicitly stating this, it appears that the top 30 cm (levels 1-6) of overburden above the midden were removed and discarded. Below that, all units were excavated primarily in 5 cm arbitrary levels (with exceptions noted below) and the matrix was dry screened on-site through 1/4-inch and 1/8-inch mesh. Records indicate that the last of this midden was excavated and removed, but at least six other buried features remain at the site. Small amounts of debitage, charcoal, red ochre, mussel shells, and *Rabdotus* snails were common in all units.

Unit 1 (Table 27) was excavated to a depth of 100 cm bs. The most significant finds were a small ceramic sherd (discussed in more detail below), a small biface fragment (probably part of the stem of a Perdiz arrow point), and a burned, fire-fractured mano.

Unit 2 (Table 28) was excavated to a depth of 95 cm bs; level 11 was a 10 cm thick level. This unit contained a small mano and the bones of hispid pocket mice. Unit 3 was also excavated to 95 cm bs. A fire-cracked mano and a modified flake were found in the lower levels (Table 29).

Unit 4 was excavated to 95 cm bs; level 12 was discarded. A uniface was found between 60 and 65 cm bs (Table 30).

Unit 5 was excavated to 95 cm bs; levels 7 and 8 were mixed into a single 10 cm level. The lower levels of Unit 5 contained an incomplete arrow point (probably Perdiz), and a utilized flake. The lowest level (level 19, 90-95 cm bs) had two deer or pronghorn metacarpal fragments (Table 31).

The upper 45 cm (levels 1-9) of Unit 6 were discarded. Below that, the unit was excavated in 5 cm levels to a depth of 100 cm bs. A uniface was recovered from 60-65 cm bs (Table 32).

Unit 7 was excavated to 60 cm. The upper 55 cm (levels 1-11) were discarded. The single level excavated from 55-60 cm bs produced a uniface and 0.9 g of charcoal (Table 33).

Artifacts

Significant artifacts recovered from the 1999 TAS excavations at 41V661 are grouped stratigraphically by excavation level (Table 34). The three diagnostic artifacts from these excavations were all Late Prehistoric types: two Perdiz points and a ceramic sherd (Figures 20-21). The plain brown, small (1.5 x 1.5 x 0.6 cm in length, width, and thickness), triangular body sherd came from 85-90 cm bs. It is blackened, and has been smoothed on the exterior, and appears to be bone tempered. The sherd thickness is within the 4.4-6.2 mm range reported for Toyah phase pottery at San Felipe Springs in Del Rio by Mehalchick et al. (1999:185). Comparing Toyah and Infierno phase bone-tempered pottery from different Lower Pecos sites using petrographic analysis of sherd pastes, Mehalchick et al. (1999:188) found "…no distinctive or even subtle differences that reasonably may be defined as culturally meaningful between Toyah and Infierno phase pottery in the Lower Pecos."

That these artifacts came from the middle and lower levels of the midden and that no Archaic period diagnostics were recovered suggests that this feature dates entirely to the Late Prehistoric. The 660 ± 50 B.P or A.D. 1240-1340 (at 1 sigma) radiocarbon date reported by Gustavson and Collins (1998), Perdiz points, and presence of bone-tempered pottery suggest this occupation belongs to the Toyah phase. Toyah culture as redefined by Johnson (1994:258) for Central Texas dates to ca. A.D. 1300-1650, and is characterized by four primary diagnostic artifact types: plainware bone-tempered pottery, Perdiz/Clifton arrow points, steeply beveled end and end/side scrapers, and beveled knives.

Artifacts and faunal remains indicate that the prehistoric occupants of this site pursued a broad range of food resources. The two manos and two unifaces (not to mention the midden of FCR) indicate that plant resources were being processed here and that they made up an important part of the diet. Larger game animals such as deer or pronghorn were also taken, as well as small rodents and freshwater mussels.

The possibilities for future research at this site are exciting. It appears that flood events have created a stratified stack of single component features at 41VV661. This depositional environment, in combination with site preservation

Table 27. 41VV661 Unit 1.

Level (depth)	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1-6 (0-30 cm)					Discarded
7 (30-35 cm)				0.6 g charcoal; 3.4 g asphalt?	Asphalt may be modern associated with railroad?
8 (35-40 cm)			0.8	0.4 g charcoal; 1 mussel fragment; 1 snail (*Rabdotus*)	
9 (40-45 cm)				1 snail (*Rabdotus*); 0.4 cm diameter hemi-spherical seed shell	
10 (45-50 cm)				Core, 40.5 g; <0.1g mussel	
11 (50-55 cm)					No recovery
12 (55-60 cm)	Perdiz stem fragment? (0.2 g)		0.4	1 snail (*Rabdotus*); <0.1 g charcoal	
13 (60-65 cm)		1 modified flake	0.1	0.1 g charcoal	
14 (65-70 cm)			0.6	1.2 g charcoal; Mammal tooth	Tooth <0.1 g
15 (70-75 cm)			2.1	<0.1 g charcoal; 1 snail (*Rabdotus*); Unidentified bone fragment (0.1 g)	
16 (75-80 cm)			0.2		
17 (80-85 cm)			0.8	0.4 g charcoal; 0.6 g unidentified fragments of bone and tooth	
18 (85-90 cm)	Ceramic sherd (0.6 g); 1.5 x 1.5 x 0.6 cm in length, width, and thickness)	1 modified flake	2.4	0.1 g. charcoal; 2.0 g mussel; 2.0 g bone from deer sized? animal; 1 snail (*Rabdotus*)	Sherd is blackened, smoothed on outside.
19 (90-95 cm)					
20 (95-100 cm)		Mano (burned)	4.3	2.1 g bones; 0.4 g charcoal	Bones are two pronghorn or deer metatarsal proximal ends and 0.4 g unidentified small fragments

Table 28. 41VV661 Unit 2.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1-6 (0-30 cm)					Discarded
7 (30-35 cm)				2.1 g charcoal	
8 (35-40 cm)				2.6 g charcoal; 1 snail (*Rabdotus*)	
9 (40-45 cm)			4.3	8 pieces of bone from at least two hispid pocket mice (2 left mandibles, 1 right mandible, left and right innominates, 2 vertebrae, and a tibia); <0.1 g charcoal; 1 snail (*Rabdotus)*	
10 (45-50 cm)			0.1	0.2 g charcoal; 22.4 g combined mussel shell and snails	
11 (50-55 cm)				16.1 g dark red ochre, about 15 pieces	
12 (55-60 cm)			<0.1	16.6 g ochre (1 piece, 2.5 x 2.5); <0.1 g charcoal; 0.5 g mussel and snail shells	
13 (60-65 cm)			1.9	1 copperhead vertebra; 1.5 g charcoal, 1 snail *(Rabdotus)*	
14 (65-70 cm)			0.3	1.2 g charcoal	
15 (70-75 cm)			1.0	1 mussel shell (6.5 x 8 cm, 80% complete), 1 snail shell *(Rabdotus)*	
16 (75-80 cm)				<0.1 g hispid pocket mouse bone (right mandible with incisor); 0.2 g charcoal	
17 (80-85 cm)			0.2	1 small limestone mano (5.5x 6 cm); incomplete mammal tooth; 0.2 g unidentified bone fragments; 0.4 g charcoal	
18 (85-90 cm)			0.3	<0.1 g charcoal	

characteristics, has the potential to provide much information about changing land use and material culture of Late Prehistoric aboriginal peoples that used the Lower Pecos region.

Now that the upper hearth has been excavated, it would be worthwhile to excavate the lower hearth to determine what changes in subsistence and technology can be detected between the beginning and end of the Flecha subperiod. The Ensor point found in situ deep in the wall of the borrow pit indicates that Archaic components are preserved at the site as well, and thus that this site can contribution information on changes (and continuities) between the Late Archaic and the Late Prehistoric in subsistence, land use, and material culture.

Table 29. 41VV665 Unit 3.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1-6 (0-30 cm)					Discarded
7 (30-35 cm)				1 snail *(Rabdotus)*	
8 (35-40 cm)				1 snail *(Rabdotus)*	
9 (40-45 cm)				1 snail *(Rabdotus)*	
10 (45-50 cm)			<0.1	<0.1 g red ochre; 1 unidentified small bone fragment; 1 snail *(Rabdotus)*	
11 (50-55 cm)			0.3	0.5 g red ochre	
12 (55-60 cm)			0.9	1.6 g charcoal; 1 snail *(Rabdotus)*	
13 (60-65 cm)			21.6	2.7 g red ochre; 19.0 g mussel shell; 0.9 g charcoal	
14 (65-70 cm)		1 mano (fire-fractured limestone)	5.1	0.8 g red ochre	
15 (70-75 cm)			0.7	2.8 g red ochre	
16 (75-80 cm)			5.1	1.2 g charcoal; 1 snail *(Rabdotus)*	
17 (80-85 cm)		1 modified flake	<12	<0.1 g charcoal	
18 (85-90 cm)			24.4		
19 (90-95 cm)				2.5 g charcoal; 1 snail *(Rabdotus)*	

EXCAVATIONS AT 41VV1207: THE HEARTH FIELD

Site Overview

41VV1207 is an extensive hearth field (90 x 265 m) down slope of some low hills in a broad drainage north of San Pedro Canyon before it flows into the Devils River. The site contains 43 recorded features, including possible rock house structures, lined basin-shaped hearths, ovens with basins, and perhaps ovens without basins. The Crew Chief for the 41VV1207 excavations was Jimmy Smith, whose field notes form the basis for much of our discussion of this site and its features.

The site was chosen for test excavations not only because of the significant features found there but because those features were being actively exposed and damaged by sheet wash erosion. Smith noted that “the site has had at least 10-14 cm of soil removed since current vegetation appeared” based on exposed roots and pedestalled rocks, suggesting that the site may have lost as much as 50 cm since it was last occupied in prehistoric times. Three test units excavated in the lowest portion of the site near some exposed hearths found no artifacts, suggesting that the original ground surface and any associated shallowly buried components have completely eroded away. Fortunately, the site probably contains many other features that remain buried, one of which

Table 30. 41VV661 Unit 4.

Level	Other Tools	Debitage (in grams)	Other	Comments
1-6 (0-30 cm)				Discarded
7 (30-35 cm)		0.6		
8 (35-40 cm)		0.6	0.3 g charcoal	
9 (40-45 cm)			1 snail *(Rabdotus)*	
10 (45-50 cm)		20.4	0.1 g charcoal	
11 (50-55 cm)		0.1	0.3 g dark red ochre; 21.9 g mussel shell (part of one large shell with umbo)	
12 (55-60 cm)				Discarded
13 (60-65 cm)	1 uniface (4.5 x 3.5 cm)	0.2	<0.1 g ochre; 1.0 g charcoal; 1 snail *(Rabdotus)*	
14 (65-70 cm)	river-rolled chert chunk (12.2 g) that may be a tool		0.3 g charcoal; 1 snail *(Rabdotus)*	
15 (70-75 cm)		0.2		
16 (75-80 cm)		0.3		
17 (80-85 cm)		7.7	0.4 g charcoal; 1 snail *(Rabdotus)*	
18 (85-90 cm)			0.3 g charcoal	
19 (90-95 cm)		1.3	0.5 g charcoal	

was discovered by a fourth test unit excavated to a depth of 50 cm bs. Another buried feature was observed eroding out of a cut bank along the west side of the wash at a depth of perhaps 30-50 cm bs during a visit to the site in 2006 with Joe Labadie. Geoarcheological trenching performed by Gustavson and Collins (2000) further down the drainage near 41VV1770 showed that small drainages (and specifically this one) have preserved stratified, buried sites.

Previous documentations of the site recorded a mano, cores, thick bifacial performs, and projectile points from several time periods. These points include Angostura, Pandale, Gower, Langtry, Montell, Frio, Ensor, and Perdiz types.

Basin-Shaped Slab-Lined Hearths or Ovens

These thermal features at 41VV1207 are characterized by a basin lined with rock slabs. Most of these features were found intact or partially intact, but some severely deflated features containing rock slabs are also included here. If a basin-shaped, slab-lined feature is discrete with little or no surrounding debris field, we consider it a hearth. Oven features are typified by the evident reuse of pieces of FCR and/or by a debris field including rock scattered upslope. Both types of features are grouped together here because the presence of a slab-lined basin is a

Table 31. 41VV661 Unit 5.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1-6 (0-30 cm)					Discarded
7-8 (30-40 cm)				0.9 g charcoal	
9 (40-45 cm)				0.1 g red ochre; 0.3 g charcoal	
10 (45-50 cm)				0.2 g charcoal	
11 (50-55 cm)				2.5 g charcoal	
12 (55-60 cm)			0.4	2 snails *(Rabdotus)*	
13 (60-65 cm)			0.1	<0.1 g red ochre; 0.6 g charcoal	
14 (65-70 cm)			0.1	0.2 g red ochre; 1.0 g charcoal	
15 (70-75 cm)	incomplete arrow point (probably Perdiz)		<0.1		
16 (75-80 cm)		modified flake	0.2	0.1 g charcoal	
17 (80-85 cm)			2.8		
18 (85-90 cm)				0.2 g charcoal	
19 (90-95 cm)			0.3	Deer or pronghorn metacarpal fragments (2 pieces, 7.8 g); unidentified bone fragment (burned?, 0.5 g); 1.4 g charcoal; 1 snail *(Rabdotus)*	

stronger uniting characteristic than the divisions based on evident rock scatters or feature reuse, which may be obscured by erosion or other post-depositional impacts.

Most of these 12 features (Table 35) are a little over 1.0 m in diameter and less than 20 cm in depth. A number of these features contained charcoal staining and/or soil discoloration or hardening. Two of these features (FX11 and FX33) were dated to the Late Archaic, and one contained a Montell dart point. Another feature (FX21) contained a biface, a core, and several flakes. Feature FX33 (Figure 22) is an excellent example of this type of feature at this site.

Probable Ovens

Features identified as ovens lack a slab-lined basin but typically contain a central concentration of FCR surrounded in all directions (including upslope) by a lighter scatter of FCR. This is consistent with the removal of debris during earth oven clean-out and re-use. Moreover, features identified as ovens may contain reused pieces of FCR, indicated by the absence of fragments around in situ pieces. Rocks function as heat reservoirs in earth ovens, helping to maintain oven temperature for the long cooking time (48 hours or more) needed for some plant foods (Dering 1999). They

Table 32. 41VV661 Unit 6.

Level	Diagnostics	Other Tools	Debitage (in grams)	Other	Comments
1-9 (0-45 cm)					Discarded
10 (45-50 cm)				0.1 g charcoal	
11 (50-55 cm)				0.9 g charcoal	
12 (55-60 cm)				1 snail *(Rabdotus)*	
13 (60-65 cm)				<0.1 g charcoal	
14 (65-70 cm)			1.7	0.9 g charcoal; 1 snail *(Rabdotus)*	
15 (70-75 cm)			0.1	2 pieces of charcoal; 1 snail *(Rabdotus)*	
16 (75-80 cm)				0.1 g red ochre; 0.1 g charcoal	
17 (80-85 cm)				<0.1 g charcoal	
18 (85-90 cm)				0.7 g red ochre; 0.4 g charcoal; 1 snail *(Rabdotus)*	
19 (90-95 cm)				0.1 g dark red ochre; 0.4 g charcoal	
20 (95-100 cm)			<0.1	13.4 g charcoal	

Table 33. 41VV661 Unit 7.

Level	Diagnostics	Other Tools	Debitage	Other	Comments
1-11 (0-55 cm)					Discarded
12 (55-60 cm)		1 uniface (4.5 x 3.5 x 1.0 cm)		0.9 g charcoal	

may be reused until they fracture to the point that they are too small to effectively retain and radiate heat. Four ovens were documented during the 1999 TAS investigations.

FX9 is 3 x 2 m in size, with dispersed FCR around a dense central concentration (85 cm diameter). It is considered an oven due to its size and the fact that the rock scatter extends upslope as well as downslope from the core.

FX15 measures 3 x 2 m, with a central concentration measuring 1.6 x 1.4 m. Burned earth is present at the center of the feature, suggesting that a fire was built underneath the rocks. Although excavation failed to reveal a basin, the burned earth beneath the rocks is otherwise consistent with earth oven construction as described by Dering (1999). The feature was evidently reused, indicated by the presence of FCR found in situ without matching fragments present from initial cracking. The lower third of this feature had been eroded away by the adjacent wash and been strewn for some distance.

FX25 is 4 x 2 m in size, but it is very dispersed. No rocks remain clearly in place, although some may be; enough large rocks are nearby for this feature to possibly represent a structure, but no well-defined clusters or shape are evident.

FX43 measures about 4 x 2 m. Half of this

Table 34. Artifacts recovered from 41VV661.

Level	Debitage (all units), in grams	Diagnostics	Other	Unit / Comments
1				NO DATA
2				NO DATA
3				NO DATA
4				NO DATA
5				NO DATA
6				NO DATA
7	0.6			
8	1.4			
9	6.7		Pocket mouse bones	Unit 2 / MNI=2
			Red ochre, 0.1 g	Unit 5
10	0.2-0.3		Mussel shell	Unit 2 / <22.4 g
			Red ochre, <0.1 g	Unit 3 / very small
11	0.3-0.4		Core; Red ochre, 16.1 g	Unit 1/40.5 g Unit 2 / dark red, 15 pieces
			Red ochre, 0.5 g	Unit 3
			Red ochre, 0.3 g	Unit 4 / dark red
			Mussel shell fragment	Unit 4 / 1 large shell half
12	3.6	Perdiz? arrow point		Unit 1 / Perdiz stem base
			Red ochre,16.6 g	Unit 2 / 1 piece bright red
			Uniface	Unit 7 / 3.5 x 4.5 x 1.0 cm
13	22.3		Snake vertebra (1)	Unit 2/ Copperhead
			Red ochre, 2.7 g	Unit 3
			Mussel shell	Unit 3 / 19.0 g
			Uniface	Unit 4 / 4.5 x 3.5 cm
			Red ochre, <0.1 g	Unit 4
			Red ochre, <0.1 g	Unit 5
14	7.5		Mussel shell	Unit 2 / 6.5 x 8 cm
			Mano (limestone)	Unit 3 / fire-fractured
			Red ochre, 0.8 g	Unit 3
			Red ochre, 0.2 g	Unit 5

Table 34. *(Continued)*

Level	Debitage (all units), in grams	Diagnostics	Other	Unit / Comments
15	3.1-3.2	Perdiz? arrow point	Red ochre, 2.8 g	Unit 3
				Unit 5 / incomplete
16	5.8		Pocket mouse bones	Unit 2 / Right mandible
			Modified flake	Unit 5
			Red ochre, 0.1 g	Unit 6
17	ca. 20 (11.5-23.5)		Small mano	Unit 2 / limestone
			Mammal tooth	Unit 2 / incomplete
			Modified flake (1)	Unit 3
18-	27.4	Ceramic sherd		Unit 1
			Red ochre, 0.7 g	Unit 6
19	5		Deer/pronghorn bone	Unit 5 / 2 metacarpal fragments
			Red ochre, 0.1 g	Unit 6 / dark red
			Mano (limestone)	Unit 1 / fire-cracked
20	4.3-4.4		Deer/pronghorn bone	Unit 1 / metatarsals (2)

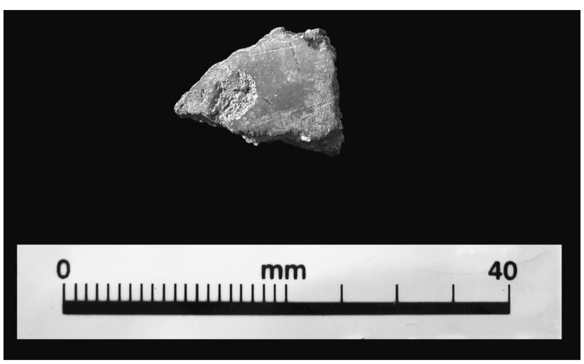

Figure 20. Ceramic sherd from 41VV661.

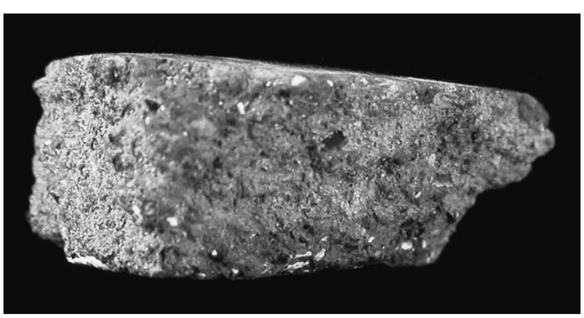

Figure 21. Close-up of the 41VV661 ceramic sherd.

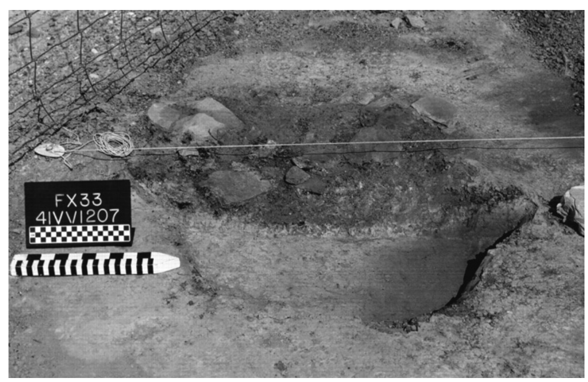

Figure 22. Profile of FX33, 41VV1207, showing basin and charcoal staining.

feature has deflated into an erosional wash. FX43 is located 3 m over the NPS fence, and consequently no work was done on this feature during the 1999 TAS Field School

Probable Hearth Features

Unlike the ovens above, features identified as hearths typically contain FCR that is confined to

Table 35. Basin-shaped slab-lined hearths or ovens at 41VV1207.

Feature	Diameter (in cm)	Associated Finds	Comments
FX1	65	—	Appears intact, no debris field
FX2	104	Biface in hearth	17 cm deep; Some scattering, interior intact
FX7	ca. 100	Dark soil with charcoal	In wash, debris scattered 15 m down slope.
FX10	60	two large flat rocks 0.5 m north and two others 2 m northeast	Debris field extends 1 m down slope.
FX11	N/A	Montell dart point and 190 BC-AD 30 calibrated date	Within 5 x 5 m dense scatter of tabular mudstone. Center of basin area contains charcoal and blackish-stained fill.
FX16	70	—	Heavily eroded, but some rocks may remain in place. Slab rocks present but no longer in place; 5 m south of FX40.
FX21	80	Biface, large core, several flakes observed, not collected.	Charcoal and burned soil at base of slab-lined basin. Eastern half of feature mostly disturbed or missing. Debris field extends 10 m down slope.
FX23	75 x 40	—	Only bottom of basin remains. Debris field is mixed with FCR (FCR) from nearby features; 2 m east of FX39.
FX33	70	Charcoal below rocks dated to AD 440-670 (calibrated); four bags of matrix collected.	14 cm deep. Covered with 3-4 m FCR scatter. Charcoal stain lens below rocks to depth of 14 cm. Soil stained black/red and surface baked very hard and discolored. Little debris down slope; mapped and photographed.
FX35	N/A	—	Central portion appears basin-shaped, no debris field around feature.
FX37	80	—	Charcoal-stained earth, no debris field; no work done here.
FX38	80	—	Dispersed; debris field extends down slope 3 m west to FX37. No work done at this feature.

a discrete area, or presumably had been prior to erosion and transport downslope. They also lack an intact or suggested hearth basin or slab lining, allowing for the presence of non-basin hearths. The 12 features placed into this category (Table 36) do not exceed 1 m in diameter.

FCR Scatter

If a thermal feature had become so dispersed that little or no FCR concentration is visible and it cannot be identified as being either a hearth or an oven, it is identified here as an FCR scatter. There are eight FCR scatters at the site.

Table 36. Probable Hearth Features at 41VV1207.

Feature	Dimensions (in cm)	Comments
FX4	62	Fairly intact; tight concentration of 15-20 rocks with only a couple down slope.
FX12	80	Dispersed, no central basin visible. Debris field extends 1 m down slope.
FX19	N/A	20-25 pieces of fire-cracked rock (FCR) with no discernible form.
FX20	60	Cluster of 10-12 pieces of FCR.
FX22	small	Only a few rocks visible. In erosional wash 2.8 m NE of hearth FX21.
FX24	large	Large, dispersed hearth with 11-20 m debris field. Only 3-4 rocks appear to remain in place.
FX27	100	Concentrated FCR; not excavated.
FX28	60	Similar to FX27, located 10 m to west; 10-12 concentrated pieces of FCR exposed.
FX29	60 x 40	Similar to nearby FX 27 and FX28. Erosional damage, no clear shape.
FX30	80	Small hearth, probably similar to FX27, FX28, and FX29; not uncovered.
FX32	small	No debris field. Erosional damage; not mapped or cleaned. 6-8 m west of FX33.
FX34	100	Light FCR scatter surrounding 30 cm concentrated core that may be in place; highly eroded.

FX3 measures 4 m in diameter. This feature is probably the rubble field from a dispersed hearth and is no longer an intact feature.

FX5 measures 2.5 x 1m. This feature is located on a high point of land between wash areas, and no discrete concentrations of FCR remain.

FX6 is 8 m diameter. This feature does not appear intact, and debris from this feature is widely scattered. The debris field may include some material from FX7, located 30 m upslope.

FX8 measures 4 m in diameter. No intact deposits remain visible; this feature is probably a dispersed hearth. Some lithics are present on the surface. A debris field extends about 3 m beyond the more concentrated FCR.

FX13 consists of 8-10 pieces of FCR on the surface of a wash area, with no visible concentration. These FCR may be associated with rock ring FX14 or FCR scatter FX17.

FX17 is a burned rock scatter located in a heavily eroded wash. Some rocks in this feature may be in place. It is possible that this feature represents a hearth associated with structure FX41.

FX26 measures 4 m in diameter. This feature is very dispersed and no central concentration remains.

FX31 is 7 x 15 m in size, and it is a large FCR scatter over an eroded area. There appear to be three concentrations of FCR within FX31, but no distinct separate features. This feature was not mapped, but it was photographed showing one concentration, then photographed again showing all three concentrations and surrounding scatter.

FX36 is a burned rock scatter inside and outside house structure FX39. It is possible that this feature represents a dispersed hearth that had been constructed adjacent to the structure.

Rock Ring Features

The presence of structures at 41VV1207 is suggested by rings of large rocks that presumably would have anchored poles for tipis or wikiups. These circles are often made up of pairs of opposed stones, a pattern typical of Late Prehistoric Infierno phase occupations at other sites in the region (Turpin 1995:552). It is common for the rock rings at 41VV1207 to be made from six stones (three pairs of opposed stones).

These features were determined on the following basis: First, rocks of this size show little downslope movement at this site, so groupings of them are most likely the result of human activity rather than natural processes. One or two rocks may have moved 1-2 m. Second, some of the rocks are out of place geologically, suggesting that they were transported and positioned by people. Third, groupings of large rock most often form a circle or semi-circle, whereas other (presumably naturally occurring) rocks on the site appear randomly spaced and are not clustered, much less arranged in a patterned way. Lastly, the sizes of rocks, and the sizes of the circles they are arranged in, are fairly consistent within this site, excepting the unusually small FX42 (Table 37).

Feature FX14 is a large rock concentration in a wash on the lower end of the site, 15 m to the east of midden/oven feature FX15. These rocks are geologically out of place, and did not wash to this location, although their positions appear to have been altered by flooding. This highly disturbed feature measures 6.4 m north-south x 9.9 m east-west.

Feature FX18 is a rock ring with an interior diameter of 5.5 m, located between rock ring structures FX39 and FX42. It is composed of six rocks, with two out of place, and no associated hearths.

Feature FX39 is a ring of large rocks, about 4.5 m in diameter. The soil inside the rock ring is darker than the surrounding area, suggesting the presence of archeological deposits marking a living surface. This feature was mapped and shot in with the TDS. Test Unit 4 was placed within this feature and excavated to a depth of 50 cm bs by Michael Williams and Andy Malof. The test unit produced buried deposits evidencing an earlier occupation of the site. Overlapping burned rock scatter feature FX36 may represent remnants of a hearth originally located adjacent to this feature. One broken biface, the base of a Langtry dart point, was collected from the surface.

Feature FX40 is a large ring of seven rocks about 4.5 m in diameter. Probably a tipi ring, this feature also conforms to the six stone (three pair) construction pattern, except that one support location has two smaller rocks where one larger rock normally would have been. Two of the seven rocks are out of place, apparently due to erosion. This site was mapped and shot in with a TDS. A non-diagnostic dart point fragment was collected that was found standing on end in the wash to the northwest. Burned rock scatter (dispersed hearth?) FX 26 is located 5 m to the southwest of this structure.

Feature FX41 is a large rock concentration that appears geologically out of place. This feature measures 6 m north-south x 10 m east-west, and was shot in with the TDS. It may represent one highly disturbed group of rocks, or rocks from two adjacent structures along and truncated by the wash. In the wash and to the west of feature FX41, burned rock scatter FX17 may represent an associated hearth.

Feature FX42 is a small structure about 2.5 m in diameter, made up of six apparently in situ large rocks arranged in a semicircle. No hearths are visible in the area. This feature was mapped with the TDS and on paper.

Lithics

Crew Chief Smith noted that bifaces were found on the surface near many of the hearths (but not collected) and that cores were common. Only

Table 37. Rock ring features at 41VV1207.

Feature	Approximate inside Diameter (in m)	Tipi or Wikiup?	Comments
FX14	6.4?	Tipi	Badly disturbed
FX18	5.5	Tipi	six rocks
FX39	4.5	Tipi	Darkened interior surface; Langtry point surface collected
FX40	4.5	Tipi?	seven rocks
FX41	?	—	Too disturbed
FX42	2.5	Wikiup?	six rocks

three diagnostic projectile points were found at 41V1207 during the 1999 TAS field school. No ground stone implements were found during the 1999 investigations.

Two rock features had lithic debitage: FX39, with 167.7 g of debitage (the numerical ratio of primary to secondary to interior flakes is 1:15:108), and FX11, with 1.2 g of unmodified debitage (two interior flakes). Two features also had bifaces and/or biface fragments. Feature FX39 had five biface fragments, one a Langtry dart point base and another reused as a scraper. Feature FX2 had one crude, battered, and chunky biface.

The two projectile points found in addition to the aforementioned Langtry dart point base from near FX39 are described in Table 38. A Cuney or Scallorn arrow point (Figure 23) was found on the surface about 10 m west of thermal feature FX1. It is very well made, but missing one barb. If the identification of the point as a Cuney is accurate, its occurrence in the Lower Pecos is well west

Table 38. Projectile points from 41VV1207, including previous studies.

Point Type	Period and Dates (Turner and Hester 1999)	Association	Year Documented
Angostura	Late Paleoindian, ca. 6800 B.C, and/or Early Archaic (5400 B.C. at Baker Cave?)	Surface	1988
Gower	Early Archaic ca. 6000-4000 B.C.	Surface	1988
Pandale	Early Archaic ca. 4000-2500 B.C.	Surface	1988
Langtry	Middle Archaic ca. 2500-1000 B.C.	Surface	1988
Langtry	Middle Archaic ca. 2500 B.C. -1000 B.C.	FX39– Surface	1999 TAS FS
Langtry	Middle Archaic ca. 2500-1000 B.C.	Surface	2006 – not collected
Montell	Late/Transitional Archaic ca. 1000 B.C. -A.D. 200	Surface	1988
Montell	Late/Transitional Archaic ca. 1000 B.C. -A.D. 200	FX11 - Surface	1999 TAS FS
Ensor	Transitional Archaic ca. 200 B.C. -A.D. 600	Surface	1988
Frio	Transitional Archaic ca. 200 B.C. -A.D. 600+	Surface	1988
Frio	Transitional Archaic ca. 200 B.C. -A.D. 600+	Surface	1988
Perdiz	Late Prehistoric ca. A.D. 1200-1500	Surface	1988
Cuney or Scallorn	Late Prehistoric	Surface	1999 TAS FS

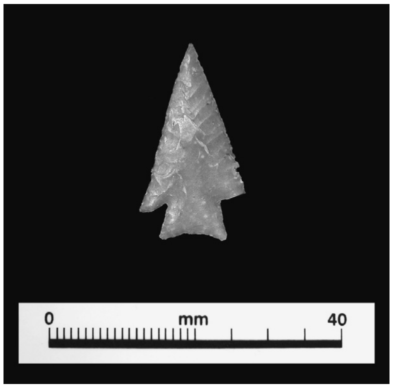

Figure 23. Possible Cuney or Scallorn, 41VV1207.

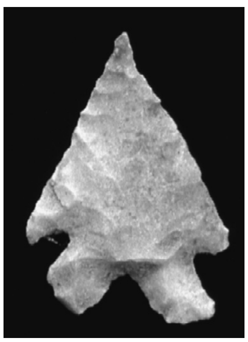

Figure 24. Montell dart point from FX11, 41VV1207 (no scale provided and lost in the field).

of the typical distribution of this type (Turner and Hester 1999:210). A Montell dart point was found in association with feature FX11 (Figure 24). Montell is a Late Archaic type estimated to date from 1000 B.C.-A.D. 200 (Turner and Hester 1999:157).

Radiocarbon Dates

Large samples of charcoal were obtained for radiometric dating from two of the best-preserved thermal features, FX11 and FX33 (see Table 1). While both samples had some dirt adhering to them, they appeared to be solid wood charcoal and enough was present for conventional radiometric dating.

The charcoal from feature FX11 came from matrix samples labeled "from hearth basin," and weighed approximately 17.6 g. This sample ANRA-4 (Beta-140484) returned a conventional radiocarbon age of 2040 ± 60 B.P. Calibrated, this corresponds to an age range of 2140-1870 B.P. at 2 sigma, or 190 B.C. to A.D. 80. This date is consistent with the Late Archaic Montell dart point found in association with FX11. Sample ANRA-3 (Beta-140483) came from feature FX33 in the charcoal layer beneath the rocks. This sample returned a conventional radiocarbon age of 1470 ± 60 B.P. Calibrated, this corresponds to a 2 sigma age range of A.D. 440-670. Both of these dates from 41VV1207 fall within Turpin's (1995:549-550) Blue Hills subperiod of the Late Archaic, from 2300 to 1300 B.P. (350 B.C. to A.D. 650).

Discussion

The site appears to have been used most intensely during the Late Archaic, but diagnostic projectile points found here indicate an aboriginal presence at this location from Late Paleoindian times through the Late Prehistoric. The Late Paleoindian occupation is represented by an Angostura dart point collected from the surface during the site's initial recording in 1988. Early Archaic Pandale and Gower dart points were also recovered from the surface during that investigation. The Middle Archaic is represented by three Langtry points; one was collected in 1988, another is the Langtry base found during the 1999 TAS field school, and the third is a complete point that the authors observed and photographed at the site in 2006.

The time period represented by the most projectile points, and with both radiocarbon dates, is the Late Archaic. A Montell dart point, an Ensor, and two Frio points were found in the 1988 recording. Another Montell point was found during the 1999 TAS field school associated with a basin-shaped and slab-lined hearth feature FX11, with a calibrated radiocarbon age of 190 B.C.-A.D. 80. This radiocarbon date falls within, but at the very end of, the 1000 B.C-A.D. 200 age range reported for Montell points by Turner and Hester (1999:157). A second basin-shaped and slab-lined hearth feature, FX33, has a calibrated radiocarbon date of A.D. 440-670. Both this date and the date for feature FX11 fall within Turpin's (1995:549-550) Blue Hills subperiod (2300-1300 B.P.). This raises the possibility that the other similar slab-lined basin hearths (and by extension perhaps a good number of the less well-preserved thermal features) at 41VV1207 date to the same period of prehistoric occupation.

Ecologically, the Blue Hills subperiod may have been a return to arid conditions following the relatively mesic 3150-2300 B.P. Cibolo subperiod of the Late Archaic (Turpin 1995:548-549). During the Cibolo subperiod, buffalo had re-entered the region, evidenced most dramatically in Bonebed 3 at Bonfire Shelter (Dibble and Lorrain 1968), and with the herds had come hunters bearing Montell and Castroville style dart points. These hunters apparently left with the buffalo when the climate became arid again, and the Lower Pecos was reoccupied during the Blue Hills subperiod by people from the deserts of northern Mexico (Turpin 1995). This is suggested by the appearance of Shumla style dart points, a type that may have originated in Nuevo Leon, Mexico, and that was apparently in use there from 3100 B.P. to 1850 B.P. (Turpin 1991), although dates on this point type from sites north of the Rio Grande are presently more uncertain (Turpin 1995). A decline in the use of Shumla points after 2300 B.P. corresponds with the appearance of Ensor and Frio dart points. These are common terminal Archaic types found across Central, South, and West Texas (Prewitt 1995), and characterize the latter part of the Blue Hills subperiod in the Lower Pecos.

The increased proportion of unifaces at many upland sites with Late Archaic dart points suggests an increased reliance on desert plant resources during this time (Turpin 1995:549). This is supported by coprolite evidence from Hinds Cave, where the percentage of coprolites containing bone fragments dropped from 97% in Middle Archaic samples to 64% during the late Middle Archaic and to only 53% during the Late Archaic (Saunders 1992:338). It is not surprising then that radiocarbon dates from slab-lined basin-hearth features (likely earth ovens associated with cooking plant foods) at 41VV1207 fall in the Late Archaic.

This dietary shift accompanies a change in settlement patterns, which Turpin (1995:556) interprets as a response to drying conditions. Settlements would have been concentrated near water and mobile task groups fanned out into the uplands to collect and process plant and animal resources. Site 4VV1207 may represent such a satellite processing site, but the numbers of projectile points suggest it may have been used by hunters as well. The lack of mussel shell in the excavated hearths at 41VV1207 is also consistent with this interpretation, in that it suggests that resources are not being transported from sites nearer water to the site, although this may simply be the result of poor preservation.

As indicated by Table 37, the rock ring structures of 41VV1207 appear to be mostly tipis, with one possible wikiup or small tipi. The possible wikiup is only 2.5 m across, but is set up as a tipi with six widely spaced rocks. In the field school manual, Collins et al. (1999:5) advised field school participants that tipi rings are typically large structures up to 8 m or more in diameter with relatively few rocks widely spaced bracing the large poles. Wikiup rings, on the other hand, tend to be 2-3 m in diameter with a more continuous ring of smaller rocks.

None of the thermal features at 41VV1207 are located at the center of any of the house structure rock rings. This reinforces the idea that the hearth features may date to an earlier time and pattern of land use than the rock rings. Similar rings of paired stones in the region are typically attributed to the Infierno phase (ca. 450-250 B.P.), although none have been securely dated. Infierno phase sites tend to be found on promontories, while 41VV1207 is in a wash. Moreover, the Perdiz style arrow points found here previously suggest an occupation by Toyah phase people rather than intrusive Infierno phase populations.

Alternately, if the house structures are contemporaneous with the terminal Late Archaic hearths, the site may represent a precursor of the type of occupation that was to follow. Further investigations will be necessary to unlock this site's mysteries, ideally with the excavation of an intact buried ground surface with both a house structure and datable thermal features.

That may not be too much to hope for. While many of the exposed features at this site have been badly eroded, some remain largely intact and still others—probably quite a few—remain safely buried. This site has great archeological research potential and remains at risk to erosion. Areas of this site may lend themselves to remote sensing methods that could help to locate intact buried thermal features or house structures. Excavation of such buried features and associated living surfaces may yield significant archeological information, particularly if radiocarbon dates or in situ diagnostic projectile points were found in association with a house structure.

FIELD SCHOOL CONCLUSIONS

The 1999 Texas Archeological Society (TAS) field school was a success on many levels. The Society's efforts produced more information about Late Prehistoric open sites with rock rings and ceramics, and generated a large amount of data on other kinds of sites as well through the survey and documentation work that was done. The archeomagnetic testing performed during the field school at a number of features at various sites found that "…these sites retained their archeological value, at least in terms of their magnetic signature, in spite of having been covered by the waters of Amistad Reservoir" (Gose in Gustavson and Collins 2000:30).

By also assessing potential impacts to sites from threats such as grazing domestic livestock, invasive clams, wave action, looting, and flood events, the field school has provided the NPS with the tools and information it needs to protect the fragile cultural resources within Amistad NRA. Furthermore, the field school provided educational and experiential opportunities for the youth and adult members of the TAS as well as research opportunities for graduate students.

A majority of the Late Prehistoric open sites given special attention by the TAS field school (with the notable exception of 41VV446) are located along alluvial terraces. Terrace sites even in small drainages were shown to have the potential to contain preserved and intact features (Gustavson and Collins 2000), with little admixture of materials from older or more recent occupations, allowing the association of specific types of features with diagnostic artifacts, other associated remains, and radiocarbon dates.

Turpin (1995:550) has stated that ring middens consistently date to the Late Prehistoric period, and identifies them as the signature of pit ovens used for cooking desert succulents such as lechugilla and sotol. We had hoped that the feature dataset from the TAS field school would allow the identification of other such temporally diagnostic and activity-specific types of thermal features. That has proven not to be the case, unfortunately, but radiocarbon dates from individual thermal features do allow us to state that certain types of features were being used at specific points in time. Perhaps future research can mesh these data with existing archeological data from other investigations in the region to provide a more robust dataset from which clearer patterns of prehistoric feature use will emerge.

The oldest features dated during the 1999 TAS field school were slab-lined basin-shaped hearths (ovens) FX11 and FX33 at 41VV1207. These both dated to the Late Archaic, and a Montell dart point was found in association with FX11. This type of feature remains in use in the area late into the Late Prehistoric period, as evidenced by FX4 at 41VV1752, also a slab-lined feature. AMS dating of this feature returned a 2 sigma calibrated age range of A.D. 1445-1645. One might be inclined to question this calibrated date from 41VV1752 given that a Fairland dart point was found in the feature, were it not for the date from another nearby feature at the site. This other feature (FX2) is a flat, rectangular hearth with a calibrated AMS age range of A.D. 1470-1660. Two different kinds of thermal features are present at 41VV661 and both were previously dated by Collins and Gustavson (1998:37). The oldest of these was an unlined basin hearth radiocarbon-dated by two charcoal samples to ca. 1320 B.P. and ca. 1250 B.P (A.D. 630-700). The more recent was the midden dated 660 B.P. (A.D. 1290) and subsequently excavated by the TAS field school.

Rock ring structures usually considered either tipi or wikiup rings are present at a number of sites in the area. One thrust of the 1999 site documentation fieldwork performed at the TAS Field School was to be on the look-out for these features, which are easily obscured by vegetation or disturbed by natural processes and human impacts. Collins et al. (2000:11) report that at Infierno Camp (41VV446), the inside diameters of wikiup rings range from 1.5-3 m, and that tipi rings range from about 4.5-7 m in diameter. At this site the 1999 TAS field school recorded 124 wikiup rings (with an additional 15 or more observed but not yet mapped) and seven tipi rings (Collins et al. 2000:11-12).

At 41VV1723, a total of 20 rock rings or features were recorded and mapped. Of these, six were classified as tipi rings and only one as a wikiup ring, with 10 unspecified rock rings. Comparing sites like 41VV1723 and 41VV661 with Infierno Camp (41VV446) may highlight the similarities and differences between occupations by Toyah phase groups in the Lower Pecos and the similar but different Infierno phase occupations. Ethnohistorical accounts document winter through spring buffalo hunts in the vicinity of the confluence of the Pecos with the Rio Grande by native groups (Wade 2003:57), and by large camps of intrusive Athabaskan-speaking peoples such as the Apache and Comanche (Kenmotsu and Wade 2002:124), activities that Turpin (1995:553) believes may be responsible for Infierno phase sites.

The rock ring structures present at 41VV1207 consist of five tipis and one possible wikiup. The possible wikiup ring is unusual, however, in that even though it has a diameter of only 2.5 m it is constructed of six widely-spaced large rocks like a tipi rather than the near-continuous arc of stones that are typical of wikiups at other sites in the area.

While Middle Archaic dart points (and some Early Archaic types) are not uncommon at these sites, the dominance of Late Archaic and Late Prehistoric diagnostic artifacts, radiocarbon dates, and structure types from such sites may at first glance give the impression that people in older Archaic times rarely saw fit to make camp anywhere but the shaded luxury of their rock shelters. A more reasonable explanation is that because terrace sites are prone to flooding from periodic catastrophic flooding, significantly older occupations have been either deeply buried or eroded away. It is probable that at many sites the latter may be the case, as Turpin (1982) reports massive erosion of deposits at Black Cave in Seminole Canyon around the onset of the Middle Archaic.

The assortment of artifacts excavated from the midden at 41VV661 is not terribly unlike the things recovered from rock shelters: bones of large and small animals, freshwater mussel shells, grinding stones, and evidence of cooking with hot rocks. This suggests (unsurprisingly) that subsistence activities at sites near rivers and streams were broadly similar in prehistoric times along the Lower Pecos regardless of whether or not there is an overhang up above. Rock shelters would of course be much more comfortable in inclement weather, and thus it seems plausible that some differences in seasonality of occupations might be observed, although none were evident from these excavations. Evidence of seasonality is perhaps more likely to be manifest in differences between riverine and upland sites, relating to seasonal targeting of particular resources such as the historically observed winter buffalo hunts. Such a seasonal focus on animal rather than plant resources may be a factor in the "striking" low frequency of burned rock at Infierno Camp noted by Collins et al. (2000:12). The bone-tempered plainware pottery sherd from 41VV661 is similar to sherds from other Toyah phase sites in the area, such as San Felipe Springs (Mehalchick et al. 1999).

Seasonality, or perhaps longer-term climate changes, may have played a role in the character of the Late Archaic occupation at 41VV1207. This site is located fairly high on a colluvial slope above a small dry wash that feeds into San Pedro Creek. This location does not provide its occupants with access to riverine resources such as mussel shells, fish, or water that would be present at river terrace sites such as 41VV661 or 41VV1723. What it may have offered instead was ready access to upland plant resources, which may have been a least risk response to environmental degradation. This adaptive pattern began in the Early Archaic (Brown 1991; Dering 1999) and may have intensified during the Blue Hills subperiod of the Late Archaic (Turpin 1995). The hearths and ovens at this site lack substantial midden accumulation or mussel shells. This may indicate that 41VV1207 was not a primary encampment but functioned as a satellite site, a place where plant-gathering parties accumulated and processed their harvests before bringing their products back to a main camp near a permanent water source, perhaps a rock shelter or a terrace site like 41VV661. This pattern of resource collection is suggested for the Late Archaic by Shafer (1986:96).

The tipi rings and arrow points at 41VV1207 suggest a change in land use with the beginning of the Late Prehistoric period. As the climate became more hospitably mesic, this Archaic outpost appears to have changed from being a workplace to a home, if only a temporary one for highly mobile people, perhaps buffalo hunters.

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REFERENCES CITED

Bement, L. C.
1986 *Excavation of the Late Pleistocene Deposits of Bonfire Shelter, Val Verde County, Texas*. Archeology Series 1. Texas Archeological Survey, The University of Texas at Austin.

Black, S. L. and L. W. Ellis
1997 Critically Recording and Observing Burned Rock Features. In *Hot Rock Cooking on the Greater Edwards Plateau: Four Burned Rock Midden Sites in West Central Texas*, by S. L. Black, L. W. Ellis, D. G. Creel and G. T. Goode, pp. 777-783. Studies in Archeology 22, Texas Archeological Research Laboratory, The University of Texas at Austin, and Report 2, Archeology Studies Program, Environmental Affairs Department, Texas Department of Transportation, Austin.

Black, S. L., L. W. Ellis, D. G. Creel, and G. T. Goode
1997 *Hot Rock Cooking on the Greater Edwards Plateau: Four Burned Rock Midden Sites in West Central Texas*. Studies in Archeology 22, Texas Archeological Research Laboratory, The University of Texas, and Report 2, Archeology Studies Program, Environmental Affairs Department, Texas Department of Transportation, Austin.

Blair, W. F.
1950 The Biotic Provinces of Texas. *The Texas Journal of Science* 2:93-117.

Boyd, C.E.
1996 Shamanic Journeys into the Otherworld of the Archaic Chichimec. *Latin American Antiquity* 7(2):152-164.
1998 Pictographic Evidence of Peyotism in the Lower Pecos, Texas, Archaic. In *The Archeology of Rock Art*, edited by C. Chippendale and P. S. C. Taçon, pp. 229-246. Cambridge University Press, Cambridge.
2003 *Rock Art of the Lower Pecos*. Texas A&M University Press, College Station.

Brown, K. M.
1991 Prehistoric Economics at Baker Cave: A Plan for Research. In *Papers on Lower Pecos Prehistory*, edited by S. A. Turpin, pp. 87-140. Studies in Archeology No. 8. Texas Archeological Research Laboratory, The University of Texas at Austin.

Byerly, R. M., J. R. Cooper, D. J. Meltzer, M. E. Hill, and J. M. LaBelle
2005 On Bonfire Shelter (Texas) as a Paleoindian Bison Jump: An Assessment Using GIS and Zooarchaeology. *American Antiquity* 70(4):595-629.

Bryant, V. M., Jr.
1974 Prehistoric Diet in Southwest Texas. *American Antiquity* 39: 407-420.

Bryant, V. M., Jr. 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, Jr. and R. G. Holloway, pp. 46-66. American Association of Stratigraphic Palynologists Foundation, Dallas.

Chaffee, S. D., M. Hyman, and M. Rowe
1993 AMS C^{14} Dating of Rock Paintings. In *Time and Space*, edited by J. Steinbring, A. Watchman, P. Faulstich, and P. S. C. Tacon, pp. 67-73. Occasional AURA Publication 8. Australian Rock Art Research Association, Melbourne.
1994 Radiocarbon Dating of Rock Paintings. In *New Light on Old Art: Recent Advances in Hunter- Gatherer Rock Art Research*, edited by D. S. Whitley and L. L. Loendorf, pp. 769-781. Monograph 36. Institute of Archaeology, University of California, Los Angeles.

Collins, M., J. Labadie, and E. R. Prewitt
2000 A Brief Account of the 1999 TAS Field School, Amistad National Recreation Area. *Texas Archeology* 44(1):9-17.

Collins, M. B., G. Bailey, J. Lakeman, S. L. Black, J. Labadie, and E. del la Rosa
1999 Manual for TAS Field School, Amistad National Recreation Area, Val Verde County, Texas June 12-19, 1999. Texas Archeological Society, San Antonio.

Dering, J. P.
1999 Earth-Oven Plant Processing in Archaic Period Economics: An Example from a Semi-Arid Savannah in South-Central North America. *American Antiquity* 64(4):656-674.
2005 Ecological Factors Affecting the Late Archaic Economy of the Lower Pecos River Region. In *The Late Archaic Across the Borderlines: from Foraging to Farming*, edited by B. J. Vierra, pp. 247-258. University of Texas Press, Austin.

Dering, J. P. (editor)
2002 *Amistad National Recreation Area: Archeological Survey and Cultural Resources Inventory*. National Park Service, Intermountain Cultural Resources Management, Santa Fe, New Mexico.

Dibble, D. S.
1967 Excavations at Arenosa Shelter, 1965-1966. Report submitted to the National Park Service by the Texas Archeological Salvage Project, The University of Texas at Austin.

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

Greer, J. H.
1968 Some Unusual Artifacts from Val Verde County, Texas. *The Texas Journal of Science* 20(2):183-192.

Gustavson, T. C. and M. B. Collins
2000 *An Assessment of Flood Damage to Archeological Sites in the San Pedro Drainage, Amistad National Recreation Area of Texas, August 1998*. The University of Texas at Austin.

Gustavson, T. C. and M. B. Collins (editors)
1998 *Geoarcheological Investigations of Rio Grande Terrace and Flood Plain Alluvium from Amistad Dam to the Gulf of Mexico*. Texas Archeological Research Laboratory, The University of Texas at Austin, and Archeological Studies Program, Report No. 12, Texas Department of Transportation, Austin.

Hammon, D.
2000 A Review of the Archeological Field Records from the 1999 TAS Field School at Amistad National Recreation Area, Del Rio, Texa*s*. Amistad National Recreation Area, Del Rio.

Hyman, M. and M. Rowe
1997 Plasma-Chemical Extraction and AMS Radiocarbon Dating of Pictographs. *American Indian Rock Art* 23:1-9.

Ilger, W. A., M. Hyman, J. Southon, and M. Rowe
1995 Dating Pictographs with Radiocarbon. *Radiocarbon* 37(2):299-310.

Johnson, L., Jr.
1964 *The Devil's Mouth Site: A Stratified Campsite at Amistad Reservoir, Val Verde County, Texas*. Archaeology Series 6. Department of Anthropology, The University of Texas at Austin.

1994 *The Life and Times of Toyah-Culture Folks as Seen From the Buckhollow Encampment, Site 41KM16 of Kimble County, Texas*. Office of the State Archeologist Report 38. Texas Department of Transportation and the Texas Historical Commission, Austin.

Kenmotsu, N. A. and M. F. Wade
2002 *Amistad National Recreation Area American Indian Tribal Affiliation Study Phase I: Ethnohistoric Literature Review*. Archeological Studies Program Report 34. Texas Department of Transportation, Austin, and The National Park Service.

Lundelius, E. L., Jr.
1984 A Late Pleistocene Mammalian Fauna from Cuerva Quebrada, Val Verde County, Texas. In *Contributions in Quaternary Vertebrate Paleontology: a volume in memorial to John E. Guilday*, edited by H. H. Genoways and M. R. Dawson, pp. 456-481. Special Publication of the Carnegie Museum of Natural History 8. Carnegie Museum of Natural History, Pittsburgh.

Malof, A. F.
1999 Findings from the 1999 TAS/ANRA Archaeological Site Impact Study. Report Submitted August 1999 in accordance with the requirements of Anthropology 6443, The University of Texas at San Antonio, Dr. Robert S. Hard, and National Park Service Requirements of July 1999.

McMahn, C. A., R. G. Frye, and K. L. Brown
1984 *The Vegetation Types of Texas, Including Cropland*. Texas Parks and Wildlife Department, Austin.

Mehalchick, G. and D. K. Boyd
1999 Water in the Desert: Prehistoric Occupations at San Felipe Springs. In *Val Verde on the Sunny Rio Grande: Geoarcheological and Historical Investigations at San Felipe Springs, Val Verde County, Texas*, pp. 149-160, by G. Mehalchick, T. Meyers, K. W. Kibler, and D. K. Boyd. Reports of Investigations No. 122. Prewitt and Associates, Austin.

Meltzer, D. J. and M. R. Bever
1995 Paleoindians of Texas: An Update on the Texas Clovis Fluted Point Survey. *Bulletin of the Texas Archeological Society* 66:47-81.

Norwine, J.
1995 Regional Climate of South Texas: Patterns and Trends. In *The Changing Climate of Texas: Predictability and Implications for the Future*, edited by J. Norwine, J. R. Giardino, G. R. North, and J. B. Valdes, pp. 138-154. GeoBooks, College Station, Texas.

Office of the State Climatologist
1987 *Climates of Texas Counties*. Graduate School of Business, The University of Texas at Austin.

Pearce, J. E. and A. T. Jackson
1933 *Prehistoric Rock Shelter in Val Verde County, Texas*. Anthropological Papers 1(3). The University of Texas at Austin.

Prewitt, E. R.
1995 Distributions of Typed Projectile Points in Texas. *Bulletin of the Texas Archeological Society* 66:83-173.

Russ, J., M. Hyman, H. Shafer, and M. Rowe
1990 Radiocarbon Dating of Prehistoric Rock Paintings by Selective Oxidation of Organic Carbon. *Nature* 348:710-711.

Saunders, J.W.
1992 Plant and Animal Procurement Sites in the Lower Pecos Region, Texas. *Journal of Field Archaeology* 19 (3):335-349.

Shafer, H. J.
1986 *Ancient Texans*. Texas Monthly Press, Austin.

Sobolik, K. D. (editor)
1996 *Nutritional Constraints and Mobility Patterns of Hunter-Gatherers in the Northern Chihuahuan Desert*. Plenum Press, New York.

Turner, E. S. and T. R. Hester
1999 *Field Guide to Stone Artifacts of Texas Indians*. Gulf Publishing Field Guide Series. Taylor Trade Publishing, Lanham, Maryland.

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

1984 The Red Linear Style Pictographs of the Lower Pecos River Region, Texas. *Plains Anthropologist* 29(105):181-198.

1986a Pictographs in the Red Monochrome Style in the Lower Pecos River Region. *Bulletin of the Texas Archeological Society* 55:123-144.

1986b Toward a definition of a Pictograph Style: The Lower Pecos Bold Line Geometrics. *Plains Anthropologist* 31 (112): 153-161.

1988 Seminole Sink: Excavations of a Vertical Shaft Tomb, Val Verde County, Texas. Memoir No. 22. *Plains Anthropologist* 33 (122, Part 2).

1990 Rock Art and its Contribution to Hunter Gatherer Archeology: A Case Study from the Lower Pecos River Region of Southwest Texas and Northern Mexico. *Journal of Field Archeology* 17(3):263-281.

1991 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 No. 8. Texas Archeological Research Laboratory, The University of Texas at Austin.

1994 The Were-Cougar Theme in Pecos River Style Art and its implications for Traditional Archeology. In *New Light on Old Art: Recent Advances in Hunter-Gatherer Rock Art Research,* Edited by D. S. Whitley and L. L. Loendorf, pp. 75-80. Monograph 36. Institute of Archeology, University of California, Los Angeles.

1995 Lower Pecos River Region of Texas and Northern Mexico. *Bulletin of the Texas Archeological Society* 66:541-560.

Turpin, S. A., M. Henneberg, and D. K. Riskind
1986 Late Archaic Mortuary Practices in the Lower Pecos River Region, Texas. *Plains Anthropologist* 31(114): 295-315.

U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS)
1982 *Soil Survey of Val Verde County Texas*. U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the Texas Agricultural Experiment Station.

Wade, M. F.
2003 *Native Americans of the Texas Edwards Plateau, 1592-1799*. University of Texas Press, Austin.

Weddle, R. S.
1968 *San Juan Bautista: Gateway to Spanish Texas*. University of Texas Press, Austin.

The 1977 Texas Archeological Society Investigations of the Sabina Mountain Number Two Site, 41EP4, El Paso County, Texas

David G. Robinson, with contributions from John E. Dockall and William L. McClure

ABSTRACT

The 1977 Texas Archeological Society Field School investigated the Sabina Mountain Number Two site (41EP4), an El Paso phase village in far West Texas. Led by William J. Mayer-Oakes and staff of the Cultural Resources Institute of Texas Tech University, the field school was designed as an educational field course rather than a strict research enterprise. The approach to the site employed surface sampling strategies and subsurface remote sensing. Excavation was limited to sample unit excavations and clearing of discovered features. The off-site survey also took a sampling approach for purposes of site-settlement analysis. These methodologies constrained any fine-grained analyses of artifacts and features, but the broader patterns so identified offer support for current models of prehistoric El Paso phase community and settlement patterns, arid lands agricultural strategies, and regional participation in social and economic networks.

INTRODUCTION

The 1977 field school of the Texas Archeological Society (TAS) excavated the Sabina Mountain Number Two site (41EP4) in El Paso County, Texas. A regional sample survey accompanied the site excavations. The site is a small village of the El Paso phase of the Jornada Mogollon tradition. Conducted chiefly as an educational project rather than a research investigation, the field school was directed by the Cultural Resources Institute (CRI) of Texas Tech University (TTU), headed by Professor William J. Mayer-Oakes. An antiquities permit issued by the Texas Historical Commission sanctioned the work. This article describes and analyzes the work of the 1977 field school and presents limited additional summaries and background on earlier work at the site by the El Paso Archeological Society (EPAS).

The Sabina Mountain Number Two site is located in eastern El Paso County on property of the Tigua tribe, formerly owned by the Horizon Land Corporation. The site lies in the Hueco Bolson, or basin, near the western flanks of the Hueco Mountains (Figure 1). The site lacks depth and consequently has many surface manifestations. This fact is key to the 20th century history of the site. For many years the site lay open to relic hunters, who dug for relics and left pot holes later reported and mapped by the field school. Avocational surveyors discovered the site in 1961 and entered it into the Texas State Archeological

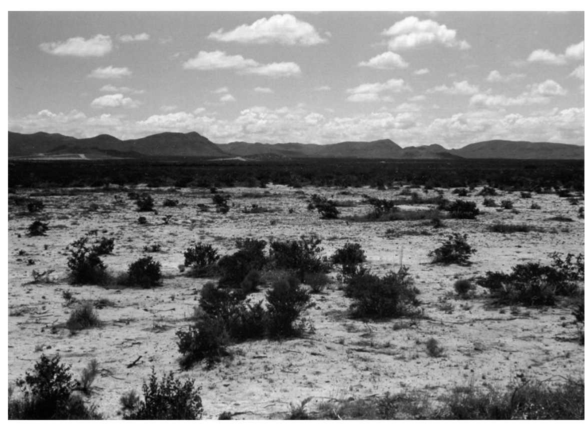

Figure 1. Sabina Mountain Number Two site (41EP4) general environment.

Site files. The discovery led to the first controlled excavations, from 1964 to 1967, by the EPAS.

HISTORY OF INVESTIGATIONS

The 1964-1967 El Paso Archeological Society Investigations

The initial phase of recorded excavations took place in 1964 and 1965 as short weekend and holiday operations on the site. This campaign was organized and led by Vernon L. Brook under the auspices of the EPAS. Crew composition and size fluctuated as a result of the intermittent nature of this effort, varying in number between six and 16 people. Known extant field notes are from September 25 and 26, 1964; December 31, 1964; and November 25, 1965. Brook (1980:15) reported that investigations continued as time permitted until 1967.

As with most worthy avocational efforts, the purpose of the excavations was the definition of site contents and spatial extent, with the specific focus on helping to define the regional distribution of adobe entrance steps, as recently identified at the Hot Well site (Brook 1980:15). Most of the site excavations were with shovels, most of that within pueblo rooms identified by wall lines on the surface. The common practice was to remove room fill down to an estimated 4 inches (10 cm) above the room floor. At that level, practice shifted to include the screening of excavated materials and the collecting and recording of artifacts and cultural remains. Notes were written on the room excavations, and photographs were taken of representative wall sections. Pollen samples were collected from floor fill.

Outside the rooms, surface collections were made with reference to a 200 x 10 ft. site grid system placed over the heaviest surface concentrations of the site (Brook 1980:20). In addition to this large grid system, two smaller localized metric grid systems were emplaced over a trash pit feature and a rock circle for purposes of excavation. Excavation within these metric grids was by 10 cm levels (Brook 1980:42).

Altogether, the 1964-1967 excavations accomplished a testing level of investigations, but without precisely establishing the site limits. Nine rooms were cleared by this effort. Additionally, three subsurface features and a trash pit were investigated. The rock surface pattern proved to lack any prehistoric cultural remains, and thus is probably a 20th century construction. Brook (1980:21) estimated the number of original Pueblo rooms at the village as between 25 and 50, based on the EPAS investigations.

The cultural assemblage was comprised of copious brown ware pottery, chert lithic debris, and burned rock. A few chert and other stone tools were recovered, as were a few items of bone, shell, and turquoise ornamentation. Animal bone was also found in all contexts. Plant macrofossils included charred kernels and cob fragments of maize, charred beans, and small sections of wood and brushy plant parts (Brook 1980).

The 1977 TAS Field School Excavations

The second phase of research investigations of the Sabina Mountain Number Two site (Figure 2) took place between June 11 and June 18, 1977, as the TAS Field School. The work was performed under a contractual agreement between the TAS and the CRI of TTU, directed by Professor William J. Mayer-Oakes. More than 200 Society members participated in the project.

An important stipulation in the TAS's contract with the CRI was that the project have a teaching/

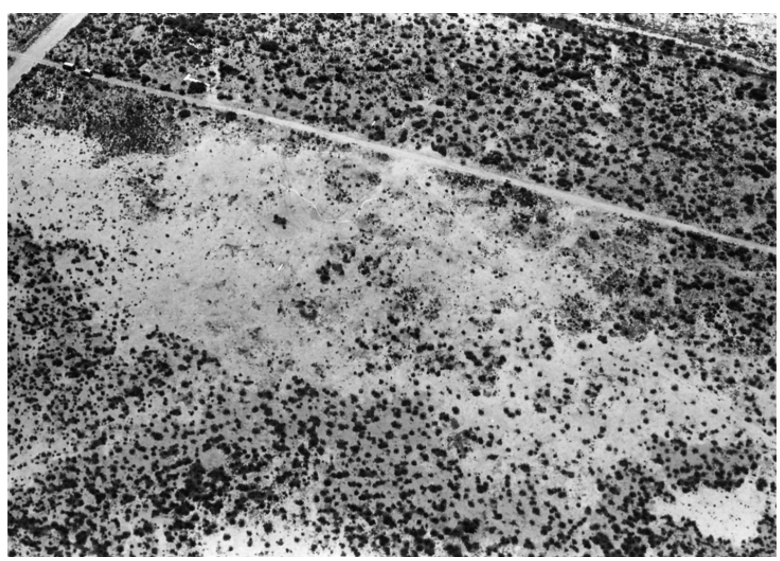

Figure 2. Aerial view of the site during preparations for the 1977 field school.

educational emphasis rather than a purely research orientation. CRI and Professor Mayer-Oakes observed this stipulation faithfully throughout the course of the field school. The objectives and goals of the excavations were stated in detail in all preparatory material, and the orientation was clearly enunciated as conservation archeology. In this theoretical approach to research, a commitment to non-destructive techniques and preservation of archeological materials—viewed truly as cultural resources—is articulated and applied in field archeology. Among other implications of this approach was the field school's application of subsurface remote sensing techniques to help define and characterize significant areas of the site without the use of large-scale excavations. Under the umbrella of conservation archeology, Mayer-Oakes and CRI formulated teaching goals on the theoretical, methodological, and field technical levels.

These goals broke down into three broad areas of field school activity: (1) site excavation; (2) on-site survey (surface techniques and remote sensing); and (3) off-site survey (site-settlement field survey). Professor Mayer-Oakes was the project and field director, and CRI staff supervised the three areas. Philip Bandy led the site excavations; John Montgomery conducted the on-site survey; and Alston Thoms headed the off-site survey.

Given the ambition of these operations, results and data accumulated enormously by the end of the week's fieldwork. In the site excavations, 122 TAS members excavated a total of 100 1 x 1 m squares. Previously investigated rooms 2 and 3 were re-excavated to offer training in the excavation of architecture. Additional contexts and features discovered by excavation included one extramural activity area, one refuse-borrow pit, a house floor previously located by remote sensing, and another pit incompletely delineated by the end of the field school (Mayer-Oakes 1979:14).

The on-site survey, conducted by a total of 91 people, focused on two categories of activity. The first was the surveying, recording, and collecting of defined travel corridors within the site (Figure 3). This effort mitigated the surface disturbance caused by the intensive foot-traffic of the large crew of site researchers. The second on-site survey category was non-corridor surface recording and collecting. Society members collected open surfaces by 1 m square collection units in addition to the corridor samples. Identified or suspected surface features were sampled also to aid in their characterization and interpretation. In all, 858 1 x 1 m squares were collected in this project effort. Additionally, four transects of varying lengths were mapped onto the site surface and completely collected regardless of feature/non-feature status. Some features, especially those of burned rock, were deemed too dense to collect physically, thus close-up photogrammetry was employed to record them. At the end of the on-site survey, a representative sample of the site surface had been gained by systematic methods, and numerous techniques had been demonstrated and taught (Mayer-Oakes 1979:14-15).

The off-site survey was a systematic sample survey of local Hueco Bolson environmental zones, with emphasis placed on teaching site identification and recording procedures. This branch of the field school effort was a field exercise in site-settlement analysis, whereby archeologists seek to discover ancient patterns of land use and subsistence practices. Ninety-four field school attendees participated in the survey, which covered approximately 600 acres by the pedestrian transect method. Each transect measured 15 m wide but extended to varying lengths in the progress of the work. Environmental zones sampled by the survey included Hueco Bolson flatlands, fields of sand dunes, arroyos, and ranges of intra-basin hills, or basin margins.

The survey discovered 37 sites, including lithic and ceramic scatters, lithic scatters, and hearth fields. The preponderance of ceramic sites contained diagnostics indicating prehistoric occupations during the Mesilla or El Paso phases. Functionally, the lithic and ceramic scatters may

Figure 3. Field school members at work during mapping operations.

have served as temporary campsites, and lithic scatters in gravel and sand microenvironments may have functioned as quarries and workshops. Two more complex sites were also found, one a probable architectural site belonging to the Dona Ana phase, and the other was a zone of more than 20 small burned rock middens thought to be part of an Archaic base camp (Mayer-Oakes 1979:15-16).

SETTING

Physical Setting

The site lies in the Hueco Bolson, an intermontane lowland that is part of the vast Southern Basin and Range physiographic province of North America. The province was formed in the tectonic upheavals of Tertiary times, which raised the Rocky Mountains and gave western North America the character it displays to this day. Regionally, the topography is block-faulted mountains alternating with normal-faulted basins filled thickly with unconsolidated sediments washed out of the mountains. The mountains expose widespread limestone formations as well as a wide variety of igneous rocks. Sandy soils of the Hueco-Wink association form on the local outwash deposits; horizons of this soil association are as much as 50 cm thick over caliche, i.e., calcium carbonate deposits formed in soils with high evapotranspiration rates. Rocks for building and stone tool making outcrop plentifully in the Hueco Mountains to the east and the Franklin Mountains to the west. Clay, of many uses, forms and accumulates in various basin microtopographies.

The Chihuahuan Desert life zone, comprising many desert-adapted plant and animal species of taxonomic distinction, overlies this physiography. The site and environs support a prevailing creosotebush-mesquite community with additional members of snakeweed, yucca, and cactus species (Figure 4). Mammals available for hunting are mule deer, antelope, jackrabbit, cottontail rabbit, rats, mice, and shrews.

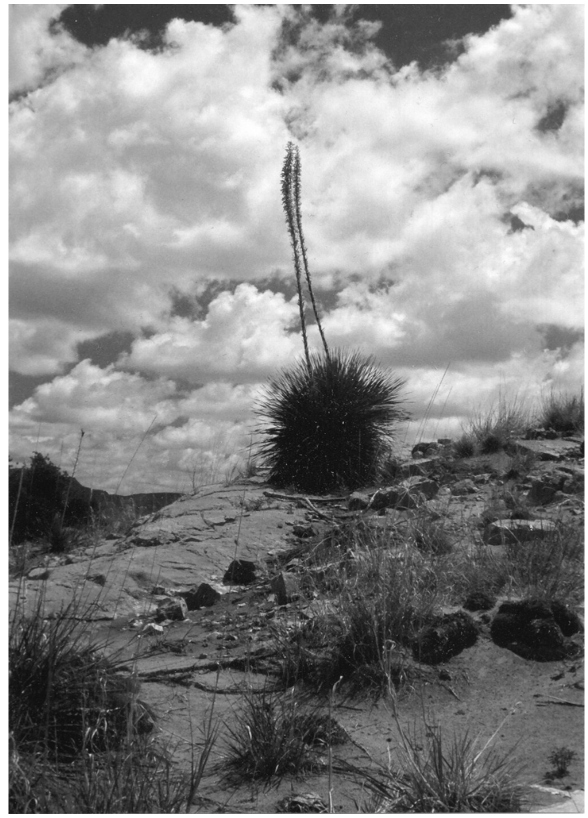

Figure 4. Typical ground surface and plant growth.

The desert nearby receives in modern times, on average, variously 7.77 inches of rain (Handbook of Texas Online 2004), 7.89 inches of rain, or 8.65 inches of rain (Portnoy 1977) annually. All figures lie well within the limits set for a desert climatic regime. Most of the rain falls in the summer in high-intensity thunderstorms accompanied by rapid runoff. Humidity remains low throughout the year, evaporation is high, and the differences between day and night temperatures are wide and fluctuating. Temperature swings are due partially to the generally high altitude of El Paso County, from 3500 feet above mean sea level along the Rio Grande to 7000 feet at the summits of the Franklin Mountains. The modern growing season is 248 days long. The Sabina Mountain Number Two site lies more than 500 feet higher than the river, at 4020 feet, and the growing season at the time of its prehistoric occupation may have fallen short of 248 days by several days or even a few weeks.

Even so, the effective growing season may have sufficed for many crops, but the amount and periodicity of rainfall would have been a continuing concern for any aboriginal folk attempting plant cultivation. Garden cultivation under irrigation is feasible in all areas away from the river in the modern regime, and water collection and retention would have been possible at the outwash fans at the base of mountains and basin margins, and at the mouths of arroyos in the basin flats (Handbook of Texas Online 2004; Texas Beyond History website 2004).

Cultural Setting

Both the 1964-1967 EPAS and 1977 TAS Field School excavation campaigns at the Sabina Mountain Number Two site identified it as a Puebloan village of the El Paso phase of the Jornada Mogollon culture. These attributions place the site occupation within the conventionally accepted sequence proposed by Lehmer (1948). The investigations also, with evidence, position the site's occupation near the end of the prehistoric period, given the El Paso phase dates of A.D. 1200 to 1450.

The cultural antiquity of the Hueco Bolson and wider Jornada Mogollon area, however, extends back before 6000 B.C., and perhaps as early as 9000 B.C., to the time of Paleoindian hunters and gatherers. Diagnostic artifacts datable to that time indicate that the area was used in Paleoindian times; occupation sites are comparatively rare. The predominant Paleoindian finds belong to the Folsom complex, with a few from the earlier Clovis period. A variety of Late Paleoindian projectile points have been found, including artifacts of the Angostura, Agate Basin, Cody, Plainview, and Firstview types. Find spots are typically lower playa margins, former ponds, and dune blowouts in which the dominant modern processes are alternating exposure and colluvial/aeolian burial. A few kill sites, butchering stations, and other small procurement locales are also known from these microenvironments. Larger logistical camps or staging areas have been identified in the mountain foothills and canyons, and there is suggestive evidence that regional mountain caves were occasionally used or occupied by Paleoindian people. Throughout the period, the sites and artifact sets of the Paleoindians suggest highly mobile societies with economies directed toward big game hunting (Carmichael 1985:10-11, 1986:7-11).

Changes in climate, megafauna extinctions, and the related regionalization of culture gave rise to the Archaic stage, of great duration in western North America where it is denoted by the term Desert Culture. The stage is marked by distinctive and variable regional adaptations, characteristic of the entire continent at that period. Wide varieties of edible and useful plant resources were collected, especially edible seeds, and the first evidence of cultivation of plants dates to the latter parts of this stage (maize and beans; Wills 1988). Seed gathering, however, is the hallmark of Archaic economies. The long period was aceramic, with the exception of a few scattered finds of plain pottery late in the stage. Ground stone artifacts in a wide variety of shapes and types are common indicators of Archaic camps and processing areas. Within and near the Hueco Bolson and Tularosa basins, Archaic components are found in rockshelters and widely distributed small open sites. Near the Rio Grande, small hamlets with circular pit shelters have been excavated (O'Laughlin 1980). These manifestations comprise a regional phase named the Hueco Basketmaker phase, or simply the Hueco phase (Brethauer 1977:6), although some have dropped the appellations altogether as having too much potential for terminological confusion and a strong suggestion of influence from Anasazi Basketmaker regions far to the north (Carmichael 1985:11-13, 1986:11-13).

The Archaic stage persisted regionally until about A.D. 500-600 and the period of quasi-sedentary horticultural hamlets and villages of pithouses and other forms of semi-permanent architecture, and a reliance on ceramic technology. All these material features are defining elements of the Formative stage. The appearance of these cultural elements inaugurated the first of Lehmer's sequence of three phases: the Mesilla phase (A.D. 500-1100), followed by the Dona Ana (A.D. 1100-1200) and El Paso (A.D. 1200-1400) phases. The Dona Ana phase is characterized also by pithouse architecture with a few surface buildings. The El Paso phase reflects an area-wide and committed shift to above-ground, contiguous room architecture. Altogether, Lehmer's phase sequence describes a branch of the regionally broad Southwestern Mogollon culture.

The broad outlines of Lehmer's sequence have stood up since the 1940s, but recent summaries of subsequent research have fleshed out the basic framework (Carmichael 1983, 1986; Shafer et al. 1999). The discovery of Archaic pithouses (O'Laughlin 1980) caused some redefinition of the essential features of both earlier and later manifestations. The origins of the Mesilla phase were defined simply as the phase marked by the initial widespread use of ceramics. "In fact, general similarities to the Archaic with regard to site size, contents, and distributions suggest that much of the Mesilla phase represents essentially an Archaic adaptation with the addition of ceramics" (Carmichael 1985:14).

The growth of pithouse villages in the Dona Ana phase has been confirmed, as has the appearance of some above-ground adobe room structures in Dona

Ana villages. Originally thought of by Lehmer (1948) as a transitional period between Mesilla and El Paso manifestations, the earliest Dona Ana hamlets show a continuing reliance on hunting and gathering and only a tentative acceptance of agricultural products such as maize, beans, and squash; in other words, these people of the Dona Ana phase maintained an Archaic economic pattern with the addition of new architectural elements. A trend of increasing reliance on agriculture, or at least agricultural products, gradually reduced the proportional contribution of wild plants and animals to the Jornada diet and lifeways, but these foods were never entirely abandoned. Site locations near the mouths of canyons and the bases of alluvial fans suggest some residence near fields of cultigens planted in zones of higher soil moisture content. At this time also, the region may have started participating in the Casas Grandes Interaction Sphere, centered in the basin and range of northern Chihuahua (Carmichael 1985:15; Schaafsma 1979; Wimberly 1979).

By about A.D. 1200, artifact assemblage changes and a near-total conversion of village domestic architecture to above-ground adobe rooms on rectilinear patterns brought about what has been named the El Paso phase. It was a time of population increase, probably marking the prehistoric maximum population density in the Hueco Bolson. Remains of maize, beans, and squash are more common in El Paso phase villages than in earlier village sites. Settlement locations on upper basin margins, mountain foothills, and at the mouths of canyons descending from the mountains, continued from Dona Ana times (Brethauer 1977:6-7). Villages were also located along the Rio Grande (Carmichael 1985:16). As El Paso phase society became more reliant on domesticated foodstuffs, so did the strength of interregional interactions and trade. El Paso Brownware pottery appeared in the early Mesilla phase, but by the El Paso phase the forms and varieties of this local ware and the numbers of extra-regional wares had proliferated greatly, as had amounts of non-local turquoise and marine shell jewelry (Brethauer 1977:6-7).

In terms of cultural dynamics, these increases in material and economic complexity corresponded to the rise in influence and dominance of the great cultural center of Casas Grandes in northern Chihuahua. The wide distribution of Chihuahuan ceramics such as Playas Red Incised and other fine wares throughout the Jornada Mogollon attests to this set of relationships. Close interdependence of the Casas Grandes center with the Jornada Mogollon hinterland is suggested also by their closely corresponding terminal dates, namely A.D. 1450 (within the Tardio period at Casas Grandes; LeBlanc 1980). Major construction ceased at Casas Grandes at about this time, although people continued living there, but almost all El Paso phase villages were abandoned, and regional populations dropped sharply (Miller 2001:105-108). The decline was so pronounced that the first European encounters with native peoples in the 1580s recorded only a few hunting and gathering groups in the region (Brethauer 1977:7; Carmichael 1983:17; Miller 2001; Schaafsma 1979; Shafer et al. 1999; Wimberly 1979).

Settlement Archaeology in the Hueco Bolson

The prime motivator of settlement archeology research in the Hueco Bolson has been the cultural resource assessment requirements of Fort Bliss maneuver areas and ranges. The result has been the near-total archeological and historical survey of the Hueco Bolson and a large proportion of the Tularosa basin immediately to the north in New Mexico. This work has been primarily site survey and analysis and parallel studies; altogether it has heavily influenced current understandings of the prehistoric cultural traditions of the Jornada Mogollon.

Whalen (1977, 1978), in two projects, surveyed wide areas of the Hueco Bolson. Carmichael (1986) later investigated the Tularosa Basin. Table 1 summarizes their work, especially regarding the numbers of El Paso phase sites found during each survey effort.

El Paso phase components were discovered in all environmental subzones of the two basins, but the village sites clustered significantly on and below the alluvial fans, or talus slopes, at the foothills of the mountains and also near playas, notably Lake Lucero in the Tularosa Basin. These locational trends were pioneered in the Dona Ana phase, and they are thought to have involved exploitation of sheet wash and arroyo-channeled runoff from summer downpours as water resources for cultivation. This locational pattern also shows a correlation between the locations of El Paso phase villages and the superior water-retaining Mimbres series soils (Kosse 1977). Limited activity and resource procurement sites are distributed widely

Table 1. Site settlement research in the Hueco Bolson and southern Tularosa Basin.

	Whalen (1977)	Whalen (1978)	Carmichael (1986)
Area surveyed	103 square miles	88.63 square miles	991 square km
Number of prehistoric sites	414 (429) components	1421	5974
El Paso phase sites/components	220	123	185

throughout the basins and mountain foothills. These sites very likely formed out of a logistical strategy of collecting plant foods, fibers, and medicinal plants such as mesquite, chenopods, amaranths, sotol, lechuguilla, and yucca. They then would have been returned to the villages for processing and consumption (Whalen 1977:141).

The intensity of site settlement research in the basins is not matched in the upland segment of this basin and range region. The natural area survey of Betancourt and Ralph (1981) in the Hueco Mountains fortunately took place a few miles eastward of the Sabina Mountain Number Two site and its off-site survey zones. Although nearby in terms of linear distance, the survey in the remote and rugged mountain zone engaged a completely different set of methodological challenges than those encountered in the low and gently sloping basins. The mountain survey as a result was a targeted reconnaissance survey that largely covered the wide canyon floors and canyon flanks. Despite this topographic emphasis, however, approximately 15 percent of the surveyed area lay on the mountain flanks and saddle ridges between peaks. A total of 41 sites were recorded, inclusive of Historic sites (Betancourt and Ralph 1981:94). The prehistoric sites covered a temporal range from the Archaic through the El Paso phase. Three El Paso phase sites were found, one of which was a multi-component site, possibly a small village (Betancourt and Ralph 1981:96-99 and Figure 5). These findings are sufficient to cast some doubt on a picture of Jornada Mogollon, and in particular El Paso phase, settlement as centered on villages centrally located on basin flanks and near major playas, with limited activity and procurement camps on dry basin bottoms and in mountain slopes and canyons.

Dockall (1999) summarized the various settlement models of the Hueco Bolson in an attempt to clarify modern understanding of Jornada Mogollon settlement and identify problem areas for further research. Whalen (1977, 1981, 1994) presented the dominant formulation, stemming from research in the Hueco Bolson. His model centers on land-use strategies and the shifting availability of subsistence resources through the year. From early Pithouse (Mesilla) times, Hueco Bolson human groups practiced residential mobility throughout the area, locating their sites where and when water and ripening foodstuffs became available. They built pithouses and other shelters in their camps when needed. This pattern in its essence was a continuation of successful and long-standing Archaic economic strategies. The pattern changed with the Pithouse to Pueblo transition, and it is observable in locational shifts of larger villages from the low basin floors to the basin flanks and mountain foothills, zones more favorable for cultivation. Limited activity sites remained numerous on the basin floors, reflecting continued collecting of foodstuffs there on a logistical rather than on a foraging basis. Increasing population and a heightened reliance on agriculture motivated the Pithouse to Pueblo transition.

Hard's (1983) model offers conceptual contrasts with Whalen's. Early Pithouse mobility was a response to differences in water availability in the winter and summer. Summer camps and hamlets dotted the basin bottoms where seasonal water ponded in playas and arroyos. Winter camps were on the basin flanks. Hard (1983) also posited a shift from a circulating pattern of sites, moving when needed in the Early Pithouse period to a radiating settlement pattern in the Late Pithouse period. A radiating pattern is one where residential sites are occupied longer in time, and residents conduct activities in smaller special task sites radiating outward from the main base camp. Mauldin

(1986) added the Pueblo (Dona Ana and El Paso phases) period to this scenario by explaining that the agricultural villages along the Rio Grande and the basin flanks were the primary sites, given the heightened importance of agriculture in meeting caloric needs. Secondary sites in the system would be occupied in the summer at the beginning of the rains and before the harvest. Both Whalen's model and Hard's and Mauldin's composite model assume significant degrees of annual mobility to accommodate fluctuations in water and food resources.

The adequacy of seasonal rainfall is a critical issue in all models of Jornada Mogollon subsistence and settlement patterns. The models advanced to date assume that the summer rainfall pattern of adiabatic thunderstorms was in place from the beginning of the Pithouse period to the present. Two allied issues remain open and worthy of consideration: (1) the total amount of seasonal water may have fluctuated as a product of paleoclimatic change, and (2) the use of irrigation technology may have enhanced available seasonal water. Both of these issues deserve brief mention since they are relevant aspects of the cultural and environmental context. Regarding the first point, the Hueco Bolson has suffered a dearth of direct paleoclimatic studies employing proxy data categories with which to reconstruct past climates, but wider regional and areal studies show that the desert Southwest from about A.D. 1200 to 1400 was a drier time than today, with slightly wetter conditions around A.D. 1450 (Bryson and Baerreis 1968; Gunn 1987; Hall 1985; Malde 1964; Martin 1967). On the issue of irrigation to heighten or intensify agriculture in the Hueco Bolson, both Whalen (1977) and Kosse (1977) posited small scale systems that left no archeological traces, but elsewhere in the Mogollon region, exactly these types of irrigation technology (i.e., check dams and stone lines directing runoff) have persisted and mark the landscape still (Creel 1988; Doolittle 1985; Neely 1992a, 1992b). Ancient reservoirs in the Bolson and nearby (Leach et al. 1996; Scarborough 1988) were probably municipal utilities built to provide water for human consumption. Thus it is most likely that irrigation to support agriculture was not practiced in the Hueco Bolson.

SITE ANALYSIS

The Sabina Mountain Number Two site (Figure 5) received an intensive investigation by the 1977 TAS Field School, but most of the observations were of its highly disturbed surface manifestations. The field school emptied the backfill and coverings on two pueblo rooms excavated in the 1964-1967 EPAS excavations in order to provide experience

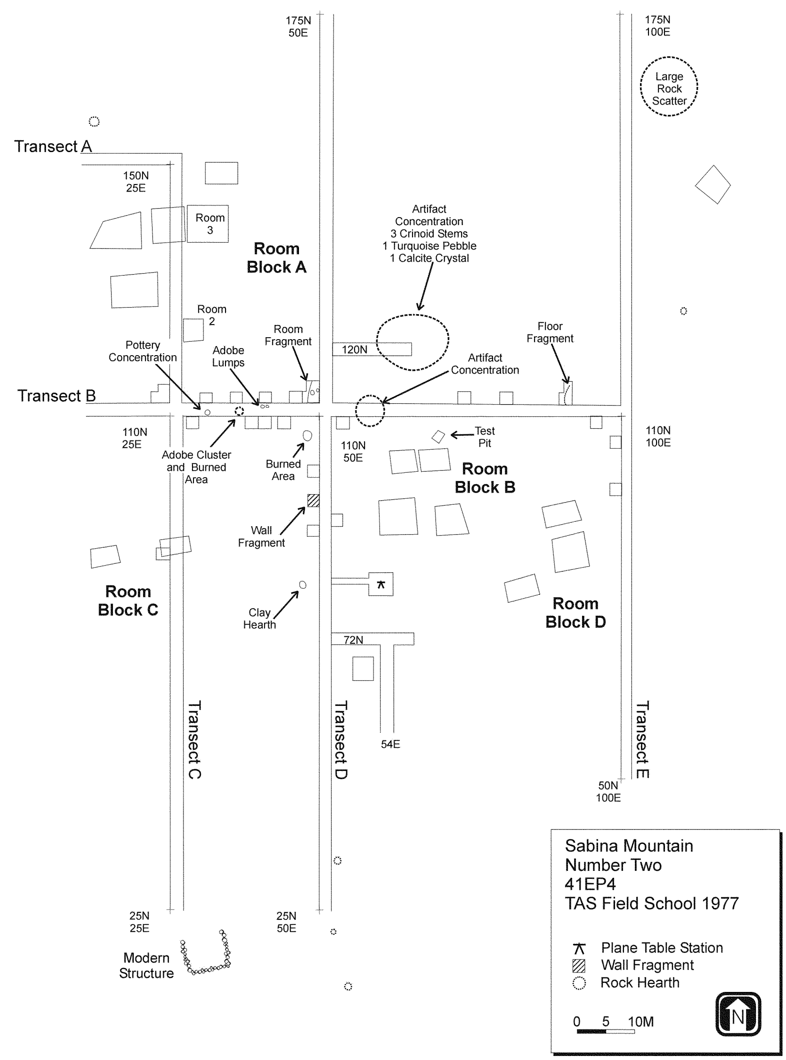

Figure 5. Site Plan of the Sabina Mountain Number Two Site.

in excavating Pueblo architecture. The rooms were Room 2 (Brook 1980:26-27) and Room 3 (Brook 1980:28-29). The investigators observed and recorded additional fragmentary architectural remains and constructed features in the numerous surface collection units at the site. The rooms and features were described on field excavation forms and then also photographed (Figure 6). The site's features lay in a highly eroded and displaced condition, and observations were necessarily of a summary nature. Locational references reported here are to the site-wide 1 m grid system emplaced before the start of the field school and oriented to magnetic north.

Room 2

The room was originally very shallow, such that some excavators stated that it had not been backfilled in the 1964-1967 excavations, but left open to erode further and collect windblown deposits. This situation was offered in excavation notes to explain the lack of any prepared floor when the room was cleared. Other excavators reported removing backfill; therefore, the room deposit situation remains uncertain. The room's general location was given as 120N 27E. Room 2 was off-square in plan (Brook 1980:26-27), forming a slight trapezoid. Its dimensions and area are given in Table 2.

Table 2. Dimensions of Room 2.

Room 2	
North wall	4.4 m
East wall	3.05 m
South wall	3.92 m
West wall	3.21 m
Room area	12.58 m^2

Figure 6. Foundation lines of pueblo rooms. Note adobe construction.

The material of the walls was not described, but puddled adobe or adobe blocks are ubiquitous on the site. It is probable that field note takers assumed that this material was used, as wall materials were never described in any excavation notes. Photographs show adobe to be the common building material. The walls lacked any features such as niches for storage or seating of roofing elements. A hearth or firing area was identified along the center of the south wall; this find was made within a few hours of the end of the field school. Understandably, efforts focused on clearing the feature, but a description of the hearth/firing area and its composition is lacking, and it was not drawn on the room plan. Its location along the center of the south wall is in common with the hearth in Room 3 and with other regional Puebloan dwellings (Brook 1980:27).

Room 3

Room 3 was located at the 135N 27E grid point, and the structure retained much of its backfill. Excavators uncovered the wall lines readily but failed to describe them. Puddled adobe and limestone blocks are the presumed building materials, based on their presence elsewhere on the site. The room was described in plan (see Figure 5) as a rough square when cleared to the floor level (Table 3). Packed earth formed the floor. Floor intrusions such as post holes, pot holes, and the hearth were clearly observable within it.

Table 3. Dimensions of Room 3.

Room 3	
N wall	6.4 m
E wall	6.16 m
S wall	6.19 m
W wall	6.37 m
Room area	39.43 m^2

The TAS excavators found a hearth near the doorway midway along the south wall. The fire pit measured 24 cm in diameter and sank to a depth of 8 cm. Presumably, packed earth or puddled adobe formed the feature. The excavators' field excavation record plan showed two doorways in the room, one each in the north and south walls. The doorways sit slightly west of the center point of their respective walls, but they are offset with respect to each other. The south doorway was hard to discern in the wall, but this effort was aided by the presence of a low step northward into the room. The north wall doorway also had a northward step, out of Room 3 or into a former contiguous room north of Room 3.

A series of post holes along the west side of the room may have been part of an internal construction such as a jacal screen or turkey pen (Brook [1980:42] reported more than 300 pieces of eggshell from the excavated extramural pit feature. These may have been from turkey eggs). Two small post holes between the hearth and the south doorway may indicate supports for a windscreen. The four larger post holes formed an approximate square in the middle of the room, indicating they are the remains of the roof supports, perhaps implying a roof pattern of primary beams laid perpendicularly and parallel to the wall lines.

Room fragment

A hard-packed section of dirt floor abutted to a definite wall line was identified in surface collection square 110N 48E (Figure 7). The hard-packed earth covered approximately one-quarter of the east side of the square and was not found in any adjacent square. The wall line extended south to north through the square and also through 111N 48E, where a large chert flake lay embedded on the floor side of the wall (east). An adobe chunk 25 cm long by 20 cm wide was found melded with the floor near its juncture with the wall in 110N 48E. It is likely that the adobe chunk was wall material that fell from the wall, probably post-abandonment, and became incorporated into the floor. A floor surface in non-contiguous square 112N 49E extended to an east-west wall line. That floor surface also had a 20

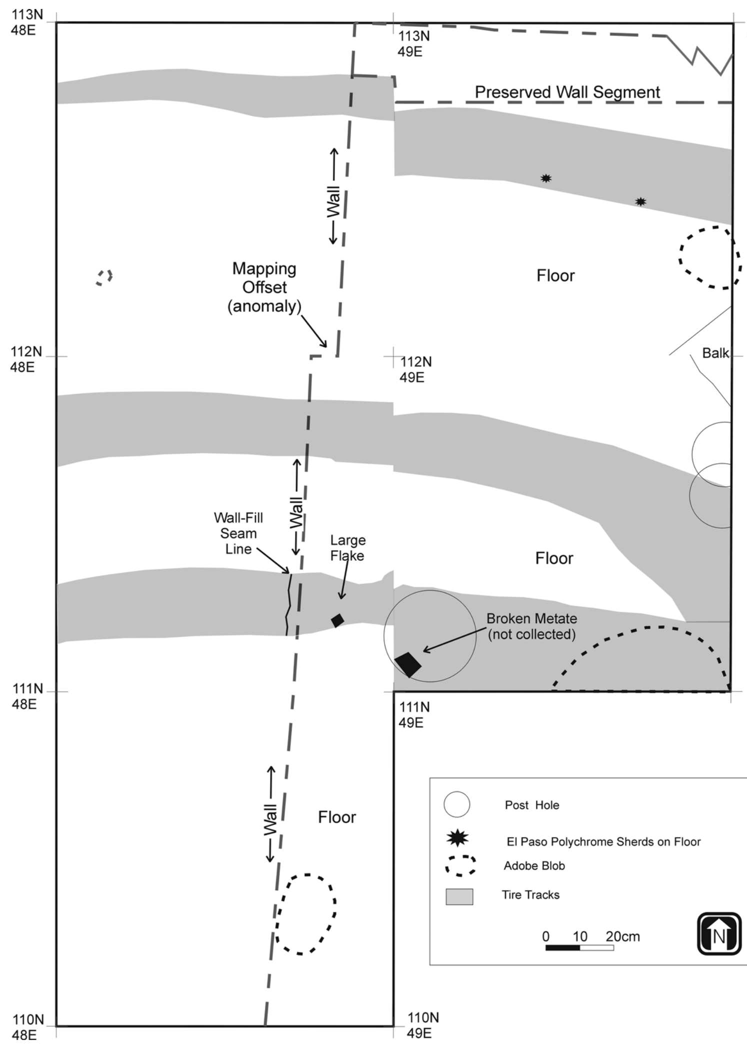

Figure 7. Plan of Room Fragment.

cm adobe chunk worked into it. The floor surface in 111N 49E was heavily disrupted by tire tracks, but it clearly revealed three post holes, two of which had overlapping outlines. These room features, in four contiguous grid squares, are sufficiently coherent to define a shallow, disturbed room.

Floor fragment

One fragment of an ancient floor surface was unearthed in 112N 91E (see Figure 5). The floor fragment consisted of an irregular strip of compacted earth arcing from the southeast grid corner and east wall into the north wall. The floor fragment lacked sufficient associated constructed features to confirm its existence as the interior floor of a room. Thus, interpretation of the floor fragment widens to include possible functions as an outdoor plaza area or an activity area under a roofed patio.

Wall fragment

One portion of a wall was cleared in the southwest corner of grid square 93N 49E (see Figure 5). The direction and extent of the adobe wall cannot be determined because of a large tire track that obscured it and much of the rest of the square. The wall section was found about 10 cm bs. Any interpretation of the wall section would be highly speculative.

Adobe Lumps and Post Hole

Grid square 111N 40E (see Figure 5) had irregular masses of adobe throughout the square and a 10 cm diameter post hole in the northwest quarter. The adobe mass best defined was approximately 20 cm in diameter. As the square lacked any defined floor surface, these materials may have fallen outside a nearby room after abandonment. The post hole may indicate an extramural construction.

Adobe Cluster

Squares 110N 35E and 111N 36E (see Figure 5) yielded five scattered oblong adobe chunks about 10 cm bs. They lacked other associated features. The single fully outlined chunk measured 50 cm long by 20 cm wide. They appear to be the common wall-building material of the site, but more detailed interpretations are not possible with the limited available information.

Hearths/burned Areas

Two hearths or burned areas were found in the on-site sampling work. They may have functioned as hearths, but they lacked any formal construction (rock linings, pits) usually associated with hearths. The term burned areas is more descriptive; the term hearths is more interpretive: both are justified and used interchangeably. The first burned area was identified by irregular stained patches ranging from light to dark gray in color in parts of four grid squares: 106N 44E, 106N 45E, 107N 44E, and 107N 45E (see Figure 5). The longest dimension of the three largest patches was about 40 cm. A roughly circular burned area was 13 cm in diameter. Associated features such as floors were lacking in the four squares.

The second burned area was uncovered in 111N 36E (see Figure 5), and consisted of two discontinuous dark, rounded stains in the western half of the square. A 12 cm diameter ashy area near the northernmost of the two stains contained a large chunk of wood charcoal. An adobe chunk was found in the southeast corner of the square. It measured 15 cm long by 10 cm wide. The stains and adobe chunk lay about 8 cm bs. The lack of other constructed features and materials suggests a simple extramural hearth.

Pottery Concentration

A concentration of pottery sherds reported as being from a single vessel was found in the northeast corner of square 111N 30E (see Figure 5). The portion in the square measured 25 cm^2, but it extended into unexcavated squares. Examination of the ceramics, however, showed the pottery concentration to be comprised of 21 small sherds of El Paso Brown, two sherds of El Paso Red-on-Brown, one sherd of an unknown polished plain ware, and 70 small fragments too small to attribute to a type or ware. The elevation below the ground surface was not reported.

SPATIAL RELATIONSHIPS

The field school on-site survey resulted in a large volume of records and collected cultural remains. The artifact collections came from corridor sections, surface collection units, excavation squares, and the clearance of the two architectural rooms excavated previously by Brook (1980). The large volume of finds, varying collection unit sizes and shapes, and non-uniform collection techniques render infeasible a computer surface density map, the near-classical surface analysis technique of 1970s archeology. This is not to say that valid artifact and feature patterns are not observable with the information obtained from the surface and near-surface collections. The most general observation that can be made is that extramural features and architectural fragments cluster in the northern half of the site, among the known room blocks (see Figure 5). Furthermore, within this area, the preponderance of artifact and residue clusters and architectural fragments lie in a broad band between room blocks A and B. This zone of concentration sweeps diagonally with reference to the site-wide grid and describes the heart of the site's cultural and behavioral activities. Detailed discussions are given below, following a methodological note justifying the combined use of surface and subsurface data.

The findings and much of the critical data gained from the remote sensing exercises conducted by Philip Bandy are not reported here, nor have they been recovered in the records. It is unfortunate that the potential of these pioneering efforts may well be lost.

A Note on the Ground Surface and Comparability of Artifact Patterns

A basic division of the work on the Sabina Mountain Number Two site was that between surface and subsurface efforts. Finds deriving from this dichotomous approach were bagged and catalogued in observance of this distinction. It is implicit in this work and at excavation sites everywhere that objects and patterns in the separate realms of surface and subsurface contexts have differing comparability, or are at odds in their implications for spatial analysis and past cultural occupation of the site. At most sites, especially those deeply stratified and with multiple components, this is indeed the case and analytic caution must be observed. However, the environment, history, and especially the ground surface of the Sabina Mountain Number Two site altogether blur this otherwise sharp distinction. Both classes of artifacts and features may be compared with equal precision in their application to studying the past life history of the site.

Two physical facts about the Sabina Mountain Number Two site environment may be used to construct an argument that surface and subsurface classes of items compare with each other and can be compared equally to in situ architecture and cultural features. The first fact is that the cultural levels of the site have always been shallow, some perhaps surface-exposed since they were formed. The vertical distance between surface and subsurface artifacts has never been great, perhaps no more than 30 cm. It is therefore of dubious validity to claim that subsurface artifact patterns in context have any more accuracy in informing about surface architecture than surface artifact patterns in context.

Secondly, the ground surface here is a spatially shifting reality. Field notes and forms commonly reported the dominant soil formation process as wind deflation, falsely implying a vector. It was also commonly observed that the Hueco Bolson is a dune-forming environment. Dune formation processes move masses of wind-responsive, or aeolian, particles (fine sand-sized and smaller) downwind. When a dune forms over any given point, the ground surface elevates to the maximum height of the dune. Within and below the dune deposits, larger, non-wind-responsive particles move vertically and horizontally significant distances by means of bioturbation. Creosotebush roots, burrowing invertebrates, reptiles, rodents, and perhaps some burrowing birds move larger particles in all directions. As the dune continues downwind, larger particles descend to a common level, that being the new ground surface behind the dune. Aeolian transport proceeds until the surface stabilizes, composed of larger particles. Therefore, the ground surface in a dune-forming environment may be thought of by the concept of oscillation or cyclation rather than a vector.

More significantly for artifact patterning at the Sabina Mountain Number Two site, the forces of dune formation and transit play equally on surface and subsurface artifact patterns, subjecting them to disruption, burial, and re-exposure repeatedly, thus giving them equivalent degrees of integrity. In consequence, the integrity of the artifact patterns can be assessed by the same evaluative criteria, whether they came from surface or subsurface proveniences. The patterns can then be applied in concert to site spatial pattern identification and interpretation.

An examination of the sketch plans of the surface collected units (exclusive of 1 x 1 m square units) provides an illustration of the surface composition of the site and its wide variation. The units varied in dimensions from 2 x 2 m to

2 x 5 m in size. Typically, surface collectors drew in on sketch plans the areas covered by dunes, deflated surface (usually denoted as hardpan), dense vegetation, tire tracks or roads/trails, or they left the surface undescribed. Table 4 tallies the units by the dominant surface types sketched on the plans. As the plans are indeed sketches, the area of surface types are estimated, not calculated. The first surface type is the dominant surface of the unit, followed in descending order of area estimate by the other types.

The table shows clearly that the concept of the surface is one of great variability at the site. It also supports the contention that spatial analysis of the Sabina Mountain Number Two site using surface data should look for the broadest possible patterns in order to draw valid conclusions about the spatial patterning of artifacts and features.

Table 4. Ground surface types of collection units.

No. of Units	Surface Composition
2	Hardpan, dense vegetation, dunes
3	Hardpan, dense vegetation
2	Hardpan, dunes
2	Hardpan, backdirt
1	Hardpan only
2	Dunes, hardpan, dense vegetation
1	Dense vegetation, hardpan, dunes
1	Dense vegetation, hardpan,
1	Dense vegetation, dunes
1	Road, hardpan, dunes
5	Undescribed

Burned Rock Distribution Analysis

Burned rock, almost all of it limestone, was widespread in surface and subsurface contexts at the site. It was found distributed in scatters and forming hearth features, and it was the most common class of collected material in the long transects through the site. Because of this common occurrence, burned rock has the capacity to delineate the broad spatial patterns alluded to above. The material itself has little to offer for insights, and so burned rock is analyzed here for its distributional information rather than in the artifact analysis section.

The rock originated in the mountains that flank the Hueco Bolson. It moved by erosion into the basin where it became locally available to the aboriginal occupants. The gathered resource was marked by fire burning in various hearths of the villagers over time. The burned limestone is therefore waste material from the ancient fires. The material ranges from sub-rounded to sub-angular in outline and from large pebble to small boulder in size classification. Colors run monotonously to gray and grayish-brown tones. The general sameness of the rock led some to question the faithful recognition of the difference between burned rock and merely sun-exposed rock. Presumably, the field school staff taught observational keys to identify the burned rock (fire-crazing, minute fracturing, generally higher angularity, etc.). As a practical matter, it is assumed that a very small proportion of unburned rock entered the burned rock analysis.

Burned rock was recorded by number of items in the artifact catalog. Number is the trait used in this analysis, and serves as an indirect, or proxy, measure of the density of burned rock in the site contexts. The analysis consisted of the counting and charting of the numbers of burned rock pieces recovered from the surfaces of transects B and C. These transects are two of the five long corridors through the site within which mapping and surface collecting were conducted (see Figure 5). Transect B was an east-west mapped corridor along the 110N line from 10E to 102E. It extended through the densest architectural precincts of the village. Transect C was a north-south mapped corridor along the 25E grid line from the 25N grid point to the 150N grid point. This transect extended from well south of the architectural remains of the village, through them, to just north of the identified structures. The transects were counted by the common surface unit, which was 2 m wide (the transect width) by 5 m long. In some portions of Transect C, some sections were divided by 1 m grids, due to the need for a more fine-grained examination of the surface (needs having to do with other than burned rock). In those areas, the burned rock counts were grouped into 10 m^2 units to gain consistency with the more common unit area. It was further discovered during the analysis that not all units were reported to the final inventory of the site's artifacts. The gaps left for any reason are reported; the loss of data is regretted.

Figure 8, the chart of Transect B burned rock, proceeds west to east, moving from left to right on

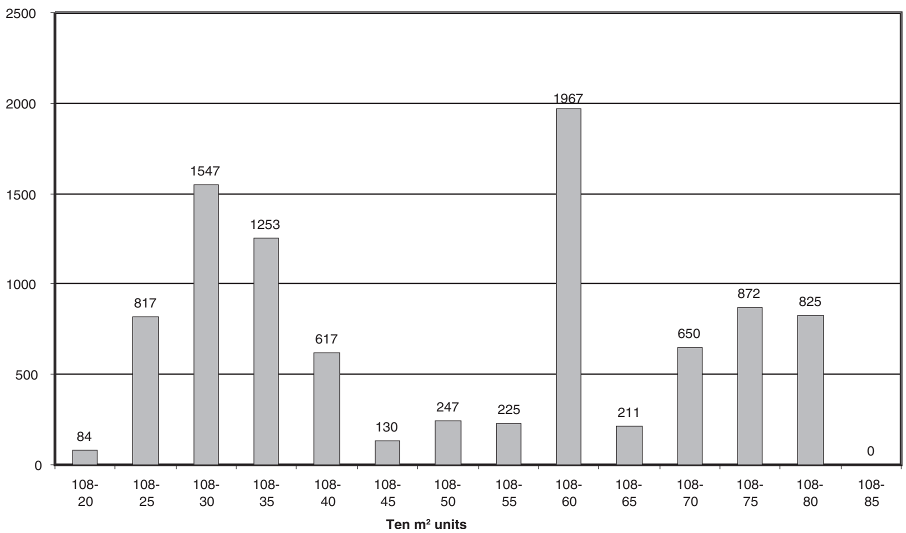

Figure 8. Transect B burned rock distribution.

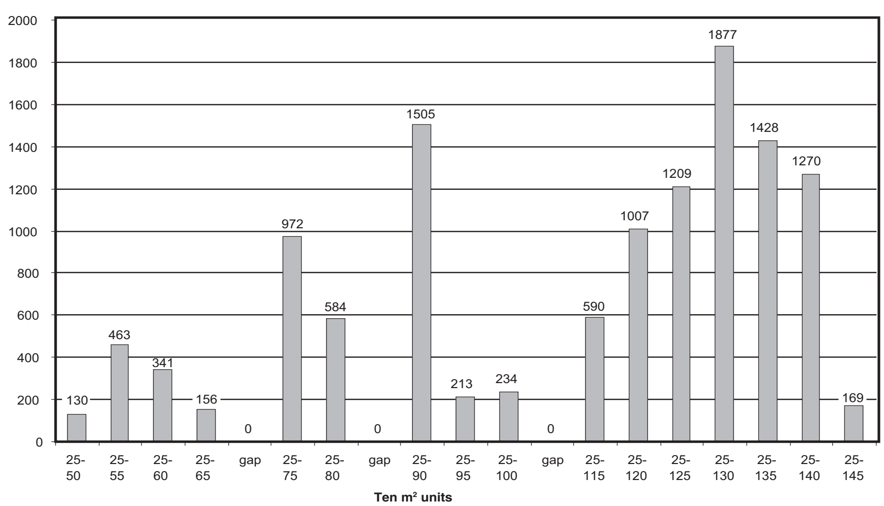

Figure 9. Transect C burned rock distribution.

the chart. The high counts of burned rock between 25E and 40E (designated 108-25, 108-30, 108-35, and 108-40 on Figure 8) are from a section of the transect where the pottery concentration, the adobe cluster with a burned area, and a cluster of adobe lumps were unearthed (see Figure 5). Furthermore, this section is 7.5 m west of the room fragment cleared by the field school on and around 110N 50E (see Figure 5). This high-count section is slightly west of an imaginary straight line between Room blocks A and B. The room fragment lies directly on the line. This pattern of artifact and architectural relationships gives a clear suggestion of additional unexcavated or destroyed rooms on the site. The high-count section between 60E and 80E (designated 108-60, 108-65, 108-70, 108-75, and 108-80 on Figure 8) lies 5 m north of the known rooms of Room Block B. The transect-high count of 1,967 burned rocks at 108-60 is from a section almost entirely within the mapped artifact concentration. The burned rock there may be from the immediate location of a burned rock feature surrounded by formerly in-place artifact distributions.

Figure 9, the histogram of Transect C burned rock, proceeds from south to north as one looks left to right on the chart. The first high-count section extends from 75N to 90N, with designations 25-75, 25-80, gap, and 25-90 on Figure 9. This section lies across Room Block C. The very high counts on the right one-third of the chart denote burned rock from transect sections within and among the rooms of Room Block A.

The burned rock distribution charts offer broad but very clear patterns of the association between burned rock, site architecture, and site-constructed features, with an abrupt fall-off of burned rock numbers between rooms and features. These patterns have persisted through the active surface and subsurface processes at work on the site and the forces of modern relic hunting and vehicle disturbance. The burned rock distribution analysis also validates some of the surface sampling strategies applied to the site during the field school site survey, specifically the surface collection of long transect corridors.

ARTIFACT ANALYSIS

Sabina Mountain Number Two Lithic Assemblage

by John E. Dockall

This lithic analysis is designed only to provide a brief discussion of raw material variability, tool typology, and possible patterns of raw material use as reflected in tool types from the Sabina Mountain Number Two site. Due to questions regarding the provenience of these artifacts, no attempt was made to examine potential contextual relationships.

Artifact Classification

The methods of artifact classification follow those employed by Dockall (1991) and Dockall et al. (1997) associated with the analysis of lithic assemblages from Mimbres-Mogollon and Jornada Mogollon sites. The manufacture of stone tools is conceived as a series of ordered stages that can be recognized in the archeological record on the basis of diagnostic attributes. These attributes are morphological and reveal information relevant to the manufacture and use of stone tools.

The artifact typology generally departs from the traditional methodology of applying functional names to artifacts. Typological names are descriptive in most cases and based more on the morphology, technology, and type of modification than on inferred function.

Raw Material

Raw material is a pertinent variable to all levels of lithic analysis including debitage, technology, raw material procurement, and function. The raw material of all flaked and ground stone tools and cores was determined by macroscopically observed properties and, where possible, an assessment was made as to the geological formation of origin of the materials.

Cortex Type

Cortex is the outer covering or rind on lithic material that forms through such agents as streams, weathering, or a combination of other chemical and mechanical processes. The presence and amount of cortex were recorded for each tool. Previous studies (Dockall et al. 1997) have noted three main classes of cortex: stream-worn, patinated, and weathered. The type of cortex would allow for some indication of where certain raw materials were procured: such as natural outcrops, stream gravels, or alluvial fan deposits or talus slopes. The amount of cortex on an implement also gives some indication of the process of selection of appropriate tool blanks and at what stage of the reduction/manufacture process these blanks were selected.

Geological Description of the Hueco Bolson

Hill (1900) and Knowles and Kennedy (1958) have described the Hueco Bolson as an intermontane basin. The Franklin-Organ-San Andres and Quitman-Malone-Finlay-Hueco-Sacramento Mountain chains bound the basin. The bolson itself is actually part of a larger intermountain basin separated by a low east-west divide north of the Texas-New Mexico border. The northern portion is known as the Tularosa Basin, which has no external drainage and has abundant dunes of white gypsum sand and salt marshes. The southern part of this intermountain basin is the Hueco Bolson, which is drained by the Rio Grande. External drainage of the Hueco Bolson means that there are no surface deposits of salt or gypsum. The southern portion of the Hueco Bolson is in Mexico where the Sierra Madre Oriental forms a partial boundary.

The location of the Sabina Mountain Number Two site is 8.3 km to the southwest of the Hueco Mountains and 3.3 km east of Sabina Mountain. The region between the Franklin Mountains to the west of the Hueco Mountains to the east is known as the Hueco Bolson or Hueco Basin. Sabina Mountain is best described as a north-south trending limestone ridge and rises 198 m above the surrounding terrain (Brook 1980:17). The Rio Grande is about 33 km to the southwest. Gravels of the Rio Grande are composed of limestone, basalt, granite, quartzite, and cryptocrystalline silicates such as chert, agate, and obsidian.

Nelson and Haigh (1958) and Sayre and Livingstone (1945) have provided a detailed discussion of Hueco Bolson geology. The rocks of the region can be subdivided into two basic groups: (1) the igneous and sedimentary rocks of the upland areas and mountains; (2) the bolson deposits (Knowles and Kennedy 1958:58). The bolson deposits are characterized by very thick deposits of sands and gravels and were derived from hard rocks of the Hueco Mountains and upland areas. Igneous and sedimentary rocks are present in both the Franklin and Hueco Mountains, and both must be considered as possible sources for lithic material present in the bolson deposits.

Igneous Rocks

There are two major types of igneous rocks by texture: granitic and porphyritic. Abundant exposures of granitic rocks are visible in the Franklin and Organ mountains and isolated exposures in the southern part of the Hueco Mountains. The central portion of the Organ Mountains is dominated by quartz monzonite. The majority of these granitic rocks are pre-Cambrian in age.

According to Knowles and Kennedy (1958:590), rhyolite and syenite porphyry are abundant source materials for bolson deposits. Rhyolites and rhyolite porphyry underlie a large part of the central Franklin Mountains. Also, a quartzite-rhyolite pebble conglomerate is present at the base of this porphyry which outcrops in the southern Franklin Mountains along the east flank. Most of the rhyolite porphyry is pre-Cambrian in age and weathers into pebbles and boulders and is a chief source of bolson gravels. Syenite porphyry at the base of the Hueco Mountains is of Cretaceous age and easily weathers and degrades into clay.

Sedimentary Rocks

Quartzite, sandstone, and limestone represent the most significant lithic types contributing to the Hueco Bolson (Knowles and Kennedy 1958). The pre-Cambrian Llanoria quartzite outcrops along the eastern flank of the Franklin Mountains in the central portion of the range. This quartzite is very dense and fine-grained, occurring in alternate thick and thin beds. The material weathers into boulders and pebbles, providing material for gravel and sand deposits of the Hueco Bolson.

A major sandstone is the Bliss formation of Cambrian or Ordovician age. The Bliss sandstone is present on the eastern flanks of the Franklin and Organ Mountains and is present in minor outcrops in the southern Hueco Mountains.

In addition to quartzite and sandstone, there is an abundant sequence of limestone. The limestones range in age from Ordovician to Cretaceous and overlie the Bliss sandstones; they are described in greater detail in Sayre and Livingstone (1945:25-27). These limestones vary from light to dark in color and are, in general, dense, hard, and massive (Nelson and Haigh 1958:59). In some localities, the limestones are interbedded with shale, sandstone, and chert. Limestone pebbles are occasionally found as clasts of the bolson deposits.

Unconsolidated Bolson Deposits

Deposits within the Hueco Bolson usually consist of clay, sand, and gravel layers of Tertiary age with the thickness of beds widely variable. Caliche is a very widespread constituent of the bolson deposits and acts as a barrier to the subsurface percolation of water. Clays within the bolson vary from reddish-brown to brown or are lighter colors of buff to gray. Clay beds range from pure clay to clay mixed with sand, pebbles, and boulders. There is a west to east gradation in clast size of gravels within the deposits of the Hueco Bolson such that deposits closer to the Hueco Mountains are finer grained and thinner than those closer to the Franklin and Organ Mountains. This indicates that the igneous rocks of the Franklin and Organ Mountains were the major sources of bolson deposits (Nelson and Haigh 1958:60).

Specific Rock Types

Limestone/Dolomite

This rock type typically occurs in a dark gray to black color range and is very fine-grained. It also has fair to good conchoidal fracture properties for manufacturing flaked stone tools and weathers to a light blue-gray with a chalky surface. A fairly thick series of Ordovician to Cretaceous limestones overlies the Bliss sandstone (Nelson and Haigh 1958:59). Another source of limestone and dolomite could include the pre-Cambrian Caster Marble exposure in Fusselman Canyon (Hoffer 1976). The most likely primary geological source for dense black limestones is the Las Cruces limestone in the Las Cruces formation of Mississippian age (Laudon and Bowsher 1949:17).

Quartzite

Quartzite occurs in varieties of light brown or gray and light green. Carmichael (1986:166) noted that both types were quite common on the eastern slopes of the Franklin Mountains. Some quartzites are also present in the Fillmore Pass area. The Llanoria quartzite occurs in the center of the Franklin Mountains on the eastern flanks. It is described as a dense, tough, fine-grained gray quartzite that weathers into both pebbles and cobbles (Nelson and Haigh 1958:59).

Rancheria Chert

The Rancheria chert occurs in the Mississippian Rancheria formation. Laudon and Bowsher (1949:17) describe the formation as a "sequence of cherty, black, bituminous, argillaceous limestone beds" with an unconformable contact with the lower Las Cruces formation. Rancheria chert is a distinctive black porous chert that weathers into a light-medium brown and occurs in both nodular and thin-bedded forms (Laudon and Bowsher 1949:19). Carmichael (1986:167) identified several varieties of Rancheria chert. This material is also quite common in the Franklin and Hueco mountains.

Other Cherts

There are a number of other cherts that differed in both color and quality in the Sabina Mountain Number Two assemblage. No attempt was made to distinguish types on the basis of physical properties. Carmichael (1986:167-168) did identify a variety of cherts for the southern Tularosa Basin and for Keystone sites 36 and 37 (Carmichael 1985:466-473) based on color, grain, inclusions, and fracture quality. The geological sources for these cherts are the various limestone formations along the eastern slopes of the Franklin Mountains and the western slopes of the Hueco Mountains.

Jasper and Chalcedony

Jasper is variable in color and has been noted in shades of yellow, brown, and various reds. Chalcedony occurs primarily in translucent to milky white varieties with a very rough exterior cortex. Carmichael (1985, 1986) identified a wide variety of types in the Franklin Mountains and southern Tularosa Basin. Both jasper and chalcedony occur as small nodules or pebbles in alluvial fan, arroyo, and bolson deposits.

Obsidian

This raw material has been commonly identified in Formative period sites in the Hueco Bolson/Franklin Mountains region. Its presence as pebbles in alluvial deposits and arroyo deposits in the southern Tularosa Basin and Franklin Mountains is, however, quite rare (Carmichael 1985:204, 1986:167). Carmichael (1986:167) noted that gravel deposits of the ancestral Rio Grande are the most likely secondary sources. An XRF analysis of obsidian from the Gobernadora and Ojasen sites (Dockall et al. 1997) indicated that the primary geological source was the Valles Caldera Composition Group in New Mexico, found west of Santa Fe.

Basalt

The basalts from the Sabina Mountain Number Two site varied from fine-grained to vesicular and were dark gray to black in color. The principal geological source for basalts is probably the Munday Breccia. This is a brecciated basalt flow that occurs within the pre-Cambrian sequence of Fusselman Canyon and elsewhere in the eastern Franklin Mountains. It overlies the Caster Marble and is in turn overlain by the Llanoria quartzite.

Diabase

The pre-Cambrian stratigraphic units of the Fusselman Canyon area and elsewhere have been intruded by a number of diabase dikes and sills (Hoffer 1976:5). In the same region, the Caster Marble has several diabase intrusions that were responsible for the metamorphism of the Caster Marble (Hoffer 1976:7). Diabase was occasionally used as a source for various types of ground stone implements such as manos and grinding slabs.

Sandstones

There are numerous possible geological sources that could have contributed sandstone to the alluvial fan, arroyo, and bolson deposits. The most likely sources are the Ordovician deposits of the Bliss sandstone. The Bliss sandstone outcrops along the eastern side of the Organ and Franklin mountains (Nelson and Haigh 1958:59). Sandstone was frequently employed as lithic material for manos, metates, and other grinding implements in Jornada Mogollon sites.

Granites and Granite Pegmatite

Granitic strata outcrop in fairly large areas of the Franklin and Organ mountains and lesser areas of the southern Hueco Mountains. All exposures are pre-Cambrian in age. The most extensive exposures occur in the central portion of the Franklins. Extensive exposures provide a good source material for the bolson deposits but the granite weathers fairly quickly (Nelson and Haigh 1958:59). In fact, granite metates and ground stone fragments from the Gobernadora and Ojasen sites have begun to exhibit signs of degradation showing weakness and crumbling along the edges. Similar weathering was observed on granite artifacts from Sabina Mountain Number Two. The rapidity of weathering may indicate that material for metates and other ground stone implements had to be procured closer to the primary source to find large enough pieces that had not been degraded.

Studies of Jornada Mogollon Raw Material Procurement

The interpretations of raw material procurement practices among Jornada Mogollon inhabitants of the basins of western Texas and south-central New Mexico have typically been phrased in terms of varying proportions of raw materials through time (Camilli 1988:148; Carmichael 1986:161-189). Associated with a temporal approach to raw material procurement and variability is the assumption that raw material variability decreased as Archaic hunter-gatherer groups made the transition to relatively sedentary Formative part-time agriculturalists (Mesilla to El Paso phases). A similar set of assumptions has also been applied to studies of raw material variability in the Mimbres Mogollon region of southwestern New Mexico (Nelson 1981). A corollary to these interpretations is that sedentary groups will tend to utilize lithic raw materials that occur within the immediate vicinity of the habitation site to a greater extent than less sedentary groups (Dockall 1991; Dockall et al. 1997; Foster 1993:21; Miller and Carmichael 1985) largely as a response to procurement practices and the scheduling of procurement within other activities (Binford 1979). The concept of scavenging raw material from earlier occupations has also been considered for the Jornada and Mimbres regions (Dockall 1991).

Camilli (1988) examined the temporal variability of raw material types among lithic assemblages from sites on West Mesa bolson. A significant portion of these raw materials represent materials that were procured from elsewhere because suitable local materials are represented by obsidian and chert that occur in typically small size. Material in the region bordering West Mesa occurs in the Rio Grande gravels and Franklin Mountains alluvial fans and includes limestone, chert, sandstone, rhyolite, and quartzite (Camilli 1988:150-151). She noted that crystalline volcanics are quite abundant in Paleoindian and Archaic assemblages. Initially, these data suggested that the degree of sedentism may be related to raw material selection; however, when raw material types were grouped according to the presence of ceramic and projectile point styles, other patterns emerged. Camilli found greater similarities among all sites regarding raw material and technological attributes, which strongly suggested a significant degree of scavenging and recycling of raw material from earlier sites by later inhabitants. The most significant implication of her research indicates that the proportion of various raw material types may not be a good indicator of the temporal affiliation of a site.

The proportion of coarse and fine-grained lithic material has typically been applied in the Jornada region to infer major raw material procurement differences through time. Carmichael (1983, 1986) noted a temporal trend toward increasing use of coarse-grained raw materials for sites in the southern Tularosa Basin of New Mexico by employing a lithic diversity index for measuring the variability among lithic assemblages. A survey of the McGregor Guided Missile Range, Otero County, New Mexico (Piggot and Dulaney 1977:83-94), demonstrated that raw materials were locally available for sites where chipped artifacts were recovered. A greater degree of mobility or regional trade for raw materials was suggested for the Paleoindian period on the basis of greater raw material variability.

For the Turquoise Ridge site, situated on the eastern edge of the Hueco Bolson, Whalen (1994:95-98) noted no significant difference among raw materials associated with early and late phases of occupation. There were no appreciable differences among raw material procurement patterns throughout the occupation of Turquoise Ridge, although there was an increased selection for more coarse-grained raw materials.

Previous Studies of Sabina Mountain Lithic Assemblages

The only known analysis of the lithic assemblages from the Sabina Mountain Number Two site was conducted by Brook (1980) as part of a comprehensive report on excavations conducted at Sabina Mountain Number One and Sabina Mountain Number Two by the EPAS intermittently between 1964 and 1967. Brook's discussion of the lithic material from Sabina Mountain Number Two is summarized here because there are several distinctive differences that emerge when compared to the material recovered by the TAS Field School in 1977.

Brook (1980:21) noted the presence of metate and mano fragments, palettes and fragments, cores, flakes, hammerstones, bifacial knives, and a number of broken and complete projectile points. One of the more interesting aspects of the lithic assemblage recovered during EPAS excavations is the general absence of lithic debitage. Among other debris and artifacts only nine unmodified flakes were recovered from a trash pit to the southeast of Room 3. Only 33 flakes were recovered from all other areas of excavation (Brook 1980:54). This is significantly different from the abundance of debitage recovered during TAS excavations and probably reflects differences in recovery techniques. The recovered lithic assemblage from EPAS excavations is recreated (in brief) in Table 5 and only provides total numbers and percentages of artifacts per category.

Raw Material at Sabina Mountain Number Two

Twenty-three kinds of stone raw material were identified during the artifact analysis of Sabina Mountain Number Two material (Table 6). The majority of these raw materials were exploited from locally occurring sources. The major source of these materials was probably the local gravel deposits. The distance of Sabina Mountain Number Two from the Rio Grande (33 km), and its location at the end of a playa, was probably a significant factor in raw material procurement and selection. Distance to suitable materials such as obsidian may have prohibited the scheduling of procurement of

Table 5. Summary totals of flaked stone tools, ground stone artifacts and lithic debitage recovered by EPAS testing at Sabina Mountain Number Two. Data derived from Brook (1980).

Lithic Category	Number of Artifacts	Percent of Total
Metate fragments	7	3.9
Manos and fragments	9	5.0
Rocking muller	1	0.6
Palette	2	1.1
Pestles	2	1.1
Floor smoothers	16	8.9
Hammerstones	9	5.0
Choppers/elongated choppers	16	8.9
Scrapers	8	4.4
Knives	18	10.0
Flakes	33	18.3
Cores	7	3.9
Drills	4	2.2
Cruciform	1	0.6
Saws	1	0.6
Projectile points	38	21.1
Incised rock	1	0.6
Altar piece	1	0.6
Shaft smoother fragments	3	1.7
Stone bowl fragments	1	0.6
Scribes	2	1.1

Table 6. Proportions of raw material types identified among the Sabina Mountain Number Two flaked and ground stone artifact categories.

Material	Number	Percent of Total
Obsidian	123	38.1
Chert	84	26.0
Rancheria chert	14	4.3
Quartzite	3	1.0
Sandstone	55	17.0
Tabular sandstone	2	0.6
Sandstone/rhyolite	1	0.3
Limestone	6	1.9
Jasper	1	0.3
Chalcedony	1	0.3
Basalt	2	0.6
Rhyolite	3	1.0
Vesicular basalt	7	2.2
Welded tuff	1	0.3
Muscovite	1	0.3
Biotite	1	0.3
Gypsum	1	0.3
Calcite	1	0.3
Hematite	1	0.3
Pumice	1	0.3
Scoria	1	0.3
Quartz	1	0.3
Granite	5	1.5
Pegmatite	1	0.3
Unknown	6	1.9
Totals	323	100

these sources within other activities. Camilli (1988) and Mauldin (1993) have noted the importance of scavenging of earlier sites on the Hueco Bolson by later inhabitants, especially of various cherts.

Although the debitage from Sabina Mountain Number Two was not subjected to analysis it was examined to identify any tools missed in the initial sorting. During this exercise, I noted an abundance (>50 %) of cherts in the assemblage and abundant evidence of early stage reduction. An examination of non-debitage chunks and angular debris demonstrated that there was abundant chert in the immediate area of the site because much of the debris was in medium to large pebble size. This strongly suggests the presence of a chert source or sources in the immediate vicinity of the site (<3-5 km). A more detailed analysis of the debitage would confirm or deny these impressions. Core analysis, however, also suggests the presence of a local chert source.

The greater abundance of obsidian in the assemblage is artificially inflated due to the inclusion of all obsidian debitage and tools in the artifact analysis. The actual abundance of obsidian in Jornada Mogollon Formative period sites is typically less than cherts, reflecting the lesser abundance of obsidian in gravel deposits.

Raw materials such as sandstone and limestone were manufactured into heavy-duty chipped and ground stone implements but do not contribute significantly to the chipped category of the lithic assemblage. Quartzite also was not typically selected (or available) for flaked stone tools.

Materials that could be identified to a specific source include Rancheria chert (only 4.3 percent of all analyzed artifacts). The majority of this material was classified as cores. Other artifacts of Rancheria chert included a core tool, two modified flakes, one Fresno arrow point, and a single utilized flake.

The most abundant cryptocrystalline material for flaked stone tools includes the various cherts, which are highly variable in quality and color. Other minor raw materials included chalcedony, jasper, basalt, quartz, and rhyolite/rhyolite porphyry. Each of these materials comprised less than 1.0 percent of the total analyzed sample of flaked and ground stone tools.

Assemblage Composition and Interpretations

The analyzed assemblage from Sabina Mountain Number Two consisted of 196 chipped and ground stone cores, tools, and tool fragments. An additional collection of thirteen bipolar flakes and 50 pieces of shatter was also analyzed for comparison to the bipolar cores. The chipped stone tool component comprised 76.5 percent and the ground stone 23.5 percent of the sample. Table 7 provides totals and percents of all major lithic artifact classes identified during the analysis.

Cores, core fragments, and miscellaneous ground stone fragments dominate the assemblage (Figure 10). The core reduction technology represents a generalized strategy of flake production where flakes are used as tools with little or no modification. The cores range from almost exhausted (no longer efficient for flake production) to only minimally reduced. The selection of a generalized core technology and a predominance of unmodified and minimally modified flake tools has been attributed to an increase in sedentism during the Formative period of the Southwest (Parry and Kelly 1987) and a decline in the importance of formal tools and methods of reduction (bifaces and blade cores). Recent studies of generalized core strategies have demonstrated that they are a logical choice when there is a sufficient supply of raw material available and that there is an inherent flexibility to produce a variety of different flake morphologies for various needs (Johnson 1986; Teltser 1991). Generalized core technologies are also logical choices in light of specific mobility patterns, distance to raw material, and the nature of that raw material (Cobb and Webb 1994:212). Formal stone technologies are frequently associated with increased risk factors (i.e., hunter-gatherer subsistence patterns), whereas generalized technologies are often related to an increased dependence on cultigens and the mitigation of the temporary risks of part-time hunting and gathering (Cobb and Webb 1994:212).

There were two techniques of generalized core reduction employed at Sabina Mountain Number Two: hard hammer percussion and bipolar percussion. The particular method employed was largely attributed to the type and nature of the raw material. Hard hammer percussion cores were almost exclusively of chert, with the exception of three of

Table 7. 1977 TAS Field School chipped and ground stone artifacts from Sabina Mountain Number Two (41EP4).

Tool Category	Number	Percent of total
Cores and fragments	39	20.3
Bipolar cores	8	4.2
Split pebble	1	0.5
Choppers/core tools	6	3.2
Battered cobbles	4	2.1
Hammerstones	7	3.6
Utilized flakes	17	8.8
Agave knives	2	1.0
Unifaces	4	2.1
Beaked unifaces	1	0.5
Carinated unifaces	8	4.2
Denticulate unifaces	1	0.5
Modified flakes	19	9.9
Perforator	1	0.5
Drill tip	3	1.6
Stage I biface	3	1.6
Dart points	4	2.1
Arrow points and fragments	11	5.7
Mano fragments	9	4.7
Metate fragments	15	7.8
Ground stone fragments	27	12.0
Palette fragments	4	2.1
Pendant fragment	1	0.5
Polishing stone?	1	0.5
Totals	196	100

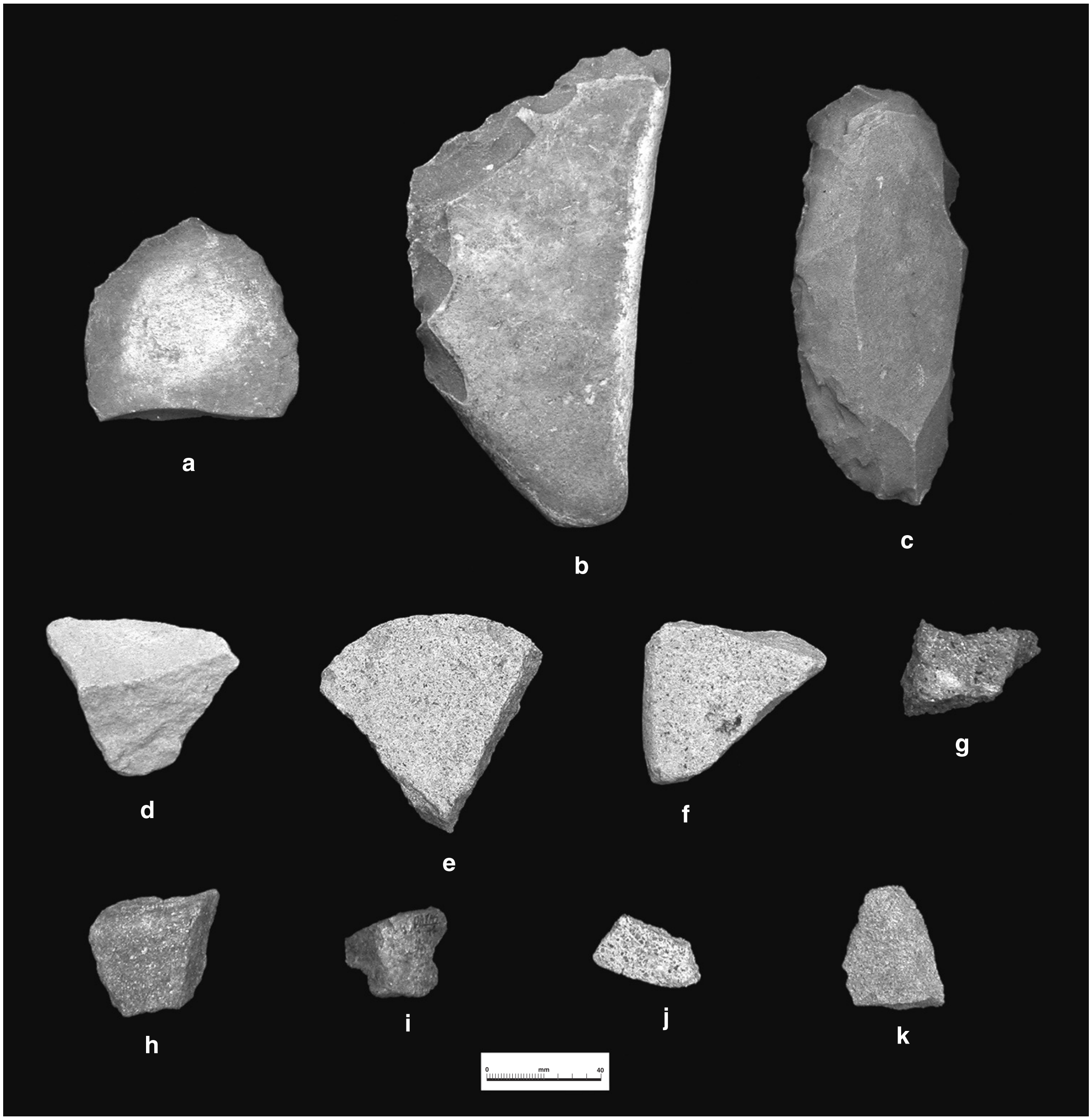

Figure 10. Heavy flake tools and ground stone artifact fragments: a, sandstone palette fragment; b-c, choppers/cobble tools; d-e, basin or slab metate fragment; f-g, trough style metate fragments; h, mano fragment; i-k, metate fragments.

sandstone. The predominance of chert cores correlates well with the predominance of chert over other materials among all chipped stone tools. All bipolar cores represent reduced obsidian pebbles. Bipolar reduction is typically associated with an abundance of shatter because of the uncontrolled nature of the fracture process, and Sabina Mountain Number Two is no different. The obsidian shatter is probably a byproduct of the bipolar reduction technique. The nature of the bipolar technology within the Mimbres and Jornada Mogollon areas was very similar and consisted of both simple nodule smashing and the purposeful splitting of oval or elongate nodules down the long axis in order to take advantage of the length of the nodule. Bipolar flakes in both groups were selected to produce small unifacial and bifacial drills, perforators, and projectile points. The same technological practice was apparently employed at Sabina Mountain Number Two based on obsidian core and debitage similarities and the presence of small obsidian bifaces (see Brook 1980:55-58). Direct percussion and bipolar percussion are very representative of Mimbres and Jornada Mogollon lithic technology and formed an integral aspect of the overall technological organization of these groups (Dockall 1990, 1991; Dockall et al. 1997; Miller 1989, 1992; Miller and Carmichael 1985).

The only other type of lithic reduction represented at Sabina Mountain Number Two is that of biface manufacture. The techniques of direct percussion and pressure flaking were employed in the manufacture of bifacial artifacts such as drills and projectile points. The presence of only three Stage I bifaces at Sabina Mountain cannot be used as a measure of the importance (or lack thereof) of bifaces at the site or within the Jornada Mogollon in general. The nature of the reduction process involved more pressure flaking of small chert and obsidian bifacial preforms than biface production by direct percussion. This is largely a phenomenon of the raw material selected for projectile point manufacture and the small size of arrow points. All bifaces and arrow points from Sabina Mountain Number Two were manufactured from cryptocrystallines such as chalcedony, cherts, and glassy volcanics. The same trend has been identified within the arrow point technology from other Jornada and Mimbres Mogollon sites (see Brook 1980:55-58; Dockall 1991:220-232).

Broad comparisons of cores with the debitage reveal that chert was the material most selected for reduction and for the manufacture of small modified and unmodified flake tools and projectile points. Also, the debitage and chipped stone artifact assemblage from Sabina Mountain Number Two strongly demonstrate that the entire reduction sequence was conducted at and near the site. This includes raw material selection, procurement, initial reduction, use, tool maintenance, and final discard. There is a total of 8223 flakes, fragments, shatter, and chunks that compose the debitage sample from Sabina Mountain Number Two. As stated above, the majority of this material is chert, but other materials that were observed included basalt, rhyolite, chalcedony, jasper, obsidian, sandstone, and limestone. This variety of raw material is probably a reflection of the types of raw material that occur within the gravels in the vicinity of Sabina Mountain Number Two, with the exception of obsidian. Future research on this collection should include a detailed quantification of the various raw materials within the debitage sample and compare these proportions to those provided for the tools in this article.

There was a variety of unmodified and modified flake tools identified from Sabina Mountain Number Two. Brook (1980) noted the abundance of very generalized tools in his lithic analysis: utilized flakes, choppers or core tools, flake knives, and scrapers. The major raw materials that were identified for the flake tools were chert, agate, and quartzite (Brook 1980:50). A number of similar tool types identified by Brook are also noted in this article, but with the addition of a few new types that had been identified in other Jornada (Dockall et al. 1997) and Mimbres assemblages (Dockall 1991). Carinated unifaces were initially defined at Gobernadora and Ojasen (Dockall et al. 1997) as a specific type of flake tool and are characterized by steeply retouched edges that often are either denticulated or slightly irregular. The distal end is keel (carina)-shaped and is often the thickest part of the tool. Use wear indicates that carinated unifaces were used in adzing and scraping activities. Beaked unifaces have one or two lateral projections created by direct percussion and were typically employed in various types of graving or incising tasks. Denticulate unifaces are thinner than either carinated or beaked unifaces and have multiple small notches created by direct percussion or pressure flaking along one lateral edge to produce a serrated appearance; these implements were used in tasks requiring an edge capable of cutting, shredding, or sawing. It is significant that only 27 percent of all the tools identified at Sabina Mountain Number Two are unifaces or utilized flakes. This proportion is considered to be lower than expected when compared to similar figures from Gobernadora and Ojasen (44 and 48 percent, respectively) (Dockall et al. 1997:Table 10.1). The reason for the lower value at Sabina Mountain Number Two is probably largely due to unsystematic collection by artifact hunters (Brook 1980:44). A detailed analysis of the debitage collection would also undoubtedly increase the number of unmodified flakes used as tools. Agave knives were identified based on descriptions provided by Shafer (1986) and Shafer and Holloway (1979). Both were manufactured of large flakes of limestone and sandstone, suggesting specific selection of that material for this artifact type. Based on the size of chert flakes and unifaces, it is probable that flakes of suitable size could not be produced from chert and other similar cryptocrystalline materials. Raw material selection at Sabina Mountain Number Two for the manufacture of flake tools demonstrates that chert was virtually the only material utilized. Sandstone and quartzite were only very occasionally used to manufacture unifaces or as utilized flakes. Studies indicate that flake tools recovered from Jornada Mogollon sites were used to process a variety of plant and animal resources and for the manufacture of an array of perishable goods (Dockall et al. 1997; Miller 1989, 1992; O'Laughlin 1979, 1980).

Other classes of tools identified at Sabina Mountain Number Two can be considered to represent heavy-duty implements. Brook (1980) identified two types of choppers based on size and shape. The current analysis includes choppers/cobble tools representing 3.6 percent of the tool assemblage (see Table 7 and Figure 10b-c). These implements were manufactured by direct percussion of cobbles, large pebbles, or large percussion flakes and fall within the range of variability identified by Brook (1980:48-50); 44 percent were manufactured from limestone and quartzite, the remainder being of chert. The present study identified three choppers/core tools of chert and three of coarse materials (sandstone, rhyolite, and quartzite). The presence of such coarse materials as sandstone, rhyolite, limestone, and quartzite indicate that these materials occur in a size that provides sufficient mass and strength for heavy duty chopping, adzing, and scraping/planing tasks (see Dockall et al. 1997; Miller 1989:Table 8.17).

As mentioned above, bifacial technology is almost entirely limited to exhausted and broken projectile points. There were three chert bifaces representing the initial stage of manufacture identified for Sabina Mountain Number Two during this study. Brook (1980) did not identify any bifacial preforms from the site. Biface technology is often scarce in Formative lithic assemblages in the Jornada area (Dockall et al. 1997; Miller 1989, 1992), being more characteristic of Archaic and Paleoindian assemblages and more mobile settlement systems.

Brook (1980:55-58) briefly discussed the collection of projectile points from Sabina Mountain Number Two recovered during EPAS testing. He described them as small and well made and noted that some preforms were present. Although Brook did not employ specific type names, several were illustrated (Brook 1980:Figure 21) that conform to the Harrell type characteristic of the Late Prehistoric of West Texas and the Panhandle region. Small triangular arrow points with straight to concave bases were also common. Excavations by the TAS recovered a smaller sample of projectile points that included two San Pedro, one Fairland-like, one undetermined dart point, one Harrell arrow point, two small triangular forms with concave bases (Figure 11a-b), one arrow barb fragment, three distal fragments, and two miscellaneous arrow fragments (see Figure 11c-d). Chert, obsidian, and quartzite were selected for manufacture of small pressure-flaked bifaces at Sabina Mountain Number Two.

Dart points are represented by the San Pedro and Fairland-like specimens. According to Turner and Hester (1993), the Fairland is mainly a central Texas type that is attributed to the Transitional Archaic period. Roney (1985: Plate 9g-h) identified Fairland-like points from Hooper Canyon Cave and Dark Canyon located in the Guadalupe Mountains of southeastern New Mexico. Beckes (1977:59) described Fairland specimens recovered from surface survey on the McGregor Guided Missile Range in Otero County, New Mexico. San Pedro points were subdivided by Dick (1965:25) into a large and small variant with small San Pedro points seeming to occur later in time. At the NAN Ruin, Dockall (1991:233-234) identified a number of both large and small San Pedro points, the majority coming from Classic period contexts probably due to prehistoric scavenging. Dick (1965:23), however, noted that the smaller variant of San Pedro occurred in Levels I and II of Bat Cave, whereas the large variant occurred in Levels III through V. San Pedro points also occurred in the upper portions of the midden at Ventana Cave without pottery and into the lower levels of ceramic-bearing deposits (Haury 1950:289-290). This suggested that the San Pedro type was in use prior to the inception of ceramics. Sayles (1983:125) identified the San Pedro stage as the final phase of the development of the Cochise Culture and immediately preceded the Early Pottery horizon of the Mogollon Culture. Geological evidence and radiocarbon dates have led to the development of a range of 1500 B.C. to A.D. 1 for the San Pedro stage. Martin and Rinaldo (1950:292, 338) described similar points within the San Francisco and Three Circle phase pithouse deposits at the Turkey Foot Ridge site in Pine Lawn Valley. This form has also been recovered from Swarts Ruin (Cosgrove and Cosgrove 1932:48) and Mattocks Ruin (Nesbitt 1931:85 and Plate 37k). Excavations at the Galaz Ruin by the Minnesota Expedition yielded San Pedro-like points (LeBlanc 1984:240 and Fig. 16.1s). Recent work by Upham and others (Newton and Upham 1985; Upham et

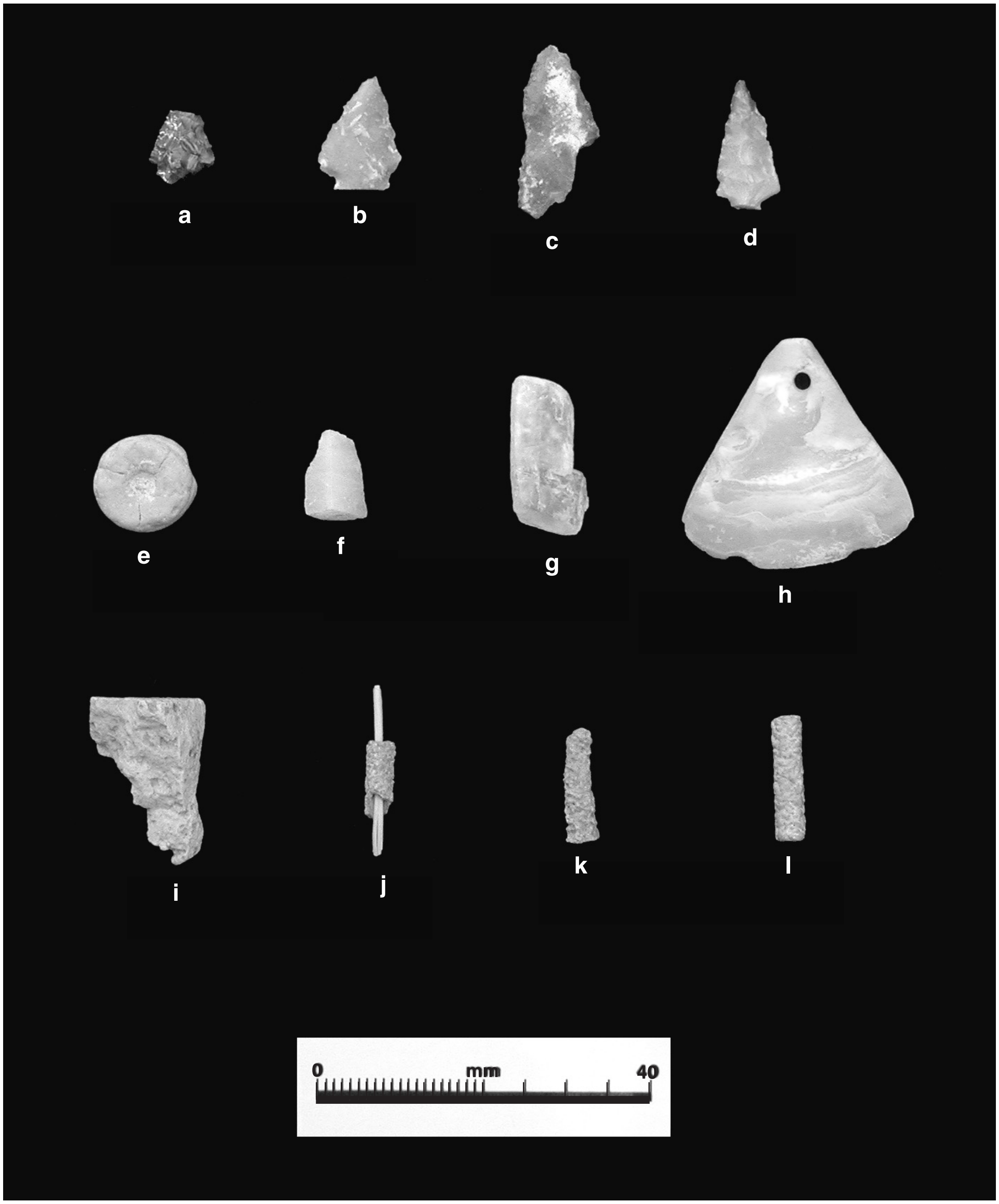

Figure 11. Arrow points, minerals, and ornaments: a-b, triangular arrow points with concave bases; c-d, arrow point fragments; e, crinoid stem section; f, quartz; g, calcite; h, marine shell pendant; i-l, coral pieces.

al. 1986) has provided new dates for the San Pedro style in southwestern New Mexico from 1500 B.C. to A.D. 1050, suggesting that this point style is not a good chronological marker. The dates indicate that San Pedro points seem to have persisted in southern New Mexico at least 700 years after their disappearance in southern Arizona.

There were three drill tips and a perforator identified in the Sabina Mountain Number Two assemblage (see Table 7). Each drill tip had a bending fracture suggesting that it had broken during use. The tips also had tip crushing and edge rounding. The tip of the perforator was smooth with a light polish. These implements were frequently employed in the manufacture and repair of perishable implements and other items. Similar artifacts were described but not illustrated by Brook (1980:55), who mentions briefly that three chert drills were recovered in addition to two "scribes" or burins of chert (Brook 1980:50).

A small amount of battered stone was included in the lithic assemblage. There were seven hammerstones and four battered cobbles. Together these categories comprise 5.7 percent of the total artifact assemblage (see Table 7). Raw materials included four limestone, two sandstone, one granite, two chert, and one chalcedony. The chert and chalcedony specimens were hammerstones and may represent recycled cores. The difference between hammerstones and battered cobbles is mainly one of degree and location of battering. Hammerstones were identified by a more extensive battered surface overall, whereas battered cobbles were only lightly battered on a surface or end and had not seen extensive use. Hammerstones and battered cobbles were employed in stone tool manufacture, mineral processing, and non-lithic raw material processing. Another important function of battered artifacts was that of pecking or resurfacing of the grinding facets of manos and metates to rejuvenate their abrasive and crushing properties. There were nine hammerstones recovered by EPAS testing at the site: three of these were chert, four limestone, one quartzite, and one from an unidentified sedimentary material (Brook 1980:48). Selection of limestone, quartzite, and sandstone materials provided mass, density, and fracture resistance during use and were probably specifically selected for these properties.

The ground stone tool component of the assemblage included only fragments of manos and metates and unidentified fragments (see Table 7). Brook (1980:44) also discussed the fragmentary nature of the ground stone tools recovered from Sabina Mountain Number Two (see Table 5). Ground stone implements recovered in the TAS testing included a majority of unidentified fragments comprising 12 percent of the tool assemblage. There were three vesicular basalt, one granite, and 23 of sandstone. All mano fragments were sandstone (see Figure 10h), whereas metate fragments included three vesicular basalt, three granite, one possible rhyolite, and nine sandstone. Some of the metate fragments were recognizable as portions of trough style metates (see Figure 10f-g). EPAS excavations recovered both trough and slab type metates (all were fragmentary; Figure 10d-e are examples of basin or slab metate fragments, and Figure 10i-k illustrate metate fragments of unidentifiable type); interestingly, one of the slab metates mentioned by Brook (1980:44) was identified as serpentine. The procurement of pieces of raw material large enough to manufacture metates, especially trough style, suggests the deliberate acquisition of raw material closer to the source and transport to Sabina Mountain Number Two. That fragments dominate the ground stone tool assemblage may be a phenomenon of recent artifact collecting discussed by Brook.

A small sample of other ground stone artifacts was identified in the tool assemblage during analysis. These included four tabular palette fragments (see Figure 10a; one welded tuff, two tabular sandstone, and one massive sandstone), one sandstone pendant fragment, and a sandstone pebble that may have been used as a polishing stone (see Table 7). Brook (1980) had not originally identified any palettes or fragments during his analysis of the EPAS material. Their identification during this study adds to the lithic assemblage from Sabina Mountain Number Two.

A small assemblage of minerals was recovered by TAS testing. Mineral types included one each of muscovite, biotite, calcite (see Figure 11g), gypsum, hematite, pumice, quartz (see Figure 11f), and scoria. Hematite was probably selected for its potential as a pigment source. The presence of scoria and pumice may indicate their use as abrasive stones. Brook (1980:70) noted five calcite crystals and suggested that they may have had ritual or ceremonial use. Sheets of biotite and muscovite have frequently been found in archeological sites in the Southwest and were used to manufacture a variety of small ornaments.

Conclusions

The lithic assemblage from Sabina Mountain Number Two is logistically oriented toward a generalized core and flake technology based on the local lithic resource base. Some lithic materials such as Rancheria chert and obsidian were probably acquired by direct and indirect procurement, indicating a technological need for these materials. There is some evidence for the specific selection of broad categories of raw material for the manufacture of specific artifact types; coarse-grained and dense materials such as quartzite, sandstone, limestone, and basalt were procured for heavy duty chopping and grinding implements. Cherts, obsidian, chalcedony, jasper, and other cryptocrystallines were selected for the manufacture of small flake tools and small bifacial implements. The patterns of procurement and use of raw material at Sabina Mountain Number Two compare favorably to other Dona Ana phase and Formative villages in the Hueco Bolson and Jornada Mogollon area. The generalized core and flake technology provided the inhabitants with a very flexible lithic technology that could be adapted to the lithic resource base that varied widely in both quality and type. It was not a simple expedient technology that was selected by inhabitants merely because they had no need of more complex methods of tool manufacture. The selection of this type of technology is as much a logistical choice based on knowledge of the raw material resource base as it was a strategic choice made in relation to a semi-sedentary lifeway based upon both hunting and gathering and some agriculture.

Stone and Shell Ornaments

The stone and shell ornaments from the site (Table 8) reflect the flow of wealth through the community and the practice and enjoyment of arts and crafts. Jewelry also served as a material expression of wealth and prestige. Quartz and calcite may have been used in ceremonialism and personal rituals. Stone and mineral types include quartz, calcite, ochre that was too hard for use as a pigment, and coral (possibly fossil coral and locally available; see Figure 11i-l). Crinoid stem sections (see Figure 11e), fossilized in limestone, may also be considered a mineral useful in jewelry making. Brook (1980:70) reported turquoise and worked pieces of copper ore from the site. Shell pieces and fragments, including a shell pendant (see Figure 11h), were all of marine shellfish, but none of the fragments could be attributed to genus. Brook (1980:67-70) reported genus *Olivella* from the site.

Pigment Fragments

Four fragments of soft earthen material were recovered from the site and catalogued (Table 9). They appear, from superficial inspection, to be discarded or broken remnants of larger blocks or crayons of natural earth pigments that prehistoric

Table 8. Stone and shell ornaments and fragments.

Lot	Provenience	Object(s)
133	N108-109/E76-77	Bead, undetermined material
181	N124-125/E26-27	Quartz pebble
370	N144-145/E49-50	Coral fragment
412	N151-152/E16-17	Quartz fragment
495	N114-115/E51-52	Quartz fragment
543	N135-136/E101-102	Shell fragment
585	IV-5-31	Shell fragment, polished crinoid stem fragment[1]
648	N111-112/E36-37	Fossil fragment (unreported type); coral fragment
671	N120/E27;Brook Rm 2	Shell fragment
700	N83-84/E50-51	Shell fragment
675	N78-79/E61-62	Quartz fragment
794	N93-94/E49-50	Ochre fragment
844	N95-96/E26-27	Shell bead
853	IV-5-2	Shell pendant
1021	N107-106/E40-41	Worked quartz
1035	N71-72/E50-51	Shell fragment
1037	N72-73/E50-51	Shell fragment
1038	N72-73/E51-52	Shell fragment
1103	N118-119/E62-63	Two crinoid stem sections
1105	N119-120/E62-63	Two crinoid stem sections, one calcite crystal
1197	N63-64/E25-24	Shell fragment
1329	N68-69/E61-62	Coral bead
2025	N74.6-74.8/E50.6-50.8	Shell fragment

[1] A worked sherd disk, a limestone blade, and two projectile points were found in the same lot.

Table 9. Pigments.

Lot #	Provenience	Length in mm	Material	Color	Munsell	Comments
547	N139-140 E100-101; surface	10	Limonite	Yellow ochre	10YR 7/8	Two planed surfaces
669	VR Brook RM 2; surface, east wall	13	Hematite	Blood red	2.5YR 4/8	Tabular fragment ; one planed surface
496	N115-116/ E50-51; surface	8	Hematite	Blood red	2.5YR 4/8	Exhausted fragment
674	N78-79/E60-61; surface	27[1]	Hematite with sand	Medium red	2.5YR 6/8	Quadrilateral with one end planed at a diagonal

[1] The specimens were generally irregular in outline, so that overall length was the only meaningful dimension, with the exception of item 674, which is 10 mm in width.

people ground and mixed as paint for a variety of purposes. These uses may have included painting ceramics, dyeing fabrics or feathers, and body painting.

Ceramic Analysis

Field notes stated repeatedly that the pottery on the Sabina Mountain Number Two site was markedly small in the common size of broken surface sherds, usually less than 1 cm in longest dimension. This uncommon situation for a site in the Southwest is most likely the result of the high volume of vehicular traffic in the 20th century. The lab researchers at the TAS field school responded to this circumstance by culling all the ceramic lots coming in to the field lab for sherds of larger sizes, considered by them to be analyzable. They also culled the ceramics returned from the off-site survey sites. These sherds were catalogued together as a single lot, 585, and labeled “Selected Types” (Figure 12). This lot is described and analyzed below. The locale to which they apply is the Sabina Mountain Number Two site and potentially all the off-site survey sites. All the remaining ceramics from the site were catalogued as lots reflecting their proveniences and by number of specimens (Appendix 1).

El Paso Brownware types are the dominant ceramics on the site. The Selected Types are representative of the whole El Paso phase village: not any room, set of rooms, trash area, or any singular behavioral context within it. An in-depth description of the selected types, mostly painted local and non-local types and ceramic artifacts, may help identify spatial and temporal relationships between the site and surrounding regions.

The descriptions of the selected types are followed by a spatial analysis of the ceramics recovered in and near the room fragment described above (see Figure 5). The ware and type designations and counts of the field analysts are used to gain some information on possible finer contextual patterns, although the field analysts did not commonly make type designations. This grosser level of analysis observes prudent caution in consideration of the general disruption and breakage of the ceramic assemblage. This analysis is not offered for the excavations of EPAS Room 2 and EPAS Room 3, as field notes warned repeatedly that recovery from those rooms originated in the backfill from the 1964-1967 excavations.

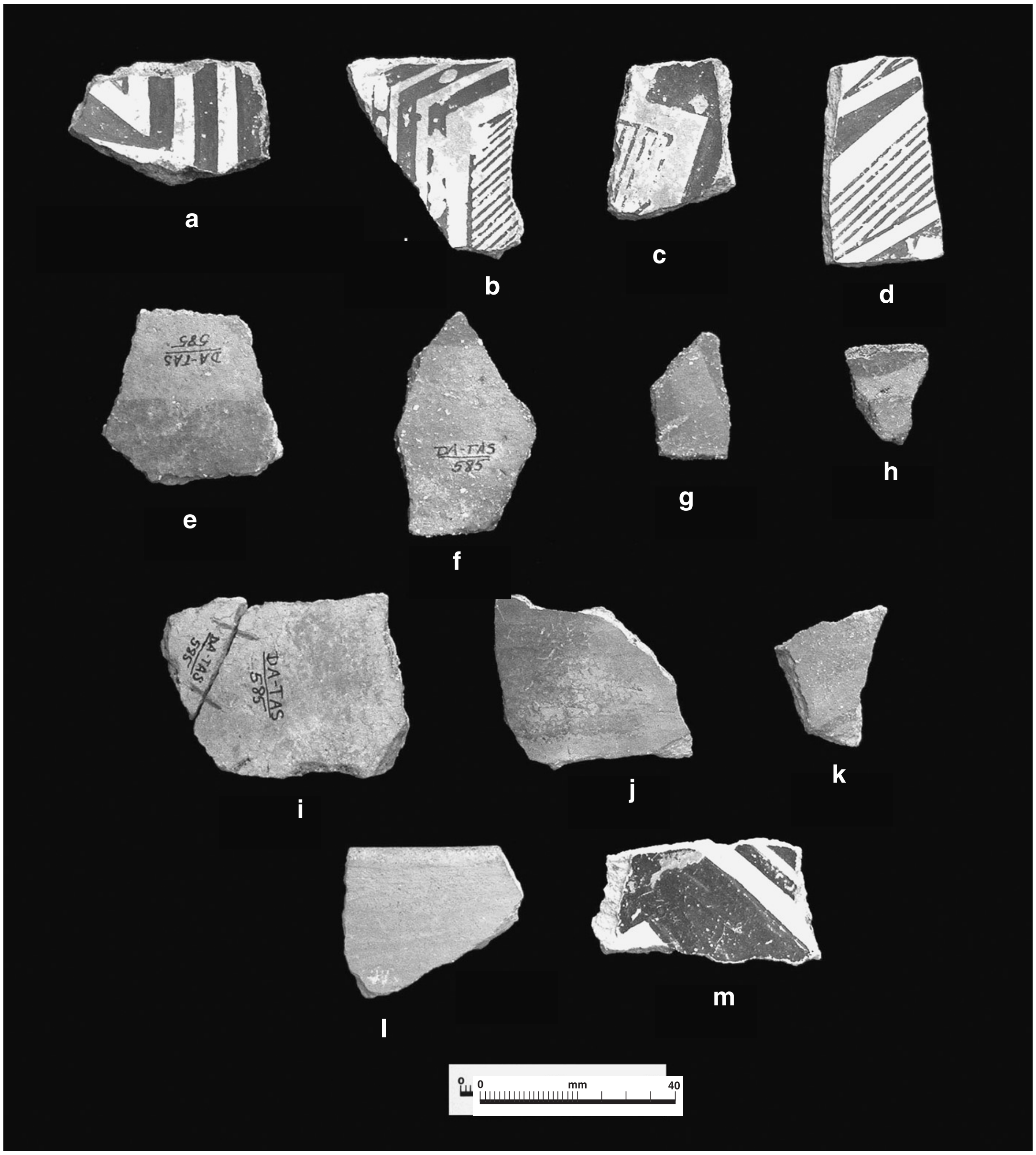

Figure 12. Selected ceramics from the 1977 TAS Field School, Lot 585: a-d, Mimbres Classic Black-on-White; e-g, El Paso Red-on-Brown; h, El Paso Polychrome; i-j, Jornada Brown; k, Pecos Glaze I; l, Three Rivers Red-on-Terracotta; m, Galisteo Black-on-White.

Mimbres Classic Black-on-White

(Five body sherds, two rim sherds, Figure 12a-d)

This small collection is exemplary of the Classic Mimbres type, save for the lack of any naturalistic depiction in the painting. Sherd thicknesses vary narrowly between 4-6 mm, and the ceramic pastes are light gray to grayish-tan in color. The fractured edges have a medium texture and the diagonal rippling or patterning of the material common in earthenwares formed by the coiling technique. Tempering particles are abundant, namely the oft described “cornmeal-sized” white grains of feldspar and other igneous rocks and minerals. Grain colors may also be pink, black, brown, or glassy. All the sherds belonged to bowls, their interior surfaces prepared for decoration with a chalky white slip that is flaking off in some examples, but intact in others. Designs are painted in black paint, although in two examples firing

Table 10. Ceramic types and numbers from analytic lot 585.

Ceramic Type Name	No. of Specimens
Mimbres Classic Black-on-White	7
Mimbres Black-on-White (probable Classic B/W)	3
El Paso Brown	3
El Paso Red-on-Brown	3
El Paso Polychrome	1
Jornada Brown	2
Unknown (painted stripe)	1
Pecos Glaze I	1
Three Rivers Red-on-Terracotta	1
Galisteo Black-on-White	1

vagaries have turned the paint reddish-brown. The designs are well-matched and well-executed fields of solid and hatched black paint. One sherd shows a cross-hatched field on it. All the sherds in the collection are too small to infer design layouts, whether rectilinear, curvilinear, or other.

Mimbres Classic Black-on-White is the culmination of a series of painted types belonging to Mogollon Brownware ceramics. This pottery's origin and center of development lies in the Mimbres Valley of southwestern New Mexico. Mimbres Classic Black-on-White with its systems of lines, painted fields, and wide array of naturalistic illustrations and scenes attained a higher level of artisanship than most other regional Mogollon painted types. Large amounts of the type were traded into the Tularosa Basin and also the Hueco Bolson, starting in the Mesilla phase and peaking in abundance in the Dona Ana phase. Mimbres Classic Black-on-White was produced as early as A.D. 1050 until A.D. 1250 and possibly into the 1300s (Human Systems Research 1973:346; Smiley 1977:173).

Probable Mimbres Classic Black-on-White

Three body sherds belong to Mimbres brownware. They lack definitive identifiers of the Classic Black-on-White type. They all have the characteristic ceramic paste; a chalky, grayish-white slip; and minor portions of filled, black decorative fields. These characteristics and the quality of design execution are all suggestive of the Mimbres Classic Black-on-White type. Whether by erosion or manufacturing variation, two sherds have abundant large tempering particles protruding through the slip and the exterior surface. The third sherd has lost most of its slip by flaking. This specimen also has a beveled edge, the beveling angled inward, toward the interior. Rather than revealing the former vessel as a reverse-beveled bowl, the beveled edge is entirely the product of grinding, perhaps post-breakage.

El Paso Brown

The three El Paso Brown sherds in this lot are exemplary of the vast majority of ceramics on the site. Clearly, this pottery is the local ceramic ware, and it corresponds well with published summaries (Lehmer 1948; Perttula et al. 1995). Sherd thicknesses range from 4-7 mm. The exterior and interior surfaces are tan to dark reddish-brown with frequent dark gray fire clouds. The ceramic interiors are all fully carbonized dark gray. Smoothing finished the original surfaces. Some surfaces appear to have been planed, indicating occasional finishing by paddling. Horizontal brush marks streak the interior of one sherd. This same specimen has a flattened and smoothed rim, and the piece was once part of a straight-sided, direct rim olla. The other two sherds belonged to jars. The pastes are all typical of El Paso Brownware, being thickly carbon-streaked as mentioned, and densely tempered with particles ranging in size from fine sand to coarse sand. White is the dominant particle color, with yellow, brown, pink, and a few black particles. Metallic flecks of mica were also observed. The dominant mineral is probably feldspar, followed by quartz. Some of the white and gray particles may also be limestone. The particles protrude through all interior and exterior surfaces.

El Paso Brown and El Paso Brownware in general are distributed throughout the Jornada Mogollon culture, from eastern Chihuahua to east of the Pecos River near Wink and Kermit, Texas (Human Systems Research 1973:331) and constitute the indigenous local ware. The painted types El Paso Red-on-Brown and El Paso Polychrome derive technologically and aesthetically from El Paso Brown. The ware was produced throughout the Jornada Mogollon sequence, with a temporal trend of increased manufacture of El Paso Polychrome and decreased use of El Paso Brown (Human Systems

Research 1973:331; Perttula et al. 1995:210-219; Mills 1988:163-164; Smiley 1977:130).

El Paso Red-on-Brown
(Figure 12e-g)

These specimens are three body sherds with the typical El Paso Brown paste with abundant particles protruding through all surfaces. They all received the application of a thin, bright red paint on their exterior surfaces, hence their typological attribution.

This type is also referred to as El Paso Bichrome to account for the vagaries of paint color and ceramic surfaces. El Paso Red-on-Brown and El Paso Polychrome appeared after A.D. 1000 as decorative variants of El Paso Brown. Through time, El Paso Polychrome replaced the bichrome types. For this reason, El Paso Red-on-Brown may date narrowly between A.D. 1000 and 1100 (Human Systems Research 1973:332; Perttula et al. 1995:214).

El Paso Polychrome
(Figure 12h)

The type is identified in one small body or neck sherd of typical El Paso Brown paste with remnants of painted bands or thick lines on both surfaces. Both sides have a black-painted field, and one side has a brownish-gray line or band in addition to the black band. A portion of one design field is medium reddish-brown, but this hue may be due to a firing variation. The sherd is 5 mm thick.

Dulaney and Pigott (1977:281-282) identified paste differences between El Paso Polychrome and its progenitor El Paso Brown, but these differences were not observed in the Sabina Mountain Number Two sample. Ceramic paste and particle variations may have been more pronounced in later time periods as design and technology diverged in the pottery. The designs and variants that constitute El Paso Polychrome appeared at about A.D. 1000 and developed through about A.D. 1450. The type may have given rise to painted pottery types in the protohistoric period (Perttula et al. 1995:212-214).

Jornada Brown
(Figure 12i-j)

Two body sherds are exemplary of Jornada Brownware. Both sherds have varying reddish-brown to medium tan colors with gray fire clouds on their surfaces. They vary from 6-8 mm in thickness. They contrast unmistakably with El Paso Brownware in having no carbon streak and fewer tempering particles in a more restricted and smaller size range (fine sand-sized appears to be modal). Further, the particles appear to be predominantly quartz sand, with smaller amounts of feldspar. No particles protrude through the surfaces; instead, surfaces are well smoothed (possibly polished in one case) with minute networks of fire-crazing on the exteriors.

Jornada Brown, also known as Jornada Plain, is distinguished from El Paso Brown in having a generally lighter paste and surface color, smaller particle sizes, and smoothed to polished surfaces. The Sabina Mountain Number Two sherds show these differences distinctly. The type is distributed throughout the Jornada area, and it may have been derived technologically from Alma Plain. The cross-dating of the type suggests a period of production between A.D. 900 and 1350 (Human Systems Research 1973:328-329; Smiley 1977:172).

Galisteo Black-on-White
(Figure 12l)

One sherd belongs to this type. It is 5 mm thick, and once belonged to a bowl. The paste is even-textured, yellowish-gray, and tempered with gray, fine particles. The interior bowl surface has a chalky, yellowish-white slip and black-filled lines and design fields. The filling is uneven, however, with some areas thinner and grayish, others thick and black. Also, the black fields have an observable glossy finish that may be incidental glazing or semi-glazing of the paint. This effect may be accidental or deliberate in the development of the technology.

Galisteo Black-on-White is a carbon-paint type named for the Galisteo basin of northern New Mexico where it originated. It is a relatively rare intrusive, or imported, ceramic type in the Jornada branch and Hueco Bolson. The type is poorly dated, but Puebloan settlement in the Galisteo basin developed in the A.D. 1200s and continued into Historic times (Mills 1988:168; Smiley 1977:197; Stuart and Gauthier 1984:99). Galisteo Black-on-White has been described as a synonym for McElmo Black-on-White based on collections from the Gallinas Springs Pueblo, LA 1178, and dated between A.D. 1250 and 1350 (Eidenbach 1982:157).

Three Rivers Red-on-Terracotta
(Figure 12m)

The type is represented by one bowl rim sherd. The sherd lacks any painting, but the type is revealed by the bright, light terracotta surface color. Polish covers the surfaces, including the rounded, direct rim. The thickest part of the sherd is 6 mm and the interior has a 3 mm carbon streak. The tempering material includes numerous white and black particles, modally coarse sand-sized. The terracotta surfaces appear to have been achieved by the application of a thick slip of that color to all surfaces.

Three Rivers Red-on-Terracotta is a type of the Three Rivers redwares and is closely synonymous with San Andres Red-on-Terracotta, although Smiley (1977:165) found them distinguishable in the southern Tularosa basin. The distinction was made on the basis of painted line width, paste color, surface color, and temper particle sizes. Mills (1988:167), working in the same region, found it prudent to class the types together as Undifferentiated Red-on-Terracotta. Smiley (1977:165) suggested that the best dating of the types, however conjoined, was between A.D. 1150-1300, while Mills (1988:167) noted that the types were produced no earlier than A.D. 1100. The type was traded widely, but the core area of production was the northern Tularosa basin and neighboring mountains (Human Systems Research 1973:333-334).

Pecos Glaze I
(Figure 12k)

The single specimen of this type is a shoulder/neck jar sherd. It is 6 mm thick. The interior surface is brownish-orange, and the exterior is yellowish-brown. The ceramic paste is ashy gray, medium-textured, with moderate-to-fine white, black, and gray particles. The interior and exterior surfaces appear to have been layered with orange slips. Design elements on the exterior are dark gray blobs, or free elements, and a reddish-gray line. The blobs' outlines are blurred and indistinct, as though melting into the surroundings. Some of the core particles similarly have obscured outlines. These qualities are typical of glazed ceramics, especially when higher firing temperatures were attempted to achieve the glaze.

Pecos Glaze I refers to its temporal position as the first of a sequence of glazed types in the central Rio Grande area and surrounding regions. In the Jornada branch it was an imported ware and of rare occurrence. The sequence of early glaze types is also called the Agua Fria Glaze-on-Red Type Cluster (Human Systems Research 1973:361). Pecos Glaze I dates between A.D. 1350 and 1425, but some research suggests that it may have been produced as late as the sixteenth century (Mills 1988:168).

Unknown painted

This type is represented by one bowl rim sherd decorated by one wavy line of purplish-brown paint. The wavy line runs under the rim on the exterior surface. The straight rim is flattened and polished. The core has a thick carbon streak and few, but coarse-sized, white tempering particles. The exterior was smoothed, and the interior was finished by smoothing and brushing. Few particles appear on the surfaces. These qualities contrast with El Paso Brownware. The sherd measures 5 mm at its thickest.

Ceramic Inventory of Room Fragment, 110N

These ceramic designations and counts come from the excavation forms recorded for the clearing of the room fragment (see Figure 5). As such, the collection includes ceramics from the near-floor context, the modern ground surface, adjacent extramural areas, and some items transported from other areas of the site. A very generalized picture of the ceramics in use at the time of occupation of this room may be gained by these ceramics (Table 11).

Table 11 demonstrates amply the dominance of El Paso Brownware on this part of the site, the corresponding popularity of El Paso Polychrome in the El Paso phase and the lack of potential for fine-grained analysis of the ceramic assemblage. The lack of potential is attributable to the post-occupational disturbances of the site, notably the 20th century impacts.

Ceramic Discussion and Comparisons

As a group, the studied ceramic types in Lot 585 suggest time periods earlier than those accepted for the El Paso phase and earlier than the specific archeomagnetic assays (early 1400s) derived from the site. Bear in mind that the selected types also came from the off-site survey sites, at least one

Table 11. Ceramic inventory of Room fragment.

Lot	Provenience	El Paso Brownware	El Paso Polychrome	Ceramic Sherds
657	111-112N, 48-49E, Level 1 Floor	20	10	
658	110-111N, 47-48E, Level 1	6	1	
659	110-111N, 48-49E, Surface	17		
1502	111-112N, 48-49E, Level 2			3
1503	111-112N, 49-50E, Level 1			40
1505	112-113N, 48-49E, Level 1			16
1506	112-113N, 49-50E, Level 1			20
	Sherd totals	43	11	79

of which, 41EP4436, was clearly identified as having a Dona Ana phase component (see off-site survey section). The median time period for the group as a whole is the A.D. 1200s, with some types more common between A.D. 1100 and 1200, and a few in production as late as A.D. 1350. The archeomagnetic assays suggest a site occupation in the late A.D. 1300s into the 1400s.

In addition to the studied types of Lot 585, site collectors reported and named in their notes, excavation forms, and catalog forms the following additional types:

- Chupadero Black-on-White
- Possible Pecos glazed sherd
- Alma Plain
- Playas Red Incised
- Lincoln Black-on-Red

The catalog forms and excavation forms make it clear also that El Paso Polychrome is the most common painted type on the site, and Chupadero Black-on-White and Mimbres Classic Black-on-White are common as well. Numerous Jornada Brown sherds were found. Chupadero Black-on-White is a common trade pottery type belonging to the Chupadero White Ware of the Jornada district of southern New Mexico east of the Rio Grande. Playas Red Incised is a widely distributed Chihuahuan type of later time periods, and Lincoln Black-on-Red is a companion type of Three Rivers Red-on-Terracotta, of the Three Rivers Red Wares (Human Systems Research 1973:326-327).

In addition to these types, Brook (1980:67) identified the following ceramic types from his Sabina Mountain Number Two site excavations. They are listed in order of abundance:

- El Paso Polychrome
- El Paso Brown
- El Paso Smudged
- Chupadero Black-on-White
- Mimbres Black-on-White
- Ramos Polychrome
- Alma Plain
- Playas Red Incised
- Incised (El Paso?)
- Unidentified
- Corrugated (El Paso?)

- Three Rivers Red-on-Terracotta
- Chihuahuan Corrugated
- Ochoa Fingernail Indented

Carmichael (1986:68) and Whalen (1977:153, 1978:59) both searched for ceramic groupings in settlements of each phase in the sequence established by Lehmer (1948). The groupings they discovered were then defined as ceramic associations. When these associations were identified on site surfaces during survey, the phase attribution of the site could be made. Whalen (1977:153, 1978:59) did not establish ceramic associations for the Dona Ana phase; he distinguished only between the Mesilla and El Paso phases. The only ceramic trait of the Mesilla phase was El Paso Brown sherds. The diagnostic ceramic associations of the El Paso phase include the following list of non-local trade types, in addition to El Paso Polychrome:

- Chupadero Black-on-White
- Mexican Polychromes
- Playas Red, Plain, or Incised
- Three Rivers Red-on-Terracotta
- Corrugated Wares (various types)
- Mimbres Black-on-White
- Other intrusives (unspecified)

The Mexican Polychromes listed above include various painted types, including the Ramos Polychrome type found at Sabina Mountain Number Two. The term is equivalent to Chihuahuan Polychromes used by Carmichael (1986:68) in his list below. Playas Red types are also Chihuahuan. These and the Chihuahuan painted types originated in the region surrounding Casas Grandes and are found in abundance there.

Carmichael (1986:68) established ceramic associations for the Dona Ana and El Paso phases. The associations for the Dona Ana phase are:

- Late El Paso Brown
- Early El Paso Polychrome
- Chupadero Black-on-White
- Mimbres Black-on-White
- El Paso Bichrome

For the El Paso phase, Carmichael (1986:72) listed the following ceramic types:

- El Paso Polychrome
- Chupadero Black-on-White
- Three Rivers Red-on-Terracotta,
- Lincoln Black-on-Red
- Los Lunas Smudged Corrugated
- Gila Polychrome
- Heshotauthla Glaze Polychrome
- Chihuahuan Polychromes

To Carmichael (1968:72), the main differences between the ceramics of the El Paso phase and the earlier Dona Ana phase were the (1) presence of the Chihuahuan Polychromes in the El Paso phase, (2) the absence of Mimbres Black-on-White in the El Paso phase, and (3) the shift to the later El Paso Polychrome ceramics in the El Paso phase. Carmichael and Whalen agreed on the appearance of Mexican/Chihuahuan pottery types, corrugated or otherwise surface-modified types, and pottery from the northern Tularosa basin district (Three Rivers Red-on-Terracotta and Lincoln Black-on-Red) in the El Paso phase.

The direct ceramic cross-dating and comparison of the site pottery to these ceramic associations leave the Sabina Mountain Number Two assemblage within the limits of the El Paso phase, but with some admixture or introduction of Dona Ana phase diagnostic ceramics to the site. The site yielded, in quantity, all the diagnostic pottery types of the El Paso phase and minor quantities of Dona Ana phase pottery in addition to those shared between them. Furthermore, the cross-dating of the common ceramic diagnostics seems to position the site chronologically somewhat earlier than the archeomagnetic assays would suggest. A reasonable explanation for this situation is that the site occupation began earlier in the El Paso phase than the specific contexts sampled for archeomagnetic assay, and earlier Dona Ana ceramics were brought in from neighboring Dona Ana sites as curiosities or novelties. An outside possibility is that the El Paso phase occupations were built on an earlier Dona Ana phase component of the site; however, there are no architectural hints at a Dona Ana component. Additionally, the broad patterning of the burned rock distributions relates heavily to the El Paso phase structures and features, not to any identifiable earlier activity areas or structures offset from the El Paso phase constructions. For there to have been a Dona Ana component at the site, the El Paso component would have had to have been built exactly on the prior component and have grown outward from it. The site lacks any spatial patterns that might indicate this situation. The only Dona Ana occupational indications are the recovered ceramics.

Altogether, the ceramics from the TAS field school and the EPAS excavations well characterize the material culture of the site and its occupations. However, limitations of the ceramic data and field school methodology must be presented as caveats. The first is that a site-wide grab sample of analyzable pottery probably is inadequate to characterize the ceramic assemblage of a Formative village. Reliable ceramic profiles are gained from excavation sampling of stratified deposits such as middens and room fills and floors. Such excavations were not part of the TAS field school strategy. The serendipitous finding of the room fragment provided some excavated ceramic data that showed only broad patterning. This view of the site ceramic complex was refined by the incorporation of wider site surface collections and the findings of the Brook (1980) excavations. The second limitation relates to scales of analysis. The fine tuning of ceramic cross-dating by Whalen and Carmichael, who wrote about later El Paso Brown, later El Paso Polychrome, etc., was based on studies of numerous vessel shapes and rim forms drawn from rim sherds in quantity. Vessels and rim sherds were simply not available on the Sabina Mountain Number Two site in sufficient numbers to allow such fine-grained studies. The forces of site deterioration, amply cited, have had their effects, resulting in a pronounced loss of archeological data.

Hunting/Gathering and Agricultural Artifact Ratios

A comparison of hunting/gathering and agricultural functions implied in the artifact assemblages from the Sabina Mountain Number Two site can indicate some of the social and economic activities of the site. Grouping artifact classes according to their implied functions may show broadly the relative balance of subsistence strategies. Accordingly, artifact categories were grouped as hunting/gathering, agricultural, or multiple. The category multiple may suggest combined or alternating hunting/gathering and agricultural activities, or it may imply uses entirely apart from economic pursuits. The large and small burned rock features may have served hunting/gathering and agricultural uses. Ceramic vessels are likewise strongly multi-functional and were used by both hunting/gathering and agricultural peoples that lived in the Hueco Bolson. The pigment samples may have been used in craft and artistic pastimes unrelated to any economic activity.

For identification and classification purposes, the artifact assemblages of Dockall (see above) and Brook (1980) were used. The functional attributions of Dockall are preferred over Brook's as they are based on a larger body of research, much of it since Brook's study. Another consideration is the function of ground stone artifacts. Functional typologies attribute slab and basin metates and circular or pestle-type manos to the processing of gathered foods; trough metates and rectangular and lenticular manos were apparently innovated more efficiently to process cultivated grains, including maize (Hard 1986; Lancaster 1984; Robinson et al. 1985). Dockall distinguished both slab and trough metate categories in the TAS and EPAS collections. Similarly, circular, pestle-like, rectangular and wedge-shaped or lenticular manos were identified in the assemblages.

A few categories fell out of the analysis as they lacked multiple or economic functions. The Dockall categories left out were the ground stone fragments (a catchall category of items lacking type attributes) and the beads and pendant fragment (personal adornment). The Brook categories excluded were the cruciform and altar piece (symbolic/ceremonial functions) and the stone bowl (single function, problematic identification). In Table 12 below, the letter D denotes a Dockall category, the letter B a Brook category.

A significant limitation of this method must be recognized. The comparisons made are category-to-category only, and do not include artifact frequencies as a comparative element. Categories weigh equally throughout the analysis; in other words, a category having one artifact to represent it has the same weight, or significance, as a category with dozens of artifacts. Quantified artifact comparisons might reveal more detail on economic and technological activities on the site, but they would also introduce the crippling factor of recovery bias, this on a site known to

Table 12. Functional categorization of Dockall and Brook artifact categories.

Hunting/gathering	Multiple	Agricultural
Slab metates – D - B	Utilized flakes - D – B	Trough metates – D – B
Circular manos – D – B (includes pestle-type)	Unifaces – D (Scrapers – B)	Rectangular manos – B (includes lenticular and wedge shapes)
Rocking muller – B	Beaked unifaces – D – B	Choppers – D – B
Stone cores – D	Carinated unifaces – D	Core tools – D
Bi-polar cores – D	Denticulate unifaces – D (saws – B)	
Split pebbles – D	Modified flakes – D	
Hammerstones – D	Palettes – D – B	
Agave knives - D	Polishing stones - D (smoothers – B)	
Perforators – D	Ceramic discs - B	
Drills – D – B	Scribes – B (burins – B)	
Stage 1 biface – D	Ceramic ladles and plate – B	
Dart points – D – B	Ceramic vessels – D – B	
Arrow points – D – B		
Shaft smoothers – B		
Total Categories: 14	13	4

have suffered long term relic collecting (a process famous for selective artifact removal). A category-to-category comparison of equal weighting has relatively more reliability, although it gives up the explanatory range of quantified artifact-to-artifact comparisons in an ideal setting. With this method, the ratios reported are also percentages of the total number of categories used in the analysis. In the first analysis below, the denominator is 31; in the second analysis, the denominator is 28 due to the removal of three categories.

Inspection of Table 12 shows that hunting/gathering artifact classes predominate in the assemblage, with hunting/gathering: multiple or multi-functional: agricultural proportions of 3.5: 3.3 :1 (denominator of 31). The picture of hunting/gathering dominance may be constrained prudently by removing from the analysis the classes of tools/resources used to make tools (not directly applied in an activity). These are the stone cores, bipolar cores, and split pebbles, removed from the hunter/gatherer list. The resulting ratio is 2.8: 3.3: 1 (denominator of 28). Multi-functional tools are clearly more useful to the site inhabitants than either of the more focused areas of endeavor, but hunting/gathering activities when compared directly to agricultural activities received more emphasis in terms of the elaboration of technology involved with them.

Further observations add to the picture (with artifact frequencies and percentages added for clarity), notably the multiple or multi-functional classes of utilized flakes (n=17, 8.8 percent of the TAS lithic assemblage), unifaces (n=4, 2.1 percent), carinated unifaces (n=8, 4.2 percent) and denticulate unifaces (n=1, 0.5 percent). These classes, while multi-functional for their purposes in cutting and sawing, favor the processing of pelts of relatively thin-skinned animals such as rabbits. Dockall observed (see above) that the proportions of unifaces and utilized flakes, while significant, are actually lower than other analyzed sites in the Hueco Bolson (Shafer et al. 1999). The drills (n=3, 1.6 percent) and perforator (n=1, 0.5 percent) facilitate the manufacture of nets, commonly applied in capturing small game. These artifact types may suggest an emphasis on the collecting and processing of small game, supported inferentially by the preponderance of small mammal bones reported in the faunal analysis (McClure, see below). Compare these likely small game tools with the dart points (n=4, 2.1 percent) and arrow points (n=11, 5.7 percent), which are applied to the acquisition of larger game, and they suggest an emphasis at the site on the procurement of larger game.

This measure of overall economic activity by proportions of functional artifact classes gives a clear result in terms of material technology. The study of artifact ratios alone, however, measures little of the actual conduct of economic life and none of the caloric yield to the site inhabitants of the various implied food-getting strategies.

ECOLOGICAL ANALYSIS

The field school collected the bones of vertebrates from widely distributed surface collection and excavation units. This collection of faunal specimens was sent to William L. McClure of Houston, Texas, for species identification.

Vertebrate Remains

by William L. McClure

A few bones of vertebrates were recovered during the project (Table 13). Most of the bones were small fragments and could not be identified. A few bones were weathered and may not be associated with the prehistoric occupation. Most of the fragments are blue-black in color due to exposure to fire. Some of the others have apparently been somewhat polished, perhaps by wind action. Identification as to the animals involved is limited to rabbit (*Sylvilagus* sp.), jackrabbit (*Lepus californicus*), and ground squirrel (*Spermophilus* sp.).

Summation of the identified elements of the faunal assemblage helps the identification

Table 13. Faunal material recovered from the 1977 TAS excavations.

Lot	Provenience	Identification	bone
23	108-109N, 24-25E, Surf.	Small mammal	Long bone shaft fragment
32	109-109N, 28-29E, Surf.	Unidentified	Fragment (3 burned)
40	108-109N, 31-32E, Surf.	Small mammal	Long bone shaft fragment, (burned)
47	109-110N, 33-34E, Surf.	Small mammal	Long bone shaft fragment
87	109-110E, 53-54N, Surf.	Small mammal	Vertebra epiphysis
126	108-109N, 74-75E, Surf.	Unidentified	Fragment (3 burned)
132	108-109N, 75-76E, Surf.	Small mammal	Long bone shaft fragment
136	108-109N, 79-80E, Surf.	Unidentified	Fragment (burned)
140	109-110N, 78-79E, Surf.	Unidentified	Fragment (3 burned)
142	108-109N, 80-81E, Surf.	Unidentified	Fragment (weathered)
144	108-109N, 83-83E, Surf.	Unidentified	Fragment
159	112-113N, 26-27E, Surf.	Small mammal	Long bone shaft fragment (2 burned)
198	131-132N, 26-27E, Surf.	Unidentified	Fragment (burned)
200	133-134N, 26-27E, Surf.	Unidentified	Fragment (burned)
234	106-107N, 29-30E, Surf.	Unidentified	Fragment (burned)
252	108-109N, 87-88E, Surf.	Unidentified	Fragment (3 burned)
257	109-110N, 87-88E, Surf.	Probable jackrabbit	Metapodial distal end (burned)
315	110-111N, 20-21E, Surf.	Unidentified	Fragment
319	111-112N, 23-24E, Surf.	Small mammal	Long bone shaft fragment (burned)
322	110-111N, 31-32E, Surf.	Unidentified	Fragment (burned)
323	110-111N, 30-31E, Surf.	Unidentified	Fragment (2 burned)
323	110-111N, 30-31E, Surf.	Jackrabbit	Left Calcaneus fragment (burned)
323	110-111N, 30-31E, Surf.	Small mammal	Phalanx proximal end (burned)
326	110-111N, 35-36E, Surf.	Ground squirrel	Axis
343	111-112N, 20-21E, Surf.	Small mammal	Long bone fragment (burned)
481	106-107N, 20-21E, Surf.	Unidentified	Fragment (burned)
481	106-107N, 20-21E, Surf.	Small mammal	Long bone fragment (burned)
488	112-113N, 50-51E, Surf.	Unidentified	Fragment
497	110-117N, 50-51E, Surf.	Unidentified	Fragment (burned)
499	118-119N, 50-51E, Surf.	Rabbit	Cranial fragment with left and right maxilla and six cheek teeth (weathered)

Table 13. *(Continued)*

Lot	Provenience	Identification	bone
501	115-116N, 51-52E, Surf.	Unidentified	Fragment (burned
502	51-52N, 116-117E, Surf.	Unidentified	Fragment (4 burned)
502	51-52N, 116-117E. Surf.	Small mammal	Long bone shaft (burned)
503	122-123N, 51-52E, Surf.	Unidentified	Fragment (burned)
512	121-122N, 51-52E	Small mammal	Long bone shaft fragment (burned)
543	135-136N, 101-102E, Surf.	Unidentified	Fragment (burned)
651	111-112N, 40-41E, Lv. 1	Unidentified	Fragment (burned)
783	77-78N, 50-51E, Surf.	Unidentified	Fragment (burned)
787	79-80N, 50-51E, Surf.	Unidentified	Fragment (burned)
1014	110-111N, 23-24E, Lv. 1	Unidentified	Fragment (2)
1060	118-119N, 58-59E, Surf.	Unidentified	Fragment
1101	66-67N, 51-52E, Surf.	Unidentified	Fragment (burned)
1103	118-119N, 62-63E, Surf.	Small mammal	Long bone shaft (burned)
1109	119-120N, 64-65E, Surf.	Small mammal	Long bone shaft fragment (burned)
1115	72-73N, 25-26E, Surf	Unidentified	Fragment (burned)
1161	68-69N, 50-51E, Surf.	Small mammal	Long bone shaft fragment (burned)
1195	62-63N, 25-26E, Surf.	Unidentified	Fragment
1300	23-24N, 111-112E, Lv. 2	Unidentified	Fragment (burned)
1320	64-65N, 60-61E, Surf.	Large mammal	Tooth fragment
1355	154-155N, 101-102E, Surf.	Unidentified	Fragment (2 burned)
1356	155-156N, 100-101E, Surf.	Unidentified	Fragment (burned)
1376	165-166N, 101-102E, Surf.	Very small bird	Humerus, proximal end (size of goldfinch)
1386	170-171N, 100-101E, Surf.	Unidentified	Fragment (burned)
1388	171-172N, 100-101E, Surf.	Unidentified	Fragment (burned)
1390	172-173N, 100-101E, Surf.	Small mammal	Long bone shaft fragment (burned)
1448	SM2-125, Surf.	Unidentified	Fragment
1503	111-112N, 49-50E, Lv. 1	Unidentified	Fragment
2024	73-73.2N, 50.8-51E, Surf.	Unidentified	Fragment
2052	#243, Surf.	Small mammal	Long bone shaft fragment (burned)
2065	#242, Surf.	Small mammal	Long bone shaft fragment (burned)

Note: In this tabulation 'Small mammal' refers to an animal about the size of a rabbit and 'Large mammal' refers to a deer-sized animal.

of patterns in the data. The most frequently identified taxon was small mammals, with 16 elements. The large mammal category included one element, as did the small bird identification and the identified species of jackrabbit, ground squirrel, and rabbit. These species are common in the immediate site area today. It is probable that the burned specimens reflect actual animals procured for food, but the unburned items suggest animals that may have died naturally on the site during and since the occupation. The faunal data are sufficient to show that hunting and collecting of animal resources, especially small mammals, were contributory economic activities of the site's inhabitants.

Floral Analysis

The flotation analysis

The 1977 field school sampled various contexts for plant macrofossil flotation. The flotation of all the samples in 2003 recovered very little. The minimal finds are presented in Table 14.

The recovered specimens were unidentifiable as to species; however, these scant finds do not imply that the Sabina Mountain Number Two site has a poor preservation environment or that the ancient village contained few economic plant species. Brook (1980) reported a more ambitious program of floral analysis, including the taking of macrofloral and pollen samples. John W. Green (1980:79-86) conducted the macrofloral analysis, and he identified quantities of wild and domesticated economic plant parts. He listed maize (*Zea mays*, eight- and 10-rowed cobs), tepary bean (*Phaseolus acutifolius var. latifolius*), mesquite (*Prosopis juliflora*), and yucca (*Yucca torreyi* and/or *Y. baccata*).

CHRONOLOGY

The Sabina Mountain Number Two site when investigated appeared to be a single component El Paso phase village of the Jornada branch of the Mogollon culture, dating ca. A.D. 1200-1450. The TAS field school had a commitment to direct dating the site in order to help refine its place in regional and areal chronologies. The sources of dating at the Sabina Mountain Number Two site were fired clay archeomagnetic samples, radiocarbon samples (charred wood and vegetal materials), and artifactual cross dating. To date, the radiocarbon samples have not been run to derive their assays.

Archeomagnetism

Archeomagnetism dating samples were taken from two loci in the site, the EPAS Room 9 and an unreported context. The sampling and chronological work were performed initially by the Earth Sciences Observatory of the University of Oklahoma. Chronometric assays of the two contexts were reported to the Society without corrections or technical data. The Museum of New Mexico Archeomagnetism Laboratory reanalyzed the cube samples in 1995. They reported all curve probabilities and technical data. Table 15 compares their findings.

The calendar age estimates of the Museum of New Mexico assays are derived from the master polar curve of the Museum of New Mexico Archaeomagnetic Laboratory. All four assays overlap in their calendar age estimates from ca. A.D. 1339 to 1365. This is a remarkably narrow range of overlap for probabilistic assays, and it covers a period in the middle of the time span of the El Paso phase as conventionally dated. The technical data of the Museum of New Mexico assays are reported in Table 16 for accuracy checking.

THE OFF-SITE SURVEY

The 600 acre survey in one week's time found 34 prehistoric archeological sites; this accomplishment was facilitated by the 94 field school attendees who participated in it. The overall method of the survey was pedestrian transect survey. The survey areas were located by use of a development map (termed the Horizon Land Co. map), which showed roads and trails, thereby aiding transportation across the basin. The actual walking transects were 15 m wide and had varying lengths. They were mapped ultimately on the USGS 7.5' Quadrangle topographic map of the area (Helms West Well). The survey plots and their transects were emplaced intentionally over a variety of basin environments in order to obtain a representative sample of the archeological remains present on the landscape. For practical purposes, the field school surveyors were divided into small teams varying in size from three to six individuals. The teams dispersed daily to their assigned transect locations by vehicle or on foot. Transects were grouped in parallel, their edges contiguous. Each transect was walked by only a single team member; it was expected, therefore, that each team would walk several transects per day.

When a site was found, the entire team worked to define the site and its limits. The team completed a standard TAS field school site form, including a sketch site plan, and scheduled the site for a revisit by the field school photography team. The survey team made surface artifact collections of some of the sites, employing various methods.

Table 17 reports the findings of the off-site sur-

Table 14. Inventory of flotation samples from 1977 TAS excavations.

Lot #	Provenience	Recovery
1307	110-111N, 31-32E NE corner, Level 2	3 flecks of charcoal, unidentified
1309	93-94N, 49-50E, Level 2	1 fleck of charcoal, unidentified
1311	110-111N, 35-36E	1 piece of wood charcoal, unidentified
1312	89-90N, 48-49E, Level 3	1 possible charred seed

Table 15. Archeomagnetism assays from Sabina Mountain Number Two.

Laboratory	Feature	Lab Catalogue #	Calendar Age Estimate
Museum of New Mexico	Room 9	ESO-UO 231/EP-1 R9	AD 995-1045, 1220-1275, 1330-1365
University of Oklahoma	Room 9	ESO-UO 231/EP-1 R9	AD 1390 ± 41
Museum of New Mexico	Unknown	ESO-UO 232/EP-2 R?	AD 920-1015, 1240-1355, 1405-1460+
University of Oklahoma	Unknown	ESO-UO 232/EP-2 R?	AD 1365 ± 26

Table 16. Archeomagnetic technical data.

Lab Catalogue #	ESO-UO 231/EP-1 R9	ESO-UO 232/EP-2 R?
Inclination	54.9	52.8
Declination	353.2	357.7
VGP Lat	82.6	87.5
VGP Long	165.1	156.7
Alpha-95	1.9	3.3
Delta-p	1.9	3.2
Delta-m	2.6	4.6
# Cubes	8/7	8/7
Demag	150	100

vey. The sites conform to the patterns of regional sites found in the Hueco Bolson (Mayer-Oakes 1979:15-16). It should be noted that sites of all reported types and time periods were found in three environments: basin bottoms, basin bottoms with sand dunes, and basin margins. These zones correspond to Mayer-Oakes' (1979:15) Hueco Bolson flatlands, large sand dune fields, and intra-bolson hills, respectively.

The recorded sites from the off-site survey display the material variety of Hueco Bolson prehistory save for the lack of Paleoindian finds. The dimensions of site types, environment, and cultural components reveal meaningful patterns and invite further analysis and interpretation. It should be noted that site forms were begun on three additional sites, but these site recordings were left in such incomplete states by the surveyors that they could not be entered into the state site files and receive official trinomial designations. These sites are left out of the site total and following analyses.

Table 18 lists site types according to the two major environmental categories: basin margins and basin bottoms, or flats. The distinction between dunes and non-dunes is relative and fluctuating, as discussed in the site spatial analysis; these two variants are collapsed into the basin bottom category. The site types used on the following tables are those given to them by the field surveyors. As such, they are descriptive, with cultural and economic functions implied but not explicit.

The emphasis on site locations in the basin bottom is overwhelming. It is notable, too, that whereas one site type is restricted to the basin margin, seven are found only in the basin bottom (see Table 18). The pattern is pronounced, but the sample of sites is small. Also, the basin bottom is a vastly larger geographic area, and this may be reflected in an imbalance in the proportions of acreage surveyed per environmental zone. Summary breakdown statistics on the survey transects and their acreages were not found in the off-site survey records, however.

As a further observation, the basin bottom contains more of the simpler and smaller site types such as burned rock scatters, lithic scatters, and others, while the basin margin has fewer but more complex sites (ceramic and lithic scatters with

Table 17. Site survey summary.

Site #	Field #	Ecozone	Site Type	Area in square meters	Time/ Culture	Diag-nostic Artifacts	Hearth (No.)	Additional Material
41EP4401	TAS-II-S-8	Basin bottom (dunes)	Ceramic and lithic scatter	300	Mesilla	EP Brown	–	BR
41EP4402	TAS-II-S-1	Basin margin	Ceramic and lithic scatter w/ hearth	8778	Mesilla	EP Brown; gr stone; pecked stone anvil	5 (ls.)	BR scatters; chert working areas; 2 middens
41EP4403	TAS-I-S-1	Basin margin	Lithic scatter w/ hearth	7626	Archaic	Thick biface	–	BR
41EP4404	TAS-II-S-10	Basin margin	Ceramic and lithic scatter w/ hearth	1200	Archaic, Mesilla	Archaic tool types; EP Brown		BR scatter
41EP4405	TAS-II-S-11	Basin margin	Ceramic and lithic scatter w/ hearth	7600	Archaic, Mesilla	Sotol knife, EP Brown	1	BR; gr stone
41EP4406	TAS-II-S-12	Basin margin	Ceramic and lithic scatter w/ hearth	9600	Mesilla	EP Brown	1	Chert; 1 obsidian flaked cobble, BR
41EP4407	TAS-IV-S-14	Basin margin	Ceramic and lithic scatter w/ hearths	288	El Paso	EP Brown	4	BR
41EP4408	TAS-I-S-18	Basin margin	Ceramic and lithic scatter w/ hearth	230	Mesilla	Unknown	8	Concentrated hearth field
41EP4409	TAS-IV-S-35	Basin margin	Artifact and lithic scatter w/ hearth	84	El Paso	EP Poly, Chupadero B/W, EP Brown	1	BR middens, rock circle, stone tools, stone debitage
41EP4410	TAS-IV-I-14	Basin margin	Isolated find	–	Unknown	-	–	Thick biface
41EP4411	TAS-IV-I-13	Basin margin	Isolated find	–	Unknown	Basal portion of chert biface	–	Slightly larger than arrow point
41EP4412	TAS-IV-I-15	Basin margin	Isolated find	–	Unknown	Sotol knife	–	Brown ss.; unifacial
41EP4413	TAS-IV-S-1	Basin bottom (dunes)	Ceramic and lithic scatter w/ hearth	225	Archaic, El Paso	EP Brown; Chupadero B/W; leaf-shaped Archaic point	3	Ashy area, BR, thick biface
41EP4414	TAS-IV-S-12	Basin bottom (dunes)	Ceramic scatter w/ hearth	600	El Paso	EP Brown, EP Poly, Chup B/W	1	Sherds in pottery concentration; BR
41EP4415	TAS-IV-S-15	Basin bottom (dunes)	Burned rock scatter	30	Unknown	-	–	Minimal scatter
41EP4416	TAS-IV-S-18	Basin bottom (dunes)	Ceramic and lithic scatter	140	Mesilla	EP Brown	–	1 sherd; BR
41EP4417	TAS-IV-S-19	Basin bottom (dunes)	Ceramic and lithic scatter	1800	El Paso	EP Poly	–	Lithic debitage
41EP4418	TAS-IV-S-20	Basin bottom (dunes)	Burned rock and lithic scatter	65	Unknown	None	2	Concentrated burned rock and minimal lithic debris

Table 17. *(Continued)*

Site #	Field #	Ecozone	Site Type	Area in square meters	Time/ Culture	Diag-nostic Artifacts	Hearth (No.)	Additional Material
41EP4419	TAS-IV-S-21	Basin bottom	Lithic scatter	240	Unknown	None	–	–
41EP4420	TAS-IV-S-22	Basin bottom	Lithic scatter w/ hearths	210	Unknown	None	2	–
41EP4421	TAS-IV-S-27	Basin bottom (dunes)	Ceramic and lithic scatter	12	Mesilla	EP Brown	–	Lithic debitage; No BR
41EP4422	TAS-IV-S-29	Basin bottom (dunes)	Lithic scatter w/ hearth	150	Unk	None	2	1 chert biface fragment
41EP4423	TAS-IV-S-30	Basin bottom (dunes)	Lithic scatter	225	Unk	None	-	Stone tool fragments
41EP4424	TAS-IV-S-32	Basin bottom (dunes)	Lithic scatter	2	–	–	–	BR concentration. 1 chipped stone tool
41EP4425	TAS-IV-S-33	Basin bottom (dunes)	Ceramic and lithic scatter w/ hearth	280	Mesilla	Mimbres B/W; EP Poly	1	
41EP4426	TAS-IV-S-36	Basin bottom (dunes)	Ceramic and lithic scatter	225	El Paso	EP Brown, EP Poly	–	–
41EP4427	TAS-IV-S-37	Basin bottom	Ceramic and lithic scatter	240	Archaic, El Paso	EP Poly, Archaic (Ensor) dart point	–	Ceramic component is EP Poly pot bust
41EP4428	TAS-IV-S-40	Basin bottom	Lithic scatter	600	Archaic	Thick biface	–	–
41EP4429	TAS-IV-S-41	Basin bottom	Ceramic and lithic scatter	25	Mesilla	EP Brown	–	–
41EP4430	TAS-IV-S-42	Basin bottom	Lithic scatter	600	Unk	–	–	Bifacial thinning flake
41EP4431	TAS-IV-I-16	Basin bottom	Isolated find	–	Archaic	Archaic dart point	–	–
41EP4432	TAS-IV-I-17	Basin bottom	Ceramic scatter	70	Mesilla	EP Brown	–	Pot bust
41EP4433	TAS-IV-S-2	Basin bottom	Artifact scatter	135.6	Mesilla?	Pottery, shell	BR midden	Ceramic types unnamed
41EP4434	TAS-IV-S-3	Basin bottom	Lithic scatter	600	Archaic Hueco phase	Ring midden	–	Lithic and BR scatter
41EP4435	TAS-IV-S-4	Basin bottom	Ceramic and lithic scatter	2000	Mesilla	Mimbres B/W, EP Brown	–	Chipped stone, BR
41EP4436	TAS-IV-S-31	Basin bottom	Artifact scatter	135000	Archaic through Dona Ana	Seven listed regional pottery types	4+	BR scatter, debitage, Archaic dart points, sotol knife, gound stone
41EP4437	TAS-IV-S-38	Basin bottom	Ceramic and lithic scatter w/ hearths	1800	El Paso	EP Poly	6+	Lithic debitage and BR scatters
41EP4438	TAS-IV-S-39	Basin bottom	Ceramic and lithic scatter w/ hearth	4500	Archaic, Mesilla	EP Brown	1	Debitage and BR scatter, hammerstone

EP=El Paso; BR=burned rock; ls.=limestone; gr.=groundstone; B/W=black-on-white pottery; Poly=Polychrome; Arch.=Archaic; Unk=unknown; ss=sandstone

Table 18. Number of site types per major environmental zone.

Site type	Basin margin	Basin bottom
Ceramic and lithic scatter with hearth(s)	6	4
Ceramic and lithic scatter		8
Lithic scatter with hearth(s)	1	2
Artifact and lithic scatter with hearth(s)	1	
Ceramic scatter with hearth(s)		1
Burned rock scatter		1
Burned rock and lithic scatter		1
Lithic scatter		6
Ceramic scatter		1
Artifact scatter		2
Totals	8	26

Table 19. Numbers of site types per identified cultural stage and phase attributions.

Site type	Archaic	Archaic-Mesilla	Mesilla	Archaic-Dona Ana	Archaic and El Paso	El Paso
Ceramic and Lithic scatter			5		1	2
Ceramic and Lithic Scatter with hearth(s)		3	4		1	2
Lithic scatter with hearth(s)	1					
Artifact and lithic scatter with hearth(s)						1
Ceramic scatter with hearth(s)						1
Lithic scatter	2					
Ceramic scatter			1			
Artifact scatter			1	1		
Totals	3	3	11	1	2	6

hearths, lithic scatters with hearths, and artifact and lithic scatters with hearths). This finding may well reveal a prehistoric pattern of greater emphasis or shift to exploitation of resources of the basin margins during the Puebloan occupations, as identified in some site-settlement models (Hard 1983; Mauldin 1986; Whalen 1977, 1981, 1994). The basin bottom, however, with its larger numbers of small sites with burned rock and hearths, is not to be disregarded as a primary zone of economic exploitation throughout prehistory. Small sites with burned rock features are consonant with extensive foraging, targeted logistical mobility, and other human food acquisition strategies.

Table 19 breaks down the site types by their stage and phase attributions, determined by the diagnostic artifacts and features found on them. Mesilla phase components have left the greatest imprint on the surveyed landscape, with 11 dated components, followed in numbers by six El Paso phase components. Archaic stage components are more frequently mixed with other components (Archaic-Mesilla, Archaic and El Paso, and Archaic through Dona Ana) than they are found singly. Of the four recorded isolated finds, one is an Archaic projectile point (found on the Bolson bottom), and the remaining three are a non-diagnostic thick biface, a basal fragment of a biface, and a sotol knife.

The spatial patterning illustrated in Table 20 is simply the prevailing numerical emphasis on the basin bottom by components of all phases and stages. The lesson here perhaps is that numbers by themselves do not reveal, in simplistic fashion, the changing patterns of prehistoric settlement.

A final observation on the off-site survey finding regards the cluster of six basin bottom sites: 41EP4433 through 41EP4438. One-half mile separates the most distant of the sites (41EP4433 and 41EP4436) from each other. The cluster contains the largest site on the survey, 41EP4436, the Dona Ana component that may comprise a village residential site. As well, the site cluster has three identified Archaic components. Prehistoric interest in this site locale may be explained by the occurrence of all these sites along the lower channel and around the mouth of a very long arroyo. Mapped as an intermittent stream, the arroyo heads in the Hueco Mountains to the east, a distance of about 5 km. Prehistorically and today, the arroyo has a higher probability of intercepting and channelizing the precipitation of scattered summer thunderstorms than arroyos of shorter length. The lower channel and mouth would therefore have soils of predictably higher moisture content and perhaps also had seasonal ponding of water. The zone would have yielded more abundant wild plant growth and also have supported fields of cultigens planted as part of an opportunistic dry farming strategy. The potential for supporting the irrigation component of an agricultural intensification strategy is also good.

Table 20. Numbers of stage or phase components per major environmental zone

Component	Basin margin	Basin bottom
Archaic	1	3
Archaic/Mesilla	2	1
Mesilla	3	8
Archaic through Dona Ana		1
Archaic and El Paso		2
El Paso	2	4
Totals	8	19

SUMMARY AND CONCLUSIONS

The Sabina Mountain Number Two site is an El Paso phase village in the Hueco Bolson of far West Texas. The village, having perhaps as few as 25 and as many as 50 rooms, varies from typical El Paso phase village plans in having its architecture oriented to the northwest-southeast-trending ridgeline on which it sits rather than to the cardinal directions, although the rooms themselves are close to cardinal orientations. The site has lines of contiguous rooms and additional free-standing rooms. The village as a whole is formed of the replication of domestic units with an apparent lack of structures serving systemic, community-wide functions.

The site artifact assemblage suggests an emphasis on hunting and gathering subsistence strategies, although agricultural products (maize, beans) and technology (ground stone artifacts, digging and chopping tools) contribute to the site artifact inventory. Ceramics are dominated by El Paso brownware, including El Paso Red-on-Brown and El Paso Polychrome. The ceramic inventory includes various Chihuahuan types, Chupadero Black-on-White, additional non-local trade types, and minor amounts of Mimbres pottery. Altogether, the ceramics can be associated with both the Dona Ana and El Paso phases, although the El Paso phase is preponderant. It is probable that earlier Dona Ana ceramics were brought to the village as curiosities and art objects. What is certain about the Sabina Mountain Number Two ceramic assemblage is that it demonstrates that the site residents participated fully in the ceramic system of manufacture, use, and trade for which the Jornada Mogollon culture is well known. Additional non-subsistence wealth in the form of turquoise, coral, and marine shell jewelry flowed through the community. Faunal analysis of the TAS Field

School animal remains showed a predominance of small mammal bones, suggesting an emphasis on the collecting of cottontails and jackrabbits. One large mammal bone, of a deer-sized animal, was also identified.

Notable aspects of the site setting and regional settlement pattern were brought to light by the TAS Field School off-site survey. The first finding is the location of the village near a zone of moisture-retaining Mimbres series soils, favorable for crop-growing. Smaller sites in the surrounding basin environment ranged in age and cultural affiliation from the Archaic stage through the El Paso phase. The majority of the sites are artifact scatters. Eighteen of these also contained stone hearths. One site (41EP4433) held a burned rock accumulation dense enough to qualify as a burned rock midden. Perhaps all the recorded sites served as temporary camps for gathering and processing basin resources. Water control features or elements of irrigation technology were not observed during the off-site survey.

The Sabina Mountain Number Two site as an El Paso phase village raises the persistent question about the existence of an arid zone Puebloan settlement dependent on agriculture without evidence of irrigation technology. Perhaps the best explanation for this apparent quandary is Mauldin's (1986) settlement model, which is part of the radiating settlement system model (Hard 1983). Mauldin's (1986) model focuses entirely on the El Paso phase. In Mauldin's (1986) concept, agricultural villages may have been established in well-watered mountain flanks and along the river, where fields were planted. Hueco Bolson villages may have held a portion of their residents year-round; field produce was brought to them after harvest (Mauldin 1986).

The Sabina Mountain Number Two site yielded the remains of maize and tepary bean as agricultural produce and mesquite and yucca remains as evidence of gathered resources. The summer- and early fall-ripening wild resources (O'Laughlin 1978:254; Whalen 1978:37) may have provided the stimulus to occupy the basin villages in full, after the season of crop growing along the river. Mesquite was abundant throughout the basin, as was yucca. The seeds and beans of mesquite were available well into the fall. Cactus fruits and the seeds of numerous grasses ripened in the summer. Nuts and acorns could have been harvested in the fall and winter in the mountain flanks and intermontane valleys and canyons. Agave could have been collected and processed on the basin flanks and mountain slopes. The basin tracts of Mimbres series soils may have been planted for supplemental fall gardens, cultivated on a dry farming basis. Cottontail and jackrabbit pelts attained their finest quality in the late fall and early winter.

Dalton (1977) provides a framework for understanding trade interaction in egalitarian, or stateless, societies. Trade between non-local partners circulated goods widely, and the interactions supported lineage and clan relations, political alliances, and ceremonialism. Imported goods, termed primitive valuables, brought in foodstuffs and prestige for trading partners and their lineages. Dalton (1977) also pointed out that marriage partners were traded to lineages appropriate for such arrangements. These transactions strengthened affinal relationships and alliances.

As trading relations were reciprocal, similar goods were exported on the network. For purposes of identifying the operation of a network, both imported goods and exported goods and services must be identified or posited. Non-local primitive valuables found in the Hueco Bolson and the Sabina Mountain Number Two site are:

- extra-regional fine ceramics
- turquoise
- marine shell

Coral jewelry beads may have been imported or possibly manufactured from fossil coral outcropping within the region. Foodstuffs and other perishables may not have entered the archeological record. Further, Dockall (this study) proposes that obsidian and higher quality cherts were gained by direct or indirect procurement as part of logistical choices in lithic technology and precise knowledge of the lithic resource base.

Likely export valuables from the site and wider Bolson settlement system include:

- rabbit fur blankets and pelts
- mesquite beans and flour
- agave meal
- shellwork
- crinoid stem beads

Dalton (1977:195) has cautioned that a simplistic network of exchanges among equal lineages and clans was modified in the neighborhood of a hierarchical society, especially a political state. He cited the ethnographic example of the African Tallensi, which existed in the political orbit of kingdoms such as the Mamprusi. This situation prevailed in the Jornada Mogollon, owing to the existence of the regional center of Casas Grandes in Chihuahua (Schaafsma 1979; Wimberly 1979). States (or paramount chiefdoms) such as Casas Grandes mediated elite trade through the center, and restricted or blocked trade in certain goods. In the Southwest, elite trade in macaw feathers would be an example. States also imposed a "king's peace" on hostile relations, thus obviating the need for alliances built on security concerns. At times, states demanded primitive valuables as tribute, for which there was no reciprocation. In their own periods of conflict, political elites levied warriors from their satellite villages. All such exchanges and transfers could be expected to have taken place under the control of the regional center of Casas Grandes. These higher-level transactions and obligations would have served to tie the fortunes of the village hinterland to those of the hierarchical center.

The causes of the abandonment of vast areas of the Jornada Mogollon branch may lie in this conceptual arena rather than that of environmental deterioration. The residents of the Sabina Mountain Number Two site and the Hueco Bolson as a whole may have, by their site settlement and economic strategies, attained sustainable levels of abundance in an arid environment. This was no mean achievement. The final abandonment of large territories at the end of the El Paso phase may have followed the collapse of significant portions of the alliance and economic network of which the Jornada Mogollon people were a part.

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REFERENCES CITED

Beckes, M. R.

1977 Descriptive Analysis of Projectile Points. In *A Cultural Resource Inventory and Assessment of McGregor Guided Missile Range, Otero County New Mexico*, by M. R. Beckes, R. Dulaney, J. D. Piggott, R. F.Scott IV, and N. K. Smiley, pp. 43-80. Research Report 65, part II. Texas Archeological Survey, The University of Texas at Austin.

Betancourt, J. and R.W. Ralph

1981 Preliminary Reconnaissance of Archeological Resources in the Lower Hueco Mountains. In *Five Archeological Investigations in the Trans-Pecos Region of Texas*, pp. 87-113. Texas Antiquities Committee Permit Series 6. Texas Antiquities Committee, Austin.

Binford, L. R.

1979 Organization and formation processes: looking at curated technologies. *Journal of Anthropological Research* 35:255-273.

Brethauer, D. P.

1977 Summary of Cultural Developments in the Hueco Bolson and Vicinity. In *Settlement Patterns of the Eastern Hueco Bolson*, by M. E. Whalen, pp. 4-11. Anthropological Paper No. 4. El Paso Centennial Museum, The University of Texas at El Paso.

Brook, V.R.
1980 The Sabina Mountain Site. *Transactions of the 15th Regional Archeological Symposium for Southeastern New Mexico and Western Texas*, pp. 15-86. Fort Davis.

Bryson R. A. and D. A. Baerreis
1968 Climate Change and the Mill Creek Culture of Iowa. *Journal of the Iowa Archaeological Society* 15-16:1-358.

Camilli, E. L.
1988 Lithic Raw Material Selection and Use in the Desert Basins of South-Central New Mexico. *Kiva* 33(2): 147-163.

Carmichael, D. L.
1983 Archeological Settlement Patterns in the Southern Tularosa Basin, New Mexico: Alternative Models of Prehistoric Adaptations. Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana-Champaign.

1985 *Archeological Excavations at Two Prehistoric Campsites Near Keystone Dam, El Paso, Texas*. University Museum Occasional Papers 14. New Mexico State University, Las Cruces, New Mexico.

1986 *Archaeological Survey in the Southern Tularosa Basin of New Mexico*. Historic and Natural Resources Report No. 3. Environmental Management Office, Directorate of Engineering and Housing, United States Army Air Defense Artillery Center, Fort Bliss, Texas.

Cobb, C. R. and P. A. Webb
1994 A Source Area Perspective on Expedient and Formal Core Technologies. *North American Archaeologist* 15(3):197-219.

Cosgrove, H. S. and C. B. Cosgrove
1932 *The Swarts Ruin: A Typical Mimbres Site in Southwestern New Mexico*. Papers of the Peabody Museum of Archaeology and Ethnology 15(1). Peabody Museum, Harvard University, Cambridge, Massachusetts.

Creel, D.
1988 Prehistoric Water Control Features in the Mimbres Valley, New Mexico. Paper presented at the Mogollon Conference, Las Cruces, New Mexico.

Dalton, G.
1977 Aboriginal Economies in Stateless Societies. In *Exchange Systems in Prehistory*, edited by T. K. Earle and J. E. Ericson, pp. 191-211. Academic Press. New York.

Dick, H. W.
1965 *Bat Cave*. The School of American Research Monograph No. 27. Santa Fe, New Mexico.

Dockall, J. E.
1990 A Technological analysis of Rhyolite Quarry Debris from the NAN Ruin, New Mexico. In *Archaeology at the Nan Ranch Ruin: 1989 Season*, edited by H. J. Shafer, pp. 107-135. Special Report 10. Department of Anthropology, Texas A&M University, College Station, Texas.

1991 Chipped Stone Technology at the Nan Ranch Ruin, Grant County, New Mexico. Master's thesis, Department of Anthropology, Texas A&M University, College Station, Texas.

1999 Modeling Land Use and Settlement/Subsistence Systems: Making a Living in the Hueco Bolson. In *Archaeology of the Ojasen (41EP289) and Gobernadora (41EP321) Sites, El Paso County, Texas*, edited by H. J. Shafer, J. E. Dockall and R. L. Brewington. pp. 45-54. Reports of Investigation No. 2. Center for Ecological Archaeology, Texas A&M University, College Station.

Dockall, J. E., R. L. Brewington, and H. J. Shafer
1997 Settlement and Mobility in the Hueco Bolson: Archaeology at Gobernadora and Ojasen, El Paso County, Texas. Draft Report. Center for Ecological Archaeology, Texas A&M University, College Station.

Doolittle, W. E.
1985 The Use of Check Dams for Protecting Downstream Agricultural Lands in the Prehistoric Southwest: A Contextual Analysis. *Journal of Anthropological Research* 41(3):279-305.

Dulaney, A. R. and J. D. Pigott
1977 Preliminary Technological Analysis of El Paso Brownware and Design for Further Research. In *A Cultural Resource Inventory and Assessment of McGregor Guided Missile Range, Otero County, New Mexico,* by M. R. Beckes, A. R. Dulaney, J. D. Pigott, R. F. Scott IV, and N. K. Smiley, pp. 263-289. Research Report No. 65. Texas Archeological Survey, The University of Texas at Austin.

Eidenbach, P. L. (editor)
1982 *Inventory Survey of the Lower Hidden Mountain Floodpool, Lower Rio Puerco Drainage, Central New Mexico*. Human Systems Research, Inc., Tularosa, New Mexico.

Foster, M. S.
1993 *Archaeological Investigations at Pueblo Sin Casas (FB6273), A Multicomponent Site in the Hueco Bolson, Fort Bliss, Texas*. Historic and Natural Resources Report No. 7. Cultural Resources Management Program, Directorate of Environment, United States Army Air Defense Artillery Center, Fort Bliss, Texas.

Green, J.W.
1980 Ethnobotanical Materials Recovered from the Sabina Mt. 2 Site (EPAS 2). Appendix 1 in The Sabina Mountain Site, by V.R. Brook. *Transactions of the 15th Regional Archeological Symposium for Southeastern New Mexico and Western Texas*, pp. 79-83. Fort Davis.

Gunn, J. D.
1987 Middle Pecos Culture Sequence and Holocene Climate. In *Advances in Middle Pecos Archaeology, Proceedings of a Symposium Held at the Fourth Jornada Mogollon conference, Tularosa, New Mexico, on October 12, 1985*, edited by S. R. Katz and P. Katz, pp. 65-86. U.S. Department of the Interior, Bureau of Reclamation, Pecos River Projects Office, Carlsbad, New Mexico.

Hall, S. A.
1985 Quaternary Pollen Analysis and Vegetational History of the Southwest. In *Pollen Records of Late-Quaternary North American Sediments*, edited by V. M. Bryant Jr. and R. G. Holloway, pp. 95-123. American Association of Stratigraphic Palynologists Foundation, Dallas.

Hard, R. J.
1983 A Model for Prehistoric Land Use, Fort Bliss, Texas. *Proceedings of the American Society for Conservation Archaeology 1983*:41-51.

1986 Ecological Relationships Affecting the Rise of Farming Economies: A Test from the American Southwest. Ph.D. dissertation, Department of Anthropology, The University of New Mexico, Albuquerque.

Haury, E. W.
1950 *The Stratigraphy and Archaeology of Ventana Cave, Arizona*. University of New Mexico Press, Albuquerque.

Hill, R. T.
1900 *Physical Geography of the Texas Region*. United States Geological Survey Topographic Atlas, folio No. 3.

Hoffer, R. L.
1976 Contact Metamorphism of the Precambrian Castner Marble, Franklin Mountains, El Paso County. Master's thesis, Department of Geology, The University of Texas at El Paso.

Human Systems Research
1973 *Technical Manual: Survey of the Tularosa Basin, The Research Design*. Human Systems Research, Tularosa, New Mexico.

Johnson, J. K.
1986 Amorphous Core Technologies in the Midsouth. *Midcontinental Journal of Archaeology* 11(2):135-151.

Knowles, B. B. and R. A. Kennedy
1958 *Groundwater Resources of the Hueco Bolson, Northeast of El Paso, Texas*. Texas Water Engineers Bulletin 5615.

Kosse, A.
1977 Agricultural Potential and Prehistoric Settlement in the Eastern Hueco Bolson. Appendix G In *Settlement Patterns of the Eastern Hueco Bolson*, by M. E. Whalen. Anthropological Paper Number 4. El Paso Centennial Museum, University of Texas at El Paso.

Lancaster, J.
1984 Groundstone Artifacts. In *The Galaz Ruin. A Prehistoric Mimbres Village in Southwestern New Mexico*, by R. Anyon and S. A. LeBlanc, pp. 247-282. Maxwell Museum of Anthropology and the University of New Mexico Press, Albuquerque.

Laudon, L. R. and A. L. Bowsher
1949 Mississippian Formations of Southwestern New Mexico. *Geological Society of America Bulletin* 60(1):1-87.

Leach, J. D., F. A. Almarez, and B. J. Buck
1996 A Prehistoric Reservoir in Far West Texas. *Bulletin of the Texas Archeological Society* 67:133-144.

LeBlanc, S. A.
1980 The Dating of Casas Grandes. *American Antiquity* 45(4):799-805.

1984 The Structure of Projectile Point Form. In *The Galaz Ruin: A Prehistoric Mimbres Village in Southwestern New Mexico*, by R. Anyon and S.A. LeBlanc, pp. 236-246. Maxwell Museum of Anthropology and the University of New Mexico Press, Albuquerque.

Lehmer, D. J.
1948 *The Jornada Branch of the Mogollon*. University of Arizona Bulletin Vol. XIX, No. 2. University of Arizona, Tucson.

Malde, H. E.
1964 Environment and Man in Arid America. *Science* 145:123-129.

Martin, P. S.
1967 Pollen Analysis of Prehistoric Middens Near Ft. Sumner, New Mexico. In *A Prehistoric Sequence in the Middle Pecos Valley New Mexico*, by A. J. Jelinek, pp. 130-134. Anthropological Papers 31. Museum of Anthropology, University of Michigan, Ann Arbor.

Martin, P. S. and J. B. Rinaldo
1950 Turkey Foot Ridge Site, a Mogollon Village, Pine Lawn Valley, Western New Mexico. *Fieldiana: Anthropology* 38(2).

Mayer-Oakes, W. J.
1979 Preliminary Results of the 1977 TAS Field School at Sabina Mountain No. 2. In *Jornada Mogollon Archaeology: Proceedings of the First Jornada Conference*, edited by P. H. Beckett and R. N. Wiseman, pp. 3-17. New Mexico State University, Las Cruces.

Mauldin, R.
1986 Settlement and Subsistence Patterns During the Pueblo Period on Fort Bliss, Texas: A Model. In *Mogollon Variability*, edited by C. Benson and S. Upham, pp. 225-269. Occasional Papers No. 15. The University Museum, New Mexico State University, Las Cruces.
1993 *The DIVAD Archaeological Project*. Historic and Natural Resources Report No. 8. Cultural Resources Management Program, Directorate of Environment, United States Army Air Defense Artillery Center, Fort Bliss, Texas.

Miller, M. R., III
1989 *Archaeological Excavations at the Gobernadora and Ojasen: Dona Ana Phase Settlement in the Western Hueco Bolson, El Paso County, Texas*. Center for Archaeological Research Report No. 673. New Mexico State University, Las Cruces.
1992 The Transitional Period in the Southern Jornada Mogollon: Archaeological Investigations in the North Hills Subdivision, Northeast El Paso, Texas. Research Report No. 1 (Draft). Batcho & Kauffman Associates, El Paso.
2001 Post-Pueblo, Protohistoric, and Early Mission Period Archeology in Western Trans-Pecos Texas and South Central New Mexico, A.D. 1450-1680. *Bulletin of the Texas Archeological Society* 72:105-163.

Miller, M. R., III and D. Carmichael
1985 Artifact Analysis. In *Archeological Excavations at Two Prehistoric Campsites Near Keystone Dam, El Paso, Texas*, edited by D. Carmichael, pp. 275-384. University Museum Occasional Papers 14. New Mexico State University, Las Cruces, New Mexico.

Mills, B.J.
1988 Ceramic Technology. In *The Border Star 85 Survey: Toward an Archeology of Landscapes*, edited by T. J. Seaman, W.H. Doleman, and R.C. Chapman, pp. 163-168. Office of Contract Archeology, The University of New Mexico, Albuquerque.

Neely, J. A.
1992a Mogollon/Western Pueblo Water-Control and Irrigation: A Reconsideration Based on Recent Findings from West-Central New Mexico. Paper presented at the 57th Annual Meeting of the Society for American Archaeology, Pittsburgh, Pennsylvania.
1992b Recent Findings Concerning Prehistoric Water-Control and Irrigation Features and Systems in West-Central New Mexico. Paper presented at the New Mexico Archaeological Council Agricultural Symposium, Santa Fe.

Nelson, L. A. and B. R. Haigh
1958 *Franklin and Hueco Mountains, Texas, November 6-8, 1958*. West Texas Geological Society Guide Book, West Texas Geological Society, Midland, Texas.

Nelson, M. C.
1981 Chipped Stone Analysis in the Reconstruction of Prehistoric Subsistence Practices: An Example from Southwestern New Mexico. Ph.D. Dissertation. Department of Anthropology, University of California, Santa Barbara.

Nesbitt, P. H.
1931 *The ancient Mimbrenos*. Logan Museum Bulletin 4. Beloit College, Beloit, Wisconsin.

Newton, R. E. and S. Upham
1985 Projectile Points as Chronological Markers?: A Reassessment of Morphological Attributes as Time-Sensitive Indicators. In *Fourth Jornada Mogollon Conference (Oct. 1985), Collected Papers*, edited by M. S. Duran and K.W. Laumbach, pp. 93-105.

O'Laughlin, T. C.
1978 Modern Vegetation of Fort Bliss Maneuver Area I. In *Settlement Patterns of the Western Hueco Bolson*, by M. E. Whalen, pp. 243-256. Publications in Anthropology No. 6. El Paso Centennial Museum, The University of Texas at El Paso.
1979 *Excavations at the Transmountain Campus, El Paso Community College, El Paso, Texas*. Publications in Anthropology No. 7. El Paso Centennial Museum, The University of Texas at El Paso.
1980 *The Keystone Dam Site and Other Archaic and Formative Sites in Northwest El Paso, Texas*. Publications in Anthropology No. 8. El Paso Centennial Museum, The University of Texas at El Paso.

Parry, W. J. and R. L. Kelly
1987 Expedient Core Technology and Sedentism. In *The Organization of Core Technology*, edited by J. K. Johnson and C. A. Morrow, pp. 285-308. Westview Press, Boulder, Colorado.

Perttula, T. K., M. R. Miller, R. A. Ricklis, D. J. Prikryl, and C. Lintz
1995 Prehistoric and Historic Aboriginal Ceramics in Texas. *Bulletin of the Texas Archeological Society* 66:175-235.

Piggot, J. D. and A. R. Dulaney
1977 Lithic Materials from McGregor Range: Mineral Types and Their Source Areas. In *A Cultural Resource Inventory and Assessment of McGregor Guided Missile Range, Otero County, New Mexico*, by M. R. Beckes, A. R. Dulaney, J. D. Pigott, R. F. Scott IV, and N. K. Smiley, pp. 81-125. Research Report No. 65. Texas Archeological Survey, The University of Texas at Austin.

Portnoy, A. W.
1977 Field Guide. Texas Archeological Society. 1977 Field School. Cultural Resources Institute, Texas Tech University. Unpublished manuscript on file at the Texas Archeological Research Laboratory, The University of Texas at Austin.

Robinson, D. G., M. D. Pool, M. S. Ford-Tomka, J. Landrum, and J. A. Neely.
1985 WS Ranch Site Project Field and Laboratory Manual. 1985 edition. Unpublished manuscript on file, The Department of Anthropology, The University of Texas at Austin.

Roney, J.
1985 Projectile Points as Chronological Markers in the Guadalupe Mountains, Southeastern New Mexico. In *Views of the Jornada Mogollon*, edited by C. M. Beck, pp. 5-29. Contributions in Anthropology Volume 12. Eastern New Mexico University, Portales.

Sayles, E. B.
1983 *The Cochise Cultural Sequence in Southeastern Arizona*. The University of Arizona Press, Tucson.

Sayre, A. N. and P. P. Livingston
1945 *Ground-water resources of the El Paso area, Texas*. U.S. Geological Survey Water-Supply Paper 919. U.S. Government Printing Office, Washington, D.C.

Scarborough, V. L.
1988 A Water Storage Adaptation in the American Southwest. *Journal of Anthropological Research* 44(1):21-40.

Schaafsma, C.
1979 The "El Paso Phase" and its Relationship to the "Casas Grandes Phenomenon." In *Jornada Mogollon Archaeology, Proceedings of the First Jornada Conference*, edited by P. H. Beckett and R. N. Wiseman, pp. 383-388. New Mexico State University, Las Cruces, New Mexico.

Shafer, H. J.
1986 *Ancient Texans: Rock Art and Lifeways Along the Lower Pecos*. Gulf Publishing, Houston.

Shafer, H. J. and R. G. Holloway
1979 Organic Residue Analysis in Determining Stone Tool Function. In *Lithic Use-wear Analysis*, edited by B. Hayden, pp. 385-399. Academic Press, New York.

Shafer, H. J., J. E. Dockall, and R. L. Brewington
1999 *Archaeology of the Ojasen (41EP289) and Gobernadora (41EP321) Sites, El Paso County, Texas*. Center for Ecological Archaeology, Reports of Investigation No. 2, Texas A&M University, College Station, and The Environmental Affairs Division, Archeology Studies Program, Report 13, Texas Department of Transportation, Austin.

Smiley, N. K.
1977 Analysis of Ceramic Materials. In *A Cultural Resource Inventory and Assessment of McGregor Guided Missile Range, Otero County, New Mexico*, by M. R. Beckes, A. R. Dulaney, J. D. Pigott, R. F. Scott IV, and N. K. Smiley, pp. 127-261. Research Report No. 65. Texas Archeological Survey, The University of Texas at Austin.

Stuart, D. E. and R. P. Gauthier
1984 *Prehistoric New Mexico. Background for Survey*. 2nd edition. New Mexico Archeological Council, Albuquerque.

Teltser, P. A.
1991 Generalized Core Technology and Tool Use: A Mississippian Example. *Journal of Field Archaeology* 18:363-375.

Turner, E. S. and T. R. Hester
1993 *A Field Guide to Stone Artifacts of Texas Indians*. Second Edition. Gulf Publishing Co. Houston

Upham, S., C. M. Stevenson, R. E. Newton, and M. Johnson
1986 Chronometric Dating of San Pedro Style Projectile Points in Southern New Mexico. In *Mogollon Variability*, edited by C. Benson and S. Upham, pp. 79-87. Occasional Papers No. 15. The University Museum, New Mexico State University, Las Cruces, New Mexico.

Whalen, M. E.
1977 *Settlement Patterns of the Eastern Hueco Bolson*. Anthropological Paper No. 4. El Paso Centennial Museum, The University of Texas at El Paso.
1978 *Settlement Patterns of the Western Hueco Bolson.* Publications in Anthropology No. 6. El Paso Centennial Museum, The University of Texas at El Paso.
1981 Cultural-Ecological Aspects of the Pithouse to Pueblo Transition in a Portion of the Southwest. *American Antiquity* 46(1):75-92.

1994 Moving out of the Archaic on the Edge of the Southwest. *American Antiquity* 59(4):622-638.

Wills, W. H.
1988 *Early Prehistoric Agriculture in the American Southwest*. School of American Research Press, Santa Fe.

Wimberly, M.
1979 Three Rivers Revisited, or, Speculation on the Meaning of it All. In *Jornada Mogollon Archaeology, Proceedings of the First Jornada Conference*, edited by P. H. Beckett and R. N. Wiseman, pp. 81-89. New Mexico State University, Las Cruces, New Mexico.

APPENDIX 1,

CERAMIC DISTRIBUTION, SABINA MOUNTAIN NUMBER TWO SITE (41EP4)

Lot	Grid or Unit	Level	No. of Ceramic Sherds
3	N108-109/E13-14	SURF	1
5	N109-110/E11-12	SURF	1
14	N109-110/E15-16	SURF	5
15	N109-110/E16-17	SURF	1
18	N109-110/E19-20	SURF	1
19	N108-109/E20-21	SURF	6
20	N108-109/E21-22	SURF	1
21	N108-109/E22-23	SURF	4
23	N108-109/E23-24	SURF	2
24	N109-110/E20-21	SURF	8
25	N109-110/E21-22	SURF	13
26	N109-110/E22-23	SURF	1
27	N109-110/E23-24	SURF	9
28	N109-110/E24-25	SURF	9
29	N108-109/E25-26	SURF	1
31	N108-109/E27-28	SURF	5
32	N108-109/E28-29	SURF	3
33	N108-109/E29-30	SURF	1
34	N109-110/E25-26	SURF	2
35	N109-110/E26-27	SURF	5
37	N109-110/E28-29	SURF	4
38	N109-110/E29-30	SURF	2
41	N108-109/E32-33	SURF	1
42	N108-109/E33-34	SURF	3
44	N109-110/E30-31	SURF	4
45	N109-110/E31-32	SURF	4
47	N109-110/E33-34	SURF	2
48	N109-110/E34-35	SURF	11
50	N108-109/E36-37	SURF	16
51	N108-109/E37-38	SURF	3
52	N108-109/E38-39	SURF	1
53	N108-109/E39-40	SURF	6
55	N109-110/E36-37	SURF	6
58	N108-109/E38-39	SURF	1
62	N108-109/E43-44	SURF	3
64	N109-110/E40-41	SURF	2
65	N109-110/E41-42	SURF	1
66	N109-110/E42-43	SURF	3
67	N109-110/E43-44	SURF	4
69	N108-109/E45-46	SURF	2
71	N108-109/E47-48	SURF	1
75	N109-110/E46-47	SURF	2
82	N108-109/E53-54	SURF	16
83	N108-109/E54-55	SURF	15
87	N109-110/E53-54	SURF	10
88	N109-110/E54-55	SURF	10
90	N107-108/E56-57	SURF	5
94	N109-110/E55-56	SURF	15
95	N109-110/E56-57	SURF	6
97	N109-110/E58-59	SURF	3
103	N108-109/E61-62	SURF	12
132	N108-109/E75-76	SURF	1
134	N108-109/E77-78	SURF	6
136	N108-109/E79-80	SURF	5

Lot	Grid or Unit	Level	No. of Ceramic Sherds
137	N109-110/E75-76	SURF	1
138	N109-110/E76-77	SURF	1
139	N109-110/E77-78	SURF	5
146	N106-107/E29-30	SURF	2
165	N118-119/E25-26	SURF	2
168	N116-117/E26-27	SURF	1
172	N120-121/E25-26	SURF	1
174	N122-123/E25-26	SURF	6
176	N124-125/E25-26	SURF	3
178	N121-122/E26-27	SURF	10
181	N124-125/E26-27	SURF	1
188	N126-127/E26-27	SURF	1
191	N129-130/E26-27	SURF	3
194	N132-133/E25-26	SURF	9
196	N134-135/E25-26	SURF	2
198	N131-132/E26-27	SURF	8
199	N132-133/E26-27	SURF	8
201	N134-135/E26-27	SURF	12
207	N135-136/E26-27	SURF	3
212	N98-99/E25-26	SURF	4
213	N98-99/E26-27	SURF	2
217	N100-101/E26-27	SURF	4
222	N103-104/E25-26	SURF	1
223	N103-104/E26-27	SURF	2
227	N105-106/E25-26	SURF	2
230	N107-108/E26-27	SURF	2
234	N106-107/E29-30	SURF	6
235	N107-108/E29-30	SURF	5
245	N107-108/E20-21	SURF	2
249	N107-108/E24-25	SURF	6
252	N108-109/E87-88	SURF	3
253	N108-109/E88-89	SURF	2
256	N109-110/E86-87	SURF	2
264	N108-109/E92-93	SURF	2
265	N109-110/E90-91	SURF	1
268	N109-110/E93-94	SURF	1
272	N108-109/E97-98	SURF	5
278	N109-110/E98-99	SURF	3
290	N100-101/E50-51	SURF	11
291	N100-101/E51-52	SURF	1
299	N104-105/E51-52	SURF	4
304	N107-108/E50-51	SURF	1
314	N110-111/E19-20	SURF	1
317	N110-111/E22-23	SURF	1
319	N111-112/E23-24	SURF	6
320	N111-112/E24-25	SURF	1
322	N110-111/E31-32	SURF	3
326	N110-111/E35-36	SURF	9
327	N110-111/E36-37	SURF	3
328	N111-112/E35-36	SURF	7
329	N111-112/E36-37	SURF	4
332	N111-112/E45-46	SURF	1
333	N111-112/E101-102	SURF	2
343	N111-112/E20-21	SURF	3
355	N117-118/E101-102	SURF	2
356	N118-119/E100-101	SURF	12
357	N118-119/E101-102	SURF	6
358	N119-120/E100-101	SURF	4
359	N119-120/E101-102	SURF	7

Lot	Grid or Unit	Level	No. of Ceramic Sherds
360	N120-121/E100-101	SURF	4
361	N120-121/E101-102	SURF	2
364	N121-122/E101-102	SURF	1
365	N122-123/E100-101	SURF	3
366	N140-141/E49-50	SURF	21
367	N141-142/E49-50	SURF	18
368	N142-143/E49-50	SURF	13
369	M143-144/E49-50	SURF	17
370	N144-145/E49-50	SURF	17
371	N145-146/E49-50	SURF	6
372	N146-147/E49-50	SURF	42
373	N147-148/E49-50	SURF	38
374	N148-149/E49-50	SURF	9
375	N149-150/E49-50	SURF	5
380	N142-143/E25/26	SURF	2
381	N141-142/E26-27	SURF	2
382	N143-144/E25-26	SURF	3
383	N143-144/E26-27	SURF	3
384	N144-145/E25-26	SURF	8
385	N144-145/E26-27	SURF	2
386	N144-145/E25-26	SURF	4
387	N145-146/E25-26	SURF	3
391	N147-148/E25-26	SURF	1
392	N147-148/E26-27	SURF	2
393	N148-149/E25-26	SURF	4
394	N148-149/E26-27	SURF	4
395	N149-150/E26-27	SURF	3
396	N150-151/E10-11	SURF	1
399	N150-151/E13-14	SURF	3
400	N150-151/E14-15	SURF	6
401	N151-152/E10-11	SURF	4
402	N151-152/E11-12	SURF	1
403	N151-152/E12-13	SURF	1
404	N151-152/E12-14	SURF	16
405	N151-152/E14-15	SURF	24
406	N150-151/E15-16	SURF	14
407	N150-151/E16-17	SURF	18
408	N150-151/E17-18	SURF	23
409	N150-151/E18-19	SURF	8
410	N150-151/E19-20	SURF	6
411	N151-152/E15-16	SURF	17
412	N151-152/E16-17	SURF	41
413	N151-152/E17-18	SURF	31
414	N151-152/E18-19	SURF	10
415	N151-152/E19-20	SURF	10
416	N150-151/E20-21	SURF	8
417	N150-151/E21-22	SURF	10
418	N150-151/E22-23	SURF	16
419	N150-151/E23-24	SURF	6
421	N151-152/E20-21	SURF	6
422	N151/152/E21-22	SURF	5
423	N151-152/E22-23	SURF	9
424	N151-152/E23-24	SURF	3
429	N150-151/E25-26	SURF	1
430	N103-104/E11-12	SURF	2
431	N103-107/E12-13	SURF	2
433	N103-104/E16-17	SURF	1
434	N103-104/E15-16	SURF	4
435	N103-104/E16-17	SURF	1

Lot	Grid or Unit	Level	No. of Ceramic Sherds
436	N103-104/E17-18	SURF	1
437	N103-104/E18-19	SURF	2
438	N103-104/E19-20	SURF	6
439	N103-104/E20-21	SURF	3
440	N103-104/E21-22	SURF	5
442	N103-104/E23-24	SURF	4
443	N103-104/E24-25	SURF	24
444	N104-105/E11-12	SURF	1
445	N104-105/E12-13	SURF	1
448	N104-105/E15-16	SURF	1
449	N104-105/E16-17	SURF	2
450	N104-105/E17-18	SURF	2
451	N104-105/E18-19	SURF	3
452	N104-105/E19-20	SURF	4
453	1N104-105/E20-21	SURF	4
454	N104-105/E21-22	SURF	3
455	N104-105/E22-23	SURF	2
456	N104-105/E23-24	SURF	2
457	N104-105/E24-25	SURF	7
458	N105-106/E11-12	SURF	9
461	N105-106/E14-15	SURF	1
464	N105-106/E17-18	SURF	1
465	N105-106/E18-19	SURF	7
466	N105-106/E19-20	SURF	4
467	N105-106/E20-21	SURF	5
469	N105-106/E22-23	SURF	4
470	N105-106/E23-24	SURF	10
471	N105-106/E24-25	SURF	5
472	N106-107/E11-12	SURF	2
473	N106-107/E12-13	SURF	2
475	N106-107/E14-15	SURF	1
476	N106-107/E15-16	SURF	1
478	N106-107/E17-18	SURF	2
479	N106-107/E18-19	SURF	1
480	N106-107/E19-20	SURF	4
481	N106-107/E20-21	SURF	11
482	N106-107/E21-22	SURF	6
483	N106-107/E22-23	SURF	11
484	N106-107/E23-24	SURF	21
485	N106-107/E24-25	SURF	24
487	N111-112/E50-51	SURF	10
488	N112-113/E50-51	SURF	34
489	N113-114/E50-51	SURF	27
490	N114-115/E20-21	SURF	28
491	N110-111/E51-52	SURF	11
492	N111-112/E51-52	SURF	14
493	N112-113/E51-52	SURF	20
494	N113-114/E51-52	SURF	21
495	N114-115/E51-52	SURF	33
496	N115-116/E50-51	SURF	35
497	N110-117/E50-51	SURF	57
498	N117-118/E50-51	SURF	11
499	N118-119/E50-51	SURF	11
500	N119-120/E50-51	SURF	13
501	N115-116/E51-52	SURF	66
502	N51-52/E116-117	SURF	117
503	N117-118/E51-52	SURF	21
503[?]	N122-123/E51-52	SURF	9
504	N118-119/E51-52	SURF	16

Lot	Grid or Unit	Level	No. of Ceramic Sherds
505	N51-52/E119-120	SURF	2
506	N120-121/E50-51	SURF	6
507	N121-122/E50-51	SURF	8
508	N122-123/E50-51	SURF	30
509	N123-124/E50-51	SURF	35
510	N124-125/E50-51	SURF	21
511	N120-121/E51-52	SURF	23
512	N121-122/E51-52	SURF	14
513	N145-146/E101-102	SURF	4
514	N123-124/E51-52	SURF`	19
515	N124-125/E51-52	SURF	34
516	N123-124/E100-101	SURF	4
517	N124-125/E100-101	SURF	12
518	N125-126/E100-101	SURF	7
520	N127-128/E100-101	SURF	2
521	N123/124/E101-102	SURF	10
522	N124-125/E101-102	SURF	2
523	N125-126/E101-102	SURF	16
526	N128-129/E100-101	SURF	18
527	N129-130/E100-101	SURF	6
528	N130-131/E100-101	SURF	8
529	N131-132/E100-101	SURF	1
531	N128-129/E101-102	SURF	9
532	N132-133/E101-102	SURF	4
533	N130-131/E101-102	SURF	4
534	N131-132/E101-102	SURF	4
536	N133-134/E100-101	SURF	3
537	N134-135/E100-101	SURF	3
538	N135-136/E100-101	SURF	7
539	N136-137/E100-101	SURF	7
540	N137-138/E100-101	SURF	9
541	N133-134/E101-102	SURF	1
542	N134-135/E101-102	SURF	6
543	N135-136/E101-102	SURF	84
544	N136-137/E101-102	SURF	8
545	N137-138/E101-102	SURF	7
546	N138-139/E100-101	SURF	21
547	N139-140/E100-101	SURF	12
548	N140-141/E100-101	SURF	12
549	N141-142/E100-101	SURF	13
550	N142-143/E100-101	SURF	13
551	N138-139/E101-102	SURF	20
552	N139-140/E101-102	SURF	18
553	N140-141/E101-102	SURF	11
554	N141-142/E101-102	SURF	8
555	N142-143/E101-102	SURF	23
556	N143-144/E100-101	SURF	8
557	N144-145/E100-101	SURF	15
558	N145-146/E100-101	SURF	10
559	N146-147/E100-101	SURF	9
560	N147-148/E100-101	SURF	1
561	N143-144/E101-102	SURF	14
562	N144-145/E101-102	SURF	21
564	N146-147/E101-102	SURF	10
565	N147-148/E101-102	SURF	1
566	N148-149/E100-101	SURF	2
567	N149-150/E100-101	SURF	3
568	N150-151/E100-101	SURF	2
569	N151-152/E100-101	SURF	15

Lot	Grid or Unit	Level	No. of Ceramic Sherds
570	N152-153/E100-101	SURF	5
573	N150-151/E101-102	SURF	8
574	N151-152/E101-102	SURF	7
575	N152-153/E101-102	SURF	25
576	N149-150/E100-101	SURF	9
586	N73-74/E25-26	SURF	3
587	N74-75/E25-26	SURF	7
588	N75-76/E25-26	SURF	16
589	N76-77/E25-26	SURF	22
590	N77-78/E25-26	SURF	31
592	N74-75/E26-27	SURF	10
593	N75-76/E26-27	SURF	25
594	N76-77/E26-27	SURF	12
595	N77-78/E26-27	SURF	39
596	N82-83/E25-26	SURF	1
599	N85-86/E25-26	SURF	1
600	N86-87/E25-26	SURF	3
601	N87-88/E25-26	SURF	1
603	N84-85/E26-27	SURF	6
606	N87-88/E25-26	SURF	1
607	N107-108/E43-44	SURF	4
608	N107-108/E44-45	SURF	6
609	N106-107/E43-44	SURF	9
610	N106-107/E44-45	SURF	2
611	N106-107/E38-39	SURF	2
612	N106-107/E38-39	LV. 1	2
613	N106-107/E39-40	SURF	8
614	N107-108/E38-39	SURF	5
615	N107-108/E39-40	SURF	3
616	N110-111/E40-41	SURF	9
617	N110-111/E41-42	SURF	2
618	N111-112/E40-41	SURF	26
619	N111-112/E41-42	SURF	20
620	N78-79/E25-26	SURF	20
621	N79-80/E25-26	SURF	69
624	N82-83/E25-26	SURF	1
625	N78-79/E26-27	SURF	41
626	N9-80/E26-27	SURF	10
627	N80-81/E26-27	SURF	1
630	N106-108/E28-30	LV. 1	10
631	N106-108/E28-30	LV. 1	12
632	N107-108/28-30	LV. 1	6
633	N106-108/E28-30	LV. 1	17
634	N106-107/E38-39	LV. 1	1
635	N106-107/E39-40	LV. 1	3
636	N107-108/E38-39	LV. 1	4
637	N107-108/E39-40	LV. 1	4
638	N106-108/E43-44	LV. 1	21
639	N106-107/E44-45	LV. 1	8
640	N107-108/E43-44	LV. 1	6
641	N107-108/E44-45	LV. 1	64
642	N110-111/E23-24	LV. 1	48
643	N111-112/E24-25	LV. 1	146
644	N111/E30; FEATURE	LV. 1	15
644	N111-E30	LV. 1	95
645	N110-111/E61-62	LV. 1	27
646	N110-111/E36-37	LV. 1	46
647	N111-112/E35-36	LV. 1	46
648	N111-112/E36-37	LV. 1	54

Lot	Grid or Unit	Level	No. of Ceramic Sherds
649	N110-111/E40-41	LV. 1	9
650	N110-111/E41-42	LV. 1	6
651	N111-112/E40-41	LV. 1	7
652	N110-111/E45-46	LV. 1	9
653	N110-111/E46-47	LV. 1	7
654	N111-112/E45-46	LV. 1	14
655	N111-112/E46-47	LV. 1	8
656	N111-112/E47-48	LV. 1	7
657	N111-112/E48-49	LV. 1	32
658	N110-111/E47-48	LV. 1	7
659	N110-111/E48-49	SURF	15
660	N111-112/E25-26	LV. 1	54
661	N144-147/E49-50	LV. 1	4
662	N147-148/E49-50	LV. 1	1
663	N148-149/E49-50	LV. 1	4
664	N149-150/E49-50	LV. 1	2
665	N122.12-122.8/E29.3-29.6	WEST WALL	1
667	N123-124/E27-31	NORTH WALL	108
668	VR BROOKS RM 2	FILL?	157
669	VR BROOKS RM 2	SURF, EAST WALL	43
670	VRBROOKS RM 2	SOUTH WALL	101
671	N120/E27; VR BROOKS, RM 2	INTERIOR	62
672	N78-79/E58-60	SURF	41
673	N78-79/E59-60	SURF	57
674	N78-79/E60-61	SURF	78
675	N78-79/E61-62	SURF	78
676	N79-80/E58-60	SURF	41
677	N79-80/E59-60	SURF	32
678	N798-80/E61-62	SURF	24
679	N79-80/E60-61	SURF	31
680	N80-81/E58-59	SURF	41
681	N80-81/E59-60	SURF	31
682	N80-81/E60-61	SURF	34
683	N80-81/E61-62	SURF	37
684	N81-82/E58-59	SURF	25
685	N81-82/E59-60	SURF	51
686	N81-82/E60-61	SURF	35
687	N81-82/E61-62	SURF	26
688	N80-81/E52-53	SURF	44
689	N80-81/E53-54	SURF	34
690	N80-81/E54-55	SURF	41
691	N80-81/E55-56	SURF	62
692	N80-81/E56-57	SURF	63
693	N80-81/E57-58	SURF	48
694	N80-81/E50-51	SURF	37
695	N80-81/E51-52	SURF	66
696	N81-82/E50-51	SURF	11
697	N81-82/E51-52	SURF	24
698	N82-83/E50-51	SURF	2
699	N82-83/E51-52	SURF	9
700	N83-84/E50-51	SURF	42
701	N83-84/E51-52	SURF	18
702	N84-85/E50-51	SURF	82
703	N84-85/E51-52	SURF	79
704	N85-86/E50-51	SURF	88
705	N85-86/E50-51	SURF	108

Lot	Grid or Unit	Level	No. of Ceramic Sherds
706	N86-87/E50-51	SURF	59
707	N86-87/E51-52	SURF	40
708	N87-88/E50-51	SURF	25
709	N87-88/E51-52	SURF	14
710	N88-89/E50-51	SURF	28
711	N88-89/E51-52	SURF	19
712	N88-89/E51-52	SURF	13
713	N89-90/E51-52	SURF	34
714	N90-91/E50-51	SURF	16
715	N91-92/E50-51	SURF	11
716	N91-92/E51-52	SURF	12
717	N92-93/E50-51	SURF	7
718	N92-93/E51-52	SURF	1
719	N93-94/E50-51	SURF	29
720	N93-94/E51-52	SURF	13
721	N94-95/E50-51	SURF	19
722	N94-95/E51-52	SURF	2
723	N95-96/E51-52	SURF	13
725	N96-97/E50-51	SURF	13
726	N96-97/E51-52	SURF	15
727	N97-98/E50-51	SURF	25
729	N98-99/E50-51	SURF	13
730	N98-99/E51-52	SURF	21
731	N99-100/E50-51	SURF	10
732	N99-100/E51-52	SURF	7
733	N93-94/E100-101	SURF	40
734	N93-94/E101-102	SURF	10
735	N94-95/E100-101	SURF	45
736	N94-95/E101-102	SURF	14
737	N95-96/E100-101	SURF	10
738	N95-96/E101-102	SURF	8
739	N96-97/E100-101	SURF	20
740	N96-97/E101-102	SURF	19
741	N97-98/E100-101	SURF	30
742	N97-98/E101-102	SURF	23
743	N98-99/E100-101	SURF	15
744	N98-99/E101-102	SURF	15
745	N99-100/E100-101	SURF	13
746	N99-100/E101-102	SURF	12
747	N100-101/E100-101	SURF	1
748	N100-101/E101-102	SURF	17
752	N102-103/E101-102	SURF	1
753	N103-104/E100-101	SURF	11
754	N103-104/E101-102	SURF	11
756	N104-105/E101-102	SURF	10
757	N105-106/E100-101	SURF	3
759	N106-107/E100-101	SURF	1
762	N107-108/E101-102	SURF	4
763	N106-107/E95-96	SURF	29
764	N106-107/E96-97	SURF	2
766	N107-108/E96-97	SURF	3
772	N110-111/E81-82	SURF	7
774	N111-112/E81-82	SURF	9
775	N110-111/E90-91	SURF	4
776	N110-111/E91-92	SURF	3
781	N76-77/E50-51	SURF	16
782	N76-77/E51-52	SURF	20
783	N77-78/E50-51	SURF	11
784	N77-78/E51-52	SURF	11

Lot	Grid or Unit	Level	No. of Ceramic Sherds
785	N78-79/E50-51	SURF	9
787	N79-80/E50-51	SURF	13
788	N79-80/E51-52	SURF	23
790	N88-89/E49-50	SURF	18
791	N89-90/E48-49	SURF	27
792	N89-90/E49-50	SURF	10
794	N93-94/E49-50	SURF	23
795	N94-95/E48-49	SURF	26
796	N94-95/E49-50	SURF	3
798	N99-100/E95-96	SURF	10
799	N96-97/E98-99	SURF	7
830	N90-91/E26-27	SURF	1
832	N91-92/E26-27	SURF	9
833	N92-93/E25-26	SURF	3
834	N92-93/E26-27	SURF	20
836	N90-91/E28-29	SURF	6
837	N91-92/E27-28	SURF	3
838	N91-92/E28-29	SURF	12
839	N93-94/E25-26	SURF	3
840	N93-94/E26-27	SURF	7
841	N94-95/E24-25	SURF	3
842	N94-95/E26-27	SURF	16
844	N95-96/E26-27	SURF	22
846	N96-97/E26-27	SURF	3
847	N97-98/E25-26	SURF	3
848	N97-98/E26-27	SURF	1
849	N125-126/E50-51	SURF	10
850	N125-126/E51-52	SURF	15
851	N126-127/E50-51	SURF	20
852	N126-127/E51-52	SURF	20
854	N127-128/E50-51	SURF	13
855	N127-128/E51-52	SURF	33
856	N128-129/E50-51	SURF	14
857	N128-129/E51-52	SURF	5
858	N129-130/E50-51	SURF	40
859	N129-130/E51-52	SURF	6
884	SM-1-2	SURF	1
886	SM-1-4	SURF	1
896	SM-1-14	SURF	1
923	SM-1-41	SURF	1
924	SM-1-42	SURF	1
929	SM-1-47	SURF	1
930	SM-1-48	SURF	1
984	SM-1-102&103	SURF	1
987	SM-1-105	SURF	1
988	SM-1-106	SURF	1
989	SM-1-108	SURF	1
990	SM-1-109	SURF	1
997	N90-91/E53-54	SURF	14
998	N90-91/E52-53	SURF	11
999	N91-92/E52-53	SURF	7
1000	N91-92/E53-54	SURF	5
1005	N106-107/E95-96	LV. 1	3
1006	N106-107/E96-97	LV. 1	12
1007	N107-108/E95-96	LV. 1	6
1008	N107-108/E96-97	LV. 1	6
1009	N103-104/E98-99	LV. 1	18
1010	N103-104/E100-101	LV. 1	7
1011	N104-105/E98-99	LV. 1	17

Lot	Grid or Unit	Level	No. of Ceramic Sherds
1012	N104-105/E99-100	LV. 1	26
1013	N110-111/E73-74	LV. 1	6
1014	N110-111/E23-24	LV. 1	9
1015	N110-111/E24-25	LV. 1	6
1016	N111-112/E23-24	LV. 1	1
1017	N111-112/E73-74	SURF	2
1018	N89-90/E48-49	LV. 1	16
1020	N106-107/E41-42	LV. 1	3
1021	N106-107/E40-41	LV. 1	1
1026	N111-112/E41-42	LV. 2	21
1029	N96-97/E98-99	LV. 1	2
1030	N96-97/E99-100	LV. 1	7
1031	N50-51/E69-70	SURF	56
1032	N69-70/E51-52	SURF	21
1033	N70-71/E50-51	SURF	55
1034	N70-71/E51-52	SURF	23
1035	N71-72/E50-51	SURF	79
1036	N71-72/E51-52	SURF	55
1037	N72-73/E50-51	SURF	15
1038	N72-73/E51-52	SURF	51
1039	N73-74/E52-52	SURF	73
1040	N74-75/E51-52	SURF	25
1049	N88-89/E48-49	LV. 1	6
1050	N88-89/E49-50	LV. 1	6
1051	N88-89/E49-50	LV. 1	3
1052	N94-95/E48-49	LV. 1	28
1053	N110-111/E22/23	LV. 1	3
1054	N112-113/E24-25	LV. 1	76
1058	N119-120/E60-61	SURF	1
1059	N119-120/E61-62	SURF	19
1060	N118-119/E58-59	SURF	13
1061	N118-119/E59-60	SURF	25
1062	N119-120/E58-59	SURF	16
1063	N119-120/E59-60	SURF	38
1064	N118-119/E60-61	SURF	6
1065	N118-119/E61-62	SURF	9
1066	N112-113/E23-24	SURF	11
1067	N112-113/E24-25	SURF	9
1073	N90-91/E52-53	LV. 1	12
1075	N98-99/E49-50	LV. 1	3
1076	N99-100/E49-50	LV. 1	8
1077	N106-107/E53-54	SURF	2
1079	N107-108/E53-54	SURF	9
1080	N107-108/E54-55	SURF	1
1081	N106-107/E53-54	LV. 1	5
1082	N107-108/E53-54	LV. 1	8
1083	N107-108/E54-55	LV. 1	42
1084	N110-111/E73-74	LV. 1	3
1085	N110-111/E74-75	LV. 1	1
1086	N110-111/E74-75	LV. 1	1
1087	N110-111/E74-75	LV. 2	1
1088	N110-111/E80-81	LV. 1	5
1089	N111-112/E80-81	LV. 1	4
1090	N110-111/E80-81	LV. 1	2
1094	N111-112/E91-92	LV. 1	2
1099	N65-66/E50-51	SURF	44
1100	E51-52	SURF	56
1101	N66-67/E51-52	SURF	28
1102	N66-67/E50-51	SURF	42

Lot	Grid or Unit	Level	No. of Ceramic Sherds
1103	N118-119/E62-63	SURF	10
1105	N119-120/E62-63	SURF	9
1106	N118-120/E63-64	SURF	14
1107	N118-119/E64-65	SURF	9
1108	N118-119/E65-66	SURF	1
1110	N119-120/E65-66	SURF	57
1111	N70-71/E25-26	SURF	2
1112	N70-71/E26-27	SURF	9
1113	N71-72/E25-26	SURF	3
1114	N71-72/E26-27	SURF	2
1121	N45-46/E25-26	SURF	4
1122	N45-46/E26-27	SURF	2
1132	N50-51/E26-27	SURF	7
1133	N51-52/E25-26	SURF	2
1134	N51-52/E26-27	SURF	4
1138	N53-54/E26-27	SURF	2
1139	N54-55/E25-26	SURF	1
1141	N55-56/E25-26	SURF	8
1142	N55-56/E26-27	SURF	21
1143	N56-57/E25-26	SURF	3
1144	N56-57/E26-27	SURF	18
1145	N57-58/E25-26	SURF	20
1146	N57-58/E26-27	SURF	23
1147	N58-59/E25-26	SURF	6
1149	N59-60/E25-26	SURF	6
1150	N59-60/E26-27	SURF	13
1151	N63-64/E51-51	SURF	51
1152	N63-64/E51-52	SURF	43
1153	N64-65/E51-52	SURF	62
1154	N64-65/E50-51	SURF	74
1155	N61-62/E50-51	SURF	28
1156	N61-62/E51-52	SURF	26
1157	N62-63/E50-51	SURF	50
1158	N62-63/E51-52	SURF	52
1159	N67-68/E50-51	SURF	37
1160	N68-69/E51-52	SURF	28
1161	N68-69/E50-51	SURF	22
1162	N68-69/E51-52	SURF	22
1163	N65-66/E25-26	SURF	9
1164	N65-66/E26-27	SURF	3
1165	N66-67/E25-26	SURF	7
1166	N66-67/E26-27	SURF	3
1167	N67-68/E25-26	SURF	1
1168	N67-68/E26-27	SURF	11
1169	N68-69/E25-26	SURF	9
1170	N68-69/E26-27	SURF	8
1171	N69-70/E25-26	SURF	7
1178	N70-71/E55-56	SURF	69
1183	N89-90/E100-101	SURF	39
1189	N92-93/E100-101	SURF	29
1190	N92-93/E101-102	SURF	29
1191	N60-61/E25-26	SURF	11
1192	N60-61/E26-27	SURF	9
1193	N61-62/E25-26	SURF	14
1194	N61-62/E26-27	SURF	5
1195	N62-63/E25-26	SURF	8
1196	N23-24/E25-26	SURF	7
1197	N63-64/E25-26	SURF	10
1198	N63-64/E26-27	SURF	1

Lot	Grid or Unit	Level	No. of Ceramic Sherds
1199	N64-65/E25-26	SURF	1
1200	N64-65/E26-27	SURF	1
1215	SM-1-130	SURF	1
1223	SM-1-138	SURF	1
1228	SM-1-143	SURF	1
1229	SM-1-144	SURF	1
1230	SM-1-145	SURF	1
1231	SM-1-146	SURF	1
1232	SM-1-147	SURF	1
1246	SM-1-161	SURF	1
1248	SM-1-163	SURF	1
1249	SM-1-164	SURF	1
1251	SM-1-166	SURF	1
1252	SM-1-167	SURF	1
1259	SM-1-174	SURF	1
1260	SM-1-175	SURF	1
1262	SM-2-1	SURF	1
1263	SM-2-3	SURF	1
1266	SM-2-10	SURF	1
1267	SM-2-12	SURF	1
1268	SM-2-15	SURF	1
1271	SM-2-22	SURF	1
1273	SM-2-28	SURF	1
1275	SM-2-33	SURF	1
1276	SM-2-34	SURF	1
1280	SM-2	SURF	1
1281	SM-2-41	SURF	1
1283	SM-2-43	SURF	1
1284	SM-2-43	SURF	1
1286	N110-111/E31-32	LV. 1	38
1300	N23-24/E111-112	LV. 2	11
1301	N110-111/E35-36	LV. 2	2
1302	N110-111/E36-37	LV. 2	2
1303	N111-112/E35-36	LV. 2	6
1316	N63-64/E60-61	SURF	124
1317	N63-64/E60-61	SURF	72
1318	N63-64/E61-62	SURF	155
1319	N63-64/E61-62	SURF	51
1320	N64-65/E60-61	SURF	60
1321	N64-65/E61-62	SURF	59
1322	N65-66/E60-61	SURF	98
1323	N65-66/E61-62	SURF	53
1324	N66-68/E60-61	SURF	165
1325	N66-67/E61-62	SURF	167
1326	N67-68/E60-61	SURF	128
1327	N67-68/E61-62	SURF	88
1328	N68-69/E60-61	SURF	113
1329	N68-69/E61-62	SURF	118
1330	N69-70/E60-61	SURF	218
1331	N69-62/E61-62	SURF	140
1332	N70-71/E56-57	SURF	129
1333	N70-71/E57-58	SURF	58
1334	N71-72/E56-57	SURF	72
1335	N71-72/E57-58	SURF	136
1336	N70-71/E58-59	SURF	124
1337	N70-71/E59-60	SURF	98
1338	N71-72/E58-59	SURF	144
1339	N71-72/E59-60	SURF	82
1340	N60-61/E70-71	SURF	117

Lot	Grid or Unit	Level	No. of Ceramic Sherds
1341	N70-71/E61-62	SURF	76
1342	N70-72/E60-62	SURF	88
1343	N71-72/E60-62	SURF	36
1344	N70-71/E62-63	SURF	103
1345	N70-71/E63-64	SURF	62
1346	N71-72/E62-63	SURF	80
1347	N71-72/E63-64	SURF	69
1348	N72-74/E60-62	SURF	55
1349	N72-73/E61-62	SURF	63
1350	N73-74/E60-61	SURF	124
1351	N73-74/E61-62	SURF	42
1352	N153-154/E100-101	SURF	13
1353	N153-154/E101-102	SURF	12
1354	N154-155/E100-101	SURF	9
1355	N154-155/E101-102	SURF	10
1356	N155-156/E100-101	SURF	19
1357	N155-156/E101-102	SURF	10
1358	N156-157/E100-101	SURF	8
1359	N156-157/E101-102	SURF	24
1360	N157-158/E100-101	SURF	5
1361	N157-158/E101-102	SURF	6
1362	N158-159/E100-101	SURF	6
1363	N158-159/E101-102	SURF	12
1364	N159-160/E100-101	SURF	3
1365	N159-160/E101-102	SURF	12
1366	N160-161/E100-101	SURF	12
1367	N160-161/E101-102	SURF	4
1368	N161-162/E100-101	SURF	27
1370	N162-163/E100-101	SURF	28
1371	N162-163/E101-102	SURF	9
1372	N163-164/E100-101	SURF	29
1373	N163-164/E101-102	SURF	19
1374	N164-165/E100-101	SURF	33
1375	N164-165/E101-102	SURF	28
1376	N165-166/E100-101	SURF	19
1377	N165-166/E101-102	SURF	24
1379	N166-167/E101-102	SURF	18
1381	N167-168/E101-102	SURF	19
1382	N168-169/E100-101	SURF	23
1384	N169-170/E100-101	SURF	25
1385	N169-170/E101-102	SURF	33
1386	N170-171/E100-101	SURF	37
1387	N170-171/E101-102	SURF	29
1390	N172-173/E100-101	SURF	57
1390?	N172-173/E100-101	SURF	17
1392	N173-174/E100-101	SURF	13
1393	N173-174/E101-102	SURF	43
1394	N174-175/E100-101	SURF	34
1399	SM2-51	SURF	1
1400	SM2-55	SURF	1
1401	SM2-56	SURF	1
1402	SM2-60	SURF	1
1403	SM2-61	SURF	1
1404	SM2-64	SURF	1
1405	SM2-65	SURF	1
1406	SM2-66	SURF	1
1407	SM2-67	SURF	1
1408	SM2-68	SURF	1
1409	SM2-70	SURF	1

Lot	Grid or Unit	Level	No. of Ceramic Sherds
1410	SM2-71	SURF	1
1411	SM2-72	SURF	1
1414	SM2-75	SURF	1
1415	SM2-76	SURF	1
1417	SM2-79	SURF	1
1418	SM2-81	SURF	1
1423	SM2-87	SURF	2
1424	SM2-88	SURF	1
1425	SM2-89	SURF	1
1426	SM2-90	SURF	1
1428	SM2-94	SURF	1
1429	SM2-95	SURF	1
1431	SM2-98	SURF	1
1432	SM2-99	SURF	1
1433	SM2-100	SURF	1
1434	SM2-102	SURF	1
1435	SM2-105	SURF	1
1437	SM2-108	SURF	1
1438	SM2-109	SURF	1
1440	SM2-114	SURF	1
1442	SM2-117	SURF	2
1444	SM2-119	SURF	1
1445	SM2-120	SURF	2
1446	SM2-122	SURF	1
1451	SM2-131	SURF	1
1452	SM2-133	SURF	1
1453	SM2-136	SURF	1
1454	SM2-138	SURF	1
1457	SM2-144	SURF	1
1458	SM2-149	SURF	1
1459	SM2-151	SURF	1
1460	SM2-152	SURF	1
1461	SM2-153	SURF	1
1462	SM2-154	SURF	1
1463	SM2-155	SURF	1
1464	SM2-157	SURF	1
1465	SM2-159	SURF	1
1472	SM2-177	SURF	1
1473	SM2-178	SURF	1
1474	SM2-179	SURF	1
1476	SM2-192	SURF	1
1477	SM2-195	SURF	1
1478	SM2-196	SURF	1
1479	SM2-200	SURF	1
1481	VERNON BROOKS #3	?	11
1482	N85-86/E/23-24	LV. 1	10
1483	N85-86/E24-25	LV. 1	15
1484	N86-87/E23-24	LV. 1	6
1485	N86-87/E24-25	LV. 1	4
1486	N85-86/E24-25	LV. 2	1
1488	N89-90/E48-49	LV. 2	1
1489	N89-90/E48-49	LV. 3	2
1491	N93-94/E49-50	LV. 2	28
1492	N96-97/49-50	LV. 2	10
1493	N99-100/E49-50	LV. 1	13
1494	N99-100/E49-50	LV. 3	2
1495	N104-105/E98-99	LV. 2	13
1497	N106-107/E44-45	LV. 1	13
1498	N107-108/E43-44	LV. 1	23

Lot	Grid or Unit	Level	No. of Ceramic Sherds
1499	N110-111/E31-32	LV. 2	46
1500	N100-111/E49-50	LV. 1	22
1501	N111-112/E45-46	LV. 1	1
1502	N111-112/E48-49	LV. 1	3
1503	N111-112/E49-50	LV. 1	40
1504	N111-112/E91-92	LV. 2	10
1505	N42-43/E48-49	LV. 1	16
1506	N112-113/E49-50	LV. 1	20
1507	N112-113/E91-92	LV. 1	17
1508	N113-114/E48-49	LV. 1	30
1509	N113-114/E91-92	LV. 1	20
2000	N73-73.2/E50.6-50.8	SURF	4
2001	N74-74.2/E50.6-50.8	SURF	4
2002	N74.8-75/E50.6-50.8	SURF	2
2003	N74.4-74.6/E50.6-50.8	SURF	2
2004	N50.8-51/E73.2-73.4	SURF	4
2005	N50.8-51/E73.4-73.6	SURF	2
2006	N74-74.2/E50.8-51	SURF	6
2007	N74.4-74.6/E50.6-51	SURF	1
2008	N73.8-74/E50.6-50.8	SURF	6
2010	N73.6-73.8/E50.8-51	SURF	4
2011	N74.2-74.4/E50.6-50.8	SURF	2
2012	N73.6-73.8/E50.2-50.4	SURF	8
2013	N73.4-73.6/E50.2-50.4	SURF	6
2014	N73.2-73.4/E50.6-50.8	SURF	5
2015	N73.4-73.6/E50.2-50.8	SURF	2
2016	N73.2-73.4/E50.2-50.4	SURF	4
2017	N74.8-75/E50.8-51	SURF	1
2019	N74.6-74.8/E50.2-50.4	SURF	1
2020	N73.8-74/E50.2-50.4	SURF	4
2021	N74-74.2/E50.2-50.4	SURF	2
2022	N74.2-74.4/E50.2-50.4	SURF	5
2023	N73.6-73.8/E50.6-50.8	SURF	5
2024	N73-73.2/E50.8-51	SURF	4
2027	N74.2-74.4/E50.8-51	SURF	4
2028	N74.4-74.6/E50.2-50.4	SURF	2
2029	N73-73.2/E50.2-50.4	SURF	4
2030	N73.2-73.4/E50.4-50.6	SURF	1
2031	N73.4-73.6/E50.4-50.6	SURF	8
2034	N73.2-73.4/E50-50.2	SURF	6
2035	N73-73.2/E50.4-50.6	SURF	4
2036	N73.6-73.8/E50.4-50.6	SURF	2
2038	N74.6-74.8/E50.4-50.6	SURF	4
2040	N74.2-74.4/E50.4-50.6	SURF	4
2041	N74-74.2/E50.4-50.6	SURF	5
2042	N73-73.2/E50-50.2	SURF	4
2043	N74.8-75/E50.2-50.4	SURF	4
2044	N74.2-74.4/E50-50.2	SURF	2
2045	N74-74.2/E50-50.2	SURF	2
2046	N73.6-73.8/E50-50.2	SURF	3
2047	N73.8-74/E50-50.2	SURF	5
2048	N74.4-74.6/E50-50.2	SURF	1
2049	N74.8-75/E50-50.2	SURF	1
2050	N74.6-74.8/E50-50.2	SURF	1
2058	#214	SURF	1
2059	#217	SURF	1
2062	#226	SURF	1
2066	#209	SURF	1
2067	#208	SURF	1

Lot	Grid or Unit	Level	No. of Ceramic Sherds
2586	(No provenance)	SURF	1
1082A	N107-108/E53-54	LV. 1	43
1083A	N107-108/E54-55	LV. 1	4
714A	N90-91/E51-52	SURF	11

SM=Sample unit; SURF=Surface; LV=level

The 1991 and 1992 Texas Archeological Society Field School Excavations at the Fasken Site (41RR14), Red River County, Texas

Daniel J. Prikryl, with contributions by Timothy K. Perttula and Nancy G. Reese

ABSTRACT

The 1991 and 1992 Texas Archeological Society Field School excavations at the Fasken Site (41RR14) in Red River County, Texas, provided significant archeological data on the site's chronological history and on two of its three Caddo mounds. A total of 52 features were recorded and 6,769 artifacts were recovered. The excavations also supplied materials for two radiocarbon and four Oxidizable Carbon Ratio (OCR) dates.

Excavations at Area A, on the terrace edge on the western periphery of the site, had the most intensive evidence of residential occupation. There, the largest numbers of lithic and ceramic artifacts were found along with daub and fire-cracked rocks. The lithic assemblage from this locale includes some evidence of Late Archaic and Woodland period occupations. However, most of the cultural remains at Area A appear to date to the Formative Caddo period and the Middle Caddo Mound Prairie phase.

Work at Area B was primarily focused on determining the construction sequence of Mound B, the second largest mound at the site. It appears that construction at the north end of the mound involved three separate events. The earliest construction episode raised the mound to almost 90 cm in height. Importantly, two OCR dates place this event after A.D. 939. A prepared yellowish-red clay cap appears to have been placed over sections of the northern and southern parts of the mound following the construction of this first episode.

A second construction episode at the north end of Mound B added another 35 cm to its height. An OCR age of approximately A.D. 1142 dates this construction to the early part of the Mound Prairie phase. There is good evidence that the surface of the second construction episode was again covered with a thin yellowish-red clay. A third construction episode is hypothesized to account for the remaining 35 cm thick deposit above this surface. It is in the upper 60 cm of deposits that the only appreciable numbers of artifacts were found. Diagnostics from this assemblage are primarily shell-tempered sherds of Late Caddo age and a few mid-19th century historic artifacts. Even later, the mound was the location of a late 19th century cotton gin.

At Area C, the excavations showed that a slight 25 cm rise is a third Caddo mound (Mound C). Use of this mound apparently began with the erection of a number of structures with non-residential functions since almost no artifacts were found in the levels representing their surfaces. Numerous post holes were uncovered, including 11 that form the southeastern part of a sub-rectangular structure. Two calibrated radiocarbon dates from the living surfaces associated with the various post holes have age range from AD 1122-1242 and AD 1043-1188. These dates place the structures within the early part of the Mound Prairie phase.

Following the use of the structures at Mound C, the area was purposely capped with a 7 to 10 cm thick red and orange clay. A 20 cm thick topsoil deposit that gradually accumulated above the clay cap was the living surface for other Mound Prairie phase peoples who left broken sherds of Sanders Engraved and Sanders Plain pottery and several arrow points of the Bonham type. Mixed in the with the Mound Prairie phase artifacts are some shell-tempered sherds suggesting a subsequent Late Caddo occupation.

INTRODUCTION

The Fasken site (41RR14) is located in Red River County, Texas, approximately 40 km northeast of Paris, Texas. The site is a Caddo mound complex located on the first terrace above the Red River floodplain, and 4 km upstream or south of the river's confluence with one of its major tributaries, the Kiamichi River. The site is also about 1.95 km south of a well-known Caddo mound complex, the Wright Plantation site (41RR7). The Fasken site was originally recorded in the 1930s by R. K. Harris, who found Historic Indian period artifacts there, including glass beads and brass ornaments (Red River County File at the Texas Archeological Research Laboratory, The University of Texas at Austin). The site was known at that time as the Flying K Ranch site. Other than Harris' limited work, the site remained relatively unknown until the 1991 and 1992 Texas Archeological Field School investigations.

The principal features on the landscape at the Fasken site are two large man-made mounds, A and B (Figure 1). Mound A, at the south end of the site, measures 90 x 55 m in size and rises 4.3 m in height, making it one of the largest known Caddo mounds in the western reaches of the Caddo archeological area of Northeast Texas and Southeast Oklahoma. Mound B, a linear mound situated about 200 m north of Mound A, covers a 60 x 40 m area and is 1.6 m in height. Viewed in profile on a north-south line, Mound B appears to be saddle-shaped with a slightly depressed area in its center (Figure 1). At least one other smaller mound, Mound C, is also present. It is a slight 25 cm rise that lies about 200 m northwest of Mound B (Figure 3). The last noticeable feature at the site is a large 80 m diameter pond located immediately northeast of Mound A. The pond appears to represent a borrow pit for fill for the construction of Mound A and possibly also for Mound B.

The site is presently in pasture and the tall grass in some areas may mask the presence of other smaller mounds like Mound C. Such mounds may also have been flattened when the site was under cultivation from the late 19th through the early 20th century. Aside from previous disturbances by cultivation, the site has also been damaged by the construction of FM 410, which runs north-south through the site near the terrace edge. Other damage to the site includes the construction of, and activities associated with, several rural farm residences that formerly stood on the site, including one that once stood atop Mound A. A former rodeo arena was constructed north of the pond, southeast of Mound B. Additionally, according to legend, a horse-powered cotton gin was built on Mound B sometime between the 1860s and 1880s. Another legend states that during the Great Depression, the former landowners dug up some pottery vessels from the deposits at Mound B.

RESEARCH DESIGN

At the start of the Texas Archeological Society (TAS) Field School investigations, it was assumed that the mounds had been constructed during the early part of the Caddo local occupational sequence and that the Historic Indian artifacts found by Harris were debris left by later aboriginal peoples, perhaps by the Cherokee. The goals of the TAS Field School work at the Fasken site were to: (1) learn more precisely when the site was occupied, (2) gain a better understanding of the types of artifacts and features present, and (3) identify the limits of the site deposits.

Bruseth (1998:51-62) and Perttula (ed., this volume, "The Roitsch Site") have proposed a chronology for Caddo development in the Middle Red River valley as follows: Early Ceramic or Woodland period (200 B. C. to A. D. 900), Formative Caddo period (A.D. 900 to A.D. 1100) or Albion phase, Middle Caddo period (A.D. 1100 to A.D. 1300) or Mound Prairie phase (a local equivalent to the Sanders phase to the west and southwest), and McCurtain phase or Late Caddo period (A.D. 1300 to A.D. 1700). Based on our knowledge of the dating of the largest Caddo mounds elsewhere, it appeared probable that the earliest construction episodes at Mound A and perhaps Mound B would date to the Formative Caddo period. Additional mound building activities could also be expected to have continued into the Mound Prairie and McCurtain phases, as indicated by the East Mound at the Roitsch site (see Perttula, ed., this volume). A primary goal of the work at Fasken was to determine the placement of the site within this framework.

The recovery of materials, especially charcoal, which could date the mound building activities was considered extremely critical. Also of importance in dating the mound building activities was the recovery of a representative sample of artifacts which would complement any radiocarbon dates, while

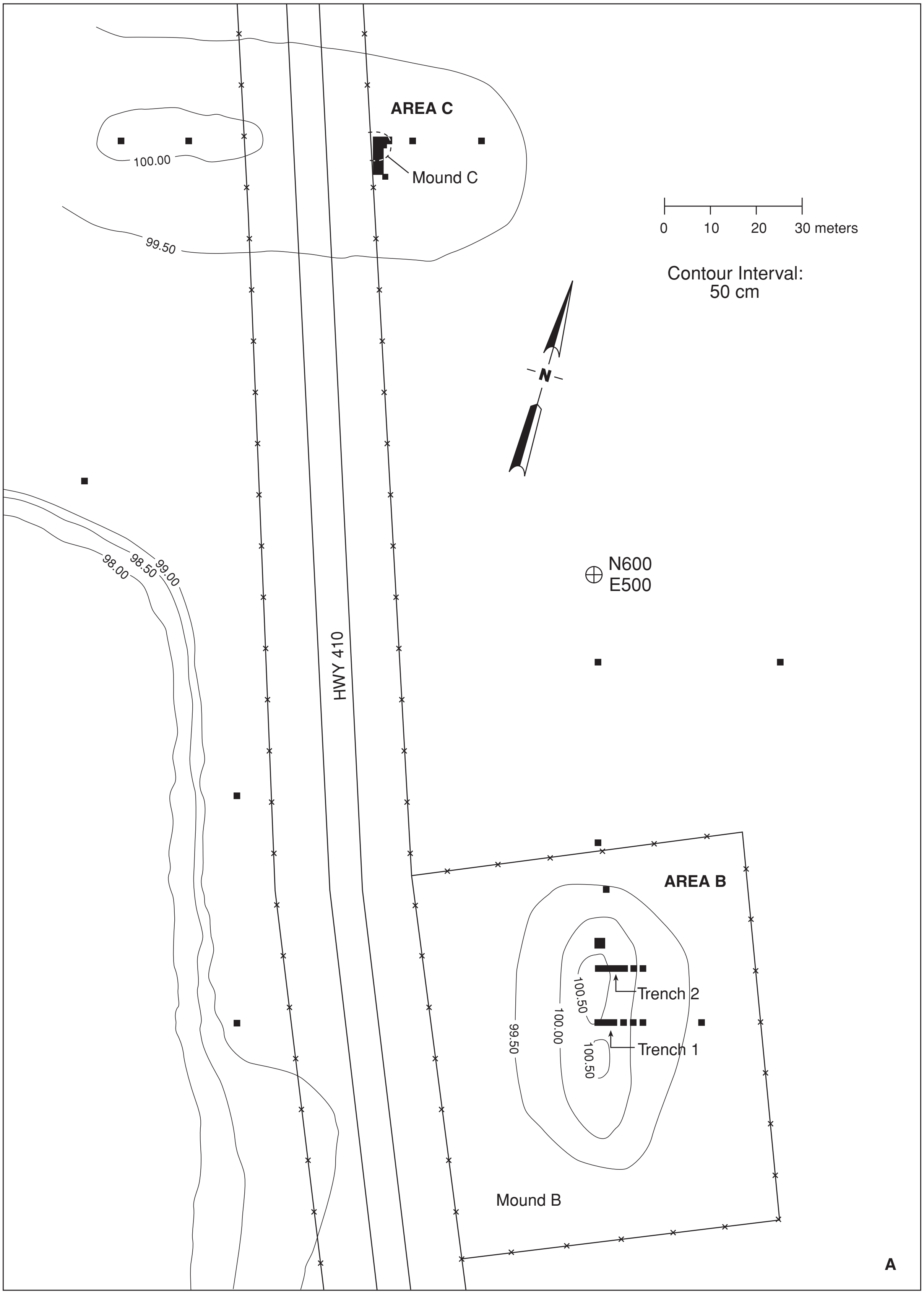

Figure 1. Topographic map of the Fasken site: a, northern part; b, southern part.

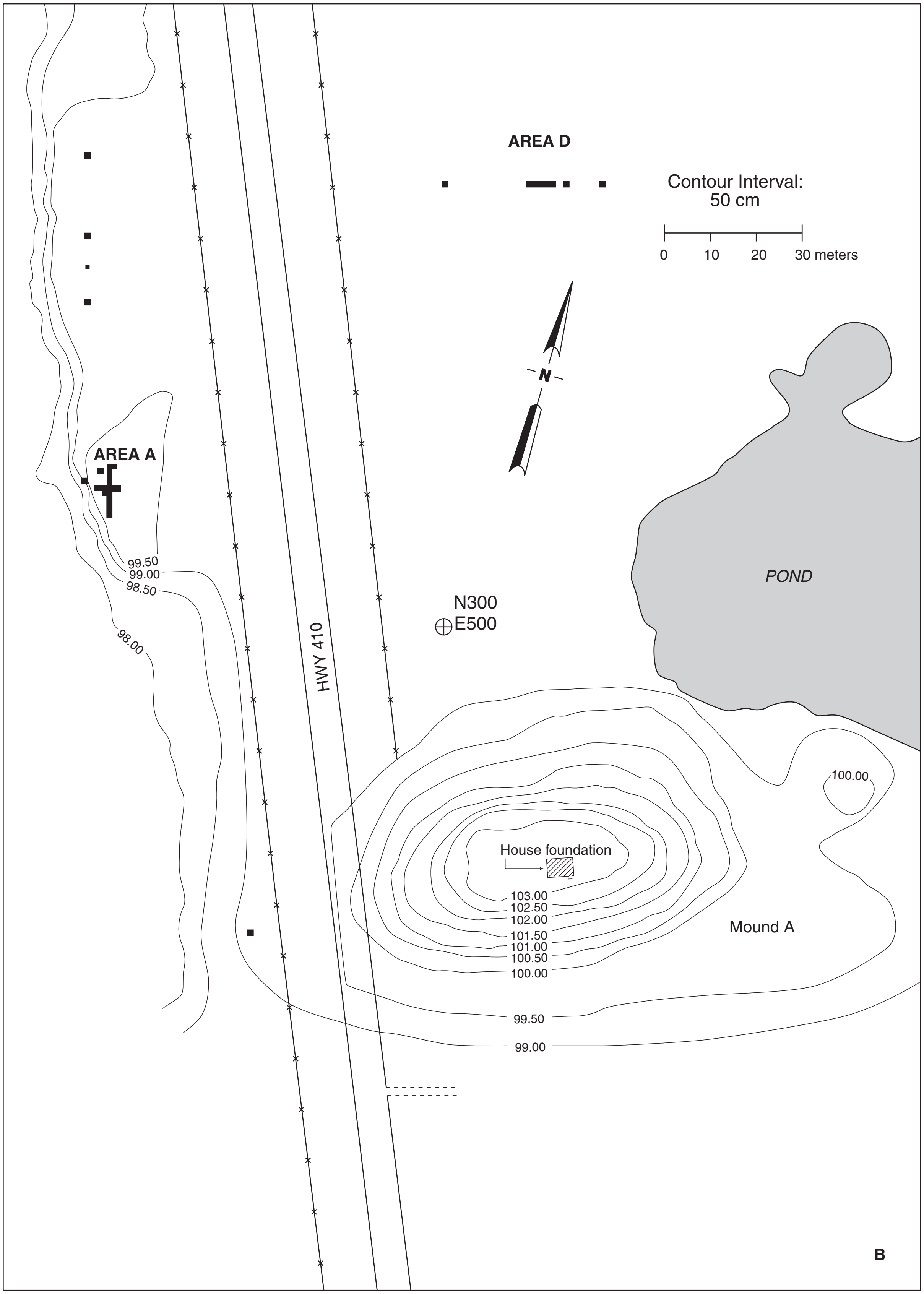
AREA D
Contour Interval:
50 cm
0
10
20
30 meters
N
AREA A
99.50
99.00
98.50
98.00
HWY 410
N300
E500
POND
100.00
House foundation
103.00
102.50
102.00
101.50
101.00
100.50
100.00
Mound A
99.50
99.00
B

Figure 2. The east side of Mound A.

Figure 3. Mound C.

the documentation of the types of features present within the mounds and adjacent deposits would provide comparative data to nearby sites such as A. C. Mackin (Mallouf 1976) and Roitsch (Skinner et al. 1969; Martin and Bruseth 1992; see also Perttula et al. 2001; Perttula, ed., this volume).

A basic aim of the work at the Fasken site was also to define the horizontal limits of the site deposits. Prior to the beginning of the TAS Field School excavations, it was not known if cultural materials were confined to the vicinities of the two major mounds or whether such remains extended continuously northward, for example, towards the Wright Plantation site.

EXCAVATION METHODOLOGY

While the above-mentioned research design issues constituted the ideal for excavations at the Fasken site, the field work was planned with the realistic expectations of how much could be accomplished in two one-week field school sessions. For example, because of the enormous size of Mound A and the limited amount of time and effort that could be expended by the TAS Field School, no work was undertaken on this mound. Instead, excavation of mound features focused on Mounds B and C, which are called Areas B and C, respectively. Limited excavations were also conducted at two other portions of the site, labeled as Areas A and D (see Figure 1). Additionally, a shovel testing program consisting of 50 x 50 cm units was undertaken to better define the boundaries of the site.

Prior to the beginning of the 1991 field season an arbitrary grid system was established at the site based on a datum placed southwest of the site in the Red River floodplain. The datum was labeled 0/0. All excavations were undertaken in areas north and east of this datum. Prior to both field seasons, portions of the site were mowed to remove tall grass and facilitate the placement of grid stakes and excavation activities in general. For horizontal measurements, the grid numbers of at the southwest corner of each 1 x 1 m were utilized.

All soil was removed from excavation units in 10 cm levels. In some cases, a transit was used to measure the depths of excavations but generally line levels strung from nails whose elevations had been taken with a transit were used for measuring depths.

Soil was excavated from the units with shovels and trowels, with the latter being utilized for more careful work in and around suspected features, cleaning off the bottoms of levels, and for straightening excavation unit walls. When charcoal or other charred materials were encountered in situ during excavations, samples were placed in aluminum foil pouches. All soil from each level was screened through 1/4-inch wire mesh.

Special attention was given to the excavation of features. All features were carefully cleaned and documented with plan view drawings, black and white prints, and color slide photography. Additionally, suspected post holes and pit features were cross-sectioned and documented with photos, plan views, and vertical profile drawings.

Another aspect of the field methodology was the use of a 1-inch diameter hand auger to penetrate subsurface deposits on the northern half of Mound B to determine the horizontal extent of a buried, prepared clay floor defined as Feature 3. Following the successful delineation of the boundary of Feature 3, the hand auger was utilized on the southern lobe of this mound to locate and partially determine the horizontal extent of a similar buried clay floor (Feature 16).

In addition to the excavations, two remote sensing surveys were conducted on parts of the site to search for buried features. One of these utilized a magnetometer while the other involved the use of a ground penetrating radar (GPR) unit. The remote sensing work was undertaken at Areas A and B and further north on the east side of FM 410 (see Figure 1). A total of approximately 10,750 m^2 (2.7 acres) were covered by the GPR, and 17,390 m^2 (4.3 acres) were subjected to magnetometer survey. The two remote sensing devices covered many of the same areas and in some cases both identified anomalies at the same spots. Four of the anomalies were ground-truthed in the excavations.

EXCAVATION RESULTS

Area A

Area A is the portion of the site on the terrace edge west of Mounds A and B and FM 410. A total of 22 1 x1 m units were excavated here (see Figure 1). These units primarily consisted of a central 2 x 2 m block with lines of other 1 x 1 m units radiating off the block in all four cardinal directions. In total, this cross-shaped block, with its approximate center at N330/E425, accounted for 20 of the 22 1 x 1 m units. The purpose of this block excavation was to investigate the area where an initial 50 x 50 cm shovel test in the southwest quadrant of the N329/E425 unit had yielded evidence of a pit feature and large quantities of ceramics, lithic debris, and daub. The other two 1 x 1 m units were located further north at N372/E419 and N387/E419. These two units were excavated to investigate anomalies found during the aforementioned remote sensing survey.

Stratigraphy

The soil stratigraphy in Area A consisted of a 20 to 50 cm thick sandy loam A-horizon deposit above a red clay B-horizon (Figure 4). At the major excavation block at Area A, the Zone I reddish-brown sandy loam sits directly atop the Zone III red clay B-horizon, except at the east wing of the T-shaped line of 1 x 1 m units where a 10 to 30 cm

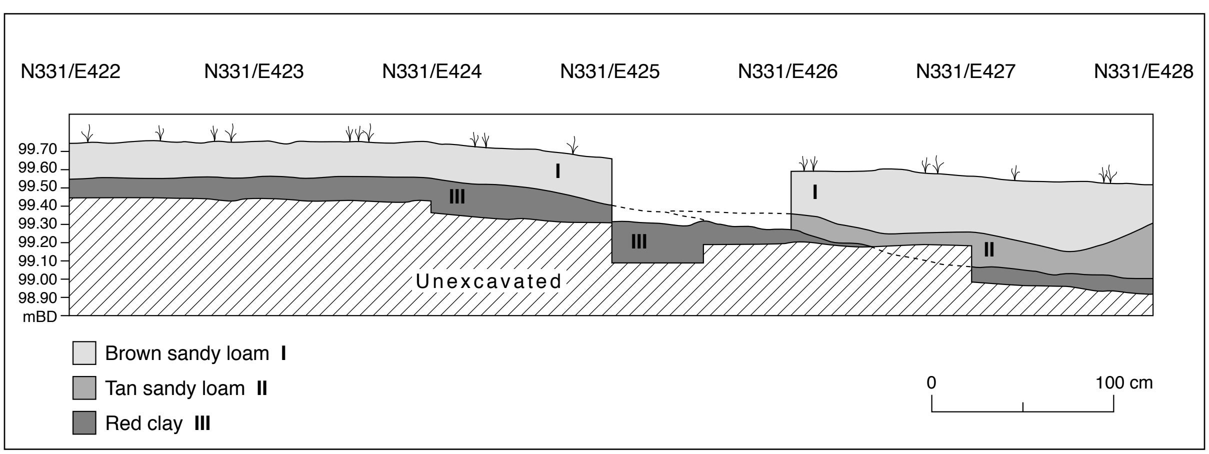

Figure 4. Stratigraphic profile along the N331 Line at Area A.

thick lighter reddish-brown sandy loam (Zone II) is distinguishable between Zones I and III. The former stratigraphy is also present in two smaller 1 x 1 m and 50 x 50 cm units excavated along the terrace edge north of Area A.

Features

Only three features, a storage/trash pit and two post holes, were found during the excavations at Area A. The storage/trash pit (Feature 2) is a circular, straight-walled depression with a diameter of 1.6 m. It is situated in the center of the excavation block (Figure 5). The feature was easily detected by its circular pattern of much darker colored sediments that were visible just beneath the 20 cm thick plow zone. From that point the pit extended down another 30 cm well into the red clay B-horizon.

The high density of chipped stone artifacts, pottery sherds, and, in particular the large quantity of daub found during the initial excavations undertaken to expose Feature 2, indicated intense occupation and the probable presence of former house structures in the vicinity of the pit feature. In order to find post holes associated with the house(s), four lines of 1 x 1 m units were excavated on the cardinal axes from the 2 x 2 m unit opened to expose Feature 2 (see Figure 1).

Although the expansion of excavations at Area A continued to yield high quantities of artifacts, only two post hole features (Features 18 and 31) were uncovered. These are shallow dark-colored circular patterns located at the north end of the northern line of 1 x 1 m units. These could be a portion of a post hole pattern, possibly indicating that a structure stood north of Feature 2, and that the storage/trash pit was located outside of a structure rather than within it.

Artifact Distributions

The investigations at Area A produced the highest artifact counts and a more diverse

Figure 5. Feature 2, a trash/storage pit, at Area A.

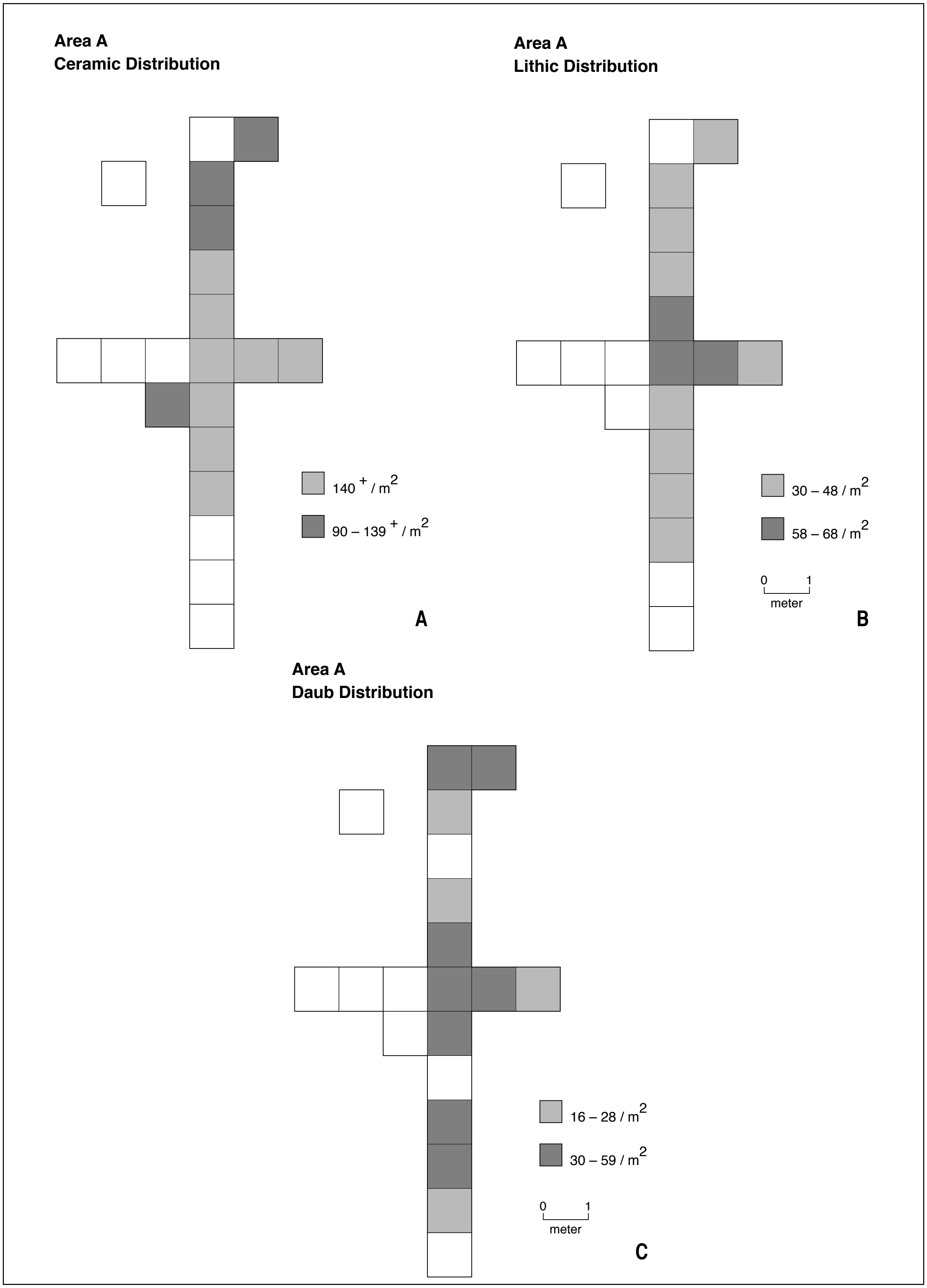

Figure 6. Distribution of artifacts, main excavation block at Area A: a, ceramics; b, lithics; c, daub.

assemblage of material culture remains than in other portions of the site. These materials strongly suggest a residential occupation here, as opposed to the special (i.e., religious or ritual) use noted for some other parts of the site. The horizontal distribution of ceramics, lithics, and daub indicate that the densest accumulations occur within and immediately adjacent to the Feature 2 trash/storage pit (Figure 6a-c). It is probable that previous plowing has scattered those materials, which would have been originally located in the upper 20 cm of deposits within the pit feature and adjacent areas.

A second noteworthy fact about the artifact distribution at Area A is the increase in density of the three artifact categories at the very northeast edge of the Area A block in the N335/E426 unit. Since the only two post holes found in Area A occur in units N335/E426 and N335/E425, it is possible that the increase in artifacts is related to the presence of a former structure in this vicinity. It is likely that Feature 2 was associated with this hypothesized structure since the distance between the pit and the structure is comparable to that noted at other prehistoric Caddo sites in northeastern Texas.

Area B

Area B centers on Mound B, and the work in this area principally focused on the excavation of two 1 m wide trenches on the east slope of Mound B (see Figure 1). The most significant finds came from Trench #2 excavated on the northern lobe of the mound. This trench consisted of nine 1 x 1m units, with the seven western units forming a contiguous line from the crest of the mound down slope to the east. The units were excavated to various depths, with the three deepest 1 x 1 m units at the western end of the contiguous trench excavated to 2 m below surface (bs). These excavations penetrated through the mound fill to 40 cm below the original surface upon which the mound had been erected.

Trench #1, at the approximate center of Mound B, consisted of eight 1 x 1 m units, including a contiguous line of five units from the mound crest down slope to the east. Excavation of Trench #1 units indicated that the uppermost 60 cm of mound fill have been disturbed by the previous excavations of pothunters and perhaps the activities associated with the construction and operation of a late 19th to early 20th century cotton gin.

Excavation of Trenches #1 and #2 during the first field season was carried only through the upper half of the mound deposits. Based on the discovery of a prepared clay floor at a depth of 60 cm bs in Trench #2 and the fact that the deposits in Trench #2 appeared to be much less disturbed than those of Trench #1, more intensive efforts during the second season focused on the completion of the Trench #2 excavations in order to establish the mound building sequence. No additional work was undertaken in Trench #1 during the second field season.

Additionally, a 1-inch diameter hand auger was used prior to the start of the second season of excavations to establish that Feature 3 extended from approximately N511 to N517.5 and from E499 to E505.5. Other soil augering on the south lobe of Mound B south of Trench #1 showed that a similar orange clay cap occurred at roughly the same depth as Feature 3 for a distance of 15.8 m on the E500 line between N478 and N493.80. The augering results suggested two possibilities. First, two parallel clay caps could have been laid simultaneously on the mound surface following the end of the first episode of mound construction. Given the fact that the present surface of Mound B is saddle-shaped with north and south lobes present in the same vicinity as the clay features, the clay features may have represented prepared floors for twin structures. If this is true, then it was thought that excavations along the edges of the clay floors might show the presence of the post holes of such structures. To explore for such post holes, a 2 x 2 m unit (N517/E500) was excavated on the north slope of Mound B during the second season. The second possibility is that a single continuous clay cap which had been disrupted by previous ground disturbance had originally extended from approximately N478 to N517.5.

Other 1 x 1 units were excavated at Area B. These consisted of the N530/E502 unit, which investigated an anomaly found during one of the remote sensing surveys at the far north edge of the mound, and the N500/524 unit to investigate the area just off the east edge of the mound.

Stratigraphy

The profile from the three westernmost units of Trench #2 provides the best evidence of the mound construction sequence. At least three construction episodes are evident there (Figure 7). From the bottom to the top on the N513 line at the west end of Trench #2, the profile was as follows: (1) original pre-mound yellowish-red B-horizon subsoil (98.60

to 98.74 m); (2) the very dark grayish-brown, organic-stained pre-mound A-horizon (98.74 to 99.02 m); (3) the multi-colored dark to very dark grayish-brown sandy loam and yellowish-red clay basket loads of soil which formed the first mound-building episode (99.02 to 99.88 m), 86 cm thick; (4) the thin yellowish-red clay which capped the first construction episode (99.88 to 99.92 m); (5) the dark grayish-brown sandy loam that formed the second construction episode (99.92 to 100.29 m), 37 cm thick; (6) the remnants of a second yellowish-red clay cap at 30 cm bs (100.29 to 100.31 cm); and (7) the uppermost deposit of dark to very dark grayish-brown sandy loam extending to the current ground surface and that formed the third and last construction episode (100.31 to 100.60 cm), 29 cm thick. The north wall profile of Trench #2 provides a broader view of the soil strata in the western half of Trench #2 (Figure 8).

Three OCR dates were obtained from soil samples retrieved from the Trench #2 profile (see Frink and Perttula [2001] for a general discussion of the methods and reasoning behind the OCR procedure as used on Caddo sites). The sample from the original pre-mound A horizon (Zone 6) at 163 to 168 cm bs, produced a date of 1011 ± 30 B.P. (A.D. 909-969), while a sample from Zone 5, the basket loads of dirt used for the first mound building episode, dated 1175 ± 35 B.P. (A.D. 740-810). The sample from just above Feature 3, which should date the fill of the second construction episode, yielded a date of 808 ± 24 B.P. (A.D. 1118-1166). While these OCR dates appear reasonable, given their context, it is important to note that the validity of all three OCR dates may be suspect because of the context of the soils themselves. While the soils used for the pre-mound and first mound building episode dates are sealed by the Feature 3 clay cap as well as mound fill, older carbonized remains are certainly present in these two samples (particularly from Zone 5, which is comprised of a mixture of sediments with different carbon contents). Furthermore, the soil used for

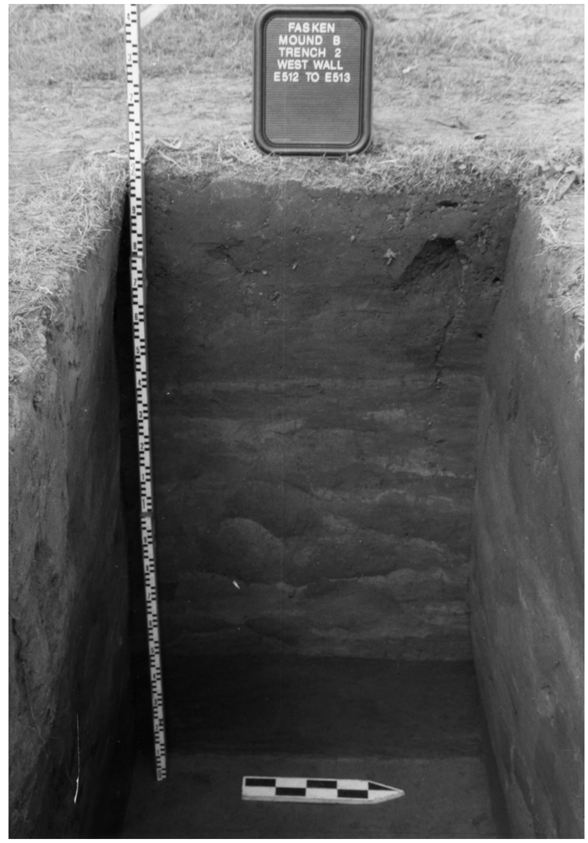

Figure 7. West wall profile of Trench #2 at Mound B.

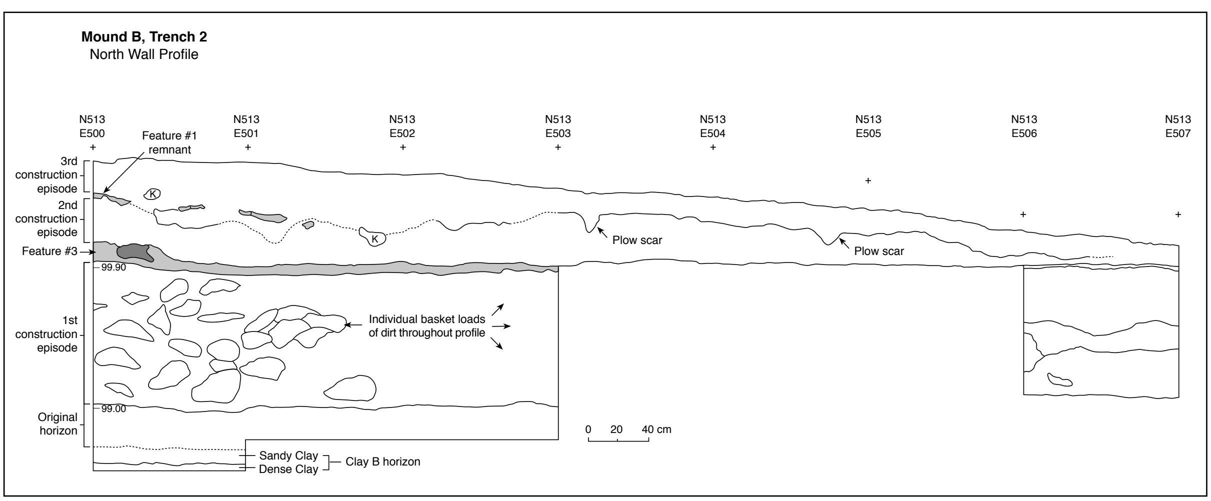

Figure 8. Profile of the western part of the north wall of Trench #2 at Mound B.

the dating of the second mound building episode could potentially include younger carbon that has migrated downward in the deposits, particularly by rodent burrowing. The interpretation offered here is that the Zone 6 pre-mound horizon was buried by mound fill subsequent to A.D. 939, and the mound fill sealed off the older carbon in this zone from mound fill and younger carbon associated with occupation of the mound itself at some later date.

Trench #1, the other trench excavated on Mound B, was 11 m south of Trench #2. It consisted of 10 1 x 1 m units excavated to explore the slightly depressed central part of the mound. Several contiguous units forming the bulk of Trench #1 were excavated to a maximum depth of 1 m. The profile of these deepest units showed four sandy loam soil zones of mound fill, with the upper 60 cm of the top three zones being much disturbed. The disturbance may be related to pothunter digging and/or the construction and operation of the 19th century cotton gin. Although no evidence of the yellowish-red clay that capped the first two construction episode was observed, hand augering further south on the southern lobe showed the earlier yellowish-red clay cap to be present at the same approximate elevation as on the northern lobe. It is possible that in the first episode of construction, this mound had a true saddle shape with slightly elevated lobes at its north and south ends. The lobes may have served as platforms for twin structures, with the yellowish-red clay being the floors of the structures.

To further explore the possibility that structures had been erected at the north and south ends of the original mound construction, a 2 x 2 m unit was excavated 5-7 m north of Trench #2, to a depth of 60 cm bs, where the augering indicated the northern edge of the yellowish-red clay cap. The purpose was to determine if post hole stains from one of the hypothesized structures would be evident. Although no such post holes were discovered there, Feature 35 was found. It is a narrow, 10 to 30 cm wide, 15 cm deep depression that extended from the top of the clay lens down 15 cm. It was oriented north-south across the entire 2 x 2 m unit rather than the expected east-west line which would have marked the northern edge of a structure, and possibly it is part of an extended entranceway trench.

Artifact Distributions

In comparison to Area A, the horizontal distribution of the three major prehistoric artifact categories at Area B shows no clear concentrations (Figures 9a-c). The volume of chipped stone and ceramic artifacts is generally higher at the west ends of the trenches near the crest of the mound. The daub distribution does not show a consistent pattern. The vast majority of these artifacts from the two 1 m wide trenches on Mound B come from the upper 60 cm of deposits and appear to be of Late Caddo age. The somewhat larger overall numbers of artifacts from Trench #2 in comparison to Trench #1 is probably due to the fact that larger volumes of fill were excavated at Trench #2.

Area C

The excavation of a 20 m^2 unit at Area C over the two seasons revealed that a man-made mound, Mound C, is present here. The identification of numerous post holes in the deeper excavation levels, including 11 that form an alignment designated as Structure 1, indicates that this area was initially the locale of more than one structure, the floors of which lay at depths between ca. 40-58 cm bs. Since extremely few artifacts were recovered from the levels which include these floor surfaces, it appears that the structures had non-residential functions probably associated with religious, ceremonial, and/or civic activities. The area containing these structures was then purposely capped with a 7 to 10 cm thick red and orange clay deposit. At some later date, a residential occupation of Area C was initiated, with relatively dense amounts of artifacts in the 20 cm thick deposits between the top of the clay cap and the current ground surface. Although two post holes originate from the upper 20 cm of deposits, it is not certain whether they are of aboriginal origin or are post holes for a historic period fence.

Stratigraphy

Figure 10 illustrates the strata uncovered at Area C. The soil profile showed an 18 to 22 cm thick surface deposit of sandy loam soil divided into two zones, Zones 1 and 2, with the principal distinction being the presence of a very dark gray color (5YR3/1) and numerous roots in Zone 1. Zone 2 has a reddish-brown color (5YR4/4). The vast majority of the aboriginal artifacts recovered at Area C come from Zones 1 and 2.

Deeper, Zone 3 is an approximately 7 to 10 cm thick layer of reddish-brown (5YR4/4) to dark

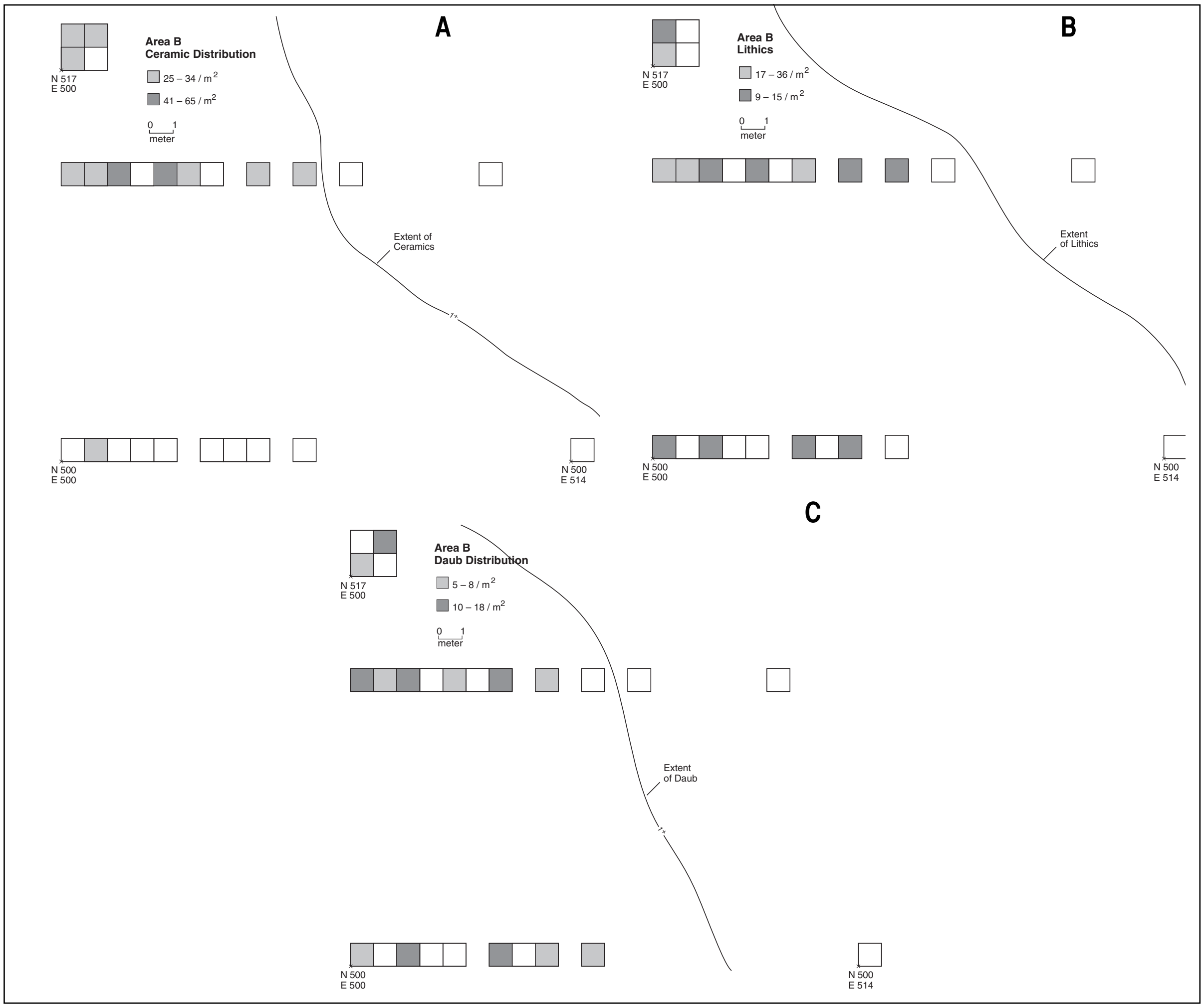

Figure 9. Distribution of artifacts in excavation units at Area B: a, ceramics; b, lithics; c, daub.

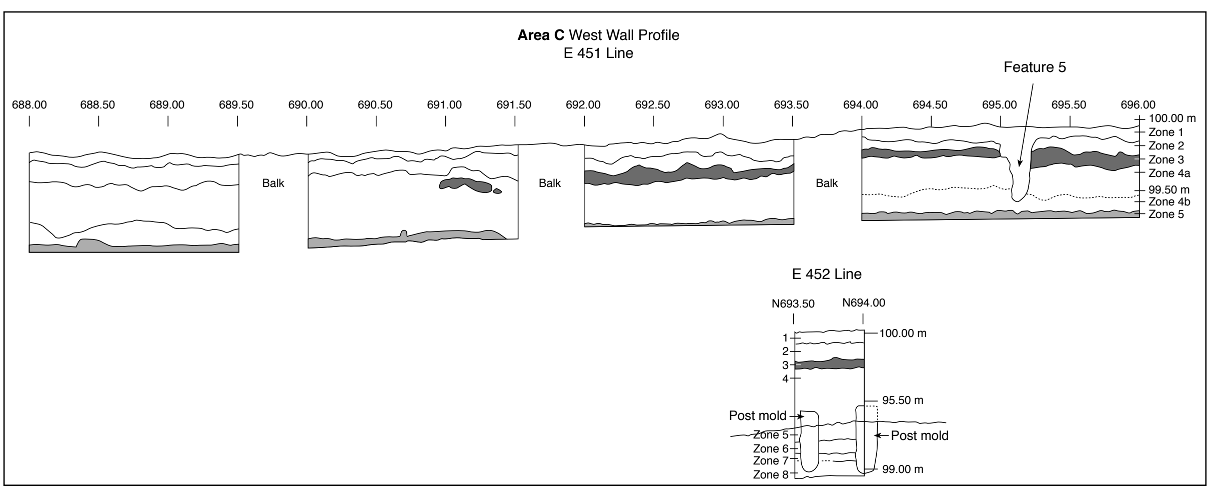

Figure 10. Profile of the west wall of the main excavation block at Area C.

reddish-brown (5YR3/3) clay that was purposely dumped over the deeper deposits by aboriginal peoples to cap several structures represented by post holes that extend from 52 to 102 cm bs. The artifact yield from Zone 3 is very low and many of those recovered may have moved down by bioturbation into the top of the clay from Zone 1 and 2 fill. In the west wall profile of the 7.5 m long excavation block, the red clay extends continuously from the N692 to N696 line. Between N692 and N691, it becomes more scattered and is absent south of the N690.87 point. On an east-west line, the Zone 3 red clay extends across the entire excavation block north of the N692 line. It is generally 10 cm thick at the west end of the block and averages 5 to 7 cm in thickness from the E452 line to the east edge of the block.

Zone 4 at Area C is a dark reddish-brown (5YR3/2) highly organic sandy loam that lies beneath the red clay cap. Zone 4 ranges in thickness from a minimum of 23 cm at the N696/E451 stake to 43 cm at N693.80/E452. Although all but two of the 34 post holes identified at Area C, including the alignment defined as Structure 1, originate from surfaces within the Zone 4 fill, extremely few artifacts were recovered. Generally, the Zone 4 fill corresponds to levels 4 through 7 in the excavation units. A radiocarbon date from charcoal recovered in level 4 in the N692/E451 unit yielded a $\delta\ ^{13}C$ corrected date of 870 ± 50 B.P., which has a calibrated 1-sigma age range of A.D. 1122-1242 (area under the probability distribution [RA]=0.83). Deeper, a second radiocarbon date from charcoal recovered in level 7 produced a $\delta\ ^{13}C$ corrected date of 910 ± 60 B.P. which has a calibrated age range of A.D. 1043-1188 (RA=1.00). These dates are in correct stratigraphic order and indicate a local Mound Prairie phase or Middle Caddo period occupation of this area for apparently non-domestic structures. An OCR date of 682 ± 20 B.P. (A.D. 1248-1288) was also obtained from Zone 4 fill. It came from charcoal-stained soil in N690/E451 from a depth of 42 cm bs. However, this sample came from an area in which the Zone 3 clay cap is not present to prevent contamination from younger carbon in the Zone 1 and 2 fill. Thus, the date may not accurately reflect the age of the cultural materials in Zone 4.

Zone 5 is a red (2.5YR4/6) clay that underlies the dark Zone 4 fill. Along the E452 line, this red clay is only 10 to 13 cm thick. Elsewhere, most excavation units were terminated as soon as the top of Zone 5 was encountered.

The profile of a narrow trench dug on the E452 line identified several deeper sediments. Zone 6 is a sandy loam deposit with a reddish-brown (5YR5/4) color. At the south end of the trench it is approximately 7 cm thick. Moving north, it progressively thickens to a maximum of 12 cm. The northern part of the trench has a red (5YR4/6) sandy loam (Zone 7) beneath Zone 6. Zone 7 ranges from 3 to 5 cm in thickness. The deepest deposit, Zone 8, lies beneath Zone 6 in the southern part of the trench wall profile and is beneath Zone 7 in the northern part of this profile. It is a reddish-brown (5YR4/4) sandy clay. Excavations did not extend to the bottom of Zone 8, but at the south end of the trench profile, it is at least 19 cm in thickness (100-119 cm bs).

Artifact Distributions

Artifact yields were high in the first three levels in Area C, but the deeper deposits (levels 4-7) representing the floors of structures had extremely few artifacts, suggesting that the structures may have had a special (i.e., religious or political) rather than residential function. The horizontal distribution pattern of prehistoric ceramics, chipped stone, and daub (Figure 11a-c) does not show as strongly distinguishable trends as that of Area A. The highest ceramic counts occur in the northeastern edge of Area C. Likewise, the distribution of daub is generally higher at the northeast edge of the block. The lithic distribution pattern is not as clear. If the artifact counts from units N690/E451 and N688/E452 are disregarded, then the lithic density is also higher at the northeast end of the block.

Area D

This area is located between Mounds A and B where a slight topographic rise similar to that at Mound C had been noted. A small excavation (seven 1 x 1 m units) was undertaken at Area D during the 1991 field season. These excavations did not reveal any evidence of mound building but did uncover a midden zone with some evidence of cultural stratigraphy.

Stratigraphy

The profile of the south wall of the main Area D excavation block at Area D has three soil zones (Figure 12). Zone 1 is a reddish-brown (5YR4/3)

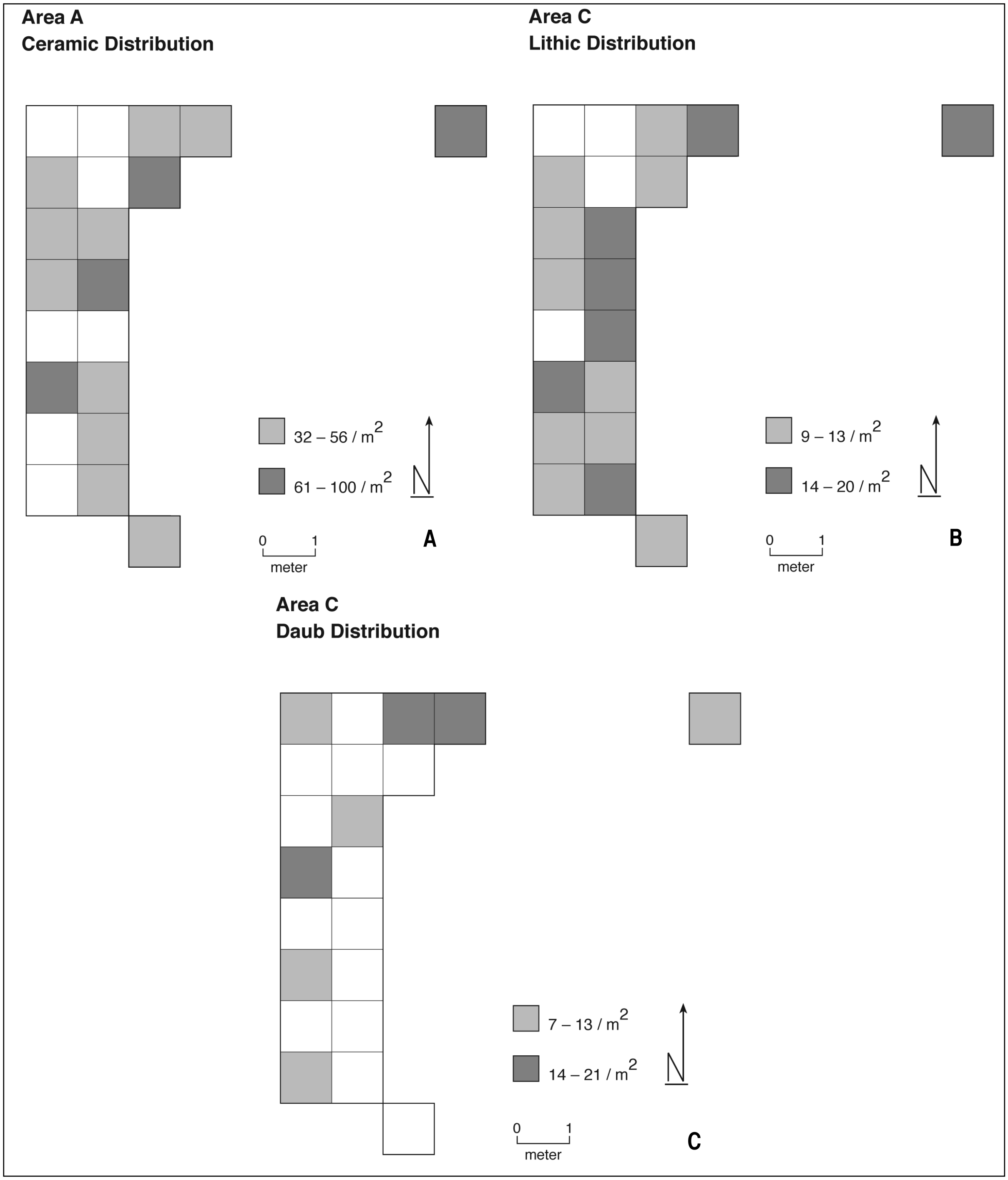

Figure 11. Distribution of artifacts in main excavation nlock at Area C: a, ceramics; b, lithics; c, daub.

sandy loam topsoil which ranges from 8 to 23 cm in thickness, but on average is about 20 cm in thickness. It appears to correspond to a plow zone. Zone 2 is a dark reddish-brown (5YR3/2) sandy loam with patches of brown and black midden (5YR2.5/1) staining. At the west end of the profile, where it is at least 39 cm thick, it can be divided into three sub-zones: 2A, 2B, and 2C. Elsewhere, it is generally about 20 cm in thickness. Zone 3 is a dark reddish-brown (5YR3/3) sandy clay loam that is the deepest zone exposed in the excavations. The top of this zone was usually approximately 40 cm bs, but was not penetrated at the far west end of the excavation block where excavations ended at 50 cm bs.

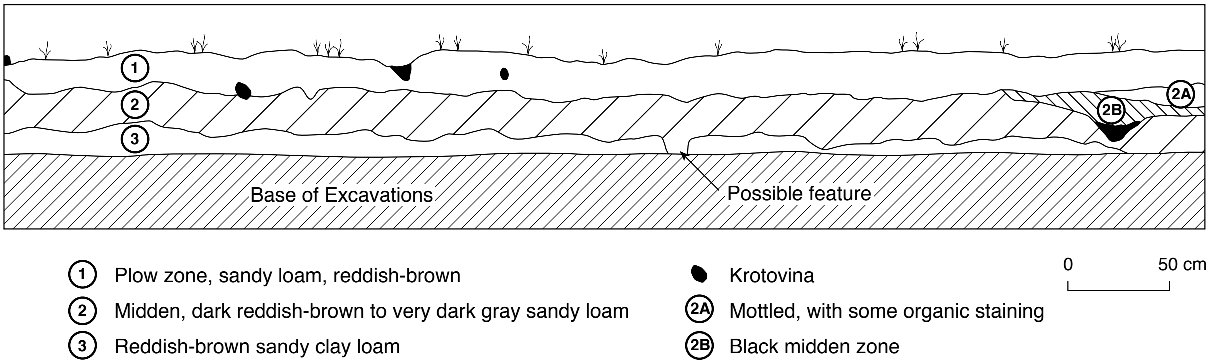

Figure 12. Profile of the south wall of the excavation block at Area D, N399 E 519–525.

Artifact Distributions

The ceramic and chipped stone categories at Area D show opposing horizontal clustering (Figure 13a-b). The ceramics are more numerous at the east end of the block while the chipped stone has a somewhat higher density at the west end. The daub count is much higher at the far east end of the block (Figure 14c), which in combination with higher ceramic counts, suggests that an aboriginal structure may have once been present in that vicinity.

Shovel Testing

A total of 22 50 x 50 cm test units and 2 1 x 1 m test units were excavated to help define the site boundaries and determine artifact densities across the site. These substantiate the findings of dense cultural materials along the terrace edge in the vicinity of Area A (Figure 14). The test units also suggest that little occupational material exists east of Mound B and in the areas east and west of Mound C at the north end of the site.

The stratigraphic profiles from the various shovel test units are provided in Appendix 1 of this article. These generally show sandy loam A-horizon deposits ranging from 56 to 72 cm in thickness in the area between Areas B and C; 36 to 42 cm thick deposits east of Area B; at least 60 to 70 cm thick A-horizon sediments west of Area C; and approximately 40 cm deposits north and south of Area A.

Remote Sensing

The two remote sensing surveys showed numerous anomalies and in many cases the magnetometer and ground-penetrating radar identified anomalies that could be correlated. Four of these anomalies were "ground-truthed" in the excavations. Three of these excavation units were placed north of the Area A block and consisted of the N372/E419 and N387/E419 1 x 1 m units and the NE and SE quads of the N404/E420 unit (see Figure 1). Rusted metal recovered from the N387/E419 unit is the probable source of the anomaly that registered there. The other two, however, yielded burned sandstone (naturally iron-enriched) rocks which are among the very few that were found in the two seasons of excavations at the site.

A fourth anomaly was tested further north on the east side of FM410 with the N644/E427 1 x 1 m unit. No artifacts or features were found in that excavation unit and it appears that the anomalous reading there was caused by the extremely shallow A-horizon. An attempt was made to ground-truth a fifth anomaly located at N530/E502, just north of Area A. Time did not allow for the completion of this 1 x 1 m unit, and those levels that were excavated produced no unusual materials or features.

Features

Of the 52 features recorded during the excavations all but eight are post holes (Appendix 2). The other eight features consist of a post hole alignment that forms portions of the east and south walls of a structure (Structure 1), three pit features, three prepared clay floors, and a possible wall or extended entranceway trench.

Structure 1

Eleven post holes in Area C beneath the clay cap form the southeastern wall of a structure

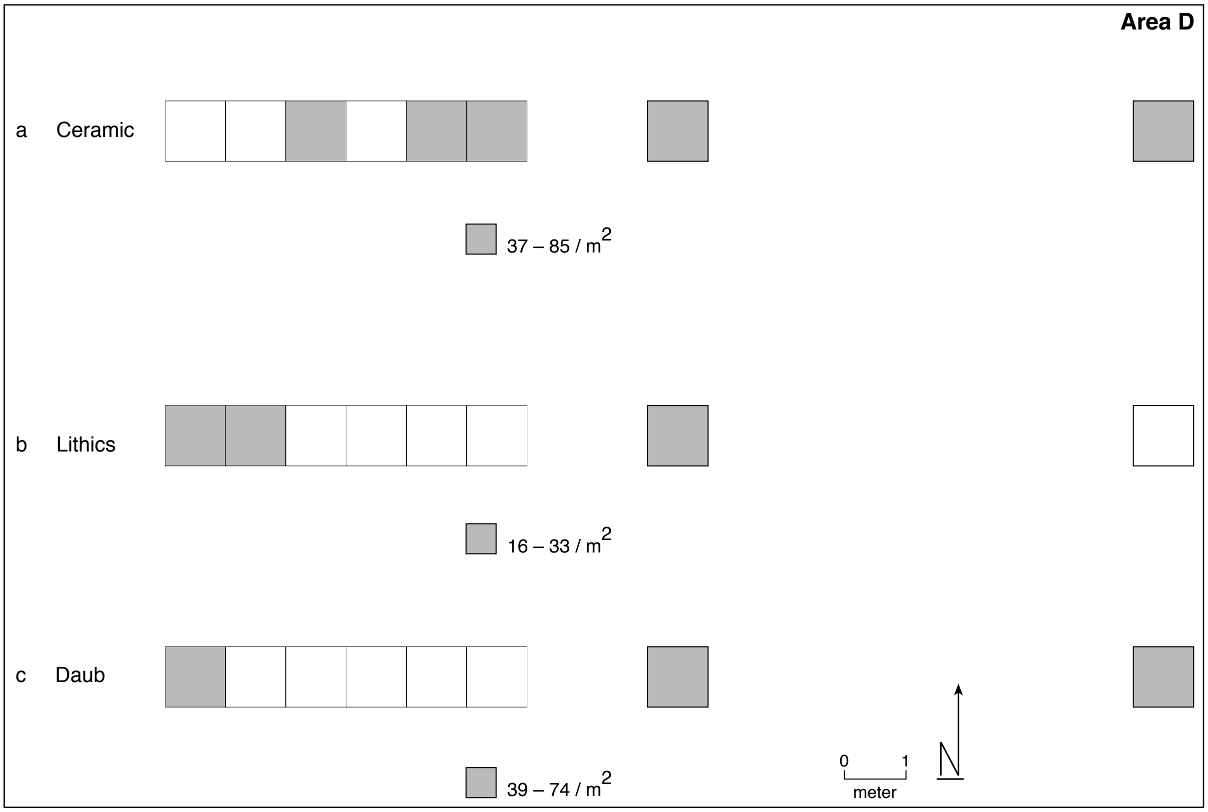

Figure 13. Distribution of artifacts, excavation block, Area D: a, ceramics; b, lithics; c, daub.

(Figure 15). Eight of the post holes are part of a north-south trending line that extends for a length of 3.5 m, and forms the southern part of the east wall of the structure. Three other post holes form the eastern part of the south wall. The arc at the intersection of the two walls suggests that the structure was sub-rectangular. Several of the post holes were first noted at depths of approximately 25 cm below the red clay cap (52 cm bs). The average diameter of the post holes is 15 cm, and their maximum observed depth is 48 cm. No diagnostic artifacts which would aid in dating this structure were found, and, indeed, very little in the way of material culture remains were found in the levels that would approximate the living surface associated with the structure.

Individual Post Holes

Aside from those post holes that define Structure 1, 33 other individual post holes were recorded. These consist of 26 post holes at Area C (Figure 16), two at Area A, and five at Area B. Twenty-four of the 26 at Area C were beneath the clay cap. Generally, the tops of those post holes south of Structure 1 occur at slightly higher elevations than those comprising Structure 1, but they are still beneath the clay cap. Two post holes at the north end of the Area C block differ from the others in that they are more recent and extend through the clay cap. These may represent a structure(s) associated with the aboriginal Caddo cultural remains found in levels 1 and 2 of Area C or they may represent historic period fence posts.

The five post holes recorded at Area B include four in the N500/E504 unit in Trench #1. They were observed in the floor of level 7 at 99.60 m. None of the four is well-preserved, nor do they form any recognizable pattern. The fifth post hole at Area B was recorded in the N518/E500 unit in the floor of level 6. It had a diameter of 35 cm and was later determined to probably represent a larger rodent burrow.

The two post holes found at Area A come from a line of 1 x 1 m units excavated north from the 2 x 2 m block which exposed a large pit feature.

Pit Features

One of the three pit features recorded during the excavations is a 1.6 m diameter storage/trash

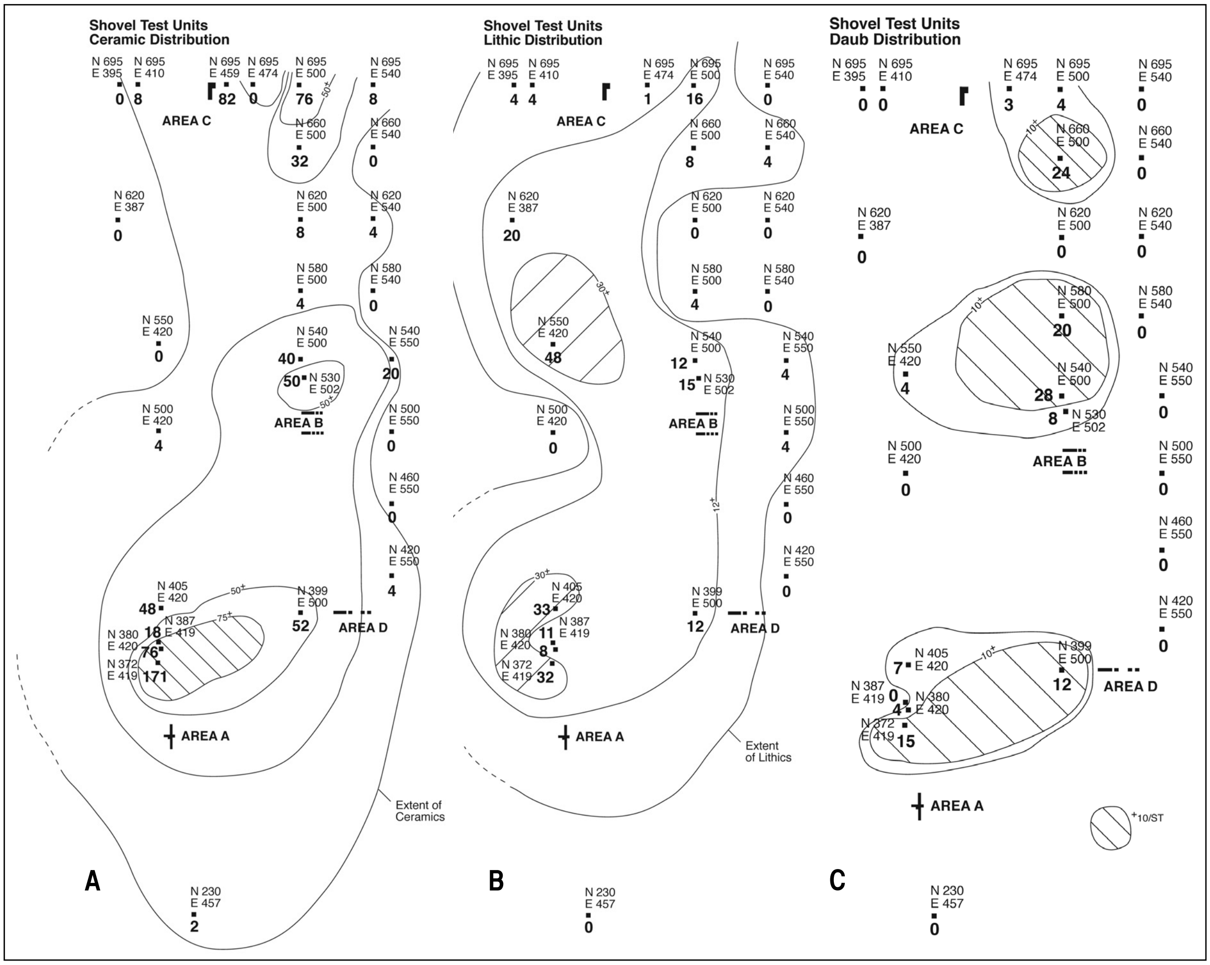

Figure 14. Distribution of artifacts in shovel test units: a, ceramics; b, lithics; c, daub.

pit (Feature 2) found in the initial excavations at Area A (see Figure 5). This feature was first noted just beneath the plow zone at a depth of 20 cm. It was distinguished by very dark fill which extended into the orange clay B-horizon to a maximum depth of 45 cm bs. The recovery of a side-notched Reed arrow point from the lower part of the pit fill suggests a Middle Caddo period or Mound Prairie phase date for the feature.

The second pit feature, Feature 50, was found in the northeastern part of the Area C block (see Figure 15). It is an approximately 1.3 m diameter oval patch of mottled dark brown sandy clay and red clay. The feature was first noted at a depth of 70 cm. It was not cross-sectioned or excavated.

The third pit feature, Feature 15, was recorded in the N695/E459 unit. It is a small 10 cm diameter pit that was observed as a pocket of dark fill that extended from 30 to 40 cm bs. Several small sandstone rocks were found in its fill as were several vertically-oriented sherds which were on edge. It could not be determined if this was a cultural feature or a rodent burrow. However, it should be noted that sandstone rocks were rarely found elsewhere at Area C.

Prepared Clay Floors

One well-preserved clay floor, Feature 3, and the remnants of two other clay floors, Features 1 and 16, were found within the mound at Area B. The best preserved clay floor, Feature 3, is represented by a 4 to 12 cm thick yellowish-red clay that occurs about 55 to 60 cm bs in Trench #2 on the north lobe of Mound B (see Figure 1). It extended from the E499 line to approximately E505.5. In the mound profile, this clay lens appears to cap the first mound construction episode, which consists of an approximately 88 cm thick mass of individual basket loads of dirt.

Feature 3 was not evident 11 m to the south in

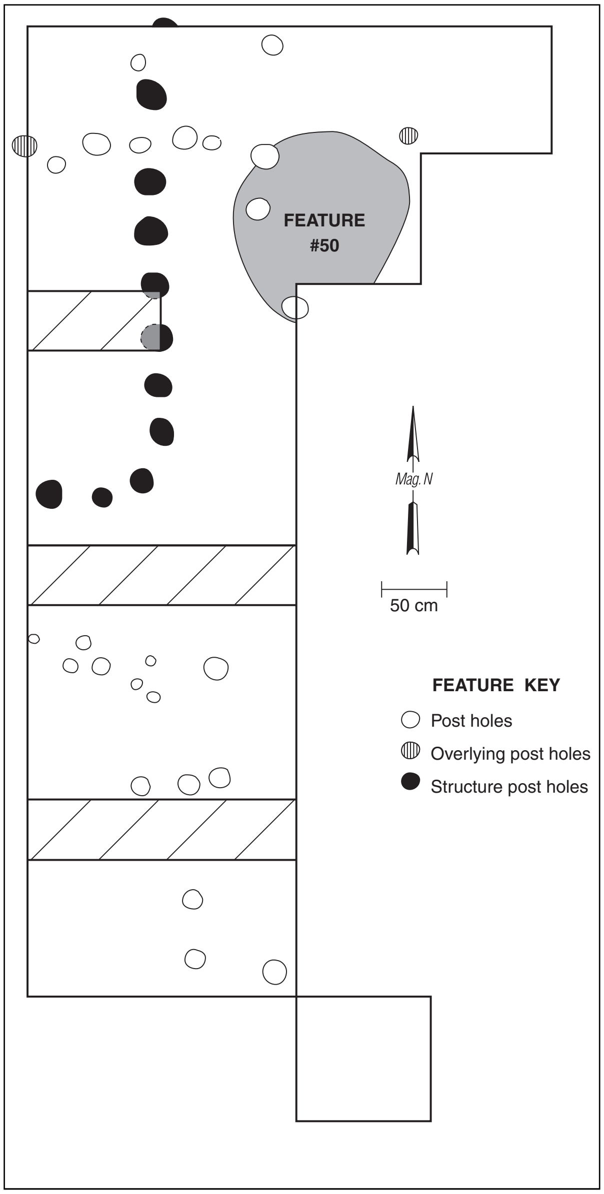

Figure 15. Plan view drawing of the excavation block at Area C showing the locations of all post holes with the outline of Structure 1 highlighted.

Trench #1, and hand augering conducted before the beginning of the second field season showed that the clay lens extended only 1 m south and west of Trench #2. A total of 31 auger holes were excavated on the north lobe, indicating that the Feature 3 clay lens extended over an area measuring 6.5 x 6.5 m in size.

Other auger holes excavated on the south lobe of Mound B south of Trench #1 showed that a similar yellowish red-clay lens (Feature 16) is present on that part of the mound at almost the same precise elevations as Feature 3. The clay lens on the south lobe was found to extend from the N478 line on the crest of the mound northward for a length of almost 16 m. The width of Feature 16 was not determined.

The third prepared clay floor, Feature 1, is a discontinuous 2 cm thick yellowish-red clay lens that is visible in several units at the west end of Trench #2 at a depth of approximately 30 cm bs in Mound B. This clay lens probably represents a clay cap placed on the mound following the second construction episode. The poor preservation of this clay lens, in comparison to Features 3 and 16, is probably due to damage from plowing and land clearing.

Extended Entranceway or Wall Trench

Feature 35 is a 10 to 30 cm wide depression in the N517/E501 and N518/E501 units that may represent the entryway to a structure associated with Feature 3. The depression is an almost continuous north-south trending line that begins at the surface of Feature 3 at approximately 60 cm bs and extends to 75 cm bs. No individual post hole stains were visible in the depression. Interestingly, these excavation units are part of a 2 x 2 m unit excavated for the purpose of locating post holes along the north edge of Feature 3. It was expected that if post holes were found, they would form an east-west alignment for a portion of the north wall of a structure. The fact that the depression has a north-south alignment suggests that it may be the entryway associated with the hypothesized structure.

Aboriginal Artifacts

Lithic Artifacts

A total of 1517 chipped stone artifact and one ground stone tool were recovered during the excavations. The chipped stone assemblage consists of 45 tools and 1472 pieces of debitage. The 17 complete and fragmentary arrow points constitute the most common chipped stone tool. Arrow point types include the Alba, Bonham, Perdiz, Scallorn, Ray, and Reed types. The most common arrow point types are Alba (n=4) and Bonham (n=4); all other recognizable types are represented by one or two specimens.

Three of the four Bonham arrow points come from the upper deposits at Area C while three of the four Alba points were found at the north end of

Figure 16. Portion of the post hole alignment forming the east wall of Structure 1 at Area C.

the Area A block excavations. It is also noteworthy that Area A produced arrow points dating from the Formative Caddo through Late Caddo periods, and that, additionally, two dart points—a Gary and an untyped Late Archaic or Woodland period specimen—also were found in the deposits. Other lithic artifacts from Area A include a drill, three cores, two ground stone fragments, and a Bristol Biface.

Chipped Stone Debitage

Two hundred and seventy-eight or 18.8 percent of the 1,472 pieces of chipped stone debitage recovered from the site were analyzed for lithic reduction elements and raw materials (Table 1).

The raw materials include Red River gravels and chert (RR/G-C for Red River gravels and chert), Big Fork chert (BFC), local chert (LC), other chert (OC), chalcedony (CH), novaculite (NO), Ogallala quartzite (OQ), a coarser-grained quartzite (GQ), siltstone and claystone (S/C), silicified wood (SW), sandstone (SS), and jasper (J). Lithic debitage was also sorted into cortical and non-cortical elements based on the presence or absence of cortex.

The lithic debitage analysis samples for raw materials are shown by area and unit number in Tables 2-6. The Red River gravel/chert, which constitutes 29.5 percent of the overall sample, is the most common lithic material. It is the most common material at Areas A, C, and D. At 20.9 percent, siltstone/claystone is the second most common raw material. It is the most common lithic material in the samples from Area B and the Test Pit Units. Local chert is the third most common (10.8 percent) and occurs in highest numbers at Area A. Ogallala quartzite, Big Fork chert, other chert, and quartzite occur in almost equal numbers at about 8 percent each. Minor amounts of silicified wood, chalcedony, sandstone, novaculite, and jasper make up the remainder.

The study of the lithic raw materials indicates that local materials were favored for the production of stone tools as the Red River gravel/chert, siltstone/claystone, local chert, and Ogallala quartzite are all available nearby and constitute almost 70 percent of the sample.

These tables also show that a high percentage of the chipped stone debitage retains cortex. Much initial reduction must have occurred at Area A. Elsewhere, the percentage of cortical and non-cortical items is roughly equal.

Stone Tools

The 46 stone tools found during the excavations consist of 45 chipped stone specimens and one ground stone fragment. The single ground stone artifact is made of a ferruginous sandstone-like material. As shown on Table 7, the favored material for the production of chipped stone tools is the Red River gravel/chert, which constitutes 28.9 percent of the chipped stone tools. Other more common material types used for making chipped stone tools are siltstone/claystone (17.8 percent), Big Fork chert (13.3 percent), and Ogallala quartzite (11.1 percent). It is noteworthy that a larger percentage of the chipped stone tools at Area A are siltstone/claystone, while at Areas B and C, tools made of the Red River gravels/chert account for approximately one-half of the totals.

Chipped Stone Tools

The 45 chipped stone tools recovered during the investigations include 10 dart points and frag-

Table 1. Chipped stone debitage sample totals.

Site Area	Total Debitage Recovered	Sample	Percentage Sampled
Area A	709	123	17.34
Area B	282	35	12.41
Area C	211	43	20.38
Area D	132	35	26.51
Test Units	131	42	32.06
Misc. Surface	7	0	0.00
Totals	1472	278	18.88

Table 2. Lithic Debitage, Area A.

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total	
	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d
Unit																										
N327/ E425																										
L. 1			1			1	2	1					1	1			1								5	3
L. 2		1		2		1							1		1	1	3	1		1					5	7
L. 3		1	1	2														1							1	4
N329/ E425																										
north quads																										
L. 1																									0	0
L. 2		2			1	1	1		1								3								6	3
L. 3		1	2			1		1									1	2						1	4	5
L. 4	4	4			2			1						1	1		3	1							10	7
L. 5		1					2									1		1							2	3
N335/ E426																										
L. 1	2	3			1												2								5	3
L. 2	2	4	3		3							1		1			4								12	6
L. 3	5	1	1		1	1							1				1		1						10	2
L. 4	5	1	3		3		2						2												15	1
L. 5	1				1								1		1										4	0
	19	19	11	4	12	5	7	3	1	0	0	1	6	3	3	2	18	6	1	1	0	0	0	1	79	44
Combined Total	38		15		17		10		1		1		9		5		24		2		0		1		123	

*c=cortical; d=decortical

Table 3. Lithic Debitage, Area B.

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total	
	d	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c
Unit #																										
N512/E500																										
L. 1																									0	0
L. 2	1				1																				2	0
L. 3																									0	0
L. 4																									0	0
L. 5																									0	0
L. 6																									0	0
L. 7	1																								1	0
L. 8																									0	0
L. 9					1											1									1	1
L.10		1			1										1		1	1							3	2
L.11	1																								1	0
L.12					1		1																		2	0
L.13										1					1			1							1	2
L.14	1												1			1	1								2	2
L.15		1											1				3	1							3	3
L.16	1	2													1	2	1	1					1		3	6
L.17																									0	0
L.18																									0	0
L.19																									0	0
L.20																									0	0
	5	4	0	0	4	0	1	0	0	1	0	0	2	0	3	4	6	4	0	0	0	0	1	0	19	16
Combined Total	9		0		4		1		1		0		2		7		10		0		0		1		35	

*c=cortical; d=decortical

ments, 17 arrow points and fragments, three arrow or dart distal blade fragments, four other biface fragments, three scrapers, two perforator fragments, and six modified flakes. Table 8 provides tool measurements.

Arrow Points

Of the 17 arrow points, four are too fragmentary for typological identification. Those which can be classified consist of four Alba, two Bonham, two Bonham-like, two Scallorn, one Perdiz, one Reed, and one Ray-like point (see Bruseth et al. 2001).

Alba (4 specimens, Figure 17a, d)

These generally conform with the definition provided by Suhm and Jelks (1962:263) in having parallel to slightly expanding stems, generally concave to recurved blades, and wide, outflaring, and usually barbed shoulders. However, one of the specimens has a wider blade and stem than is standard. The blade edges of this aberrant specimen are also heavily serrated. Two of the other specimens are somewhat unusual in that one has an alternately beveled blade and the other has an asymmetrical blade.

Table 4. Lithic Debitage, Area C.

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total	
	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d
Unit																										
N693/E452																										
L. 1																	1								1	0
L. 2	2	1	1		1									1		1	1	1		1					5	5
L. 3	1																	1							1	1
L. 4																									0	0
L. 5																									0	0
L. 6																									0	0
L. 7																									0	0
N694/E451																										
L. 1		4																	1						1	4
L. 2					1		1							1		1									2	2
L. 3																									0	0
L. 4																									0	0
L. 5																									0	0
L. 6																									0	0
L. 7																									0	0
N694/E453																										
L. 1																	1								1	0
L. 2	1	1					2	1					2	1		1						2			5	6
L. 3																		1							0	1
L. 4																									0	0
L. 5																									0	0
L. 6																									0	0
N695/E451																										
L. 1																									0	0
L. 2	3	1												1			2								5	2
L. 3														1											0	1
L. 4																									0	0
L. 5																									0	0
L. 6																									0	0
	7	7	1	0	2	0	3	1	0	0	0	0	2	5	0	3	5	3	1	1	0	2	0	0	21	22
Combined Totals	14		1		2		4		0		0		7		3		8		2		2		0		43	

*c=cortical; d=decortical

Table 5. Lithic Debitage, Area D.

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total	
	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d
N399/E520																										
L.1																									0	0
L.2		3			2							1					1								3	4
L. 3	5	4		1		1							1												6	6
L. 4	1	1																1							1	2
L. 5																									0	0
N399/E523																										
L. 1				1																					0	1
L. 2																									0	0
L. 3			1				1	1										1							2	2
L. 4																									0	0
L. 5	1							1								1									1	2
L. 6																									0	0
L. 7							1						2				1	1							4	1
	7	8	1	2	2	1	2	2	0	0	0	1	3	0	0	1	2	3	0	0	0	0	0	0	17	18
Combined Total	15		3		3		4		0		1		3		1		5		0		0		0		35	

*c=cortical; d=decortical

Table 6. Lithic Debitage, Test Units.

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total	
	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d
N405/E420																										
L. 1	2	2		1	1		1						1				1								6	3
L. 2	1	1		1	1	1							1				3	2	1	1	1				8	6
L. 3				1				1						1		1	3								3	4
L. 4																									0	0
L. 5																									0	0
N550/E420																										
L. 1																2									0	2
L. 2				1	1		1		1	2						2	2								5	5
	3	3	0	4	3	1	2	1	1	2	0	0	2	1	0	5	9	2	1	1	1	0	0	0	22	20
Combined Totals	6		4		4		3		3		0		3		5		11		2		1		0		42	

*c=cortical; d=decortical

Table 7. Lithic Tools and Raw Material Types.

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total
	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	
Area A																									
L. 1		1 Gary																			1 celt fr.				2
L. 2		1 ud			1bf		1pf			1Reed				1s/1mf/1df											7
L. 3			1pf 1Alba						1Bh				1 Alba				1a/df								5
L. 4								1s							1mf								1mf		3
Area B																									
Mound B																									
L. 1			1bf																						1
L. 2	1bf, 1af					1 Gary				1af															4
L. 3	1af																								1
Non-Mound																									
L. 1																									0
L. 2	1Gary, 1bf								1 Alba								1Bh								4
L. 3																									0
L. 4																1mf									1
Area C																									
L. 1	1Bon.																								1
L. 2	1Sc													1mf				1Bh							3
L. 3	2af					1Ray										1 Gary								1mf	7
L.4																				ls					
L.5																									0
L.6																									0
L.7	1a/df																								1

Table 7. (*Continued*)

	RR/G-C		BFC		LC		OC		CH		NO		OQ		GQ		S/C		SW		SS		J		Total
	c*	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	
Area D																									
L. 1																							1Perdiz		1
L. 2	1Sc																								1
L. 3																								1df	1
L. 4			1Gary																						1
Test Units																									
L. 3																				1df					1
																									1
Surface			1Gary																						1

*c=cortical; d=decortical; a/df.=arrow point or dart fragment, af=arrow point fragment, bf=biface fragment, Bh=Bonham point, df=dart point fragment, mf=modifed flake, pf=perforator fragment, s=scraper, Sc=Scallorn point, ud=untyped dart point

Table 8. Lithic Tool Measurements (in mm).

Type	Area	Level	Length	Width	Thickness	SL	Stem Width (Maximum)	Stem Width (Minimum)
Arrow points								
Alba	A	Level 3	27.2	18.9	3.7	5.0	9.0	8.3
Alba	A	Level 3	21.5	–	2.4	4.2	4.9	4.5
Alba	A	Level 3	–	–	4.3	5.1	6.9	5.9
Alba	B	Level 2	–	–	4.3	5.0	7.0	6.9
Bonham	B	Level 2	–	–	3.0	5.4	5.3	4.6
Bonham	C	Level 1	–	–	3.3	–	–	–
Bonham	C	Level 2	–	–	3.6	4.1	4.1	3.8
Bonham	C	Level 3	–	–	–	–	–	–
Perdiz	D	Level 1	20.9	13.7	3.5	7.6	6.4	2.5
Ray	C	Level 3	–	–	2.2	6.1	–	5.3
Reed	A	Level 2	–	–	3.1	–	–	9.1
Scallorn	D	Level 2	–	–	3.1	6.2	6.5	4.7
Scallorn	C	Level 2	–	11.2	2.6	4.7	7.1	5.8
Frag.	B	Level 2	–	–	–	–	–	–
Frag.	B	Level 2	–	7.2	–	–	–	–
Frag.	B	Level 3	–	–	2.9	–	–	–
Frag.	C	Level 3	–	–	–	–	–	–
Dart Points								
Gary	A	Level 1	–	–	6.3	12.5	13.3	1.7
Gary	B	Level 2	–	–	–	11.9	–	2.5
Gary	B	Level 2	49.7	23.3	7.1	16.5	15.7	8.3
Gary	C	Level 3	–	28.7	7.6	–	16.6	–
Gary	D	Level 4	–	–	–	27.7	21.0	8.2
Gary	–	Surface	–	–	7.6	12.0	12.0	–
Untyped	A	Level 2	–	–	5.7	11.4	9.5	8.1
Frag.	A	Level 2	–	–	–	–	–	–
Frag.	D	Level 3	–	14.5	5.4	–	–	–
Frag.	Testing	Level 3	–	–	–	–	17.2	–
Arrow or Dart Fragments								
Frag.	A	Level 3	–	–	–	–	–	–
Frag.	C	Level 3	–	–	–	–	–	–
Frag.	C	Level 7	–	–	–	–	–	–
Biface Fragments								
Frag.	A	Level 2	–	–	–	–	–	–
Frag.	B	Level 1	–	–	–	–	–	–
Frag.	B	Level 2	–	–	–	–	–	–
Frag.	B	Level 2	–	–	–	–	–	–
Other Tools								
Perf.	A	Level 2	–	–	–	–	–	–
Perf.	A	Level 3	–	–	–	–	–	–
Scraper	A	Level 2	21.1	19.1	4.3	–	–	–
Scraper	A	Level 4	–	12.5	3.4	–	–	–

Table 8. *(Continued)*

Type	Area	Level	Length	Width	Thickness	SL	Stem Width (Maximum)	Stem Width (Minimum)
Other Tools *(Continued)*								
Scraper	C	Level 3	27.3	15.8	8.1	–	–	–
MF	A	Level 2	18.7	18.1	6.4	–	–	–
MF	A	Level 4	35.1	19.0	9.5	–	–	–
MF	A	Level 4	19.6	10.0	3.2	–	–	–
MF	B	Level 4	25.5	12.5	4.5	–	–	–
MF	C	Level 2	32.4	17.6	4.7	–	–	–
MF	C	Level 3	29.2	17.7	11.4	–	–	–

Perf=perforator; MF=modified flake tool; SL=stem length

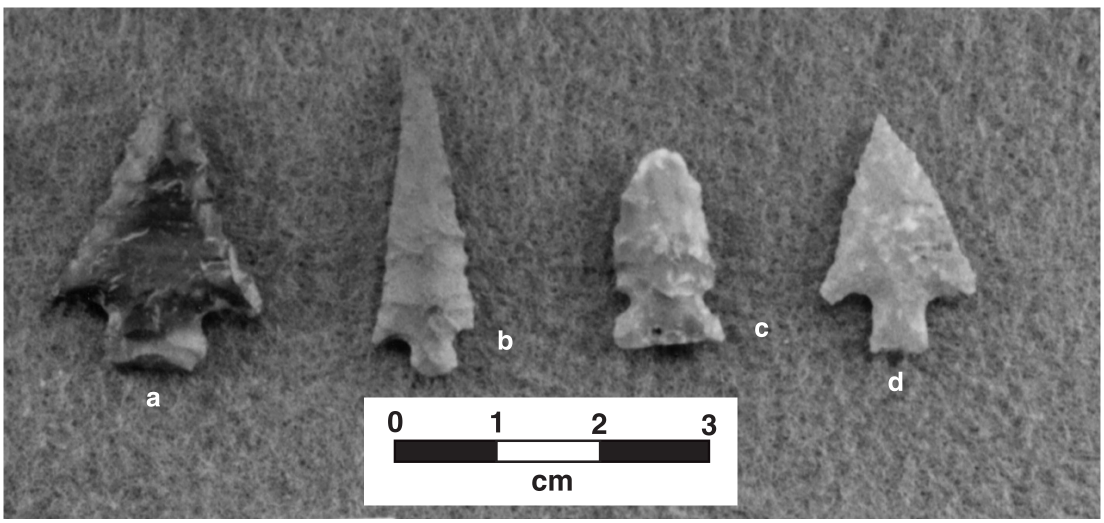

Figure 17. Projectile points from excavations.

Three of the Alba points were recovered from level 3 of various 1 x 1 m units at the north end of Area A, while the fourth is from level 2 of unit N500/E508 immediately off the east edge of Mound B at Area B.

Bonham and Bonham-like (4 specimens, Figure 17b)

These two specimens have the narrow stems and blades typical of the Bonham type as described by Suhm and Jelks (1962:267). One of these has a very short stem and a convex base, and was found in level 2 at Area C, while the other, which came from level 2 of the N500/E510 unit off the east edge of Mound B at Area B, has a rectangular stem and a flat base. Two other fragmentary specimens are classified as Bonham-like due to their very narrow long blades, typical of Bonham specimens illustrated by Suhm and Jelks (1962:268 and Plate 134j-k). They come from levels 1 and 3 at Area C where much of the Sanders Plain and Sanders Engraved pottery was found.

Perdiz (1 specimen)

This specimen is classified as Perdiz because of its contracting stem (Suhm and Jelks 1962:283). The distal blade edges have been sharpened to form a fine needle-like point. The lower parts of the blade edges are straight. Shoulders are strong and barbed. The point was found in level 1 at Area D.

Ray (1 specimen)

This small unifacial arrow point may fit into the new provisional type defined by Bruseth et al. (2001) as the Ray type. The blade edges are straight and shoulders are moderate. The stem is broken, but shows some evidence that it was expanding and possibly had a convex base. This arrow point was found in level 3 at Mound C at Area C.

Reed (1 specimen, Figure 17c)

This arrow point is a side-notched specimen with one convex blade edge and one straight-sided blade edge. The base appear to have been broken. It was found in level 2 in Feature 2 in the central part of Area A.

Scallorn (2 specimens)

These arrow points have expanding stems formed by corner-notching of the arrow preform. Both have straight blade edges and are well-shouldered. One of the specimens comes from level 2 at Area C. It has a concave base and is similar in overall form to Brown's (1996) Scallorn *sattler* and Scallorn B varieties. The other specimen was found from level 2 at Area D and has a convex base.

Unclassified arrow points (4 specimens)

These consist of two distal blade fragments from level 2 of the N512/E506 unit on the east edge of Mound B, a proximal blade fragment from level 3 of the N512/E501 unit at Mound B, and a partial blade and stem from level 3 at Mound C.

Dart Points

Gary (6 specimens)

These dart points have the contracting stem that is characteristic of the Gary type. The four specimens retaining all or most of the blade have straight and concave blade edges and strong to weak shoulders. One of these four specimens has an alternately beveled blade from sharpening activity. These four specimens have stem lengths that are similar but two have much narrower stem widths. A fifth specimen has a much longer, wider, and thicker stem. The last specimen is a fragmentary piece that has a short stem and a portion of one blade shoulder. The Gary points were found in all parts of the site, including level 1 at Area A, level 2 on Mound B, level 2 off Mound B at Area B, level 3 at Area C, level 4 at Area D, and on the surface of the site.

Untyped dart point

One complete specimen having a narrow, straight-edged blade with weak shoulders was recovered in level 2 at Area A. Based on the shape of its narrow, rectangular stem with a flat base, it does not fit into any established type found in Northeast Texas.

Dart Point Fragments (3 specimens)

One of these specimens is an almost complete dart point blade with the extreme upper edge of the stem from level 3 at Area D. A second specimen is a longitudinally split section of a dart blade and the upper edge of the stem from level 2 at Area A. The final specimen is from level 3 of the N405/E420 test unit. It appears to be a dart point stem fragment that has a convex base.

Biface Fragments

Three distal biface fragments recovered during the excavations may represent the tips of arrow points or dart points. Specimens from levels 3 and 7 at Area C are more likely arrow point fragments while a slightly larger biface tip from level 3 at Area A is probably a dart point tip. The specimen from level 7 at Area C is noteworthy as it is the only lithic artifact found beneath the clay cap at Mound C at Area C.

Biface fragments that do not appear to represent fragments of projectile points include two from Mound B at Area B from the first and second levels, one from level 2 north of Mound B, and a thicker specimen from level 2 at Area A.

Scrapers

Three scrapers were found during the excavations. One (level 3 at Area C) is a made on a curved flake with a thick dorsal surface. Retouch is evident on all four edges of the rectangular surface. Another specimen has retouch only on the distal end of a flat flake. This specimen was found in level 4 at Area A. The third specimen is flatter and has retouch around a semi-circular worked edge. It was found in level 2 at Area A.

Perforators

One of the tools is this category is a unifacial distal end from level 2 at the north end of Area A. The second specimen is a bifacial fragment from level 3 of Area A. This fragment consists of portions of the base and proximal end of the tool. There is a possibility that it could, instead, represent a part of the stem and one of the shoulders of a dart point.

Modified Flakes

While the percentage of novaculite in the debitage sample is low, three of the six modified flakes from Fasken are made of this material. The three consist of specimens from level 2 at Area C, level 4 off Mound B at Area B, and level 4 at Area A. A second modified flake was also found in level 4 at Area A. The other specimens came from level 3 at Mound C and level 2 at Area A.

Ground Stone Tools

Only one ground stone tool was recovered from the excavations. It is a celt fragment that was found in level 1 at Area A. It is made of a ferruginous sandstone-like material. The specimen measures 43.5 mm in length, 25.6 in width, and 4.9 mm in thickness. Five other ground stone celt tools were surface collected in the field to the northeast of Area B prior to the start of the 1991 field season.

CERAMICS

Pottery

The most common prehistoric artifact recovered during the excavations at the Fasken site is ceramic sherds. Of the total of 4,228 sherds, 172 either exhibited decoration and/or retained a portion of the rim. In addition to incised, engraved, punctated, brushed, and appliqué decorations, the decorated group includes those sherds with a red slip, which is characteristic of the Mound Prairie and Sanders phase Sanders Plain and Sanders Engraved grog-tempered types (see Krieger 1946:185-192; Perttula, ed., this volume), as well as Late Caddo period shell-tempered types such as Avery Engraved. As shown on Table 9, Area A has the largest number of decorated/rim

Table 9. Distribution of ceramic sherds at the Fasken site by area.

Area	Plain Body Sherds	Decorated Sherds	Plain Rim Sherds	Totals
A	1992	42	20	2054
B	534	20	5	559
C	809	37	6	852
D	387	12	6	405
NW Test Units	2	0	0	2
NE Test Units	31	2	0	3
SW Test Units	253	8	8	269
SE Test Units	40	5	1	46
Surface	8	0	0	8
Totals	4056	126	46	4228

Table 10. Distribution of Decorated Sherds.*

Area	E**	I	NB	P	A	B	RSP-R	RSP-NR	Totals
A	20	3	–	5	6	1	1	6	42
B	12	–	1	1	–	–	3	3	20
C	16	3	–	1	–	–	5	12	37
D	9	–	–	1	–	–	1	1	12
NW Tests	–	–	–	–	–	–	–	–	0
NE Tests	2	–	–	–	–	–	–	–	2
SW Tests	3	3	–	1	1	–	–	–	8
SE Tests	3	1	–	1	–	–	–	–	5
Totals	65	10	1	10	7	1	10	22	126

*Does not include plain rims
**E = engraved, I = incised, NB = neck-banded, P = punctated, A = appliquéd, B = brushed, RSP-R = red slipped plain rim, RSP-NR = red slipped plain body sherd

sherds followed by Area C. A relatively high number of decorated/rim sherds are from the small test pits dug in the southwest quadrant of the site, the same part of the site where the Area A block excavation was situated.

The most common decoration is engraving, which accounts for 57 percent of the decorated rim and body sherds, including the red-slipped sherds. Although it is not indicated on Table 10, 31 percent (n=20) of the engraved sherds can be conclusively identified as red-slipped examples, including many of the Sanders Engraved type (Table 11). In particular, pendant designs commonly seen on Sanders Engraved vessels (Figure 18d-e) are abundant in the upper levels of Mound C, where 12 sherds of this type were identified. However, a majority of these Sanders Engraved sherds at Mound C may come from a single broken vessel. Other identifiable engraved types include at least one example each of the Avery Engraved (Figure 18c) and Clark Engraved types.

After the engraved category, plain red-slipped body and rim sherds together constitute another 25 percent of the decorated/rim category (see Table 11). Many of these (75 percent) appear to be examples of either Sanders Plain (see Figure 18b) or come from non-decorated portions of Sanders Engraved vessels since they have grog or grit-tempered pastes; these date to Mound Prairie phase times. The remaining 25 percent of the plain red-slipped body and rim sherds have shell, shell/shale, or no temper, and are likely from Late Caddo vessels.

Almost equal numbers of incised, punctated, and appliquéd sherds (see Figure 18a) make up the remainder of the decorated sherds (see Table 11), with the exceptions of one untyped brushed sherd and one example of the Nash Neck Banded type. Among the incised sherds are several examples of Canton Incised.

Table 12 demonstrates that the most common temper among the decorated/rim sherds is grog, amounting to 28 percent of the assemblage. This sherd temper category predominates in Area A (40 percent) and Area D (41 percent), but is not very common at Area B. The combination of grog and grit amounts to 22 percent of the assemblage of all decorated sherds. This temper category predominates at Area C (47 percent), but is not very common at Areas B or D. Overall, grog, grit, and

Table 11. Distribution of decorated pottery types by area.

	AREAS				TEST UNITS				
Type	A	B	C	D	NW	NE	SW	SE	N
Sanders Engraved	2	3	12	2	–	1	–	–	20
Sanders Plain	6	2	14	2	–	–	–	–	24
Avery Engraved	–	–	–	1	–	–	–	–	1
Clark Engraved	–	1	–	–	–	–	–	–	1
Untyped Engraved	18	8	4	6	–	1	3	3	43
Canton Incised	3	–	–	–	–	–	–	–	3
Untyped Incised	–	–	3	–	–	–	3	1	7
Nash Neck Banded	–	1	–	–	–	–	–	–	1
Untyped Appliqued	6	–	–	–	–	–	1	–	7
Untyped Punctated	5	1	1	1	–	–	1	1	10
Untyped Brushed	1	–	–	–	–	–	–	–	1
Untyped red-slipped rims	1	4	1	–	–	–	–	–	6
Untyped red-slipped body sherds	–	–	2	–	–	–	–	–	2
Totals	42	20	37	12	0	2	8	5	126

various combinations of grog, grit, and/or bone temper predominate, and these various categories account for 78 percent of the temper types in the sherd sample. Generally, these categories and combinations are indicative of Caddo occupations during the Early and Middle Caddo periods. Shell tempering, which is the common temper material in the Late Caddo period, is predominant only at Area B. Significantly, most of the shell-tempered sherds at Mound B occur in the uppermost levels, suggesting a Late Caddo occupation that post-dates the mound construction sequence.

Concerning the vertical distribution of the pottery at Fasken, it is noteworthy that very few sherds were recovered from the lower levels of Mound B and beneath the clay cap at Mound C. This indicates that Mound B served a non-residential function until late in time. Similarly, the structures, as indicated by the post hole patterns beneath the clay cap, at Mound C must also have served some special non-residential function.

Decorated Sherd Descriptions

Area A

Area A has the most diversity in types of decorated sherds (see Table 11). Three examples of Canton Incised are present as well as an example of heavily grit-tempered LeFlore Plain (see Brown 1996). Other unique specimens include a zoned punctated sherd, four other punctated sherds of unidentified type, the only brushed sherd recovered at the site, and six appliqué sherds, including at least two grog-tempered examples of the kind of utility pottery associated with the Mound Prairie phase era at other sites in the middle Red River area. Twenty of the 42 decorated sherds are engraved following the pattern elsewhere at the site, and two can be identified as the red-slipped Sanders Engraved type.

Area B

Twelve of the 20 decorated sherds from Area B are engraved (see Table 11). These include three that are red-slipped Sanders Engraved, and one possible shell-tempered Clark Engraved sherd dating to the McCurtain phase (see Perino 1994). Other sherds consist of one Nash Neck-Banded, four sherds of red-slipped shell-tempered Clement or Roden ware; the remainder are unidentified to type.

Area C

Of the 37 decorated sherds found at Area C, 16 (43 percent) are engraved, with 12 classified as

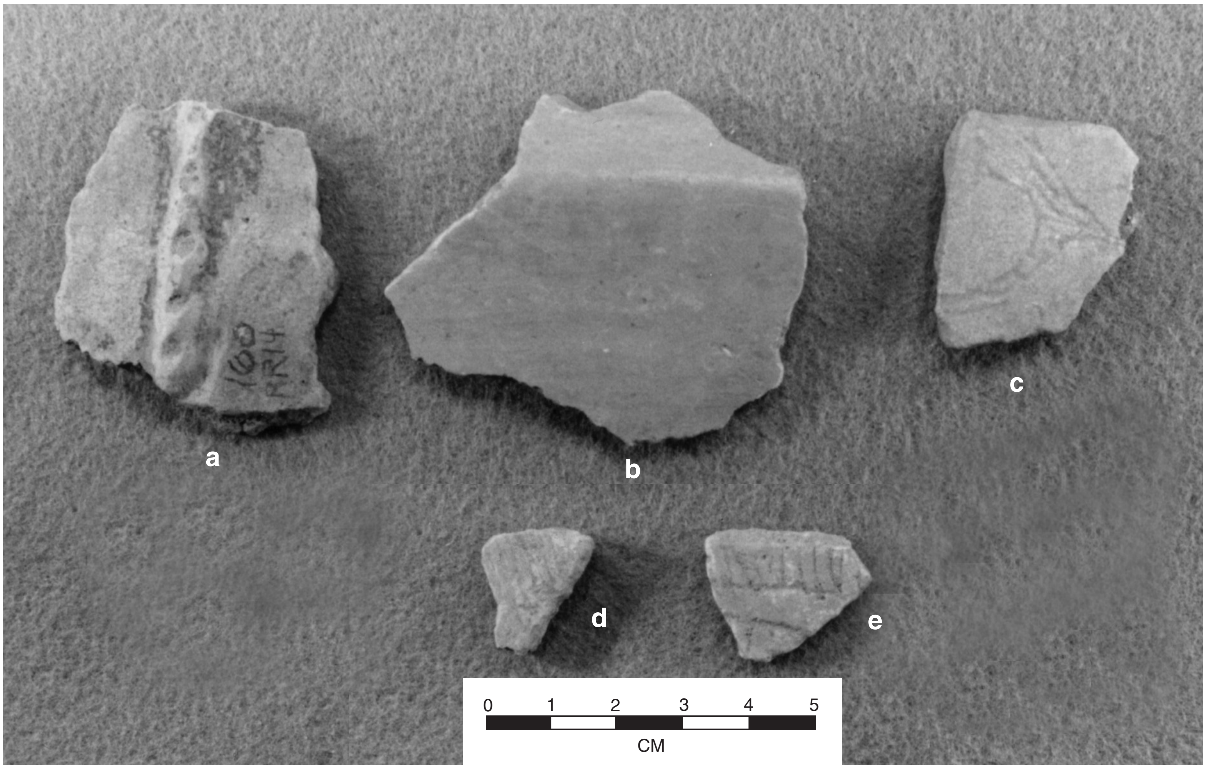

Figure 18. Select decorated ceramic sherds from excavations at the Fasken site.

Table 12. Decorated/Rim Sherd Temper Inclusions by Area.

Area	G*	GT	G/GT	G/B	G/GT/B	S	S/SH	NT	Totals
A	17	6	15	1	7	2	6	8	62
B	3	2	7	–	1	12	–	–	25
C	12	5	17	–	1	3	5	–	43
D	6	5	2	1	2	–	–	2	18
NW Tests	–	–	–	–	–	–	–	–	–
NE Tests	–	–	1	–	–	–	1	–	2
SW Tests	3	1	3	2	4	1	2	–	16
SE Tests	1	1	1	–	2	–	–	1	6
Totals	42	20	46	4	17	18	14	11	172

*G = grog, GT = grit, G/GT = grog and grit, G/B = grog and bone, G/GT/B = grog, grit, and bone, S = shell, S/SH = shell or shale, NT = no temper

Sanders Engraved (see Table 11). In particular, the pendant triangle designs commonly seen on Sanders Engraved vessels are common. These Sanders Engraved sherds are red-slipped and are tempered with grog, grog and grit, or a combination of grog, grit, and bone. Seventeen other sherds, accounting for another 46 percent of the decorated pottery from Area C, are plain red-slipped body and rim sherds. Most of these (n=14) appear to be from Sanders Plain vessels or the non-decorated parts of Sanders Engraved vessels. Three of these 17 sherds are shell or shell/shale-tempered and are probably of Late Caddo period age. The only other decorated sherds from Area C consist of four untyped engraved sherds, three untyped incised sherds, and one untyped punctated sherd.

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Area D

The majority of the decorated/rim sherds from Area D are also engraved (75 percent) (see Table 11). Only two of these are of the red-slipped Sanders Engraved type. One other engraved sherd (shell-tempered) is Avery Engraved. The remaining sherds are an untyped punctated and a red-slipped rim fragment, plus two red-slipped Sanders Plain sherds.

Test Units

A total of 15 decorated sherds were recovered in the test units, most of them from the Southwest (n=8) and Southeast (n=5) areas (see Table 11). The only identifiable sherd is a Sanders Engraved from the Northeast area, while the others are unidentifiable to type: untyped engraved (n=7), untyped incised (n=4), untyped appliqued (n=1), and untyped punctated (n=2).

Plain Sherds

The temper in a sample of plain sherds was examined for comparisons to the decorated/rim sherd categories (Table 13). The sample includes all plain sherds from unit N335/426 at Area A, the N512/E500 unit at Area B, and unit N399/E523 at Area D. The sherds from Areas B and C were subdivided by mound construction episode. At Area B there are three divisions: lower for the first construction episode, middle for the second construction episode, and upper for the third construction episode. The Area C sample differs in that it consisted of the plain sherds found beneath the Mound C clay cap feature plus all of those above the clay cap from two units (N695/E451 and N695/E451). In the case of Area C, the purpose of examining all the plain sherds was to help gain more chronological data on the features found beneath the cap.

Several interesting facts emerged from this analysis. First, several additional temper and temper combinations were noted that are not represented in the decorated/rim sherds. In the unit examined at Area A, shell was found to have been combined with grog, and in some cases with both grog and grit, to comprise 17 percent of the Area A sample unit. This unit also had a much higher percentage of shell and shell/shale-tempered sherds (58 percent) than the sum percentage of shell and shell/shale decorated/rim sherds (13 percent) from this area of the site. Individual examples of grog and shell used in combination were also found in the upper deposits of the samples from Areas C and D. Lastly, the only example of a bone tempered-sherd from any of the decorated/rim and plain sherds examined was noted from the Area D plain sherd sample.

The examination of the nine sherds found directly beneath the clay cap at Area C indicated that six of the nine sherds were found to be shell or shell/shale-tempered. The radiocarbon dates from beneath the clay cap are Early to Middle Caddo period in age, which would indicate that grog, grit, and grog/grit-tempered sherds should predominate. However, the sample is small and it is possible that the shell and shell/shale-tempered sherds are intrusive due to rodent burrowing or the excavation of post holes through the clay cap later in time.

The examination of the plain sherds from the N512/E500 unit further confirmed the evidence provided by the decorated/rim sherd collection from Area B that the deposits of the third (or final) construction fill on Mound B contain predominantly Late Caddo period shell and shell/shale-tempered pottery. The few plain sherds from the second (or middle) construction episode from this unit consist of three shell-tempered sherds and one sherd each of grog-tempered and grog/grit-tempered pottery; the two plain sherds from the first construction episode in the deepest levels consist of one shell-tempered sherd from level 11 and one shell/shale-tempered sherd from level 17. The two from the deepest levels are probably intrusive. The only other plain sherds which occur beneath the clay cap are from unit N512/E501, and consist of

Table 13. Plain Sherd Sample Temper Types.

Area	G*	GT	G/GT	G/B	G/S	G/GT/S	S	S/SH	NT	B	Totals
A	6	0	10	2	7	4	12	22	2	–	65
B											
upper	–	–	1	–	–	–	11	–	–	–	12
middle	–	1	1	–	–	–	3	–	–	–	5
lower	–	1	–	–	–	–	1	1	–	–	3
C											
upper	4	4	1	–	1	–	9	10	10	–	39
lower	2	–	1	–	–	–	3	3	–	–	9
D	10	4	12	3	1	–	–	8	4	1	43
N	22	10	26	5	9	4	39	44	16	1	176

* G = grog, GT = grit, G/GT = grog and grit, GB = grog and bone, GS = grog and shell, G/GT/S = grog, grit, and shell, S = shell, S/SH = shell or shale, NT = no temper, B = bone

one shell/shale-tempered sherd from level 16 and two grog-tempered sherds from level 17.

Oxidation Patterns

Decorated Sherds

Cross-sections of all decorated and red-slipped pottery sherds were examined to determine firing conditions (see Teltser 1993:Figure 2). The majority of the pottery at all parts of the site, particularly at Area C, was low-fired in a reduced atmosphere (Table 14). At Area A, however, the majority of the pottery was then cooled in high oxygen environment. Table 15 shows the results by temper type and Table 16 by decoration pattern.

The engraved, red-slipped plain rim, and red-slipped non-rim categories are sherds from vessels that were predominantly fired in a reduced atmosphere. Non-Sanders engraved, incised, and punctated sherds tend to be from vessels that were reduced and cooled in a high-oxygen environment.

Plain Sherds

The oxidation patterns of the 176 plain sherds were also examined by area, and in the cases of Areas B and C were subdivided by construction episode zones (Table 17). At all areas of the Fasken site, plain sherds were predominantly from vessels that were reduced and then cooled in high oxygen environment. The oxidation patterns of the plain sherd sample by temper type are provided in Table 18.

Pipes

Five Caddo ceramic pipe fragments were identified in the ceramic assemblage. The largest of these was a long-stemmed Red River pipe that came from level 9 in unit N500/E502 (Trench #1) at Area B. The others, which consist of specimens from unit N512/E500, level 7 at Area B, the N330/E422 unit, level 2, the N330/E427 unit, level 2, and the N331/E425 unit, level 3 at Area A, are too fragmentary for classification.

DAUB

A total of 1,019 pieces of daub were identified from the Fasken site excavations. Approximately 49 percent of the daub is from Area A (Table 19). Much of this daub appears to have been dumped into Feature 2, a trash/storage pit feature (see Figure 6c). A large amount of daub was also found at the extreme northeast end of the Area A block, which in combination with several post holes, suggested that a structure had formerly stood in that area.

Table 14. Oxidation Patterns of Decorated/Rim Sherds by Area.

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
A	5 (8%)	23 (37%)	5 (8%)	29 (47%)
B	2 (8%)	15 (60%)	1 (4%)	7 (28%)
C	2 (6%)	26 (70%)	3 (9%)	12 (15%)
D	2 (11%)	10 (55%)	1 (6%)	5 (28%)
Totals	11	74	10	53

Table 15. Areas A-D Decorated/Rim Sherds Oxidation Patterns by Temper Type.

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
Grog-Tempered Pottery				
A	–	4	2	11
B	–	1	–	2
C	–	7	1	4
D	–	5	1	–
Grit-Tempered Pottery				
A	–	5	1	–
B	–	1	–	1
C	1	2	–	2
D	2	3	–	–
Grog- and Grit-Tempered Pottery				
A	3	7	–	5
B	–	5	–	2
C	1	10	1	5
D	–	1	–	1
Grog-, Grit-, and Bone-Tempered Pottery				
A	–	1	–	6
B	–	–	–	1
C	–	1	–	–
D	–	–	–	1
Grog- and Bone-Tempered Pottery				
A	–	–	–	1
B	–	–	–	–
C	–	–	–	–
D	–	–	–	2

Table 15. *(Continued)*

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
Shell-Tempered Pottery				
A	–	1	–	1
B	2	8	1	1
C	–	3	–	–
D	–	–	–	–
Shell- or Shale-Tempered Pottery				
A	–	2	–	4
B	–	–	–	–
C	–	3	1	1
D	–	–	–	–
Untempered Pottery				
A	2	3	2	1
B	–	–	–	–
C	–	–	–	–
D	–	1	–	1
Totals	11	74	10	53

Table 16. Oxidation Patterns by Decoration Type.

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
Engraved	2	35	1	16
Incised	1	–	–	5
Neck-Banded	1	–	–	–
Punctated	1	1	1	5
Appliqué	1	2	–	3
Brushed	–	–	–	1
Red-Slipped Plain Rim	–	7	–	–
Red-Slipped Non-Rim	1	8	–	–
Totals	7	53	2	30

Table 17. Oxidation Patterns of Plain Sherd Sample by Area.

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
Area A	3	8	11	43
Area B				
upper	–	2	2	8
middle	1	3	1	–
lower	–	1	–	2
Area C				
upper	3	2	1	33
lower	2	2	–	5
Area D	5	7	1	30
Totals	14	25	16	121
Percent	8%	14%	9%	69%

Table 18. Oxidation Patterns of Plain Sherd Sample by Temper Type.

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
Grog-Tempered Plain Sherds				
Area A	–	1	3	2
Area B	–	–	–	–
Area C	–	1	–	5
Area D	2	–	1	7
Grit-Tempered Plain Sherds				
Area A	–	–	–	–
Area B	–	–	1	1
Area C	–	–	–	4
Area D	–	–	–	4
Grog-Grit-Tempered Plain Sherds				
Area A	–	–	4	6
Area B	–	1	1	–
Area C	–	–	–	2
Area D	–	5	–	7
Grog-Bone-Tempered Plain Sherds				
Area A	–	–	1	1
Area B	–	–	–	–
Area C	–	–	–	–
Area D	–	1	–	2

Table 18. *(Continued)*

Area	Oxidized	Reduced	Incomplete Oxidization	Reduced and Cooled in High Oxygen Environment
Grog-Grit, and Shell-Tempered Plain Sherds				
Area A	–	–	–	4
Area B	–	–	–	–
Area C	–	–	–	–
Area D	–	–	–	–
Grog-Shell-Tempered Plain Sherds				
Area A	1	1	1	4
Area B	–	–	–	–
Area C	–	–	–	1
Area D	–	–	–	1
Shell-Tempered Plain Sherds				
Area A	–	2	1	9
Area B	1	5	1	8
Area C	2	2	1	7
Area D	–	–	–	–
Shell/Shale-Tempered Plain Sherds				
Area A	2	2	1	17
Area B	–	–	–	1
Area C	3	1	–	9
Area D	2	–	–	6
Bone-Tempered Plain Sherds				
Area A	–	–	–	–
Area B	–	–	–	–
Area C	–	–	–	–
Area D	–	–	–	1
Untempered Plain Sherds				
Area A	–	2	–	–
Area B	–	–	–	–
Area C	–	–	–	10
Area D	1	1	–	2
Totals	14	25	16	121

Table 19. Daub totals by site area.

Area	Number	Percent
A	494	49
B	133	13
C	132	13
D	217	21
Test Units	43	4
Total	1019	100

FAUNAL AND FLORAL REMAINS

Faunal remains are very poorly preserved in the acidic soils at the Fasken site. An initial examination of the tiny pieces of bone recovered at the site by Yates (1992, see also Perttula, ed., this volume) led to the determination that a formal analysis would not be warranted at the present time.

Examination of the floated samples of fill from the various parts of the Fasken site also showed extremely little potential for the identification of archeobotanical remains and only a single sample with any appreciable volume of material was submitted for archeobotanical analyses: Feature 2, a trash/storage pit at Area A of the site. Examination of the sample showed minute remains of carbonized hickory, other unidentified wood, acorn, maize cupules, amaranth seeds, portulaca seeds, and euphorbs (Fritz 1992, see also Perttula, ed., this volume).

HISTORIC ARTIFACTS FROM THE FASKEN SITE

Timothy K. Perttula and Nancy G. Reese

A small historic archeological component (or components) has also been identified at the Fasken site. Much of the historic archeological material recovered at the site includes late 19th to mid-20th century wire nails and bottle glass from structures that stood on the mounds or around the mounds, but there is evidence that the Fasken site was also settled during the mid-19th century, probably by Anglo-American settlers. No evidence of an historic Indian occupation was identified in the artifacts recovered during the 1991-1992 TAS Field School investigations.

Early-Mid-19th Century Component

Artifacts associated with the early-mid-19th century settlement at Fasken were found primarily between 0-20 cm on the crest and eastern slopes of Mound B. Among these artifacts are an assortment (n=34) of decorated whiteware or refined earthenware ceramics (Figure 19, top), namely three blue shell-edged sherds with scalloped (ca. 1810-1835) and non-scalloped (ca. 1835-1860) rims and impressed lines (see Hunter and Miller 1994); black, blue, and red transfer-printed flatware (n=14) sherds; bold and fine-line hand-painted cup sherds (n=16), and one sherd of annular ware. The latter decorated whiteware dates generally from 1830-1860 (Majewski and O'Brien 1987), but the scalloped shell-edged ware, and a single plain sherd of pearlware, hint at a pre-1835 use of the Fasken site.

Utilitarian ceramics were also found in the early-mid-19th century component. This includes a sherd of salt-glazed stoneware (n=1, see Figure 19, top) and an undecorated piece of yellow ware (n=1), probably from a serving bowl. The plain whiteware (n=38) and porcelain (n=2) is probably associated with the 19th century component.

Other 19th century artifacts that can be primarily associated with the early settlement at the Fasken site include metal items, bottle glass, clothing items, and metal tools. Cut nails (n=94), and many of the nail shanks (n=42) that are probably from cut nails, are abundant, indicating that a wood frame structure stood on Mound B. The use of fire arms is indicated by a single musket lead ball and a blade gunflint. The gunflint is a honey-colored chert with a faceted cross-section, no arris lip, a broken working edge, and step flaking/crushing on the heel (see Figure 19, bottom). The olive and dark olive green bottle glass (n=8) is from wine and champagne bottles, and the aqua glass (n=10) is from hand-blown medicine bottles. The brass three-piece U.S. military button has a Symmetrical Spread Eagle design that is dated to ca. 1847-1880 (Wyckoff 1984:88). Other 19th century buttons include a brass loop button with a shield design and a 2-hole bone button (see Figure 19, bottom).

The two wound glass beads from Mound B are similar to those found on ca. 1830-1870 North American sites (see DeVore 1992:Figures 8c and

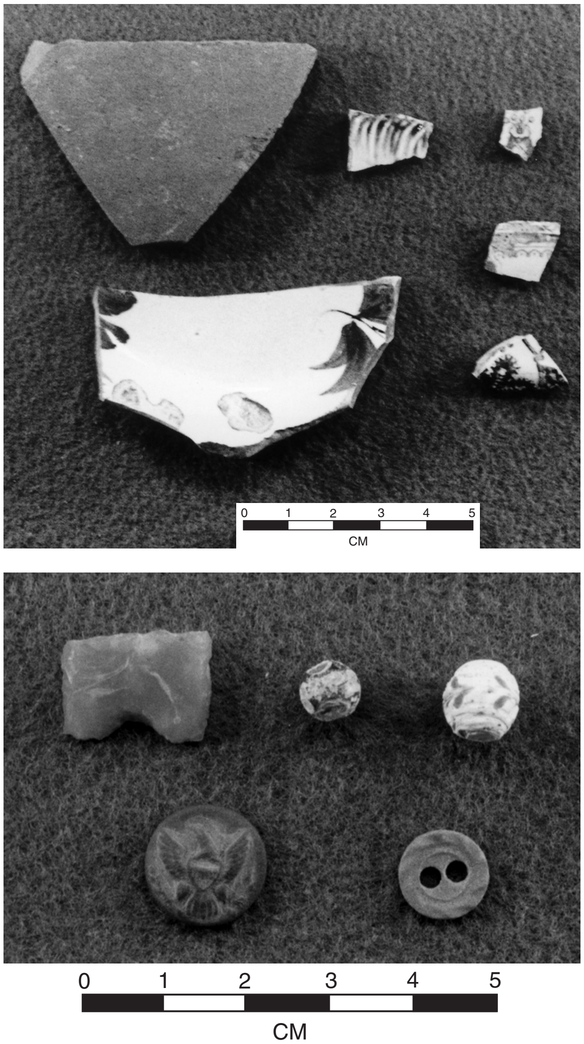

Figure 19. 19th Century Artifacts from the Fasken Site: top, decorated refined earthenwares and stoneware sherds; bottom: gunflint, beads, and buttons.

15n). The first, from unit N500/E500, 0-10 cm, is a white opaque glass bead with a leaf decoration, and it resembles DeVore's type CIISCT1Va. It is approximately 9.0 mm in diameter. The second glass bead (type CISAT1Vq), from 10-20 cm in unit N500/E524, is a clear red color, and is 7.0 mm in diameter (see Figure 19, bottom).

Two metal knife fragments were found during the Fasken excavations. One was a blade fragment from a possible case knife, and the other was a bone-handled pocket knife.

Post-1890 Component

The later historic component at the Fasken site is dominated by bottle glass fragments, wire nails, unidentified metal and iron fragments, and an assortment of other farm-related artifacts. The machine-made 20th century bottle glass includes clear or colorless (n=103), brown (n=32), and amber (n=1) sherds, along with one clear drinking glass sherd, four sherds of milk glass, and two sherds of clear fruit jar or Mason jar glass. Architectural items include 17 wire nails, thick (>2.00 mm) window glass, and roofing tin (n=1).

Fence staples are abundant (n=20), along with barbed wire pieces (n=6), and large metal spikes (n=3). Other household items include two tin can fragments, slate (n=2) and mirror glass, along with a .22 shell casing and 10-12 gauge wire (n=3). The remaining artifacts that can be associated with the post-1890 use of the Fasken site are plastic (n=1), a rubber gasket, one metal wedge and washer, and 29 unidentifiable metal and iron strips and fragments.

CONCLUSIONS

Based on the results of two Texas Archeological Society (TAS) Field School excavation seasons at the Fasken site in 1991 and 1992, it appears that the site was principally utilized between ca. A.D. 900-1300, during the Formative Caddo and Middle Caddo (Mound Prairie phase) periods. This assessment is based on the preponderance of ceramic sherds with grog and grit tempering (or these two temper agents in combination) and the predominance of arrow point types such as Alba, Bonham, Scallorn, and other mostly rectangular stemmed untyped fragments.

The most intensive residential occupation appears to have occurred along the terrace edge in the vicinity of the Area A excavations. These units yielded the largest numbers of lithic and ceramic artifacts. Other artifact categories such as daub and fire-cracked rock are also more abundant there. In particular, the lithic artifacts are more diverse and include some evidence of a Late Archaic and/or Woodland period occupation. Smaller test units excavated across the site further confirm the hypothesis of intensive residential occupation in the southwest quadrant of the site around Area A. The test units also suggest that the site covers an area measuring approximately 150 m east-west by at least 480 m north-south (approximately 18 acres), with the areas south of Area A and north of Area C remaining unexplored by the TAS.

Excavations on the north end of Mound B at Area B showed that the initial mound construction episode was a raised surface that was 88 cm in height at its crest. A thin yellowish-red prepared clay floor was then placed on the top of the north and south ends of the mound. Two OCR dates place this initial construction episode at Mound B sometime after A.D. 939, when the A-horizon was buried by the initial mound deposits. A second construction episode is evident on the north lobe of the mound in the Trench #2 profile. It raised the mound another 35 cm and was again covered with a yellowish-red prepared clay floor. An OCR date of A. D. 1142 from the lower part of the fill of the second construction episode suggests that this addition to the mound occurred during the Middle Caddo period or local Mound Prairie phase. A 30 cm thick deposit above this second clay floor probably represent a third construction episode. Cultural remains suggestive of prehistoric occupation activities are confined to these uppermost deposits and diagnostic materials are primarily shell-tempered ceramics of the Late Caddo era. Even later in time, it appears that mid-19th century settlers utilized the mound area and during the late 19th century it was the site of a cotton gin.

The TAS Field School excavations also demonstrated that a slight 25 cm high rise at the north end of the site, known as Mound C, is an aboriginal mound. Use of this feature area apparently began with the erection of a number of structures which had non-residential functions since very few ceramic and lithic artifacts occur at the levels representing the floors of these structures. Numerous post holes—including 11 that form the southeast part of a structure—were identified in the deepest excavated levels. Two calibrated radiocarbon dates with age ranges of AD 1122-1242 and AD 1043-1188 indicate that these structures were apparently utilized during the early part of the Mound Prairie phase.

Following the use of these structures, this area was intentionally capped with a 7 to 10 cm clay cover. Subsequently, the 20 cm thick topsoil deposit that accumulated over this clay cap was the living surface for Mound Prairie phase occupants who left broken Sanders Engraved and Sanders Plain ceramic sherds and several Bonham arrow point fragments. Some Late Caddo materials related to the McCurtain phase are also present in this deposit. Two post holes that originate from this upper deposit may be related to this occupation or may be the result of recent historic period fence building activities. As a result of aboriginal activities, Mound C became a slightly elevated rise about 25 cm in height.

REFERENCES CITED

Brown, J. A.

1996 *The Spiro Ceremonial Center: The Archaeology of Arkansas Valley Caddoan Culture in Eastern Oklahoma*. 2 Vols. Memoirs No. 29. Museum of Anthropology, University of Michigan, Ann Arbor.

Bruseth, J. E.

1998 The Development of Caddoan Polities along the Middle Red River Valley of Eastern Texas and Oklahoma. In *The Native History of the Caddo: Their Place in Southeastern Archeology and Ethnohistory*, edited by T. K. Perttula and J. E. Bruseth, pp. 47-68. Studies in Archeology 30. Texas Archeological Research Laboratory, The University of Texas at Austin.

Bruseth, J. E., L. Banks, and J. Smith

2001 The Ray Site (41LR135). *Bulletin of the Texas Archeological Society* 72:197-213.

DeVore, S.

1992 *Beads of the Bison Robe Trade: The Fort Union Trading Post Collection*. Friends of Fort Union Trading Post, Williston, North Dakota.

Frink, D. S. and T. K. Perttula

2001 Analysis of the 39 Oxidizable Carbon Ratio Dates from Mound A, Mound B, and the Village Area at the Calvin Davis or Morse Mounds Site (41SY27). *North American Archaeologist* 22(2):143-160.

Fritz, G. J.

1992 Archaeobotanical Remains from Five Sites on the Red River, Northeast Texas. MS on file, Archeology Division, Texas Historical Commission, Austin.

Hunter, R. R., Jr. and G. L. Miller

1994 English Shell-Edged Earthenware. *Antiques* 145(3):432-443.

Krieger, A. D.

1946 *Culture Complexes and Chronology in Northern Texas*. Publication No. 4640. The University of Texas at Austin.

Mallouf, R. J.

1976 *Archeological Investigations at Proposed Big Pine Lake, 1974-1975, Lamar and Red River Counties, Texas.* Archeological Survey Report 18. Office of the State Archeologist, Texas Historical Commission, Austin.

Martin, W. A. and J. E. Bruseth
1992 Arnold Roitsch Site (41RR16). In *Field Guide for the 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas*, by J. Bruseth, T. Perttula, B. Martin, and D. Prikryl, pp. 29-40. Texas Historical Commission, Austin.

Majewski, T. A. and M. J. O'Brien
1987 The Use and Misuse of Nineteenth-Century English and American Ceramics in Archaeological Analysis. In *Advances in Archaeological Method and Theory, Vol. 11*, edited by M. B. Schiffer, pp. 97-209. Academic Press, Orlando.

Perino, G.
1994 Archaeological Research at the Rowland Clark Site (41RR77), Red River County, Texas. *Journal of Northeast Texas Archaeology* 4:3-42.

Perttula, T. K., J. E. Bruseth, N. A. Kenmotsu, D. J. Prikryl, W. A. Martin, L. Banks, J. Smith, N. G. Reese, and S. A. Iruegas
2001 Archeological Investigations on the Red River and Tributaries: Summary of the Findings of the 1991 and 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas. *Bulletin of the Texas Archeological Society* 72:165-250.

Suhm, D. A. and E. B. Jelks (editors)
1962 *Handbook of Texas Archeology: Type Descriptions*. Texas Archeological Society, Special Publication No. 1, and the Texas Memorial Museum, Bulletin No. 4, Austin.

Teltser, P. A.
1993 An Analytic Strategy for Studying Assemblage-Scale Ceramic Variation: A Case Study from Southeast Missouri. *American Antiquity* 58(3):530-543.

Wyckoff, D. G.
1984 *United States Military Buttons of the Land Services 1787-1902*. McLean County Historical Society, Bloomington, Illinois.

Yates, B. C.
1992 Observations on the Faunal Remains from the 1991 TAS Field School. MS on file, Archeology Division, Texas Historical Commission, Austin.

APPENDIX 1,
SHOVEL TESTING DATA

N540/E500
0-16 cm (99.11-98.95 m): brown sandy loam; 16-65 cm (98.95-98.46 m): dark reddish brown sandy loam; 65-75 cm (98.46-98.36 m): reddish brown sandy clay; 75 cm+: red clay

N580/E500
0-43 cm (99.04-98.61 m): brown sandy loam; 43-62 cm (99.61 - 99.42 m): dark reddish brown sandy loam; 62 cm+: red clay

N620/E500
0-30 cm (99.09 - 98.79 m): brown sandy loam; 30-56 cm (98.79 - 98.53 m): dark reddish brown sandy loam; 56 cm+: red clay

N660/E500
0-37 cm (99.31 - 98.94 m): brown sandy loam; 37-69 cm (98.94 - 98.62 m): reddish brown sandy loam; 69 cm+: red clay

N695/E500
0-30 cm (99.41 - 99.11 m): brown sandy loam; 30-72 cm (99.41-99.01 m): reddish brown sandy loam; 72 cm+: red clay

N695/E540
0-26 cm (99.14 - 98.88 m): brown sandy loam; 26-58 cm (99.88 - 98.56 m): reddish brown sandy loam; 58 cm+: red clay

N620/E540
0-38 cm (99.01 - 98.63 m): brown sandy loam; 38-62 cm (98.63 - 98.39 m): reddish-brown sandy loam; 62 cm+: red clay

N580/E540
0-31 cm (98.87 - 98.56 m): brown sandy loam; 31-58 cm (98.56 - 98.29 m): reddish brown sandy loam; 58 cm+: red clay

N540/E550
0-15 cm (98.95 - 98.80 m): brown sandy loam; 15-42 cm (98.80 - 98.53 m): reddish brown sandy loam; 42 cm+: red clay

N500/E550
0-22 cm (99.04 - 98.82 m): brown sandy loam; 22-41 cm (98.82 - 98.63 m): reddish brown sandy loam; 41-50 cm+ (98.63 - 98.54 m): red clay

N460/E550
0-21 cm (99.02 - 98.81m): brown sandy loam; 21-36 cm (98.81 - 98.66 m): reddish brown sandy loam; 36 cm+: red clay

N420/E550
0-14 cm (99.04 - 98.90 m): brown sandy loam; 14-39 cm (98.90 - 98.65 m): reddish brown sandy loam; 39 cm+: red clay

N399/E499
0-? cm (99.39 - ?): brown sandy loam; ?-60 cm (? - 98.79 m): reddish brown sandy loam; 60 cm+: red clay

N?/E?
0-31 cm (99.10 - 98.79 m): disturbed brown sandy loam with orange clay mottling; 31-48 cm (98.79 - 98.62 m): reddish brown sandy loam; 48 cm+: orange clay

N550/E420
0-23 cm (99.07 - 98.84 m): brown sandy loam; 23-38 cm (98.84 - 98.69 m): reddish brown sandy loam; 38 cm+: red clay

N500/E420
0-28 cm (99.21 - 98.93 m): brown sandy loam; 28-44 cm (98.93 - 98.77 m): disturbed reddish brown sandy loam with orange clay lumps; 44-54 cm+: (98.77 - 98.67 m): red clay

N380/E420
0-? cm (99.32 - ? m): brown sandy loam; ?-36 cm (? - 98.96 m): reddish brown sandy loam; 36-44 cm+ (98.96 - 98.88 m): red clay

N230/E457
0-32 cm (99.22 - 98.90 m): brown sandy loam; 32-42 cm (98.90 - 98.80 m): reddish brown sandy loam; 42 cm+: red clay

N695/E410
0-12 cm: brown sandy loam with numerous roots and small pebbles; 12-40 cm: dark brown sandy loam; 40-60 cm: light yellowish brown sandy loam

N695/E395
0-10 cm: brown sandy loam; 10-30 cm: light brown sandy loam; 30-70 cm: reddish brown sandy loam

APPENDIX 2, LIST OF FEATURES

Feature #	Description
1	This feature was distinguished by scattered bits of yellowish-red clay lumps at depths ranging from 20 to 32 cm below ground surface (bs) in the N512/E500 and E501 units at Area B. These clay lumps probably represent a prepared clay floor that marked the top of the second construction episode on the north lobe of Mound B. In units further east and down slope, it is hypothesized that the clay floor has been more thoroughly disrupted by plowing so that the clay lumps are smaller and less evident.
2	Trash/storage pit at Area A in the N328/E425 and N329/E425 units. The pit is evident in levels 3 through 5 as darker fill in a 1.6 m diameter area. Pit fill in levels 1 and 2 has been disrupted by plowing. The feature fill contained a large volume of ceramics, lithic debitage, and daub.
3	A yellowish-red prepared clay floor that ranges from 12 cm thickness at the west end of north wall profile of Trench #2 at the N512/E501 line at Mound B to only 4 cm thickness at the N513/E501 line. Augering showed that the clay floor covers at 6.5 x 6.5 m area that extends from approximately the N511 line to about the N517.5 line and from the E499 line to the E505.5 line. The yellowish-red clay appears to cap the first construction episode on the north lobe of Mound B.
4	This post hole is in the west wall of the N695/E451 unit and extends from the Zone 1 topsoil down through the Zone 3 artificial clay cap into Zone 4B. The maximum recorded length of this post hole is 45 cm and its diameter is 15 cm. It may be associated with the aboriginal cultural remains in Zones 1and 2 or it could be a recent historic post hole dug for a fence.
5	This post hole is located in the N695/E451 unit and was recognizable from 45 to 65 cm bs. It had a diameter of 23 cm.
6	This post hole is located in the N695/E451 unit and was recognizable from 57 to 85 cm bs. It had a top diameter of 15 cm.
7-10	These post holes were plotted on the floor plan at the completion of level 7 in unit N500/E504. All appeared to be pockets of darker soil. The definition of these four post holes is suspect.
11	This post hole was found in the N695/E451 unit and was recognizable from 58-74 cm bs. It had a diameter of 19 cm at its top.
12	This post hole was found in the N694/E451 and N694/E452 units and was recognizable from 40 to 100 cm bs. It had a diameter of 23 cm at its top.
13	This post hole was found in the N694/E451 and N694/E452 units and extended from 57 to 101 cm bs. It had a diameter of 12 cm.
14	The approximate center of this post hole was the N695/E452 stake. It extends into all four surrounding 1 x 1m units. It was recognizable from 53 to 101 cm bs and had a diameter of 16 cm.
15	This small 10 cm diameter pit was found from 30 to 40 cm bs in the N695/ E459 unit. It contained a few small rocks and several pottery sherds which lay on edge vertically. It was not determined if this was a cultural feature or a rodent burrow.
16	This prepared yellowish-red clay floor was discovered by augering the south lobe of Mound B. It lay at the same approximate elevation as Feature 3 and it extended on a north-south line from N478 to N493.80. Augering was not undertaken to determine the east-west dimension of the feature.

Feature #	Description
17	This possible post hole was found in the N518/E500 unit in the floor of level 6. It was later determined to most likely be a rodent burrow. It had a diameter of 35 cm.
18	This post hole was found in the N335/E426 unit at Area A. It extended from 30 to 35 cm bs.
19	This post hole was found in the N688/E452 unit and extended from 55 to 65 cm bs. It had a diameter of 17 cm.
20	This post hole was found in the N690/E451 unit at 37 to 60 cm bs. It had a diameter of 8 cm.
21	This post hole was found in the N693/E451 unit. It extended from 57 to 66 cm bs, and had a diameter of 25 cm.
22	This post hole was found in the N692/E451 unit from 70 to 92 cm bs. It had a diameter of 20 cm.
23	This post hole was found in the N692/E451 unit at 70 to 83 cm bs. It had a diameter of 12 cm.
24	This post hole was located in the N692/E452 unit. It extended from 62 to 109 cm bs and had a diameter of 19 cm.
26	This post hole was found in the N692/E451 unit from 70 to 82 cm bs. It had a diameter of 17 cm.
27	This possible post hole was located in the N691/E451 unit. It was found at about 60 cm bs and extended only to 65 cm bs. Its small 5 cm diameter suggests that it was probably a rodent burrow.
28	This possible post hole was located in the N691/E451 unit in the floor of level 7. It had a diameter of 13 cm but a depth of only 1 cm in profile, which suggested that it was a rodent burrow.
29	This feature is another probable rodent burrow in N691/E451 and is similar to Features 27 and 28.
30	This post hole is located in the N691/E451 unit and extended from 59 to 70 cm bs. It had a diameter of 14 cm.
31	This possible post hole was visible in the north wall profile of the N335/E426 unit at Area A. It had a diameter of about 12 cm and a depth of 5 cm.
32	This post hole was found in the N691/E451 unit in floor of level 7. Cross-sectioning showed that it extended down only to 72 cm bs. It had a diameter of only 7 cm. It is possible that this may represent the very bottom of a post hole whose upper portion may have been equivalent to that of Feature 33.
33	This post hole was found in the N691/E451 unit. It was first recognized at 36 cm bs and extended down to 72 cm bs. In the floor of level 7 at 70 cm bs, it had a diameter of only 6 cm.
34	This post hole was found in the N690/E452 and N691/E452 units. It was found from 70 to 95 cm bs, and had a diameter of 7 cm.
35	This feature is a narrow depression that ranges from 10 to 30 cm in width that extends on a north-south line across the N517/E501 and N518/E501 units. It was first noted in the floor plan at the completion of level 6. Cross-sectioning showed that it extended downward another 15 cm. The depression may be a trench for posts set as an extended entryway into the hypothesized structure that stood on the Feature 3 prepared clay floor on the north lobe of Mound B.
36	This post hole was recognized in the floor of level 7 in the N690/E451 unit. Cross-sectioning showed that it extended down another 7 cm to 77 cm bs. Its recorded diameter at 70 cm bs was 12 cm.

Feature #	Description
37	This post hole was first recognized in the floor of level 6 in the N690/E451 unit. It extended downward to 76 cm bs. It had a diameter of 12 cm.
38	This post hole was found in the N690/E452 unit in the floor of level 7. It extended down to 79 cm bs and had a diameter of 13 cm.
39	This post hole was first noted in level 6 in the N688/E452 unit but was not clearly distinguishable until the drawing of the floor plan at the completion of level 7. From this floor it extended down to 93 cm bs. It had a 16 cm diameter.
40	This possible post hole was found in the N688/E452 and extended from 70 to 83 cm bs. It had a diameter of 16 cm.
41	This post hole was found in the N695/E452 unit. It extended from about 50 to 64 cm bs and had a diameter of about 16 cm.
42	This post hole was located in the N694/E452 and N695/E452 units. It was noted at 55 to 65 cm bs and had a diameter of 17 cm.
43	This possible post hole was found in the N695/E452 unit. It extended from 58 to 63 cm bs and had a diameter of 19 cm.
44	This post hole was located in the N695/E453 in a balk left at the southeast corner of the unit. It appears to be a later post hole like Feature 4 and could be traced from about 10 to 40 cm bs. It had a diameter of 12 cm.
45	This post hole was found in the N694/E452 unit. It extended from 76 to 84 cm bs and had a diameter of 15 cm.
46	This post hole is located in the N695/E451 and N695/E452 units. It had a diameter of 19 cm and extends from 70 to 93 cm bs.
47	This post hole is located in the N695/E451 unit. It extends from 70 to 92 cm bs. It had a diameter of 20 cm.
48	This post hole is situated in the N693/E451 and N693/E452 units. It was visible from 52 to 100 cm bs and had a diameter of 19 cm.
49	This post hole was located in the N689/E452 unit in the floor of level 7. It extended down to 89 cm bs and had a diameter of 14 cm.
50	This feature is a large circular pocket of mottled dark brown sandy clay with red clay mottles that covered most of the floor of N694/E453 at the end of the excavations. It also extended into the adjacent N695/E453, N693/E452, and N694/E452 units and should have its south edge in the unexcavated N693/E453 unit. The feature has a diameter of roughly 130 cm and shows in the uneven bottoms of the excavations at 60 and 70 cm bs. Post holes defined as Features 42, 45, and 51 lie within and penetrate into Feature 50.
51	This post hole is located in the N693/E452 unit. It was noted during the recording of Feature 50 in the floor of level 7. It was not cross-sectioned to determine how far downward it continued.
52	This post hole was noted during the final profiling of the north wall of the N695/E451 and the N695/E452 units. It appeared to extend from about 60 cm bs to the bottom of the profile at 72 cm bs. The diameter of the post hole cross-section exposed in the wall was about 14 cm.

Archeological Survey of the Roitsch Farm and Adjoining Lands, 1991 and 1992 Texas Archeological Society Field School, Red River County, Texas

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with contributions by Gayle Fritz, Bo Nelson, LeeAnna Schniebs, and Mike Turner

ABSTRACT

During the 1991 and 1992 Texas Archeological Society Field Schools, about 2500 acres of land in Red River County, Texas, were surveyed, and a total of 109 new or previously recorded archeological sites were visited during the course of the survey work. Most of the sites were prehistoric in age, documenting two peak periods in settlement: from the Late Archaic through the Woodland period (ca. 2000 B.C. to A.D. 900) and then during the Late Caddo McCurtain phase (ca. A.D. 1300-1700). Historic sites found during the survey were occupied principally between 1860-1950, and were the remnants of farmsteads and tenant farms in several abandoned communities.

INTRODUCTION

This article describes the results of the archeological survey of the A.E. Roitsch Farm, and adjoining lands, completed during the 1991 and 1992 Texas Archeological Society (TAS) Field School in Red River County, Texas (Figure 1). These survey areas are in immediate proximity to the A. E. Roitsch (41RR16; previously known as the Sam Kaufman site) and Salt Well Slough (41RR204) sites (see Perttula, ed., this volume, and Kenmotsu 2006), and within 15-30 km of the other archeological sites (the Jonesborough, Fasken, and Ray sites; see Reese 2001; Prikryl, this volume; Bruseth et al. 2001) that were excavated during the TAS Field School. A brief recent discussion of the findings of the archeological survey is also presented in Perttula et al. (2001).

This article is organized in two parts: Part I, which discusses the methods employed during the survey, and summarizes the archeological findings of the survey with respect to the research problems and issues laid out in the project research design (Bruseth et al. 1991:17-26, 53, 1992:19-28, 61); and Part II, which presents detailed descriptions of the 88 sites recorded during the TAS Field School survey. Incorporated also in Part II are descriptions of 21 other prehistoric and historic sites recorded on the Tarrant and Wright Farms property during a 1993-1994 supplementary survey by the Northeast Texas Archeological Society in cooperation with the Texas Historical Commission.

SURVEY METHODS

Between four and five survey crews were used during the two seasons in Red River County. The survey crews each consisted of a Crew Chief and four crew members. One of the Crew Chiefs also served as an Assistant Survey Supervisor (Chris Kneupper in 1991 and Jay Hornsby in 1992) to oversee the activities of the crews, and assist the Survey Supervisor (Perttula) in completing the work.

About 3500 acres were available for survey on the Roitsch Farm; about 1500 acres were actually surveyed during the 1991 and 1992 TAS Field schools. The survey areas were principally spread along Salt Well Slough, Pond Creek, and upper and lower sections of the Big Pine Creek drainage. The survey areas were a mixture of pastures, plowed fields, and second growth woodlands. The different

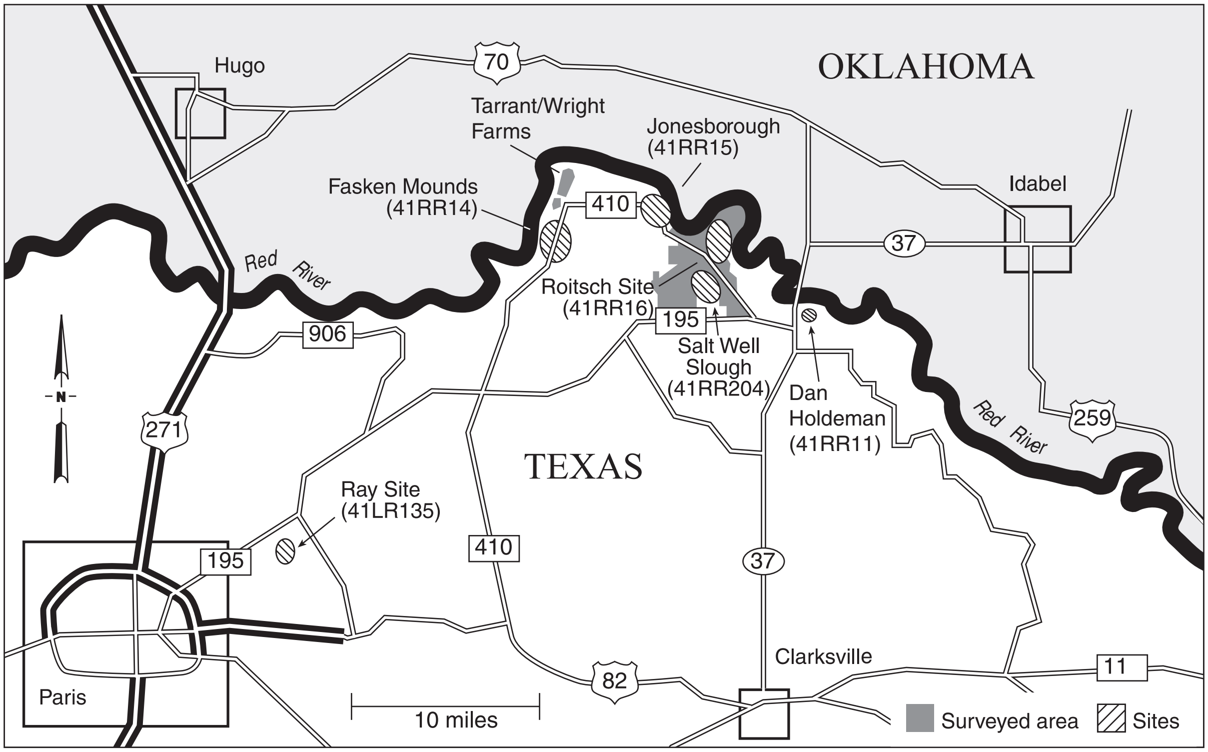

Figure 1. Location of 1991 and 1992 Texas Archeological Society Field School Sites and Survey Areas in Northeast Texas. Texarkana 1:250,000, USGS.

ground surface visibility conditions determined the types of survey procedures we used to locate archeological sites.

Additional acreage was surveyed on property owned by Mr. Andy Fasken north and northwest of the Fasken site (41RR14). This area was on an alluvial terrace of the Red River, and had been recently plowed. During the 1992 Field School, about 50 acres of recently plowed lands at the Dan Holdeman site (41RR11), an important Early to Late Caddo period village (Perino 1995; Perttula 1995) located a few miles downstream from the Roitsch lands, also received archeological survey investigations. Finally, about 500 acres of the Tarrant and Wright Farms, across from the confluence of the Kiamichi and Red rivers, was surveyed in 1993 by the Northeast Texas Archeological Society in cooperation with the Texas Historical Commission. This property was like the Roitsch Farm survey areas in that it was a mixture of pasture, woodlands, and plowed fields.

In plowed fields, the archeological survey effort consisted of walking across the ground surface looking for artifacts. Crews proceeded up and down the crop rows, being careful not to trample or damage the crop, while searching for artifact concentrations. Generally speaking, if more than 10 or 20 artifacts were visible in a 100 to 250 m^2 area, the artifacts were designated as an archeological site and fully recorded. Pin flags were used to help mark these site areas, and also to locate specific diagnostic artifacts (i.e., projectile points, prehistoric ceramic rim or decorated sherds, or certain historic artifacts) within the site boundaries that would be collected after their locations were plotted on the site map in relationship to an arbitrary established site datum.

Notes were taken by the Crew Chief or the Survey Supervisor on the density of artifacts visible on the surface, and the types of artifacts visible that were not collected (i.e., lithic debris, fire-cracked rock, brick, etc.). Information was also recorded on whether midden stains or other types of features (i.e., such as a house foundation or a disturbed burial) were apparent at the site.

In a few cases, most notably at the Dan Holdeman site (41RR11), controlled surface collections of small areas (ca. 100-500 m^2) were completed to obtain representative samples of the range and frequency of artifact types within selected sites (such as the Late Caddo salt processing sites on

Salt Well Slough, or the early 20th century tenant farm community along Pond Creek). In these cases, all the artifacts within the surface collection areas were collected for laboratory analyses.

Depending upon the circumstances, and with the permission of the landowner, some shovel testing was conducted in plowed fields (only within recorded sites) to obtain information on the extent and depth of subsurface cultural materials, and to assess the potential of sites to contain features or middens. Shovel tests were 30 x 30 cm in size, and were excavated to a maximum of ca. 80 cm, or until the B-horizon clay subsoil was reached. The soil from the shovel tests was screened through 1/4-inch meshed portable screens, and all artifacts recovered in the screens were saved for laboratory analysis. The shovel tests were not screened by level, but the excavators keep notes on a Shovel Test Form (on file at the Texas Archeological Research Laboratory at The University of Texas at Austin) indicating the general depths of the artifacts as they were found.

All shovel tests were numbered and plotted on the site map. In addition to information on the depths of the artifacts and the kinds of artifacts found (if any), the Crew Chief recorded the total depth of the shovel test, the types of soils encountered, and other specific data of archeological interest (such as lens of burned soil, middens, presence of plow zones, or other zones of disturbance) on a Site Summary Form.

In pastures and wooded areas, the crew members were spaced about 20-50 m apart, depending upon the terrain, and they closely examined all surface exposures (dirt roads, eroded areas, cut banks, gopher holes, ant mounds, etc.) for the presence of archeological materials. Random shovel tests were also excavated in likely areas, such as terrace edges, alluvial rises, and upland landforms overlooking streams while attempting to locate archeological sites.

When surface cultural materials were noted in these circumstances, shovel tests were then excavated to determine if there were preserved subsurface archeological deposits at the site, and to try to determine their depth and extent. Shovel tests were excavated in the same manner as described above for plowed fields, both on known site areas and during initial efforts to find sites.

Limited test excavations were conducted in 1992 at several of the survey sites, the results of which are also described in Part II of this article. The purpose of this work was to investigate in more detail some prehistoric archeological sites in the vicinity of the Roitsch site that appeared to have significant Woodland period and post-A.D. 800 Caddo tradition deposits, and thus to collect supplementary data on other prehistoric settlements in the Mound Prairie area. Our interest was in assessing the character of these site's archeological deposits, determining what types of features were present (if any), acquiring representative samples of material culture remains (especially domestic ceramics and lithic tools), as well as recovering samples of charcoal to obtain radiocarbon dates.

The testing consisted of 1 x 1 m units excavated in 10 cm levels, with the levels measured with a line level and 3 m tape from the ground surface of each corner of the pit. Soil from all units was screened through 1/4-inch mesh, and if warranted, small samples of soil were collected for flotation analysis or radiocarbon dating. Unit level forms were completed for each level, as was a feature form when a feature was found. Soil profiles were also completed of one wall of the test units, and a photograph taken of the scribed profile.

Photographs were taken of the site areas, when possible (technical difficulties sometimes presented themselves during this task), along with any obvious natural or cultural features on the site or in the vicinity that would aid in its future relocation. Temporary datums were placed at the sites, and the site area, shovel tests, surface collection areas, and surface collected diagnostics were mapped in relationship to it; when the mapping was completed, the temporary datum was removed.

PART I

FINDINGS OF THE 1991-1992 TEXAS ARCHEOLOGICAL SOCIETY FIELD SCHOOL

ARCHEOLOGICAL SURVEY

The main purpose of the archeological survey was to identify and record prehistoric and historic sites in this Red River alluvial setting, assess the contextual integrity and research potential of each of the sites in so far as feasible, and evaluate their temporal and cultural relationships, particularly their relationships to the Early-Late Caddo occupations at the nearby Roitsch site (41RR16). We expected that the information gained from the archeological survey would allow us to address (to some extent) the following research problems and project goals (see Bruseth et al. 1991, 1992; Perttula et al. 2001; Perttula, ed., this volume):

- Improve the Local Chronology
- Understand the Village Structure at the Roitsch Site
- Understand the Village Structure at all of the sites
- Determine if the Caddo were Processing Salt near the Roitsch Site, and
- Examine Early Anglo-American Settlement and Trade

I will take up each of these research problems in turn, following a summary discussion of the character and content of the prehistoric and historic archeological sites in the survey area.

SUMMARY OF THE SURVEY FINDINGS

A significant body of information on the Archaic, Woodland, and Caddo settlement and use of the Mound Prairie area was obtained during the course of the Texas Archeological Society (TAS) survey effort, but commensurably less was gathered on the historic Anglo-American and African-American settlement because most of the historic sites and components discovered date principally to the first and second quarters of the 20th century when large numbers of tenant farmers lived in the area (cf. Harper 1996a:496). Nevertheless, information on settlement locations, the presence of cultural features at some sites, and the recovery of substantial samples of prehistoric (n=9360) and historic (n=4934) artifacts from many sites (Tables 1 and 2), allows us to begin discerning diachronic and spatial changes in land use patterns along the Red River and Big Pine Creek.

Prehistoric archeological sites are thickly distributed along Big Pine Creek and Salt Well Slough (Figure 2), primarily in immediate proximity to the Caddo-era Roitsch village, but extending downstream to the Dan Holdeman site. Most are situated on sandy loam soils on the edge of alluvial

Table 1.
Summary of Prehistoric Artifacts from 1991-1992 TAS Survey Sites.

dart points	62	
arrow points	33	
arrow point preform	3	
bifacial preform	40	N=212
bifacial tool fragment	14	
gouge	1	
flake tool	57	
flake drill	2	
ground stone tool	17	
pitted stone	2	
mano	6	
grinding slab/metate	9	
celts	35	N=87
axe (?)	1	
hammerstone	12	
battered cobble	5	
lithic debris	2646	
celt lithic debris	6	N=3003
cores	54	
fire-cracked rock	297	
plain sherds*	790	
decorated sherds*	27	
decorated shell-tempered	259	
plain shell-tempered	4037	N=5601
shell-tempered vessel sections	7	
plain grog-tempered	314	
decorated grog-tempered	158	
grog-tempered vessel sections	9	
Red River pipe sherds	4	
Elbow pipe sherds	2	N=6
daub/burned clay	446	
mud-dauber nest pieces	5	N=451
Total Prehistoric Artifacts		N=9360

* temper analysis was not conducted on these sherds

Table 2.
Historic Artifacts from the TAS 1991-1992 Survey Sites

STRUCTURAL/ARCHITECTURAL (n=114)	
Square Cut Nails	14
Wire Nails	31
Brick Fragments	37
Daub	22
Window Glass	9
Iron Screw	1
TOOLS (n=52)	
Metal Tool Fragments	51
Iron Saw Blade	1
HORSE & STABLE (n=47)	
Metal Agricultural Items	32
Horse/Mule Nails	2
Horseshoe	2
Mule Shoe	1
Barbed Wire Pieces	8
Plow Part	1
Metal Ring/Chain	1
KITCHEN/DOMESTIC (n=4648)	
Metal Cooking Pan	1
Cast Iron Pieces, Stove/Kettle	6
Metal Utensil (Knife?)	1
Metal Spoon	1
Tin Can Fragments	6
Bottle Glass	2583
Tableware Glass	8
Milk Glass	182
Zinc Fruit Jar Lid	1
Fruit Jar Glass	9
Plain Whiteware	1281
Whiteware Teacup Handle	3
Decorated Whiteware	140
Burned Whiteware	10
Decorated Ironstone	2
Plain Porcelain	53
Decorated Porcelain	13
Porcelain Vase	2
Porcelain Doll Parts	1
Porcelain Figurine	1

Table 2. (*Continued*)

Whiteware Maker's Marks	31
Red ware	2
Yellow ware	6
Stoneware	305
CLOTHING/ADORNMENT (n=16)	
Porcelain Button	10
Brass Overall Button	3
Metal Button	1
Metal Buckle	1
Shell Button	1
FIREARM-RELATED (n=9)	
Lead Ball	1
Lead Bullet	1
Shell Casings	7
PERSONAL USE (n=16)	
Coins	1
Kaolin Pipe stem	1
Clay Stoneware Pipe	2
Slate Writing Tablet	5
Glass Marble	5
Clay Marble	1
Pocket Knife	1
HOUSEHOLD FURNISHINGS (n=7)	
Porcelain Door Handle	3
Chimney Glass	2
Plumbing Fitting	1
Metal Latch	1
MISCELLANEOUS (n=25)	
Rubber Pieces	24
Plastic Pieces	1
TOTAL ARTIFACTS	4934

terraces, or are located on natural rises on such landforms. A few of the sites, almost exclusively Late Caddo period in age (such as the salt-making sites discussed below) and containing quantities of shell-

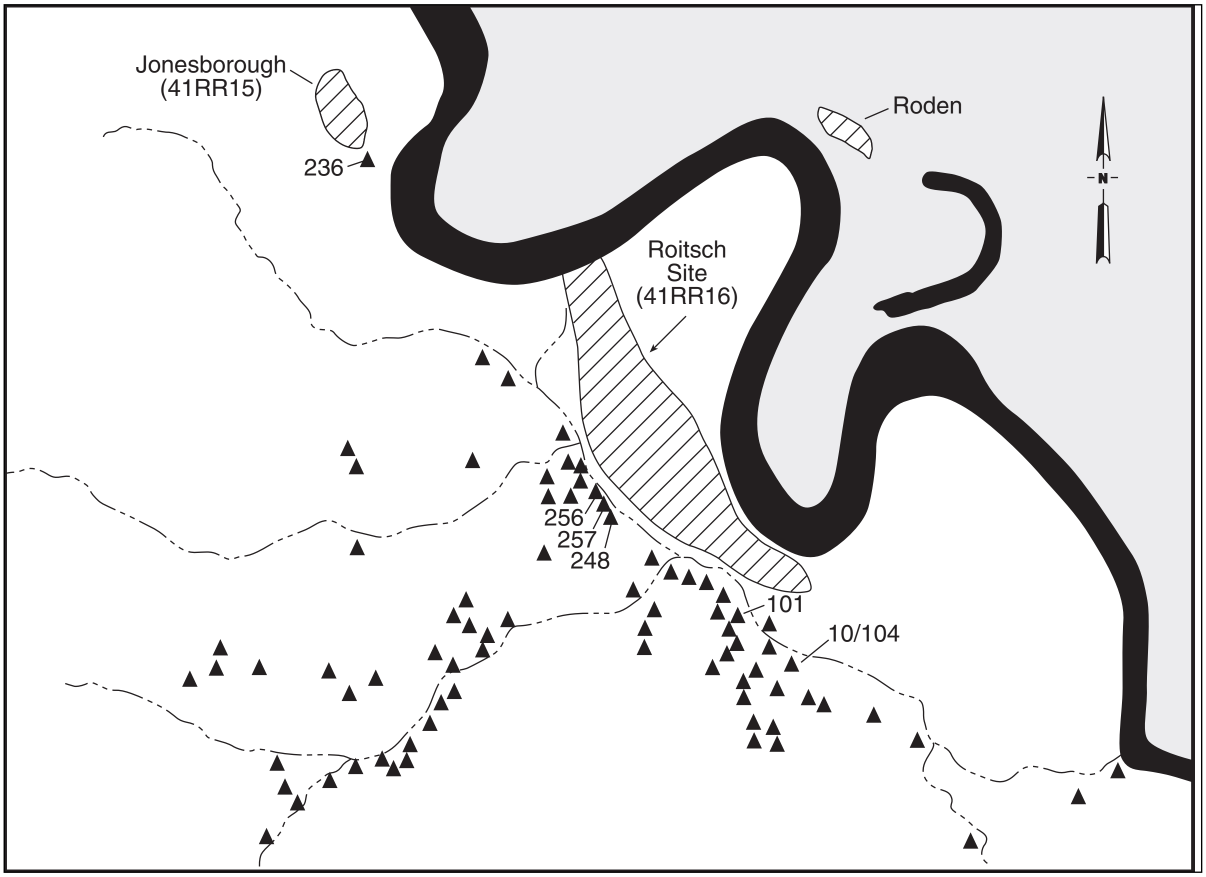

Figure 2. Distribution of Prehistoric Sites on the Roitsch Farm, and in the vicinity of the A. E. Roitsch site (41RR16).

tempered sherds and daub/burned clay, occur on a band of dense clays that parallels Salt Well Slough and Big Pine Creek below its confluence with Salt Well Slough. A similarly dense cluster of prehistoric sites is apparent along the edges of alluvial terraces around the Wright Plantation site (Figure 3).

Of the 109 sites recorded on the Roitsch, Holdeman, and Tarrant/Wright farmlands, 89 percent had evidence of at least one prehistoric occupation. The recovery of diagnostic projectile points and ceramics (especially decorated sherds or sherds with shell tempering) from surface collections, shovel tests, and a few 1 x 1 m units (see Table 1 and Appendix II), suggests that there were two peaks in periods of settlement: from the Late Archaic (ca. 2000 B.C. to A.D. 200) through the Woodland (ca. A.D. 200-A.D. 800) period, and then again during the Late Caddo period, specifically during the McCurtain phase (ca. A.D. 1300-1650/1700). However, finds from the sites in the TAS survey area, including information obtained from the excavations at Roitsch and Fasken (see Perttula, ed., this volume; Perttula et al. 2001; Prikryl, this volume), also indicate that the area was utilized by Native Americans from Paleoindian times to about A.D. 1700 or later.

Many of the Late Archaic and Woodland period sites probably represent small, seasonally occupied forager camps, although at least a few of the Woodland period sites (such as 41RR101) have middens and dense occupational refuse. These types of sites are very similar to the Ray site (41LR135; see Bruseth et al. 2001) in that they contain thick grog-tempered pottery, and thus they may be small homesteads occupied on a multi-seasonal or year-round basis; structures and cooking/storage features are probably preserved in the archeological deposits from such sites.

Only four (4.5 percent) of the prehistoric sites have identifiable Formative (ca. A.D. 800-1000) to Middle Caddo period (ca. A.D. 1100-1300) occupations, probably farmsteads. One such habitation site near Fasken, site 41RR206 (see Part II of this article), has a discrete midden deposit and an abundance of prehistoric ceramics and stone tools. It probably represents one small part of the dispersed Caddo community around this 11th-13th century

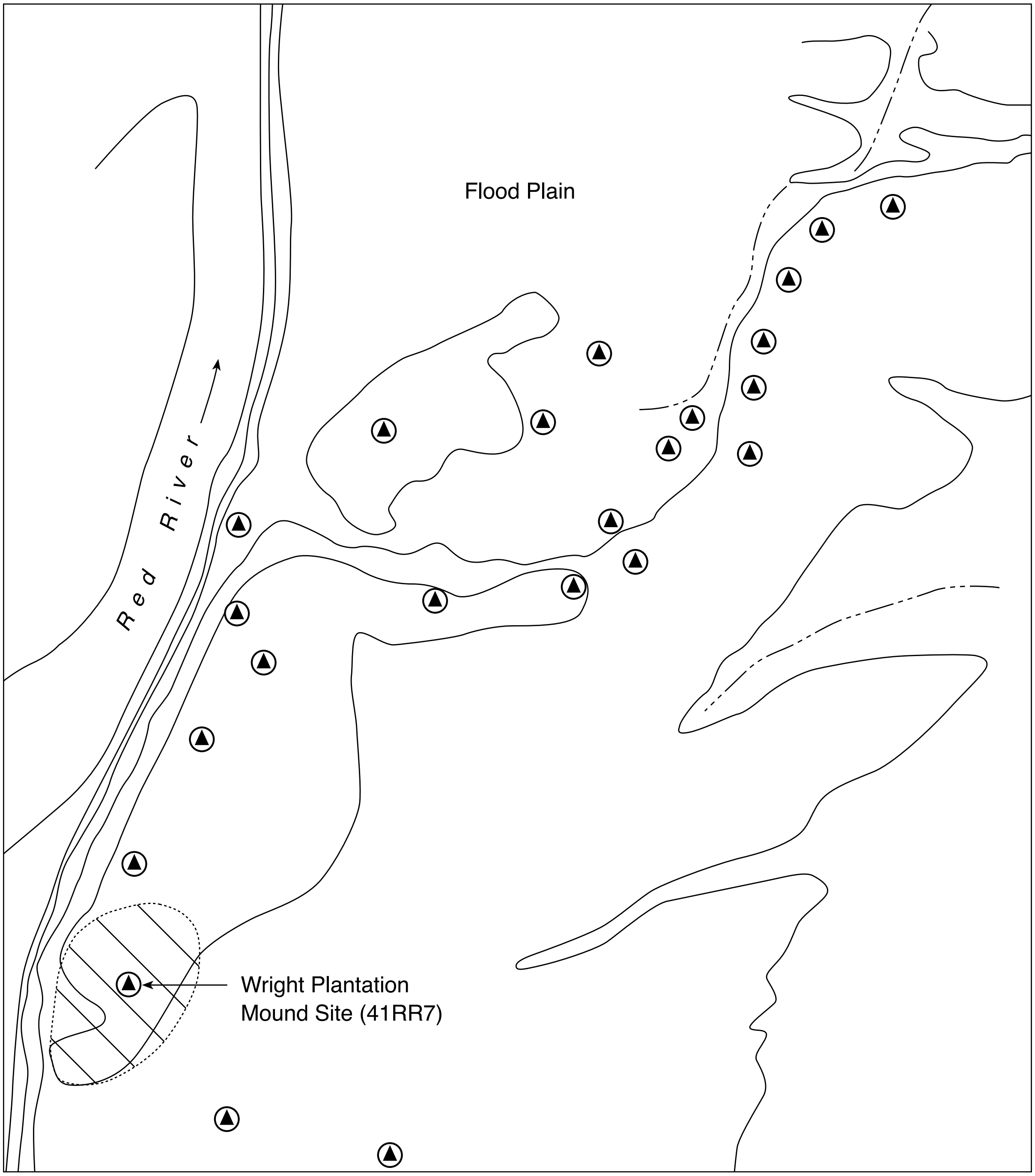

Figure 3. Distribution of Prehistoric Sites on the Tarrant and Wright Farms in the vicinity of the Wright Plantation site (41RR7).

civic-ceremonial center (see Prikryl, this volume). The Formative to Middle Caddo component at the Holdeman site (41RR11), on a broad and low alluvial terrace of the Red River, is represented by at least one earthen mound that covered a circular house and a small Formative Caddo period cemetery (Perino 1995; Perttula 1995), as well as extensive village remains from a large settlement.

The Late Caddo period, McCurtain phase, settlement of the Big Pine Creek and Salt Well Slough areas was extensive, as was expected (cf. Bruseth 1998; Harris 1953; Skinner et al. 1969). The habitation sites are characterized by shell-tempered ceramics, small triangular arrow points, and some quantities of daub or burned clay. The sites are presumed to represent dispersed farmsteads, or compounds of farmsteads, that are associated with the larger village community at the Roitsch site. The habitation sites are typically small in size, may or may not contain middens, and generally are not characterized by large quantities of material culture remains; this suggests short (perhaps a few years) occupations by prehistoric Caddo farmers. Some of these sites contain family cemeteries, as at 41RR10/104 on Big Pine Creek (cf. Hampton and Moore 1936). Other Late Caddo components include three salt-making sites on Salt Well Slough, not including the Salt Well Slough site (41RR204; see Kenmotsu 2006), as well as a few components that simply contain a few triangular arrow points from either hunting/refurbishing camps and/or from hunting losses.

A much larger Late Caddo occupation was defined at the Holdeman site during our 1992 TAS investigations. Holdeman appears to have been a substantial village during Late Caddo times, as it contains abundant artifacts (mainly shell-tempered ceramics) and features, as well as numerous cemeteries, marking clusters of Caddo houses of this age spread across a large alluvial terrace of the Red River. During deep plowing of one portion of the site in 1992, the landowner exposed considerable Late Caddo habitation debris and broken vessels from disturbed burials across a spring branch from the Formative Caddo mound mentioned above, and Perino (1995) excavated some 30 burials from this area in the early 1980s before land-leveling activities; other cemeteries and structures were disturbed by pipeline construction before that in several other locales within the boundaries of the site (see Briscoe 1995). In most particulars, the archeological deposits at the Holdeman site during the Late Caddo occupation are thought to be quite comparable to the village areas at Roitsch (Blocks III-IV) (Perttula et al. 2001; Perttula, ed., this volume; see also Banks and Banks 2002), Bob Williams (Perino 1983), and Rowland Clark (41RR77), another contemporaneous Late Caddo village a few km downstream from Holdeman on the Red River (Perino 1994).

Understanding the Village Structure of Caddoan Groups on Mound Prairie

Based upon the 1691 Domingo Teran de los Rios map of a Red River Caddo community (probably downstream from Red River County, near the Hatchel site in Bowie County, Texas, see Wedel 1978) and ethnographic descriptions of the dispersed nature of Caddo settlement in East and Northeast Texas (see Foster 1998), it was expected that in addition to the larger Late Caddo communities with mounds (as at Roitsch) the settlement system would also be comprised of individual farmsteads, hamlets, and small villages (Bruseth et al. 1992:10, 22). It was uncertain whether such a model of settlement would also be applicable to Formative-Middle Caddo period communities in the Mound Prairie area.

The archeological survey data from the Roitsch Farm does suggest that there are clusters of contemporaneous Late Caddo period farmsteads and ancillary sites located immediately to the south and west of the Roitsch site along old channels of the Red River (now used as channels by Big Pine Creek and Salt Well Slough). No evidence was recovered in the survey to indicate that larger Late Caddo hamlets or villages occur away from the river itself, as all the non-salt-making sites along Big Pine Creek and Salt Well Slough seem to have been about the size to contain individual houses, small trash middens, and a household cemetery. The dispersion of Late Caddo remains at Holdeman suggests that a number of presumably associated household compounds are present there (as they are in the extensive village at the Roitsch site; see Perttula et al. 2001; Perttula, ed., this volume), but the village lacked a mound during this occupation.

The low number of Formative-Middle Caddo period sites in the survey areas argues against the same type of dispersed settlement system as characterized the Late Caddo period adaptation in the Mound Prairie area. The few sites of this period that were identified during the TAS Field School occur only in immediate proximity to Roitsch, Fasken, Wright Plantation, and Holdeman, each being large civic-ceremonial villages with mounds. This suggests that populations during Formative-Middle Caddo times were mainly concentrated in a few optimal locales along the Red River, but became more dispersed in Late Caddo period times to suitable habitats to cultivate crops and gather salt.

Caddo Salt Processing

In addition to the salt processing site at Salt Well Slough (41RR204; see Kenmotsu 2006), three other Late Caddo period salt making sites (41RR248, 41RR256, and 41RR257) have been identified immediately south of the Salt Well Slough site along

Salt Well Slough below its confluence with Pond Creek. Known salt-making sites, on intractable clay soils, extend for at least 800 m along high ground immediately adjacent to the slough.

These sites contain extremely abundant surface and buried archeological deposits of large, shell-tempered Nash Neck Banded and Emory Punctated-Incised jar sherds, with only a few other kinds of decorated sherds (mainly Avery Engraved), large quantities of burned clay (and daub), and evidence from shovel testing of burned and oxidized soils; few chipped or ground stone tools or pieces of lithic debris have been found at these sites (see Part II and Appendix II). Our inference that these are salt-making sites hinges on the fact that Salt Well Slough is fed by a salt spring, on the findings of features and burned areas from the Salt Well Slough site, the chemical analysis of soils and sherds from the latter site, and comparisons with other salt-making sites in southwestern Arkansas and northwestern Louisiana (cf. Early 1993; Girard 2006; Kenmotsu 2006). Despite the extensive amounts of broken sherds and daub at the Salt Well Slough site, no evidence of discrete habitation areas was recognized during the archeological investigations there.

Anglo-American Settlement and Trade

The recorded historic archeological sites are the remnants of homesteads and tenant farms occupied principally between 1860 and 1950. These sites contain a variety of material culture items (see Table 2), principally including ceramics and bottle glass from kitchen/domestic use (94 percent), along with nails, bricks, and window glass from the construction and repair of structures (2.4 percent), metal tools, horse and stable items, clothing buttons and buckles, firearms, household furnishings, and items for personal use. Of the 56 archeological sites that have historic archeological components, only 12.5 percent have occupations that predate 1900, while another 23 percent may have had 19th century occupations but the archeological material remains are equivocal. One late 19th century cemetery (41RR235) was recorded on the upper reaches of Salt Well Slough (Figure 4).

Early 19th century artifacts (English transfer-printed and hand-painted ceramics, dark green bottle glass, square nails, and metal implements, etc.) have been found in some quantity at Jonesborough (see Reese 2001; Perttula and Reese 2001), as well as on Mound B at Fasken (see Prikryl, this volume), and similar material remains have been documented in the R. K. Harris collection (now at the National Museum of Natural History, Smithsonian Institution, Washington, D.C.) from the Wright Plantation site (41RR7) and several sites on the Tarrant lands examined by the Northeast Texas Archeological Society (see Part II below, and Nelson et al. 1995). However, clear Antebellum Anglo-American or early 19th century Native American sites were not identified in the TAS Field School survey.

Nevertheless, the historic sites are widely dispersed across the Roitsch Farm (see Figure 4), but they are especially common on high ground between Big Pine Creek and Pond Creek, but off of the Late Holocene alluvial terraces where the Roitsch site is situated. The few historic sites that were occupied only in the 19th century appear to be along landforms paralleling the tributaries of Red River, particularly Big Pine Creek (for example, site 41RR266, see Part II), rather than on the river itself. These landforms were probably chosen for settlement to avoid the regular and often devastating flooding along the Red River in modern times.

These historic farmsteads cluster around the old and abandoned community of Blakeney (see Hazlewood 1996:580), along the roads that ran from the late 19th-mid-20th century towns of Manchester and Davenport (near Jonesborough), and immediately north of Pond Creek where an unnamed 20th century community of tenant farmers lived. This particular community was reported to have had as many as 15 separate farmsteads and a blacksmith shop, and a general store was thought to have been in the area as well. The TAS survey of that area recorded six ca. 1900-1930 farmsteads (41RR215, 41RR222-41RR225, 41RR227), and through systematic surface collections recovered a large sample of domestic artifacts associated with each of the farms (see Appendix III).

On the Tarrant and Wright farms, 19th and 20th century sites are also concentrated on high alluvial terraces along the Red River (Figure 5). Many of the historic sites date to the late 19th-mid-20th century and represent farmsteads and later tenant farms associated with the large cotton-producing Wright Plantation, established in the early 19th century (see Steely 1982). Unlike the Roitsch farm lands, a number of the Tarrant and Wright farm sites have ca. 1830-1860 archeological deposits and material culture remains, particularly refined English earthenware, locally-produced stonewares, English wine

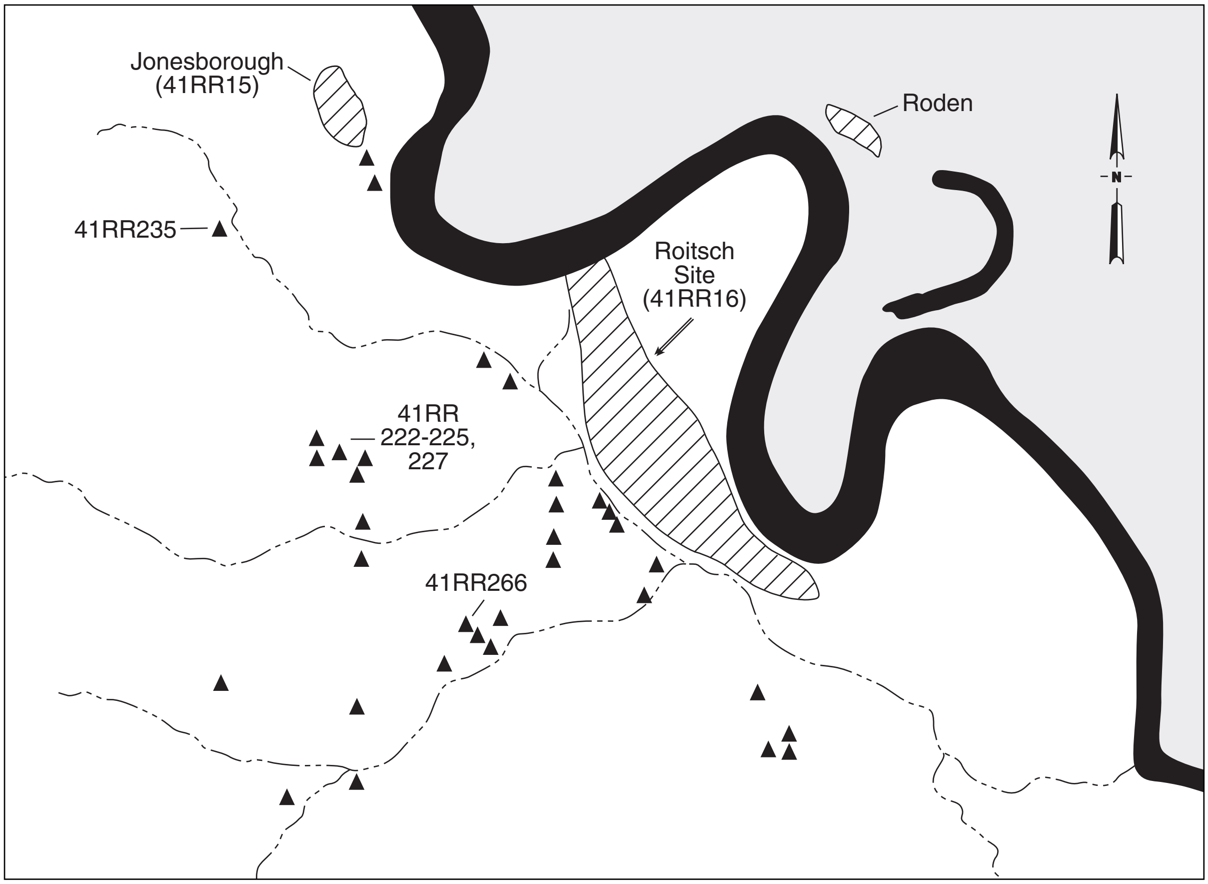

Figure 4. Distribution of 19th and 20th Century Archeological Sites on the Roitsch farm, and in the vicinity of the Jonesborough site (41RR15).

bottles, and other assorted items. Clearly, there was a substantial antebellum occupation at the confluence of the Kiamichi and Red rivers.

In general, the archeological and historical research significance of late 19th and early 20th century farmsteads like those recorded during the TAS Field Schools remains unexplored in Northeast Texas, as it does in much of Texas (Denton 1999). Little substantive archeological, archival, and/or historical research has been completed on rural agricultural settlements in the Northeast Texas region outside of the Cooper Lake project area on the South Sulphur River (see Fields et al. 1997; McGregor et al. 1996). Nevertheless, should further archeological investigations demonstrate that intact deposits, features, and material culture items remain at any of the farmstead sites, they have the potential to contribute important information on the history and settlement of the Red River valley, and a better understanding of a broad range of research themes (cf. Jurgelski et al. 1996:69-71), including the: (a) architectural and material culture correlates of social status, (b) settlement patterns/spatial organization, (c) subsistence/economic organization, (d) community structure/social organization, (e) visibility of ethnic differences, and (f) diversity in Upper and Lower South cultural lifeways and adaptations along the middle reaches of the Red River.

PART II

SITE DESCRIPTIONS

This section presents detailed descriptions of each of the sites recorded during the 1991 and 1992 Texas Archeological Society (TAS) Field School in Red River County, Texas. As previously mentioned, a number of sites had already been recorded on the Roitsch farm, and on other farms along the Red River, some as early as 1936, but most in 1972

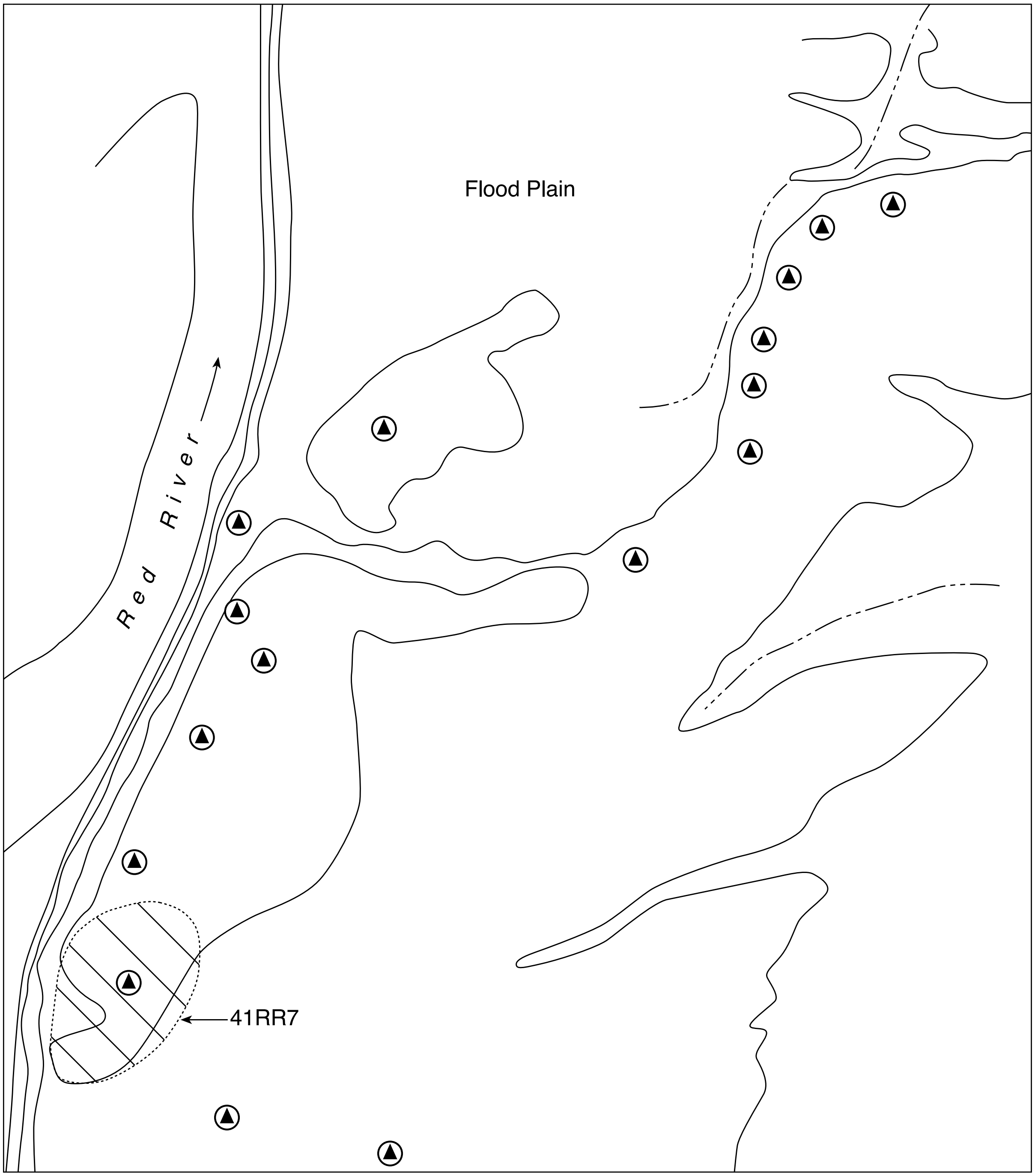

Figure 5. Historic Sites on the Tarrant and Wright Farms.

(Hyatt and Mosca 1972) during an archeological survey of the proposed Big Pine Reservoir completed by Southern Methodist University (SMU).

The site descriptions present basic information on site setting, known integrity, size and depth (when determined), types of artifacts recovered from surface collections and shovel testing (or 1x 1 m units in the case of 41RR101 and 41RR236; see also Appendix II and III), the age of the site, and considerations of site significance. Site maps are included for those sites that are considered to possess research potential; other pertinent information (site forms, shovel test forms, etc. are on file at the Archeology Division, Texas Historical Commission and the Texas Archeological Research Laboratory at The University of Texas at Austin [TARL]).

41RR10/41RR104, Howard Hampton Place

Site 41RR10 was originally recorded by Howard Hampton and George Moore (1936). During the 1932 grading of FM 410 across the alluvial rise, a Late Caddo period McCurtain phase (probably late in the McCurtain phase, after ca. A.D. 1500) cemetery was exposed, and looting began. Hampton and Moore (1936) report that nine extended burials were found in the cemetery, and included as funerary objects with the burials were a number of ceramic vessels (including Avery Engraved, Simms Engraved, and Nash Neck Banded; see Hampton and Moore 1936:Plates X and XI) along with a stone pipe. They also noted pottery sherds, mussel shell, fire-cracked rock, arrow points, and drills on the surface of the site. TARL has a small amount of engraved and plain shell-tempered pottery from the Howard Hampton Place. During the SMU survey, a small amount of lithic debris, an arrow point preform, and plain shell (n=3) and grog- and grit-tempered (n=6) pottery was collected from a 45 m diameter area of the site surface (Table 3).

The Howard Hampton Place site was in pasture when it was visited by the TAS. The alluvial rise, bisected by FM 410, covers about 2000 m^2 (we did not have landowner permission to survey the eastern half of the site, and thus it is expected that the site is a good bit larger) and it is 3 m above the Big Pine Creek floodplain. A few pieces of lithic debris and a ground stone tool fragment were visible on a slightly higher part of the rise, and two shovel tests were placed there to determine if there were subsurface cultural deposits still preserved at the site. The soil (Desha clay) is a very plastic clay (see Thomas 1977), and difficult to excavate, but one of the two shovel tests contained a single plain pottery sherd at ca. 15 cm bs.

Although it appears that the site only contains sparse cultural materials, the previous discovery of a small Late Caddo, McCurtain phase cemetery on the rise suggests that remnants of an associated farmstead may be present nearby as well. The road construction and plowing have adversely effected the site, and the shallow clayey soils are a constraint to excavations, but we believe this site may still has some research potential, particularly in conjunction with local and regional archeological investigations of the Late Caddo McCurtain phase. The plain grog- and grit-tempered pottery from the Howard Hampton Place is probably from an earlier Caddo

Table 3. Artifacts Collected by SMU from Selected Big Pine Creek Sites.

Site*	Ceramics	AP**	DP	Tools/Cores	FCR	LD	Daub	Hist	Totals
85	–	–	2	24	57	91	6	2	182
99	2	1	7	14	45	85	–	–	164
100	97	–	1	23	20	76	–	–	218
101	–	–	–	6	30	125	–	–	161
102	4	–	1	9	12	95	–	–	121
103	–	–	–	–	4	9	–	–	13
104	9	1	–	1	–	3	–	–	14
105	24	–	–	3	2	16	1	–	46
106	5	–	–	1	1	11	–	–	18
107	–	–	1	1	1	15	–	–	18
109	43	–	–	–	–	–	15	–	58
110	18	1	–	7	–	53	–	–	79
111	15	–	–	–	–	1	–	–	16
112	3	–	–	1	1	20	–	–	25
119	–	–	–	1	2	11	–	–	14
129	–	–	–	1	3	3	–	–	7

*All numbers preceded by "41RR"

** AP=arrow point; DP=dart point; FCR=fire-cracked rock; LD=lithic debris; Hist=Historics occupation, dating prior to A.D. 1300, when these temper inclusions were common in the ceramics.

41RR11, Dan Holdeman Site

The Dan Holdeman site is a major prehistoric Red River Caddo village, comparable in scope and character to the Roitsch-Williams (41RR16) and Rowland Clark (41RR77) villages a few miles upstream and downstream from the site, respectively (see Skinner et al. 1969; Perino 1983, 1994). The site was also occupied during Paleoindian and Archaic times, as well as during the 19th century as part of the Houser Plantation (see summary in Briscoe 1995), but the major occupation(s) took place in the Formative Caddo period, the Middle Caddo Mound Prairie phase (locally equivalent to the Sanders phase, see Perttula, ed., this volume: Table 1), and in Late Caddo McCurtain phase times. There are thought to have been four earthen mounds constructed at the Dan Holdeman site during the Caddo occupation (see Briscoe 1995), possibly all of them during the extensive Mound Prairie phase occupation of the site.

The site is situated on low and high alluvial terraces immediately overlooking the floodplain and current channel of the Red River (see Perino 1995:Figure 1), and covers about 25-30 acres of the terraces (Figure 6). The western edge of the Dan Holdeman site is State Highway 37, which earlier

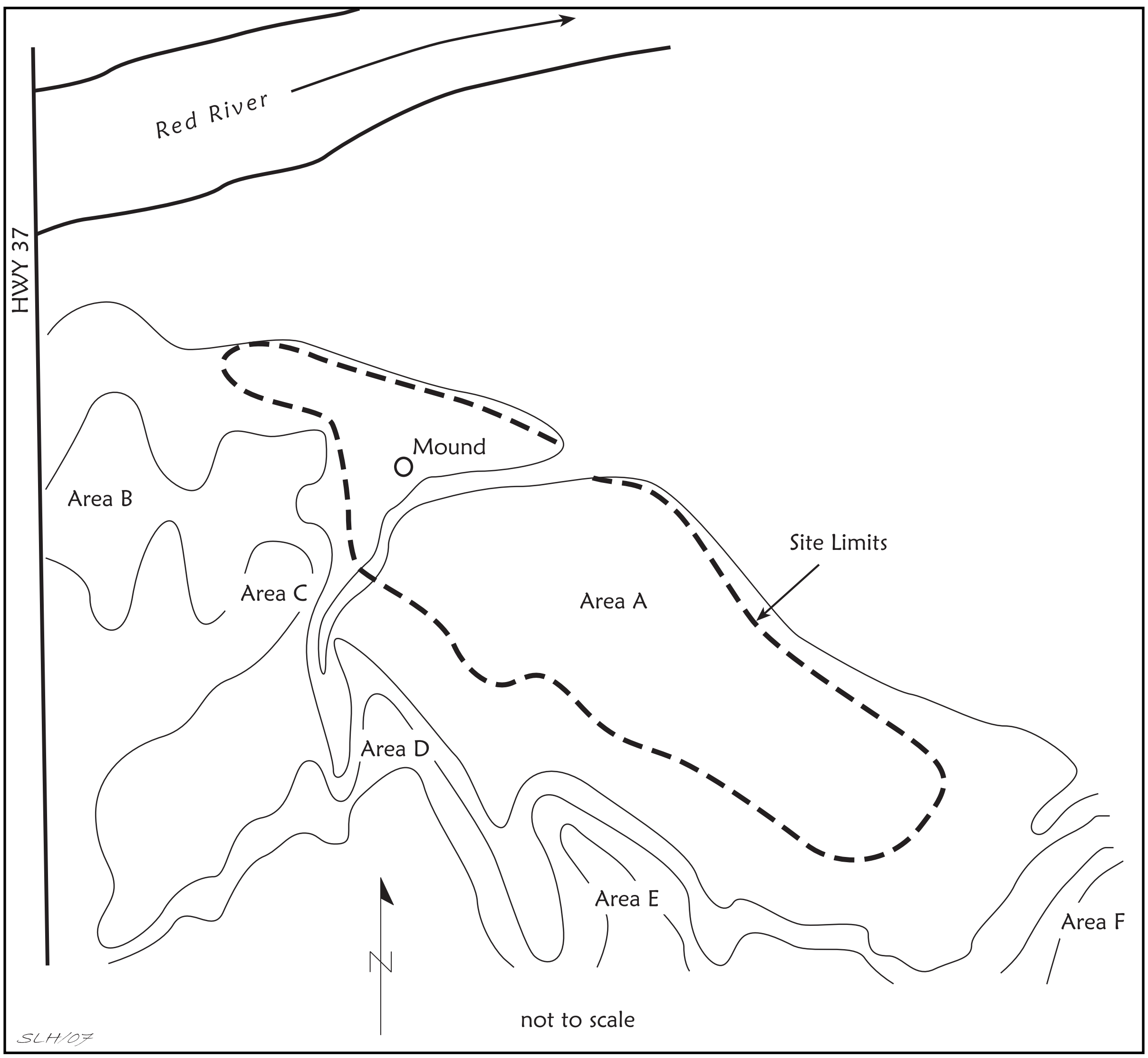

Figure 6. The Dan Holdeman Site, after Perino (1995:Figure 1).

in the 20th century ended at the Albion Ferry along the south bank of the Red River. The terraces have been cultivated for crop lands for more than 100 years, and erosion and topsoil removal has been severe in some areas (as much as 60 cm according to Perino [1995]). More recently, within the last 10 years, several areas of the site have been bulldozed and leveled by the landowner to create new fields and drainage ditches, and a pipeline cut across the terrace had impacted parts of several Caddo period cemeteries.

It appears that the site was first recorded in the early 1930s by the University of Texas as the J. R. Houser Plantation at the village of Albion, and notes on file at TARL state that a Red River flood in the late 1920s exposed several burials and ceramic vessels on the plantation. TARL collections from the site (then with the trinomial 41RR13; the current site boundaries for the Holdeman site include the J. R. Houser Plantation) include marine shell beads, catfish spines, and *Lithospermum* sp. beads.

The next archeological investigation at Dan Holdeman was by the Museum of the Red River between 1983-1985 when the Museum held a summer field school there (Perino 1995), along with two short periods of work to salvage portions of prehistoric Caddo cemeteries slated for immediate bulldozing and land leveling by the landowner. In essence, Perino's work focused on the excavation of a Mound Prairie phase mound, which covered a 5 x 6 m rectangular structure as well as a few Formative Caddo features (pits, hearths, dog burials, and portions of one or two structures) and graves; during the McCurtain phase a small cemetery was placed atop the mound by the Caddo, comparable to the Caddo's use of the East Mound at the Roitsch site (see Perttula, ed., this volume; Skinner et al. 1969; Harris 1953). Perino also conducted limited excavations in two Mound Prairie phase and/or McCurtain phase cemeteries south of the earthen mound (Figure 7; see Perino 1995; Perttula 1995). The poorly preserved skeletal remains from these Caddo cemeteries have been analyzed by Loveland (1987, 1994), and the Caddo populations living there were similar in their diet and health conditions to contemporaneous populations from Roitsch, Bob Williams, and Rowland Clark.

The TAS investigations at the Dan Holdeman site in 1992 came about at the request of Mr. Dan Holdeman, the landowner. He asked the TAS to investigate a large plowed field south of the mound that he had just deep-plowed, exposing large quantities of prehistoric cultural materials, including major sections of reconstructable Caddo ceramic vessels. This field (see Figure 6) is the same as Area A in Perino (1995:Figure 1).

Our investigations over parts of two days consisted of mapping the distribution of artifacts across the plowed field, defining specific concentrations of artifacts (designated TAS areas A-D) and possible features (Figure 8), and carrying out a selective surface collection (of temporally or functionally diagnostic ceramic and lithic artifacts) in the plowed field and one area near State Highway 37 where a 19th and 20th century archeological deposit had been exposed by erosion (cf. Briscoe 1995). No excavations or shovel tests were conducted at the site at the request of Mr. Holdeman other than a shallow 2 x 2 m unit to expose a number of disturbed vessels in TAS area A (see below).

At the conclusion of the TAS work, Mr. Holdeman provided us with more information on the archeological deposits at the Holdeman site. He has prepared a scaled map (using the pipeline that cuts across the site as a datum line) of features (primarily human burials) exposed on the site since he became the landowner; it also has plottings of some of the areas where Perino worked in the 1980s. This information has proved to be particularly useful since Perino's (1995) original MS did not contain a map with complete provenience information on his excavation areas (for instance, the location of the cemetery areas off the mound was not provided in Perino [1995]). Holdeman's map indicates that there are several Caddo cemeteries on the low alluvial terrace, both east and west of the spring branch, now a drainage culvert (see Figure 7); the pipeline through the site has disturbed these cemeteries.

Most recently, Briscoe (1995) conducted a survey along the western margins of the Holdeman site as part of the abandonment of the OkTex pipeline and tie station. While the pipeline abandonment itself was determined to have no effect on significant archeological deposits, principally because only a small area was involved and it had been disturbed many years ago during construction of the State Highway 37 bridge, Briscoe (1995) did locate a substantial McCurtain phase archeological deposit in the vicinity of the tie station; daub and ceramics were particularly abundant. Mike Turner (1994 personal communication) also has noted a 10-15 m long concentration of daub in the same site area that suggests that one or two burned Caddo structures are

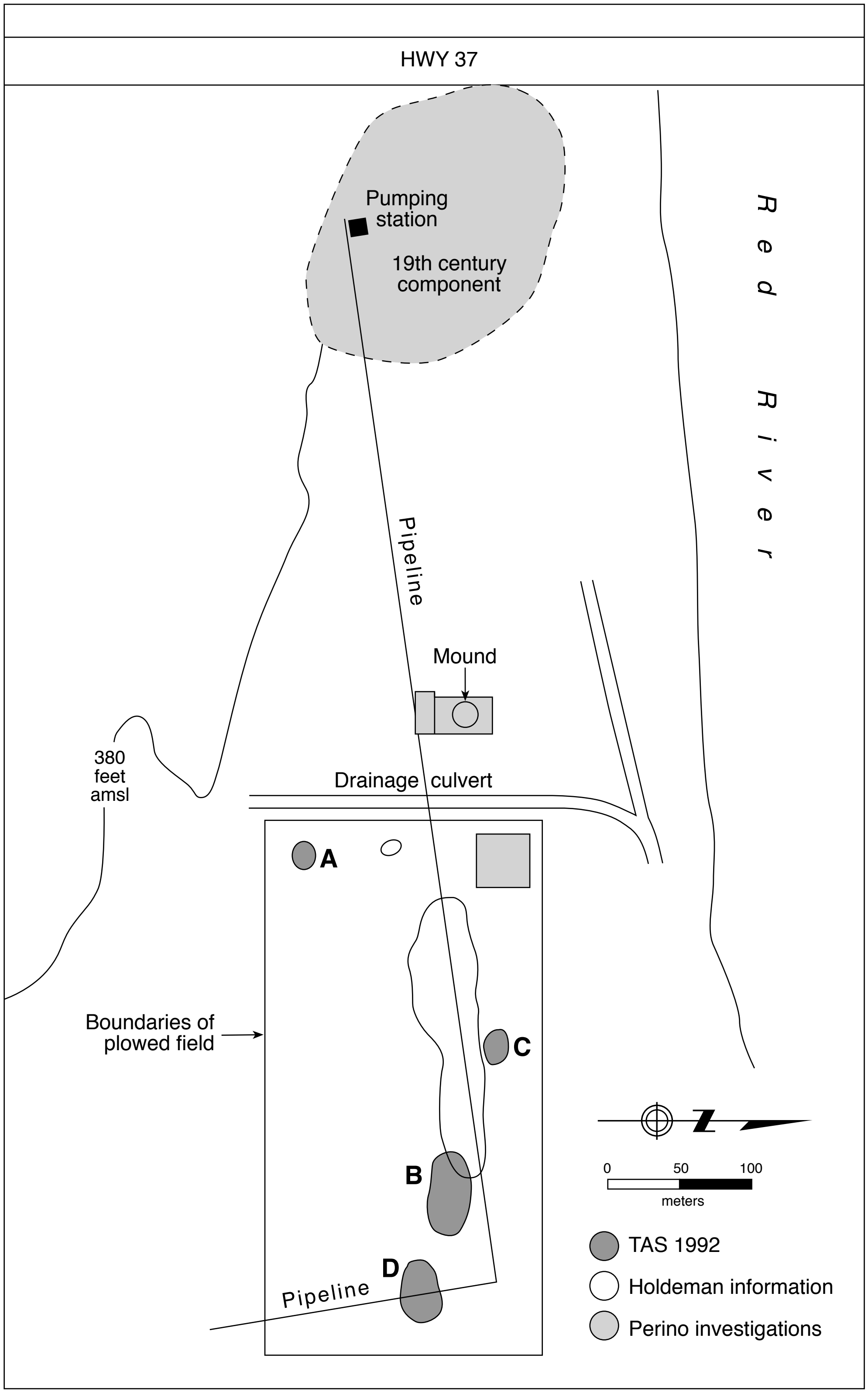

Figure 7. Museum of the Red River Investigations, Dan Holdeman information, and location of the 1992 Texas Archeological Society investigations in Area A of the Dan Holdeman Site.

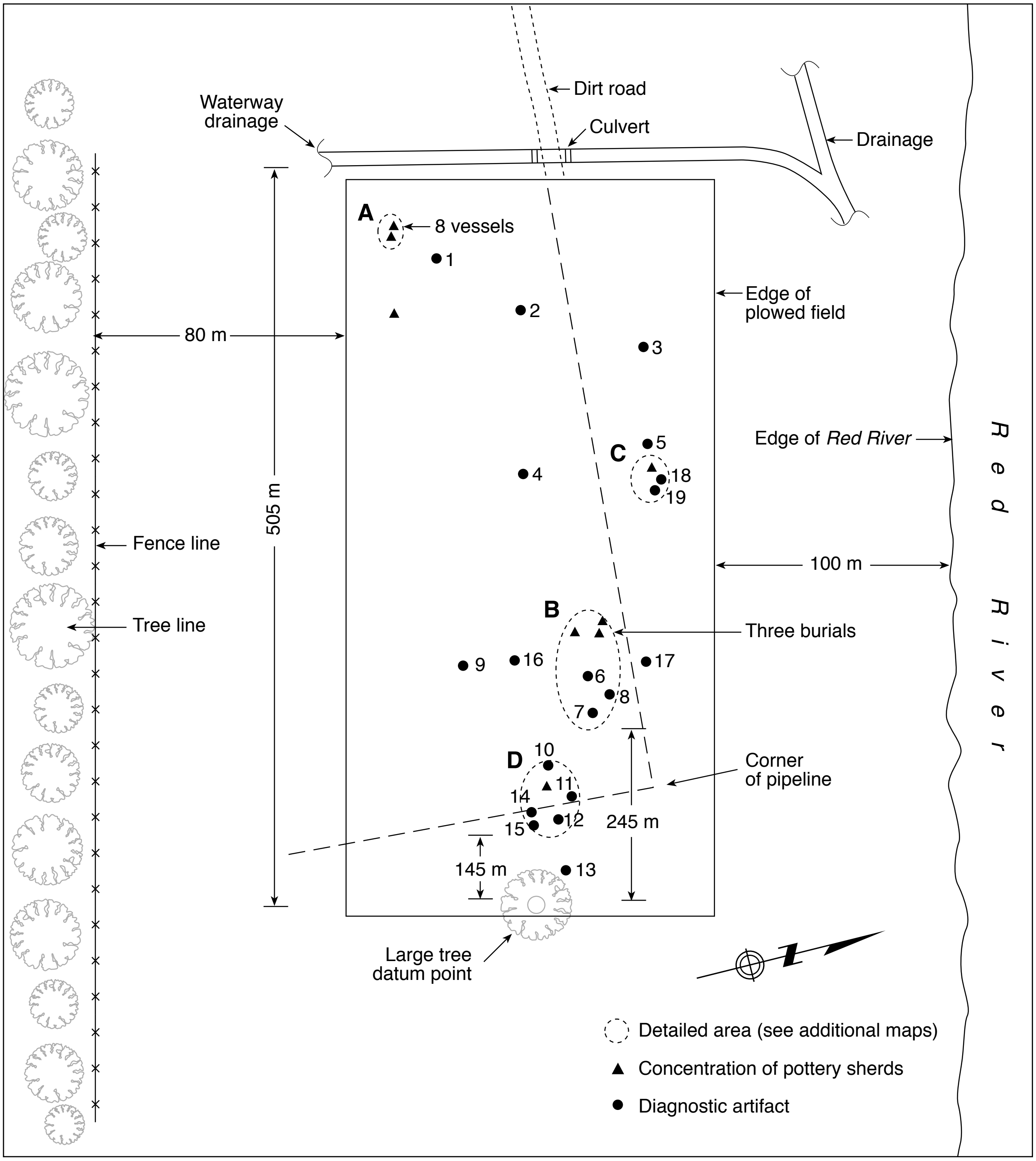

Figure 8. TAS Investigation Areas A-B, within Perino's Area A at the Dan Holdeman Site.

present there. This was exposed after Mr. Holdeman excavated a long trench in the area to remove the pipeline that ties in with the OkTex pipeline.

As mentioned above, the TAS work at the Dan Holdeman site focused on a large (500 x 200 m, ca. 25 acres) plowed field on the low alluvial terrace (see Figure 8). The crews systematically examined the field, noting and mapping the locations of diagnostic lithic and ceramic artifacts (which were numbered from 1-19, although other unnumbered diagnostic artifacts were collected from Area B) as well as four larger areas (areas A-D) where artifacts (especially ceramic sherds from recently broken vessels) were particularly concentrated. At the completion of the mapping of the field and areas A, B, and D, the diagnostic artifacts were collected for study.

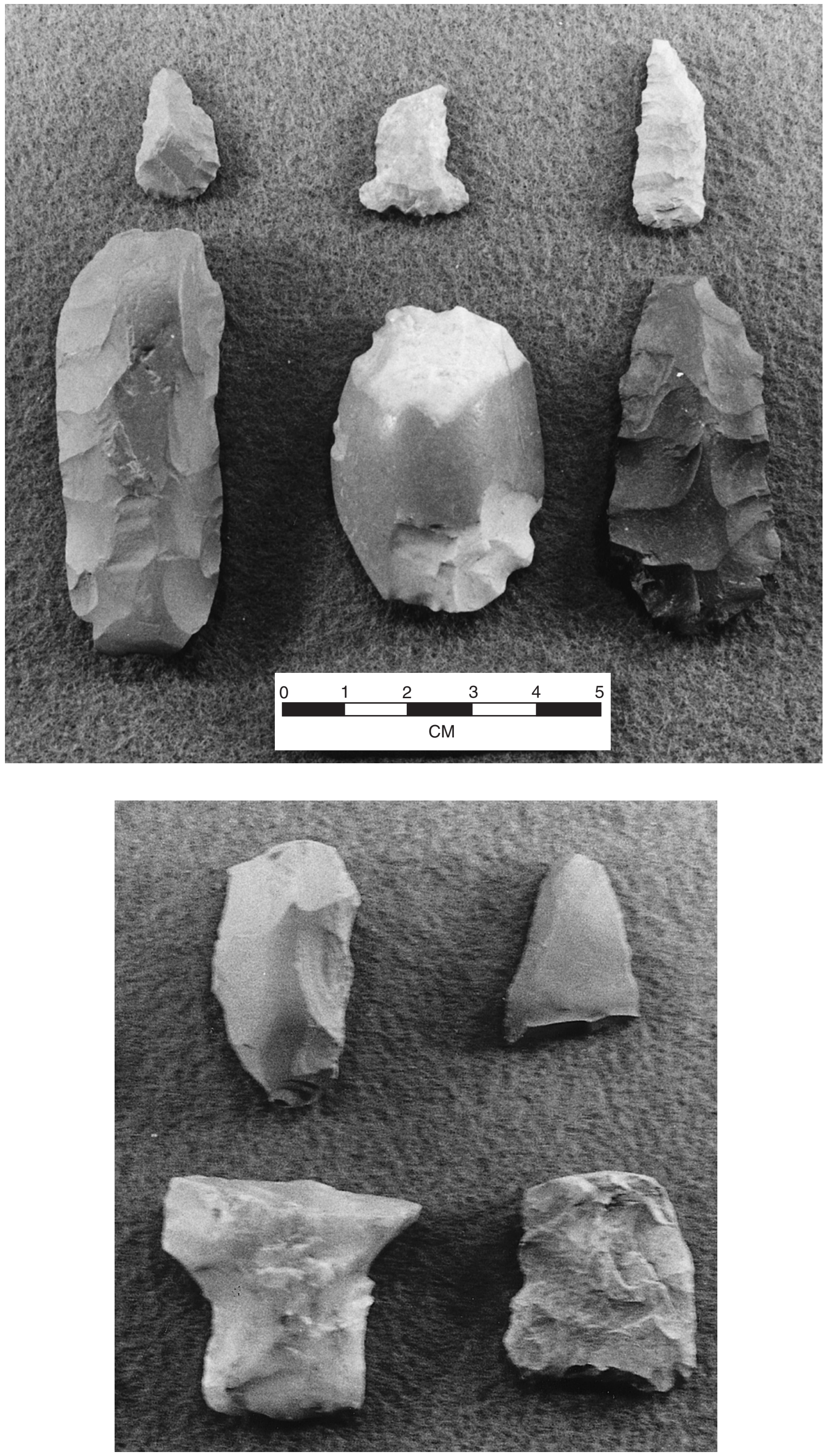

Figure 9. Archaic and Woodland period tools from the Holdeman Site.

Archaic and Woodland period diagnostics from the low terrace at Dan Holdeman include a variety of stemmed and corner-notched dart points, principally Gary points, but also including Ellis, Godley, and Bulverde types, as well as other tools (Figure 9). Interestingly, these were recovered exclusively in and around areas B and D at the east end of the field (see Figure 8). Briscoe (1995) notes that Archaic materials are common on the high terrace projections and ridges above the low terrace

Figure 10. Arrow points from the Dan Holdeman Site.

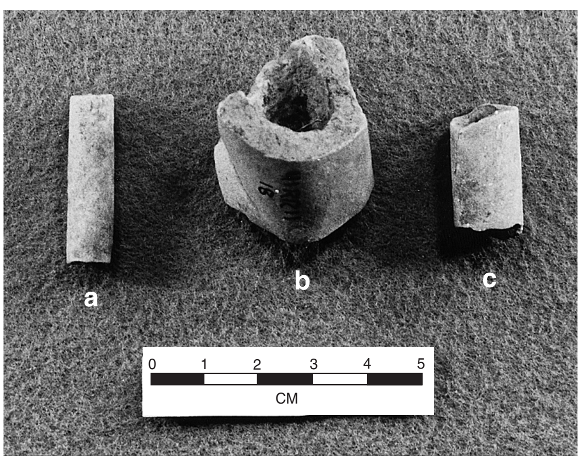

Figure 11. Ceramic Pipes from the Dan Holdeman Site.

plowed field (see Figure 6).

Formative to Middle Caddo period Alba (n=7), Colbert, Reed, and Bonham arrow points, an unidentified corner-notched point fragment, and arrow point fragments (Figure 10), were scattered across the low terrace, but did not occur in any particular clusters in this part of the site; a single Red River style long-stemmed clay pipe sherd was also found north of area C (Figure 11a). Based on Perino's (1995) work at the Dan Holdeman site, however, the main Formative to Middle Caddo occupation was west of the plowed field and spring branch.

Most of the vessels or vessel sections (nine of 11 or 82 percent) in TAS area A are grog or grog-bone-tempered vessels that appear to be of Middle Caddo period age. Features 1, 2, 5, 6, and 8 consist of single vessels, while two grog-tempered vessels were found with Features 3 and 7:

Feature 1, Vessel 1: small grog-tempered jar with an appliqued design below the rim-body juncture (Figure 12); the

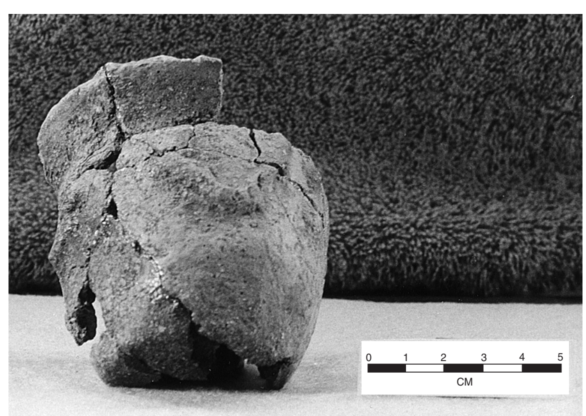

Figure 12. Feature 1, Vessel 1.

appliqued design consists of a horizontal and curvilinear strip with two sets of nodes below the center of the strip; rim is everted with a rounded lip; rim thickness is 5.0 mm, and body and base thicknesses are 7.0 mm and 9.5 mm, respectively.

Feature 2, Vessel 1: small, plain bowl with grog-bone temper; the rim is straight or direct with a rounded lip (Figure 13); the interior surface is blackened from soot; 2.5 mm rim thickness, 4.5 mm body wall thickness, and 7.5 mm thick base.

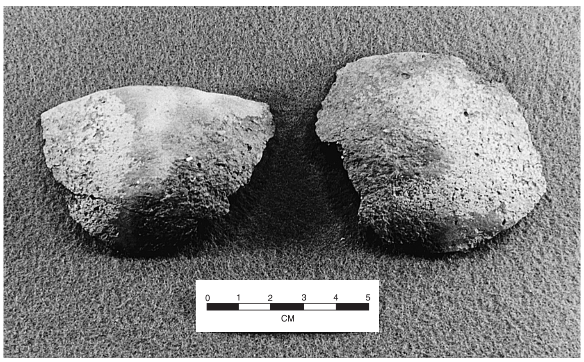

Figure 13. Feature 2, Vessel 1.

Feature 3, Vessel 1: 50 percent of a grog-tempered jar standing ca. 16 cm in height, with an estimated 10.7 cm orifice diameter; the jar is decorated with appliqued strips and nodes in a triangular decorative element on the body (Figure 14); 5.0 mm rim thickness; 4.0 mm body thickness; 7.5 mm thick base.

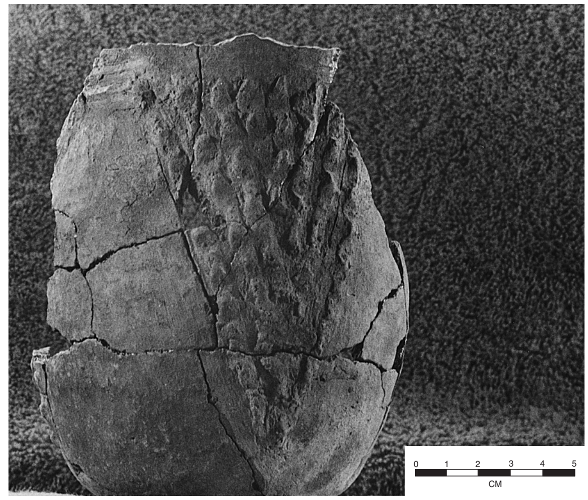

Figure 14. Feature 3, Vessel 1.

Feature 3, Vessel 2: small section of a grog-bone-tempered punctated jar; the punctated design is a vertical row of fingernail impressions; body wall thickness is 6.5 mm.

Feature 5, Vessel 1: 40 percent of a plain grog-tempered bottle fired under a reduced or low oxygen environment; the rim is straight with a flat lip; rim thickness is 4.9 mm and body wall thickness ranges between 5.6-8.7 mm.

Feature 6, Vessel 1: grog-tempered everted rim jar with diagonal appliqued strips on the vessel body; the lip is flat; the exterior surface has been scraped, while sooting and smudging is apparent on the vessel interior; 5.6 mm rim thickness and 6.2 mm body wall thickness.

Feature 7, Vessel 2: 20 percent of a grog-bone-tempered jar with lugs that quadrate the upper vessel body (Figure 15); the rim is direct and rounded; the interior vessel surface has been scraped and poorly smoothed; rim thickness, 4.6 mm, body thickness, 7.9 mm.

Feature 7, Vessel 3: small plain jar, with no apparent temper inclusions (possibly leached shell?); the vessel is poorly

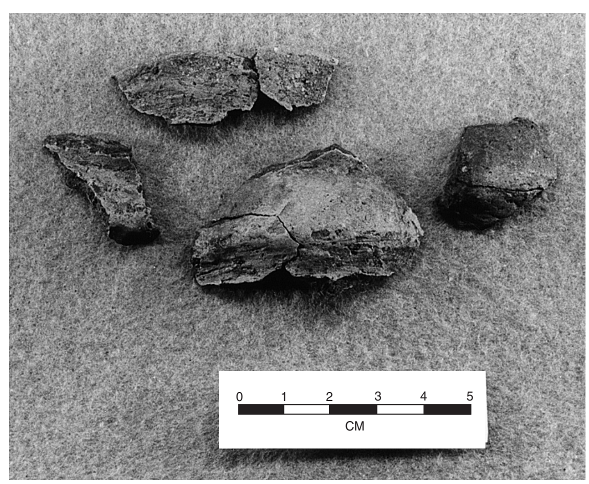

Figure 15. Feature 7, Vessel 2.

smoothed, with wall scraping on the exterior; rim is direct with a flat lip (Figure 16); rim thickness, 3.6 mm, body thickness, 3.1 mm.

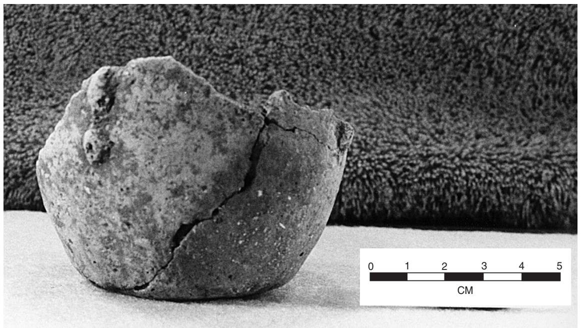

Figure 16. Feature 7, Vessel 3.

Feature 8, Vessel 1: grog-tempered everted rim jar standing 9.6 cm in height, with a flat lip; the rim is plain, but the body has sets of appliqued triangles filled with appliqued nodes (Figure 17); the exterior surface is sooted. Rim, body, and base thickness is 3.3, 3.6, and 5.9 mm, respectively.

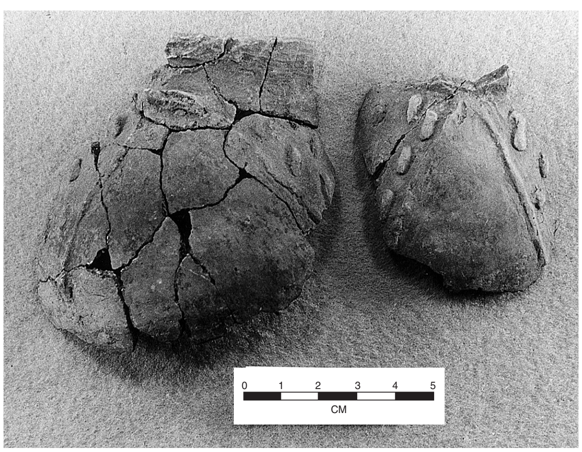

Figure 17. Feature 8, Vessel 1.

A single grog-tempered vessel (Vessel 1) was also documented in TAS area B; it was the lower body and base of a thin-walled (5.6 mm) plain jar or bowl with a flat disk base. The exterior surface of area B, Vessel 1 was well-burnished.

A total of 151 rim and decorated sherds of grog and grog-bone tempered sherds from Holdeman can be associated with the Formative and Middle Caddo period settlement of the alluvial terrace. They include the following types of decorations:

- appliqued 8
- appliqued-incised 1
- appliqued-punctated 2
- engraved 42
- incised 29
- incised-punctated 12
- punctated 15
- plain red-slipped 25

The appliqued decorative elements include strips and nodes, primarily on the bodies of jars (including several of the vessels from TAS Area A) with plain, incised, or punctated rim decorations. Most of the engraved sherds are from bowls and carinated bowls with diagonal, diagonal and horizontal, or cross-hatched rim motifs from Sanders Engraved vessels (see Suhm and Jelks 1962:Plate 69), although a small number have curvilinear decorative elements (n=6) and pendant triangles (n=2) (Figure 18). The incised sherds primarily have horizontal (n=6), multiple parallel (n=7), cross-hatched (n=5), diagonal (n=4), and diagonal/opposed (n=4) decorative elements, along with single examples of herringbone, opposed, and vertical incised (Figure 19); with the exception of the horizontal incised rims, these sherds are probably all from Canton Incised vessels (see Suhm and Jelks 1962:Plate 12). The 12 incised-punctated sherds are from Canton Incised jars (Figure 20c, f). They are decorated with zoned incised triangles filled with punctations. The most common punctated decoration consists of multiple rows of punctations (n=10) on the rim of jars with either straight or everted rims (Figure 20a-b), but punctations randomly covering the body of vessels are also present (n=4).

The high proportion of red slipped plain sherds (18.4 percent of the decorated sherds), including plain red slipped rims and plain red slipped rims with scalloped lips (Figure 21), from the site suggests that the primary earlier Caddo occupation of Perino's Area A was during the Middle Caddo period (see Bruseth 1998; Perttula 1997a). More than 23 percent of the Middle Caddo, Mound Prairie phase, component vessels at Holdeman excavated by Perino (1995) have a red slip, plain bowls and

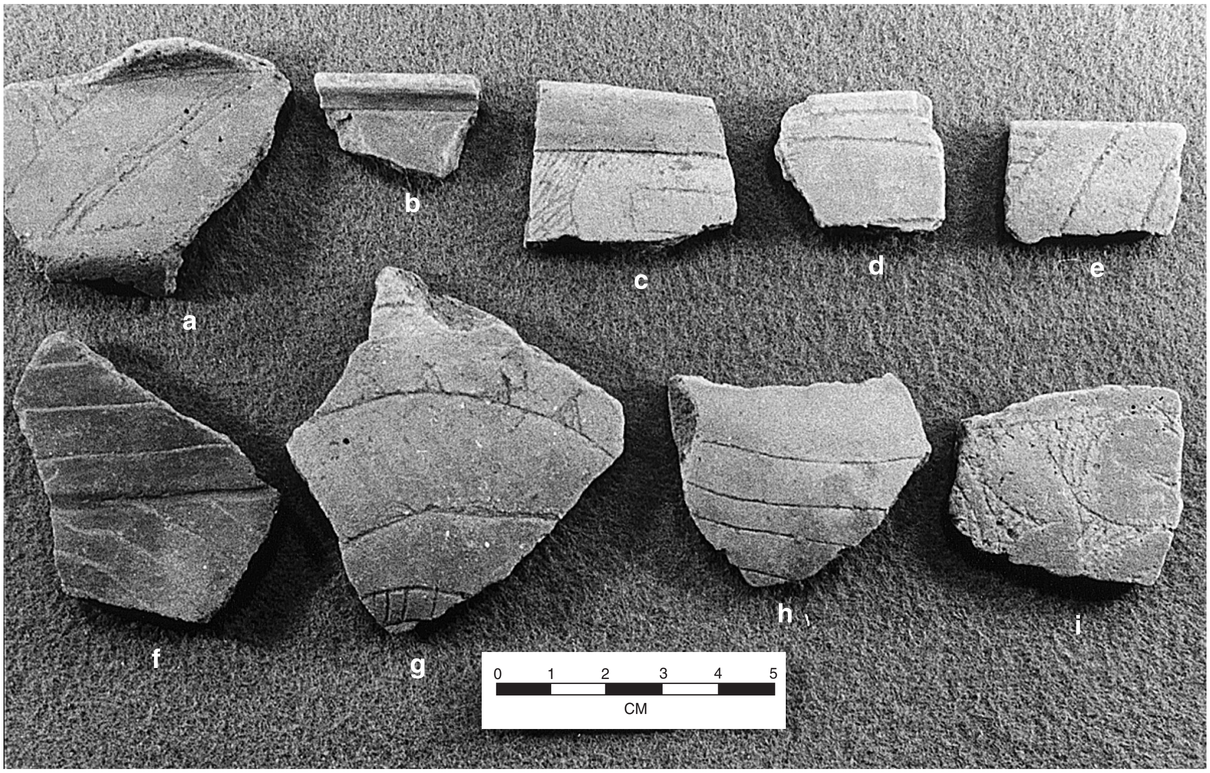

Figure 18. Engraved Sherds from Early-Middle Caddo Ceramics at Dan Holdeman.

Figure 19. Incised Sherds from Dan Holdeman Site Surface Collections.

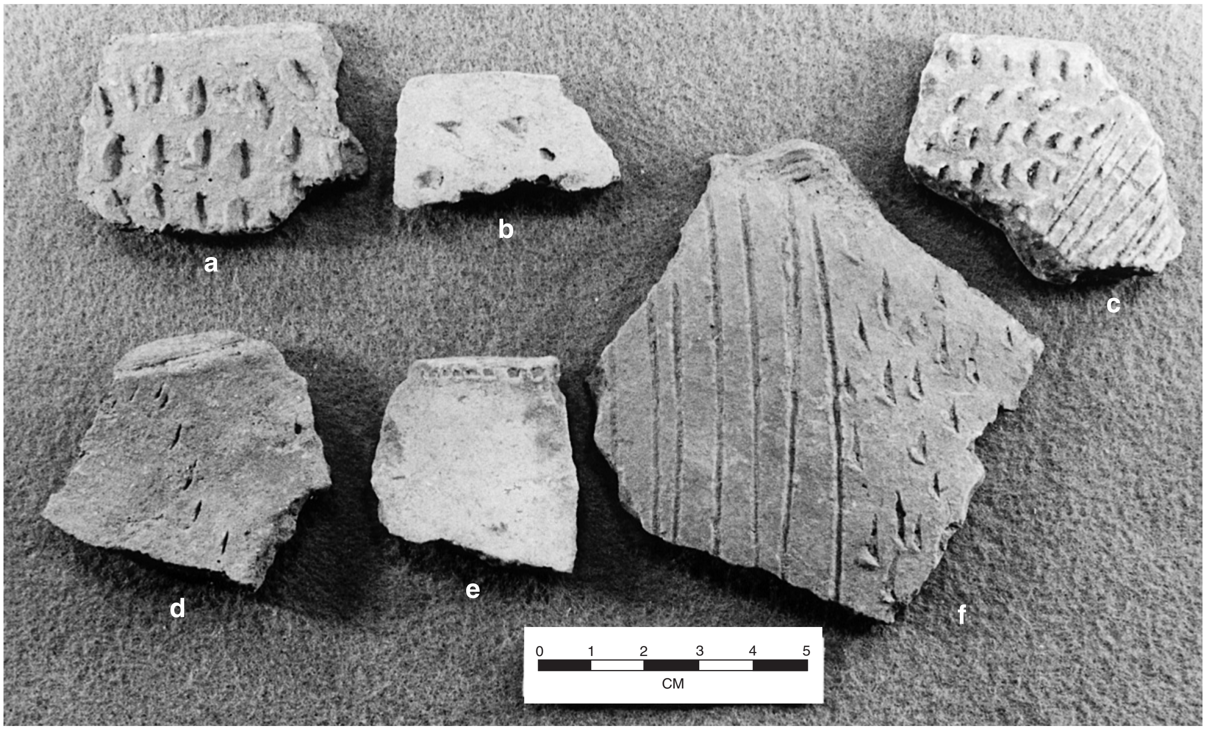

Figure 20. Punctated and Incised-Punctated Sherds from the Dan Holdeman Site.

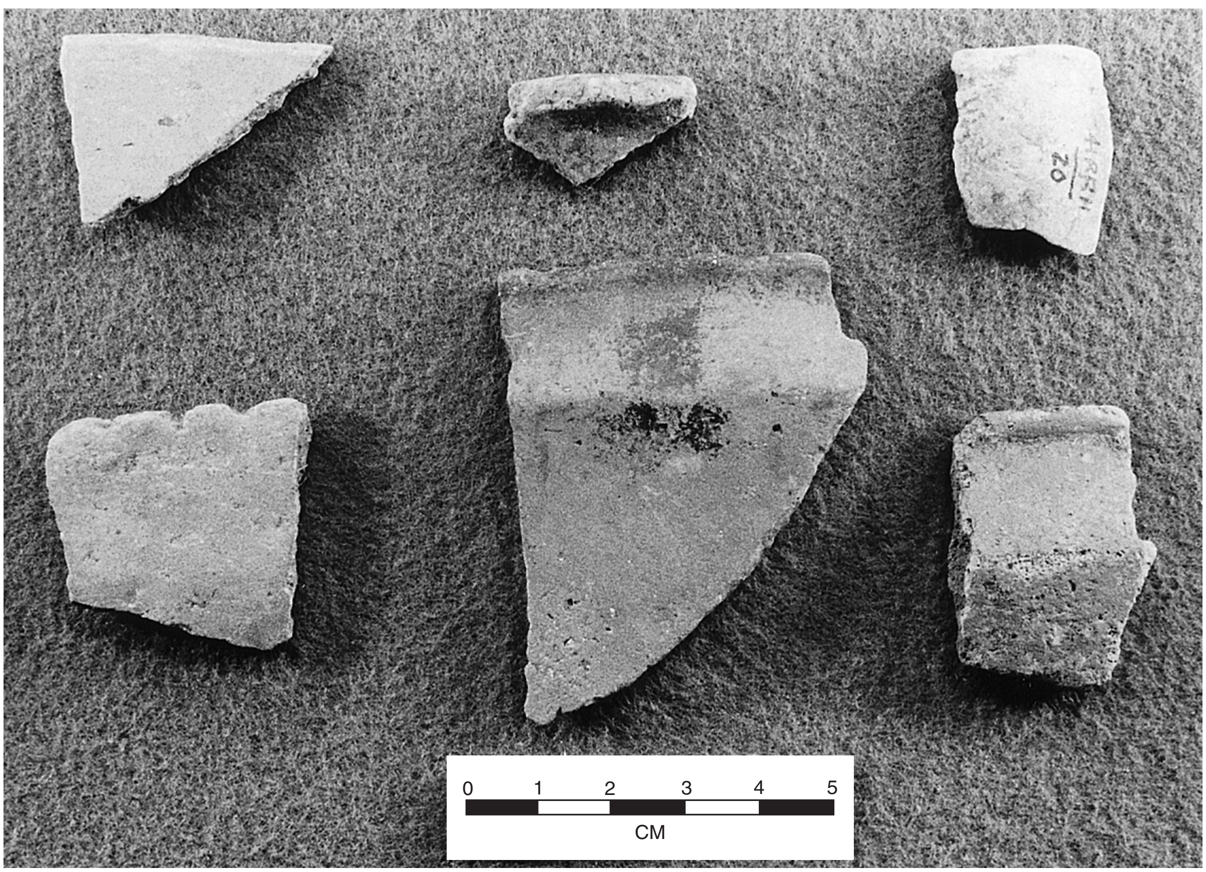

Figure 21. Red-Slipped Grog-Tempered Rim Sherds from the Dan Holdeman Site.

jars were common, and Canton Incised jars were particularly common. Maxey Noded Red ware is absent in the small TAS sherd collection from Holdeman, but relatively abundant in excavated and landowner collections from the site (Perino 1995; Perttula 1995, 1997b).

The low terrace appears to also have been settled during the Late Caddo McCurtain phase (see discussion in Perttula 1995), as sections of shell-tempered ceramic vessels were mapped and recovered in several of the areas defined by the TAS survey teams. In area A in the southwestern corner of the field, sections of 11 vessels were found over a ca. 5 m^2 area, along with small, powdery pieces of bone from disturbed human burials. A 2 x 2 m unit was laid out over the vessels to determine their contextual association, and the unit was shovel scraped to define and locate burial pits and features as well as other possible grave furniture. No cultural features or other ceramic vessels were revealed in shovel scraping the unit to a depth of 30 cm below the bottom of the eight vessels. Thus, unfortunately it seems likely that the deep plowing had massively cut and mixed the deposits to some depth underneath the shallowly buried graves in this part of the site.

Two of the TAS area A vessels are shell-tempered, Vessel 1 in Feature 4 and Vessel 1 in Feature 7. The other nine documented in Area A have grog, grog-bone, or no apparent tempering aplastics. The Feature 4 vessel is a plain red-slipped bowl with an interior thickened rim, while Vessel 1 in Feature 7 is 30 percent of a plain jar with a small strap handle. Also present in Feature 7 was a shell-tempered Emory Punctated-Incised rim sherd, and a plain shell-tempered red slipped sherd was recovered in association with Feature 3. Other plain shell-tempered sherds were found with Features 5 and 7.

In Area B, the Late Caddo component is represented by five (Vessels 2-6) shell-tempered vessels (one Avery Engraved, one plain, two appliqued, and one horizontal engraved) that appear to be part of three separate and disturbed Caddo interments. Vessel 2 is 20 percent of a plain red-slipped bowl; Vessel 3 is 40 percent of a small jar with four vertical appliqued strips; Vessel 4 is 25 percent of a red-slipped Avery Engraved V-shaped bowl (Figure 22); Vessel 5 is 20 percent of a red-slipped bowl

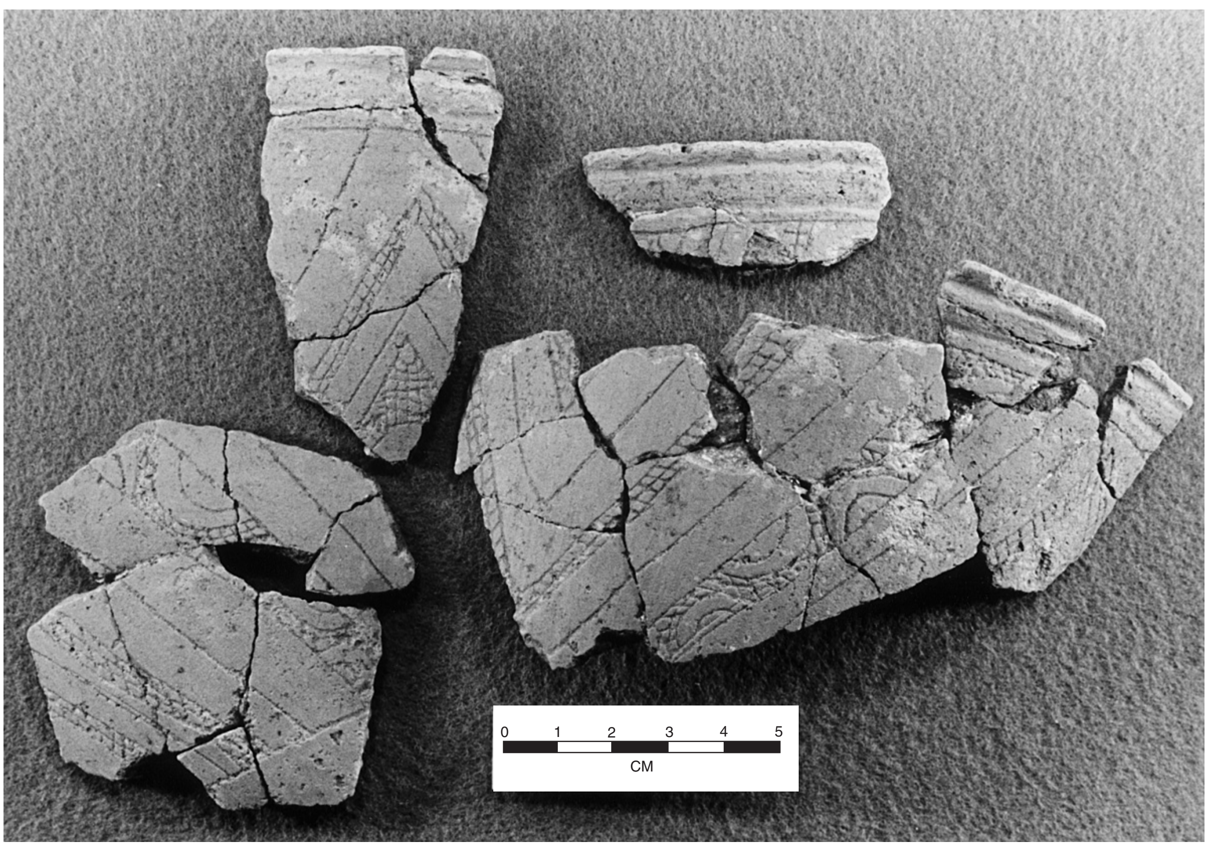

Figure 22. Area B, Vessel 4.

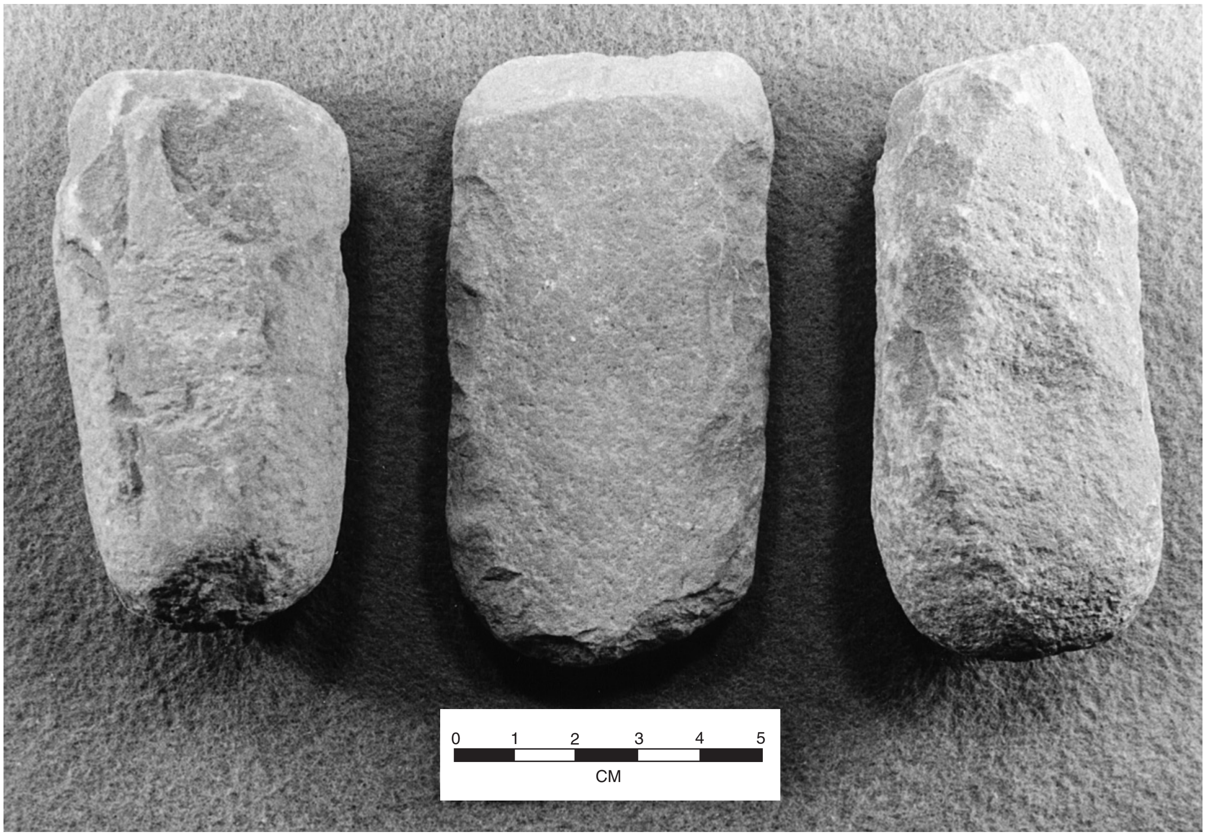

Figure 23. Ground Stone Celts from Area B at the Dan Holdeman Site. BW Roll 5, no. 5

with a single horizontal engraved line below the lip, along with nodes; and Vessel 6 is 20 percent a small bowl with an appliqued strip. Each of the vessels has thin rim and body walls, ranging from 3-6 mm in thickness, and flat disk bases. A single Scallorn *var. sattler* arrow point, generally found in early McCurtain phase contexts (see Brown 1996; Perino 1995; Skinner et al. 1969), was also found in association with Vessel 6.

Probing adjacent to the pipeline that runs by TAS area B identified ceramic vessels that were in situ, suggesting that at least two or three undisturbed Caddo burials occur here as well. One large greenstone celt and several celt fragments, of the style common in McCurtain phase components at Roitsch (Ferring 1969) and Rowland Clark (Perino 1994), was also recovered on the surface in Area B (Figure 23). Areas C and D had three small partial vessel sections from disturbed Late Caddo graves. One celt and several celt fragments were also recovered in the northern part of area D.

In addition to the vessels, there are 35 decorated and/or rim sherds with shell-tempering in the TAS collections from Dan Holdeman. All are from Perino's (1995) Area A. They include two plain rims, 11 body and rim sherds with interior and/or exterior red-slipping, nine engraved, five incised, four punctated, three neck-banded, and one appliqued sherd (Figure 24).

The red-slipped sherds are from plain undecorated bowls with direct rims, either Clement Redware (Flynn 1976) and/or Roden Ware (Perino 1981). Among the shell-tempered engraved sherds are six red- and black-slipped Avery Engraved specimens, one Hudson Engraved, one diagonal engraved, and one rim with horizontal engraved lines. The single cross-hatched incised sherd from Area A may be from a Maydelle Incised vessel, but the diagonal and diagonal-parallel incised decorative elements occur as well on early varieties of Emory Punctated-Incised jars (cf. Perino 1981). The punctated sherds are from Emory Punctated-Incised jars with rows of rim punctations. The neck-banded sherds are from Nash Neck Banded sherds (see Figure 24e), as may be the single body sherd with the appliqued strip. In general, the prevalence of undecorated red-slipped shell-tempered vessels, an early form of Emory Punctated-Incised, and both red

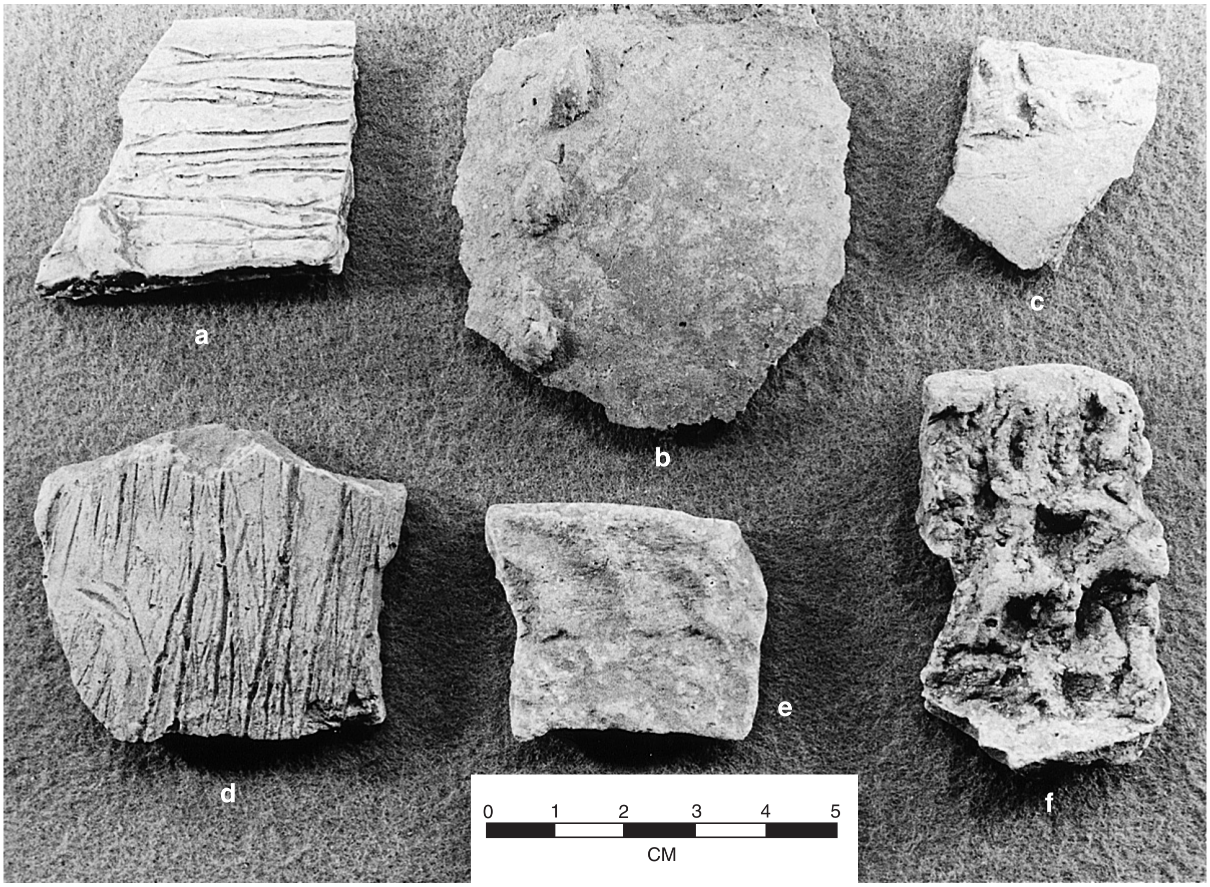

Figure 24. Late Caddo Decorated Sherds from Dan Holdeman.

and black-slipped Avery Engraved, suggests that the McCurtain phase component at Holdeman dates to the early phase (ca. A.D. 1300-1500) (see Bruseth 1998; Perttula 1992:Table 11). Also associated with the McCurtain phase component are shell-tempered elbow pipe sherds (see Figure 11b), Maud arrow points (from Area A), and a Harrell side-notched arrow point from Area A (see Figure 10g, j).

Three parallel brushed sherds (with grog temper) from the lower terrace are also likely to be associated with these Late Caddo ceramics (see Figure 24d). The brushed sherds may well be from a Whelan or Titus phase vessel traded from the Big Cypress Creek basin, where contemporaneous grog-tempered vessels were common (see Thurmond 1990). Brushed sherds—whether shell—or grog-tempered—are otherwise quite rare in the middle part of the Red River valley in Northeast Texas.

The historic archeological component at the Dan Holdeman site is present on the higher terrace paralleling Highway 37 and the pumping station, as well as a garden area north of the mound (see Figure 7). The earlier 19th century material in this area is probably related to the Houser Plantation, and includes square or cut nails, decorated refined earthenware (shell-edged, transfer-printed, annular, sponged, and hand-painted) (Figure 25), salt-glazed and alkaline-glazed stoneware (Figure 26e-f), lead balls (Figure 26c), dark olive green bottle glass (Figure 26b), and kaolin pipe stems (Figure 26d). Post-1880 settlement on the high terrace is denoted by considerable amounts of semi-automatic or machine-made bottle glass, plain whiteware sherds, decalcomania, relief-molded and gilt lip banded sherds, and sherds with maker's marks, lead-glazed stoneware, Bristol-glazed stoneware, natural clay slipped stoneware, and other items (see Appendix III).

The Dan Holdeman site is one of the more significant prehistoric Caddo village sites in the Middle Red River area; it has earlier prehistoric and later historic occupations that also have research significance. Unfortunately, it has been adversely effected over the years by pothunting

Figure 25. Early-Mid-19th Century Decorated Refined Earthenware from the Dan Holdeman Site.

and collecting activities, pipeline and highway construction, and farm cultivation and land leveling practices, such that much of the site's archeological deposits have been disturbed and/or destroyed (a visit in March 1997 noted that much of Perino's [1995:Figure 1] Area A had been turned into shallow catfish ponds by Mr. Holdeman). Nevertheless, there are substantial archeological deposits preserved in many areas of the site, and these warrant protection and preservation. It remains to be seen, however, whether the landowner is amenable to the long-term preservation or protective designation of the site. In the meantime, I recommend that the TAS and the Texas Historical Commission (through its Northeast Texas stewards) continue to monitor landowner activities at the Dan Holdeman site, and be available to advise and assist the landowner in planning his farming and land leveling activities to minimize damage to the most significant parts of the site (i.e., the Caddo village, mound, and cemetery areas). It is also important that Mr. Holdeman's extensive artifact collections be studied and photo-documented to fully clarify the prehistoric use of the site.

41RR15, Town of Jonesborough

Based on archeological, historical, and oral historical grounds, the town of Jonesborough (1816-1844), as well as the later historic settlement associated with the community of Davenport founded as a river community in the same general area, probably covers about 60 acres of an alluvial terrace overlooking an old channel of the Red River (see also Reese [2001], wherein she concludes that 41RR15 primarily post-dates 1844, and suggests an alternate location to the southwest for the town of Jonesborough). The majority of the site is in a plowed soybean field.

As defined here, 41RR15 includes several prehistoric components (near Mrs. Pool's house and east and southeast of the Jonesborough historic marker [referred to as the Roitsch West area]), and historic archeological materials dating from the early 19th century to the mid-20th century. The

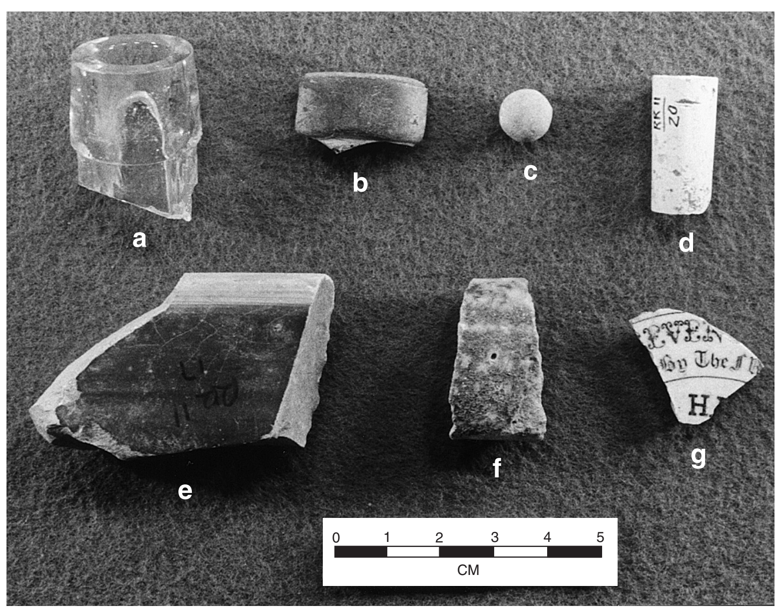

Figure 26. Early-Mid-19th Century Bottles, Stoneware, Pipes, and Lead Ball from the Dan Holdeman Site.

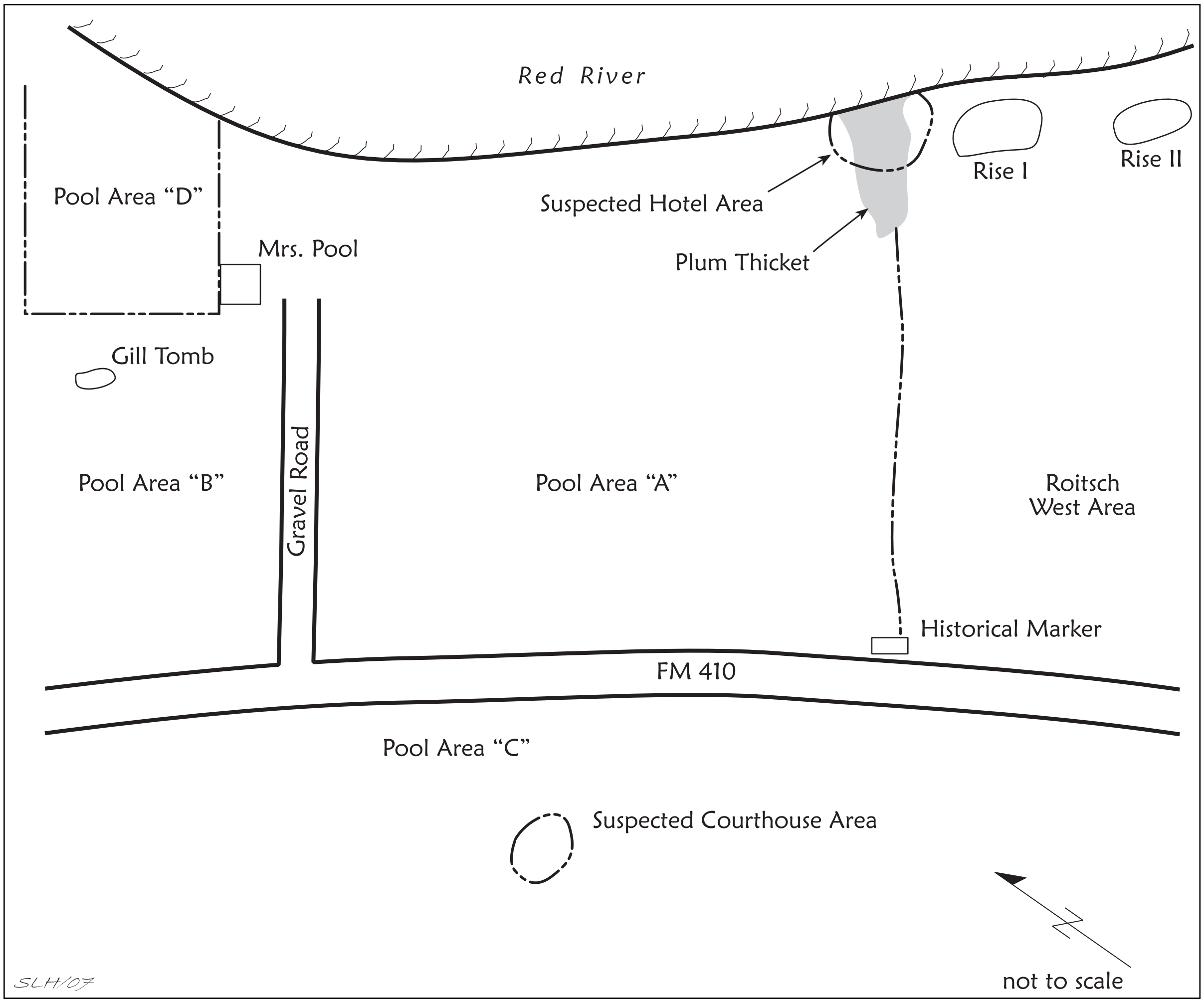

Figure 27. Site Map of 41RR15.

19th century materials are abundant in surface collections (particularly in Pool Area A), but their subsurface context is not clear (see Reese 2001). These materials are most common from the historic marker north to the Bagwell property north of Pool Area B and D (Figure 27).

Excavations by the TAS in 1991 in Pool Area B located the burial tomb of Jane Chandler Gill (b. 1782, d. 1846) west of Mrs. Pool's house, and several other features were located that may relate to the town of Jonesborough. However, the majority of the historic archeological deposits seem to relate to the later community of Davenport (see Reese 2001).

While the Historic Archeology team was investigating the Jonesborough town site area by Mrs. Pool's house, the Survey Team conducted shovel testing and surface collections on the Roitsch West area to delimit two concentrations of prehistoric cultural materials on sandy rises (Rises I and II) overlooking the former channel of Red River (see Figure 27). Small amounts of prehistoric ceramics and bone were recovered from midden deposits in six shovel tests; lithic debris and daub were noted on the surface of both rises. Prehistoric Caddo houses probably stood on each of the rises, but plowing has disturbed them to some extent. Nevertheless, prehistoric ceramics, daub, and bone were recovered in apparently good contexts below 50 cm bs in Rise II. In the main, the ceramics are shell-tempered, thus indicating that the Caddo occupation occurred during the McCurtain phase. Considerable McCurtain phase artifacts were also recovered in Pool Area D, as well as at the nearby Pine Cone site (41RR236; see below). Some earlier prehistoric materials were recovered as well from surface contexts (i.e., dart projectile points) and shovel testing on Rise I, and these probably relate to an Woodland or Late Archaic age component.

Although the site has been plowed for more than 100 years, has been impacted by river bank erosion, and has been flooded on many occasions, there are areas within the Jonesborough town site that have intact prehistoric and historic archeological deposits. Further efforts are warranted, including examination of aerial photographs, to try to locate foundations and features associated with the 1816-1844 town; Pool Area A and B have the best potential to contain these types of remains. Work in Pool Area C (see Figure 27) should also be conducted to determine if the Jonesborough courthouse mentioned in oral interviews is present in that area. Significant data on Late Caddo McCurtain phase farmsteads may be obtained from both the Roitsch West (Rise II) and Pool Area D subareas of 41RR15.

41RR85

Originally located by SMU, they described the site as containing a "thin deposit" of lithic debris and Late Archaic projectile points (Yarbrough and Edgewood) eroding out of the bank of an alluvial terrace of Big Pine Creek (Hyatt and Mosca 1972). A wide assortment of cultural materials were collected at 41RR85 (see Table 3) at that time in addition to the Late Archaic points, including lithic debris, grinding stone fragments, a ferruginous sandstone axe fragment, an end scraper, three bifacial tool fragments and one bifacial preform, 11 expedient edge-modified pieces, and 129 g of burned clay. The lithic debris and tools were from local brown and red cherts and quartzite, with 5.5 percent of the lithic debris, both projectile points, 50 percent of the bifacial fragments, and 55 percent of the flake tools from Ouachita Mountains cherts, available in the Red River gravels (see Banks 1990).

Our investigations indicate that the site covers about 8 acres of a Pleistocene terrace some 6 m above, and 300 m from, Big Pine Creek. It is presently covered in pasture grass.

Limited amounts of chert lithic debris (n=18), bifacial tool fragments, fire-cracked rock, and ground stone tools were observed in small eroded areas along much of the crest of the terrace; no apparent concentrations were noted in limited investigations. Shovel tests in that area recovered a moderate density of chert lithic debris, fire-cracked rock, a core, small amounts of daub, and plain grog-tempered pottery sherds (n=2) throughout a 40-50 cm thick A-horizon (which had been plowed) over a red clay B-horizon. No midden deposits were noted at the site. While SMU's work indicated that 41RR85 had a Late Archaic occupation, the plain pottery sherds suggest that the site was also used during either the Woodland and/or earlier Caddo times.

The shallow, plowed soils, and the wide, but dispersed nature of the archeological remains do not suggest that the site has great potential to contain intact deposits of either Archaic, Woodland, or Formative to Early Caddo age. However, the recovery of ceramics in both shovel tests (at depths from 0-25 cm), and daub from Shovel Test #1, may be an indication that a farmstead or homestead was present on one area of the alluvial terrace; the shallow depth of the A-horizon over clay is favorable for detecting post holes, pits, or features that extend from an occupation horizon (or the plow zone) into the sterile subsoil. Further investigations may be warranted if the temporal context of these materials can be established with reasonable certainty.

41RR99

The site is located in a pasture on a possible alluvial/colluvial landform adjacent to Big Pine Creek. It covers about 1800 m^2 and, based on the TAS shovel testing, has archeological deposits between 20-40 cm in thickness.

During the 1972 SMU survey, artifacts were observed eroding out at the northern edge of the landform. A large amount of artifacts were collected from the surface (see Table 3). About 4.5 percent of the lithic debris is of Ouachita Mountains chert, while 36 percent of the 11 expedient edge-modified flake tools are of this raw material. Of particular note in the collections was one Scallorn arrow point of Ogallala quartzite, seven Gary dart points (including the Late Archaic and pre-A.D. 200 forms of *var. Gary* and *var. LeFlore* [Schambach 1982]) on Ogallala quartzite (n=5), Ouachita Mountains chert, and a local yellow chert, and two plain grog-tempered pottery sherds. These suggest that the site was principally occupied during the Late Archaic and earlier part of the Woodland period, while the Scallorn point may be from a later Woodland (post-A.D. 700) or Formative Caddo use of 41RR99.

During our work at 41RR99, a moderate density of lithic debris (n=47) and one plain pottery sherd (Shovel Test #4) were recovered in sandy loam A-horizon deposits from four shovel tests dispersed across the site (Figure 28); lithic debris was noted on

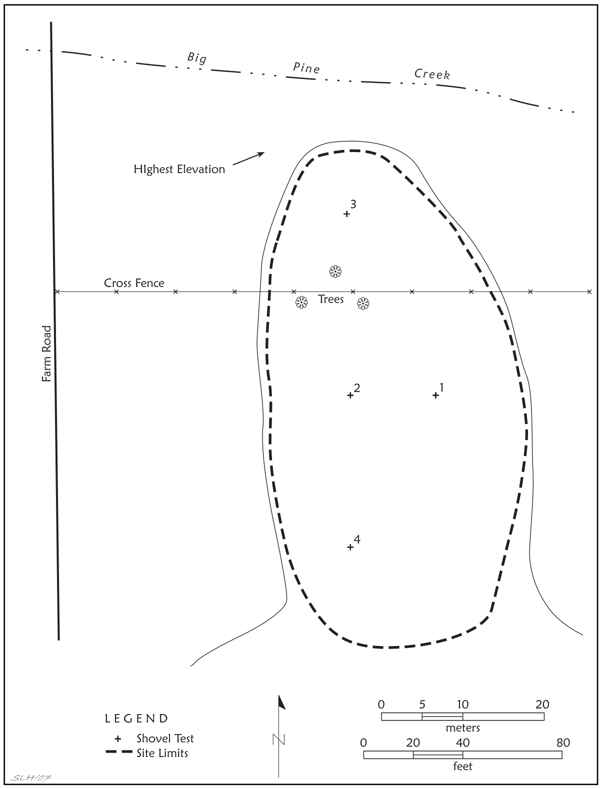

Figure 28. Site map of 41RR99.

the surface. Daub was also found in Shovel Test #3. No features or middens were noted at the site, and the landform has been plowed. However, the presence of subsurface deposits, and the potential that the archeological materials may pertain to a single component Woodland habitation, suggests that a small and discrete archeological site (from a period of time in Northeast Texas that is not well understood [Perttula et al. 1993] is still preserved at 41RR99. Thus, site 41RR99 appears to possess research significance, and further investigations are warranted should disturbances to the site be proposed.

41RR100

Site 41RR100 covers about 3 acres of an alluvial terrace (with two small rises) about 6 m above the Big Pine creek floodplain; Big Pine Creek runs in an old channel of the Red River and a slough is present immediately below the site. During our investigations, a small amount of lithic debris and fire-cracked rock was visible on the surface in a pasture, but when the site was recorded in 1972, considerable lithics and ceramics were apparently collected from the two small rises south of the slough.

The SMU work documented Archaic (probably Late Archaic) and Caddo period occupations (see Table 3). The former consisted of a dart point tip and a few bifacial tools, a hammerstone, 20 fire-cracked rocks, and a sandstone mano and pitted stone. The lithic debris is exclusively of local cherts and quartzites (which is characteristic of Late Archaic occupations), while 88 percent of the 17 edge-modified flake tools are also on local raw materials. Both pre- (81 grog and grog-bone tempered ceramics, including several with red slips, incisions, and punctated decorations on them) and post-A.D. 1300 Caddo settlements and habitation areas (16 plain shell-tempered pottery body sherds, including two with red slips) are represented by a large sherd sample (n=97).

Only one of the two shovel tests we excavated at 41RR100 contained artifacts, and these consisted of one piece of lithic debris and four fire-cracked rocks between 30-55 cm bs. The low density of surface and subsurface cultural materials documented in the TAS work is quite different from the SMU results. Several explanations may account for the differences, including: (a) the SMU and TAS sites may not be the same, and the location of one has been misplotted; (b) since 1972 the cultural materials on the site have been extensively eroded and disturbed, such that little in situ deposits remain; and (c) most of the material present at the site was actually collected during the earlier survey. Re-examination of the SMU survey forms and notes is warranted to try to resolve the archeological discrepancies, since the discrepancies have implications for determinations of site significance/research potential.

41RR101

This is a large (5.6 acres) prehistoric site situated on a long, narrow alluvial terrace overlooking a slough of Big Pine creek and Red River. The terrace is open pastureland with fairly deep (ca. 80 cm) Annona-Freestone complex sands, but eroded exposures are quite limited. Small amounts of lithic debris were noted on the surface, but our shovel testing demonstrated that there is a dense subsurface cultural deposit preserved at the site, particularly on a rise at the southeastern end of the terrace (Figure 29).

SMU's investigations showed that lithic debris was "thinly" spread over the site, but that survey crew did not shovel test to determine if there were buried deposits; no temporally diagnostic artifacts

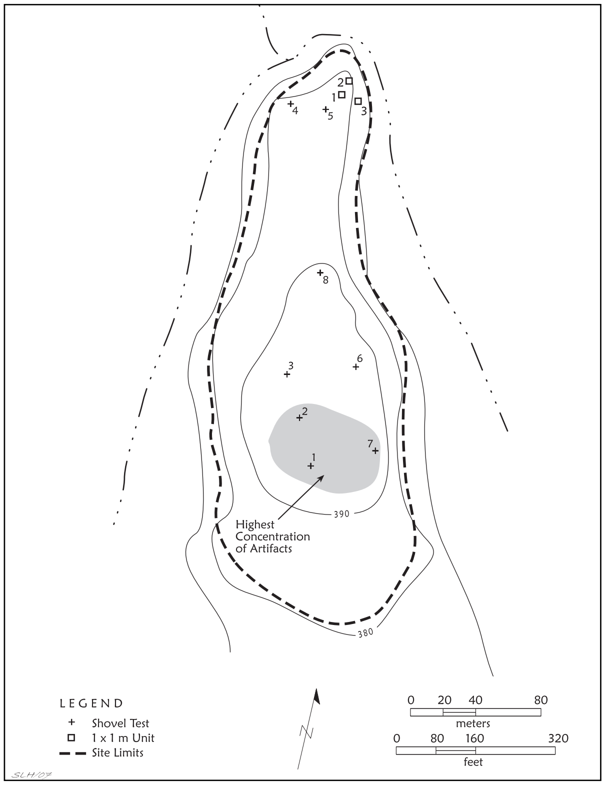

Figure 29. Site Map of 41RR101.

were recovered in their work. About 16 percent of the lithic debris was of Ouachita Mountains cherts, along with one of the two cores; there were four edge-modified flake tools on local cherts. Our conversations with local collectors during the 1991 survey effort indicated that 41RR101 was quite productive, at least in terms of their interests (i.e., it has quantities of projectile points).

Fourteen shovel tests were scattered across the site during the TAS work, and eight of them contained cultural materials such as projectile points, lithic debris, pottery, daub, bone, and ground stone tools to depths of 80 cm+ (see Figure 29). The density of artifacts per shovel test (mean= 32.8 or roughly 360 artifacts per m^3) is among the highest of all the shovel-tested sites on the Roitsch Farm.

The bone, ceramics, and daub, as well as lithic debris, were concentrated in shovel tests #1, 2, and 7 (see Figure 29), along with Gary dart points. While the overall sample of artifacts from the site is small, what was found is evidence that an Woodland period occupation is present in this area of the site. The recovery of bone in the sandy soils also suggests that midden deposits may be preserved in this area as well, perhaps in association with a habitation site. Clearly, the 1991 work demonstrated that site 41RR101 has considerable potential to answer research questions concerning Woodland period settlement in the Middle Red River and Mound Prairie region.

In 1992, TAS survey crews returned to the site to excavate 3 1 x 1 m units at the site to acquire more specific information about the subsurface character of the archeological deposits. Although the intent was to place the test units in the area where shovel testing had determined that ceramics, bone, and daub were concentrated, the units were actually placed at the far northern tip of the terrace (see Figure 29). Moderate quantities of lithic debris (n=221) and fire-cracked rock (n=21), as well as a dart point fragment, were recovered in shallow (≤ 40 cm) sandy loam deposits over a red clay B-horizon. An Archaic period component may be preserved here, although its integrity is questionable because of the shallow, presumably eroded, nature of the soils at the tip of the landform. Eleven sherds and nine pieces of daub in the three test units are apparently indicative of the Woodland period component better preserved upslope on the rise; three shell-tempered sherds in unit N20E0, level 2, also indicate a small McCurtain phase occupation there. Needless to say, the southeastern rise still warrants test excavations should the site be threatened by development activities that could adversely impact the archeological deposits.

41RR102

The site is on the crest of an alluvial landform that parallels the Big Pine Creek floodplain as well as a slough of the creek; the slough marks an older channel of Red River. Currently in pasture, a few pieces of lithic debris were visible in gopher mounds on the site. Four positive shovel tests located low densities of subsurface cultural materials (only a maximum of 28 cm in depth) over ca. 7500 m^2, with lithic debris, plain grog- and shell-tempered sherds, and daub represented in the small assemblage (n=21). A local collector reported to the TAS survey crew that most of his ceramic sherd collection came from site 41RR102.

Hyatt and Mosca (1972) characterized the site as only a ca. 290 m^2 scatter of lithic debris and tools in an eroded area on a rise. However, the materials they collected from the site also included a small amount (n=4) of both grog- and shell-tempered pottery. The single projectile point recovered was a Gary type of Ouachita Mountains chert. Also in the collection were a biface preform, one bifacial tool fragment, and seven edge-modified flake tools (43 percent of Ouachita Mountains chert).

No midden deposits or areas of artifact concentration were identified in the limited TAS investigations at the site. Plowing of the shallow deposits has presumably affected its subsurface integrity, and in combination with its multi-component nature (Woodland, and Early and Late Caddo occupations), this suggests that it would be difficult to accurately separate cultural deposits within the site, unless the components are horizontally discrete. It would be worthwhile, however, to document the cultural materials in local collections from the site as they apparently consist of large samples of prehistoric Caddo ceramics.

41RR103

This large (7 acres) prehistoric site is in a pasture about 100 m from Big Pine Creek. The landform is a prominent alluvial terrace that sits approximately 6 m above the floodplain (Figure 30). The sandy loam A-horizon soils at the site vary from 20-60 cm in depth over B-horizon clays, and the A-horizon contains moderate densities of lithic debris, cores, bifacial tool fragments, fire-cracked rocks, one Gary point (Figure 31f) and one Marcos dart (Figure 31b).

All nine shovel tests excavated at 41RR103 by the TAS contained cultural materials. Shovel tests #3-#5 had the highest densities (between 7-28 artifacts/shovel test, or ca. 80-300 artifacts per m^3). The two dart points (a Gary, *var. LeFlore* and a corner-notched Marcos) were found on the surface in a cattle trail along the northern edge of the terrace (see Figure 30).

When SMU recorded it, 41RR103 was thought to cover about 500 m^2 on a "ridge" south of Big Pine Creek. Only a few pieces of fire-cracked rock and lithic debris of local cherts and Ouachita Mountains quartzitic sandstone were collected or noted from the site (see Table 3).

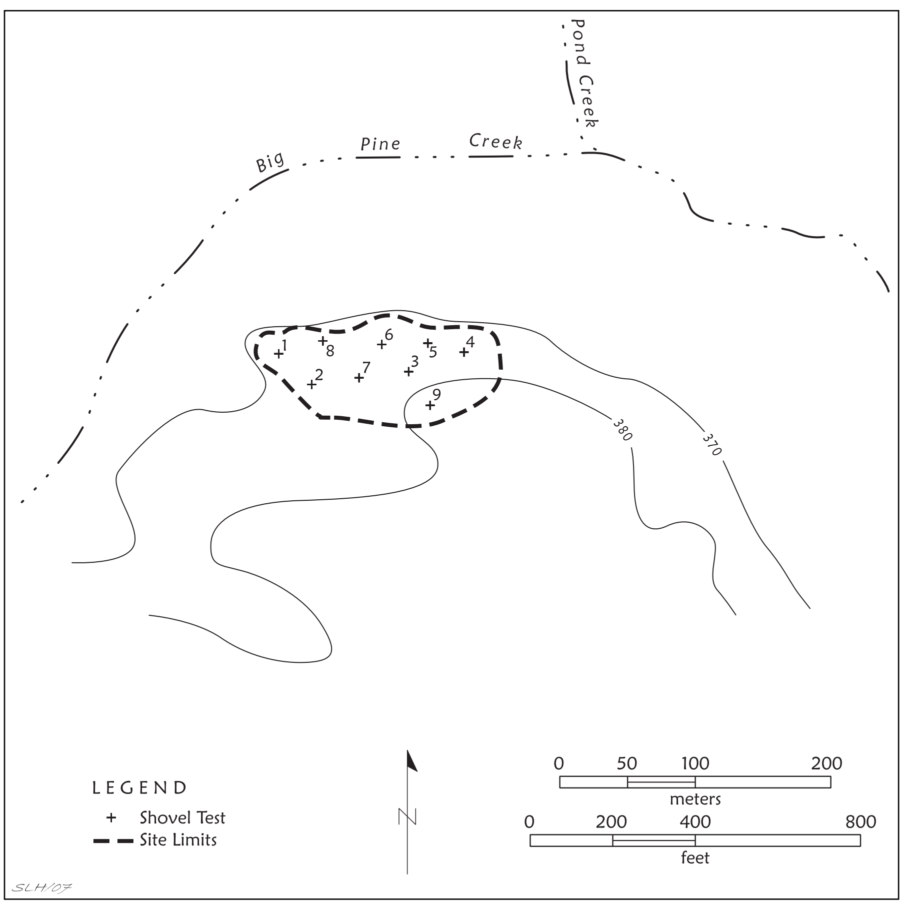

Figure 30. Site map of 41RR103.

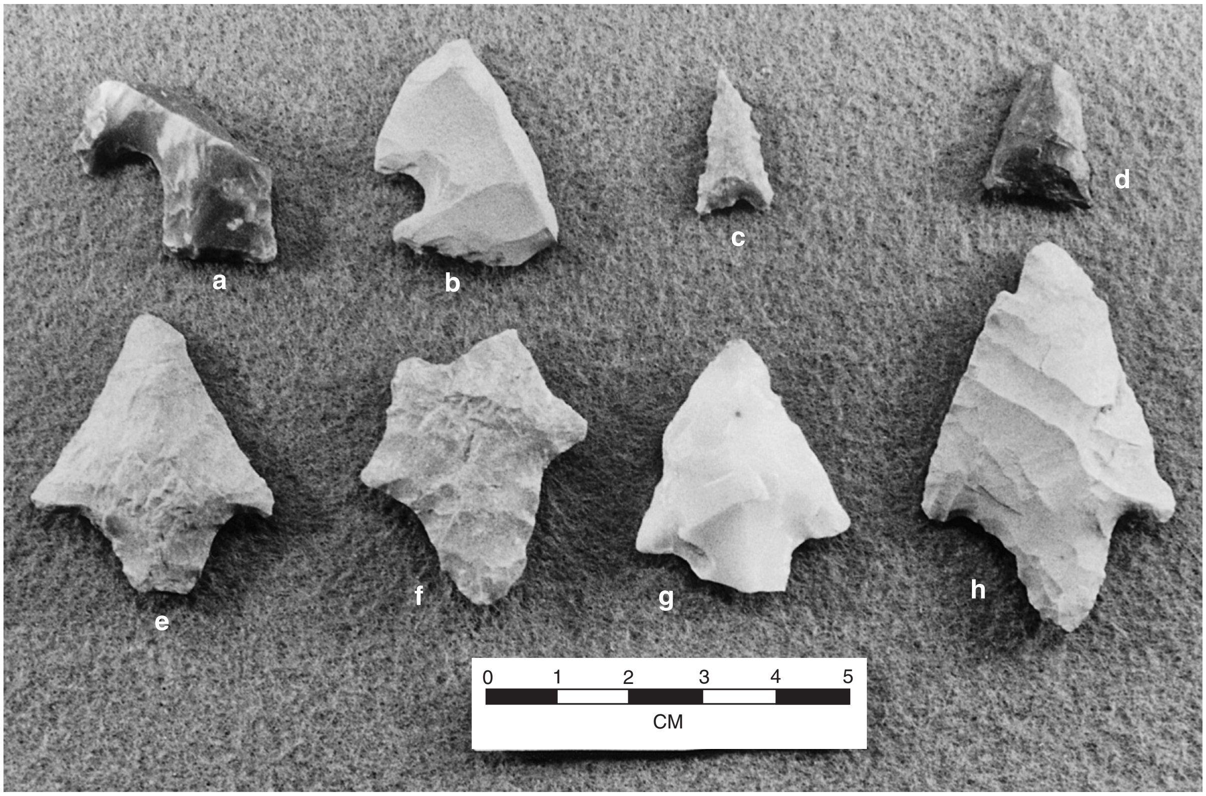

Figure 31. Dart Points and Arrow points from Survey Sites: a, 41RR261; b, 41RR103; c, 41RR268; d, 41RR288; e, 41RR289; f, 41RR103; g, 41RR263; h, 41RR288.

Site 41RR103 appears to have been occupied principally during the Late Archaic period (and/or the early part of the Woodland period), and at least one concentration of subsurface cultural materials was documented on the eastern part of the terrace that appears to be relatively intact. In general, Archaic hunter-gatherer sites in Northeast Texas (as well as in the Red River valley) have not been thoroughly investigated, and much about the archeology of the period is not well understood (Fields and Tomka 1993). Since there are intact deposits at the site, it has the potential to contribute useful archeological information on the nature of Archaic (Late Archaic) lifeways, and thus warrants future archeological attention.

41RR105

This site is located in a distinctive setting within the Big Pine Creek valley: on a small knoll (1000 m^2) on a low, narrow, alluvial terrace between two channels of Big Pine Creek. The channel areas are forested, but the terrace itself is in pasture.

Terrace soils are uniformly Desha clay, a Late Holocene Red River alluvial deposit (Thomas 1977), except on the knoll itself where the soil is comprised of a orange-brown clay loam more than 80 cm in depth. Of the six shovel tests placed on and around the knoll, only Shovel Test #2 contained artifacts and clay loam soils; recovered were three Late Caddo period McCurtain phase shell-tempered sherds and two pieces of lithic debris between 30-40 cm bs (Figure 32).

SMU's investigations documented that the site was about 600 m^2 in size. It was situated on what they described as an older alluvial terrace, some 60 m from the bridge crossing Big Pine Creek. A small assemblage (principally ceramic sherds) collected from the site (see Table 3) suggests that both Middle Caddo and Late Caddo occupations occurred on the site; the 10 Late Caddo shell-tempered body sherds are plain, but the possible Middle Caddo sample of grog and bone-tempered pottery includes two with red slips (probably Sanders Plain [Brown 1971, 1996; Suhm and Jelks 1962]), and two decorated with parallel incised lines. Daub was also present on the site. There were also a small blade core fragment, two pieces of fire-cracked rock, 16

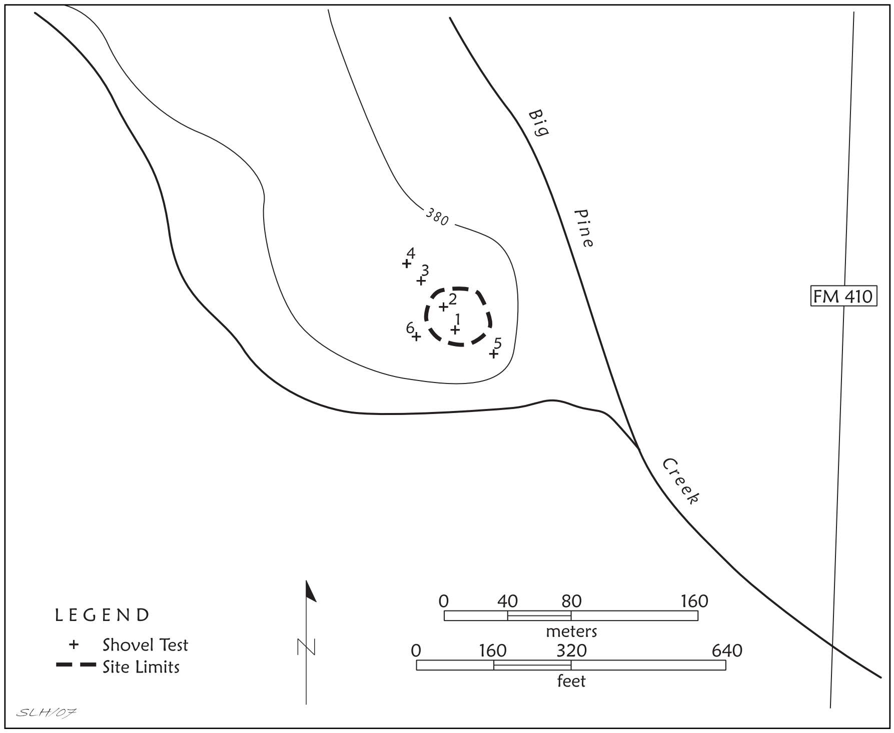

Figure 32. Site Map of 41RR105.

lithic debris (88 percent local cherts and quartzite), an edge-modified flake tool, and a bifacial tool fragment of Big Fork chert.

The small size of the site, and the recovery of daub and primarily shell-tempered Late Caddo ceramics, suggests that 41RR105 mainly represents a single McCurtain phase farmstead; salt-processing sites of the same age, and in the same area, typically contain large quantities of sherds (especially from Nash Neck Banded jars) and daub (see Kenmotsu 2006). The low density of cultural materials may also be indicative of the site's being occupied by Caddo peoples for only a short period of time. Limited investigations recovered no evidence that a midden or cultural features are preserved at the site, but its compact nature and short-term occupation could provide a unique set of data on the character and diversity of McCurtain phase habitation sites away from the Roitsch site village.

41RR106

This site is on an alluvial terrace facing the Big Pine Creek floodplain; Big Pine Creek is 300 m away, but seep springs are present along the slopes of the terrace. The terrace itself has a number of small "pimple" mounds, two of which upon being shovel tested were found to contain high densities of cultural materials between 20-80+ cm in depth. I estimate the site size as 2500 m^2 (Figure 33).

Both positive shovel tests contained plain pottery body sherds, with one rim, and with most of the pottery (n=35) coming from more than 35 cm bs. Lithic artifacts included pieces of lithic debris, fire-cracked rock, and a dart point. Shovel Test #1 also had considerable amounts of charcoal along with a piece of bone, suggesting that a feature or midden deposit may be preserved on one of the "pimple" mounds. A Kent dart point was recovered at 40 cm bs in Shovel Test #2.

In 1972, cultural materials at 41RR106 were recovered by Hyatt and Mosca (1972) on the top of the terrace. This included small amounts of lithic debris and fire-cracked rock, a sandstone grinding stone fragment, and plain grog (n=3) and shell-tempered (n=2) pottery (see Table 3).

The artifacts found during the 1972 and 1991 investigations at 41RR106 suggest that both Woodland and Caddo period components are present; the grog-tempered pottery may be Woodland in age, or be associated with a Formative to Middle Caddo occupation. The Woodland occupation (the Kent point and perhaps the ceramics found below 40 cm bs) may also be buried in the terrace sediments.

Figure 33. Site 41RR106 Plan map.

The preservation of charcoal and bone in the lower deposits suggests these remains may pertain to the Woodland occupation (or be preserved in pit features), which would be of considerable significance given the general dearth of Woodland sites in Northeast Texas with preserved plant and animal remains (e.g., Perttula et al. 1993). Given the above, site 41RR106 warrants further test level investigations to fully assess its research potential.

41RR107

Site 41RR107 was located on an alluvial ridge 200 m south of Big Pine Creek, and 250 m south-southeast of the confluence of Big Pine Creek with Salt Well Slough. It overlooks, but is 6 m above, the Red River floodplain, with the current river channel about 0.8 km to the north.

The site covers about 2800 m^2 of the crest of the dissected terrace. Lithic debris and fire-cracked rock was visible on the surface in eroded areas along the edge of the ridge, along with a expedient flake tool of Red River gravel chert, and two of three shovel tests had sparse amounts of lithic debris (n=3) and fire-cracked rock (n=1) between 10-40 cm bs. Soils belong to the Annona-Freestone complex, but they are shallower than described (Thomas 1977:7-8) because of site erosion.

According to SMU, 41RR107 covered only a 200 m^2 area atop a small knoll of the alluvial terrace; the slough ran below the site. Artifacts collected from the site include a Late Archaic Palmillas dart point (Ouachita Mountains chert), a bifacial tool fragment of a banded red chert, and a few pieces of lithic debris and fire-cracked rock (see Table 3).

This site contains minimal archeological deposits, apparently of Late Archaic age based on the one recovered dart point (cf. Story 1990:Figure 32). The deposits appear to possess limited integrity, and we conclude that they have low potential for addressing important Red River regional research problems and issues.

41RR109

From the SMU work in 1972, this site appeared to be a McCurtain phase farmstead. It was situated on a small rise, covering ca. 1035 m^2, overlooking the confluence of Big Pine Creek and Salt Well Slough. Their field notes describe the soil as thick and dark in color, possibly because of a midden, and "there was a good deal of pottery." The cultural materials collected by SMU indicated that there were 43 plain shell-tempered body sherds and 15 pieces of wattle-impressed daub. The presence of daub probably is good evidence that a prehistoric Caddo structure is (or was) preserved at the site, possibly along with other features.

The 1992 TAS investigations documented that site 41RR109 is much larger in size than SMU suggested, about 20,000 m^2, and also that it has an extensive late 19th century archeological deposit. Due to the extremely wet conditions at the time of the survey, and the intractable clay soils, no shovel tests were attempted at the site.

Curiously, no Late Caddo McCurtain phase archeological materials were identified in a controlled surface collection completed during the survey, although a sparse scatter of probable Archaic period lithic debris, ground stone tools (pitted stone and mano), fire-cracked rock, and chipped stone tool fragments (including a preform to a dart projectile point of claystone-siltstone) was present near the crest of the rise (Figure 34a).

The principal historic archeological assemblage from 41RR109 contained refined earthenwares (shell-edged, hand-painted, flown blue, Figure 35j), stonewares (lead-glazed, salt-glazed, and alkaline-glazed), bottle glass (11 aqua and 11 dark olive green body sherds, 1 aqua-colored hand-applied lip), square nails, porcelain buttons, a stoneware pipe sherd (Figure 36a), and other metal artifacts (mostly unidentifiable to function), but including a metal utensil, tools, and a cooking pan fragment of cast iron from a pre-1880 occupation. One whiteware maker's mark reads "... WTHOR.." and has an English Royal Arms (dating after 1837). Later 19th and early 20th century artifacts include much of the bottle glass, including ornamental tableware, and plain whiteware sherds.

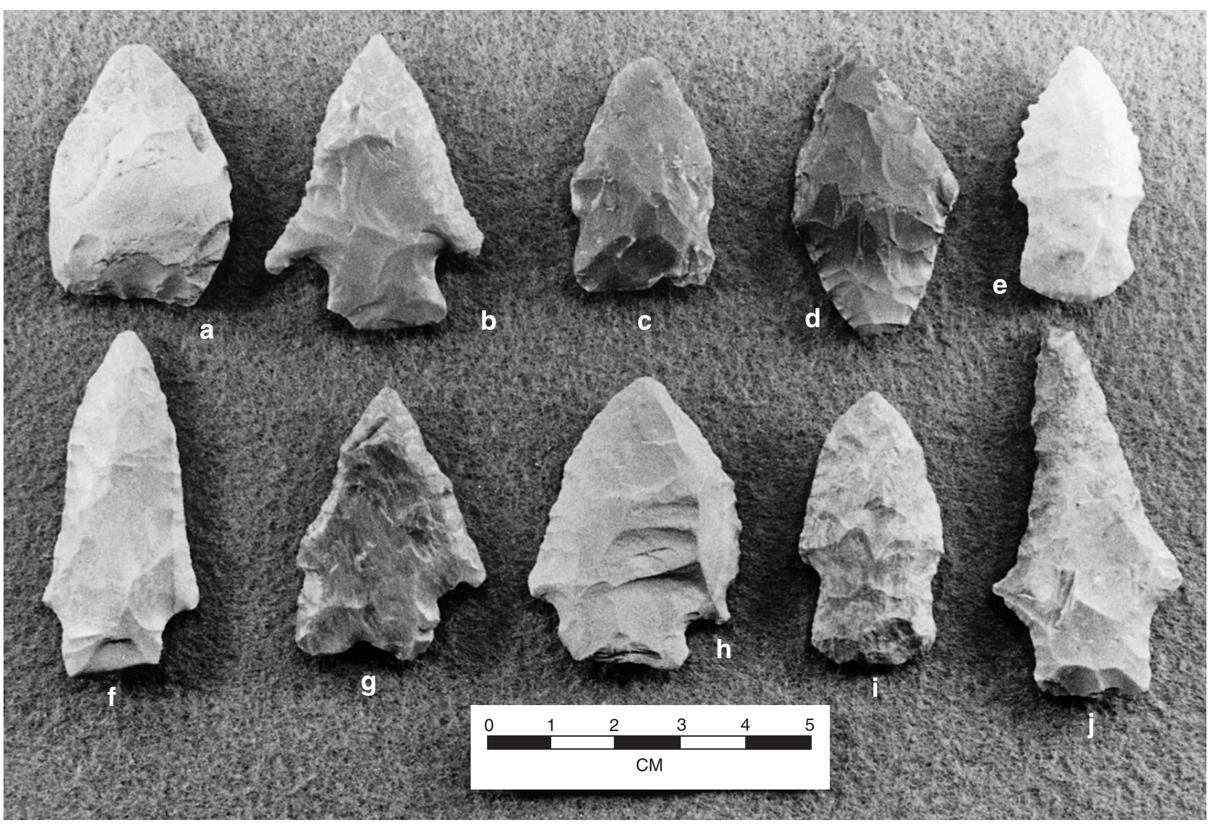

Figure 34. Dart Points from the TAS Survey: a, 41RR109; b, 41RR260; c, 41RR242; d, h, 41RR263; e, 41RR260; f, 41RR262; g, i, 41RR119; j, 41RR202.

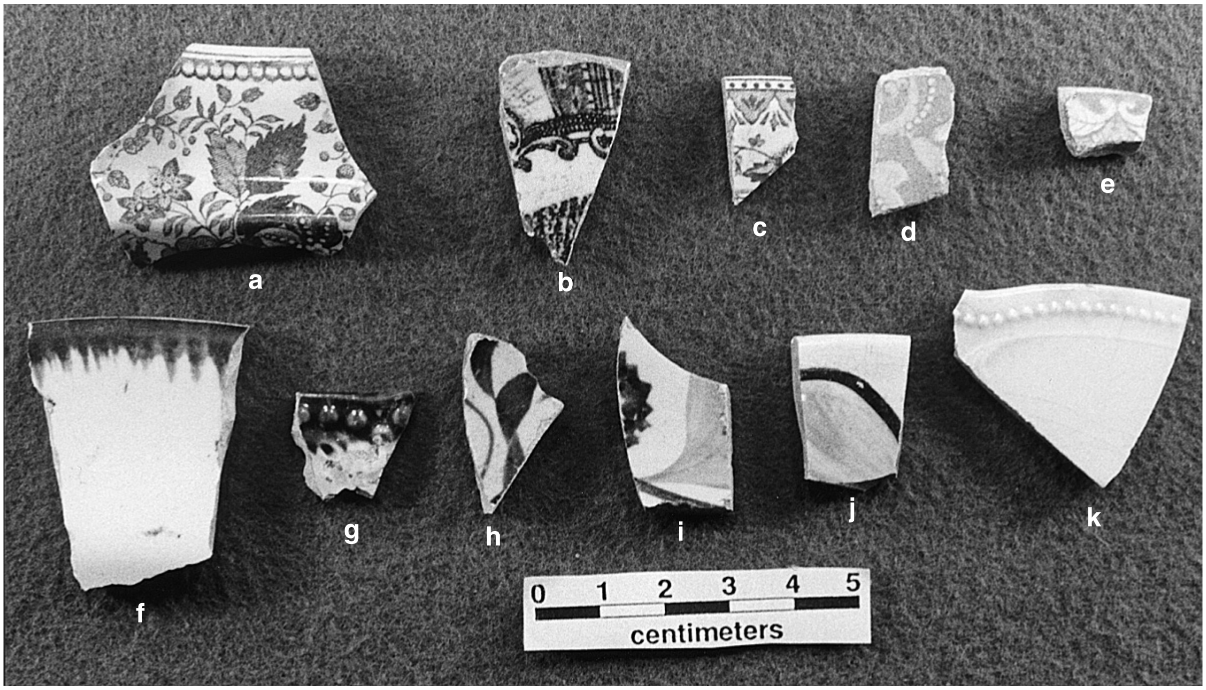

Figure 35. Decorated Refined Earthenware Sherds from TAS Survey Sites: a, 41RR119; b, 41RR296; c, e, 41RR287; d, g, 41RR286; f, 41RR205; h, 41RR305; i, k 41RR205; j, 41RR109.

Although the site area has been plowed for many years, the prehistoric and historic materials are probably intact. This material from 41RR109 probably is from one of the historic farmsteads dispersed along tributaries of Red River during much of the 19th and early 20th centuries, but with a substantial mid- to late-19th century occupation.

41RR110

When the site was recorded in 1972, it was estimated to cover ca. 650 m^2 on a high knoll some 50 m from Big Pine Creek. Although the SMU investigators noted no midden deposits at 41RR110, they collected a moderate assortment of Caddo lithics and ceramics (Hyatt and Mosca 1972). In the surface collection assemblage was an arrow point preform of a local heat-treated chert, lithic debris and a few utilized edge-modified pieces of local cherts and quartzites, and shell- and grog/grit-tempered pottery. Based on the limited number of decorated ceramics (one grog/grit-tempered sherd with a red slip and one shell-tempered piece with parallel punctations [Emory Punctated-Incised]) among the 18 sherds collected by SMU, the site appears to have both Middle and Late Caddo components.

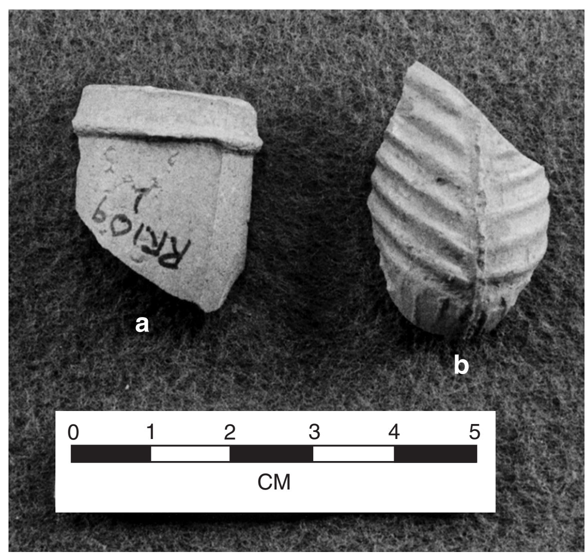

Figure 36. Stoneware Pipe Sherds: a, 41RR109; b, 41RR205.

Both the 1991 and 1992 TAS survey crews reexamined the site. It is in a pasture with poor surface visibility but the extent of the site was determined to be about 12,500 m^2. Three shovel tests were placed across the knoll, and a high density of ceramics (n=12), daub (n=9), bone, and charcoal (n=14) was recovered from each of the tests (but particularly in Shovel Test #2) between ca. 10-80 cm bs (Figure 37), as well as lithic debris and fire-cracked rock. The frequency of these types of artifacts strongly suggest that Caddo period structures and/or middens are likely to be preserved at the site. Both Early-Middle and Late Caddo ceramics were found in the TAS investigations.

The 1992 crew excavated a single shovel test near the crest of the knoll, and recovered lithic debris, charcoal fragments, and three plain sherds (two were shell-tempered) between 40-60 cm bs. The shovel test furthered verified that intact Caddo archeological deposits of some depth are preserved at 41RR110.

Site 41RR110 clearly appears to have research significance. A variety of research problems concerning the lifeways of Caddo peoples in the Mound Prairie area can be investigated from an examination of the site's archeological deposits (e.g., Bruseth et al. 1991, 1992; Perttula 1993; Perttula, ed., this volume) Moreover, the presence of charcoal in subsurface contexts suggests that features or midden deposits may be well preserved at the site, and that radiocarbon dates of the Caddo component(s) can be secured. This site warrants additional investigations as well as long-term preservation.

41RR111

Site 41RR111 was found by the SMU survey team on a "high knoll" only about 25 m south of 41RR110. Only apparently ca. 500 m^2 in size, both lithic and ceramic artifacts were collected from the surface of the site (see Table 3). Our inspection of those materials, principally the 10 shell-tempered rim and body sherds (including two with exterior red slips and another with an appliqued design on the exterior surface) suggests that an early McCurtain phase occupation occurred at the site. There were also two grog-bone-tempered body sherds with interior and exterior red slipping as well as three plain grog-tempered body sherds. These sherds belong

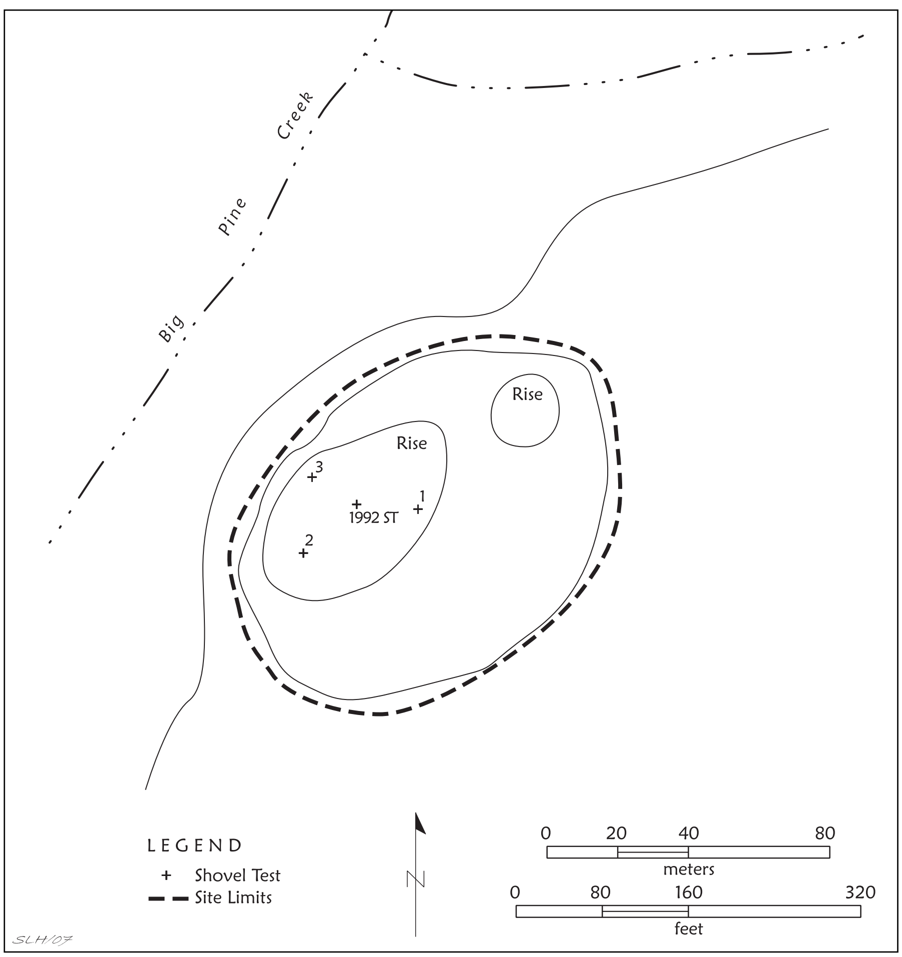

Figure 37. Site map of 41RR110.

with an earlier, pre-A.D. 1300 Caddo occupation at 41RR111 (e.g., Perttula 1997a, 1997b).

In 1991, the TAS survey crew noted prehistoric ceramics, ground stone tools, and lithic debris on the surface of the knoll (although no artifacts were collected), and the site appeared to be intact. No shovel tests were excavated at 41RR111 during the 1991 season.

This site was also relocated by a TAS survey crew in 1992, although only a limited surface reconnaissance was done and one shovel test excavated there because of the wet and muddy conditions. No archeological materials were visible on the surface of the knoll, which overlooks the floodplain of Big Pine Creek, while the shovel test recovered one piece of fire-cracked rock and three charcoal pieces between 70-80 cm bs.

Due to the very limited work completed at 41RR111 by the TAS, and the evidence for a Late Caddo occupation suggested by the SMU investigations, the site should be revisited and systematically shovel tested should it become threatened by farming operations or other development activities. Most of the Late Caddo sites known in the Mound Prairie area are restricted to the Red River alluvial floodplain, or are along an old Red River channel, so further work at a Late Caddo settlement some km up Big Pine Creek would promise to contribute useful information on the overall character of the settlement system around the Roitsch site village at that time.

41RR112

Site 41RR112 is located on the tip of a narrow alluvial ridge between two intermittent tributaries of Big Pine Creek. The creek is about 120 m to the north of the site.

Covering about 800-1000 m^2, 41RR112 has been disturbed by an old road that had cut through the approximate center of the ridge. This has exposed prehistoric artifacts along the roadbed slopes, and artifact collectors have been actively scouring the surface and erosional cuts for projectile points. In a surface collection secured from the site by the TAS, four (three Gary and one unidentified expanding stem) dart projectile points were recovered, as well as 47 lithic debris, two bifacial tool fragments, and one piece of fauna. The projectile points are indicative of Late Archaic and Woodland use of the ridge.

Three shovel tests were excavated along the ridge to ascertain whether intact archeological deposits were present at 41RR112. Only two pieces of lithic debris were recovered from 0-10 cm in one of the shovel tests (ST #2), and the shovel testing documented that the archeological deposits are shallow and eroded.

A small collection of artifacts were obtained in 1972 by the SMU crew in a 90 m^2 area of the site apparently subject to more considerable erosion (see Table 3). Fire-cracked rock, lithic debris, and three grog/bone-tempered pottery sherds from one vessel (with possible interior red slip) were found at 41RR112, probably from a Formative to Middle Caddo occupation of the ridge.

Taken together, the SMU and TAS investigations at 41RR112 document a periodic Late Archaic, Woodland, and possibly a Formative to Middle Caddo use of the site. However, due to disturbances from road construction, the activities of artifact collectors, and erosion, there is little potential for intact archeological deposits to be preserved at the site. No further work is warranted at 41RR112.

41RR119

According to SMU field notes from the Big Pine Creek Reservoir project, this is a 2070 m^2 surface scatter of lithic and ceramic artifacts at the west end of a long ridge next to Big Pine Creek. The collection we examined from 41RR119, however, contained only a small assortment of fire-cracked rock and lithic debris of local chert and quartzite (see Table 3). Also in the collection was one edge-modified flake tool of red chert.

Investigations in 1991 by the TAS showed that site 41RR119 covers a much larger area than previously thought, about 19,800 m^2 of the alluvial ridge and that it also has a late 19th-mid-20th century component. The channel of Big Pine Creek is 100 m east of the site. The landform is dissected by several large gulleys, and these served as convenient depressions for the dumping of historic artifacts and trash.

Historic and prehistoric archeological materials were widely dispersed in surface contexts across the landform. The historic artifacts were most common at the west end of the site (in the vicinity of a structure and barn as depicted on the 1951 USGS 7.5' quadrangle map) and the prehistoric artifacts were restricted primarily to the eastern half of the site. No shovel tests were excavated at the site, unfortunately, to ascertain whether either intact prehistoric or historic archeological deposits remain preserved.

A small collection of prehistoric and historic artifacts were recovered from 41RR119 through a systematic surface collection. The prehistoric remains (n=32) include two plain shell- and grog-tempered sherds, four pieces of daub, two dart points (a Yarbrough and the stem of a Gary point; see Figure 34i), two bifacial tool fragments of novaculite, five cores, 12 lithic debris, one ground stone tool (a possible mano), and five fire-cracked rocks, probably from Late Archaic and Woodland period occupations of the site. The shell-tempered sherds are indicative of a Late Caddo, McCurtain phase component.

The late 19th-mid-20th century occupation at 41RR119 is represented by 11 machine-made brick fragments, one possible post-1890 wire nail, four pieces of whiteware (including one with a brown transfer-printed decoration; see Figure 35a), two stoneware sherds, one clear tableware glass sherd, and 21 pieces of bottle glass and milk glass. A cursory reexamination of the site in 1992 by the TAS recovered an expanding stem Archaic dart projectile point (see Figure 34g) in an eroded area at the eastern end of the ridge.

The prehistoric component of site 41RR119 warrants further attention, principally to establish whether the site contains intact and interpretable archeological deposits of either Late Archaic or Woodland age, and has any potential to contain cultural features. A program of shovel testing should be completed in the future in the eastern portion of the site, where prehistoric artifacts are common in surface contexts, should activities be proposed that could damage possibly important Late Archaic and/or Woodland archeological deposits.

41RR129

Only a small (10 m in diameter) scatter of lithic debris and fire-cracked rock on a knoll near Big Pine Creek was recorded by SMU during their site identification efforts (Hyatt and Mosca 1972). Collections from the site are consistent with this description: three fire-cracked rock, three pieces of lithic debris, and a core of Ouachita Mountains chert (see Table 3).

During the 1991 TAS survey investigations, we relocated the site through shovel testing. It covers ca. 1300 m^2 of an alluvial terrace with two pimple mounds. Both of the pimple mounds contain prehistoric artifacts, principally lithic debris and daub, in archeological deposits at least 30 cm in thickness. Due to heavy rains and saturated soils, the shovel tests were only excavated to 30 cm bs. Of the two shovel tests, Shovel Test #2 (on the northern pimple mound at the site) contained a high density of lithic debris (n=10) and daub (n=27), along with pieces of charcoal; only one lithic debris and a bifacial preform fragment were recovered from Shovel Test #1. A small surface collection of prehistoric artifacts (one arrow point preform fragment, one lithic debris, one ground stone tool, and a biface) was obtained from gopher mounds dispersed across the site. The prehistoric artifacts from site 41RR129 are for the most part temporally undiagnostic, although the arrow point preform denotes a post-A.D. 800 Caddo use of the landform. The lack of ceramics in the small collection, however, hints that the principal use of the site probably took place prior to ca. 2000 years B.P. (about the time of the advent of ceramics along the Red River in Northeast Texas [Story 1990]).

Further shovel testing should be conducted at 41RR129 to better define the horizontal and vertical extent of the archeological deposits. The results of the shovel testing should be informative about the site's contextual integrity, and may provide useful data about the archeological contents of the deposit.

41RR201

Site 41RR201 is on a small rise (ca. 1000 m^2), probably part of a dissected alluvial terrace, overlooking the floodplain of Salt Well Slough; the slough is 50 m east of the site. The Salt Well Slough site (41RR204), and other salt-making sites, are just to the south of 41RR201 along Salt Well Slough (see Kenmotsu 2006). It is in a pasture area with good surface visibility (20 percent on average).

A light scatter (ca. 1 artifact per 10 m^2) of thin shell-tempered ceramics and burned clay is present on the surface of the site, and a small surface collection (29 plain sherds and two pieces of burned clay) was obtained during the site recordation process; the density of artifacts strongly contrasts with the high amounts of ceramics and daub noted at the nearby salt making sites (see Kenmotsu 2006). No shovel testing was conducted at the site, but it is likely that the archeological materials at 41RR201 are from a Late Caddo period farmstead. Thus, if through future shovel testing, subsurface deposits were shown to be intact, the site would then have excellent potential to contain important information about the character of the Late Caddo McCurtain phase farmsteads dispersed around the Late Caddo Roitsch village.

41RR202

Site 41RR202 is much like 41RR201 in that it contains a small (ca. 800 m^2) concentration of principally plain shell-tempered sherds dispersed across the surface of a natural rise on an alluvial terrace of the Red River; Salt Well Slough is about 50 m east of the site, and the current channel of the Red River is 800 m to the east. Some 30 plain shell-tempered sherds were collected from a general surface collection of the site, along with a red-slipped Avery Engraved body sherd (Figure 38b). No shovel tests were conducted at 41RR202; if the site is to be threatened in the near future, a program of shovel testing should be implemented to assess the subsurface integrity of any preserved archeological deposits.

Based on the available evidence, the site is also interpreted as a Late Caddo McCurtain phase farmstead, and perhaps it was occupied by Caddo peoples that produced salt at the Salt Well Slough salt making site. It was also used during the early part of Late Archaic times, as a large straight-stemmed dart point of Red River gravel chert resembling a Bulverde (see Figure 34j) was recovered in the surface collection from 41RR202.

41RR203

This appears to be an Archaic period site located on a topographic high overlooking the confluence of Pond Creek and Salt Well Slough; Pond Creek is about 100 m from 41RR203. TAS investigations at this site were limited to a cursory reconnaissance of the landform, and only lithic debris and fire-cracked rock were noted to be thinly scattered on the surface over a 20,000 m^2 area; no temporally diagnostic artifacts were recovered or observed from 41RR203, however.

The presence of probable Archaic archeological deposits along Salt Well Slough is intriguing, amidst the relatively dense cluster of Late Caddo habitation sites and salt making locations, but additional investigations are needed to determine if preserved subsurface archeological deposits are present at 41RR203. A program of shovel testing is warranted to assess the archeological character of the component(s), and to acquire artifacts that will aid in determining the period(s) of prehistoric occupation at the site.

41RR204, Salt Well Slough Site

The Salt Well Slough site is a Late Caddo McCurtain phase salt-making loci. It is situated on a gently sloping rise on the edge of an alluvial terrace dissected by Salt Well Slough and Pond Creek. From surface indications in a plowed field during a 1991 reconnaissance, the site had an extremely dense concentration of plain and decorated shell-tempered sherds and daub/burned clay, and appeared to have great potential to contain intact archeological deposits and features relating to the Caddo manufacture of salt. The site was selected for intensive investigations during the 1991 field season of the Texas Archeological Society Field School (Kenmotsu 2006; see also Perttula et al. 2001).

41RR205

This is a multi-component prehistoric and historic site that covers about 6400 m^2 on the edge of an alluvial terrace of the Red River. It is on farmlands of the Fasken Farm, and a short distance northwest of the Fasken site.

The terrace had been recently plowed, exposing a dense concentration of mid- to late 19th century artifacts (including bottle glass, whitewares, stonewares, and an occasional brick or metal fragment) and a sparse scatter of prehistoric lithics across the site. The soil at the site, a sandy loam, is distinctly darker than the surrounding soil, suggesting that an historic sheet or yard trash midden is preserved at 41RR205; no shovel testing was conducted during our cursory reconnaissance to verify the presence of a midden deposit.

A selective surface collection of artifacts was recovered from the site, principally to characterize the age of the historic occupation as well as to document the presence of a prehistoric component. Among the collected historic artifacts (n=165) are shell-edged, transfer-printed, and hand-painted whitewares (see Figure 35f); slip-banded yellow wares; alkaline glaze, salt glaze, and natural clay slipped stonewares; a stoneware pipe bowl (see Figure 36b); and a few sherds of hand-molded bottle glass with applied lips. A whiteware maker's mark reading "... ANL... ENGLA..." is from a J & G Meakin Ltd. vessel made between ca. 1890-1907 (Kovel and Kovel 1986). With the exception of the maker's mark, a few Bristol-glazed stonewares, a relief-molded whiteware rim (see Figure 35k), one machine-made brick fragment, and clear, purple, blue, and milk glass, these artifacts are generally consistent with an antebellum historic occupation; the latter artifacts recovered from 41RR205 suggest that the occupation, probably a farmstead, may have extended to about 1900.

The prehistoric component at 41RR205 is not temporally diagnostic: only a single piece of lithic debris, a bipolar core fragment, and one bifacial preform fragment were recovered in the surface collection. What is notable is the complete absence of aboriginal ceramics, which occur in quantity on most prehistoric archeological sites along Holocene alluvial terraces of the Red River; indeed, other prehistoric sites in proximity to 41RR205 along this stretch of alluvial terrace have significant quantities of ceramic artifacts from Caddo occupations (see 41RR206 and 41RR209), as does the nearby Fasken site (see Prikryl, this volume). This suggests that the prehistoric component at 41RR205 is more than 2000 years old, as prehistoric ceramics commonly occur on Red River sites dating only after that time (cf. Schambach 1982; Story 1990).

The site has considerable potential to contribute important information on the lifeways of relatively early Anglo- or African-American settlers of the Mound Prairie area of Red River County. This area was settled in the 1820s (Steely 1982), so the occupation at 41RR205 may represent a farmstead of a second generation settler of the region. To obtain useful archeological information on the site, a program of shovel testing should be conducted at 41RR205 to better clarify the contextual integrity of the 19th century occupation, and also to establish if features (i.e., sheet middens, wells, privies, and house foundations) from the occupation are present, and if they are well preserved. To learn more about the occupants of the site (such as their ethnic heritage, occupation, and economic status), land deed and title research should also be carried out.

41RR206

Site 41RR206 was discovered in a plowed soybean field on a natural rise along the edge of an alluvial terrace of the Red River. Based on the surface distribution of prehistoric artifacts in the plowed field, the site covers ca. 5000 m^2. The darkened soil on the rise suggests that a prehistoric midden deposit is preserved at the site, but no shovel tests were excavated to ascertain its condition, content, or possible thickness.

A large quantity (n=119) of prehistoric lithic and ceramic artifacts were selectively collected from the surface of the plowed field (this includes three pieces of Red River chert lithic debris from the 1993 Northeast Texas Archeological Society survey effort [see below]), including plain and decorated grog-tempered Caddo ceramics (n=64), lithic debris, cores, bifaces, a Gary dart point, a celt, and the mid-section of an arrow point; a few fire-cracked rocks and daub were also collected. The majority of the prehistoric artifacts appear to be from an earlier Caddo component (i.e., predating A.D. 1300), perhaps contemporaneous with the occupation at the Fasken civic-ceremonial center (41RR14, see Prikryl, this volume). This prehistoric mound center and village is less than 1 km to the southeast of 41RR206. The Gary point may be associated with the Caddo component, but it is more likely to relate to the limited use of the site during Late Archaic/Woodland times.

It is possible that 41RR206 represents an outlying settlement that was directly associated with the occupation and use of the Fasken civic-ceremonial center, though further investigations will obviously be needed to determine when it was actually occupied. The nature and abundance of the material remains from the site, and the likelihood that a midden is preserved there, suggests that the Caddo occupation was intensive, and probably marked by house structures, features, and trash deposits. This Caddo site clearly warrants further investigations as well as protection efforts, because of its potential to contain significant information on Caddo prehistory.

The Northeast Texas Archeological Society visited the site during their reconnaissance of the Wright and Tarrant Farms in February 1993 (see Nelson, Turner, and Perttula, below). In their survey, they documented that site 41RR206 was also occupied in the late 19th-early 20th century, probably by tenant farmers. Included among the artifacts collected on the site revisit are one plain whiteware sherd, another whiteware sherd (from a brimmed plate) with a black hand-painted (overglaze) decoration, one porcelain button (4-hole), and two ironstone sherds with maker's marks, one of which (Standard Pottery Co. of East Liverpool, Ohio) dates between ca. 1910-1927. The other has a "VITREOUS" mark that dates after ca. 1901 (Kovel and Kovel 1986).

41RR207

Located in the same plowed soybean field as 41RR205 and 41RR206, site 41RR207 appears to be the remains of one of the tenant farms or farmsteads that once lined the Kiomatia-Jonesborough road between ca. 1880-1930. Covering about 2000 m^2 of the alluvial terrace, the site contains a range of domestic refuse strewn across the surface, including: bottle glass, wire nails, farm implements, bricks, and ceramics (whiteware and stoneware).

No features were apparent at 41RR207 in the cursory reconnaissance completed by TAS at the site, but foundation remnants, privies, and yard sheet trash may be present. No shovel tests were excavated to characterize the subsurface character of the archeological deposit. A small collection of stonewares (n=2), post-1875 lead-glazed and salt-glazed/lead-glazed, was recovered from the site to help characterize the temporal range of the occupation, along with a whiteware maker's mark, "THOMPSON & ...". The mark may be from the C.C. Thompson Pottery Co. (1868-1938) (Kovel and Kovel 1986).

Archival investigations may be warranted at some future date for 41RR207 as part of developing a better understanding of the historical and archeological parameters of the tenant farming system in the Mound Prairie area of Northeast Texas. The limited information obtained from the survey reconnaissance of this site does not strongly suggest that it has much potential to address relevant archeological research problems for the period, but undoubtedly there are other better preserved sites that possess such research value. Limited test excavations could be conducted at these sites in the context of a well-developed research design concerning late 19th century Anglo-American or African-American tenant farmers.

41RR208

Like 41RR207, this site appears to represent the archeological remnants of a tenant farm, one of many such farms scattered along FM 410 between Kiomatia, Wright Plantation, and Jonesborough (later known as Davenport). Site 41RR208 is marked by a fairly dense (ca. 5 artifacts per 10 m^2) surface scatter of historic ceramics, bottle glass, post-1890 wire nails, and machine-made brick fragments covering about 1600 m^2, along with a darker soil stain that may be indicative of sheet or yard trash midden deposits; no foundation or privy features were noted in the TAS survey reconnaissance and no shovel tests were excavated at the site.

Based on observations of the kinds of historic artifacts present at 41RR208, it was occupied in the early 20th century (ca. 1900-1940). Present were such artifacts as post-1903 machine-made bottles, fiesta ware ceramics, Bristol-glazed stoneware, and wire nails. The house that stood at the site must have been abandoned some years before 1949, as no structure is shown at this location on the Kiomatia 7.5' USGS topographic map dating to that year. Because of the relatively recent age of the site, and its relatively commonplace archeological record (i.e., there are thousands of similar sites across Northeast Texas), we offer no further archeological recommendations for site 41RR208.

41RR209

Site 41RR209 is a small prehistoric Caddo archeological deposit located on the edge of an alluvial terrace of the Red River, not far from the Fasken mound site; the terrace had been plowed for soybeans shortly before the onset of the 1991 TAS survey efforts. The current channel of the river is 1.5 km to the west of the site, but probably flowed closer to it during prehistoric times.

The site is marked by a low density (ca. 1 prehistoric artifact per 25 m^2) surface scatter of ceramics, lithic debris, burned clay/daub, fire-cracked rock, and chipped and ground stone tool fragments; no obvious surface concentrations of artifacts were noted across the 1600 m^2 site area. The rise the site is situated on has been darkly stained, probably from a midden deposit, although no shovel tests were excavated at 41RR209 to confirm the presence of any midden areas. A surface collection of prehistoric ceramics (n=36), lithic debris (n=9), fire-cracked rock (n=3), and a greenstone (siliceous shale) celt fragment were retrieved during the surface inspection of the site. The plain and decorated grog-tempered ceramics found at the site denote a Caddo occupation between ca. A.D. 900 and A.D. 1300; it is impossible to be more temporally specific because of the small number of decorated ceramics in the collection.

The possible midden staining, in conjunction with the prehistoric domestic refuse, suggests that site 41RR209 probably represents a small farmstead or homestead of Red River Caddo peoples. Given its proximity to the Fasken civic-ceremonial center, it may also plausibly be part of the population that built and used this important regional Caddo civic-ceremonial center between the 11th and 13th centuries (see Prikryl, this volume). Whether this is the case or not, this

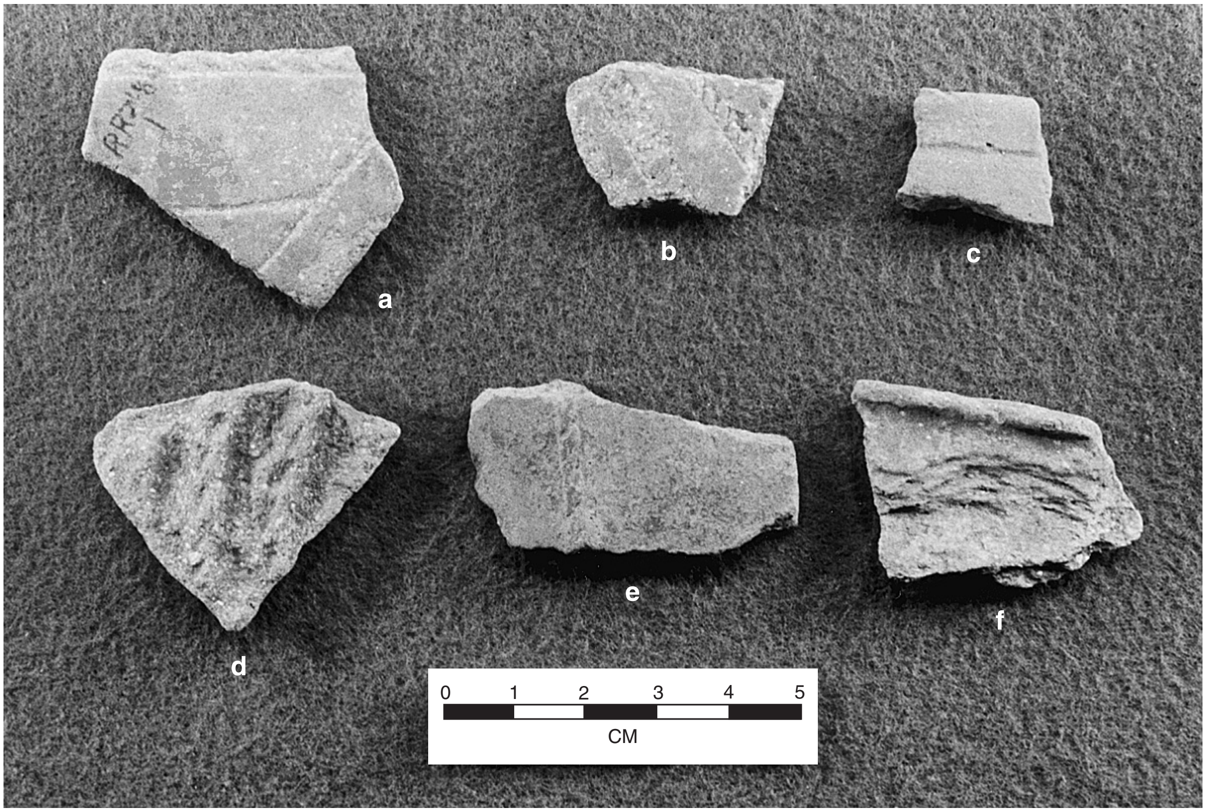

Figure 38. Decorated Caddo Sherds from TAS Survey Sites: a, d, f, 41RR248; b, 41RR202; c, e, 41RR290.

site does appear to have the potential to contain significant archeological data on the Caddo settlement of the Mound Prairie area in Northeast Texas. A program of shovel testing should be conducted at the site to determine the contextual integrity and character of its subsurface archeological deposits, and then assess its likelihood to contain cultural features.

41RR210

This multi-component prehistoric and historic site is along an intermittent tributary of Little Pine Creek, about 1.5 km or so south of the southwest corner of the Roitsch Farm survey area (see Figure 1). The community of Manchester is 1.2 km to the north of 41RR210. FM 2118 has cut through the site, disturbing and mixing the prehistoric and historic components, but the possibility exists that in situ deposits are present in the 2000 m^2 portion of the site across FM 2118 to the south.

The site has been plowed, and prehistoric Caddo ceramics and lithic debris were noted (although none were collected) on the surface along with 20th century plain whiteware and Bristol-glazed stoneware ceramics and clear bottle glass. The historic artifacts are probably from a house site that had been razed and removed, while the small Caddo occupation may be a farmstead. The grog-tempered Caddo ceramics from 41RR210 indicate that the site was settled prior to ca. A.D. 1300.

If the site is threatened by further road construction along FM 2118, a program of shovel testing should be conducted at 41RR210 to ascertain if it has the potential to contain significant subsurface archeological deposits. As most of the Caddo sites recorded and investigated in the Mound Prairie area are located along the Red River, one of its alluvial terraces, or along a main tributary of the river, further examination of a Caddo site such as 41RR210 may acquire significant archeological information on the early Caddo use of small tributaries and prairie/woodland habitats away from the modern Red River alluvial floodplain.

41RR211

Site 41RR211 occupies a long, narrow alluvial ridge between two intermittent tributaries of Big Pine Creek; the site area is estimated at 25,000 m^2 (Figure 39). The site is currently in a heavily grazed cow pasture, although it has been plowed in the past, and lithic debris is observed in rodent mounds and eroded areas across the ridge.

A program of shovel testing was conducted at 41RR211, and seven of 10 shovel tests excavated along the ridge contained prehistoric lithic and ceramic artifacts in moderate densities (mean=15.7 artifacts/shovel test or ca. 170 artifacts per m^3). The artifacts occur to about 80 cm bs in sandy loam deposits of the Annona-Freestone complex (Thomas 1977); areas with shallow sandy loam soils over a clay B-horizon typically lack subsurface archeological deposits at the site. The shovel testing did not identify midden deposits at 41RR211. The highest densities of subsurface artifacts were found in the southeast quarter of the site (see Figure 39) in Shovel Tests #1, #3, #6, and #7. This is also the same area where plain prehistoric ceramics were found in the shovel testing.

A surface collection of prehistoric artifacts from eroded areas of the site recovered 45 items. This includes lithic debris (n=42), cores (n=2), and one fire-cracked rock. Similar kinds of prehistoric materials were found in the shovel tests at 41RR211, along with daub (n=14), plain grog-tempered sherds (n=3), three shell-tempered sherds (from Shovel Test #7), a straight-stemmed dart point, one mano, and a quartzite bifacial preform fragment. With the exception of the Late Caddo shell-tempered sherds, the assemblage of prehistoric lithic and ceramic artifacts is most consistent with a Woodland period occupation of the site.

This site certainly warrants further consideration on a number of grounds. First, it contains well-preserved and intact prehistoric archeological deposits, and thus it should receive long-term protection. Second, the archeological deposits appear to principally pertain to a Woodland period occupation, which is a period of time that is poorly known in an archeological sense in the Middle Red River valley (cf. Perttula et al. 1993). Test excavations at 41RR210 would be profitable as part of research efforts aimed at learning more about the development of prehistoric sedentary life in Northeast Texas, as well as the functional and technological character of Woodland period material culture assemblages. Learning more about the use of the site during the Late Caddo period may provide important information on the character of settlement by Late Caddo farmers along a Red River tributary in the Mound Prairie area.

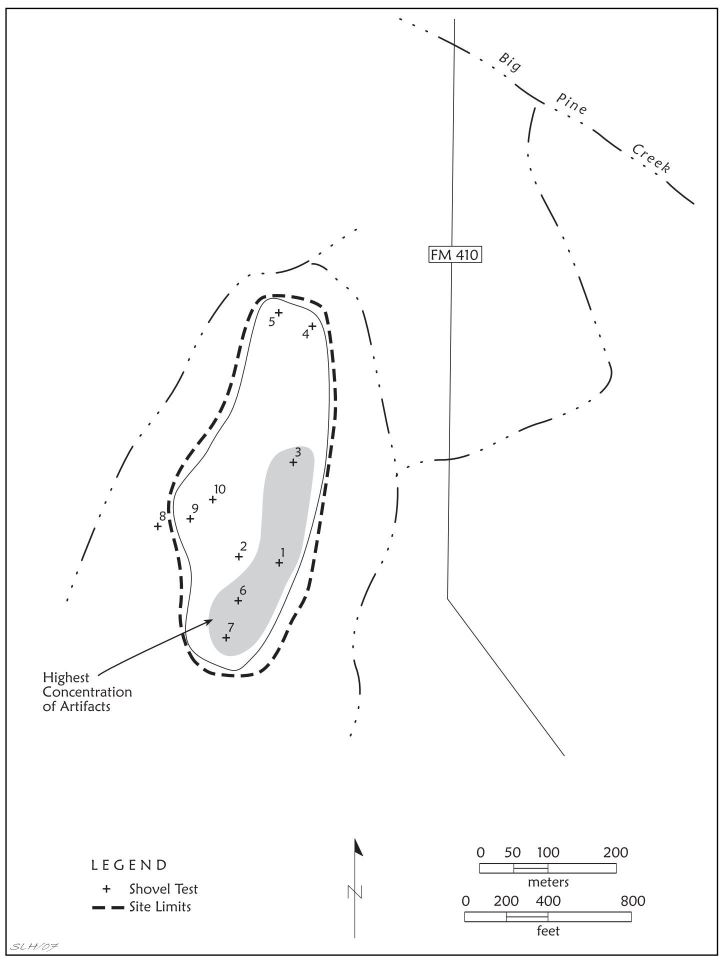

Figure 39. Site Map of 41RR211.

41RR212

This site includes a low density scatter of prehistoric ceramics and lithics eroding out along the margins of a small pimple mound. The pimple mound, about 1200 m^2 in size, is on a linear alluvial ridge that has been dissected by erosion, and there are small intermittent drainages of Big Pine

Creek on both sides of the landform. Big Pine Creek is 600 m north of the site.

Two shovel tests on the pimple mound recovered no prehistoric artifacts. The eroded sandy loam soil is only about 5 cm in thickness over a hard B-horizon red clay, indicating that almost all of the archeological deposit has been eroded away, probably by historic timbering, plowing, and grazing activities. A small surface collection from 41RR212 recovered a battered quartzite cobble, and the location of a plain grog-tempered pottery sherd was plotted on the site map drawn in the field; it was not collected. Based on this admittedly limited assemblage of artifacts, site 41RR212 may have been used to some extent after about 2000 years B.P., but certainly was occupied before ca. A.D. 1300 (when shell-tempered ceramics occur with frequency in Middle Red River Caddo assemblages).

The lack of subsurface archeological deposits, and the extensive site erosion, indicate that site 41RR212 retains no research potential. No further archeological investigations are warranted for the site at this time.

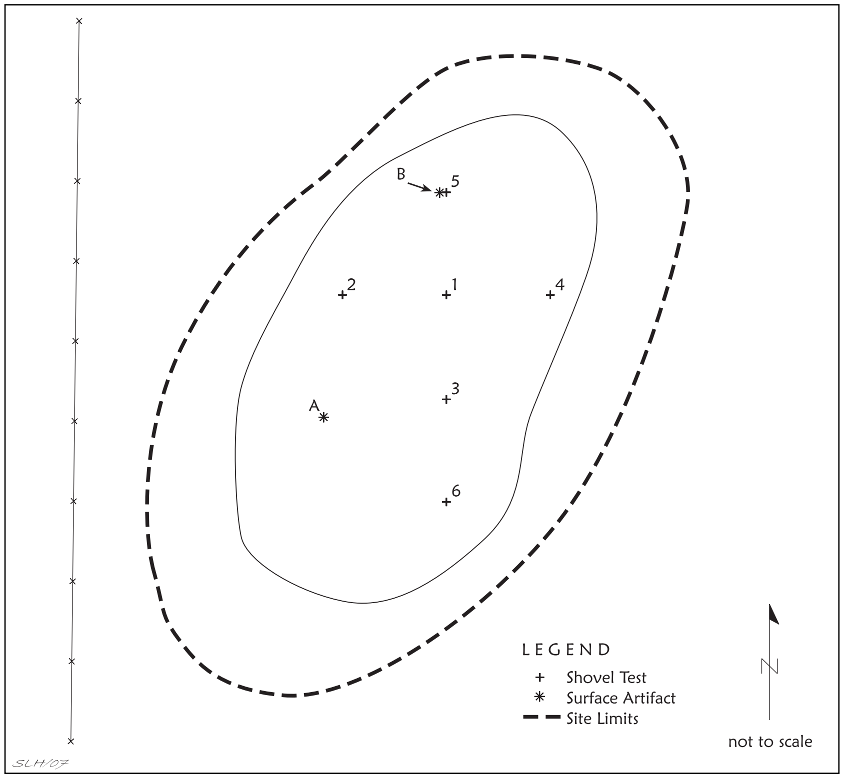

Figure 40. 41RR214 Site Map.

41RR213

This site is located in a similar setting as 41RR212, namely on a small pimple mound along a linear and eroded alluvial ridge that has been dissected by several intermittent drainages of Big Pine Creek. A low scatter of prehistoric lithic debris covers about 4000 m^2 of the pimple mound and alluvial ridge.

Shovel tests on the pimple mound failed to identify subsurface archeological deposits, and the soil consists of only 15-25 cm of sandy loam over a red B-horizon clay. A surface collection of the site area recovered only three pieces of lithic debris and one unifacially retouched tool from a temporally unknown prehistoric occupation, a piece of bone (that appears to be recent), and one 20th century bottle glass sherd.

No further archeological investigations are recommended for site 41RR213. Extensive erosion and cattle grazing have removed the vast majority of the site's archeological deposit, and what remains is simply too sparse and disturbed to have any research potential.

41RR214

This site appears to contain an intact Woodland period component on a small alluvial knoll (1800 m^2) overlooking an intermittent drainage and the floodplain of Big Pine Creek. A small scatter of prehistoric lithic and ceramic artifacts were noted on the surface of the knoll, but shovel tests placed across the landform (Figure 40) disclosed that moderate to high densities (site average=14.2 artifacts/shovel test, ranging from 3-26 artifacts) of artifacts occur in subsurface contexts in each of the six shovel tests at 41RR214.

Recovered in the shovel testing were lithic debris (n=48), daub (n=6), one possible Kent dart point from Shovel Test #1, fire-cracked rock (n=3), ground stone tools (n=3), and plain grog-tempered ceramics (n=24). Similar materials were noted in surface contexts. Ceramics were uniformly distributed across the site, although they were particularly common in Shovel Test #5, with 17 plain sherds, at the northern end of the knoll (see Figure 40). The shovel testing at 41RR214 did not identify midden deposits or other cultural features, but prehistoric artifacts were retrieved to between 50-60 cm bs in sandy loam deposits of the Annona-Freestone complex.

The site appears to possess research potential since it may have an intact Woodland period occupation. The relatively diverse nature of the artifactual assemblage from 41RR214 bespeaks an occupation of some duration, and thus it is possible that habitation features are present at the site; the depth of the sandy loam soils over the clay B-horizon also suggests that some features can be identified in subsurface contexts. If such features are present at the site, their investigation could shed significant new light on the nature of Woodland period settlement in the Red River valley. Test excavations seem warranted to fully assess the contextual integrity and research values of 41RR214.

41RR215

This 20th century house site is located on a small rise adjacent to Pond Creek, and adjacent to an old farm road that crosses Pond Creek. The site is marked by a diffuse scatter of household-related debris in an overgrown pasture setting, including whitewares, stonewares, brick fragments, bottle glass, and wire nails. A small surface scatter (n=30) of historic artifacts was documented to characterize the temporal span of the historic occupation; one burnt machine-made brick fragment was collected from the surface. No house foundations or other cultural features were apparent from the surface inspection of 41RR215, and no shovel tests were excavated, but the 1951 Kiomatia USGS 7.5' map shows a standing structure at this location; presumably the structure was razed and removed from the site sometime after 1951.

The age, location, and general character of the site is quite similar to the group of historic archeological sites (41RR222-225, and 41RR227) to the immediate north and west (along the same old farm road that crosses Pond Creek) that are thought to be part of a tenant farm community established there in the early 20th century. Site 41RR215 may be part of the same historic community. Archival and oral historical investigations would be useful to learn more about the history of the community and the families that lived there. The site's archeological potential appears to be rather limited, since at best what would be obtained is yard sheet trash data and a larger sample of mass-produced bottle, glass, and metal artifacts, and we do not recommend that additional archeological investigations be conducted there.

41RR216

This is an early 20th century house site that is probably associated with the small community of Blakeney; a sparse prehistoric component is also present. The site is located on a pimple mound situated on a low alluvial ridge about 3 m above the floodplain of an intermittent tributary to Big Pine Creek. It has been eroded, and a farm road has also cut the south end of the site, creating a cut bank that is further exposing archeological deposits. A small feed silo has been constructed on the site as well.

Historic artifacts (n=12) were collected in displaced contexts from the road bank area, and the excavation of six shovel tests defined a 7200 m^2 area of the pimple mound that apparently contains subsurface archeological deposits. A high density of 20th century historic ceramics, bottle glass, metal, bricks, and wire nails were recovered in sandy loam sediments between 0-50 cm bs in the two positive shovel tests, mixed with a single piece of lithic debris in one of the shovel tests; there is no indication that the prehistoric artifacts occur in a discrete or isolable zone below the historic 20th century deposits.

Given the age of the artifacts recovered in the surface collection and shovel testing, the historic archeological deposits appear to be from the standing structure shown at this location on the 1951 Kiomatia USGS 7.5' topographic quadrangle. No archeological features or house foundation remnants were identified by TAS survey personnel. Site 41RR216 was apparently occupied in historic times during the heyday of the Blakeney community, which was a small commercial establishment of about 100 in population in 1910 (Webb 1952, Volume I:171; Hazlewood 1996:580).

The prehistoric artifacts, particularly the one plain grog-tempered sherd recovered in the surface collection, hint at limited use of the site during either the Woodland period or the earlier part of the prehistoric Caddo tradition in the Mound Prairie area. These materials are sparsely distributed at the site, and they occur in eroded, disturbed, or mixed contexts.

Considering both the historic and prehistoric archeological information recovered in the TAS investigations, site 41RR216 appears to lack the potential to address important regional archeological research problems. Consequently, I do not recommend future investigations at the site.

41RR217, Roitsch Barn

The Roitsch Barn site is on an alluvial landform that parallels an intermittent tributary to Big Pine Creek, which is about 1 km to the north. There are several pimple mounds on the landform, and two of these contain subsurface archeological deposits with prehistoric and historic artifacts. Prehistoric and historic artifacts are also visible on the surface in eroded and disturbed contexts which were caused by road grading and barn construction.

Based on surface exposures and shovel testing, the Roitsch Barn site covers about 5000 m^2, and has archeological deposits that extend to approximately 25 cm bs in depth. The erosion, road grading, and barn construction have heavily disturbed the site, and only small remnants of possibly intact archeological deposits were identified in the shovel testing of the pimple mounds. Four shovel tests were excavated at 41RR217, and two contained low densities of prehistoric and historic artifacts.

Prehistoric artifacts recovered from the site include lithic debris (n=3), fire-cracked rock (n=6), and three plain grog-tempered pottery sherds. These cultural materials may represent either a Woodland period and/or Early Caddo occupation, although the archeological evidence is not sufficient to be more definitive on the temporal span of site use.

Unidentified metal fragments, a plain whiteware sherd, and a salt-glazed/lead-glazed stoneware sherd were recovered in surface collections and shovel testing. They are indicative of site use after ca. 1875, and may represent yard sheet trash from a possible farmstead or tenant farm; no historic features or structural foundations were apparent at the Roitsch Barn site, however.

Due to the shallow and disturbed archeological deposits across most of the Roitsch Barn site, we do not think that further archeological investigations are warranted at this time. The two pimple mounds with shallow prehistoric remains should be avoided if possible, however, because there is a slight chance that prehistoric features of Woodland period and/or earlier Caddo age may still be present below the plowed and disturbed soils at the site.

41RR218

Site 41RR218 is in a pasture on a narrow rise paralleling an intermittent tributary of Big Pine Creek; the creek itself is about 900 m to the north. There are a number of pimple mounds on the landform, but none of them in the vicinity of the site appears to contain archeological deposits.

The site was first identified when 20th century historic glass and metal artifacts, and several pieces of lithic debris, were noted along the eroded edge of the dirt farm road that runs along the northern end of the site. This farm road also runs past sites 41RR216 and 41RR217 to the old community of Blakeney, Texas. The excavation of three shovel tests documented that the site has shallow (ca. 20 cm) and plowed archeological deposits that cover about 12,000 m^2. Although prehistoric artifacts were observed in surface contexts, and a piece of lithic debris and a grinding slab fragment were collected from the surface, only 20th century ceramics (both whiteware and Bristol-glazed stoneware, including one ca. 1920 piece with cobalt paint), bottle glass, and wire nails (n=3) were recovered in the two positive shovel tests and the selective surface collection (n=80 specimens) carried out when the site was first identified by the TAS, along with a mule shoe, barbed wire, and a piece of rubber (see Appendix III).

Based on the recovery of both domestic and architectural artifacts, it is presumed that site 41RR218 principally represents the remnants of a 20th century farmstead; the prehistoric lithic debris and ground stone evidences the limited use of the site area in prehistoric times. No structural remains or foundations were identified during the survey, however. The historic occupation appears to be contemporaneous with nearby sites 41RR216 and 41RR217, and these three sites may represent farmhouses that were an outlying part of the small Blakeney community. No archeological investigations are recommended for site 41RR218 at this time, but archival and historical research on the Blakeney community could profitably illuminate the character of early 20th century agricultural settlements in this part of Red River County, Texas.

41RR219

This primarily prehistoric site is located on a dissected alluvial landform overlooking, and some 3-6 m above, the Big Pine Creek/Red River floodplain. Several pimple mounds occur on the landform, but they do not appear to have been particularly favored for prehistoric habitation or use in this area. The land is pasture, with scattered hardwoods, and a few gopher mounds observed on the northern and northwestern part of the landform disclosed a few pieces of lithic debris and two plain grog- and bone-tempered pottery sherds, as well as two clear bottle glass sherds; otherwise, surface visibility ranged between 10-20 percent.

To overcome the poor surface visibility between the scattered gopher mounds, and to help determine the vertical and horizontal extent of the archeological deposits at 41RR219, three shovel tests were excavated by the TAS survey team. All three shovel tests contained prehistoric artifacts; this, in combination with the surface distribution of cultural materials suggests the site covers approximately 10,800 m^2 of the alluvial landform. The shovel tests were excavated to depths of 50-70 cm bs, where a sandy clay subsoil was encountered. Prehistoric artifacts, including lithic debris (n=5), fire-cracked rock (n=3), and a quartzite biface preform, were recovered from 20-40 cm bs in a sandy loam soil; the density of artifacts per shovel test is relatively low (3.0 artifacts/shovel test) compared to other prehistoric sites on the Roitsch Farm. No cultural features or midden deposits were noted in the limited investigations conducted to date at site 41RR219.

Although this site has a low density of artifacts in subsurface contexts, the TAS shovel testing effort suggests that the archeological deposits are basically intact. The lack of diagnostic artifacts hinders specific temporal interpretations of when the site was occupied (i.e., the plain sherds suggest that the site may have been used during either the Woodland period or the Formative-Middle Caddo periods [ca. 200 B.C. to A.D. 1300]). However, the good integrity of the site, and the possibility that cultural features could be preserved there, mean that further archeological investigations are warranted to determine whether site 41RR219 has research significance.

41RR220

Site 41RR220 appears to contain a small (1800 m^2), but discrete, archeological deposit situated along a narrow alluvial ridge that has been dissected by two intermittent (and probably spring-fed) tributaries which drain north into the Big Pine Creek floodplain. Big Pine Creek is some 800 m to the north-northwest of the site.

Currently in pasture, the site is well-marked by two pimple mounds along the northern side of the ridge, and the pimple mounds have sandy loam sediments about 60+ cm in thickness (based on the shovel testing). Surface visibility was poor on the site, less than 5 percent, and only a single piece of fire-cracked rock was observed on the surface.

Five shovel tests were then excavated along the ridge, and on the pimple mounds, to determine if site 41RR220 contained subsurface archeological deposits; the shovel tests were somewhat randomly spaced between 5-40 m apart. Four of the five shovel tests recovered prehistoric artifacts between 10-40 cm bs, specifically: lithic debris (n=11), plain pottery sherds (n=13), decorated pottery sherds (n=2), daub (n=1), and charcoal (n=2). Most of the artifacts were from Shovel Test #5 (n=13), in the southeastern portion of the site (Figure 41).

The one grog-tempered appliqued pottery sherd (see Figure 38e), and the quantity of plain grog-tempered sherds within the assemblage as a whole, suggests that site 41RR220 was occupied during the earlier part of the prehistoric Caddo tradition, broadly from ca. A.D. 800-1300; appliqued vessels with grog-temper are relatively common, as mentioned above, in the ca. A.D. 1100-1300 component at the Holdeman site (41RR11) (see Perino 1995; Perttula 1995). There is also one red-slipped shell-tempered body sherd from Shovel Test #5, pointing to a Late Caddo use of the site as well.

The presence of daub, as well as charcoal, may also hint at the possibility that features (hearths) and/or structures (with mud walls and thatch) are preserved at the site. The apparent integrity of the site, the kinds and abundance of artifacts, and the possibility that the archeological deposits relate almost exclusively to a single archeological component, all reasonably lead to the recommendation that 41RR220 be preserved. Test excavations, or more intensive shovel testing across the site, should also be conducted to determine more confidently what the research potential of the site is, and what types of archeological research problems and issues can be addressed through its future investigation.

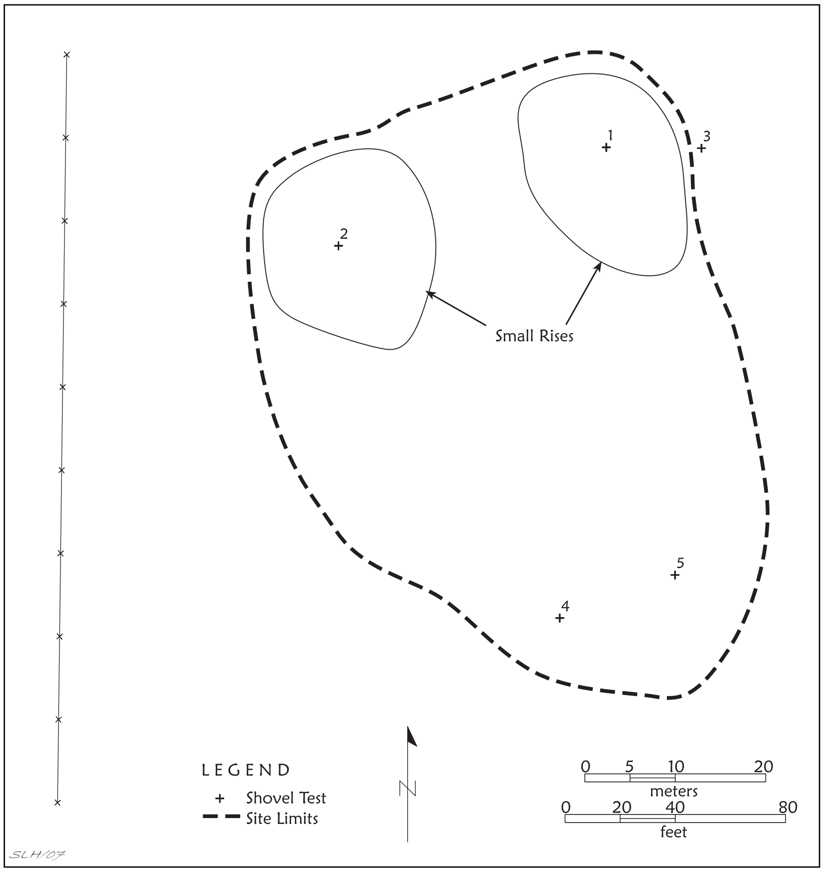

Figure 41. Map of 41RR220.

were excavated to determine the depth and extent of any preserved archeological deposits. Based on the recovery of archeological materials from each of the shovel tests, the known extent of the site is about 8000 m^2 (Figure 42); since it is likely the site covers the area of the pimple mounds as well as the alluvial terrace itself, the site limits are estimated at 19,000 m^2.

The shovel testing disclosed archeological deposits at least 80 cm (the depth of the shovel testing) in thickness in the Annona-Freestone Complex soils. No features were identified in the limited investigations, but large pieces of fire-cracked rock and ceramic sherds, as well as charcoal, at a depth of 50 cm bs in Shovel Test #1 (see Figure 42) suggest that a cultural feature may have been encountered in this area of the site; it is considered likely that site 41RR221 contains a variety of cultural features (probably pits and cooking/heating hearths). Although the soils at the site are dark in color, and appear to contain high amounts of organic material, our shovel testing did not locate midden deposits. Bone fragments in Shovel Test #1, and charcoal pieces in Shovel Tests #1 and #2, do indicate that faunal and floral materials are preserved at the site, although their frequency or density cannot be estimated from the limited TAS work.

All three shovel tests at this site contain high densities of artifacts (average of 26.7 artifacts/shovel test or ca. 300 artifacts per m^3), which is among the highest densities of any of the sites that received shovel testing during the TAS investigations. Recovered in the shovel tests were: plain body sherds (n=13) and a plain direct or straight rim with a rounded lip (n=1), lithic debris (n=34), one Gary, *var. Camden* dart point from Shovel Test #3, a grinding slab fragment, a unifacial lithic tool, daub (n=4), fire-cracked rock (n=7), bone (n=1), and charcoal/charred nutshells (n=17). While the archeological evidence is rather limited, the plain grog-tempered pottery sherds and the Gary

41RR221

Site 41RR221 appears to have an important discrete and intact Woodland period archeological deposit; features, middens, and abundant archeological materials are likely to be preserved at the site. A plain shell-tempered rim sherd also suggests that the site was occupied during the Late Caddo McCurtain phase. This site is located on an alluvial terrace of Big Pine Creek, and small, intermittent tributaries run along the west and south sides of the landform. Big Pine Creek is about 50 m north of the terrace.

The northern half of the terrace is wooded, while the southern half is in pasture; the surface visibility is limited in both areas, and all the TAS investigations took place in the pasture area. Two plain sherds and a biface preform fragment of Red River gravel chert were found in a surface collection in the pasture, and field notes suggest that lithic debris and pottery sherds were common in gopher mounds across the site. Several pimple mounds mark the pasture, and three shovel tests

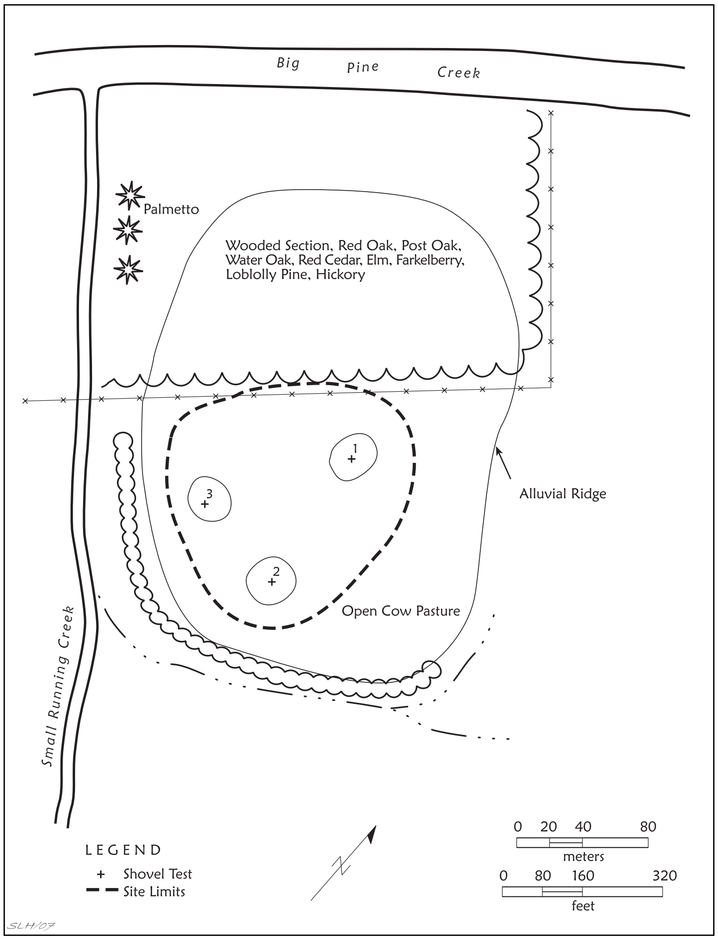

Figure 42. Site Map for 41RR221.

site that appear to have the best potential to contain intact features and living areas of Woodland period peoples.

dart point can be interpreted to be associated with a Woodland period component, as these classes of artifacts are rather consistently found together in the Middle Red River area only on sites occupied during that time (see Bruseth et al. 1991, 1992; Perttula, ed., this volume; Perttula et al. 2001).

Certainly further archeological investigations are warranted to determine if site 41RR221 primarily represents a single component Woodland period occupation. At the present time, the archeological evidence retrieved from the site indicates that it contains a well-preserved archeological deposit, one with the potential to contain cultural features and associated material remains from a period in prehistory that is not well known on the Red River (e.g., Perttula et al. 1993:100-101). I recommend a program of systematic shovel testing across the site—including pasture and woodland areas—to get a broad idea of the subsurface character of the archeological deposits, followed up by controlled hand excavations focusing on one or two areas of the site that appear to have the best potential to contain intact features and living areas of Woodland period peoples.

41RR222

Site 41RR222 is one of a set of five (41RR222-41RR225, and 41RR227) closely spaced early 20th century farmsteads defined (through systematic surface collection) in a 23 acre plowed field on a low terrace about 500 m from Pond Creek (Figure 43). They are thought to be part of a small community of tenant farmers that lived in the area ca. 1930. The farm roads that run by the archeological remnants of the community appear to have been farm roads used at the time that ran between the larger market communities of Davenport and Manchester.

This site covers approximately 5500 m^2, and is immediately parallel to the dirt and gravel farm road. While quantities of historic artifacts were visible on the surface of the plowed field, and artifacts were marked and pin flagged as part of the process of defining site limits, no clear concentrations of historic artifacts could be detected on the basis of the surface evidence. No structural remains or foundations were noted at 41RR222, which suggests that when the site was abandoned the structure that must have been present was either torn down and destroyed, or was removed to another location to be reused.

A wide variety of ca. 1900-1940 historic artifacts were collected from 41RR222 during the TAS investigations, along with an isolated dart point fragment. Machine-made bottle glass sherds, mainly clear in color, were well represented (n=581), along with whiteware, porcelain, ironstone, and stoneware sherds (n=67). Among the glass sherds were milk glass pieces from fruit jar lids, two sherds from brown glass snuff containers, and two machine-made tableware glass fragments. The only decorated whiteware sherds were a green Fiesta ware and one decalcomania-relief-molded rim. One whiteware sherd with a maker's mark is from a vessel made by the Crown Potteries Co. in Evansville, Indiana between ca. 1902-1962 (Kovel and Kovel 1986).

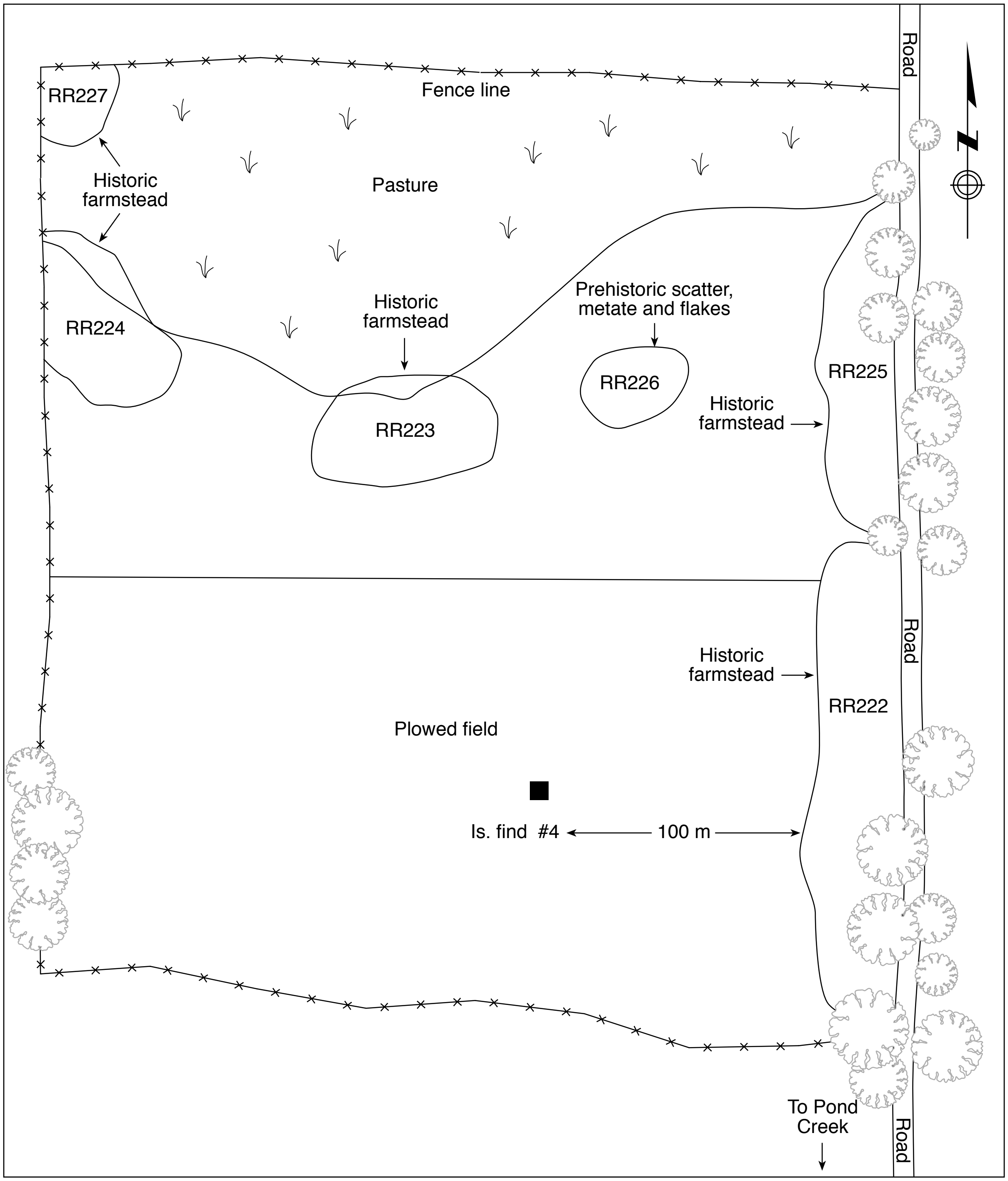

Figure 43. Distribution of Sites 41RR222-227 and Isolated Find #4.

Metal (n=6) and brick fragments were also present; in the case of the latter artifacts, notes were taken on the types of metal and brick artifacts observed on the surface, but most were not collected. The wire nails are securely dated to after 1890 (Wells 1998).

The types of metal artifacts that were noted included wire nails, cartridge casings, stove parts, or parts of metal tools, as well as agricultural tools (i.e., sickles, irrigation sleeves, chains, and hoes) to horseshoes and stove legs, and rusted pieces of metal beyond description. All the artifacts recovered from the site testify to the domestic nature of the historic occupation, thus our conclusion that it represents a farmstead, and the wide scatter of artifacts is indicative of a broad dispersal of yard sheet trash associated with the use of the farmhouse and yard areas.

It is not known if site 41RR222 contains subsurface archeological deposits as no shovel tests were conducted as part of our investigations here, but it is doubtful that they are extensive given the stable landform, the short occupation, and the deep chisel plowing carried out in recent years along Pond Creek by the landowner. Thus, it is considered unlikely that 41RR222 possesses archeological significance, or has much potential to contribute to the resolution of research problems on this era that depend on the kinds of information obtained from the archeological record. Nevertheless, given its age, the site may possess historical significance by being able to contribute to our understanding of tenant and cotton farming in Northeast Texas in the early 20th century, but its evaluation in this regard awaits the development of the appropriate regional and topical historic context (cf. Wilson 1990). For the meantime, we recommend no further investigations at site 41RR222.

41RR223

This historic site is located in the middle of the large plowed field, and in the midst of a cluster of probable ca. 1900-1930 tenant farmsteads that marked an abandoned Depression-era community. Historic site 41RR223 is immediately west of site 41RR225 and north-northwest of 41RR222; historic farmstead 41RR224 is about 50 m to the west (see Figure 43).

Site 41RR223 covers approximately 10,200 m^2 based on the surface distribution of historic artifacts. The spatial pattern in the distribution of artifacts suggests that there might have been two structures on the site (Figure 44), a house (Area B) and a barn (Area A), or alternatively that the house area (Area B had a number of machine-made brick fragments) had a well-defined yard sheet trash deposit in association (that is, immediately behind the probable house area). No structural remnants or foundations were apparent at 41RR223.

The same survey procedures used at 41RR222 were also employed at 41RR223, and the pin-flagging of surface artifacts allowed the recognition of the two artifact concentrations. The kinds of ca. 1900-1940 historic artifacts recovered in the surface collections (see Appendix III) include machine-made brick fragments, ironstone, whiteware, porcelain, and stoneware sherds (n=310), clear, aqua, green, purple, and brown machine-made bottle glass (n=418), brown snuff container glass, purple and clear glass tableware, wire nails and other metal items (n=49), a porcelain button, a porcelain door knob, and four pieces of slate from a writing board. Window glass and pieces of plastic were observed on the surface, but they were not collected during our investigations. One of the two whiteware maker's marks is identifiable: "... OMPSON ...HANL... ENGLAN..." appears to be from a J & G Meakins Ltd. plate made between ca. 1890-1907 (Kovel and Kovel 1986).

We offer no archeological recommendations for site 41RR223 at the present time (see discussion for 41RR222, above). Further archival and historical investigations could be conducted to determine what kind of community existed in this area during the Depression, and who the occupants of the community were.

41RR224

This historic farmstead is situated at the far western edge of the large plowed field, with

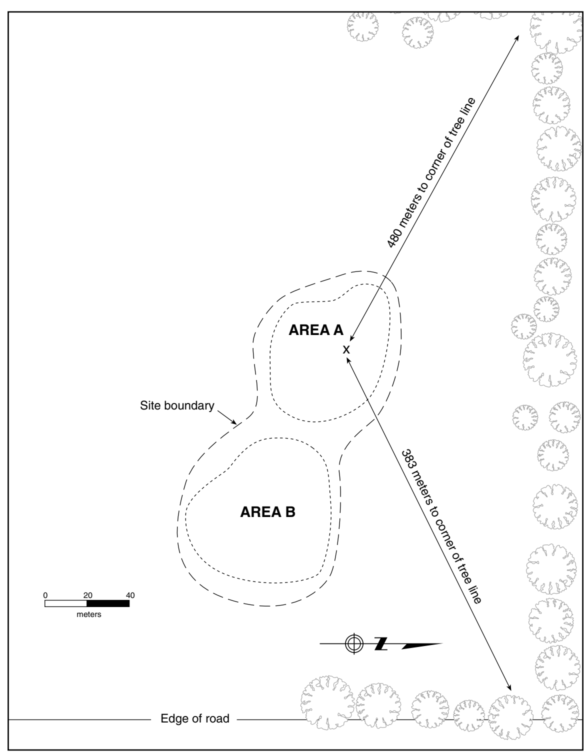

Figure 44. Area A and B at 41RR223.

41RR223 some 50-100 m to the east, and historic farmstead 41RR227 about 70 m to the north along the fence line; a small portion of the site is in an unplowed corner of the field (see Figure 43). The site is estimated to cover only about 410 m^2, based on the distribution of historic artifacts on the surface of the field.

The artifacts recovered in the surface collection suggest that 41RR224 was occupied between ca. 1900-1940, and their domestic nature is apparent (see Appendix III). These include machine-made brick fragments (n=3), clear, purple, aqua, blue, and brown machine-made bottle glass, fruit jar, and milk glass sherds (n=82), brown snuff container glass, a porcelain doll leg, and plain ironstone, whiteware, and porcelain sherds (n=68). Among the decorated whiteware are six Fiesta ware and two relief-molded rim sherds, and there is one porcelain sherd with a painted rim band. A few metal artifacts (n=4) were collected from the site: wire nails, and a teaspoon with "WM RODGERS AND SON AAX" inscribed on it. Two pieces of animal bone (probably from cow) were also collected from the site in our survey investigations.

No archeological investigations are recommended for site 41RR224 at this time. As mentioned before, an archival and historical study of this small Depression-era community could be enlightening about what life was like in this part of the Red River Valley in the early 20th century.

41RR225

This historic farmstead, also occupied between roughly ca. 1900-1940, is situated immediately to the west of the farm road, about 20 m north of 41RR222 (another historic farmstead) and 0.6 km north of the wooden bridge over Pond Creek (see Figure 43). The site covers about 4200 m^2 of the plowed field, with one concentrated area of artifacts in the approximate center of the defined site boundaries.

No structural remains or foundations were observed at the site, but historic ceramics (n=42), glass (n=428, 76 percent clear glass, including 1 clear tableware glass base with a floral motif), metal (n=11), and machine-made brick (n=11) artifacts are common on the surface. Two of the whiteware sherds have late 19th-early 20th century relief-molded rims (e.g., Majewski and O'Brien 1987), while one porcelain sherd has a decalcomania decoration.

The artifacts are mainly domestic in character (ceramic tableware and stoneware crocks, as well as bottle and canning jar glass sherds, and one glass marble), but architectural remains (i.e., window glass, wire nails, and machine-made bricks) are also present. In all likelihood, the majority of the artifacts found in the surface collection at 41RR225 represent sheet trash dumped and swept in the yard of a farm house. The bricks, nails, and window glass represent the repair, as well as the dismantling and destruction, of the structure during its use and eventual abandonment. The TAS work did not include shovel testing at any of the historic farmsteads in the community of which 41RR225 appears to have been a part, so it is not known if subsurface archeological deposits and/or features are present at the site.

As with the other 20th century sites in this part of the Roitsch Farm survey area, archival and historical investigations should be carried out to learn more about this possible Depression-era community. No archeological work seems warranted until the archival and historic investigations have been completed, and a proper research context has been developed to understand the historical significance of these kinds of sites (e.g., Wilson 1990).

41RR226

Site 41RR226 is a small (ca. 230 m^2) prehistoric archeological site amidst the community of probable tenant farmsteads (discussed above) north of Pond Creek (see Figure 43). It is located between historic farmstead sites 41RR225 and 41RR227.

The site was defined by a low density (1 artifact per 10 m^2) scatter of lithic debris, burned rocks, and three fragments of a sandstone metate. As no shovel tests were conducted at 41RR226, it is not known whether or not the site has subsurface archeological deposits. Given the low density of artifacts and the shallow loamy soils, the recent deep-plowing at the site has probably adversely effected the archeological potential of the site. Nevertheless, until shovel testing is conducted, and the presence or absence of buried archeological deposits is confirmed, it is recommended that the site be avoided by any ground-modifying activities different from the traditional use of the land.

41RR227

Site 41RR227 is the last of the five apparently associated 20th century historic farmsteads (the others include 41RR222-225) in the large plowed field north of Pond Creek. This particular site, which covers only about 100 m^2, is located in the far northwest corner of the plowed field and adjacent to a tree-covered fence line, about 25 m north of 41RR224 (see Figure 43) and west of the other three farmsteads.

The small size of the site and the limited number of surfaces may suggest that it is not a farmstead per se, but a sheet trash area or yard midden associated with a farmstead structure in the vicinity (i.e., 41RR224). Based on the kinds of artifacts found at the site in surface contexts (plain and decorated whiteware and porcelain [n=6], clear, purple, and aqua bottle glass from post-1903 machine-made bottles [n=12], milk glass from fruit jar lids [n=3], and unidentifiable metal fragments [n=2]), and the low density of materials, the deposit seems to represents a limited accumulation of domestic refuse.

We recommend no further archeological investigations at site 41RR227. Historic and archival research of this community may shed some light on the nature and character of the occupants of the site, as well as on the archeological deposit found there.

41RR228

During the survey by the TAS of the Jonesborough site area (41RR15) in 1991, a cursory reconnaissance was conducted of a large plowed soybean field some 500 m south and southeast of the historic marker for Jonesborough on FM 410. The purpose of the reconnaissance was to try to locate historic archeological sites contemporaneous with the putative early- to mid-19th century occupation at 41RR15, thought to be the town of Jonesborough (see Perttula and Reese 2001; Reese 2001). Site 41RR228 was located during this effort in the Jonesborough vicinity.

The site, which covers about 500 m^2, is on a broad, flat alluvial terrace of the Red River; the current channel of the river is about 600 m to the east-southeast. Two slightly (above 390 feet amsl) higher alluvial terrace remnants occur to the north and south of 41RR228, which is located on a lower "swale" between the terrace remnants. The area was recently plowed, with soybean plants maturing, but ground surface visibility was excellent (80 percent).

Twentieth century historic ceramics (n=4), including plain whiteware and one Bristol-glazed stoneware, bottle glass (n=7), and milk glass (n=7) from fruit jar lids were rather evenly dispersed over the site area, and they occurred in low densities. The presence of subsurface archeological deposits has not been ascertained, but it is unlikely that extensive deposits are preserved in the deep-plowed sandy loams at the site. No further archeological investigations are warranted at 41RR228.

The plain whiteware, the stoneware, and the clear and brown bottle glass made on an automatic bottle making machine, suggest that the site roughly dates between ca. 1900-1940. It is presumed that these archeological remains represent the traces of a tenant farm (Arnold Roitsch, 1991 personal communication) probably associated with the community and market town of Davenport, established in 1885 but with a population of only 44 in 1940 (Webb 1952, Volume I:467; Harper 1996b:520). If and when archival and historical studies are initiated of the community of Davenport, we recommend that the studies be sufficiently broad to encompass the outlying and dispersed tenant farmsteads that were apparently also part of the community.

41RR229

This particular site was reported to the TAS survey team by Mr. Ernst Roitsch (1991 personal communication). He noted that prehistoric cultural materials, principally lithic debris and tool fragments, were visible in the area of a small rise when it is mowed and/or plowed. The prehistoric artifacts are located on an alluvial landform (a dissected alluvial terrace of the Red River) paralleling Pond Creek, some 100 m to the north. The crest of the landform is about 3 m above the Pond Creek floodplain.

When a TAS survey team visited the site in 1991, it was covered in native grasses and second growth hardwoods, and surface visibility ranged between 0-10 percent. The rise itself covered about 800 m^2. There were several extensive (i.e., 10 m^2) eroded areas paralleling the farm road that bisects the site, and these indicated that shallow (less than 40 cm) sandy loam and loam sediments were present on the rise. Prehistoric lithic debris and an occasional piece of plain whiteware and ironstone (as well as small brick fragments and a porcelain door knob sherd) indicate that site 41RR229 was used during prehistoric and historic (ca. 1900) times, but the nature of the occupations is very poorly defined at present. The brick and door knob fragment suggest that a 20th century farmstead was present at 41RR229. We recommend that a program of shovel testing be done to assess the nature and extent of any subsurface archeological deposits at the site.

41RR230

This archeological site appears to have been looted and dug by collectors and "pothunters" who have pocked the area with pits and holes. The site itself is on a small knoll situated along the edge of an alluvial terrace deposit overlooking the Big Pine Creek floodplain; two small natural ponds are present in the floodplain east and northeast of the terrace cutback, and the current channel of Big Pine Creek is 350 m to the north.

Lithic debris (n=6) and tools were visible on the surface of the site, along with modern bottle glass (n=3) and a single small piece of brick. Included in the prehistoric tools collected from the disturbed surface were a unifacial retouched flake and two dart projectile points. The dart points were a Gary point, *var. Gary* made of Big Fork chert and a resharpened Kent point on a local reddish-gray quartzite. If Story's (1990:Figure 32) proposed chronological sequence of dart points in Northeast Texas is accurate, the dart points at 41RR230 imply that the site was occupied in the latter part of the Late Archaic period, around 2500 years ago.

Four shovel tests were excavated at 41RR230 to determine if the site contained intact archeological deposits. Three of the shovel tests had prehistoric lithic debris (n=10) and fire-cracked rock (n=1) in sandy loam deposits about 30 cm in depth, and the dispersion of these shovel tests suggests the site covers about 1200 m^2; one shovel test also had an unidentifiable piece of metal. The density of artifacts in subsurface contexts is uniformly relatively low (3.7 artifacts/shovel test) compared with other shovel-tested sites on the Roitsch Farm, although Shovel Test #3 at the western end of the knoll contained about twice as many artifacts as the site average.

While no obvious concentrations of prehistoric artifacts were encountered in the limited shovel testing, and the site has been damaged by artifact collectors to a limited but basically unknown extent, our work at the site suggests that the bulk of the archeological deposit at 41RR230 is intact. Its significance, and potential for features, has not yet been determined, however. I believe the appropriate next step in the investigations is to conduct more extensive shovel testing (perhaps at 10 m intervals) to better define the vertical and horizontal extent of the archeological deposit, and based on the results of that work, hand-controlled excavations may be warranted to fully explore its research significance. It is also important to photo-document as much as feasible the archeological collections accumulated from the site by the collectors and diggers as this recordation may provide pertinent information on the prehistoric use of the site area.

41RR231, Conehead

The Conehead site may be a prehistoric earthen mound, although insufficient information was uncovered in the limited TAS investigations to be absolutely sure that it is nothing more than a natural mound. The site is located adjacent to an intermittent tributary of Big Pine Creek and near the toe of an upland slope; Big Pine Creek is 700 m north of the site.

Present at 41RR231 is a small, conical mound-shaped area ca. 40 m in diameter and 4.6 m in height. It is not a natural pimple mound, it has a large tree growing out of it, and shovel tests excavated by the TAS survey team showed that the mound had a mottled, clayey fill while off-mound areas were characterized by Thenas fine sandy loam alluvial soils (see Thomas 1977). There are also several potholes in the mound, but examination of them did not disclose obvious mound fill zones, features, or artifacts. On the available evidence, it may be reasonable to conclude that the mound is of man-made construction, although at this point we cannot conclude that it was built in prehistoric times; it may simply be a modern earth-moving feature. Shovel testing around the mound did not locate any associated prehistoric habitation features or archeological deposits.

One intriguing piece of information that is available is that several collectors and pothunters told the TAS survey team about what they referred to as an "early" mound in this vicinity on Big Pine Creek that they were digging. Exactly what they meant by "early" was not clear; that is, it was not obvious if "early" referred to the kinds of artifacts being found at the site during their digging (that is, did the artifacts suggest an occupation predating the Caddo settlement of the Red River region?), or if they based the "early" designation on the apparent shape or form of the mound. In any case, the mound at the Conehead site does evidence some pothunting activities, so there is some possibility that this mound and the "early" mound mentioned by the collectors and pothunters are one and the same. We should note that none of the collectors and pothunters we talked with offered to show us the location of the "early" mound, or permit TAS survey teams to view or photo-document any artifacts that may have come from the site.

Thus, for the moment the Conehead site is an enigma. It is important to determine whether the mound is a prehistoric feature. If it is a prehistoric mound, then the site would prove to have great significance for understanding prehistoric lifeways in the middle Red River region, especially so if the mound were shown to have been constructed prior to Caddo times. Pre-A.D. 800 mounds are rare in Northeast Texas, particularly north of the Sabine River (see Perttula et al. 1993:99, 110, 114-115), although they are relatively common along the Red River in southwestern Arkansas and northwestern Louisiana (Schambach 1997). For future purposes, then, we recommend that further systematic shovel testing be completed around the mound to search for buried archeological deposits, and several controlled excavation units should also be placed in the mound to examine the character of its fill, as well as the presence or absence of features and prehistoric occupational strata within the mound itself.

41RR232

Site 41RR232 is a prehistoric archeological site of unknown age. It is located on a small alluvial rise (covering about 900 m^2) adjacent to an intermittent tributary of Big Pine Creek, and it overlooks the Big Pine Creek floodplain; the creek itself is 450 m to the north. The site is in an overgrown pasture, and consequently surface visibility was poor (less than 10 percent), but lithic debris, a biface, fire-cracked rock, and a ground stone tool were visible eroding from the north end of the rise. The erosional cut showed that the artifact-bearing loamy soils (Mckamie loam) are about 40 cm thick over the red clay B-horizon.

A small surface collection of lithic debris (n=8), fire-cracked rock (n=1), a biface, and one ground stone tool was obtained from the area of the erosional cut. Three shovel tests were then excavated at 20 m intervals on the rise, beginning immediately above the erosional cut. All three shovel tests contained prehistoric artifacts, generally from depths of 0-30 cm, including lithic debris (n=16), daub (n=1), and fire-cracked rock (n=1); small pieces of charcoal were noted in two of the shovel tests, but its cultural context was not definitely established during the TAS investigations. Although the site deposits are relatively shallow, and the density of archeological materials is relatively low (6.0 artifacts/shovel test), the TAS work indicates that intact archeological deposits are present at the site. I recommend that additional shovel tests and/or 50 x 50 cm units be excavated at the site to obtain temporally diagnostic artifacts, assess the potential of the site to contain features, and determine the contextual association of the charcoal present in the subsurface deposits.

41RR233

Site 41RR233 has been extensively disturbed by construction of a pond on an alluvial terrace of Big Pine Creek. This construction removed archeological deposits over an area of approximately 3000 m^2 (about 40 percent of the site area), and prehistoric and historic artifacts were visible around the edge of the pond and in the adjacent pasture. The site itself is on an alluvial landform next to an intermittent tributary of Big Pine Creek; the surface distribution of artifacts and shovel testing suggest the site covers ca. 7700 m^2.

The TAS survey crew secured a surface collection of artifacts from 41RR233. Lithic debris (n=25) and cores (n=5) were common, along with a dart point preform (for a Gary type?), fire-cracked rock (n=1), and 20th century ceramics and bottle glass (n=4). Four shovel tests were excavated around the perimeters of the pond to determine the horizontal and vertical extent of the archeological deposits, and three of the tests contained prehistoric artifacts between 10-30 cm bs; the clay B-horizon ranged from 30 to 46 cm bs across the site area. A low density of artifacts were found in subsurface contexts (3.7 artifacts/shovel test), including lithic debris (n=9), fire-cracked rock (n=1), and a bifacial tool fragment in Shovel Test #1. The possible preform to a Gary point suggests only that site 41RR233 was occupied during either the Late Archaic or Woodland periods.

The research potential of 41RR233 has been considerably diminished by the construction of a stock pond on the site, as it has destroyed about 40 percent of its archeological deposits. Nevertheless, the TAS shovel testing did show that there are intact subsurface archeological remains around the pond which may warrant further investigation. It seems appropriate that more intensive shovel testing and limited controlled excavations be carried out at the site in the future to assess its potential to contain cultural features, and to determine what the contextual integrity is of the prehistoric occupation(s) there.

41RR234

This site is located on a 1500 m^2 alluvial rise or pimple mound about 200 m from an intermittent tributary of Big Pine Creek; site 41RR214 is 50 m to the east-southeast. The landform is currently in pasture, with poor surface visibility (5 percent), but lithic debris (n=3), one animal bone, and a plain grog-tempered pottery sherd were recovered in eroded surface contexts at the site.

The TAS survey team excavated three shovel tests on the landform, two on the rise and a third on a very small pimple mound about 30 m to the north of the rise; this shovel test did not encounter archeological deposits. The other two shovel tests contained low densities (2.0 artifacts/shovel test) of prehistoric artifacts (four pieces of lithic debris) between 10-50 cm in sandy loam sediments.

The low numbers of prehistoric artifacts recovered from 41RR234 prohibits any definitive conclusions concerning the age or function of the site occupation(s), although the recovery of a single non-shell tempered pottery sherd implies an occupation predating ca. A.D. 1300. The fact that up to 50 cm of archeological deposits are present at the site, and that there is no evidence that the deposits have been disturbed, suggests that indeed intact archeological deposits may be preserved there. What the research significance of these archeological deposits is unclear, but can be addressed with further archeological investigations.

41RR235

Site 41RR235 is an historic cemetery nestled in a strip of dense hardwoods some 50 m west of Salt Well Slough, and about 350 m downstream from the Davenport bridge over the slough. The cemetery, which covers about 2800 m^2, sits on a narrow alluvial rise (Figure 45).

This site was reported to one of the TAS survey teams by Mr. Bob Williams of Clarksville, Texas. Although the area was thickly overgrown (with dense patches of poison ivy), the survey team was able to locate six marked graves and one depression that may also be from a burial (Figure 46a). Mr. Williams indicated that there are other marked and unmarked burials at the site beyond the ones we were able to locate, but the thick vegetation and numerous downed trees limited our ability to ascertain how many graves there are at 41RR235. We noted no disturbance to the cemetery during our investigations, other than damage done by tree falls, and there is a remnant of a barbed wire fence along the eastern side of the site; to the west is a pasture. Thus, the cemetery does not currently appear to be in danger of disturbance.

The six marked graves were scattered from north to south across the western side of the rise, while the one depression is at the northern end of the rise (see Figure 46a). A small patch of irises were noted along the western side of the rise, not far south of the Wm Taylor grave. The grave markers (from north to south) were placed for:

1. B. J. Taylor, Oct 23, 1872, Apr. 30, 1900. The marker reads: "Hope" at the crest, and "To live in the hearts of those we love is not to die" near the bottom of the stone (see Figure

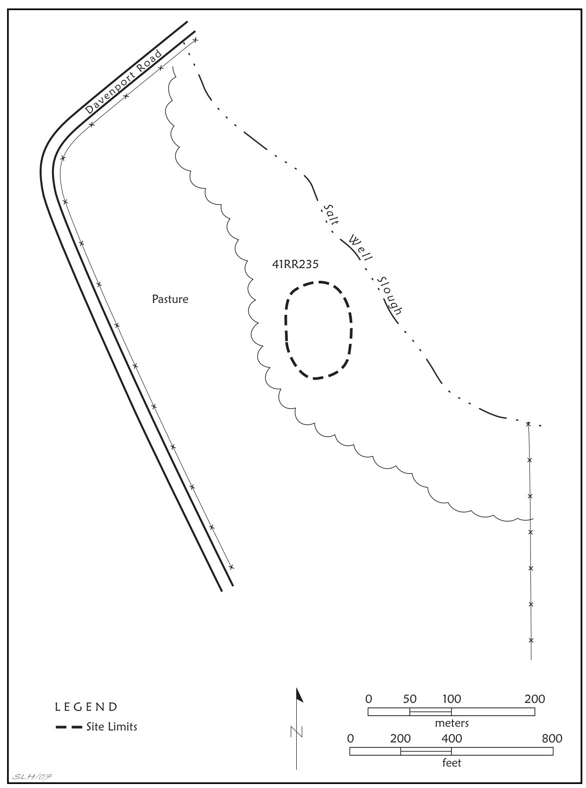

Figure 45. General Site Map of 41RR235.

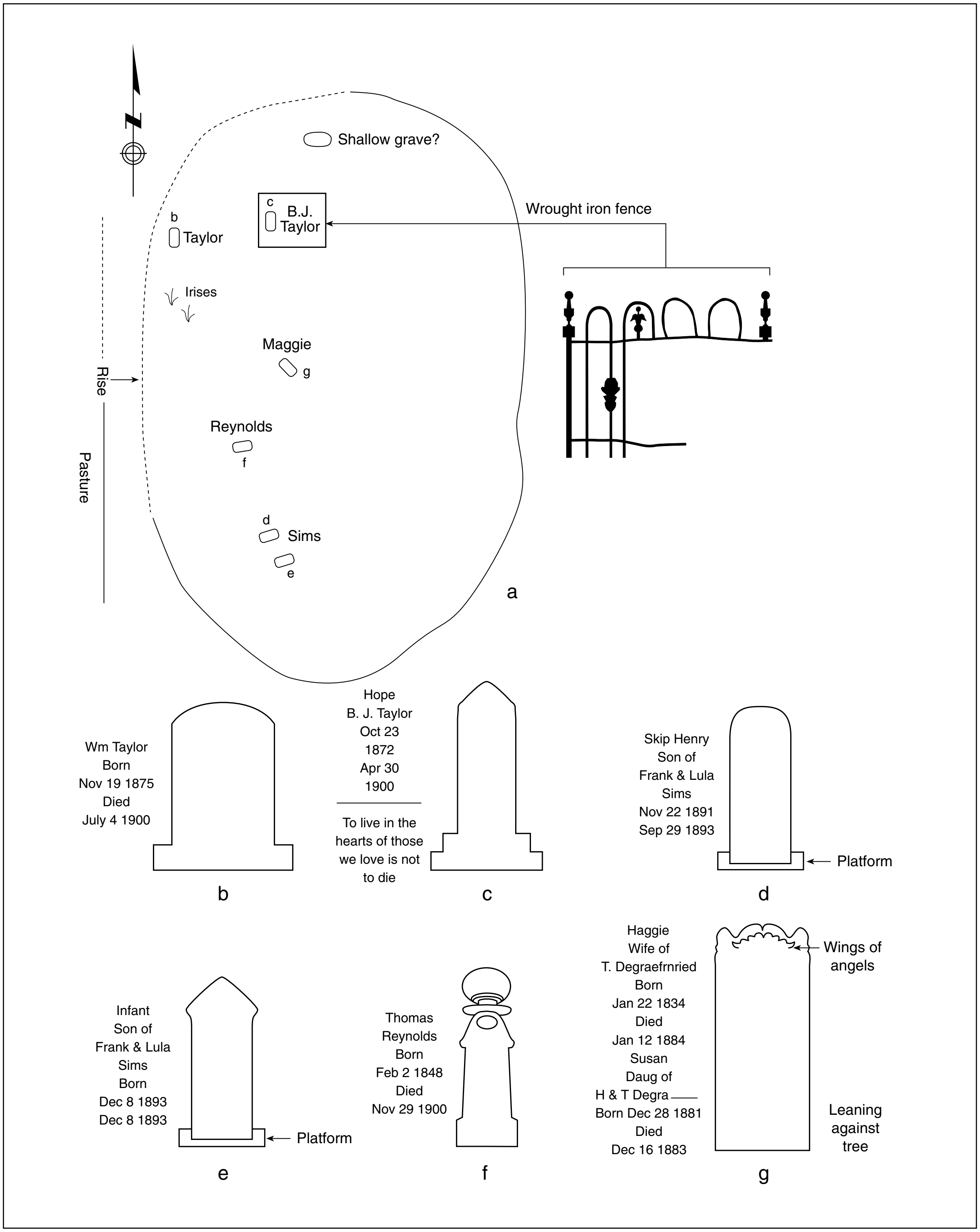

Figure 46. Plan of the 41RR235 cemetery and Headstones: a, rise with graves and depression; b, Wm Taylor headstone; c. B. J. Taylor headstone; d, Skip Henry headstone; e, headstone for Infant son of Frank & Lula Sims; f, Thomas Reynolds headstone; g, Haggie Degraefrnried headstone.

46c). This grave was placed within a plot of ground outlined by a wrought-iron fence, with the marker along the western side of this small plot.

2. Wm Taylor, born Nov 19, 1875, died July 4, 1900 (see Figure 46b).

3. Haggie, wife of T. Degraefrnried, born Jan 22, 1834, died Jan 12, 1884; and Susan, daughter of H & T Degra____[illegible, but probably Degraefrnied], born Dec 28, 1881, died Dec 16, 1883. Wings of Angels were carved at the top of the headstone (see Figure 46g), which was found leaning against a tree.

4. Thomas Reynolds, born Feb 2, 1848, died Nov 29, 1900 (see Figure 46f).

5. Skip Henry, son of Frank & Lula Sims, Nov 22, 1891, Sep 29, 1893 (see Figure 46d).

6. Infant, son of Frank & Lula Sims, born Dec 8, 1893, [died] Dec 8, 1893 (see Figure 46e).

We recommend that a more complete reconnaissance of the cemetery site be made in the future, preferably during the winter months when the vegetation is not so thick and visibility should be much improved. The purpose of these investigations would be to fully define the number and location of the marked graves at 41RR235, as well as attempt to ascertain the likely number and location of depressions and probable unmarked burials. If the same spacing of graves occurs on the eastern side of the rise as the TAS documented on the west side, the cemetery may contain a total of 15-20 individuals

41RR236, Pine Cone Site

Site 41RR236 covers about 1050 m^2 of a small rise on a Holocene alluvial terrace of the Red River. The current channel of the river is about 800 m north of the site. The site was initially located by the TAS historic archeological team working at the nearby Jonesborough site (see Perttula and Reese 2001; Reese 2001), who noted a scatter of prehistoric ceramics and lithic artifacts on the plowed surface of the rise while they were conducting a surface inspection of the general area (the Roitsch West tract, see Figure 27). The historic archeological team then notified one of the TAS survey teams, who went to record the prehistoric site.

Following the initial identification of the Pine Cone site, and the acquisition of a small surface collection from the sandy rise, three shovel tests and four 1 x 1 m units were excavated at the site (Figure 47). The purpose of this work was to assess the contextual integrity of the site's archeological deposits, and to ascertain the nature of the Caddo occupation(s), as part of determining whether more intensive excavations by the TAS Field School were warranted in the 1992 field school effort.

Our investigations at the Pine Cone site showed that there are relatively deep (ca. 70-100+ cm) archeological deposits preserved at the site; it has been plowed, but there are considerable undisturbed remains below the plow zone. The sediments on the site include a tan sand plow zone overlying dark brown sandy loam A- and E-horizons that extends from ca. 25-65 cm bs. Below this is a reddish-brown sand with clay lamellae pedogenic features below about 90 cm bs. The prehistoric artifacts are concentrated in the sandy loam deposit, but do occur to about 110 cm bs.

One cultural feature (Feature 1) was identified in Test Unit 4 (Figure 48) between ca. 53-65 cm bs. This was a small pit—probably a smudge pit based on its contents—filled primarily with charred pine cone remains (see Fritz, Appendix IV, this article); seven plain shell-tempered sherds were also recovered in the pit. Similar types of smudge pits with pine cones have been recognized in Late Caddo McCurtain phase contexts at the Rowland Clark site (41RR77; Perino 1994; Blake 1994) about 25 km downstream from the Pine Cone site. A number of large pieces of unburned animal bone were also found in this unit in apparent association with Feature 1 (see Schniebs, Appendix V, this article).

A large assortment of prehistoric Caddo artifacts were recovered in the limited TAS investigations at the Pine Cone site (Table 4), principally plain and decorated sherds and daub. The shovel testing indicates that there is a uniformly high density (22.0 artifacts/shovel test or ca. 240 artifacts per m^3) of archeological materials in subsurface contexts on the rise, while the test excavation units documented densities of 200-700 items per m^2, with Units 1 and 4 on opposite ends of the rise having the most abundant remains of ceramics, daub, and lithic debris (see Figure 47). The majority of the artifacts were found in the upper 50 cm of the archeological deposit, but materials were recovered to depths of +80 cm in both Units 1 and 4.

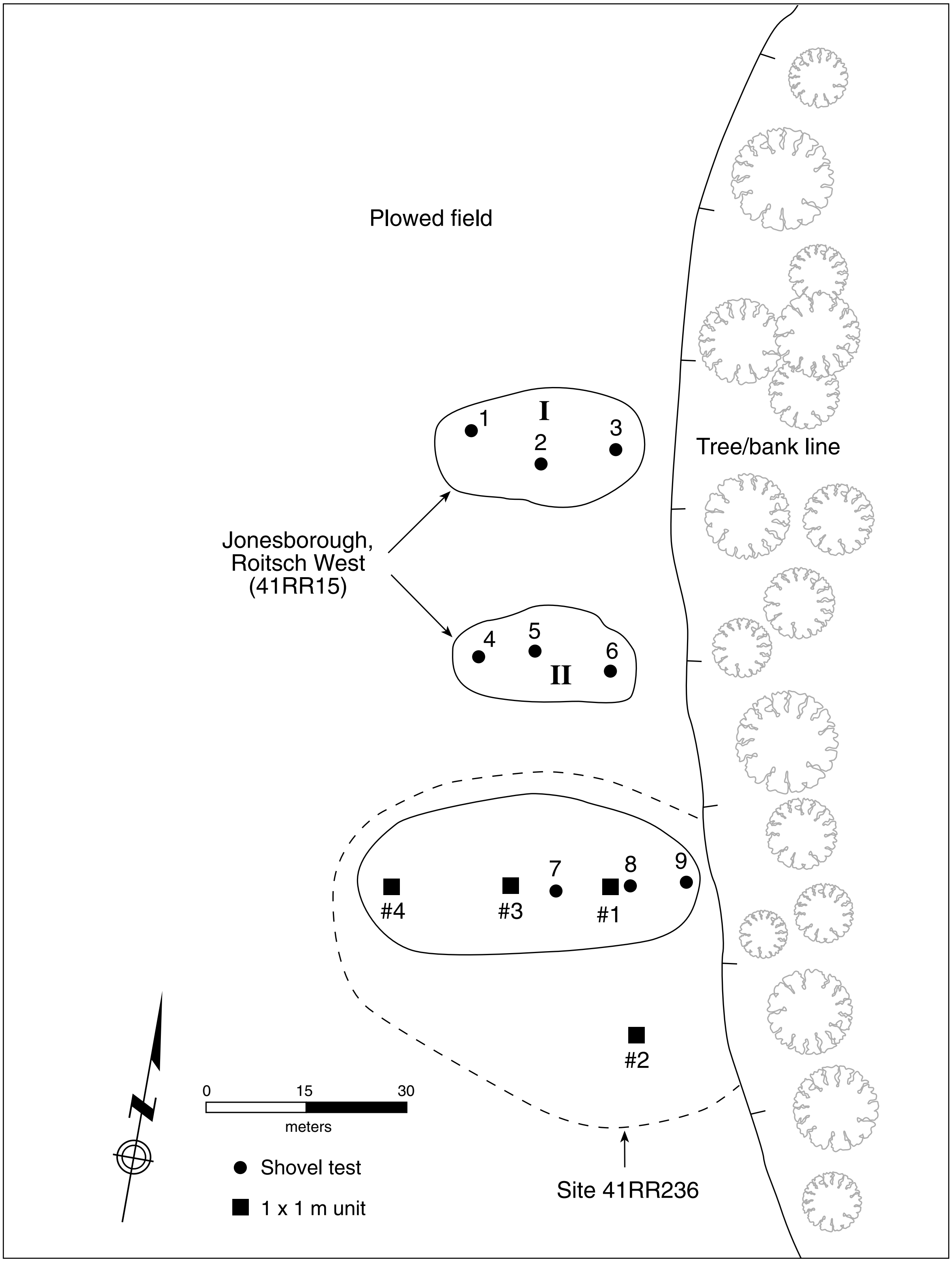

Figure 47. Site Map of the Pine Cone Site (41RR236) showing site area, the location of shovel tests and test units, and the sandy knolls of the Jonesborough, Roitsch West (41RR15) site.

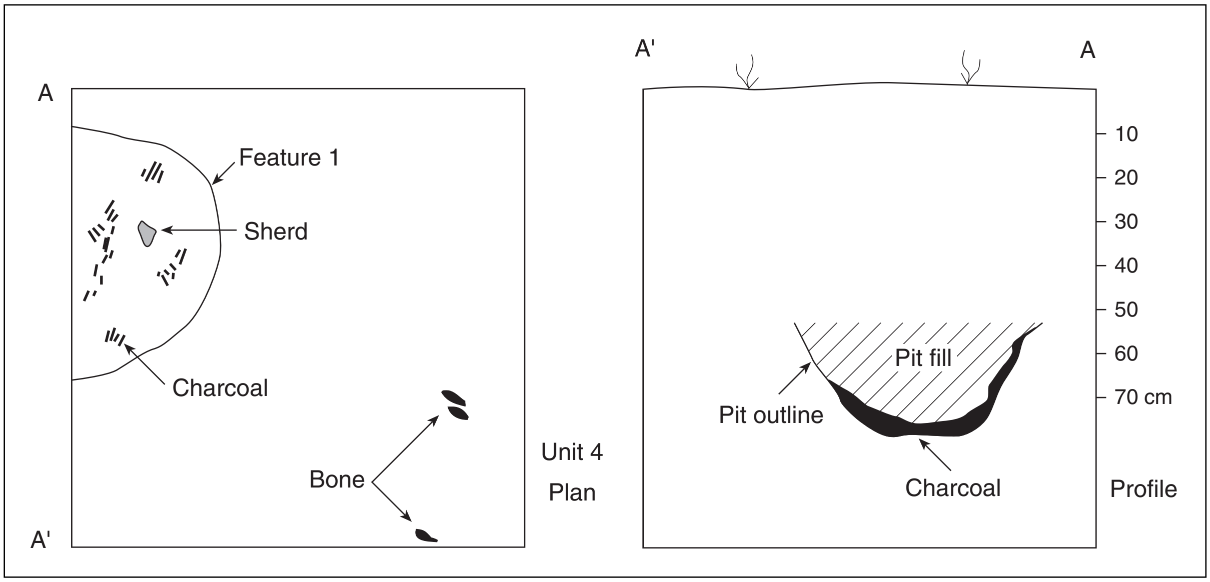

Figure 48. Plan and profile of Feature 1 at the Pine Cone site (41RR236).

Two arrow points were recovered in the upper 30 cm of the archeological deposit: a triangular specimen (possibly a preform) of Big Fork chert in level 3 of Unit 1, and a gray chert Bonham point from level 2 of Unit 2. A Gary *var. Camden* projectile point of a yellow claystone/siltstone was found in level 8 of Unit 1, and its tip had been resharpened to form a small scraper or adze-like edge.

Two other lithic tools were found in the TAS investigations at the Pine Cone site, a bilateral or side scraper from Unit 1, 30-40 cm bs, and a unilateral retouched and utilized bipolar flake from Unit 4, 0-10 cm bs. Both tools were on a yellow claystone/siltstone raw material that is available in quantities in the local Red River gravels.

The lithic debris is comprised primarily of Red

Table 4. Prehistoric and Historic Artifacts from 41RR236, the Pine Cone Site.

Units	Lithic Debris	Daub	Bone	Plain Sherds	Decorated Sherds	Arrow point	Tools	Historic
Surf.	4	–	–	13	3	–	–	–
STs	7	4	30	45	2	–	–	–
1	13	54	4	179	13	2*	1	3
2	8	9	2	55	9	1	–	6
3	13	23	-	45	1	–	–	3
4	22	47	65	102	9	–	1	7
Total	67	137	101	439	37	3	2	19

* Includes one Gary dart projectile point

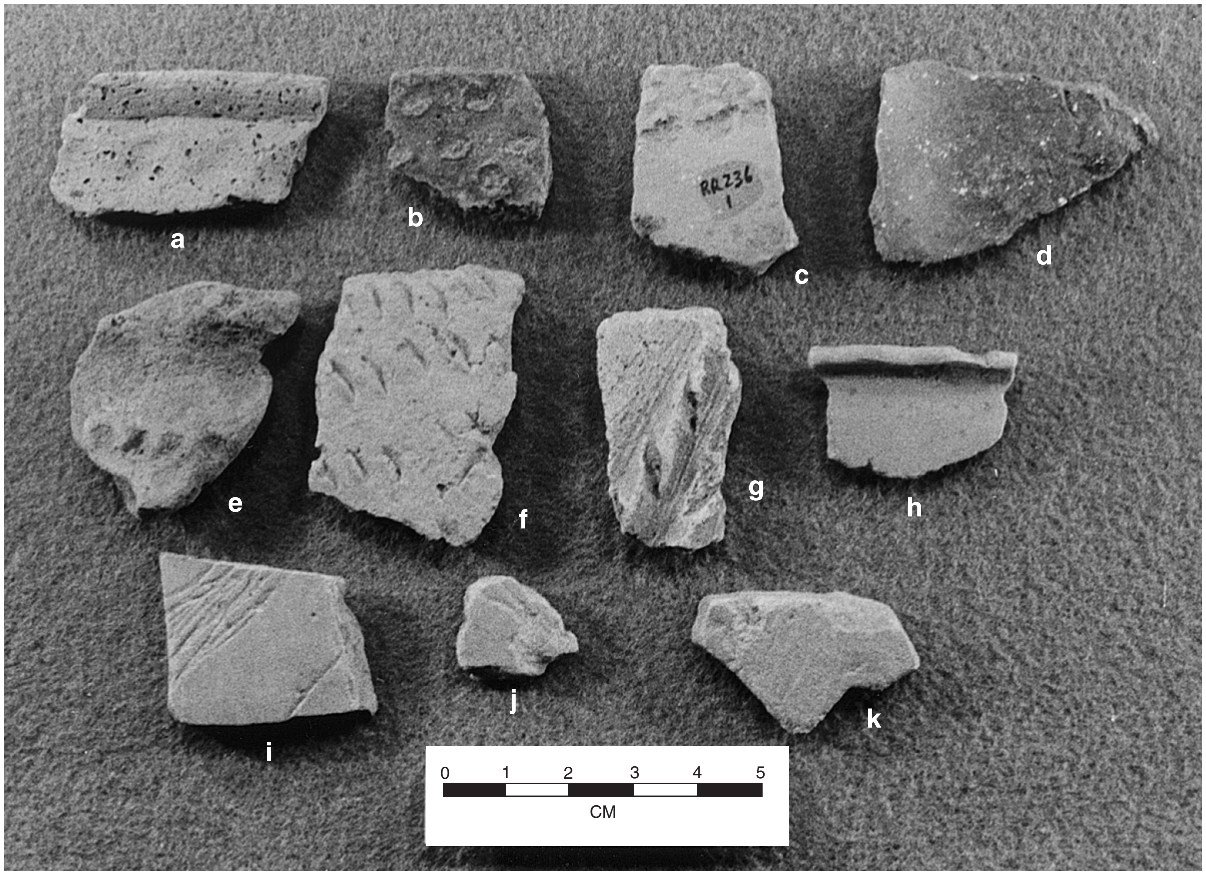

Figure 49. Decorated Sherds and Rim Sherds from the Pine Cone Site (41RR236).

River gravel cherts (i.e., Big Fork chert and Johns Valley shale raw materials from the Ouachita Mountains that are available in Red River gravels below the mouth of the Kiamichi River [Banks 1990]), yellow claystone/siltstone, and red or yellow jasper. These materials account for 72 percent of the lithic debris, along with Ogallala quartzite (13 percent), chalcedony (6 percent), a local yellow chert (1.5 percent), a lustrous gray chert (1.5 percent), quartz (1.5 percent), quartzitic sandstone (3 percent), and hematite (1.5 percent). With the exception of the hematite, a local and poorly knappable material, the remainder of the lithic debris can be acquired in the Red River gravels. Some 48 percent of the lithic debris has no cortical remnants, principally the debris of jasper (75 percent) or chalcedony (75 percent) raw materials. This suggests that these materials were not initially reduced on site, but were brought there in roughed out blanks, large flakes, or as completed tools.

The 476 ceramics from the site are dominated by shell-tempered wares (including a few sherds—about 1 percent—with shell-tempered grog), comprising about 80 percent of the sherds, followed by various sorts of non-shell-tempered wares, including grog (13.4 percent), bone-grog (5.4 percent), grog-grit (0.7 percent), and bone (0.4 percent) aplastics. The shell-tempered ceramics are from a McCurtain phase occupation, and include sherds from Nash Neck-Banded (n=6) and Emory Punctated-Incised jars (n=5), red-slipped Avery Engraved bowls (n=5), and plain red-slipped bowls (n=5), one with a thickened rim (Figure 49a-k); the latter red-slipped bowls are common in early McCurtain phase sites in the middle Red River (see Perino 1981, 1994, 1995). Decorated sherds account for 10.5 percent of the shell-tempered pottery, a considerably higher proportion than the contemporaneous Roitsch and Salt Well Slough sites a few miles downstream (see Kenmotsu 2006; Perttula et al. 2001; Perttula, ed., this volume).

Approximately 4 percent of the shell-tempered wares have a red slip on interior and/or exterior vessel surfaces. Other shell-tempered sherds include three plain rims, six engraved and three incised sherds with undetermined elements, and seven sherds with thin appliqued strips or bands on the body of jars (see Figure 49g); the latter may be from early varieties of Nash Neck Banded and/or McKinney Plain vessels. Finally, a shell-tempered bowl sherd from an elbow pipe was recovered from Unit 4, level 4.

The non-shell (grog and grog-bone)-tempered decorated sherds include punctated bodies (n=8) from utility ware jars, along with one grog-tempered handle or lug. The punctations occur in horizontal rows, and their crescent shape indicates they were usually made by fingernails. Plain bowls and bottles are also represented in the non-shell-tempered Caddo ceramics. More than 16 percent of the non-shell-tempered sherds have an exterior and/or interior red slipped vessel surface.

The presence of daub (n=106), and five mud dauber nest pieces from Units 1 and 2, at the Pine Cone site suggests a mud and thatched (i.e., wattle and daub) Caddo structure or structures stood on the sandy rise. Impressions on the daub include that of sticks, twigs, and grasses. Small pieces of burned or fired clay were recovered almost exclusively from the upper McCurtain phase deposits in Units 1 and 4; these pieces may represent remnants of the lining of clay hearths or outside cooking features.

The few historic artifacts (n=19) include late 19th-early 20th century bottle glass and metal (cut nails and unidentifiable metal fragments) from the plow zone deposits (0-30 cm bs; see Appendix III). They do not appear to relate to the nearby Jonesborough site, however, and probably represent yard trash from one of the houses in the later community of Davenport (see discussion above for the Jonesborough site [41RR15]).

Fritz (1992; see also Perttula, ed., this volume) reported on the paleobotanical remains recovered from Feature 1 at the Pine Cone site. It included 9.04 g of carbonized pine cone fragments, 0.04 g of cane, 0.10 g of maize fragments (including five cupules and 10 cupule fragments), and a few charred seeds (one maygrass, one chenopod, one purslane, and two pine). Appendix IV of this article provides more specific information on the paleobotanical analyses of the remains from the Pine Cone site. The limited amount of animal bone appears to have been primarily from white-tailed deer (Schniebs, Appendix V, this article).

From the available archeological evidence, it seems that the Pine Cone site may have been intensively occupied by Caddo groups during both the Middle and Late Caddo periods (based on the ceramics and the arrow points), with a hint of Woodland period use if the Gary *var. Camden* projectile point does not represent the collection and reuse of the tool by Caddo groups. The abundance of ceramics and daub clearly suggests that the Pine Cone site is a small Caddo habitation site, and structures are likely to be present there. As the site also does contain intact and well-preserved archeological deposits with features, in addition to preserved faunal and floral remains, it has the potential to address important research problems pertaining to the Caddo settlement of the middle Red River (cf. Bruseth et al. 1991; Perttula 1993; Perttula, ed., this volume). Further archeological investigations (i.e., test excavations) would be warranted if the site cannot be protected by the landowner.

41RR237

Prehistoric site 41RR237 covers about 1000 m^2 along the edge of an alluvial terrace being dissected by the current channel of Big Pine Creek. The creek bank is 3-6 m in height, but the landform away from the bank is flat.

Lithic debris and scattered fire-cracked rocks were noted along the bank edge during the 1991 TAS survey reconnaissance, as well as in gopher mounds away from the bank itself. No culturally or temporally diagnostic artifacts were noted at 41RR237. Shovel testing should be conducted at the site to determine if intact archeological deposits are present there.

41RR238

The TAS survey crew recorded this prehistoric site on a moderately-sized knoll (ca. 3600 m^2) on an alluvial landform ca. 800 m north of Big Pine Creek. The Davenport road is immediately adjacent to the western edge of 41RR238. There are low, marshy areas to the north and east of the site.

Lithic debris was noted across the knoll's surface in gopher mounds and eroded areas. Two shovel tests recovered low densities of lithic debris (n=9), fire-cracked rock (n=1), and one plain grog-tempered sherd in sandy loam deposits between 0-46 cm bs (Figure 50). The sherd may be indicative of either a Woodland or Formative-Early Caddo period occupation. The sandy loam deposits on the knoll extend to at least 90 cm bs.

The presence of apparently intact prehistoric

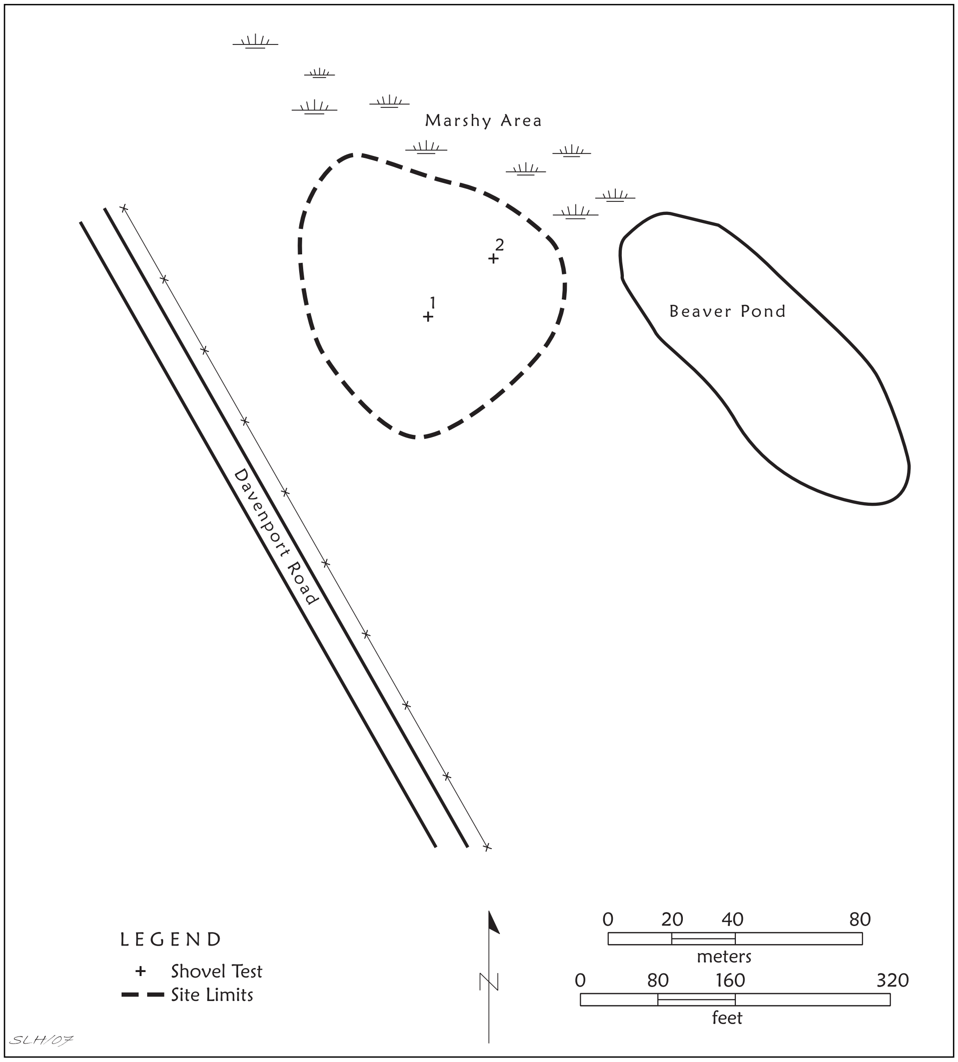

Figure 50. Site 41RR238 map.

archeological deposits suggests that site 41RR238 may contain important archeological information. However, further shovel testing seems warranted to clarify the site's potential to contain cultural features or reasonably isolable deposits with sufficient interpretable quantities of artifacts and/or other archeological materials (i.e., plant or animal remains).

41RR239

Site 41RR239 is on a sandy alluvial terrace overlooking the Big Pine Creek floodplain; a marshy area is present along the southeastern part of the terrace. On the terrace are several small natural rises; it is likely that they all contain prehistoric archeological deposits as lithic debris and fire-cracked rock was noted on the surface of the rises.

To determine if there were preserved archeological deposits at 41RR239, four shovel tests were excavated: two near the southwestern edge of the site where artifacts were eroding out of the terrace, and two on the most prominent rise (Figure 51). All four shovel tests contained prehistoric artifacts (20.3 artifacts per positive shovel tests); in the eroded area of the site, archeological deposits extended to only about ca. 20 cm bs, and contained only limited amounts of lithic debris (n=5) and a metate fragment. However, in the center of the site, the archeological deposits were between 70-80 cm in thickness. Recovered in the two shovel tests from this area were high quantities of lithic debris (n=31), daub (n=15), four charcoal pieces, fire-cracked rock (n=22), one fragment of a ground stone tool, and two plain grog-tempered sherds. Seven pieces of barbed wire from a

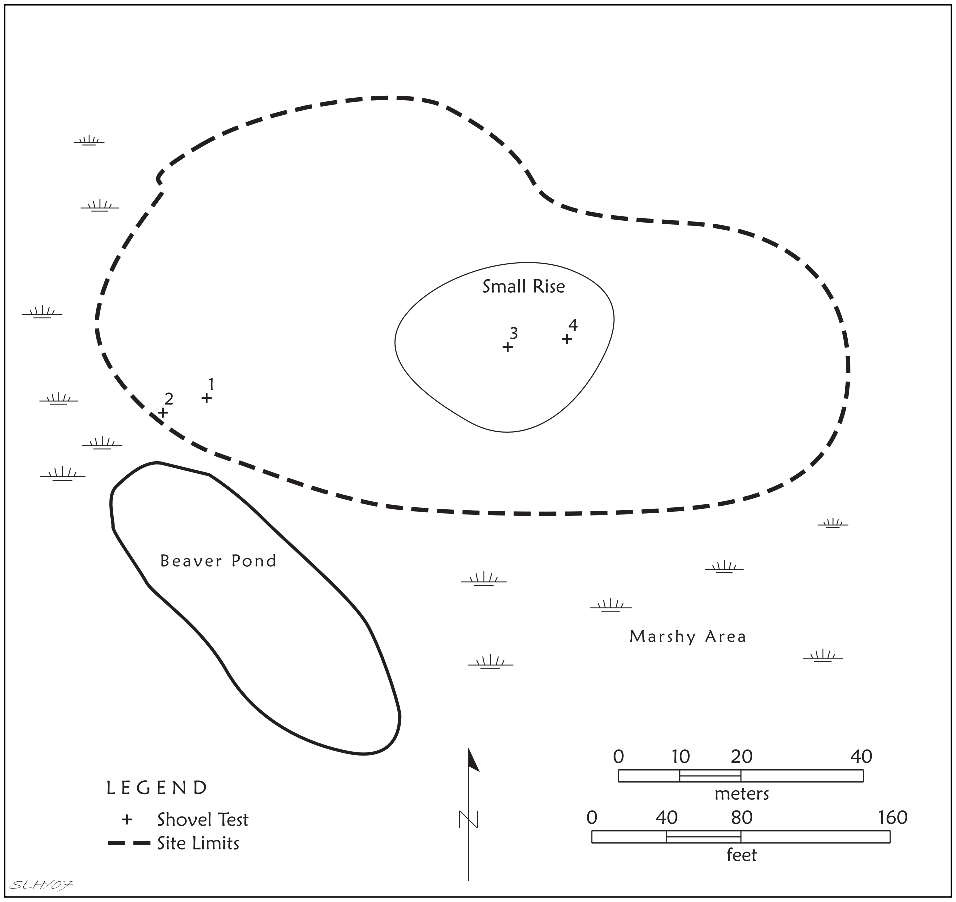

Figure 51. Site map of 41RR239.

fence were found at ca. 12 cm bs in Shovel Test #3.

Although it has not been established on the basis of shovel testing when 41RR239 was occupied in prehistoric times (i.e., the one possible temporal diagnostic—the plain grog-tempered sherd—could be representative of either a Woodland or a Caddo period occupation), the archeological information obtained via the shovel tests clearly demonstrates that extensive archeological deposits are present at the site. Because of the thickness of the sandy loam A-horizon, further shovel testing or limited controlled excavations should be conducted at 41RR239 to determine the contextual integrity of the deposits (particularly in the central part of the site), the potential for features to be preserved, and the possibility of defining discrete and interpretable archeological components.

41RR240

This prehistoric site is on a series of low pimple mounds atop a flat Holocene alluvial terrace, about 1 km north of the current channel of Big Pine Creek; it is estimated to cover 1800 m^2. The terrace is currently an overgrown pasture with hardwoods along the margins of the terrace and floodplain.

Six shovel tests were excavated on two pimple mounds, and low densities (mean of 2.6 artifacts per positive shovel test) of prehistoric lithic debris and pottery sherds were recovered between 0-25 cm in five of the small tests (Figure 52). The soil is a sandy loam (Whakana-Elysian Complex; see Thomas 1977) at least 80 cm in thickness. Plain grog-tempered sherds (n=7) were found in Shovel Tests #1, #2, and #5 on one pimple mound, and in Shovel Test #6 on the pimple mound to the north about 50 m (see Figure 52). Also recovered were five pieces of lithic debris and one fire-cracked rock. No definitive temporally diagnostic artifacts were retrieved from 41RR240, although the presence of plain grog-tempered sherds suggests that the site was used either during the Woodland period or Formative-Middle Caddo periods, before shell-tempered pottery became popular.

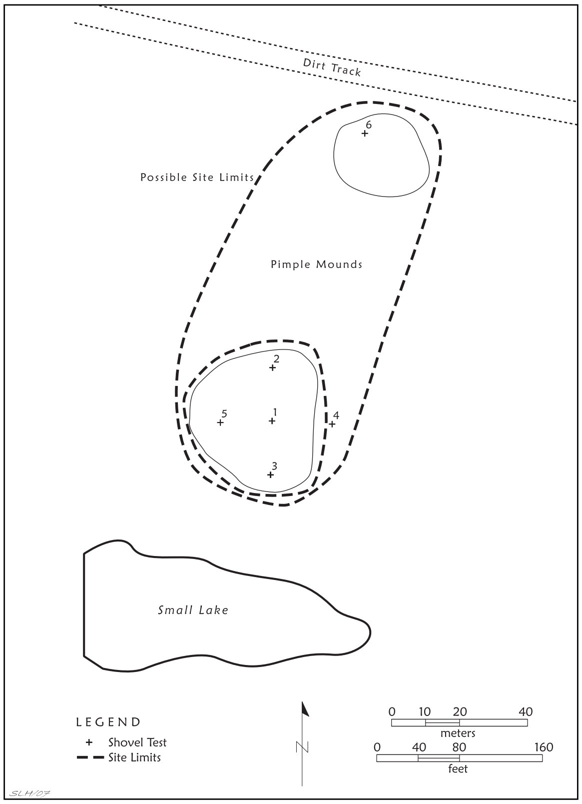

Figure 52. Site Map of 41RR240.

Although this site has an apparently low density of artifacts in subsurface contexts, insufficient evidence was obtained during the shovel testing to ascertain whether the archeological deposits possess integrity or have the potential to contain cultural features. It is possible, based on the available information, to suggest that a short-term habitation area is present at 41RR240. Additional shovel tests should be excavated to make these determinations, particularly between the main site area and the small northern pimple mound, and on the northern pimple mound itself.

41RR242

A multi-component prehistoric and historic 19th century farmstead, site 41RR242 is situated on an alluvial ridge or natural levee of the Red River. Salt Well Slough runs in an old channel of the river at this point in its course. The site itself covers approximately 9400 m^2 of the plowed natural levee, with the highest concentration of archeological materials visible on the site at the crest of the levee (the southwestern part of the site proper) (Figure 53).

A limited random surface collection of artifacts was conducted at the site to obtain a representative sample of the prehistoric and historic archeological materials present on the levee. A mid- to late 19th century occupation, probably a farmstead, is represented by historic ceramics and bottle glass (n=22). Among the historic artifacts are a mid-19th century hand-painted whiteware sherd and a possible mocha whiteware sherd (see Rickard 1993), a brown lead-glazed stoneware, and aqua and brown bottle glass. A possible Woodland period component is also present at 41RR242, as indicated by

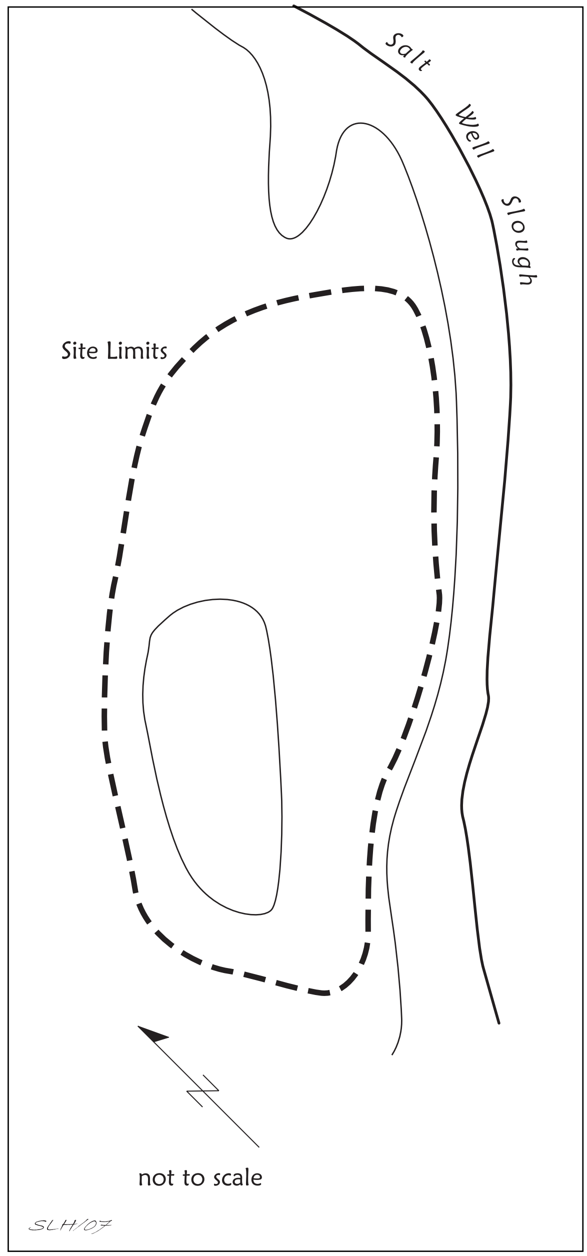

Figure 53. Map of Site 41RR242.

one expanding stem (possibly of the Elam type) projectile point made of novaculite (see Figure 34c), three plain pottery sherds, lithic debris, daub, fire-cracked rock, a bifacial tool fragment, ground stone tools (a pitted stone and mano fragment), and a possible chipped stone axe fragment of hematite (see Appendix II).

No shovel tests were conducted at 41RR242, but given the soils (Waskom loam) and the types of artifacts recovered, it is likely that subsurface archeological deposits are present there. To determine the integrity of these deposits, and their horizontal and vertical extent, shovel testing is warranted in conjunction with the systematic surface collection of the site if artifact concentrations are noted.

41RR243

Mr. Ernest Roitsch reported this prehistoric site to the 1991 TAS survey crew. It is located on about 2500 m^2 on the crest of a relatively flat alluvial terrace paralleling Big Pine Creek; the current channel of the creek is about 200 m to the east. Plain sherds and lithic debris were visible on the surface in an overgrown pasture, and a small collection of 20 lithic debris and one plain grog-tempered sherd was obtained during a cursory site reconnaissance in 1991. These may represent a Woodland period to Formative-Middle Caddo period component at 41RR243 (see below). A single plain whiteware sherd was also collected from the surface of the site. This site needs better vertical and horizontal definition, and it is particularly important to gather information on the integrity of the archeological deposits.

Ernest Roitsch allowed the TAS to document a small collection that he has from the site. It includes Gary (*var. Camden*) and Bulverde dart projectile points (of Red River jasper and novaculite, respectively), a beveled lanceolate of probable Late Paleoindian period age (made from a cream-colored chert of uncertain origin or source area), a biface fragment of Johns Valley shale (Banks 1990), eight pieces of lithic debris (chert and novaculite), two plain grog-tempered pottery body sherds, a rim sherd with diagonal incisions, another rim sherd from a carinated bowl with diagonal incisions, and a single plain European-manufactured whiteware sherd worked into a disc; such discs are commonly noted on Antebellum era settlements in the region. These demonstrate prehistoric occupation of parts of 41RR243 during Paleoindian, Late Archaic, Woodland, and Caddo (probably Early-Middle Caddo period) times, with subsequent use of the site in the 19th century.

41RR244

Site 41RR244 is immediately north of 41RR242, on the same Holocene alluvial ridge or natural levee formed by the Red River. A cursory surface inspection of the site by the 1991 TAS survey team noted both historic and prehistoric artifacts over about 1000 m^2 of the landform, but no apparent concentrations of artifacts were recorded. No shovel tests were excavated at 41RR244 during the 1991 season.

The small 1991 collection of artifacts from 41RR244 document: (1) a late 19th-early 20th century occupation (probably a sheet yard scatter from a tenant farmstead) with plain whiteware ceramics and clear, purple (ca. 1880-World War II), aqua, and brown bottle glass (n=9), and (2) a prehistoric component of unknown age. Prehistoric artifacts collected include seven pieces of lithic debris, four cores, and three fire-cracked rocks.

This site was revisited in 1992, and another small surface collection was obtained from the plowed field along the edge of the ridge or levee. Again, no shovel testing was conducted during the survey effort. Lithic debris, fire-cracked rock, and a dart point blade and tip from a probable Late Archaic period occupation were obtained from 41RR244.

The horizontal and vertical character of the prehistoric archeological deposits at site 41RR244 should be delimited as part of assessing its integrity, its potential to contain cultural features, and in determining if discrete cultural components exist on the landform. Should this be warranted because of threats to the site, these tasks can be readily accomplished by excavating and screening shovel tests and/or 50 x 50 cm units across the part of the natural levee where prehistoric materials are present on the surface.

41RR245

This prehistoric site is located on a sandy pimple mound that is on an alluvial terrace, about 800 m from the current channel of Big Pine Creek. Currently in pasture, prehistoric lithic debris and fire-cracked rocks were noted on the surface in gopher mounds.

Mr. Ernest Roitsch has collected and observed prehistoric artifacts at the site after rains, but apparently no temporally diagnostic materials have been noted there. No shovel testing was completed during the cursory reconnaissance of 41RR245, and basic information on site extent, depth, and contextual integrity of any preserved archeological deposits is needed to assess the historical significance of the site.

41RR246

From information provided by Mr. Ernest Roitsch, site 41RR246 appears to have been occupied during the Late Caddo McCurtain phase, as shell-tempered pottery, daub, and lithic debris is scattered over about 5000 m^2 of the natural levee that parallels Salt Well Slough. No artifacts were collected, and no concentrations were noted across the surface. The slough is ca. 50-100 m from the site itself.

It is likely that 41RR246 is closely related to the other Late Caddo farmsteads (such as 41RR201 and 41RR202) and salt processing sites (such as Salt Well Slough [41RR204], 41RR248, 41RR256, and 41RR257) that extend for more than 1 km along the west side of Salt Well Slough (see Kenmotsu 2006). It warrants further investigations—shovel testing, systematic surface collections after site plowing, and controlled excavations if intact archeological deposits are identified—as part of a study of the Late Caddo community at the Roitsch site, as well as the broader Mound Prairie area (cf. Bruseth et al. 1991, 1992; Perttula, ed., this volume).

41RR247

Site 41RR247 is probably a Late Prehistoric Caddo site, based on information reported to the TAS survey crew by Mr. Ernest Roitsch. It is in an old cultivated field, on a narrow projection of an alluvial terrace dissected by Pond Creek; the creek is 300 m south of the site. Prehistoric ceramics and lithic debris and tools are apparent at the site after each plowing, but no collections are currently available to characterize the temporal span of occupation. Given its proximity to the many Caddo prehistoric sites present along Salt Well Slough, and the lower courses of Pond Creek and Big Pine Creek (in the vicinity of 41RR102 and 41RR103), site 41RR247 warrants further investigation to determine if intact Caddo archeological deposits are present that may contain important archeological information on Caddo lifeways.

41RR248

This site was originally reported to the 1991 TAS survey crews by Ernest Roitsch. He had noted a concentration of prehistoric ceramics on an alluvial knoll overlooking Salt Well Slough. During the 1992 season, one of the TAS survey crews located and documented the site.

Site 41RR248 is principally a dense scatter of McCurtain phase Late Caddo period ceramics and daub/burned clay spread over about 3 acres of a plowed alluvial knoll; Salt Well Slough is ca. 100 m east of the site. A small concentration of 20th century refined earthenware, stoneware, bottle glass, and other items (n=54 artifacts) was also noted at the extreme south end of the site (Figure 54), including a shell button (Figure 55a) and a shotgun cartridge. A whiteware maker's mark of "W P La Belle China" is from a plate made by the Wheeling Pottery Co. between ca. 1893-1910 (Kovel and Kovel 1986).

Over 2700 shell-tempered McCurtain phase pottery sherds (ca. 900 surface sherds per acre), about 80 pieces of daub/burned clay, five pieces of lithic debris, three grinding slab fragments, four fire-cracked rock, and a few pieces of animal bone and mussel shell, were recovered in a controlled surface collection of the plowed field (see Appendix II). Shovel tests documented archeological deposits at least 31 cm in thickness in a Late Holocene alluvial clayey sediment, and thick concentrations of large shell-tempered sherds (n=58, along with a few pieces of daub and animal bone) were encountered in Shovel Test #2 (see Figure 54) between ca. 15-31 cm in depth. The soil was too saturated, and the density of sherds too thick, to carry the shovel testing to the depth of the subsoil.

The Late Caddo archeological materials from the site closely resemble those recovered in excavations at the Salt Well Slough site, which appears to be a salt making site used after ca. A.D. 1300 (Kenmotsu 2006). There, massive quantities of utilitarian Nash Neck Banded and Emory Punctated-Incised jars and other sherds (more than 21,000 sherds or more than 1000 per m^2) were found in association with large areas of burned soil and daub that are the residues of boiling the water from Salt Well Slough to make salt for the Late Caddo inhabitants of the Mound Prairie area on Red River. No salt pans were

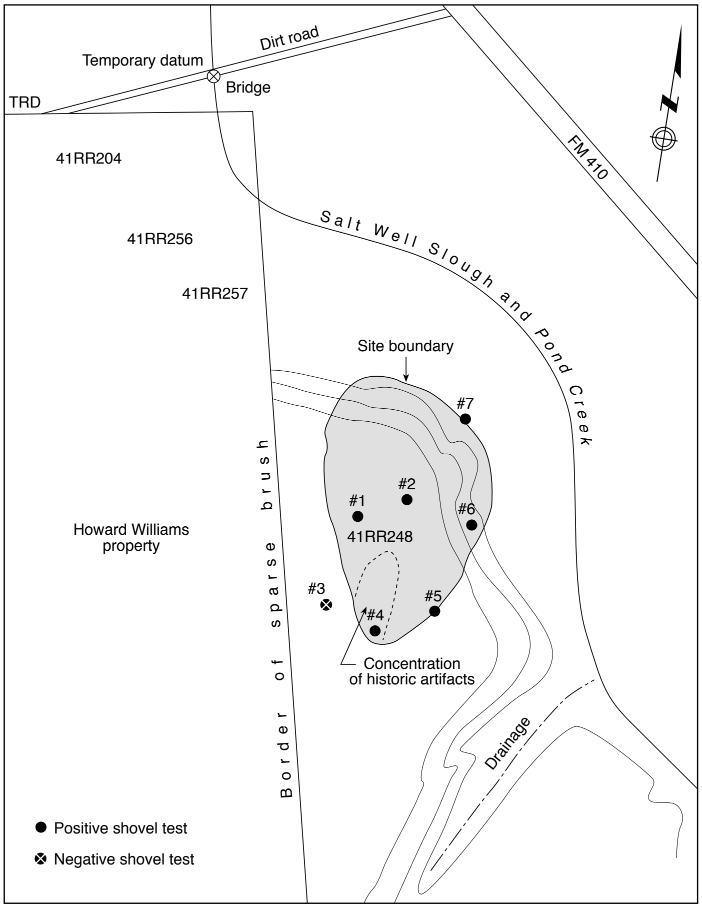

Figure 54. Site Map of 41RR248.

used at the sites, in contrast to some Late Caddo salt making sites in Northwest Louisiana and Southwest Arkansas (cf. Early 1993; Girard 2006).

At 41RR248, the decorated shell-tempered ceramics primarily consist of Nash Neck Banded rim (n=83) and body (n=42) sherds (constituting 79 percent of the 158 decorated sherds from the site) (Figure 56a-d), Emory Punctated-Incised (n=7) (Figure 56e, g), and Avery Engraved (n=8), along with plain red-slipped rim and body sherds (n=8); the one rim has straight walls and a rounded lip. Of the Nash Neck Banded rims, approximately 40 percent have everted profiles with rounded and flat lips, and the remainder have relatively straight rim profiles with rounded lips. There are also 41 plain rims with primarily rounded or folded lips, one engraved sherd with a single line, six sherds with appliqued strips, one diagonal incised body sherd, and two appliqued-punctated body sherd (possibly also Emory Punctated-Incised) (see Figure 38a, d, f). The decorated sherds comprise 5.6 percent of the sherd assemblage (n=2825), and only 10.8 percent of the decorated sherds are from fine wares (i.e., engraved and red-slipped specimens); the remainder are from relatively thin (5.31 $\pm$ 1.45 mm) shell-tempered utility ware jars with everted rims.

Two other salt making sites were recorded during the 1992 TAS survey of Salt Well Slough: 41RR256 and 41RR257. These lie between the Salt Well Slough site (41RR204) and site 41RR248.

41RR249

Located on a small alluvial rise in a wheat field above an intermittent tributary of Big Pine Creek, this late 19th century farmstead site was reported to the TAS by Mr. Ernest Roitsch. Although surface visibility was poor (< 5 percent), hand-made bricks, whiteware ceramics, and bottle glass sherds from hand-blown and semi-automatic (ca. 1880-1903) manufactured bottles were visible on the surface over a ca. 1000 m^2 area. One concentration of bricks may represent the remnants of a house foundation or a chimney fall.

Due to limited available time, no shovel testing was completed at the site to evaluate the character of its archeological deposits. This should be done to assess its

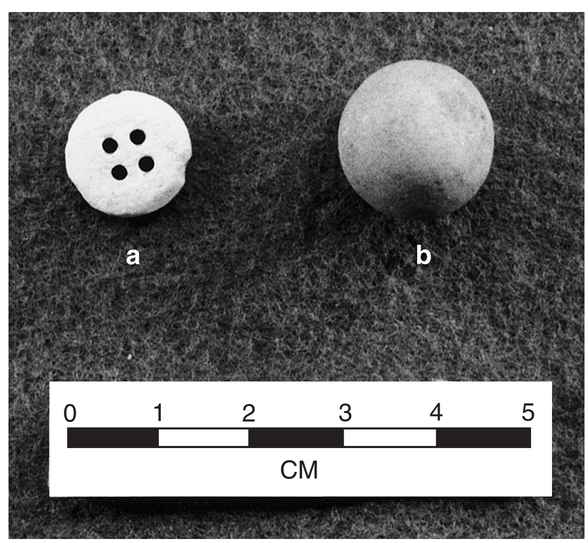

Figure 55. Historic Shell Button and Clay Marble from TAS Survey Sites: a, 41RR248, lot 1; b, 41RR287.

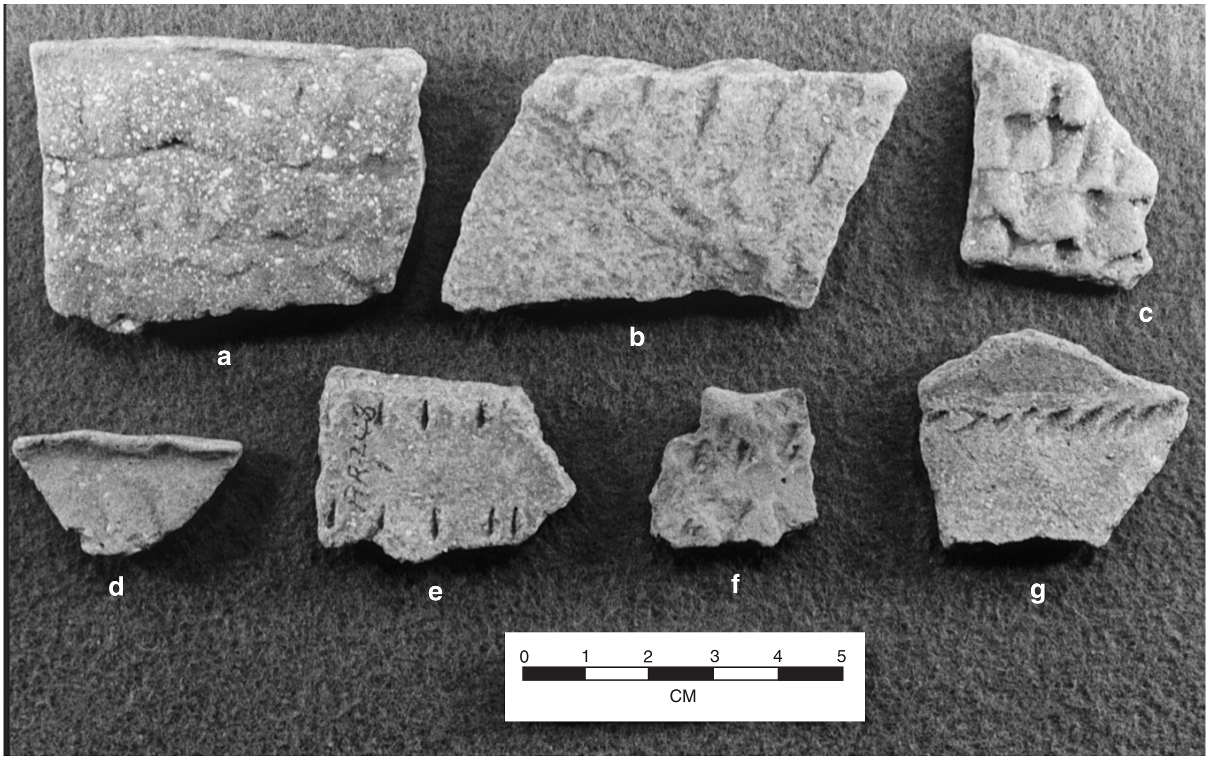

Figure 56. Decorated Sherds from 41RR248 and 41RR290: a-d, f, Nash Neck Banded; e, g, Emory Punctated-Incised. All from 41RR248, except f, from 41RR290.

historical significance, in conjunction with archival and historical research to help determine who its occupants were, and when they settled the property.

41RR250

The site is in a pasture on a small, eroded knoll along a tributary to Big Pine Creek, which is about 800 m to the north. A few prehistoric artifacts were noted on the knoll surface, and three pieces of lithic debris and one animal bone were collected from an unspecified surface provenience; the total size of the site has not been determined. One of the two shovel tests excavated at 41RR250 contained a piece of lithic debris and part of a grinding slab fragment between 30-40 cm bs; the total thickness of the sandy loam A-horizon at 41RR250 was about 60 cm. The limited quantity of artifacts found at this site, and the equivocal information obtained from the shovel testing on the age, context, and integrity of the deposits, suggest that additional shovel testing is warranted at a future date to better characterize these archeological deposits.

41RR251, Tarrant #1

The Tarrant #1 site was reported to the TAS by Mr. Larry Banks (then at Southern Methodist University, Dallas, Texas). Banks described the site as a Woodland period midden containing thick grog-tempered ceramics (Williams Plain?), lithic debris, and chipped stone tools. The reported site location is on an alluvial terrace overlooking the floodplain at the confluence of the Kiamichi and Red rivers.

The Northeast Texas Archeological Society relocated the Tarrant #1 site during their 1993-1994 survey of the Tarrant Farm (see Nelson, Turner, and Perttula, article; see also Nelson et al. 1995). However, the poor surface visibility limited the amount of investigations conducted there, and no surface collections were obtained.

The known artifact collections from the site should be studied and photo-documented when the opportunity arises. Currently, there are few known and discrete Woodland period midden components in this part of the Red River valley (cf. Perttula et al. 1993). Thus, further investigations are warranted at 41RR251 to acquire archeological information to better understand regional Woodland period adaptations.

41RR252

Mr. Larry Banks also reported this prehistoric site to the TAS Field School in 1992. Unfortunately, the TAS survey crews were unable to complete any survey work on private land in the area of the site, which is about 2.8 km southwest of the Fasken Mound site (41RR14).

Site 41RR252 is reported by Mr. Banks to be an Early Caddo period settlement. It is situated on the edge of a broad alluvial terrace a short distance from the current channel of the Red River. Caddo sites of similar age have been recorded during the TAS Field School in the vicinity of the Fasken site (i.e., 41RR206 and 41RR209). This site should be relocated, any collections from the site need to be photo-documented, and subsurface investigations should be completed to assess its integrity as well as its archeological character.

41RR253, the Bob and Bret Show

Site 41RR253 is one of several late 19th century to early to mid-20th century archeological sites recorded in the area between Pond Creek and Big Pine Creek. The Bob and Bret Show site is along a fence line in a relatively flat plowed field.

The relatively dispersed archeological materials, including bottle glass, ceramics, and metal fragments (n=70), were collected over an 800 m^2 area. Among the ceramics are plain whiteware, a plain porcelain sherd, one late 19th century rim with relief-molded dots, and lead-glazed and salt-glazed stoneware. Two of the bottle glass sherds are from brown glass snuff containers, and the remainder of the machine-made glass is clear, purple, brown, aqua, and milk glass (see Appendix III). These historic artifacts probably are trash deposits associated with an abandoned structure a short distance to the north along the same fence line. Two pieces of quartzite lithic debris were also recovered in the surface collection, indicating a minimal prehistoric use of the landform. Because of the saturated clays on site, standing water, and the recent age of the archeological deposits, no shovel tests were excavated at 41RR253 as part of the recordation process.

41RR254

This is a small (ca. 860 m^2) and apparently sparse prehistoric archeological deposit on the flat alluvial terrace between Pond Creek, Salt Well Slough, and Big Pine Creek; Pond Creek is about 300 m to the north.

A few pieces of lithic debris and quartzite hammerstone fragments were observed in eroded areas of the pasture, along with a metal chain link. As the surface visibility was about 50 percent in the pasture, it seems probable that the site has only a very low density of (temporally undiagnostic) lithic artifacts. No shovel testing was conducted on the site, but as it has been plowed, and it is situated in an area with a generally quite shallow (ca. 10-20 cm) and gravelly A-horizon, there is little likelihood that intact archeological deposits are preserved at 41RR254.

41RR255

Twentieth century foundations and a scattering of historic artifacts were noted over a 1500 m^2 area on an eroded knoll of an alluvial terrace facing a broad and flat lower terrace that ends at Salt Well Slough. These archeological materials are along an old farm road and fence line between Pond Creek and Big Pine Creek. Site 41RR253 is several hundred meters to the south along the same fence line. The site probably represents an abandoned farmstead.

No shovel tests were conducted at 41RR255 because of the relatively recent age of the historic occupation. For similar reasons, no surface collections were obtained from the site. The site has little archeological potential, and does not warrant further archeological investigations.

41RR256, Howard Williams Property Block

The Howard Williams Property Block site is part of the large complex of Late Caddo, McCurtain phase, salt processing sites (including Salt Well Slough [41RR204], 41RR248, 41RR256, and 41RR257) that extend for about 800 m along Salt Well Slough (see Figure 2). Site 41RR256 is on a large plowed knoll (ca. 15,600 m^2) approximately 100 m west of Salt Well Slough; the site sediments are a dense black Desha clay. Shovel testing of the black clay at the site documented archeological deposits at least 18 cm in thickness with an abundance of large shell-tempered pottery sherds (Figure 57).

A surface collection of the site by one of the 1992 TAS survey crews recovered 217 shell-tempered sherds (principally plain body sherds probably from

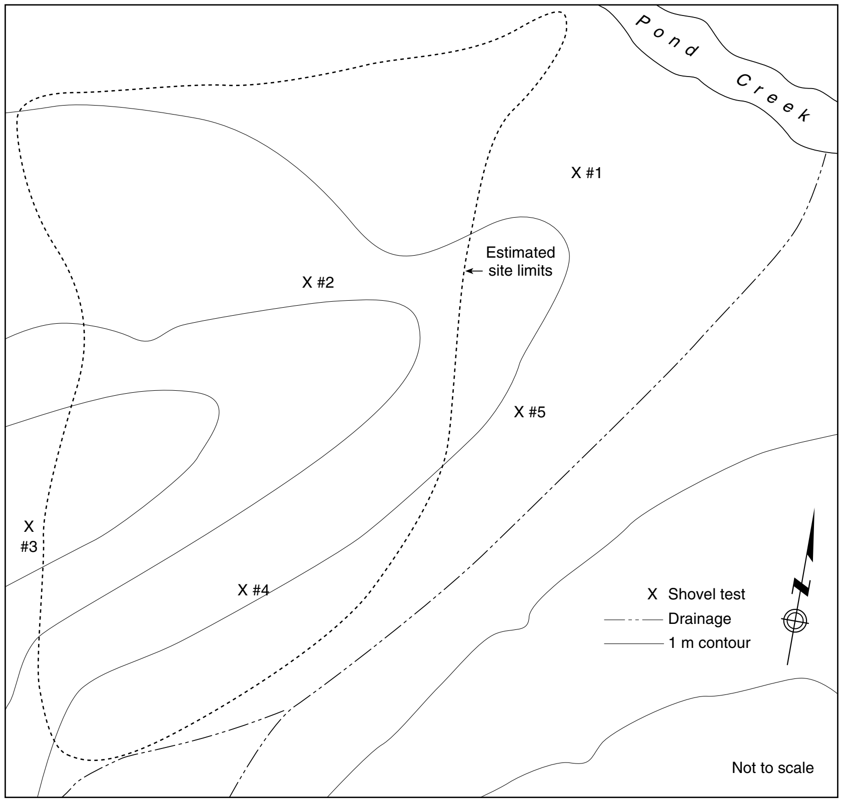

Figure 57. Site Map of 41RR256.

Nash Neck Banded jars), including four plain rims (everted with rounded lips) and one Nash Neck Banded everted rim sherd. This is a surface density of ca. 50 sherds per acre, approximately 18 times lower in density than at 41RR248 (see above). This suggests a fairly non-intensive salt making use at 41RR256 by comparison with either the Salt Well Slough site or 41RR248. Daub or burned clay (n=9), four pieces of poorly preserved animal bone, a grinding slab fragment and two hammerstones, and one lithic core comprise the remainder of the prehistoric artifact assemblage in the 41RR256 surface collection. The limited range of artifact classes (i.e., almost exclusively [93 percent] pottery sherds, daub, and/or fired clay) at site 41RR256 is consistent with the types of artifacts found at the other salt processing sites (see discussion in Kenmotsu 2006). Three historic 20th century plain whiteware sherds from the site represent the casual discard of historic trash in the area.

Along with the other salt processing sites on Salt Well Slough, site 41RR256 represents an important archeological resource that warrants preservation and protection. Test excavations should be conducted at the site to document the settlement and feature plans, determine specifically the chronological span of the occupation (i.e., when salt processing became important to the agricultural McCurtain phase Caddo [see Perttula 1993, 1996; Kenmotsu 2006]), and gather pertinent information on how the Caddos produced salt for local consumption and trade. This work would be an important facet of a regional study of prehistoric and historic Caddo salt processing, and a particular focus of archeological planning for the Eastern Planning Region of Texas (e.g., Kenmotsu and Perttula 1993).

41RR257

This Late Caddo salt processing site is situated on the edge of an alluvial terrace, about 100 m from Salt Well Slough. It covers about 8400 m^2 of a currently plowed field, but has archeological deposits (large shell-tempered sherds and daub) in excess of 15 cm in depth; large sherds were visible in the walls of three shovel tests (Figure 58).

A controlled surface collection of the site area was conducted by one of the 1992 TAS survey crews, and a large quantity of Late Caddo cultural materials was collected from a 20 x 30 m area where sherds and daub were particularly

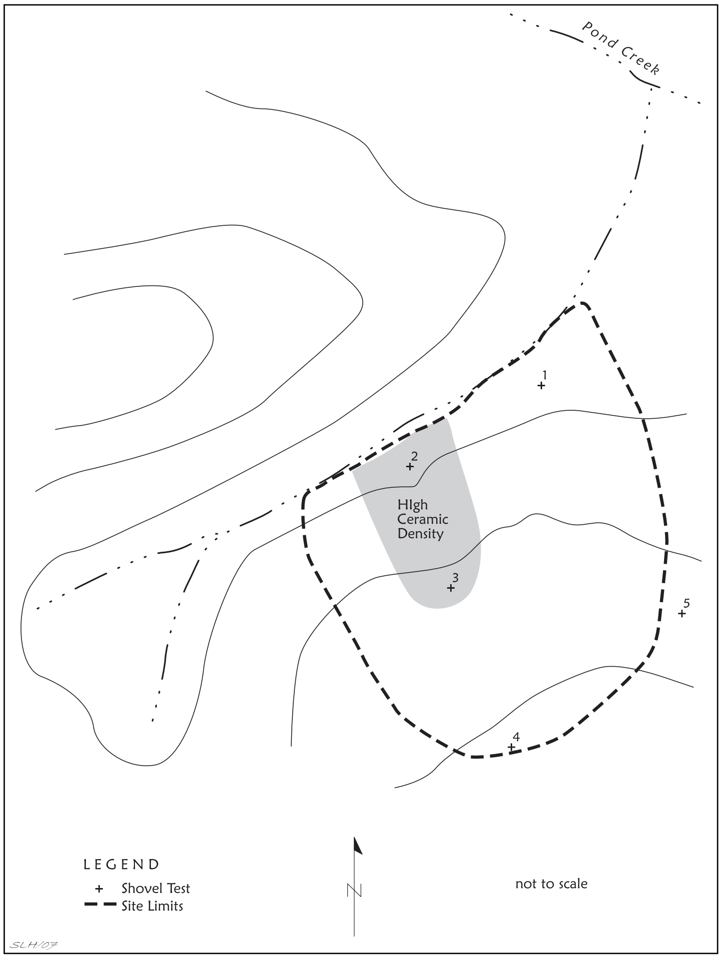

Figure 58. Site Map of 41RR257.

concentrated. Recovered in the surface collection were 756 McCurtain phase shell-tempered sherds (principally from large jars), 30 pieces of daub or burned clay, four fire-cracked rock, one animal bone, and three pieces of lithic debris. Among the sherds are six plain jar rims (everted with rounded lips), one Emory Punctated-Incised body sherd, and three Nash Neck Banded rim and body sherds. The percentage of decorated sherds is 0.5 percent, much lower than at the Salt Well Slough site or 41RR248. The surface sherd density across the entire site is ca. 380 sherds per acre, intermediate between the surface sherd density at the other two salt making sites recorded during the TAS Field School (41RR248: 900 sherds per acre; 41RR256: 50 sherds per acre).

Again, the prehistoric assemblage from 41RR256 is consistent with the other known salt processing sites along Salt Well Slough. The few historic artifacts recovered (n=6) date after ca. 1937 (including a pocket knife and a 1937 penny); they are not associated with a farmstead, however, and are presumably trash discards.

Site 41RR257 warrants further investigations as part of a regional study of Caddo salt processing. It has abundant material remains, and apparently in situ archeological deposits, and should contribute significant new information on the Late Caddo saltmakers in the Red River valley.

41RR258

This is a multi-component prehistoric and historic site on a small knoll of a Holocene terrace that overlooks Pond Creek, about 250 m to the north. The site covers about 1200 m^2 of the knoll, and the site limits were defined from the surface distribution of historic and prehistoric artifacts in the pasture. No shovel tests were excavated at 41RR258, but based upon other sites in the area, and the type of soil (described in the field notes as a dark brown to black loam or clay), the archeological deposits are probably less than 30-40 cm in thickness and they have subjected to clearing and past cultivation.

A surface collection recovered 34 historic and six prehistoric artifacts, and one animal bone, at 41RR258. The historic artifacts include plain and decorated (relief-molded and decalcomania) whiteware and porcelain ceramics, Bristol-glazed stoneware, bottle glass (clear, blue, and brown), milk glass, tin can fragments, machine-made bricks, and a glass marble from a ca. 1900-1940 period occupation or trash deposit; no house or structure foundations were noted at the site. The prehistoric artifacts were undiagnostic lithic debris (n=5) and a bifacial preform fragment (of claystone/siltstone) that may be a remnant of an Archaic period dart projectile point.

41RR259

Site 41RR259 is on a prominent, linear sandy rise about 380 feet amsl between Pond Creek (to the north) and Salt Well Slough (to the east). Unlike other areas slightly lower in elevation that have deposits of more recent black clay (as at the Salt Well Slough site and other salt processing sites along Salt Well Slough), the rise at 41RR259 has a generally shallow and gravelly sandy loam A-horizon that overlies a reddish-brown clay B-horizon.

Shovel testing disclosed prehistoric archeological deposits from ca. 0-10 cm bs over a 2600 m^2 area. Two of five shovel tests excavated at 41RR259 contained low densities of lithic debris (mean=3.0 artifacts per positive shovel test), and no apparent concentrations of prehistoric artifacts were observed on the rise. The uncontrolled surface collection from the site recovered 53 lithic debris, one fire-cracked rock, one mussel shell (probably modern), an Ogallala quartzite biface preform, and two bifacial tool fragments of Ogallala quartzite and claystone/siltstone, along with a Woodland period Gary, *var. Camden* dart point of claystone/siltstone, a dart point blade of quartzitic sandstone, and a dart point tip.

These remains appear to be from a probable Woodland period occupation at the site (based on the *var. Camden* point, dated by Schambach [1982] to ca. A.D. 200-700), based on the kinds of dart projectile points from surface provenience. Occupations of similar age tend to be widely distributed along Big Pine Creek and its surrounding uplands, rather than on the active floodplain areas of the Red River where post- A.D. 800 Caddo materials are well represented in surface contexts, but earlier Archaic and Woodland period materials are notably absent. The latter materials are presumably deeply buried in Red River alluvium on the active floodplains, and sites of such nature need to be identified and documented to clearly develop an understanding of the settlement and land use patterns of Late Archaic and Woodland period groups in the Mound Prairie area.

Site 41RR259 possesses little archeological integrity, and almost no potential for preserved cultural features because of the shallow deposits. The limited surface reconnaissance also identified no horizontal concentrations of cultural materials. Based on these characteristics, the site warrants no further investigations at the present time.

41RR260

This prehistoric site is located in a flat overgrown pasture about 200 m west of an intermittent tributary that drains north into Big Pine Creek. A low density of artifacts were visible on the surface, and a probable Late Archaic Williams dart projectile point of a lustrous Red River gravel chert (see Figure 34b) was collected in a dirt road that crosses the site. Shovel testing on both sides of the dirt road located a Late Archaic Yarbrough projectile point (see Figure 34e) and a mano fragment about 17 cm bs in one shovel test (Shovel Test #5); the other five excavated at the site were sterile. Ernest Roitsch indicated to the TAS survey crew that he found a ground stone celt in the vicinity of 41RR260.

Because of the low artifact density at 41RR260, the surface and subsurface extent of the archeological deposits has not been determined. Shovel tests, however, indicate a sandy loam A-horizon about 20 cm thick overlying a clay B-horizon that extends to at least 60 cm bs. The archeological deposits are likely restricted to the thin A-horizon sediments. While it appears that 41RR260 was occupied during the Late Archaic period, the sparse and shallow nature of the deposits suggest that cultural features or interpretable temporal or spatial patterns of material culture remains are unlikely to exist at the site.

41RR261, Williamson-Weldon Site

The Williamson-Weldon site is one of three small archeological deposits clustered on sandy knolls near the headwaters of an intermittent tributary that drains southeast to Big Pine Creek. Williamson-Weldon covers about 500 m^2 of one knoll. Shovel testing on the knoll documented shallow (< 20 cm) loamy sands over B-horizon clays; the site has been previously plowed.

The surface collection of Gary and corner-notched (see Figure 31a) dart projectile points indicate that the site was used during the Late Archaic and/or Woodland periods, but an Early to Middle Caddo occupation(s) is probably represented by five plain grog- and grog-bone-tempered sherds, including two with interior-exterior red-slipped surfaces. Also retrieved from the surface collection were 38 pieces of lithic debris, one biface preform of quartzitic sandstone, one battered chert cobble, one fire-cracked rock, and 10 pieces of historic 20th century green bottle glass and plain whiteware ceramics.

Two of the five shovel tests at 41RR261 contained only three pieces of lithic debris about 10 cm bs, but the extent of the deposits was not determined. While artifacts were relatively common on the surface, shovel testing at 41RR261 clearly suggests that it has only sparse subsurface archeological remains (of either prehistoric or historic age). The shallow nature of the deposits also suggests that the site lacks integrity.

41RR262

Site 41RR262 is about 90 m east of 41RR261, and approximately 100 m west of 41RR263. Based on the surface evidence of cultural materials, and the landform, the site covers ca. 250 m^2 of a sandy knoll near a southeasterly-draining tributary to Big Pine Creek. It is currently in a pasture, but the area has been previously plowed.

Five shovel tests on the knoll failed to identify any subsurface archeological deposits. However, the loamy sand A-horizon at 41RR262 is a maximum of 35 cm in thickness, suggesting that very sparse archeological materials may still be preserved at the site. Fairly good surface exposure on the site knoll revealed no apparent concentrations of prehistoric cultural materials, although one parallel-stemmed dart projectile point (see Figure 34f, a style of dart point common in the Late Archaic in Northeast Texas [Story 1990:Figure 32]), 13 pieces of lithic debris, one biface preform fragment, a battered quartzite cobble, one animal bone, and three plain grog-tempered ceramic sherds were collected by the TAS survey crew. Based on this recovery, site 41RR262 was probably sporadically used during both the Late Archaic and Woodland periods, but there is little likelihood that significant archeological deposits are present at the site that could contribute important information on current Northeast Texas research problems (cf. Kenmotsu and Perttula 1993:69-187).

41RR263

Site 41RR263 covers about 250 m^2 of a third knoll along the intermittent tributary of Big Pine Creek. Recorded during a driving thunderstorm, a low density of prehistoric artifacts was noted on the surface of the knoll. Five shovel tests were excavated across the knoll, but they failed to identify subsurface archeological deposits on the landform. Like 41RR261 and 41RR262, this site has a fairly shallow loamy sand A-horizon over a clay B-horizon. The lack of intact archeological deposits, and the sparse archeological materials recovered from 41RR263, indicate that the site does not now have research potential, and further work at the site does not seem warranted.

A systematic artifact surface collection was obtained from 41RR263, because surface visibility was good despite the standing water. However, only a limited array of prehistoric artifacts was present, including 38 pieces of lithic debris, four fire-cracked rocks, four dart projectile points, and a blade fragment of an unidentified arrow point (possibly an arrow point preform). Represented among the dart points were three fairly wide and thick Gary points (Gary *var. Gary*) (see Figure 31g and Figure 34d), and a resharpened specimen with a broad, parallel stem and small barbs (see Figure 34h). Although the number of absolute dates of Archaic projectile points in Northeast Texas is very limited (cf. Story 1990; Fields and Tomka 1993), these darts probably are best indicative of sporadic use of the site during the Late Archaic.

41RR264

This site appears to represent the remnants of a late 19th-early 20th century farmstead. It is located in a flat, plowed field along a dirt road that runs between Salt Well Slough and Pond Creek, and may be associated with the cluster of historic 20th century farmsteads (41RR215, 41RR222-41RR227, and 41RR229) a short distance to the south along Pond Creek; these correspond to a community of tenant farmers reported in the area in the 1920s-1930s (A. E. Roitsch, 1991 personal communication).

Site 41RR264 covers approximately 200 m^2. A small collection of late 19th-20th century ceramic and bottle glass sherds (n=22) was collected from the surface during the TAS survey, including three floral relief-molded whiteware rim sherds (popular after ca. 1870-1880 [see Majewski and O'Brien 1987:155 and Figure 4d-e]), brown snuff glass, and a machine-made brick fragment (see Appendix III). The presence of intact archeological deposits and/or features was not determined as no shovel testing was conducted, but given the deep plowing, the recent age of the deposits, and the basically non-aggrading landform, it is quite unlikely that archeological deposits with any integrity are preserved at 41RR264. Thus, no further archeological investigations are warranted at this historic site.

41RR265

This predominantly late 19th-early 20th century archeological site is on a gently sloping alluvial terrace overlooking the current channel of Big Pine Creek, about 600 m upstream from the confluence of Big Pine Creek and Salt Well Slough. A small amount of lithic debris (n=6) and daub (n=4) denotes the prehistoric use of the landform, probably in Late Prehistoric (Late Caddo?) times. The soil is the Late Holocene black Desha clay alluvial deposit that mantles the Salt Well Slough and lower Big Pine Creek drainage basins.

The site itself covers about 2.5 acres of the alluvial terrace, with a relatively dense concentration of artifacts (faunal remains, bottle glass, refined earthenwares [whitewares], and stonewares) near the crest of the terrace and larger metal objects (i.e., plow parts and horse shoes) at the south end where there are remnants of a concrete barn foundation. Some 369 historic artifacts were recovered from a surface collection at 41RR265, including 10 pieces of animal bone (probably cow).

Among the artifacts are wire nails, horse/mule nails, one horseshoe, two shell casings, 166 bottle glass sherds, and 167 ceramics. Clear, brown, and purple (1880-World War I) bottle glass sherds are most common, along with brown snuff glass (n=10), and hand-applied (ca. 1880) and semi-automatic (ca. 1880-1903) manufactured bottle lips. There are also four aqua paneled bottle glass sherds, and another 18 sherds with embossed markings/lettering; these are from bitters and medicinal bottles made between ca. 1860-1900 (Switzer 1974). Of the 116 whiteware and porcelain sherds, all are plain with the exception of three rims with relief-molded floral motifs. One whiteware maker's mark is from the Goodwin Pottery Co. of East Liverpool, Ohio (1872-1913), and another has the Royal Arms of a British manufacturer (dating after 1837) (Godden 1964; Kovel and Kovel 1986) (Figure 59b-c).

The stoneware sherds are dominated by lead-glazed and salt-glazed pieces, dating generally after 1875, as well as natural clay-slipped sherds. Twentieth century Bristol-glazed stoneware sherds comprise 20 percent of the stoneware sherds, including three sherds with either a lead-glazed or natural clay-slipped interiors (ca. 1875-1920).

No shovel tests were excavated in the dense and saturated black clay, but based on shovel tests and excavations conducted at other sites in this same area, it is conceivable that about 30 cm of archeological deposits are preserved at site 41RR265. If this is an accurate assessment, shovel testing should be conducted at the site to determine the presence and location of intact historic and/or prehistoric archeological deposits and features.

41RR266

Site 41RR266 has both prehistoric and historic archeological remains covering ca. 500 m^2 of an alluvial knoll along an intermittent stream in the Big Pine Creek valley. The site is about 100 m from Big Pine Creek itself.

Both prehistoric and historic archeological materials were visible in eroded areas in a pasture,

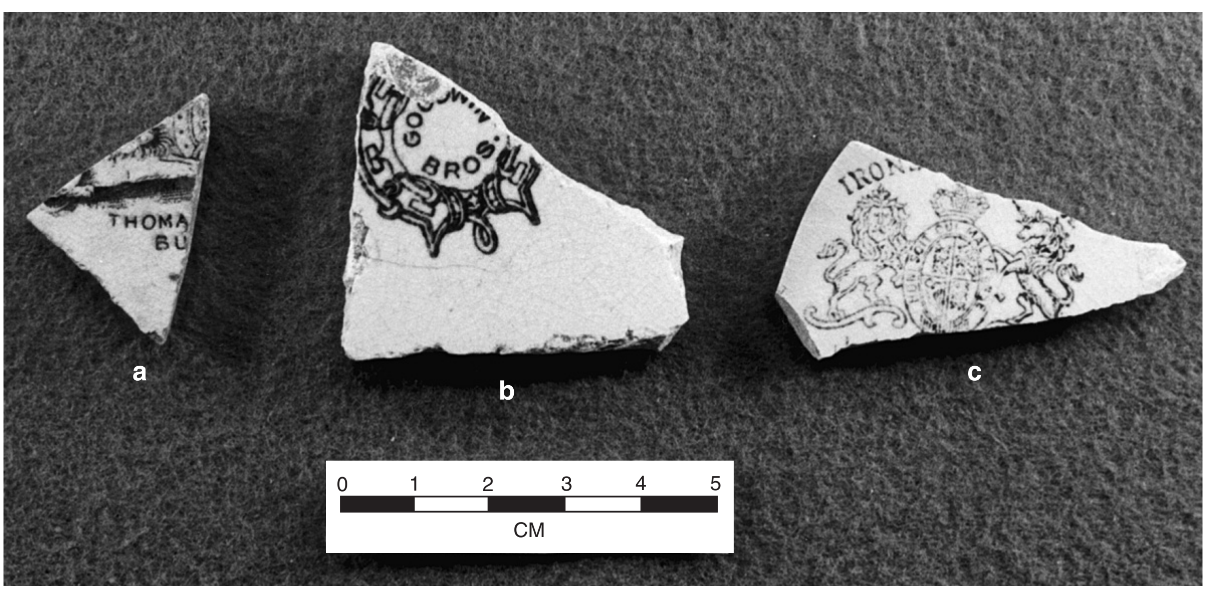

Figure 59. Whiteware Maker's Marks: a, 41RR285; b-c, 41RR265.

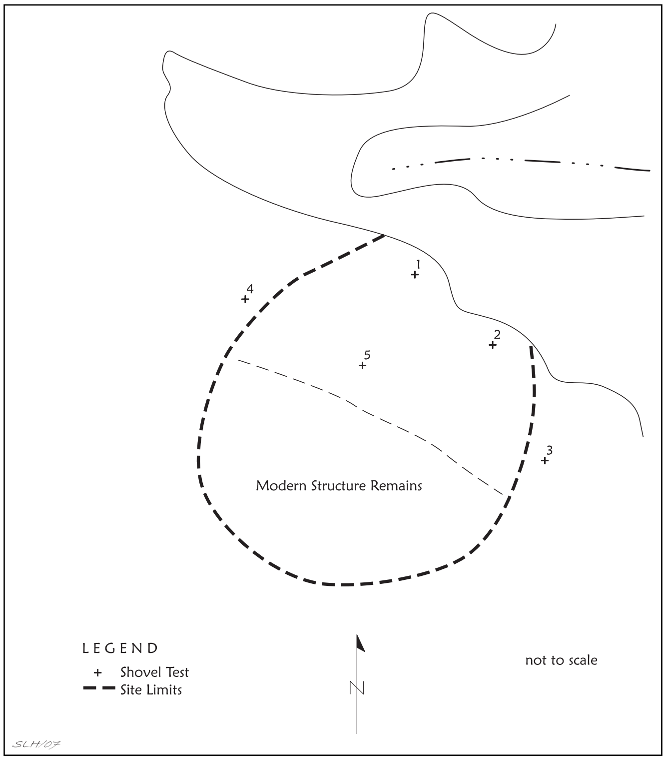

Figure 60. Site Map of 41RR266.

and substantial quantities of 19th century artifacts (pre-1880 in age) were also recovered to depths of 26 cm in limited shovel testing at the northern end of the site (Figure 60). The shovel testing also documented that historic midden deposits are preserved in the sandy loam A-horizon sediments at 41RR266. Modern structural remains (concrete foundations) were noted at the southern end of the site, but no surface collecting activities or shovel tests were conducted in that area.

The prehistoric materials recovered in the surface collection included only two plain sherds (one grog-tempered and one shell-tempered), probably from a sparse pre- and post-A.D. 1300 Caddo use of the Big Pine Creek valley. The historic artifacts (n=73) from the site include six square nails, bottle glass (clear, aqua, and brown; see Figure 45a), refined earthenwares (hand-painted and relief-molded), stone-wares (two salt-glazed/lead-glazed), daub (n=28) probably from a mud cat chimney, and six pieces of animal bone (artifacts from surface collection=36; Shovel Test #1=16; and Shovel Test #2=21). Among the recovered artifacts was a whiteware maker's mark reading "...STONE CH..."

This is clearly an important 19th century historic archeological site in that it contains intact archeological deposits and a midden feature from a relatively early (i.e., pre-1880) Anglo-American farmstead in this part of the Red River valley. Further investigations are certainly warranted in conjunction with the historical, archival, and archeological study of the settlement of the Jonesborough site and immediate region (see Perttula and Reese 2001; Reese 2001). Additional shovel testing should also be conducted to determine if more substantial prehistoric archeological deposits are preserved at 41RR266.

41RR267

Site 41RR267 is situated along a dissected alluvial terrace along the south side of the Big Pine Creek valley, not far downstream from 41RR266. The site itself covers at a minimum about 100 m^2 of the terrace, and was found by the TAS survey crew because of the sparse scatter of prehistoric (one plain shell-tempered sherd and one piece of lithic debris) and late 19th-early 20th century historic (n=15) artifacts on the surface; ground surface visibility ranged between 30-40 percent across the site. The historic artifacts include clear and blue

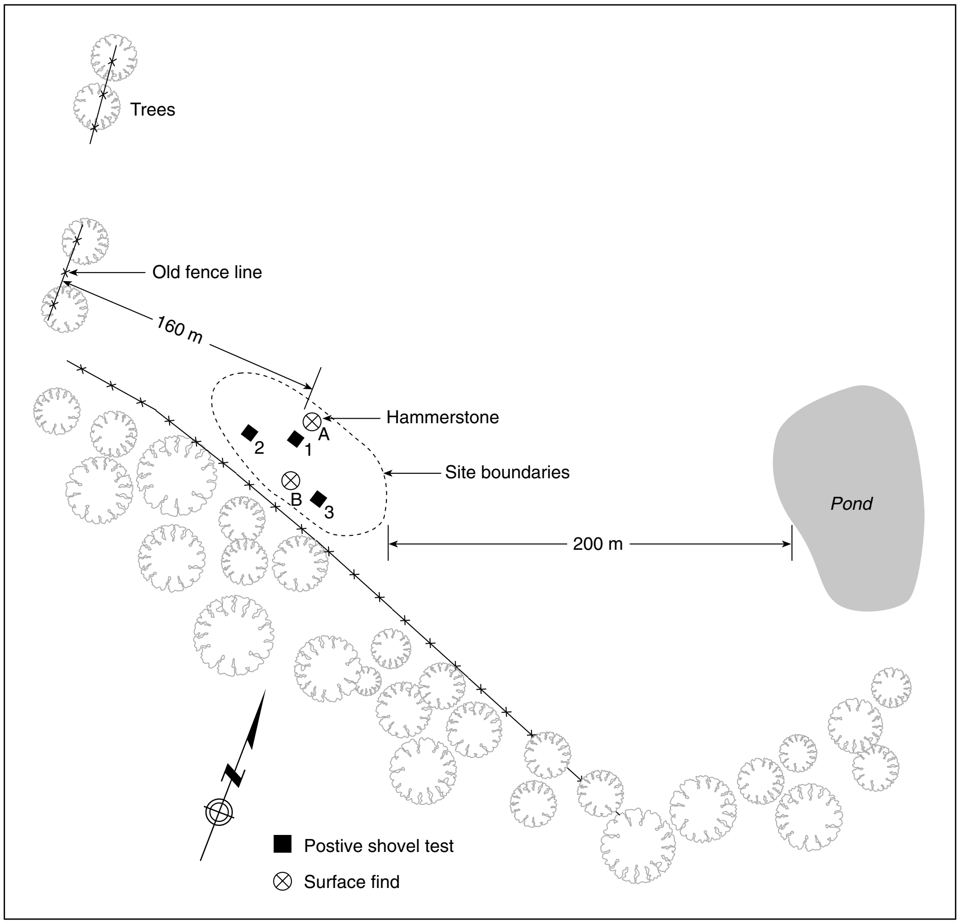

Figure 61. Site Map of 41RR268.

bottle glass, late 19th century clear chimney glass, two glass sherds with embossed markings, and two decorated whiteware sherds (relief-molded and blue transfer-printed)

Five shovel tests were excavated at 41RR267, and two of them contained artifacts in a sandy loam A-horizon between 0-15 cm bs; the A-horizon continued to about 35 cm bs. The first contained a single piece of unidentifiable metal at 5 cm bs, while the other had a plain shell-tempered sherd and one fire-cracked rock between 0-15 cm bs.

Based on the results of both the surface collections and the shovel testing, it appears that the site contains, at best, only sparse surface and subsurface archeological deposits of probable Late Caddo, McCurtain phase and historic late 19th-early 20th century age. No cultural features were noted in the limited investigations, and the depositional context suggests it is unlikely that features will be preserved at 41RR267. The site warrants no further attention at this time.

41RR268

This is a probable small (500 m^2) Late Caddo habitation site located on a knoll of an alluvial terrace along Big Pine Creek. The current channel is about 500 m south of 41RR268, but channel scars in the floodplain of the creek indicate that it flowed much closer to the site at an earlier time. A natural spring is present 200 m east of the site (Figure 61).

Investigations conducted at 41RR268 first included a cursory surface inspection, and one quartzite hammerstone, six pieces of lithic debris, and a Maud arrow point of Ogallala quartzite (see Figure 31c) were collected from the surface. Three shovel tests were excavated at the site to better define the depth and extent of the archeological deposits, and all three contained prehistoric artifacts between ca. 10-50 cm bs in a sandy loam sediment. Recovered in the shovel testing were 11 pieces of lithic debris, 15 shell-tempered sherds, and charcoal fragments (from Shovel Test #3) that probably relate to a Late Caddo period habitation or farmstead. Among the shell-tempered sherds is a plain everted jar rim and a small rim with a portion of an incised line below the lip. There are also three plain grog-tempered sherds from Shovel Test #1, which may or may not be associated with the Late Caddo component at 41RR268.

No features or midden deposits were observed in the limited investigations. However, the depth of the deposit (and its seemingly intact nature), as well as the probable single component Caddo use of the site, strongly suggest that the site has the potential to contain important information on the Late Caddo settlement of the Mound Prairie area. Further investigations (i.e., more shovel tests and controlled test excavations) are warranted at 41RR268 to clarify its integrity, and better determine whether cultural features and significant archeological deposits are preserved at the site.

41RR269

A small surface scatter (600 m^2) of prehistoric lithic debris on the edge of an alluvial terrace of Big Pine Creek marks site 41RR269. Big Pine Creek runs east-west by the site, about 400 m to the south.

Recovered on the surface were six pieces of temporally undiagnostic lithic debris in gopher mounds in an overgrown pasture. Two shovel tests were excavated to depths of 25 cm bs at 41RR269, but neither contained any prehistoric or historic archeological materials. While the possibility exists that subsurface prehistoric archeological deposits may be present below 25 cm (i.e., because the sandy loam A-horizon may be 50 cm or more in thickness), the sparse surface evidence of prehistoric use and the lack of archeological materials between 0-25 cm suggests that 41RR269 does not contain intact and/or interpretable archeological deposits with research value.

41RR270

Site 41RR270 is on a floodplain knoll of Big Pine Creek. The current channel of Big Pine Creek is about 450 m to the north.

The TAS survey conducted very limited investigations at the site, consisting of a cursory surface reconnaissance of the knoll and surrounding area, as well as the excavation of a single shovel test on the knoll itself. One plain shell-tempered sherd, three pieces of lithic debris, and charcoal fragments were recovered in sandy loam deposits between 50-70 cm bs in this shovel test. The presence of buried archeological materials, and the recovery of a Caddo sherd, suggests that a small Late Caddo, McCurtain phase settlement is preserved on the knoll. To investigate the character of the archeological remains from 41RR270, and define the vertical and horizontal extent of the site, further shovel tests should be excavated on the knoll to retrieve this information. In the meantime, we recommend that the site be protected by the landowner.

41RR271

This site has both prehistoric and historic components. It is situated along the edge of an alluvial terrace paralleling Big Pine Creek, about 700 m away, and covers about 20,000 m^2 (5 acres). An old channel of Big Pine Creek is only 130 m to the south of 41RR271.

No concentrations of prehistoric or historic artifacts were apparent on the surface, but surface visibility was poor. Seven shovel tests were excavated at 41RR271; however, no subsurface archeological deposits were identified in any of them. The lack of intact archeological remains means the site likely has no potential to address important Northeast Texas prehistoric and/or historic archeological research problems.

In eroded areas and gopher mounds, however, early 20th century bottle glass, whiteware, stonewares, bricks, and metals were collected (n=60 artifacts), and concrete blocks from a structure were noted at the south end of the site. The bottle glass is dominated by clear and brown glass sherds, one purple (1880-World War I) glass sherd, and a clear glass sherd with embossed letters. The whiteware is plain, except for one late 19th century relief-molded rim. The three stoneware sherds include one Bristol-glazed with cobalt (dated ca. 1920, see Greer 1981), one lead-glazed, and one salt-glazed with an Albany-glazed interior (ca. 1875-1900). There are also four tin can fragments, a metal latch, and a horse/mule shoe. These artifacts probably represent the accumulation of sheet or yard midden deposits around the structure (cf. Moir 1987).

Prehistoric artifacts retrieved in the TAS surface collection include 12 pieces of lithic debris, one Gary projectile point (*var. LeFlore*?), and an unidentified parallel-stemmed dart point fragment of novaculite from a probable Late Archaic or Woodland period use of the alluvial terrace. The landowner's son reportedly found a possible Paleoindian point at the site

TARRANT AND WRIGHT FARM SURVEYS

Bo Nelson, Mike Turner, and Timothy K. Perttula

This section of Part II describes the prehistoric and historic archeological sites identified during a February 1993 archeological survey completed by the Northeast Texas Archeological Society (NETAS), under the sponsorship of the Texas Historical Commission, as an addendum to the 1991-1992 TAS surveys along the Red River (see also Nelson et al. 1995). Ms. Linda Tarrant, who attended the 1991 and 1992 Field Schools, requested that we conduct an archeological survey of the Tarrant Farm lands along the Red River near the mouth of the Kiamichi River to determine if any significant prehistoric and/or historic archeological sites were on the property. Bo Nelson and Mike Turner agreed to lead the survey effort for NETAS, under the supervision of the THC, and complete the site forms for submission to TARL.

While the NETAS survey crews were completing the Tarrant Farm survey, Mr. Richard Wright of the Wright Farm (which immediately adjoins the Tarrant Farm and is located across from the mouth of the Kiamichi River) gave permission for the crews to also examine certain portions of their lands to identify prehistoric and historic archeological sites. This provided an excellent opportunity to locate Caddoan sites that may be associated with the Wright Plantation mound site (41RR7), and possibly identify the ca. 1825 Cherokee village of Tahchee reported to have been on the Red River near the mouth of the Kiamichi River (Everett 1990:34, 51). Early 19th century cultural materials (including European ceramics, gun parts, and glass beads) collected in the 1960s by R. King Harris at Wright Plantation (presently being curated at the Smithsonian Institution, National Museum of Natural History, but photographs of the materials are on file at the Archeology Division at the THC) suggested that archeological remains associated with the Cherokee village may indeed be present on the Tarrant Farm. A limited reconnaissance was thus completed of Wright Farm lands during the 1993 NETAS survey.

During the survey effort, no shovel testing was done at any of the sites at the request of the landowners. Also, at the request of the Wright family, no surface collections were taken at archeological sites on their property; the Tarrant family gave permission for surface collections of samples of prehistoric and/or historic artifacts to be collected from sites on their lands.

41RR285, Tarrant #2

The Tarrant #2 site has both prehistoric and historic components. The site itself sits along the edge of an alluvial terrace overlooking the dissected floodplain at the confluence of the Red and Kiamichi rivers. A small tributary of the Red River, probably a remnant of an old channel or slough of the river, runs at the base of the alluvial terrace about 200 meters from the site.

The site covers about 7200 m^2 of a plowed field on the alluvial terrace, and surface visibility in the plowed field was about 80 percent. No particularly notable concentration of either prehistoric or historic artifacts were identified during the NETAS survey.

Two prehistoric components are present at the site, the first a probable Formative or Early Caddo occupation marked by lithic debris, cores, fire-cracked rocks, two flake tools, and 20 plain grog- and grog/bone-tempered ceramics. The Caddo component probably represents one of many farmsteads that were once dispersed in the Red River valley along elevated landforms with arable soils. Further investigation of this Caddo component is warranted to determine if contextually intact archeological deposits and features are preserved at the site that may contain important research information.

Most of the artifacts visible on the surface of the plowed field are from a ca. 1870-1950 historic farmstead. The Kiomatia 7.5' 1951 USGS topographic map indicates a farm structure was present at 41RR285, although no structural remains were observed in the plowed field. The types of artifacts present at the farmstead include: plain whitewares and ironstones, one flown blue whiteware sherd, ironstones with embossed or relief-molded rims and decalcomania decorations, thick window glass, machine-made bricks, plow parts, cast iron stove or kettle parts, one metal overall button ("ROUND HOUSE"), a wide variety of purple, clear, blue, and green bottle glass, and sherds from salt-glazed, lead-glazed, Albany-glazed, and Bristol-glazed stoneware crocks and jars (see Figure 40e; see also Appendix IV). One whiteware maker's mark with a Royal Arms and "...THOMA..." can only be dated to after 1837 (Godden 1964) (see Figure 59a).

41RR286, Tarrant #3

The Tarrant #3 site is also located along the edge of the Holocene alluvial terrace (demarcated by the 390 foot contour interval) that cuts across the Tarrant and Wright Farms. It covers about 2730 m^2 of the plowed portion of the landform, and site surface visibility was excellent.

Most of the prehistoric artifacts probably relate to a Late Archaic and/or Woodland period occupation, as indicated by one Gary, *var. Gary* dart point on Ogallala quartzite, another dart point preform, lithic debris (n=16), a fire-cracked rock, one core or tested cobble, and one hammerstone. The recovery of four relatively thin and plain grog-tempered sherds, as well as another grog-tempered body sherd with an exterior red slip (probably Sanders Plain), suggest that a small Middle Caddo Mound Prairie phase component is also present at the site. Shovel tests should be conducted at the site to determine the character of the prehistoric archeological deposits.

A ca. 1890-1940 historic occupation, probably a tenant farm, at the Tarrant #3 site is represented by plain whiteware and ironstone ceramics (n=13), two whiteware sherds with decalcomania, fruit jar milk glass lid liner fragments (n=2), machine-made brick fragments, and machine-made clear, purple, aqua, green, and brown bottle glass (n=9). The 1951 USGS 7.5' topographic map depicts a structure in the same location as 41RR286.

An earlier historic occupation is also present at the site that is roughly estimated to date between ca. 1830-1860. It contains decorated whitewares (n=11), including blue and red transfer-printed, blue shell-edged (with an even scalloped rim, dating ca. 1810-1835; see Hunter and Miller 1994:Plate V), and blue broad-line hand-painted (see Figure 35d, g), and dark olive green wine bottle glass (n=1). There are also two lead-glazed redware sherds, which according to Green et al. (1996:467, 469) "is extremely rare in nineteenth century archaeological assemblages from northeastern Texas and it generally [was] replaced [by] stoneware by 1850."

Because of the small artifact sample size from this component, none of the early-mid-19th century artifacts recovered from the site can be definitively linked with either the Cherokee Village or with an Anglo-American farmstead related to the settlement of the Wright Plantation (Steely 1982). Clearly, however, this early component warrants further investigations (e.g., shovel testing and controlled excavations) to determine if intact archeological deposits can be identified, and hopefully retrieve additional artifacts and/or features that can unravel the ethnic and cultural affiliation of the site occupants.

41RR287, Tarrant #4

The Tarrant #4 site is a short distance north of 41RR286 along the alluvial terrace landform; the tributary stream or slough/old channel is ca. 150 m to the west below the base of the terrace. The site is in a plowed field, and based on the surface distribution of prehistoric and historic artifacts, it covers approximately 4100 m^2.

A probable single prehistoric component of Woodland period age can be discerned in the surface collections from the site. It contains lithic debris (n=4), a tested cobble or core, and several pieces of fire-cracked quartzite cobbles, along with a single grog-tempered body sherd.

The Tarrant # 4 site also was occupied in historic times, with the predominant use of the site between ca. 1890-1940. This occupation, probably that of a tenant farmstead, is characterized by large quantities of plain whiteware, porcelain, and ironstone sherds (n=101), fiesta ware, decalcomania and relief-molded whiteware sherds, ceramic fruit jar lid liner sherds (n=13), lead-glazed stoneware, ceramic (see Figure 55b) and glass marbles, a porcelain animal figurine fragment, and clear, brown, aqua, blue, and purple bottle and snuff glass (n=155). Three transfer-printed whiteware sherds (blue, red, and maroon; see Figure 35c, e), and one flown blue decorated sherd, as well as salt-glazed stoneware (n=7), indicate that the site was also used sometime between about 1830-1860; it is not possible to be more specific given the small and relatively undiagnostic nature of the decorated whiteware recovered in surface collections from the site. Future subsurface investigations (i.e., systematic shovel testing) could prove profitable if intact Antebellum archeological deposits can be located on the Tarrant #4 site.

41RR288, Tarrant #5

This is a large (ca. 12,100 m^2), multi-component prehistoric and historic site on an alluvial terrace that borders a small stream (slough or old channel) that flows northeast into the Red River. The site is in a plowed field, and surface visibility was excellent.

The main component at the Tarrant #5 site probably dates to the Late Archaic period, based on the recovery of a Gary, *var. Gary* dart point (cf. Schambach 1982) and six large Gary bifacial preforms (see Figure 31h). Other kinds of prehistoric artifacts likely associated with this Late Archaic occupation include six other bifacial preforms and tool fragments, hammerstones (n=2), mano fragments (n=2), sandstone and quartzite fire-cracked rock (n=43), many cores, core fragments, and tested cobbles (n=12), retouched pieces, scrapers and drills (n=14), and probably most of the 299 pieces of lithic debris gathered in the site surface collection. Later Caddo occupations in the middle Red River region usually contain low numbers of lithic tools, other than arrow points and celts (see Perttula, ed., this volume; Perttula et al. 2001), and the observed density of lithic debris at Tarrant #5 is more comparable to that documented at Archaic and Woodland period sites.

This is not to say that the site was not occupied by Caddo peoples. A small sample of shell- and grog-grit-tempered ceramics (n=28) were collected from the site, along with one Maud arrow point (see Figure 31d) and two unidentifiable arrow point fragments (all of Red River gravel cherts). The Maud arrow point and the shell-tempered sherds (one red-slipped, one parallel incised and eight plain body sherds) are indicative of a Late Caddo, McCurtain phase component, while the plain and relatively thin-walled grog-grit-tempered ceramics (n=18) denote a Caddo occupation that is presumed to predate ca. A.D. 1300.

Finally, the Tarrant #5 site was used in historic times, after about 1890 to probably the mid-20th century (like many of the other sites in the NETAS survey area with historic period components). No structural features were observed at the site, and the functional or occupational context of the material is unknown, but a small amount of historic plain whiteware sherds, clear, purple, aqua, amber, and blue bottle glass, a milk glass fruit jar sherd, and a metal plow part (n=20) were collected from the plowed field.

Both the Late Archaic period and Caddo components at Tarrant #5 have the potential to contain intact archeological deposits. A program of shovel testing would be particularly useful in determining the character and preservation condition of these deposits, and in assessing the research significance of the prehistoric archeological record at the site. The relatively recent historic component at the Tarrant #5 site does not warrant further investigations.

41RR289, Tarrant #6

The Tarrant #6 site is located in a plowed field a short distance to the north of 41RR288 along the same alluvial terrace of the Red River. The small tributary stream or slough of the Red River is about 200 m west of the site.

This site covers approximately 4200 m^2, based on the surface distribution of artifacts in the plowed field. Both prehistoric and historic artifacts were recovered in the surface collections from Tarrant #6, and they indicate that the site was occupied in prehistoric times during the Late Archaic, Early-Middle Caddo, and Late Caddo periods, and then also in the late 19th-early 20th century.

The Late Archaic component includes one Gary *var. Gary* dart point and another Gary *var. LeFlore* point (see Figure 31e), and probably much of the lithic debris (n=65), cores (n=3), a bifacial tool fragment (n=1), and fire-cracked rock (n=4) in the surface collection. A quartzite gouge fragment probably is part of the Late Archaic artifact assemblage. The Early-Middle Caddo period component is represented by 23 grog and grog-bone tempered ceramics, including two red-slipped Sanders Plain body sherds, one diagonally incised body sherd, and a plain rim. Four plain shell-tempered body sherds constitute the sum total of a Late Caddo, McCurtain phase occupation at the Tarrant #6 site. Further investigations of these prehistoric components are warranted to ascertain whether any of the components contain horizontally or vertically discrete archeological deposits and features.

Only 14 historic artifacts were collected from this site, including plain whiteware (n=5), one blue transfer-printed whiteware sherd, one sherd from an Albany-glaze stoneware crock, clear, aqua, and purple bottle glass, one porcelain button (4-hole), and milk glass fruit jar lid fragments. While the sample of artifacts is small, they are consistent with historic use of the site from ca. 1860 to the early

20th century. No structural features were noted at the Tarrant #6 site during the investigations, and the 1951 USGS 7.5' quadrangle does not indicate a structure or farmstead at this location. It is possible that if there was a structure or farmstead at the site around the turn of the 20th century, it had already been destroyed or dismantled before 1951. One aspect of further archeological investigations of the prehistoric components at the site should be to determine if intact late nineteenth-early twentieth century archeological deposits are present.

41RR290, Tarrant #7

The Tarrant #7 site is another multi-component prehistoric and historic archeological deposit located along the margins of a Red River alluvial terrace. It overlooks a small tributary or slough of the Red River that is 200 m north of the site. The site area (ca. 2500 m^2) has been plowed, and surface visibility was excellent (about 80 percent visibility at the time of the survey).

Both Early-Middle and Late Caddo period occupational debris is present on this part of the alluvial landform, principally plain and decorated pottery sherds (n=63). A small amount of lithic debris (n=36) and a multiple platform quartzite core were also collected from the site, along with four unifacial flake tools of jasper, claystone/siltstone, and quartzite raw materials. About 60 percent of the Caddo pottery is grog, grit, and grog-bone tempered, which we consider to be of Early to Middle Caddo period age, and there are three decorated sherds: a single engraved line on a body sherd; a horizontal punctated rim; and a direct or standing rim with a vertical incised line. There is one plain rim, standing with a rounded lip.

Of the 24 shell-tempered sherds, one has punctated designs (cf. Emory Punctated-Incised) (see Figure 56f), three body sherds are red-slipped on interior and exterior surfaces (probably from either what Flynn [1976] refers to as Clement Redware or what Perino [1981] refers to as Roden Ware), and one is from an Avery Engraved bowl. A standing rim sherd has a single horizontal trailed line below the lip (see Figure 38c), and there is a shell-tempered handle sherd (probably from a Nash Neck Banded or Emory Punctated-Incised jar) with short vertical incised lines. A McCurtain phase component is indicated by this cultural material.

Historic artifacts are abundant at the Tarrant #7 site, and they appear to be yard sheet midden deposits associated with a now-abandoned farmstead. Although no structural features or foundations were visible at the surface during the survey, a structure is shown at this location on the 1951 Kiomatia 7.5' topographic quadrangle. The historic artifacts noted and/or collected at the site include: plain whitewares and ironstone (n=57); milk glass fruit jar lid liner fragments (n=11); clear, aqua, purple, amber, and blue bottle glass (n=75); one porcelain 4-holed button and a brass overall brad; a 20th century shell casing ("PETERS"); six machine-made brick fragments; and Albany and Bristol-glazed stoneware sherds (n=13). In aggregate, they indicate an occupation from ca. 1870 to at least the 1930s.

The Caddo archeological materials identified at the Tarrant #7 site probably represent the remains of farmstead compounds dispersed along elevated, arable lands in the Red River alluvial valley. If they are from preserved habitational context, their investigation could contribute significant information on Caddo lifeways in the Red River area of Northeast Texas. Also of possible significance, Late Caddo McCurtain phase occupations like that at Tarrant #7 are not common upstream from the Roitsch site, and the confluence of the Red and Kiamichi rivers seems to generally mark the western distribution of McCurtain phase settlements along the Red River (see Bruseth 1998). McCurtain phase settlements are present, however, in the Kiamichi River valley at least as far north as Hugo Lake in Choctaw County, Oklahoma (Rohrbaugh 1973), and at the Fasken site a short distance upstream on the Red River from its confluence with the Kiamichi River (see Prikryl, this volume). Shovel testing is thus warranted to determine if intact Caddo archeological deposits are present at the site.

No recommendations are offered at this time for further work on the relatively recent historic period occupation of the site. An Historic Context should first be developed for historic Anglo- and African-American farmsteads and tenant farm archeological sites in the Red River valley, as this will specify the important research problems and issues that will help determine if historic occupations on archeological sites like Tarrant #7 have significance.

41RR291, Tarrant #8

The Tarrant #8 site is located along a farm road that runs in a loop from FM 410 to the margins of the alluvial terrace bisecting the Tarrant and

Wright farms, joining up with FM 410 by the Wright Plantation site (41RR7). The site is in a plowed field near the edge of the alluvial terrace, overlooking the wooden slopes and a slough of the Red River in the current Red River floodplain, and artifacts were observed in the farm road bed.

Both prehistoric and historic archeological materials were collected from Tarrant #8, which covers an area of about 1550 m^2, although no particular concentrations of artifacts were noted associated with either occupation. The prehistoric component probably dates to the Early-Middle Caddo period, as it contains thin and well-made grog- and grog-bone tempered pottery sherds, which are characteristic of this period in the Middle Red River drainage. Twelve pieces of lithic debris were also observed that may be associated with this component.

The historic period component dates from about the turn of the 20th century to ca. 1950, based on the clear bottle glass sherds from machine-made bottles, plain ironstones and whitewares, Bristol-glazed stonewares, and fruit jar sherds, as well as information from the 1951 Kiomatia 7.5' quadrangle that indicates a structure stood in this location. No surface evidence of structural or foundation remains was noted during the survey, however, but it is presumed that the recovered artifacts reflect yard sheet midden deposits.

The possibility that the prehistoric archeological deposits at the Tarrant #8 site represent a single component Early-Middle Caddo occupation, which are relatively rare in the Middle Red River region (e.g., Bruseth 1998), suggests that additional investigations are warranted. A program of shovel testing across the site area would be useful in ascertaining whether preserved archeological deposits and features remain that could contribute important information on Caddo lifeways. The historic period component represents another in a series of fairly recent farmsteads (tenant farms?) on the old Wright Plantation. As discussed above, their historical research potential is equivocal.

41RR292, Tarrant #9

The Tarrant #9 site is on a low, narrow, natural levee deposit that runs parallel to a slough or small tributary of the Red River; the slough is about 20 m south of the site. The natural levee is situated on Red River floodplain deposits, and the higher alluvial terrace (upon which are found many of the previously described archeological sites recorded during the survey). The site covers approximately 4130 m^2 of the natural levee, which had been plowed prior to the survey.

Prehistoric artifacts recovered from the Tarrant #9 site include a small amount of lithic debris (n=53), 1 metate fragment, 12 fire-cracked rock, a bifacial tool fragment, and 31 shell-tempered sherds. Among the shell-tempered sherds were two with interior/exterior red-slipping, one Nash Neck Banded body sherd, one with a single engraved line, and another sherd with part of an appliqued ridge on it. The latter sherd may be from either a Nash Neck Banded or Emory Punctated-Incised jar (cf. Perino 1994:Figure 7). The ceramics from the site clearly are from a single component Late Caddo, McCurtain phase occupation (it is not conclusive that the lithic artifacts are also part of the McCurtain phase archeological deposit), probably a small residential occupation. As previously discussed, a few single component Late Caddo habitation sites were recorded during the TAS survey of the Roitsch farm, but the Tarrant #9 site appears to represent the westernmost unmixed McCurtain phase occupation in this stretch of the middle Red River.

Site 41RR292 is also interesting in comparison with the other prehistoric sites documented in the Tarrant and Wright Farms survey in that it appears to have been occupied only during the Late Caddo McCurtain phase; the landform the site is on is also different. No evidence of a preceding prehistoric use of the site, or of historic Anglo- or African-American settlement, was observed in our investigations; this obviously contrasts with the multi-component nature of almost all the other sites identified during the survey. To better understand the nature of Caddo settlement during the Late Caddo period in the middle Red River region (e.g., Bruseth et al. 1991, 1992; Bruseth 1998; Perttula, ed., this volume), it is important that both the large and small sites (i.e., the village, such as the Roitsch site, as well as the single farmstead compounds) be identified and investigated for their archeological research potential; the Tarrant #9 site seems to represent one of the smaller farmstead compounds. Further investigations are warranted to determine if the Tarrant #9 site contains intact archeological deposits and features from the McCurtain phase occupation.

41RR293, Tarrant #10

The Tarrant #10 site is situated on another patch of plowed, low, natural levee deposits in the Red

River floodplain, about 90 m to the north-northeast of the Late Caddo Tarrant #9 site. The slough is about 30 m to the northeast of the natural levee.

A low density scatter of prehistoric artifacts covers approximately 4080 m^2 of the natural levee landform, based on the surface distribution of artifacts in the plowed field. Artifacts noted on the site include fire-cracked rock (n=11), lithic debris (n=7), and plain Late Caddo shell-tempered pottery sherds (n=2). Although smaller than the artifact assemblage from the adjoining Tarrant #9 site, the types of artifacts recovered at the Tarrant #10 site are quite similar. It is possible that the latter site simply represents one part of a larger McCurtain phase farmstead compound dispersed across natural levee deposits in this stretch of Red River floodplain. The low density of artifacts suggests that the McCurtain phase occupation was neither intensive, nor prolonged, perhaps nothing more than a single structure or a outdoor work/trash disposal area associated with structures in another nearby part of the floodplain.

Because the Tarrant #9 and #10 sites may be part of a related Late Caddo occupation, the Tarrant #10 site warrants additional work to determine the nature of any preserved Late Caddo archeological deposits. A systematic surface collection after a fresh disking of the natural levee may also prove worthwhile in defining particular areas within the site where intact archeological deposits and features (i.e., structures and middens) may be located.

41RR294, Wright #2

The Wright #2 site is located on a high alluvial terrace (400 feet amsl) along the east side of the Red River. It is a short distance north of the Wright Plantation (41RR7) mound site.

An old channel or slough of the river runs immediately below the terrace. The site was discovered when a small number of prehistoric and historic artifacts were observed in and immediately adjacent to a road bed that runs along the alluvial terrace; the boundaries of the site were not determined because the immediate area was forested and this limited the surface visibility accordingly.

Artifacts observed at the Wright #2 site include a small number of prehistoric lithics (n=6) and plain ceramics (n=2), along with ca. 1870-1900 plain whitewares and ironstones (n=20, including one with a partial mark "CHINA"), salt-glazed and Albany-lead glazed stonewares (n=5), and aqua, amber, and amethyst bottle glass sherds (n=7). Among the prehistoric lithic artifacts are five pieces of lithic debris (Red River yellow jasper, cherts, and metaquartzite) and a bifacial scraper of Red River gravel chert. The prehistoric ceramics include both plain shell-tempered and grog-tempered wares, which may imply different periods of Caddo use of the site, while the domestic artifacts from the historic component suggest that a farm structure was present at the site in the late 19th and early 20th centuries; no trace of historic features or foundations was noted during the investigations.

Further surface inspection of the site area, in conjunction with shovel testing in wooden areas along either side of the dirt farm road, is warranted to first determine the spatial boundaries of the different archeological components. Following this, it will be important to determine if either the prehistoric or historic components contain intact archeological deposits, and thus have the potential to address important regional research problems.

41RR295, Wright #3

Prehistoric and historic artifacts at the Wright #3 site are apparently confined to a small 10 x 20 m natural rise on the high alluvial terrace east of the Red River and south of the Kiamichi River confluence. The area is not currently plowed, and ground surface visibility is poor (10-20 percent), but a handful of artifacts were noted in exposed and eroded areas of the rise.

Two bifacial tool fragments (one of an unidentified chert and the other of Big Fork chert, both probably materials found in local Red River gravels) comprised the prehistoric artifacts exposed on the rise. They likely represent stem portions of broken Archaic-style projectile points, but their small size prohibits further determinations of tool type and/or function.

Both pre-1860 and post-1880 historic materials were noted at the Wright #3 site. The antebellum artifacts include one dark olive green wine bottle sherd and a green transfer-printed whiteware sherd. The later historic artifacts include plain whiteware (n=3, all burned) and porcelain (n=1) sherds, two ironstone sherds with royal crest maker's marks (dating after ca. 1880 [see Godden 1964]), a porcelain body sherd with decalcomania, and a whiteware rim sherd with a red stencil decoration. One of the maker's marks also has "CLEM... E...," and may be from a Clementson Bros. (Ltd.) vessel made between ca. 1865-1916 (Godden 1964).

Further archeological investigations at the pre-1860 historic component, such as shovel testing and systematic surface collections, could prove informative in determining whether preserved archeological deposits and features are present at the site. If such archeological remains are preserved, they may contain a wealth of information on antebellum lifeways in the Red River valley of northeastern Texas, as few sites of this period of time have been identified and/or investigated in the region. No further investigations are recommended at the present time for the Archaic or post-1880 archeological components at the Wright #3 site.

41RR296, Wright #5

The Wright #5 site is located on the high alluvial terrace (above 400 feet amsl) not far north of the Wright Plantation (41RR7) site, and immediately adjacent to the current channel of the Red River. The terrace is in pasture, and surface visibility is poor (10-20 percent), but a small amount of prehistoric and historic artifacts were noted over about 2400 m^2 of the landform.

The prehistoric occupation of the Wright #5 site is marked by three pieces of lithic debris (two of Red River chert gravels and the third of novaculite), a flake tool (Red River chert), and two broken bifaces (quartzite and Red River chert) observed on the site surface. Their temporal or cultural affiliation is unknown, but probably Archaic. The historic archeological materials observed includes: one lead bullet (.32 cal), one plain whiteware body sherd, three sherds of porcelain (including two from the same vessel with blue transfer printing, see Figure 35b), four sherds of decalcomania (including one rim), one blue transfer-printed whiteware, and ironstone sherds. These probably represent artifacts discarded in a yard sheet midden from a late 19th-early 20th century farm house. The 1951 Kiomatia 7.5' USGS topographic quadrangle depicts a structure and barn in this general location, but no structural or artifactual remains were noted that pertain to a 1940s-1950s historic occupation. At this time, we do not recommend any further investigations at the Wright #5 site.

41RR297, Wright #4

The Wright #4 site sits on a flat alluvial terrace a short distance east of the Wright Plantation site and historic farm complex (41RR7). It is along the edge of a plowed field, and FM 410 runs immediately to the south of the site while a dirt road runs through the general site area. An abandoned frame farm house still stands at the site, and the Kiomatia 7.5' topographic map indicates that the farm house was occupied in 1951.

The principal occupation of the site occurred from about the turn of the 20th century to ca. 1950, probably as a tenant farm. Historic ceramics, bottle glass, and fruit jar lid sherds are distributed across a few bare surface areas to the immediate north of the house, which ended up there because of trash discarded in the backyard to the farm house. Most of the historic ceramics are plain whitewares and ironstone sherds (n=42), along with a few sherds (n=3) decorated with decalcomania and rim relief molded (floral and ribbed). Bristol-glazed stoneware crockery sherds (n=2) were also noted in the yard sheet trash deposit, along with one salt-glazed/lead-glazed sherd. Machine-made (post-1904) purple and brown bottle glass (snuff containers) were also identified in the surface artifact scatter, along with post-1920 Mason jar milk glass lid sherds. We do not recommend further investigations of this 20th century farmstead at this time.

The Wright #4 site also has a minor prehistoric component. Three pieces of temporally and culturally undiagnostic lithic debris were noted in one of the bare surface areas, mixed in amidst the much more recent historic artifacts. Unless prehistoric archeological deposits are buried below the plow zone, or below depths disturbed by the historic use of the site, it is unlikely that intact prehistoric archeological remains are still preserved at the site. Limited shovel testing could be conducted in the general site area to evaluate the potential for such buried remains to be preserved, and assess their potential to contain features or other important deposits.

41RR298, Tarrant #1A

The Tarrant #1A site was exposed in a dirt path on a low sandy loam terrace landform north of a slough or intermittent tributary of the Red River. The dirt path has been used by cattle, and as a farm road, and these activities have caused sufficient erosion to expose prehistoric cultural materials.

Plowed fields are also present on either side of the road, and surface visibility in these areas is good (about 70 percent).

The site consists solely of a scatter of prehistoric lithic debris covering an area of unknown size on the terrace. No prehistoric artifacts were collected from the site, and more specific information about the debris (i.e., such as raw material, size, heat-treatment, presence of bifacial thinning flakes, etc.) is not available that might permit more definitive statements about the temporal and/or cultural affiliation of this material. Because so little is known about the site at present, we recommend a program of shovel testing be carried out to determine whether any intact prehistoric archeological deposits are present at the site, and if they have any potential to contain cultural features or other significant remains (i.e., preserved plant or animal remains).

41RR299, Wright #6

The Wright #6 site is currently eroding into the Red River, which is changing its course. It is located along the margins of the high alluvial terrace (the location of the Wright Plantation mound site) at an elevation between 380-385 feet amsl, and the course change of the river is cutting into the terrace deposits themselves.

Both prehistoric and historic artifacts were observed in eroded areas along the edge of the terrace. This consisted of prehistoric lithic debris and historic whiteware and bottle glass. No artifacts were collected at the request of the landowner, and no notes were taken describing the specific kinds of prehistoric and historic artifacts present at the site; thus, no discussion of the possible age or cultural affiliation of components or occupations is possible. We do recommend that a program of shovel testing be conducted at Wright #6 to evaluate the condition of any intact archeological deposits, and surface collections should be secured to permit more confident assessments of its age and character. The bank erosion should be monitored on a regular basis to make sure that possibly important archeological deposits and/or features are either not actively eroding into the river, or are not being threatened by imminent erosion.

41RR300, Wright #7

The Wright #7 site is in a cultivated field on an eastern extension of the high alluvial terrace (above 400 feet amsl) of the Red River. Surface visibility on the terrace was good (50-60 percent), and abundant amounts of prehistoric lithic and ceramic artifacts from a Caddo occupation were observed on the surface south of a dirt farm road.

As the landowner did not wish any artifacts to be collected from the site, and only a cursory reconnaissance was completed, we were not able to collect any specific information on the kinds of prehistoric artifacts present at Wright #7. Given the relatively dense archeological deposit exposed in surface contexts, we presume that a Caddo habitation locale (the specific cultural period [e.g., Story 1990:334] is not known) is present at this place on the high alluvial terrace. Whether it contains intact archeological deposits has not been ascertained, and thus we recommend that systematic shovel testing be conducted to determine the nature of the Caddo occupation at the Wright #7 site.

41RR301, Wright #8

The Wright #8 site is much like Wright # 7 in that it is located on the eastern arm of the high (400 feet amsl) alluvial terrace of the Red River, and it also contains in plowed surface contexts abundant Caddo lithic and ceramic artifacts. The specific prehistoric cultural period(s) when the site was occupied is again not known. With landowner permission, a program of shovel testing and systematic surface collection could be conducted that would ascertain whether the Wright #8 site contains intact archeological deposits, and whether these deposits have research significance.

41RR302, Wright #9

Prehistoric lithic debris was noted during the NETAS survey of the Wright Farm on the eastern side of a low (380 feet amsl) alluvial terrace. The terrace had been plowed, and visibility was good (50-60 percent), thus exposing a surface scatter of lithic artifacts. The size or depth of the site was not ascertained in our investigations, and at the request of the landowner no surface collections of prehistoric artifacts was made. We recommend further investigations at the site to specifically determine if it possesses research significance.

41RR303, Wright #10

'The Wright #10 site contains both prehistoric and historic components. It is located along FM

410, about midway between the Wright Plantation farm complex and the Kiomatia School (a structure is shown on the 1951 Kiomatia 7.5' USGS map, but is no longer present).

The historic component probably spans the period from ca. 1900-1950, based on the ages of most of the other historic farmsteads on the Tarrant and Wright farms, its location on FM 410, and the fact that a structure is shown at this location on the 1951 USGS quadrangle; no structure or structural remains are present at the site today. While specific details are not available on the artifacts, clear, purple, and brown bottle glass, plain whiteware, and machine-made brick fragments from yard sheet trash were abundant at the Wright #10 site. This historic occupation at the site does not warrant further archeological investigations.

This site also apparently has a prehistoric Caddo occupation(s), mixed with the 20th century farmstead materials, based on the large amount of lithic and ceramic artifacts exposed on the surface. We suggest that a Caddo farmstead compound may have been present at the site, and recommend a program of shovel testing to determine its horizontal and vertical site boundaries, as well as whether it contains any intact archeological deposits.

41RR304, Wright #11

Both prehistoric and historic artifacts were noted at the Wright #11 site, which is located in a plowed field on the 400 foot alluvial terrace several hundred meters north of the Wright Plantation site (41RR7), and immediately east of the current channel of the Red River. The 1951 Kiomatia 7.5' USGS quadrangle indicates that a historic house and barn stood at this location, but no structural remains or foundations were observed during the NETAS reconnaissance of the site. Historic bottle glass and ceramics are common at the Wright #11 site, and these presumably represent 20th century domestic artifacts that had been discarded in yard sheet trash deposits near the house. We recommend no further work on the historic component of the site at this time.

Prehistoric Caddo lithic and ceramic artifacts were present in abundance at this site. Given the apparent density of Caddo artifacts, these may represent the archeological remains of a Caddo farmstead compound, but shovel testing would have to be conducted to determine if the Wright #11 site contains preserved archeological deposits and cultural features (i.e., middens, structures, and pits) expected on a site of this kind.

41RR305, Wright #1

The Wright #1 site is located on a small rise on a remnant of a low sandy loam terrace deposit (380 feet amsl) some 300 m east of the current channel of the Red River. Most of the other archeological sites in the Tarrant and Wright surveys either are found along the edge of the 390 feet amsl terrace that cuts across the farms, or are on the 400 foot terrace to the south and west; the Wright Plantation mound site (41RR7) occurs on this higher terrace. The low terrace has been partially plowed, and surface visibility on the site was about 50 percent.

Based on the surface distribution of artifacts on the terrace, the Wright #1 site covers approximately 2100 m^2. Both probable Middle and Late Caddo period components can be identified from the prehistoric artifacts noted on the site, and the probable Middle Caddo component appears to have been the principal prehistoric occupation. The kinds of artifacts comprising the probable Middle Caddo occupation include 55 grog and grog-bone tempered sherds, 50 of which were plain (including a plain rim). The decorated sherds include four red-slipped Sanders Plain body sherds. The scatter of lithic debris (n=51) and fire-cracked rocks (n=3) may also be part of the Middle Caddo period artifact assemblage. The Late Caddo use of the Wright #1 site is denoted by two plain shell-tempered body sherds.

A small amount of historic artifacts were also noted on the surface of the site, but no historic structural remnants or features were present on the terrace. Blue hand-painted (see Figure 35h) and blue shell-edged whiteware (n=3) indicates that the initial historic occupation of Wright #1 occurred between ca. 1830-1860. This occupation may be related to the early Anglo-American settlement of the Wright Plantation area (cf. Steely 1982). Machine-made brick fragments, ironstone china, and clear and brown bottle glass bespeak a later historic occupation, one probably dating roughly from the turn of the 20th century.

There is a possibility that the Wright #1 site contains intact Middle Caddo period archeological deposits from a farmstead compound, as well as perhaps a small Late Caddo component. Accordingly, we recommend that systematic shovel tests be excavated at the site to determine its horizontal and vertical boundaries, to assess the subsurface character of the archeological deposits, and evaluate the site's potential to contain cultural features (i.e., middens, pits, and structures, etc.). Completing this shovel testing effort should also be sufficient to determine the condition and character of any preserved 1830-1860 archeological deposits.

SURVEY RESULTS FOR THE TARRANT AND WRIGHT FARMS

Twenty-two prehistoric and historic archeological sites were recorded or are present on the two farms (including the Wright Plantation site). Most of the sites (68 percent) are located along the edges of two Holocene alluvial terraces (at elevations of 390 and 400+ feet in elevation, respectively) paralleling the course of the Red River, and the remainder (all dating after ca. A.D. 1200) are on low natural levee/terrace deposits of Late Holocene to recent age about 3 m above the flow of the river. A small tributary or slough of the Red River runs immediately adjacent to this landform. The sites range in age from the Late Archaic (ca. 2000-200 B.C.) to the 1950s, but most appear to have been occupied either late in the historic era (ca. 1890-1950) or by Caddo groups in prehistoric times (i.e., from ca. A.D. 800-1600).

Late Archaic period components were recognized at five archeological sites, 60 percent on the 390 foot alluvial terrace, and the other two sites on the 400 foot alluvial terrace (Figure 62a). Archeological deposits at these Late Archaic sites include large quantities of lithic debris (from Ouachita Mountains cherts and quartzites in Red River gravels), thick and broad Gary dart points and large Gary bifacial preforms, hammerstones, manos and pitted stones, many cores and tested cobbles, retouched pieces, scrapers and drills, as well as fire-cracked quartzite and sandstone cobbles from hearths and cooking features. We interpret these sites to primarily represent the seasonally-occupied residential sites

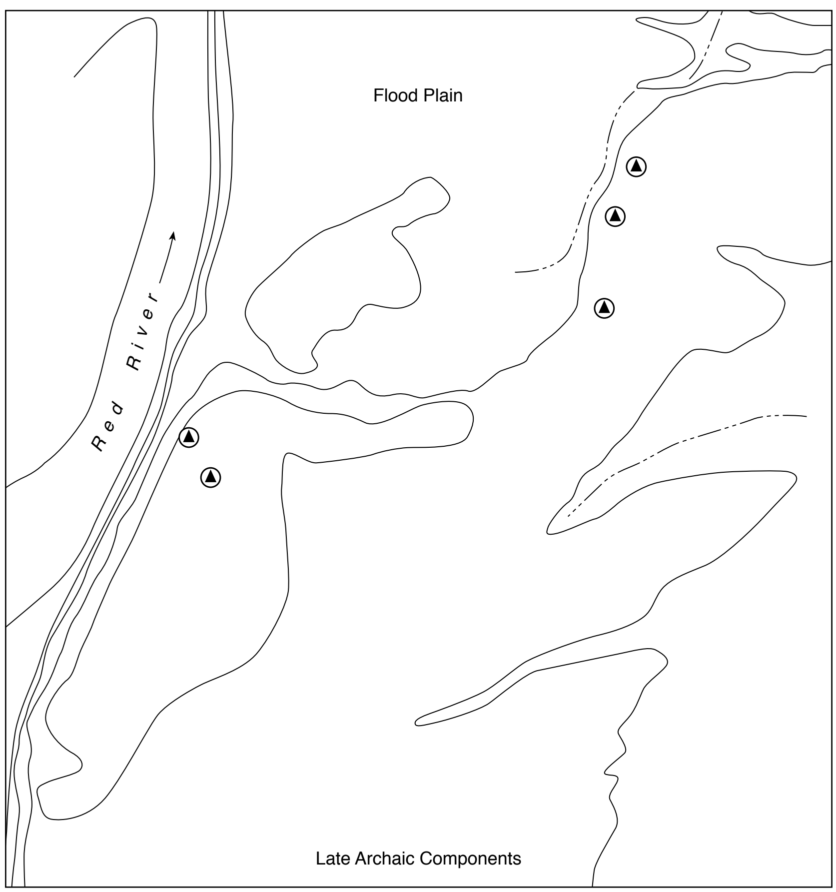

Figure 62. Distribution of Prehistoric and Historic Components at Sites on the Tarrant and Wright Farms: a, Late Archaic; b, Woodland; c, Formative-Early Caddo; d, Middle Caddo; e, Late Caddo; f, ca. 1830-1860s; g, ca. 1870-1950.

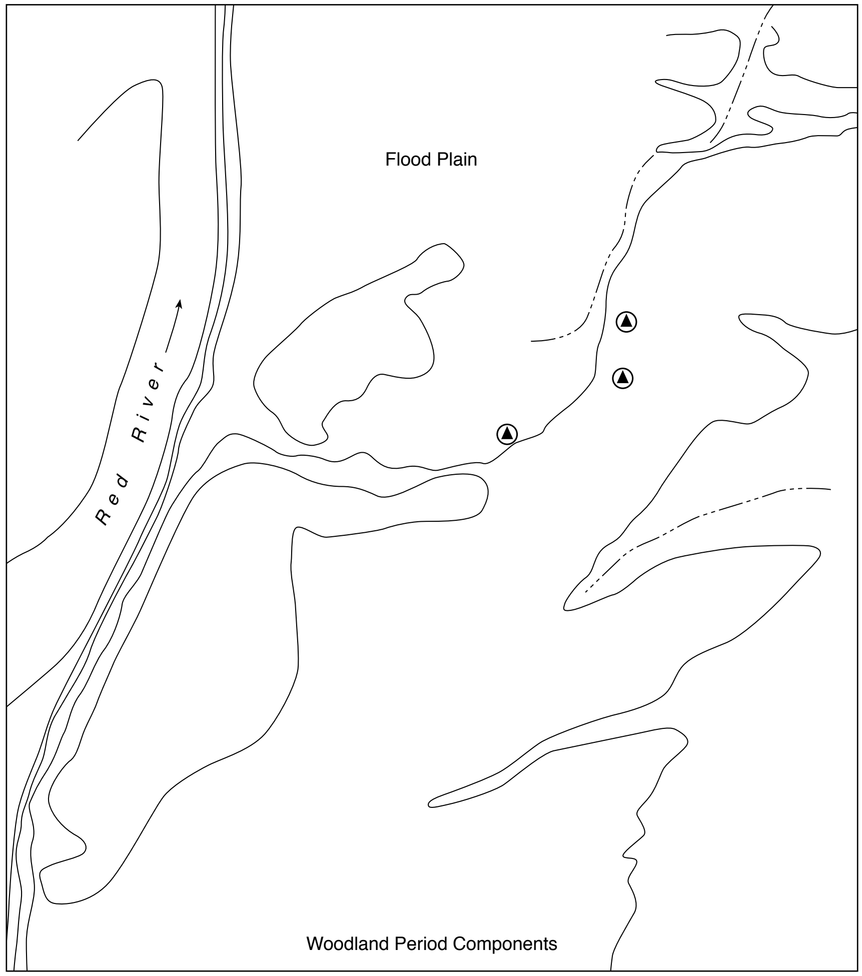

Figure 62b. Woodland.

or base camps of hunter-gatherers who foraged in the Red River basin.

One important archeological trend in Northeast Texas between ca. 200 B.C.-A.D. 800 is the increasingly sedentary nature of prehistoric hunter-gatherer communities that lived in the region. This trend suggests that group sizes were growing during this period (termed the Woodland period), and that the occupation of individual sites was more long-lived. Nevertheless, Woodland period sites in the Red River basin are presently poorly known (Perttula et al. 1993:100-101). Only three possible Woodland period components were identified in the survey area, including one pointed out to us by Larry Banks (then of Southern Methodist University, Dallas, Texas). This particular site is situated at the base of the slope immediately below the 390 foot alluvial terrace (see Figure 62b). According to Banks, the site (41RR251) contains midden deposits and thick, plain grog-tempered pottery (Williams Plain). This settlement appears to resemble Woodland period Fourche Maline culture sites in southwest Arkansas and southeast Oklahoma, where small villages and hamlets are present on the floodplains or terraces of larger streams (or old channels of the Red River) (cf. Schambach 1982, 2002). The other two components contain only small amounts of plain grog-tempered pottery, and are situated on the 390 foot terrace (see Figure 62b).

Caddo archeological components dating between ca. A.D. 800-1300 were found on sites located on the 400 foot alluvial terrace (n=1, but with three other possible components) and the natural levee/terrace deposits (n=1, but dating to the Middle Caddo period), but were particularly common and clustered on the 390 foot terrace (n=5) (see Figure 62c-d). These Caddo components probably represent farmsteads that were dispersed in the Red River valley along elevated landforms with arable

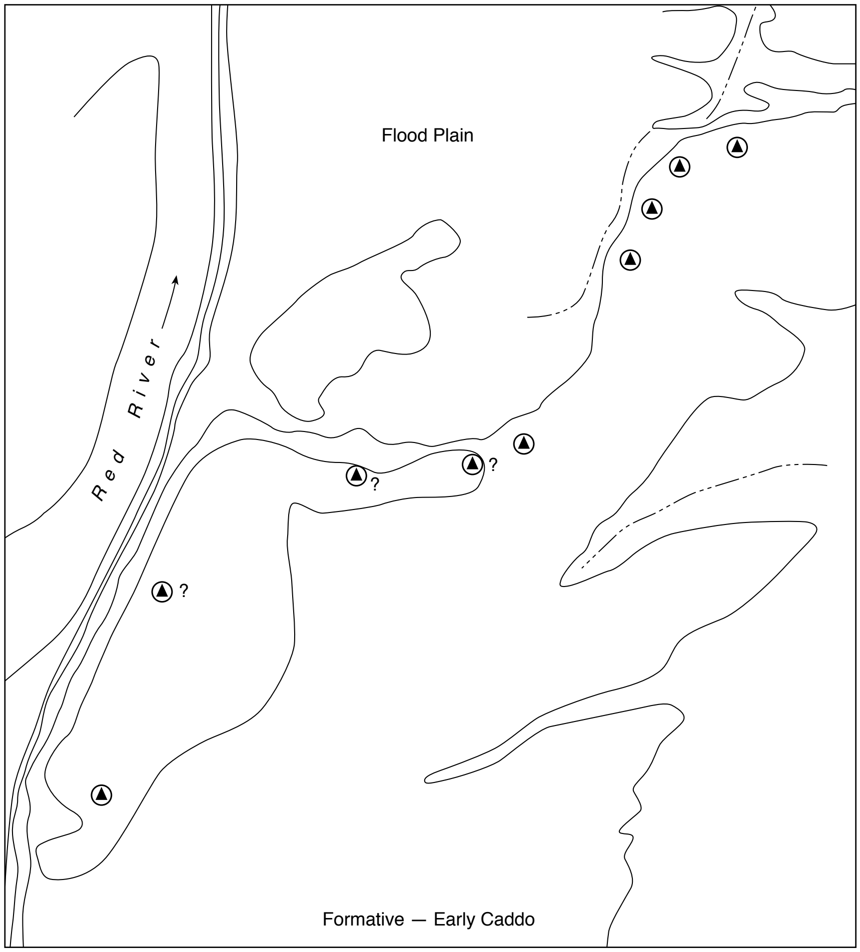

Figure 62c. Formative-Early Caddo.

soils. Thomas (1977:Table 2) indicates that these sites are on soils (Hapludalfs and Oklared fine sandy loam) well-suited to dry-farmed crop lands, particularly the cultivation of corn.

These earlier Caddo occupations, which are fairly small in size (ranging between 1500-7200 m^2) are marked primarily by thin and well-made grog and grog/bone-tempered Caddo ceramics and small amounts of lithic debris and arrow point fragments. Most of the ceramics are plain, but at 41RR305 the decorated sherds include one Sanders Engraved rim sherd, four red-slipped [Sanders Plain?] body sherds, and two Canton Incised body sherds from a Middle Caddo period (ca. A.D. 1100-1300) Mound Prairie phase component. Based on the density of cultural materials, at least three substantial Mound Prairie phase (see Perttula, ed., this volume) occupations were recognized during the survey, one on natural levee/terrace deposits (41RR305) and the other two (41RR289 and 41RR290) on the 390 foot alluvial terrace. Site 41RR305, with a Middle Caddo period component, is the oldest prehistoric component on the Tarrant and Wright farms to be found on the natural levee/terrace deposits, and provides proxy evidence on the age when these deposits were formed and were no longer prone to regular flooding. The Wright Plantation mound site (41RR7), on the 400 foot terrace, may also have been principally used during the Mound Prairie phase, the local equivalent to the Sanders phase (e.g., Bruseth 1998).

The Late Caddo period McCurtain phase sites (dating from ca. A.D. 1300-1600/1700) are also common on the two farms, as components of this age were recognized at two sites on the 400 foot terrace (including Wright Plantation), three sites on the 390 foot terrace, and three sites on natural levee/low 380 foot terrace deposits (see Figure 62e). These sites are affiliated with the McCurtain phase, which

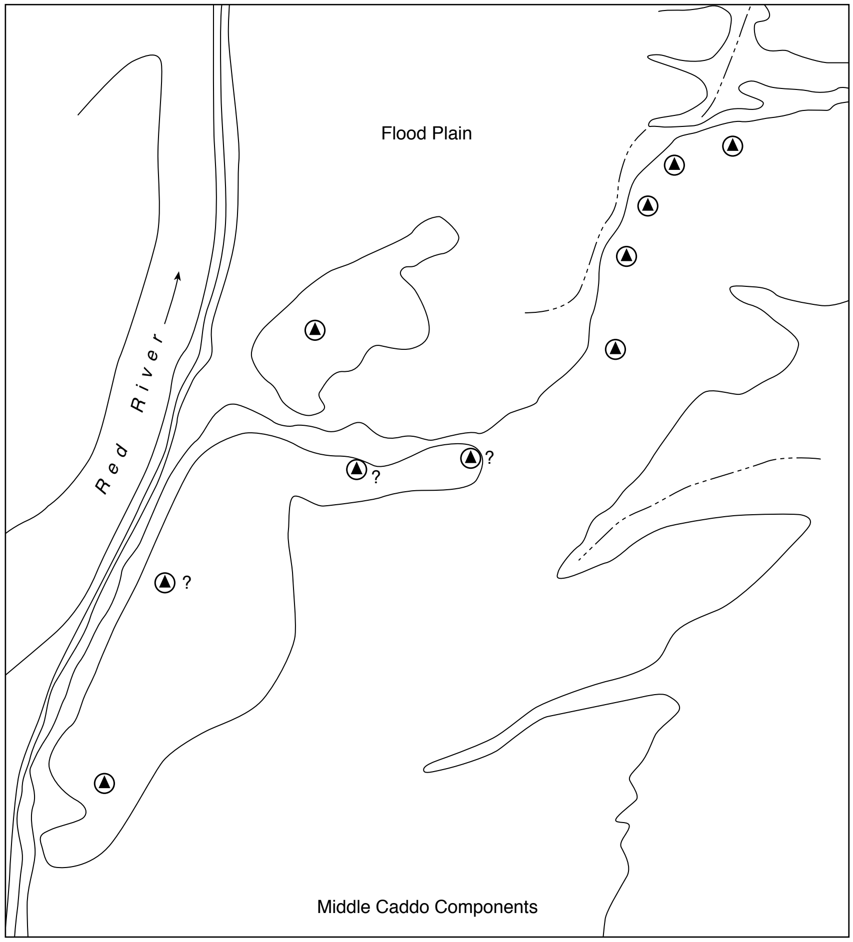

Figure 62d. Middle Caddo.

seems to represent the archeological remains of certain agricultural Caddo groups who lived on the middle Red River in Northeast Texas and Southeast Oklahoma, as well as in the Little River and southern Ouachita Mountains in the southeastern part of Oklahoma (see Bruseth 1998).

Like the earlier Caddo sites, the McCurtain phase sites are recognized by the kinds of ceramics found on them. All the ceramics are shell-tempered, the use of which seems to have occurred about A.D. 1300 in this part of the Red River valley, and most are plain body sherds from large jars and bowls. Decorated ceramics include punctated sherds from Emory Punctated-Incised jars, Nash Neck Banded body sherds, Avery Engraved bowl sherds, sherds with appliqued ridges (either from a Nash Neck Banded or Emory Punctated-Incised jar [see Perino 1994:Figure 7]), and plain sherds with red-slipped interior and exterior surfaces. These are probably from what Flynn (1976) refers to as Clement Redware bowls, or from the undecorated portions of Avery Engraved vessels.

Substantial McCurtain phase components are present at sites 41RR288, 41RR290, and 41RR292; the latter is located on natural levee/terrace deposits (see Figure 62e) while the other two are on the 390 foot alluvial terrace. Indeed, site 41RR292 seems to represent a single component McCurtain phase residential occupation. The other sites probably also represent several farmstead compounds on arable soils on the alluvial terrace.

McCurtain phase occupations are not common upstream from the Mound Prairie-Arnold Roitsch site locality, and the confluence of the Red and Kiamichi rivers seems to generally mark the western distribution of McCurtain phase settlements along the Red River (there is a small McCurtain phase component at the Fasken site, just upstream from the confluence; see Prikryl, this volume). McCurtain phase settlements are present, however, in the Kiamichi River valley at least as far north as Hugo Lake in Choctaw County, Oklahoma (Rohrbaugh 1973).

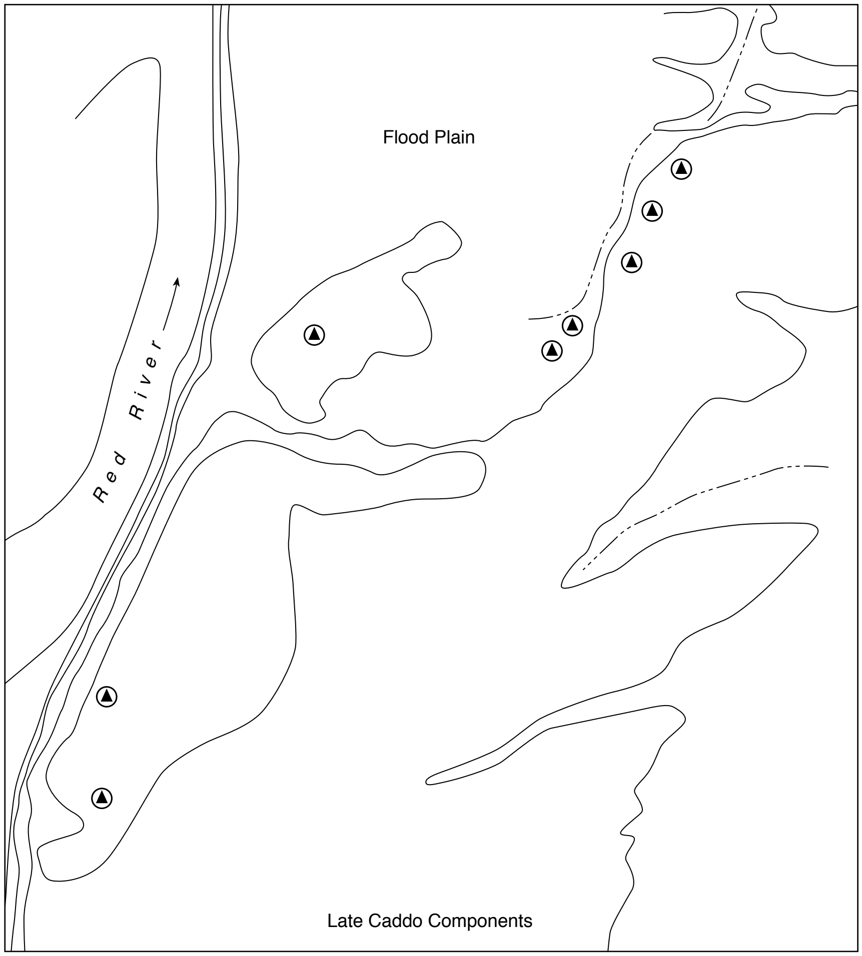

Figure 62e. Late Caddo.

No conclusive evidence of the Cherokee village of Tahchee was located during our survey, although five sites with historic archeological materials dating as early as ca. 1830 were identified; again, the 390 foot and 400 foot terraces received the heaviest use (see Figure 62f). These occupations contained decorated European whitewares or refined earthenwares (transfer-printed patterns of various colors, blue shell-edged, and broad-line hand-painted) and dark olive green wine bottle glass. Site 41RR286 (on the 390 foot terrace) contains the largest antebellum assemblage, and further investigations are clearly warranted here to determine if intact archeological deposits are present there, and to retrieve additional artifacts and/or features that can unravel the ethnic and cultural affiliation of the site occupants.

Finally, probable farmsteads associated with the Wright Plantation, and tenant farmstead occupations dating from ca. 1890-1950, were identified on 15 archeological sites (one site on the 400 foot terrace appears to have been occupied between ca. 1870-1900) distributed across all three landforms; 14 of the 15 tenant farmsteads are on the 390 and 400 foot terraces, however (see Figure 62g). These sites contain large quantities of plain whitewares and ironstones, Bristol and Albany-glazed stonewares, bottle glass and fruit jar glass, metal tools and implements, window glass, and machine-made bricks. The domestic artifacts on these sites appear to be from sheet midden deposits associated with now-abandoned farmsteads. No structural features or foundations were visible at any of the post-1890 sites.

SUMMARY AND CONCLUSIONS

The 1991-1992 Texas Archeological Society (TAS) Field School survey effort was quite

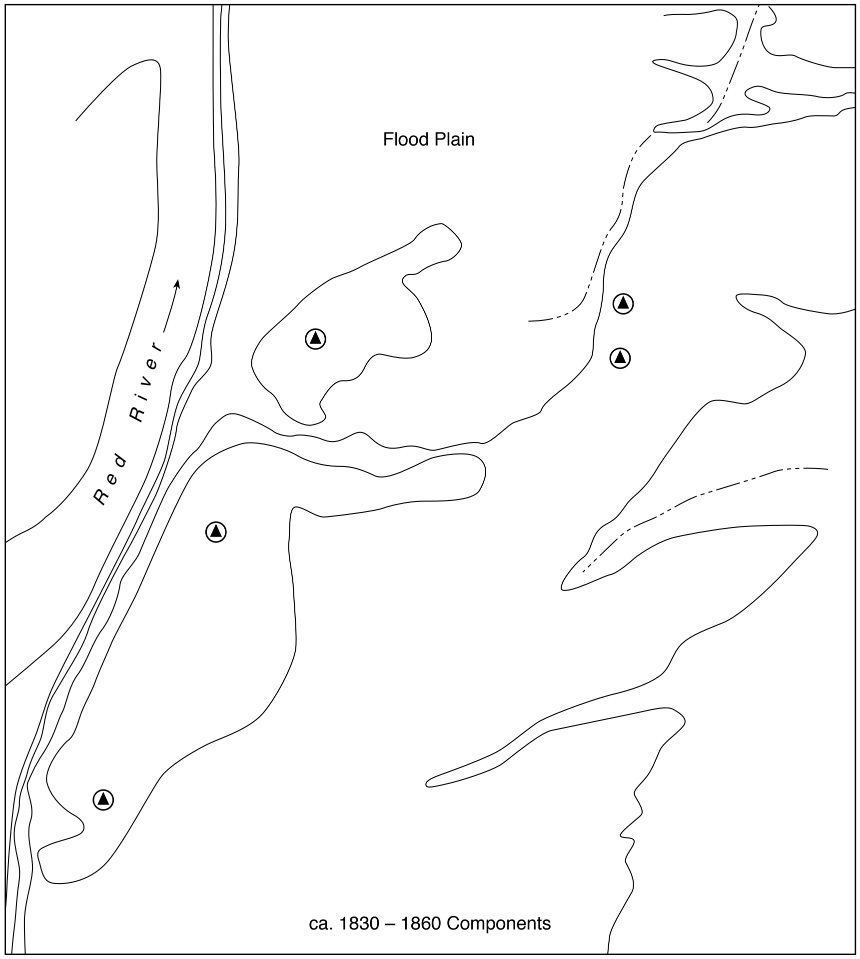

Figure 62f. ca. 1830-1860 components.

successful in locating and documenting a number of apparently important prehistoric and historic sites along the terraces and alluvial landforms of the Red River, Salt Well Slough, and Big Pine Creek on the Roitsch farm, as well as on the Tarrant and Wright farms (Table 5). Most of these sites include Early to Late Caddo settlements dating from ca. A.D. 900 to the late 17th century, from the large village at the Dan Holdeman site (41RR11) to a smaller range of probable hamlets and farmsteads with probable preserved structures and features, but several well-preserved early- to mid-19th century farmsteads have also been identified that promise to contribute important archeological information on "planters and plain folk" (e.g., Lowe and Campbell 1987) that lived in the middle reaches of the Red River valley in Northeast Texas.

A total of 70 new archeological sites were recorded during the two TAS field seasons on the Roitsch and Fasken farms, and another 18 previously recorded sites were visited and new archeological information gathered from them. To supplement the TAS survey, the 1993 NETAS survey of the Tarrant and Wright farms at the confluence of the Red and Kiamichi rivers recorded another 21 archeological sites, several of which appear to also have the potential to contain important prehistoric and historic archeological deposits (see Table 5).

Although many of the previously recorded and new archeological sites are of unknown prehistoric age—containing relatively undiagnostic lithic debris and fire-cracked rock or plain grog-tempered pottery, for the most part—it is evident that these four farms were witness to fairly intensive settlement beginning after about 2000 B.C. in the Late Archaic period, as well as during the Woodland period, and then particularly so by Caddo peoples after about A.D. 800.

Woodland period sites appear to be concentrated on what would have been forested terrace and

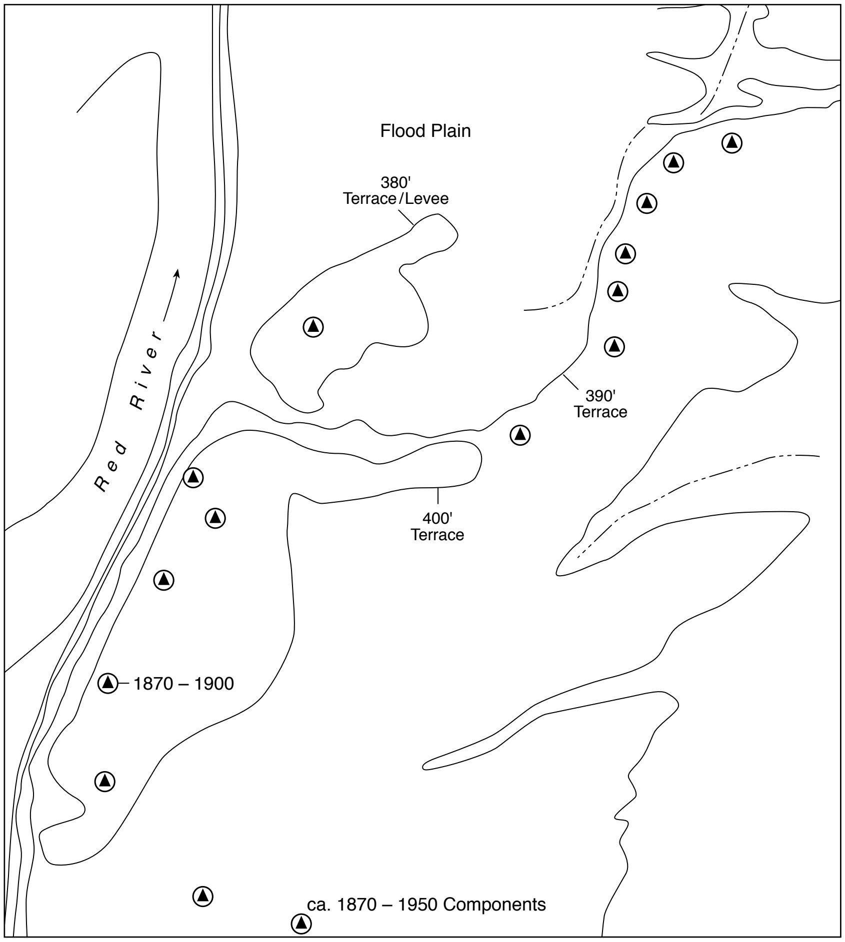

Figure 62g. ca. 1870-1950 components.

upland settings overlooking the Red River floodplain, and along its principal tributary on Mound Prairie (Big Pine Creek), with loamy sediments well-suited to dry farming (Figure 63a). It may be significant that the large Roitsch site (41RR16; see Figure 63a) does not have a substantial Woodland occupation, although in part this may be because the alluvial terrace did not form until after ca. A.D. 800/900 (see Perttula, ed., this volume; Perttula et al. 2001). Schambach (1998:xv) suggests that these Woodland peoples (i.e., Fourche Maline culture) were probably "significantly reliant on seed-crop horticulture," and the distribution of Woodland period sites (ranging from large [>3-5 acres] to small [<1 acre] settlements) on arable lands supports this notion. Future archeological investigations at these Woodland period components on Mound Prairie should contribute new information on the nature of Woodland period settlements and communities, as well as gather evidence for horticultural economies prior to the establishment of Caddo agricultural systems along the Red River valley.

Formative, Early, to Middle Caddo components are probably underrepresented in the 109 archeological sites investigated during the TAS survey because it is difficult to identify or define specific components for these three periods when only a small scattering of plain grog-tempered sherds (which are also present on Woodland period sites, although thought to have thicker vessel walls) and an occasional stemmed arrow point is typically recovered from shovel testing and a surface collection. The available information suggests Early to Middle Caddo components are concentrated in the vicinity of larger villages and civic-ceremonial centers—as at the Roitsch, Holdeman, and Fasken sites—that have mounds, structures, and other evidence of permanent settlement (see Skinner et al. 1969; Perino 1995; Perttula, ed., this volume; Prikryl, this volume). These Caddo populations were sedentary, and the size of sites on the Roitsch farms (0.3-3.1 acres) suggest that these groups lived in small

Table 5. Notable Archeological Sites Investigated by the Texas Archeological Society Survey and the Northeast Texas Archeological Society along the Red River in 1991-1993.

Site	Site Size (in acres)	Principal Components*	Known Features
Dan Holdeman, 41RR11	25-30	FC, MC, LC, mid-19th C.	middens, mounds, burials, structures, pits
41RR101	5.6	Woodland	midden?
41RR103	7.0	Late Archaic	?
41RR106	0.6	Woodland	midden? pits?
41RR109	5.0	LC, mid-19th C.	LC structure?
41RR110	3.1	FC, MC, LC	midden? pits?
41RR201	0.3	LC	structure?
41RR205	1.6	mid-late 19th C.	midden?
41RR206	1.2	FC, MC	midden, pits?
41RR209	0.4	FC, MC	midden?
41RR211	6.2	Woodland	?
41RR214	0.4	Woodland	?
41RR220	0.4	FC, MC	structure? pits?
41RR221	4.0	Woodland	midden? pits?
41RR231	?	Woodland?	mound?
41RR235	0.7	1883-1900	cemetery
41RR236	0.3	MC?, LC	midden, pits, structure?
41RR239	1.9	Woodland, EC	structures?
41RR248	3.0	LC	salt-making features
41RR256	3.9	LC	salt-making features
41RR257	2.1	LC	salt-making features
41RR266	0.1	mid-19th C.	midden
41RR268	0.1	LC	pits?
41RR286	0.7	FC, MC, mid-19th C.	?
41RR290	0.6	FC, MC, LC	?
41RR292	1.0	LC	?

* FC=Formative to Early Caddo; MC=Middle Caddo; LC=Late Caddo

farmsteads or hamlets that were associated with the larger and self-supporting villages and mound centers. It is doubtful that these pre-A.D. 1300 Caddo populations were intensive agriculturists (see Perttula 1996:314-322, 2008), however, although they assuredly cultivated corn, and gathered wild seeds and other plant and animal resources. The few discrete Formative, Early, to Middle Caddo components outside of the Roitsch and Holdeman sites are on terraces and uplands with arable loamy sediments (see Figure 63b). There is no evidence that the Formative, Early, and Middle Caddo populations gathered or processed salt at this time.

Most notably, Late Caddo sites—probable farmsteads and small hamlets, as well as the large village at Roitsch and the Dan Holdeman site (41RR11)—are abundant on the Roitsch (see Figure 63c) and Tarrant-Wright farms (see Figure 62e)—but this is not the case upstream on the Red River on the Fasken farms. These Late Caddo McCurtain phase groups living at the mouth of the Kiamichi River were closely affiliated (ethnically and genetically) with Caddo groups living some miles downstream along the Red River in the vicinity of the Roitsch

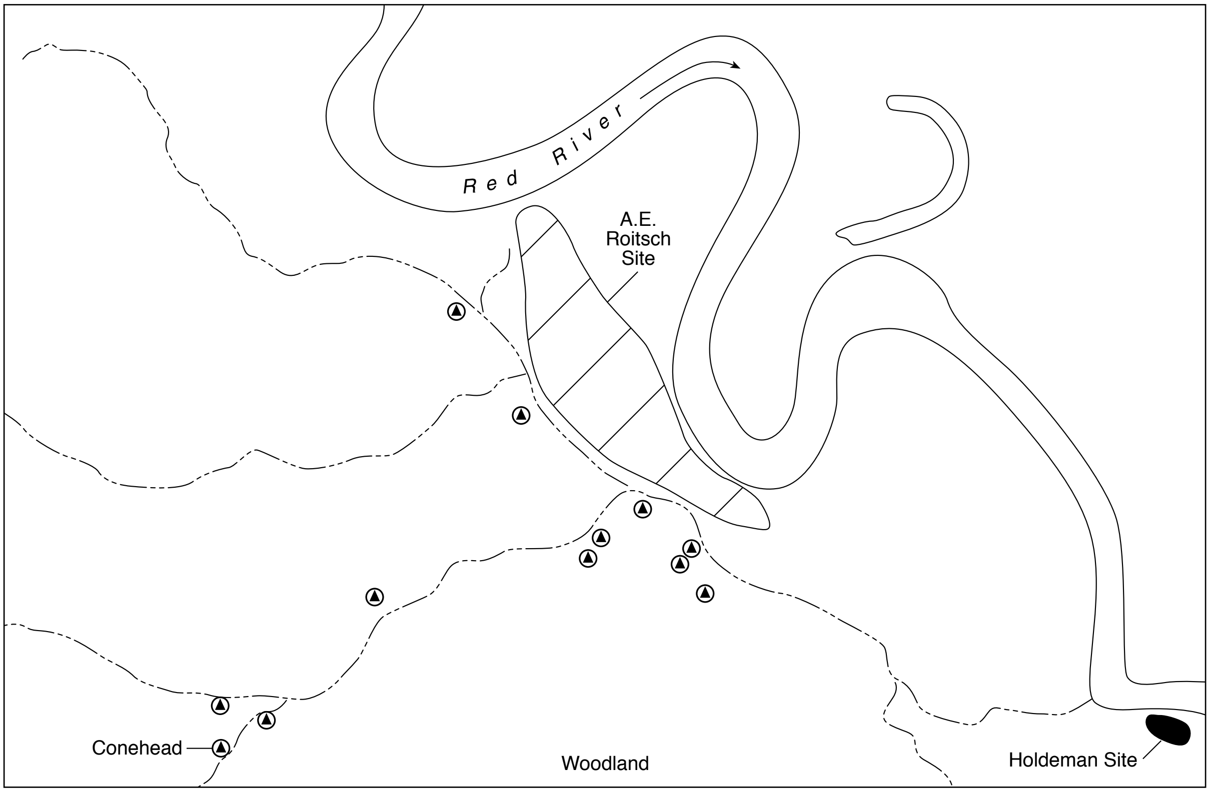

Figure 63. Distribution of Principal Components on the Roitsch Farm: a, Woodland period.

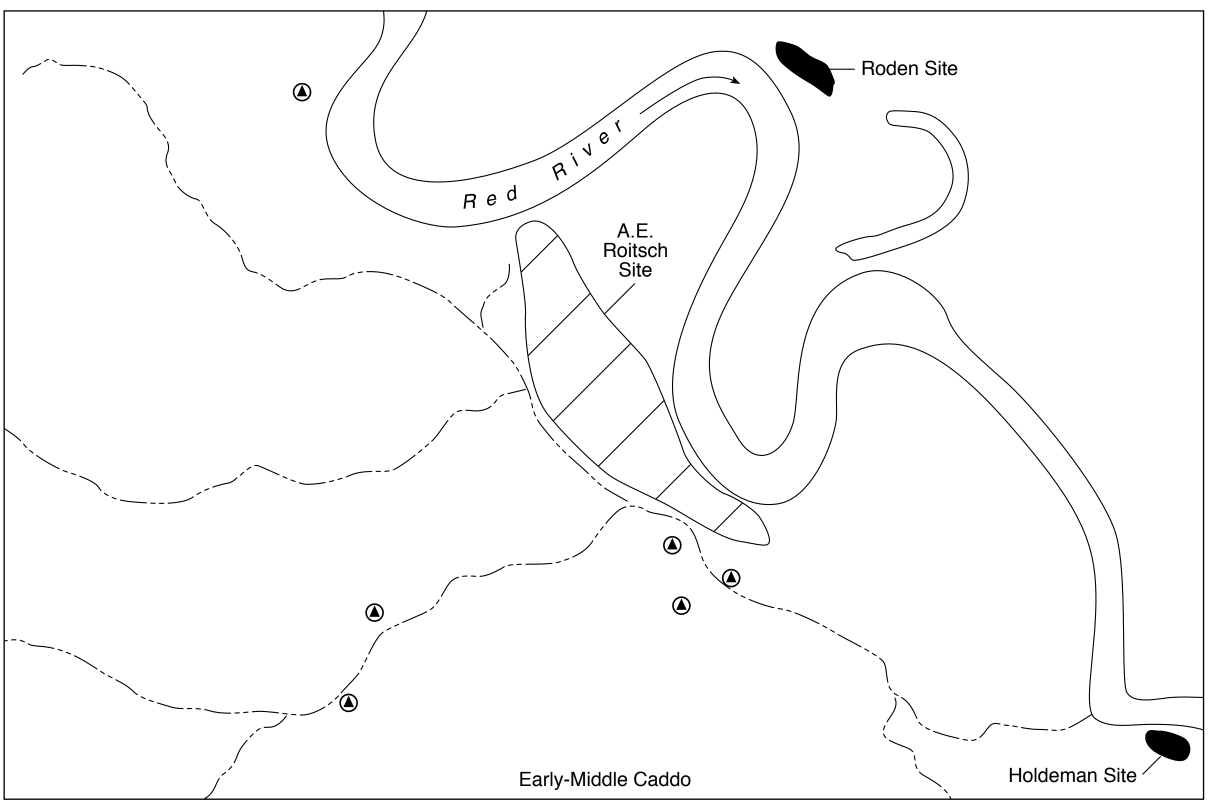

Figure 63b. Formative, Early, to Middle Caddo periods.

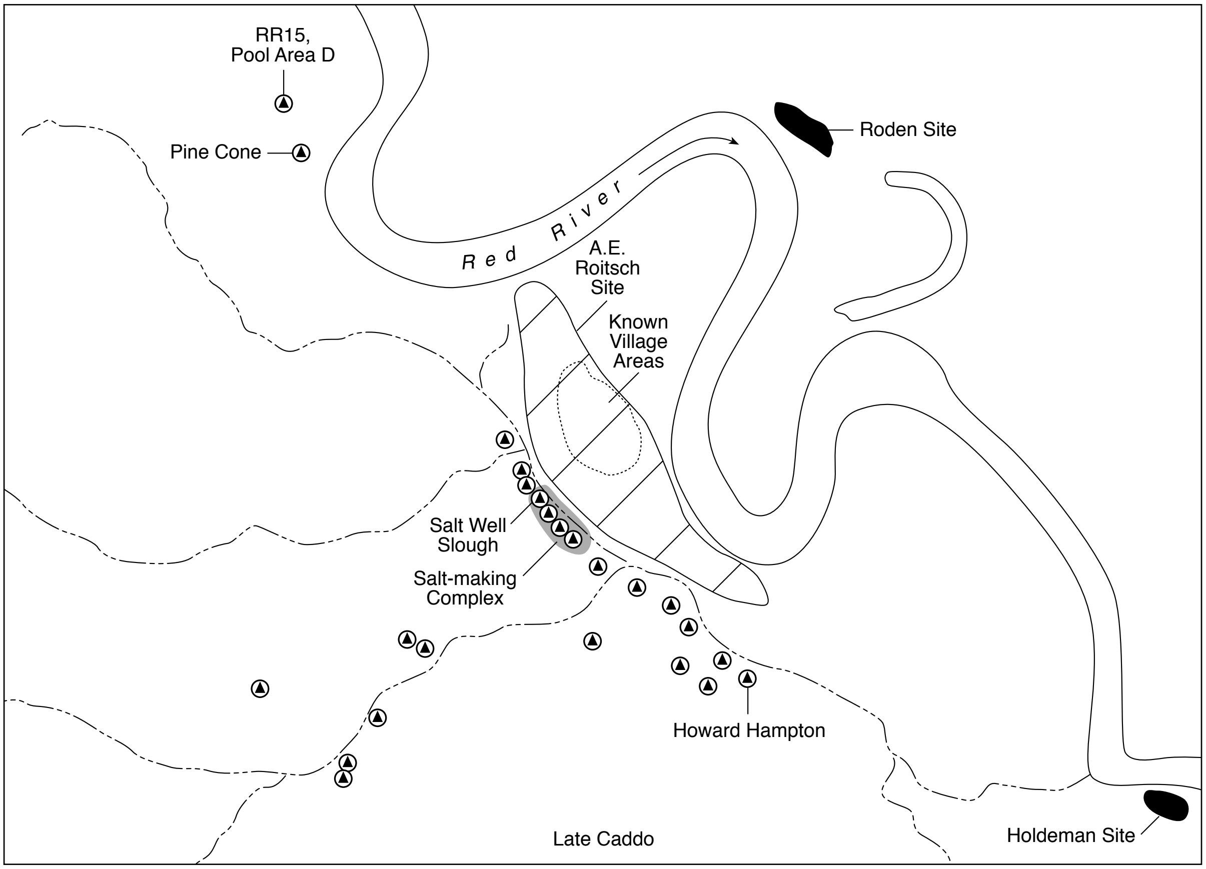

Figure 63c. Late Caddo period.

site, as well as with other groups on the Kiamichi, the Little River, and parts of the southern Ouachita Mountains (Figure 64). The McCurtain phase Caddo communities were agriculturists: this has been well-demonstrated through stable carbon isotope analyses and bioarcheological studies from the Roitsch, Holdeman, Roden (Perino 1981), and Rowland Clark sites (see Derrick et al. in Perttula, ed., this volume; Perttula 1996:321), as well as the findings from salt-making sites along Salt Well Slough (see Kenmotsu 2006).

Maize probably comprised more than 50 percent of the diet for the McCurtain phase Caddo peoples, based on stable isotope values, and thus it is not surprising that the villages and farmsteads are associated with fertile and renewable alluvial soils, particularly with easily-tilled fine sandy loam sediments on alluvial terraces that are associated with the modern Late Holocene channel of the Red River. Smaller McCurtain phase settlements and farmsteads (ranging from ca. 0.1-5 acres in size) on the Roitsch farm are clearly concentrated in the vicinity of the large Roitsch village and mound center (see Figure 63c) and are presumed to belong with the Roitsch community, but they are found on loamy upland and terrace soils facing the Red River floodplain and along Big Pine Creek.

The four Late Caddo salt making sites are near the known village areas at Roitsch (see Figure 63c), but on clayey alluvium that would have been very difficult to work with wood and bone tools. Kenmotsu's (2006) analyses of the Salt Well Slough site (41RR204) indicates that Late Caddo agriculturists needed salt to supplement their diets, but that the production of salt was limited in scale, probably to meet the needs of the Roitsch community.

Although the 1825 Cherokee village of Tahchee was not identified during the survey of this stretch of the Red River (Bruseth et al. 1991:14; Everett 1990:34, 51), antebellum archeological sites dating as early as ca. 1830 were relatively common on the Tarrant and Wright tracts of land (see Figure 62f), and at the Fasken site (see Prikryl, this volume), but much less so in the vicinity of the Roitsch site (see Figure 63d). The early Anglo-American settlers were apparently

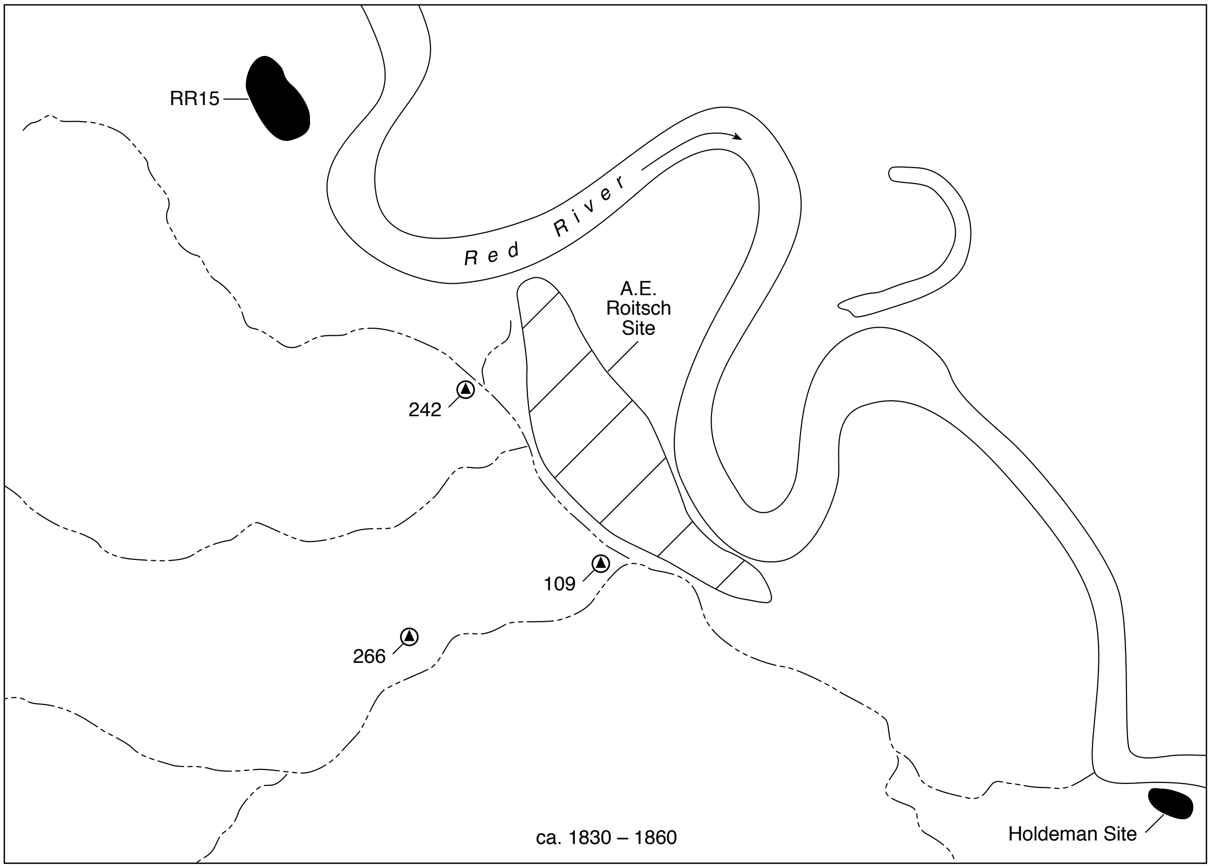

Figure 63d. ca. 1830-1860 settlements.

widely dispersed across Mound Prairie, choosing alluvial terrace landform with fertile soils to establish farmsteads (as at 41RR109, 41RR242, and 41RR266) and larger plantations (as at the Houser Plantation at the Dan Holdeman site and the Wright Plantation) to cultivate corn, cotton, and other foods (see Lowe and Campbell 1987). With a growing population before 1860, but significantly expanding in the 20 years after the Civil War (Harper 1996a:496), along with the coming of the Texas and Pacific Railway, and the expansion in cotton cultivation, rural farmsteads spread across the county's farmlands through the 1930s. By 1920, for example, more than 260,000 acres were in cultivation in Red River County, particularly for the production of cotton. With increasing reliance on cotton as a cash crop in the early 20th century, less than "30 percent of the county's farmers owned all or a part of their farms" (Harper 1996a:496). The majority of the historic sites on the Roitsch and Tarrant-Wright farms were occupied, probably by tenant farmer, during this period of increased cotton production.

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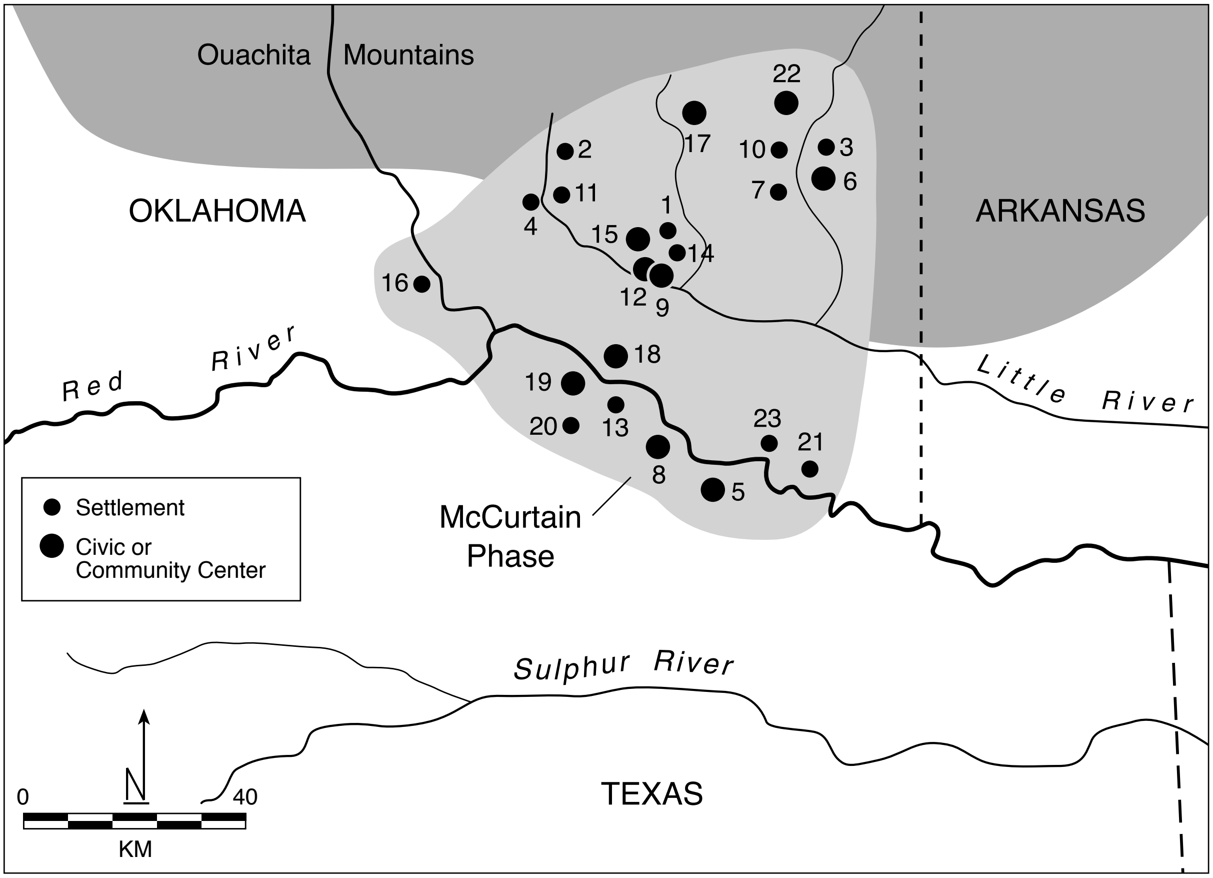

Figure 64. Distribution of the McCurtain phase, after Bruseth (1998:Figure 3-9). Note that no. 13 is the Dan Holdeman site, no. 19 is the Roitsch site, and no. 20 is Salt Well Slough.

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At the end of the project, Sandy Hannum and Roland Pantermuehl stepped in to work on finalizing figures. Ron Ralph and Pam Wheat pushed the project along to the finish line.

REFERENCES CITED

Banks, L. D.
1990 *From Mountain Peaks to Alligator Stomachs: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest*. Memoir No. 4. Oklahoma Anthropological Society, Oklahoma City.

Banks, L. D. and N. T. Banks
2002 *Last Twentieth Century Archeological Investigations at the Arnold Roitsch Site (41RR16), Red River County, Texas*. Final report in fulfillment of Texas Antiquities Permit No. 2179, on file at the Archeology Division, Texas Historical Commission, Austin.

Blake, L. W.
1994 Analysis of Rowland Clark Site Corn. *Journal of Northeast Texas Archaeology* 4:43-49.

Briscoe, J.
1995 *Archeological Investigations on the OkTex Pipeline Company Proposed Abandonment of OK-7, Red River County, Texas*. Briscoe Consulting Services, Norman.

Brown, J. A.
1971 *Pottery Vessels*. Spiro Studies No. 3. University of Oklahoma Research Institute, Norman.
1996 *The Spiro Ceremonial Center: The Archaeology of Arkansas Valley Caddoan Culture in Eastern Oklahoma*. 2 Vols. Memoirs No. 29. Museum of Anthropology, University of Michigan, Ann Arbor.

Bruseth, J. E.
1998 The Development of Caddoan Polities along the Middle Red River Valley of Eastern Texas and Oklahoma. In *Caddo Native History: Their Place in Southeastern Archaeology and Ethnohistory,* edited by T. K. Perttula and J. E. Bruseth, pp. 47-68. Studies in Archeology 30. Texas Archeological Research Laboratory, The University of Texas at Austin.

Bruseth, J. E., L. Banks, and J. Smith
2001 The Ray Site (41LR135). *Bulletin of the Texas Archeological Society* 72:197-213.

Bruseth, J., T. Perttula, and B. Martin
1991 *Field Guide for the 1991 Texas Archeological Society Field School in Red River County, Texas*. Texas Historical Commission, Austin.

Bruseth, J., T. Perttula, B. Martin, and D. Prikryl
1992 *Field Guide for the 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas*. Texas Historical Commission, Austin.

Denton, M. H.
1999 Dealing with Late-19th- and Early-20th-Century Sites. *Cultural Resource Management News & Views* 11(1):13-14. Archeology Division, Texas Historical Commission, Austin.

Early, A. M. (editor)
1993 *Caddoan Saltmakers in the Ouachita Valley: The Hardman Site*. Research Series No. 43. Arkansas Archeological Survey, Fayetteville.

Everett, D.
1990 *The Texas Cherokees: A People between Two Fires 1819-1840*. University of Oklahoma Press, Norman.

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, pp. 83-95. Contributions in Anthropology No. 5. Department of Anthropology, Southern Methodist University, Dallas.

Fields, R. C. and S. A. Tomka, with contributions by T. K. Perttula
1993 Hunter-Gatherer Mobility in Northeast Texas, 10,000-200 B.C. In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by N. A. Kenmotsu and T. K. Perttula, pp. 69-95. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Fields, R. C., M. E. Blake, and K. W. Kibler
1997 *Synthesis of the Prehistoric and Historic Archeology of Cooper Lake, Delta and Hopkins Counties, Texas*. Reports of Investigations No. 104. Prewitt and Associates, Inc., Austin.

Flynn, P.
1976 A Study of Red-Filmed Pottery from the Clement Site (Mc-8), McCurtain County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society* 25:127-134.

Foster, W. C. (editor)
1998 *The La Salle Expedition to Texas: The Journal of Henri Joutel, 1684-1687*. Texas State Historical Association, Austin.

Fritz, G. J.
1992 Archaeobotanical Remains from Five Sites on the Red River, Northeast Texas. MS on file, Archeology Division, Texas Historical Commission, Austin.

Girard, J. S.
2006 *Regional Archaeology Program, Management Unit 1, Seventeenth Annual Report, 2006*. Northwestern State University of Louisiana, Natchitoches.

Godden, G.
1964 *Encyclopaedia of British Pottery and Porcelain Marks*. Herbert Jenkins Ltd., London.

Green, M. M., R. W. Moir, and D. H. Jurney
1996 Archaeological Investigations at 41DT113: The John C. Wright Site. In *Archaeological Investigations at Cooper Lake, Delivery Order Numbers 2, 3, & 4, 1987: Cultural Resource Studies for Cooper Lake, Hopkins and Delta Counties, Texas*, by D. E. McGregor, M. M. Green, D. H. Jurney, W. A. Martin, R. W. Moir, and J. W. Saunders, pp. 461-471. 2 Vols. Archaeology Research Program, Department of Anthropology, Southern Methodist University, Dallas.

Greer, G. H.
1981 *American Stonewares*. Schiffer Publishing Ltd., Exton, Pennsylvania.

Hampton, H. and G. Moore
1936 A Burial Site in Northeastern Red River County. *Bulletin of the Central Texas Archeological Society* 2:64-69.

Harper, C., Jr.
1996a Red River County. In *The New Handbook of Texas, Vol. 5*, edited by R. Tyler, pp. 495-497. Texas State Historical Association, Austin.

1996b Davenport, Texas. In *The New Handbook of Texas, Vol. 2*, edited by R. Tyler, p. 520. Texas State Historical Association, Austin.

Harris, R. K.
1953 The Sam Kaufman Site, Red River County, Texas. *Bulletin of the Texas Archeological Society* 24:43-68.

Hazlewood, C.
1996 Blakeney, Texas. In *The New Handbook of Texas, Vol. 1*, edited by R. Tyler, p. 580. Texas State Historical Association, Austin.

Hunter, R. R., Jr. and G. L. Miller
1994 English Shell-Edged Earthenware. *Antiques* 145(3):432-443.

Hyatt, R. D. and H. P. Mosca III
1972 *Survey of Cultural Resources of the Proposed Big Pine Lake, Texas*. Research Report 15. Archaeology Research Program, Southern Methodist University, Dallas.

Jurgelski, W. M., K. H. Cande, and G. Sabo III
1996 *Farms in the Forests: A Study of Late Historic Domestic Sites on the Ozark and Ouachita National Forests, Arkansas*. Project 958 Final Report. Sponsored Research Program, Arkansas Archeological Survey, Fayetteville.

Kenmotsu, N. A.
2006 *Investigations at the Salt Well Slough Site, 41RR204, a Salt-Making Site in Red River County, Texas*. Archeological Reports 4. Texas Historical Commission, Austin.

Kenmotsu, N. A. and T. K. Perttula (editors)
1993 *Archeology in the Eastern Planning Region, Texas: A Planning Document*. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Kovel, R. and T. Kovel
1986 *Kovels' New Dictionary of Marks: Pottery and Porcelain, 1850 to the Present*. Crown Publishers, Inc., New York.

Loveland, C. J.
1987 Human Skeletal Remains from the Clark and Holdeman Sites, Red River County, Texas. *Bulletin of the Texas Archeological Society* 57:165-182.

1994 Rowland Clark and Dan Holdeman Site Human Skeletal Remains. *Journal of Northeast Texas Archaeology* 4:50-60.

Lowe, R. G. and R. B. Campbell
1987 *Planters & Plain Folk: Agriculture in Antebellum Texas*. Southern Methodist University Press, Dallas.

Majewski, T. A. and M. J. O'Brien
1987 The Use and Misuse of Nineteenth-Century English and American Ceramics in Archaeological Analysis. In *Advances in Archaeological Method and Theory, Vol. 11*, edited by M. B. Schiffer, pp. 97-209. Academic Press, Orlando.

McGregor, D. E., M. M. Green, D. H. Jurney, W. A. Martin, R. W. Moir, and J. W. Saunders
1996 *Archaeological Investigations at Cooper Lake, Delivery Order Numbers 2, 3, & 4, 1987: Cultural Resource Studies for Cooper Lake, Hopkins and Delta Counties, Texas*. 2 Vols. Archaeology Research Program, Department of Anthropology, Southern Methodist University, Dallas.

Moir, R. W.
1987 Farmstead Proxemics and Intrasite Patterning. In *Historic Buildings, Material Culture, and People of the Prairie Margin*, edited by D. H. Jurney and R. W. Moir, pp. 229-237. Richland Creek Technical Series, Volume V. Archaeology Research Program, Southern Methodist University, Dallas.

Nelson, B., M. Turner, and T. K. Perttula
1995 An Archeological Survey of Lands at the Confluence of the Red and Kiamichi Rivers. *Oklahoma Anthropological Society Newsletter* 43 (No. 5):10-12.

Perino, G.
1981 *Archeological Investigations at the Roden Site, McCurtain County, Oklahoma*. Potsherd Press, Publication No. 1. Museum of the Red River, Idabel, Oklahoma.
1983 *Archaeological Research at the Bob Williams Site, Red River County, Texas*. Museum of the Red River, Idabel, Oklahoma.
1994 Archaeological Research at the Rowland Clark Site (41RR77), Red River County, Texas. *Journal of Northeast Texas Archaeology* 4:3-42.
1995 Archaeological Investigations at the Dan Holdeman Site (41RR11), Red River County, Texas. *Journal of Northeast Texas Archaeology* 6:3-62.

Perttula, T. K.
1992 *"The Caddo Nation": Archaeological & Ethnohistoric Perspectives*. University of Texas Press, Austin.
1993 The Development of Agriculture in Northeast Texas before A.D. 1600. In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by N. A. Kenmotsu and T. K. Perttula, pp. 121-146. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.
1995 A Reconsideration of the Chronological and Cultural Placement of the Mortuary Remains and Grave Goods from the Dan Holdeman Site. *Journal of Northeast Texas Archaeology* 6:67-87.
1996 Caddoan Area Archaeology Since 1990. *Journal of Archaeological Research* 4(4):295-348.
1997a The Archaeology of the Middle Caddoan Period in the Middle Red River Valley of Northeast Texas. *Journal of Northeast Texas Archaeology* 10:47-51.
1997b Sabine River and Middle Red River Ceramics: Musings on the Ceramic Data Used in Schambach's "Continuing the Discussion of the Spiroans and Their Entrepots." *Caddoan Archeology* 8(3):9-18.
2008 Caddo Agriculture on the Western Frontier of the Eastern Woodlands. *Plains Anthropologist*, in press.

Perttula, T. K. and N. G. Reese
2001 Investigations at the Jonesborough Site. *Bulletin of the Texas Archeological Society* 72:235-239.

Perttula, T. K., R. C. Fields, J. E. Corbin, and N. A. Kenmotsu
1993 The Emergence of Sedentism in the Northeast Texas Archeological Region, ca. 500 B.C. to A.D. 1000. In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by N. A. Kenmotsu and T. K. Perttula, pp. 97-120. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Perttula, T. K., J. E. Bruseth, N. A. Kenmotsu, D. J. Prikryl, L. Banks, J. Smith, N. G. Reese, S. A. Iruegas, and W. A. Martin
2001 Archeological Investigations on the Red River and Tributaries: Summary of the Findings of the 1991 and 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas. *Bulletin of the Texas Archeological Society* 72:165-250.

Reese, N. G.
2001 *Archeological and Archival Investigations at the Jonesborough Site, 41RR15, Red River County, Texas*. Archeological Reports Series, No. 2. Texas Historical Commission, Austin.

Rickard, J.
1993 Mocha ware: Slip-decorated refined earthenware. *Antiques* 144(2):182-189.

Rohrbaugh, C. L.
1973 *Hugo Reservoir III*. Archaeological Site Report No. 24. Oklahoma River Basin Survey, University of Oklahoma, Norman.

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, pp. 132-197. Research Series No. 15. Arkansas Archeological Survey, Fayetteville.
1997 The Development of the Burial Mound Tradition in the Caddo Area. *Journal of Northeast Texas Archaeology* 9:53-72.
1998 *Pre-Caddoan Cultures in the Trans-Mississippi South: A Beginning Sequence*. Research Series 53. Arkansas Archeological Survey, Fayetteville.
2002 Fourche Maline: A Woodland Period Culture of the Trans-Mississippi South. In *The Woodland Southeast*, edited by D. G. Anderson and R. C. Mainfort, Jr., pp. 91-112. University of Alabama Press, Tuscaloosa.

Steely, S.
1982 *Six Months from Tennessee*. Hennington Publishing Company, Wolfe City, Texas.

Story, D. A.
1990 Cultural History of the Native Americans. In *Archeology and Bioarcheology of the Gulf Coastal Plain*, by D. A. Story, J. A. Guy, B. A. Burnett, M. D. Freeman, J. C. Rose, D. G. Steele, B. W. Olive, and K. J. Reinhard, pp. 163-366. 2 Vols. Research Series No. 38. Arkansas Archeological Survey, Fayetteville.

Suhm, D. A. and E. B. Jelks (editors)
1962 *Handbook of Texas Archeology: Type Descriptions*. Special Publication No. 1, Texas Archeological Society, and Bulletin No. 4, Texas Memorial Museum. San Antonio and Austin.

Switzer, R. R.
1974 *The Bertrand Bottles: A Study of 19th-Century Glass and Ceramic Containers*. Publications in Archeology No. 12. U.S. Department of the Interior, National Park Service, Washington, D.C.

Thomas, J. R., Jr.
1977 *Soil Survey of Red River County, Texas*. United States Department of Agriculture, Soil Conservation Service, in cooperation with Texas Agricultural Experiment Station.

Thurmond, J. P.
1990 *Archeology of the Cypress Creek Drainage Basin, Northeastern Texas and Northwestern Louisiana*. Studies in Archeology 5. Texas Archeological Research Laboratory, The University of Texas at Austin.

Webb, W. P. (editor)
1952 *The Handbook of Texas*. 2 Vols. The Texas State Historical Association, Austin.

Wedel, M. M.
1978 *La Harpe's 1719 Post on the Red River and Nearby Caddo Settlements*. Bulletin No. 30. Texas Memorial Museum, The University of Texas at Austin.

Wells, T.
1998 Nail Chronology: The Use of Technologically Derived Features. *Historical Archaeology* 32(2):78-99.

Wilson, J. S.
1990 We've Got Thousands of These! What Makes an Historic Farmstead Significant. *Historical Archaeology* 24(2):23-33.

APPENDIX I, ISOLATED FINDS

Isolated Find 1

Isolated find 1 was a bifacial preform of Johns Valley shale collected from the surface of the plowed field about 130 m southwest of Salt Well Slough. It is in an area between the Salt Well Slough site (41RR204) and 41RR259.

Isolated Find 2

This find consisted of a dart projectile point collected on the surface (a possible Marcos), and another dart point (Palmillas type) was recovered in one of six shovel tests excavated in the vicinity of the find spot. These artifacts are indicative of a limited Late Archaic use of the area. The landowner has reportedly collected a ground stone celt in this location, which may represent a later Caddo use of the area.

Isolated Find 3

A broken Gary point was collected from the surface in a 23 acre field south of the Roitsch farmhouse. This is a broad and flat alluvial landform between Pond Creek and Salt Well Slough.

Isolated Find 4

This locality consisted of a Late Archaic-style corner-notched dart point and a single piece of lithic debris recovered in the systematic surface collection of a plowed field about 500 m north of Pond Creek. Five ca. 1900-1940 historic farmsteads were also recorded in this field, and Isolated Find 4 is 100 m west of 41RR222. The nearest prehistoric site is about 300 m to the north (41RR226), and consists solely of a surface scatter of lithic debris, fire-cracked rock, and three fragments of a metate.

Isolated Find E-1

A single Gary projectile point was collected off the surface in a pasture about 100 m south of an intermittent tributary of Big Pine Creek; the current creek channel is 1.25 km to the north. No other artifacts were visible on the surface, and the five shovel tests in the vicinity of the find spot failed to disclose any subsurface archeological deposits.

APPENDIX II, PROVENIENCE OF PREHISTORIC MATERIALS

Isolated Find #1

lot 1, surface

1 dart point (expanding stem, Red River chert)

Isolated Find #2

lot 2, surface

1 bifacial preform fragment, Big Fork chert

Isolated Find #3

lot 1, surface

1 Gary dart point, yellow chert, 20.0 mm stem width, 8.1 mm thickness
1 dart point tip, Ogallala quartzite

Isolated Find #4

lot 4, shovel test #1

2 plain sherds
2 lithic debris

41RR10

lot 2, surface collection

1 ground stone tool
3 lithic debris

lot 1, shovel test #1

1 plain sherd

41RR11, Holdeman

lot 3, Feature 1

2 decorated sherds (1 shell-tempered incised [one line] and 1 grog-tempered Canton Incised)
36 plain sherds
28 lithic debris
2 cores (1 bipolar)
1 lithic flake tool (1 bilateral retouched, Ogallala quartzite)
1 fire-cracked rock

lot 4, Feature 1

Vessel 1, 12 sherds (75% of vessel), grog-tempered jar with appliqued decoration on body; 7.2 cm in diameter; 5.0 mm rim thickness, 7.0 mm body wall, 9.5 mm base thickness

lot 6, Feature 2

Vessel 1, 22 sherds (50% of vessel), plain grog-bone tempered bowl, 2.5 mm rim thickness, 7.5 mm body, and 4.5 mm base thickness

lot 2, Feature 3

Vessel 1, 54 sherds (50% of vessel), grog-tempered jar with appliqued design on body; 5.0 mm rim thickness, 4.0 mm body thickness, 7.5 mm base thickness
6 grog-bone horizontal punctated body sherds (6.5 mm thickness)
1 shell-tempered plain red-slipped body sherd
1 plain grog-tempered body sherd

lot 1, Feature 3/4 fill

2 decorated/rim sherds (non-shell-tempered, 1 punctated, 1 horizontal incised rim sherd)
18 plain sherds (non-shell-tempered)
7 lithic debris
1 burned faunal remain, unidentified

lot 5, Feature 4

Vessel 1, 41 sherds (98% of vessel), shell-tempered bowl with exterior red slipping, interior thickened rim

lot 7, Feature 5

Vessel 1, 72 sherds (40% of vessel), plain grog-tempered bottle, 4.9 mm rim thickness, 5.6-8.7 mm body wall thickness

9 plain grog-tempered body sherds
1 grog-tempered parallel incised body sherd
1 plain grog-tempered rim sherd (6.7 mm thick)
1 plain shell-tempered body sherd
4 lithic debris
1 faunal remain

lot 8, Feature 5

7 decorated/rim sherds (1 shell-tempered red-slipped body, 3 red-slipped bone-grog-tempered body, 1 grog-tempered horizontally incised rim, 1 grog-tempered curvilinear engraved bottle sherd, 1 plain grog-tempered rim)
35 plain sherds
29 lithic debris
2 core fragments
2 lithic tools (2 bilateral retouched, red jasper and Red River chert)
1 daub
3 fire-cracked rocks
1 faunal remain

lot 9, Feature 6

Vessel 1, 13 sherds (15% of vessel), grog-tempered jar with diagonal appliqued strips on the body; everted rim; 5.6 mm rim thickness, 6.2 mm body thickness
1 lithic debris

lot 10, Feature 7

Vessel 1 (30% of vessel), plain shell-tempered jar with strap handle, 4.8 mm body, 8.2 mm base thickness
Vessel 2 (20% of vessel), plain grog-bone-tempered jar, four body lugs, 4.8 mm rim thickness, 7.9 mm body thickness
Vessel 3 (60% of vessel), plain small jar, no apparent temper, jar, 3.6 mm rim thickness, 3.1 mm body thickness
15 plain sherds (6 shell-tempered, 9 grog-tempered)
2 plain grog-tempered red slipped sherds
1 shell-tempered Emory Punctated-Incised rim sherd
4 lithic debris

lot 11, Feature 8

Vessel 1, 34 sherds (40% of vessel), grog-tempered jar (9.6 cm in height) with appliqued triangle, 3.3 mm rim thickness, 3.6 mm body, and 5.9 mm base thickness
3 lithic debris
1 daub
1 fire-cracked rock

lot 12, Area B surface collection

4 dart points (1 Gary point, quartzite, 17.0 mm stem width, 8.0 mm thickness, 1 side-notched novaculite, 1 Ellis, Big Fork chert, 1 Godley, Big Fork chert)
2 lithic debris
1 bifacial preform, Red River chert
3 celts
1 hammerstone fragment

lot 14, Area B, Vessels 1-6 and fill around Vessels 1-5

Vessel 1, 5 sherds (15% of vessel), fine grog-tempered plain jar or bowl; 5.6 mm body thickness, 7.7 mm base thickness; and 1 lithic debris
Vessel 2, 18 sherds (20% of vessel), plain shell-tempered bowl with interior-exterior red slip (Clement Redware); 39 Red River chert lithic debris, 2 daub, 28 plain shell-tempered sherds, 61 plain grog-tempered sherds, 3 grog-tempered engraved sherds--single line
Vessel 3, 19 sherds (40% of vessel), small shell-tempered jar with vertical appliqued ridges, 19 lithic debris, Red River chert, 3 daub, 2 fire-cracked rock, 5 faunal remains; other assorted sherds: 11 plain shell-tempered body sherds, 1 Avery Engraved body sherd; 31 plain grog-tempered body sherds; 1 grog-tempered curvilinear engraved body sherd
Vessel 4, 26 sherds (25% of vessel), shell-tempered Avery Engraved V-shaped bowl, 3.0 mm rim thickness, 4.5 mm body thickness; 2 lithic debris, 1 lithic tool, 1 faunal remain
Vessel 5, 81 sherds (20% of vessel), shell-tempered bowl with horizontal engraving and nodes, interior-exterior red slip; 3.3 mm rim thickness, 4.1 mm body thickness
Vessel 6, 52 sherds (20% of vessel), small shell-tempered bowl with appliqued strip
1 arrow point, Scallorn *var. sattler*, Red River chert

lot 13, Area D surface collection

15 decorated sherds (1 grog-bone-tempered punctated, 2 grog/grog-bone tempered Canton Incised, 1 grog-tempered red-slipped rim, 1 grog-tempered parallel engraved, 1 grog-tempered single line

engraved, 1 grog-bone tempered horizontal and diagonal engraved rim, 1 grog-bone tempered curvilinear engraved, 1 grog-tempered diagonal engraved, 2 grog-tempered multiple parallel incised, 1 shell-tempered diagonal incised, 1 grog-bone tempered horizontal incised, 1 grog-tempered diagonally opposed incised rim, 1 grog-tempered red slipped rim, scalloped)
6 plain rim sherds (5 grog-tempered, 1 shell-tempered)
63 plain sherds
1 arrow point fragment, expanding stem/corner-notched, Red River chert
4 dart points (1 Big Fork chert fragment, 1 Bulverde, novaculite, 2 Gary, claystone-siltstone, 15.0-16.0 mm stem width and 6.0-8.0 mm thickness)
67 lithic debris
2 cores/core fragments, Red River chert and siliceous shale
7 lithic flake tools (3 unilateral retouched [novaculite, siliceous shale, red chert], and 2 bilateral retouched [yellow claystone-siltstone])
2 ground stone celt fragments
2 quartzite hammerstones
3 faunal remains

<u>lot 15, surface collection outside areas A, B, or D</u>

11 decorated sherds (2 shell-tempered Avery Engraved body, 1 shell-tempered parallel-diagonal incised, 1 grog-tempered red slipped body, 1 shell-tempered horizontal engraved rim, 1 grog-tempered unidentified engraved, 1 grog-tempered brushed body, 1 grog-tempered Canton Incised rim, 2 grog-tempered horizontal punctated rims, 1 grog-tempered Sanders Engraved, scalloped rim)
10 plain sherds
1 Red River pipe stem sherd
6 arrow points (1 expanding stem-unifacially flaked, Red River chert, 1 contracting stem, Big Fork chert, 3 Alba [claystone-siltstone, red chert, red jasper], 1 Bonham, gray chert)
1 lithic flake tool (1 unilateral retouched, novaculite)
1 bifacially worked drill, claystone-siltstone
2 celt blanks
1 battered cobble

<u>lot 16</u>

2 arrow points (1 Maud, Big Fork chert, 1 blade fragment, Ouachita Mountains quartzite)
3 dart points (1 Gary, Ouachita Mountains quartzite, 18.9 mm stem width, and 7.1 mm thickness, quartzite; 1 Gary, Ogallala quartzite, 15.0 mm stem width, 6.2 mm thickness; 1 Gary, novaculite, 20.0 mm stem width and 6.2 mm thickness)
1 celt fragment
3 bifacial preforms (1 gray chert, 1 petrified wood, 1 red jasper)
1 lithic debris

<u>lot 17</u>

4 celt fragments (1 diorite, 3 greenstone)
5 celt lithic debris (4 diorite, 1 greenstone)
56 plain sherds
1 Gary dart point, novaculite (20.5 mm stem width and 5.6 mm thickness)
3 arrow points (1 Alba, Red River chert, 1 Colbert, Ogallala quartzite, 1 Maud, Ogallala quartzite)
3 cores (2 bipolar, 1 tested cobble)
9 decorated sherds (2 grog-tempered parallel brushed, 1 red-slipped with scalloped rim, 2 red-slipped body sherds-shell-grog tempered, 1 shell-tempered cross-hatched incised, 1 grog-tempered appliqued, 1 shell-tempered punctated rim, 1 grog-tempered vertical punctated)
34 lithic debris

<u>lot 18</u>

30 decorated grog and grog-bone tempered sherds (1 red-slipped scalloped rim, 5 red-slipped body, 2 Canton Incised, 3 diagonal-opposed incised, 2 horizontal incised, 1 vertical incised, 1 diagonal incised, 5 multiple parallel incised, 2 engraved pendant triangle, 2 single line engraved, 1 diagonal engraved rim, 1 diagonal-parallel engraved, 4 engraved, unidentified motifs)
13 decorated shell-tempered sherds (2 Nash Neck Banded, 4 red-slipped rim, 2 red-slipped body, 2 Emory Punctated-Incised, 1 diagonal incised, 2 Avery Engraved)
4 plain rims (1 shell-tempered, 3 grog-tempered)
1 elbow pipe bowl sherd, shell-tempered
27 plain sherds
11 lithic debris
6 arrow points (1 corner-notched fragment, siliceous shale, 1 novaculite corner-notched blade, 1 unifacially-worked stemmed, claystone-siltstone, 1 Reed, Big Fork chert, 1 Harrell, red chert, 1 Alba, Red River chert)

1 drill, unidentified heat-treated chert
1 arrow point preform, Big Fork chert
2 bifacial preforms, Red River chert
2 celt fragments

<u>lot 19, surface collection area A</u>

5 grog-tempered plain rims
3 shell-tempered decorated sherds (2 exterior red-slipped body, 1 Hudson Engraved body)
26 grog and/or grog-bone tempered decorated sherds (1 plain red-slipped rim, 1 plain red-slipped rim with lip tab, 2 plain red-slipped body, 2 punctated, 1 Canton Incised, 2 alternating triangle incised rims, 3 appliqued, 1 red-slipped Sanders Engraved, 1 diagonal engraved, 3 single line engraved, 4 multiple parallel engraved, 1 horizontal engraved rim, 1 curvilinear engraved rim, 1 curvilinear engraved bottle sherd, 1 herringbone incised, 1 diagonal incised body)
189 plain sherds
232 lithic debris
4 flake tools (1 thumbnail scraper, novaculite, 3 unilateral retouched, Red River chert and 2 claystone/siltstone)
3 bifacial preforms (quartzite and 2 Red River chert)
1 faunal remains
12 daub
9 fire-cracked rocks

<u>lot 20, surface collection, general field</u>

4 decorated shell-tempered sherds (1 appliqued, 1 Avery Engraved, 1 diagonal engraved, 1 Nash Neck Banded rim)
26 decorated grog and/or grog-bone tempered sherds (1 red-slipped plain rim, 5 red-slipped body, 2 appliqued-punctated, 1 horizontal punctated, 2 horizontal punctated rims, 3 Canton Incised rims, 1 diagonal incised rim, 3 cross-hatched incised rims, 1 opposed incised body, 1 red-slipped diagonal engraved, 4 multiple parallel engraved, 1 diagonal and curvilinear, 1 horizontal incised-appliqued node)
2 plain grog-tempered rim sherds
5 plain sherds
3 Red River pipe stem sherds
22 celt/celt fragments
1 celt lithic debris
138 lithic debris
5 cores/core fragments
4 arrow points (1 novaculite Alba, 1 unidentified chert Alba, 1 Big Fork chert tip, 1 quartzite Hayes point stem)
7 flake tools (1 unilateral retouched, Red River chert; 6 bilateral retouched, 3 Red River chert, 2 Big Fork chert, 1 claystone/siltstone)
5 bifacial preforms, 2 novaculite, 1 claystone/siltstone, 2 quartzite
1 bifacial tool fragment, Ogallala quartzite
1 Gary dart point, yellow jasper, 16.3 mm stem width, 6.0 mm thickness)

41RR15, Jonesborough

<u>lot 54, Rise I, shovel test #1</u>

1 plain sherd
1 Gary dart point
1 lithic debris

<u>lot 50, Rise I, shovel test #2</u>

1 plain sherd
7 daub

<u>lot 52, Rise I, shovel test #3</u>

1 plain sherd
1 daub

<u>lot 49, Rise II, shovel test #4</u>

1 ground stone fragment

<u>lot 53, Rise II, shovel test #5</u>

5 decorated sherds
14 plain sherds
4 bone

<u>lot 48, Rise II, shovel test #6</u>

10 plain sherds
3 daub

41RR85

<u>lot 1, surface collection</u>

3 lithic tools: 2 bifaces, 1 flake tool

2 ground stone tools
18 lithic debris
6 fire-cracked rock

lot 2, shovel test #1

1 plain sherd
5 lithic debris
9 daub

lot 3, shovel test #2

1 plain sherd
9 lithic debris
3 fire-cracked rock

41RR99

lot 1, surface collection

10 lithic debris

lot 5, shovel test #1

16 lithic debris

lot 4, shovel test #2

8 lithic debris

lot 2, shovel test #3

9 lithic debris
4 daub

lot 3, shovel test #4

1 plain sherd
14 lithic debris

41RR100

lot 1, shovel test #2

1 lithic debris
4 fire-cracked rock

41RR101

lot 1, shovel test #1

2 plain sherds
1 dart point (Gary type)
24 lithic debris
32 daub
12 faunal remains
13 charcoal pieces

lot 2, shovel test #2

6 plain sherds
15 lithic debris
2 daub
2 fire-cracked rock
4 charcoal pieces

lot 3, shovel test #3

1 decorated/rim sherd
1 biface
2 ground stone tools
24 lithic debris
4 daub

lot 4, shovel test #4

6 lithic debris

lot 5, shovel test #5

1 corner-notched dart point
17 lithic debris

lot 6, shovel test #6

4 lithic debris
1 daub

lot 7, shovel test #7

13 plain sherds
1 ground stone tool
32 lithic debris
3 daub
4 charcoal pieces

lot 8, shovel test #8

4 plain sherds

1 ground stone tool
51 lithic debris
2 daub
1 piece of charcoal

<u>lot 40, N20E0, level 1</u>

11 plain sherds
102 lithic debris
1 lithic tool
3 daub
8 fire-cracked rock

<u>lot 41, N20E0, level 2</u>

3 plain sherds (shell-tempered, 5.0 $\pm$ 1.0 mm mean thickness)
36 lithic debris
3 fire-cracked rock

<u>lot 42, N20E0, level 3</u>

17 lithic debris
1 fire-cracked rock

<u>lot 43, N20E0, level 4</u>

6 lithic debris

<u>lot 44, N20E30, level 1</u>

1 dart point
38 lithic debris
2 lithic tools
9 fire-cracked rock

<u>lot 46, shovel test (#9), level 1</u>

15 lithic debris
6 daub

<u>lot 45, shovel test (#9), level 2</u>

7 lithic debris

41RR102

<u>lot 5, surface collection</u>

4 plain sherds, grog-tempered (4.75 $\pm$ 0.88 mm mean thickness)
4 lithic debris

<u>lot 3, shovel test #1</u>

7 lithic debris

<u>lot 1, shovel test #2</u>

2 plain rim sherds, shell-tempered (5.5 mm thickness)
1 lithic debris

<u>lot 4, shovel test #3</u>

1 lithic debris

<u>lot 2, shovel test #4</u>

5 plain body sherds, 2 grog-tempered (4.25 $\pm$ 0.75 mm mean thickness) and 3 shell-tempered (5.5 $\pm$ 0.33 mm mean thickness)
1 daub

41RR103

<u>lot 1, surface collection</u>

2 dart points (1 Gary, Ogallala quartzite, 18.0 mm stem width, 8.2 mm thickness, 1 corner-notched Marcos, claystone/siltstone)
48 lithic debris
2 cores
6 fire-cracked rocks

<u>lot 5, shovel test #1</u>

1 lithic debris
1 fire-cracked rock

<u>lot 8, shovel test #2</u>

1 lithic debris

<u>lot 6, shovel test #3</u>

26 lithic debris
2 fire-cracked rocks

<u>lot 10, shovel test #4</u>

6 lithic debris

6 fire-cracked rocks

<u>lot 2, shovel test #5</u>

8 lithic debris
1 fire-cracked rock
1 core

<u>lot 4, shovel test #6</u>

2 lithic debris

<u>lot 3, shovel test #7</u>

2 lithic debris
1 fire-cracked rock

<u>lot 9, shovel test #8</u>

2 fire-cracked rocks

<u>lot 7, shovel test #9</u>

3 lithic debris
1 fire-cracked rock

41RR105

<u>lot 1, shovel test #2</u>

1 decorated/rim sherd
2 plain sherds
2 lithic debris

41RR106

<u>lot 2, shovel test #1</u>

26 plain sherds, grog-tempered
5 lithic debris
1 faunal remain
22 charcoal pieces

<u>lot 1, shovel test #2</u>

1 plain rim sherd, grog-tempered
8 plain sherds
1 dart point (Kent type)
1 fire-cracked rock
16 lithic debris

41RR107

<u>lot 1, surface collection</u>

10 lithic debris
1 fire-cracked rock
1 bilateral retouched flake, Red River chert

<u>lot 3, shovel test #1</u>

1 lithic debris

<u>lot 2, shovel test #2</u>

2 lithic debris
1 fire-cracked rock

41RR109

<u>lot 1, surface collection</u>

15 lithic debris
2 ground stone tools: 1 pitted stone and 1 possible mano (1 grinding surface)
1 daub
3 fire-cracked rocks

<u>lot 2, surface collection</u>

1 bifacial tool, claystone/siltstone
12 lithic debris
4 fire-cracked rock

41RR110

<u>lot 2, surface collection</u>

2 plain sherds
1 lithic debris

<u>lot 4, shovel test #1</u>

3 plain sherds
1 faunal remain
1 daub
4 fire-cracked rock
7 charcoal pieces

lot 3, shovel test #2

1 decorated/rim sherd
8 plain sherds
14 lithic debris
1 lithic tool
5 daub
2 fire-cracked rocks
7 charcoal pieces

lot 1, shovel test #3

7 lithic debris
3 daub

lot 11, shovel test #2 (1992)

3 plain sherds (1 grog-tempered, 4.5 mm thickness, 2 shell-tempered, 4.0 mm thickness)
11 lithic debris
4 pieces of charcoal

41RR111

lot 11, shovel test #1

1 fire-cracked rock
3 pieces of charcoal

41RR112

lot 1, surface collection

4 dart points (3 Gary, 1 expanding stem)
2 biface tool fragments
47 lithic debris
1 faunal remain

lot 2, shovel test #2

2 lithic debris

41RR119

lot 1, surface collection (1991)

2 plain sherds, 1 shell-tempered (6.5 mm) and 1 grog-tempered (6.5 mm)
2 dart point, 1 Yarbrough, Ogallala quartzite, and Gary point stem, novaculite
2 bifacial tool fragments, novaculite
5 cores
1 ground stone tool (possible mano with edge grinding)
11 lithic debris
5 fire-cracked rocks
4 daub

lot 11, surface collection (1992)

1 dart point, expanding stem with basal notch, Woodford chert

41RR129

lot 2, surface collection

1 arrow point fragment
1 biface
1 ground stone tool
1 lithic debris

lot 1, shovel test #1

1 biface
1 lithic debris

lot 3, shovel test #2

10 lithic debris
27 daub
4 charcoal pieces

41RR201

lot 1, surface collection

29 plain sherds (shell-tempered, 5.5 ± 0. 77 mm mean thickness)
2 daub

41RR202

lot 1, surface collection

1 shell-tempered Avery Engraved body sherd, interior-exterior red slipped
30 plain sherds, shell-tempered (6.05 ± 1.57 mm mean thickness)

1 dart point (straight-stemmed Bulverde with beveled blade, Red River chert)

41RR205

lot 1, surface collection

1 biface preform, broken, Red River chert
1 core fragment, bipolar, Big Fork chert
1 lithic debris (Big Fork chert)

41RR206

lot 1, surface collection

10 decorated/rim sherds
54 plain sherds
1 arrow point
1 Gary point
1 biface
1 flake tool
1 ground stone celt
41 lithic debris
2 daub
3 fire-cracked rocks

41RR209

lot 1, surface collection

7 decorated/rim sherds
29 plain sherds
9 lithic debris
3 fire-cracked rocks
1 ground stone celt

41RR211

lot 1, surface collection

2 cores
42 lithic debris
1 fire-cracked rock

lot 2, shovel test #1

11 lithic debris
7 daub
11 fire-cracked rocks

lot 3, shovel test #2

2 plain body sherds, grog-tempered (7.5 mm thickness)
7 lithic debris
1 biface preform, quartzite

lot 4, shovel test #3

17 lithic debris
2 fire-cracked rocks
1 ground stone tool, mano
1 straight-stemmed dart point base, Ouachita Mountains quartzite

lot 6, shovel test #5

4 lithic debris
3 daub
6 fire-cracked rocks

lot 5, shovel test #6

1 plain sherd, grog-tempered (4.0 mm)
5 lithic debris
14 fire-cracked rocks

lot 7, shovel test #7

3 plain sherds, shell-tempered (5.0 $\pm$ 0.67 mm, mean thickness)
6 lithic debris
5 fire-cracked rocks

lot 9, shovel test #10

1 lithic debris

41RR212

lot 1, surface collection

1 battered quartzite cobble

41RR213

lot 2, surface collection

3 lithic debris
1 lithic tool

41RR214

lot 1, surface collection

1 decorated/rim sherd
4 plain sherds
1 ground stone tool
7 lithic debris
1 daub

lot 2, shovel test #1

3 plain sherds
1 dart point (possible Kent)
14 lithic debris
1 fire-cracked rock

lot 3, shovel test #2

1 ground stone tool
5 lithic debris
3 daub

lot 4, shovel test #3

1 plain sherd
5 lithic debris
2 daub
1 fire-cracked rock

lot 5, shovel test #4

3 lithic debris

lot 6, shovel test #5

17 plain sherds
2 ground stone tools
5 lithic debris
1 daub
1 fire-cracked rock

lot 7, shovel test #6

3 plain sherds
16 lithic debris

41RR216

lot 3, shovel test #5

1 lithic debris

41RR217

lot 1, surface collection

3 plain sherds, grog-tempered
1 lithic debris

lot 3, shovel test #1

1 lithic debris

lot 2, shovel test #2

1 lithic debris
6 fire-cracked rocks

41RR218

lot 1, surface collection

1 lithic debris
1 grinding slab fragment

41RR219

lot 4, surface collection

2 plain sherds (grog and bone-tempered, 5.75 $\pm$ 0.25 mm)
2 lithic debris
1 quartzite hammerstone

lot 1, shovel test #1

2 lithic debris
2 fire-cracked rocks

lot 3, shovel test #2

2 lithic debris
1 fire-cracked rock

lot 2, shovel test #3

1 biface preform, quartzite
1 lithic debris

41RR220

lot 1, surface collection

1 fire-cracked rock

lot 4, shovel test #1

1 plain sherd, grog-tempered (5.5 mm thickness)
3 lithic debris
1 daub
2 pieces of charcoal

lot 5, shovel test #2

2 plain sherds (grog-tempered, 4.75 ± 0.25 mm mean thickness)
3 lithic debris

lot 2, shovel test #4

1 plain sherd, grog-tempered (5.0 mm thickness)
3 lithic debris

lot 3, shovel test #5

2 decorated sherds (1 red-slipped shell-tempered Clement Redware; 1 appliqued body sherd, grog-tempered)
9 plain sherds, grog-tempered (5.28 ± 0.34 mm mean thickness)
2 lithic debris

41RR221

lot 1, surface collection

2 plain sherds, grog-tempered (3.75 ± 0.25 mm mean thickness)
1 biface preform, Red River chert

lot 4, shovel test #1

6 plain sherds, grog-tempered (6.0 ± 0.33 mm mean thickness)
7 lithic debris
1 faunal remain
4 daub
17 charcoal pieces
1 fire-cracked rock

lot 3, shovel test #2

1 plain shell-tempered rim sherd
7 plain sherds, grog-tempered (5.07 ± 0.65 mm mean thickness)
12 lithic debris
3 fire-cracked rocks

lot 2, shovel test #3

1 unifacial lithic tool
1 dart point, Gary, *var. Camden*
1 ground stone tool (grinding slab fragment)
15 lithic debris
3 fire-cracked rocks

41RR222

lot 3, surface collection

1 dart point

41RR226

lot 1, surface collection

1 metate fragment (3 broken pieces)

41RR229

lot 1, surface collection

3 lithic debris

41RR230

lot 1, surface collection

2 dart points, 1 Gary, Big Fork chert; 1 Kent, quartzite
1 unifacial flake tool
6 lithic debris

lot 3, shovel test #1

2 lithic debris
1 fire-cracked rock

lot 4, shovel test #3

7 lithic debris

lot 2, shovel test #4

1 lithic debris

41RR232

lot 4, surface collection

1 biface
1 ground stone tool
8 lithic debris
1 fire-cracked rock

lot 1, shovel test #1

4 lithic debris
1 daub

lot 3, shovel test #2

10 lithic debris
1 fire-cracked rock

lot 2, shovel test #3

2 lithic debris

41RR233

lot 4, surface collection

1 dart point preform (Gary?)
5 cores
25 lithic debris
1 fire-cracked rock

lot 1, shovel test #1

1 biface
6 lithic debris
1 fire-cracked rock

lot 3, shovel test #3

1 lithic debris

lot 2, shovel test #4

2 lithic debris

41RR234

lot 1, surface collection

1 plain sherd
3 lithic debris
1 faunal remain

lot 2, shovel test #1

3 lithic debris

lot 3, shovel test #2

1 lithic debris

41RR236

lot 2, Rise III, shovel test #7

8 plain body sherds (7 shell-tempered, 1 grog-tempered)
2 red-slipped and shell-tempered engraved body sherds (1 Avery and 1 diagonal lines)
1 grog-tempered red-slipped body sherd
4 lithic debris
1 daub

lot 1, Rise III, shovel test #9

3 lithic debris
3 decorated sherds (1 bone-grog tempered punctated; 2 shell-tempered, 1 Emory Punctated-Incised, 1 single line incised)
1 plain shell-tempered and red-slipped rim sherd
3 daub

lot 13, Unit 1, level 1

9 plain sherds (7 shell-tempered, 2 grog-tempered)
2 lithic debris

<u>lot 14, Unit 1, level 2</u>

2 decorated sherds (1 bone-grog-tempered punctated; 1 shell-tempered incised)
13 plain sherds (11 shell-tempered, 1 shell-tempered red-slipped, 1 grog-grit-tempered)
2 lithic debris
6 daub
3 fired clay

<u>lot 15, Unit 1, level 3</u>

16 plain sherds (12 shell-tempered, 1 shell-tempered red-slipped, 3 grog-tempered)
1 arrow point preform, Big Fork chert
1 lithic debris
3 daub
5 fired clay

<u>lot 18, Unit 1, level 4</u>

7 decorated sherds (3 shell-tempered Nash Neck Banded, 1 rim and 2 body; 1 shell-tempered Emory Punctated-Incised rim sherd; 1 shell-tempered punctated; 1 Avery Engraved shell-tempered; 1 grog-bone-tempered punctated)
1 plain shell-tempered rim sherd
49 plain sherds
1 bilateral flake tool (side scraper), claystone/siltstone)
1 lithic debris
14 daub
7 fired clay
2 faunal remains
8 charcoal pieces

<u>lot 19, Unit 1, level 5</u>

44 plain sherds (37 shell-tempered, 2 shell-tempered red-slipped, 2 shell-grog-tempered, 1 bone-grog-tempered, 1 grog-tempered, 1 grog-tempered red slipped)
1 lithic debris
7 daub
2 charcoal pieces

<u>lot 17, Unit 1, level 6</u>

6 plain sherds (6 shell-tempered)
1 shell-tempered Avery Engraved body sherd
1 lithic debris
1 daub

<u>lot 16, Unit 1, level 7</u>

2 decorated sherds (1 shell-tempered appliqued body sherd; 1 grog-tempered punctated body sherd)
19 plain sherds (15 shell-tempered, 1 shell-tempered red-slipped, 1 grog-tempered, 1 bone-grog-tempered, 1 bone-tempered)
2 lithic debris
6 charcoal pieces

<u>lot 12, Unit 1, level 8</u>

1 shell-tempered punctated body sherd
11 plain sherds (6 shell-tempered, 3 grog-tempered [including 1 bottle sherd], 1 grog-grit-tempered, 1 bone-grog-tempered)
1 Gary dart point, claystone/siltstone (13.0 mm stem width and 5.6 mm thickness)
1 charcoal piece

<u>lot 7, Unit 1, level 9</u>

1 shell-tempered appliqued body sherd
11 plain sherds (2 bone-grog-tempered, 6 grog-tempered, 2 shell-tempered, 1 shell-grog-tempered red-slipped)
2 lithic debris
5 daub
1 burned clay
1 fire-cracked rock

<u>lot 10, Unit 1, level 10</u>

2 decorated sherds (1 plain red-slipped and shell-tempered rim sherd; 1 shell-tempered engraved rim, single line)
1 plain sherd (1 shell-tempered)
2 mud dauber nest pieces
1 charcoal piece

<u>lot 11, Unit 1, level 11</u>

1 plain sherd (1 shell-tempered)
1 lithic debris
2 charcoal pieces

<u>lot 9, Unit 2, level 1</u>

8 plain sherds (6 shell-tempered, 1 shell-tempered red-slipped, 1 bone-grog-tempered red-slipped bottle sherd)

1 lithic debris
2 daub

lot 8, Unit 2, level 2

8 plain sherds (4 shell-tempered, 2 grog-tempered, 2 bone-grog-tempered)
1 arrow point, Bonham, gray chert
1 lithic debris

lot 6, Unit 2, level 3

11 plain sherds (9 shell-tempered, 1 grog-tempered, 1 bone-grog-tempered)
3 lithic debris
2 daub
1 fired clay

lot 4, Unit 2, level 4

1 decorated shell-tempered body sherd (1 appliqued)
9 plain sherds (8 shell-tempered, 1 bone-grog-tempered)
1 daub

lot 5, Unit 2, level 5

9 decorated sherds (1 plain red-slipped shell-tempered rim; 1 shell-tempered Avery Engraved body, 3 shell-tempered single line engraved; 1 shell-tempered curvilinear engraved; 1 shell-tempered Nash Neck Banded rim; 1 shell-tempered appliqued body sherd, 1 bone-grog tempered red slipped body)
18 plain sherds (17 shell-tempered, 1 grog-tempered)
3 lithic debris
3 mud dauber nest pieces
1 faunal remain
1 charcoal piece

lot 36, surface collection around Unit 3

5 decorated sherds (2 shell-tempered Nash Neck Banded, 1 rim and 1 body; 1 shell-tempered appliqued body sherd, 1 shell-tempered red slipped body, 1 grog-tempered red-slipped body)
11 plain sherds (9 shell-tempered, 2 grog-tempered)
4 lithic debris

lot 29, Unit 3, level 1

1 plain red-slipped shell-tempered rim sherd
1 grog-tempered red-slipped body sherd
12 plain sherds (10 shell-tempered, 1 bone-grog-tempered, 1 grog-tempered)
5 lithic debris
1 daub

lot 30, Unit 3, level 2

17 plain sherds
3 lithic debris

lot 31, Unit 3, level 3

4 plain sherds (2 shell-tempered, 2 grog-tempered)
1 lithic debris
2 daub
1 charcoal piece

lot 32, Unit 3, level 4

8 plain sherds (4 shell-tempered, 3 grog-tempered, 1 bone-grog-tempered)
4 lithic debris
12 daub
5 charcoal pieces

lot 33, Unit 3, level 5

3 plain body sherds (2 shell-tempered, 1 grog-tempered)
6 daub
5 pieces of charcoal

lot 34, Unit 3, level 6

2 charcoal pieces

lot 35, Unit 3, level 7

1 daub

lot 20, Unit 4, level 1

1 shell-tempered red-slipped rim sherd (Clement Redware)
25 plain sherds
1 unifacial flake tool, claystone/siltstone
9 lithic debris
6 daub
3 burned clay

lot 21, Unit 4, level 2

1 decorated sherd (1 shell-tempered Avery Engraved body sherd)
1 plain shell-tempered rim sherd
23 plain sherds
8 lithic debris
5 daub
1 charcoal piece

lot 22, Unit 4, level 3

1 grog-tempered punctated body sherd
1 shell-tempered red-slipped body sherd
6 plain sherds (6 shell-tempered)
2 lithic debris
7 daub
2 burned clay
4 charcoal pieces

lot 23, Unit 4, level 4

6 decorated sherds (1 shell-tempered appliqued body sherd; 1 shell-tempered Emory Punctated-Incised; 3 grog-tempered punctated body sherds; 1 shell-tempered red-slipped)
19 plain sherds (15 shell-tempered, 3 grog-tempered, 1 bone-grog-tempered)
1 shell-tempered elbow pipe bowl sherd
1 lithic debris
11 daub
2 burned clay
1 faunal remain

lot 24, Unit 4, level 5

13 plain sherds (12 shell-tempered, 1 grog-tempered)
1 shell-tempered appliqued body sherd
1 bone-grog-tempered red-slipped
2 daub
2 burned clay
1 lithic debris
20 faunal remains
7 charcoal pieces

lot 26, Unit 4, level 6

3 plain sherds (3 shell-tempered)
4 daub
1 faunal remain
3 charcoal pieces

lot 28, Unit 4, Feature 1 (60-72 cm)

7 plain sherds (7 shell-tempered)
1 daub

lot 25, Unit 4, level 7

1 shell-tempered diagonal incised body sherd
3 plain sherds (3 shell-tempered)
2 daub

lot 27, Unit 4, level 8

1 lithic debris
1 faunal remain

41RR238

lot 1, shovel test #1

1 lithic debris

lot 2, shovel test #2

1 plain sherd
8 lithic debris
1 fire-cracked rock

41RR239

lot 2, shovel test #1

1 metate fragment

lot 3, shovel test #2

5 lithic debris

lot 1, shovel test #3

5 lithic debris
7 daub
2 fire-cracked rocks

lot 4, shovel test #4

2 plain sherds
26 lithic debris
1 ground stone tool

8 daub
20 fire-cracked rocks
4 charcoal pieces

41RR240

lot 2, shovel test #1

1 plain sherd
1 lithic debris

lot 3, shovel test #2

2 plain sherds
1 lithic debris
1 fire-cracked rock

lot 1, shovel test #3

1 lithic debris

lot 4, shovel test #5

1 plain sherd

lot 5, shovel test #6

3 plain sherds
2 lithic debris

41RR242

lot 1, surface collection

3 plain grog-tempered sherds
1 dart point, expanding stem, novaculite, cf. Elam type
1 bifacial tool fragment, quartzite
5 lithic debris
2 ground stone tools (1 pitted stone, 1 mano fragment)
1 axe fragment (?), hematite
3 daub
6 fire-cracked rocks

41RR243

lot 1, surface collection

1 plain sherd
20 lithic debris

41RR244

lot 1, surface collection (1991)

7 lithic debris
4 cores
3 fire-cracked rocks

lot 1, surface collection (1992)

1 dart point blade and tip, quartzite
9 lithic debris
2 fire-cracked rocks

41RR248

lot 1, surface collection

154 decorated/rim sherds (2 shell-tempered red-slipped exterior [Clement Redware], 6 shell-tempered red-slipped interior-exterior, 1 rim and 5 body; 8 Avery Engraved, 1 rim [red-slipped] and 7 body; 1 engraved with interior-exterior red slipped; 2 shell-tempered appliqued-punctated body sherd; 6 shell-tempered appliqued body sherds; 1 diagonal incised shell-tempered body sherd; 7 shell-tempered Emory Punctated-Incised body sherds; 121 shell-tempered Nash Neck Banded, 80 rims and 41 body sherds)
40 plain shell-tempered rim sherds
2573 plain shell-tempered sherds (5.31 $\pm$ 1.45 mm mean thickness)
5 lithic debris
3 grinding slab fragments
4 fire-cracked rocks
77 daub
7 faunal remains
7 mussel shell fragments

lot 2, shovel test #2

4 decorated sherds (4 Nash Neck Banded, shell-tempered, 3 rim and 1 body)

1 plain shell-tempered rim sherd
53 plain sherds
2 daub
2 faunal remains

lot 3, shovel test #4

1 plain shell-tempered sherd
1 daub

41RR250

lot 1, surface collection

3 lithic debris
1 faunal remain

lot 2, shovel test #1

1 lithic debris
1 grinding slab fragment

41RR253

lot 3, surface collection

2 lithic debris

41RR254

lot 1, surface collection

2 lithic debris
2 hammerstones, quartzite

41RR256

lot 1, surface collection

4 plain shell-tempered rim sherds
1 shell-tempered Nash Neck Banded rim sherd
212 plain shell-tempered sherds (5.83 $\pm$ 1.14 mm mean thickness)
1 core
1 grinding slab fragment
2 hammerstones
9 daub
4 faunal remains

41RR257

lot 1, surface collection

4 decorated shell-tempered sherds (3 Nash Neck Banded, 2 rim and 1 body; 1 Emory Punctated-Incised body)
6 plain shell-tempered rim sherds
746 plain shell-tempered body sherds
3 lithic debris
30 daub
4 fire-cracked rocks
1 faunal remain

41RR258

lot 1, surface collection

5 lithic debris
1 dart point preform, claystone/siltstone
1 faunal remain

41RR259

lot 1, surface collection

3 dart points, 1 blade (Ouachita Mountains quartzite), 1 tip (Ogallala quartzite), 1 Gary point (claystone/siltstone, 11.5 mm stem width, 5.8 mm thickness)
53 lithic debris
2 bifacial tool fragments, Ogallala quartzite and claystone/siltstone
1 biface preform, Ogallala quartzite
1 fire-cracked rock
1 mussel shell fragment

lot 2, shovel test #1

2 lithic debris

lot 3, shovel test #2

3 lithic debris
1 unifacial flake tool, Red River chert

41RR260

lot 1, surface collection

1 dart point, expanding stem, corner-notched, heat-treated Red River chert (cf. Williams)

lot 2, shovel test #5

1 dart point, expanding stem, concave base (cf. Yarbrough), heat-treated grayish-brown chert, possibly non-local
1 battered cobble with one ground edge

41RR261

lot 1/2, surface collection

3 plain sherds, grog and grog-bone (6.5 ± 1.0 mm mean thickness)
2 red-slipped (interior-exterior) grog-tempered sherds
3 dart points, 1 stem (novaculite), 1 Gary point (quartzite, 17.8 mm stem width, 7.6 mm thickness), 1 straight-stemmed with corner-notching and barbs (Red River chert)
38 lithic debris
1 biface preform, Ouachita Mountains quartzite
1 ground stone tool (battered chert cobble)
1 fire-cracked rock

lot 3, shovel test #4

2 lithic debris

lot 4, shovel test #5

1 lithic debris

41RR262

lot 1/2, surface collection

3 plain sherds, grog-tempered
1 dart point, parallel-stemmed, Red River chert
13 lithic debris
1 biface preform fragment, Ouachita Mountains quartzite
1 ground stone tool (battered quartzite cobble)
1 faunal remain

41RR263

lot 1/2, surface collection

1 arrow point blade, Red River chert
4 dart points, 2 Gary points (1 Big Fork chert, 21.0 mm stem width, 8.2 mm thickness; 1 claystone/siltstone, 19.0 mm stem width, 7.0 mm thickness), 1 contracting stem fragment (novaculite), 1 short expanding stem and corner-notched (cf. Marshall, claystone/siltstone)
38 lithic debris
4 fire-cracked rocks

41RR265

lot 1, surface collection

6 lithic debris
4 daub

41RR266

lot 1, surface collection

2 plain sherds (1 grog, 6.0 mm thickness, and 1 shell-tempered, 5 mm thickness)

41RR267

lot 1, surface collection

1 plain sherd, shell-tempered (6.5 mm)
1 lithic debris

lot 3, shovel test #3

1 plain sherd, shell-tempered (5.0 mm)
1 fire-cracked rock

41RR268

lot 1, surface collection

1 Maud arrow point, Ogallala quartzite
6 lithic debris
1 hammerstone

lot 4, shovel test #1

1 plain shell-tempered rim sherd
1 shell-tempered incised rim sherd
15 plain sherds, 12 shell-tempered (5.38 ± 0.46 mm mean thickness), 3 grog-tempered (6.33 ± 0.45 mm mean thickness)
2 lithic debris

lot 3, shovel test #2

1 plain sherd, shell-tempered (8.0 mm thickness)
3 lithic debris

lot 2, shovel test #3

6 lithic debris

41RR269

lot 1, surface collection

6 lithic debris

41RR270

lot 1, shovel test #3

1 plain sherd, shell-tempered (5.0 mm thickness)
3 lithic debris

41RR271

lot 1/2, surface collection

2 dart points, 1 Gary [24.5 mm stem width, 7.5 mm thickness], Ouachita Mountains quartzite, 1 parallel-stemmed fragment, novaculite)
12 lithic debris

41RR285

lot 1, surface collection

2 fire-cracked rocks
15 lithic debris
1 core fragment
2 flake tools (1 novaculite, 1 Johns Valley shale)
20 plain grog-tempered body sherds

41RR286

lot 1, surface collection

1 fire-cracked rock
1 Gary point, Ogallala quartzite, 8.4 mm thickness, stem width, ca. 21.9 mm
16 lithic debris
1 core fragment
1 bifacial preform
1 hammerstone, quartzite
4 plain grog-tempered body sherds
1 red-slipped body sherd, grog-tempered

41RR287

lot 1, surface collection

6 fire-cracked rocks
1 plain grog-tempered sherd
1 tested cobble, coarse-grained quartzite
4 lithic debris

41RR288

lot 1, surface collection

43 fire-cracked rocks
4 tested cobbles
3 cores
5 core fragments
299 lithic debris
1 Gary point, Red River chert, 17.6 mm stem width, 7.0 mm thickness
2 hammerstones, quartzite
2 manos, sandstone
10 quartzite bifacial preforms
2 bifacial tool fragments, quartzite and Red River chert
14 unifacial and bifacial flake tools (2 novaculite, 4 Red River chert, 1 claystone/siltstone, 1 siliceous shale, and 6 quartzite)
1 Maud arrow point, Big Fork chert
1 arrow point fragment, Big Fork chert
1 novaculite arrow point tip
8 plain shell-tempered sherds
2 decorated shell-tempered sherds (1 red slipped

body, 1 parallel incised body)
18 plain grog-grit-bone tempered sherds

41RR289

lot 1, surface collection

4 fire-cracked rocks
2 tested cobbles
1 core fragment
65 lithic debris
2 Gary dart points, quartzite (17.0 mm stem width, 7.0 mm thickness, and 22.0 mm stem width and 11.2 mm thickness)
1 bifacial tool fragment, quartzite
1 gouge fragment, quartzite
1 grog-bone tempered incised sherd (diagonally incised)
2 red-slipped body sherds, grog-tempered
1 plain rim, grog-tempered
19 plain grog-tempered sherds
4 plain shell-tempered sherds

41RR290

lot 1, surface collection

1 quartzite multiple platform flake core
4 unifacial flake tools (jasper, 2 claystone/siltstone, 1 quartzite)
1 arrow point preform (siltstone)
36 lithic debris
1 plain rim sherd (grog-tempered)
3 plain shell-tempered red slipped body sherds
4 decorated shell-tempered sherds (1 punctated body; 1 horizontal engraved rim; handle with incised lines; rim sherd with horizontal trailed line)
3 decorated grog-tempered sherds (1 engraved body; 1 horizontal punctated rim; 1 vertical incised rim)
34 plain sherds, bone-grog and grog-tempered
17 plain shell-tempered body sherds

41RR292

lot 1, surface collection

12 fire-cracked rocks
1 ground stone tool (metate fragment)
53 lithic debris
1 bifacial tool fragment, Red River chert
5 shell-tempered decorated sherds (1 Nash Neck Banded, 1 single-line engraved, 2 red-slipped, 1 appliqued)
26 plain shell-tempered sherds

41RR293

lot 1, surface collection

2 plain shell-tempered sherds (6.25 $\pm$ 1.25 mm thickness)
11 fire-cracked rocks
7 lithic debris

41RR294

lot 1, surface collection

1 bifacial scraper, Red River chert

41RR295

lot 1, surface collection

2 dart point stem fragments, Big Fork chert and unidentified chert

41RR297

lot 1, surface collection

3 lithic debris

41RR305

lot 1, surface collection

3 fire-cracked rocks
51 lithic debris
49 plain body sherds, grog and grog-bone tempered
1 base sherd, grog-bone tempered
1 plain grog-tempered rim (direct with folded lip)
4 red-slipped body grog-tempered sherds
2 plain shell-tempered body sherds

APPENDIX III, PROVENIENCE OF HISTORIC MATERIALS

41RR11

Lot 17, Garden Area

2 post-1880 shell casings
3 square nails
143 bottle glass sherds (8 clear, 34 purple, 18 aqua, 35 brown, 2 amber, 40 green, 6 dark/olive green)
2 porcelain buttons (4-hole)
244 plain whiteware sherds
3 plain porcelain sherds
9 plain whiteware sherds with maker's marks
2 blue shell-edged whiteware rim sherds, unscalloped and impressed lines
1 green shell-edged whiteware rim sherd, unscalloped and impressed lines
1 sponge/annular whiteware sherd
10 burned whiteware sherds (possibly decorated)
4 yellow ware sherds
44 stoneware sherds (18 salt-glazed-Natural clay slipped interior, 6 Bristol ware, 10 Natural Clay slipped, 10 Albany glazed)
1 porcelain door handle
3 whiteware teacup handles
1 unidentified brass/copper item

Lot 20, Field Surface Collection

1 kaolin pipe stem, 5/64" interior bore hole diameter

Lot 21, Oil Station

2 bottle glass body sherds (1 purple, 1 dark green)
2 bottle glass lip sherds (1 clear, 1880s, and 1 aqua, medicinal)
23 decorated whiteware sherds (1 red cut sponge, 2 blue cut sponge, 3 blue floral transfer-printed, 1 green transfer-printed, floral, 1 red transfer-printed, 3 annular ware--blue, white, and black bands, 7 hand-painted monochrome and polychrome, 1 brown hand-painted rim band, 2 decalcomania, 1 relief-molded floral motif, and 1 gilt lip band)
1 sherd with unidentified black maker's mark
2 yellow ware sherds, 1 with white exterior band
7 stoneware sherds (1 Bristol ware, 5 Natural Clay slipped, 1 Alkaline-glazed)
1 porcelain button
1 cut nail
1 lead ball

41RR109

Lot 1, surface collection

79 bottle glass sherds (41 clear, 4 purple, 11 aqua, 9 brown, 2 amber, 1 blue, and 11 dark green)
3 bottle glass lips (1 brown beer, 1880s, 1 aqua hand-applied lip, 1 purple, machine-made)
1 purple glass base, ornamental tableware
3 bottle glass sherds with embossed markings
171 plain whiteware sherds
15 decorated whiteware sherds (3 blue-shell edged [unscalloped and impressed lines], 3 black hand-painted rims,1 hand-painted body, polychrome, 4 blue Fiesta ware, 3 flow blue, 1 hand-painted)
1 whiteware maker's mark
1 clay stoneware pipe rim
70 stoneware sherds (28 Lead-glazed, 11 Salt-glazed, 11 Salt-glazed/Lead-glazed, 2 Lead-glazed/Brown banded, 2 Alkaline-glazed, 15 Unidentified (12 possible salt-glazed?), 1 Flowerpot (?)
3 porcelain buttons (4-holes)
1 cut nail
1 metal utensil (knife?)
3 metal tool fragments
13 unidentified pieces of metal
1 metal cooking pan fragment
1 brick fragment
10 faunal remains
7 mussel shell fragments

Lot 2, surface collection

4 clear bottle glass sherds
1 plain whiteware sherd
1 Albany-glazed stoneware sherd

41RR112

lot 1, surface collection

2 bottle glass sherds

41RR119

lot 1, surface collection

3 plain whiteware sherds
1 decorated whiteware sherd (brown transfer-printed)
2 stoneware sherds (salt-glazed with interior brown lead glaze and Bristol ware with blue cobalt glaze)
21 bottle glass body sherds (12 clear, 1 purple, 1 aqua, 3 brown, 3 blue, 1 milk glass)
1 clear tableware glass base sherd
1 unidentified metal piece
11 machine-made brick fragments

41RR205

lot 1, surface collection

36 plain whiteware sherds
5 decorated whiteware sherds (1 hand-painted, 2 relief molded dots, 1 hand-painted, polychrome, 1 blue shell-edged, unscalloped and painted)
4 whiteware maker's marks
24 stoneware sherds (4 Bristol glazed, 9 Albany glazed, 1 Bristol glazed with cobalt, 3 Lead glazed, 1 Lead glazed-Alkaline glazed, 3 Salt glazed-Lead glazed, 1 Alkaline glazed?, 2 yellow ware, and one with brown bands)
1 clay stoneware pipe bowl
3 bottle glass lip sherds (1 aqua, machine-made, 1 aqua, 1880s, 1 purple, pre-1903)
83 bottle glass sherds (44 clear, 22 purple, 6 aqua, 4 brown, 3 blue, 4 green)
4 milk glass fruit jar sherds
1 brass overall button
1 machine-made brick fragment
3 cast iron pieces

41RR206

lot 2, surface collection

1 porcelain button (4-hole)
3 whiteware maker's marks

41RR207

lot 1, surface collection

2 stoneware sherds (1 Lead-glazed, 1 Salt-glazed/Lead-glazed)
1 whiteware sherd with maker's mark

41RR213

lot 2, surface collection

1 bottle glass
1 faunal remain

41RR215

lot 1, surface collection

1 machine-made brick fragment (burnt)

41RR216

lot 1, surface collection

1 plain whiteware sherd
1 decorated porcelain sherd, relief-molded, floral
1 Bristol-glazed stoneware sherd
5 bottle glass body sherds (2 clear, 2 purple, 1 milk glass)
2 bottle glass base sherds (1 clear vial, 1 purple), machine-made
1 bottle glass lip sherd (1 brown snuff)
1 machine-made brick fragment

lot 3, shovel test #5

1 plain whiteware sherd
2 bottle glass sherds (1 clear, 1 purple)
5 wire nails

lot 2, shovel test #6

1 plain whiteware sherd
13 bottle glass sherds (9 clear, 3 brown, 1 light green)
1 clear bottle glass lip, 1880s
7 wire nails
1 metal buckle
1 zinc fruit jar lid
1 faunal remain

41RR217

lot 2, shovel test #2

1 plain whiteware sherd
1 stoneware sherd (1 Salt-glazed/Lead-glazed)
6 unidentified pieces of metal

41RR218

lot 1, surface collection

18 plain whiteware sherds
4 stoneware sherds (1 Bristol-glazed, 1 Lead-glazed, 1 Salt-glazed, 1 Bristol-glazed with cobalt)
41 bottle glass body sherds (23 clear, 3 aqua, 6 brown, 4 blue, 5 milk glass)
2 bottle glass lip sherds (1 brown snuff, 1 clear, machine-made)
3 clear tableware glass base sherds, floral motif
3 wire nails
1 metal tool/implement
6 metal agricultural objects
1 mule shoe
1 piece of rubber

lot 2, shovel test # 1

9 clear bottle glass sherds
2 unidentified metal pieces

lot 3, shovel test #2

20 bottle glass body sherds (18 clear, 2 purple)
1 clear drinking glass base, embossed floral motif
3 wire nails
1 barbed wire piece

41RR219

lot 4, general surface collection

2 clear bottle glass sherds

41RR222

lot 1-6, surface collection

581 bottle glass sherds (366 clear, 18 purple, 59 aqua, 43 brown, 24 blue, 71 milk glass)
9 bottle glass lip sherds (6 continuous thread machine-made, 4 clear, 2 aqua; 2 brown beer, 1880s; 1 medicinal, purple)
24 bottle glass base sherds, machine-made (4 clear, 6 brown, 5 aqua, 3 green, 2 milk, 1 purple, 3 blue)
2 clear tableware glass base sherds, machine-made
2 brown snuff glass base sherds
6 bottle glass sherds with markings
58 plain whiteware sherds
2 plain porcelain sherds
3 stoneware sherds (1 Bristol-glazed/Lead-glazed, 2 Lead-glazed)
2 decorated whiteware sherds (1 green Fiesta ware, 1 decalcomania-relief-molded)
1 whiteware maker's mark
1 decorated porcelain sherd (1 decalcomania)
1 wire nail
4 unidentified pieces of metal
1 plumbing fitting
2 machine-made brick fragments
3 pieces of rubber

41RR223

lot 1-4, surface collection

344 bottle glass body sherds (111 clear, 81 purple, 46 aqua, 93 brown, 13 milk glass)
5 bottle glass lip sherds (2 purple [pre-1903], 3 aqua, ca. 1880s)
10 continuous thread lip sherds, machine-made (6 clear, 3 aqua, 1 green)
7 semi-automatic-made bottle glass lip sherds (ca. 1880-1903), 1 brown, 6 purple
13 machine-made bottle glass lip sherds (3 clear, 1 brown, 3 aqua, 6 green)
5 medicinal bottle glass lip sherds (1 clear, 1880s, 2 brown, 2 purple)
5 brown snuff glass lip sherds
7 brown snuff glass base sherds
26 machine-made bottle glass base sherds (4 clear, 5 brown, 5 aqua, 5 green, 2 milk, 5 purple)
8 bottle glass sherds with markings-embossed letters
1 clear glass tableware lip sherd, machine-made
1 purple glass tableware, ornamental vase
198 plain whiteware sherds
5 decorated whiteware sherds (3 decalcomania, 2 relief-molded, floral)
2 ironstone sherds with floral relief molding
2 whiteware maker's marks

20 plain porcelain sherds
83 stoneware sherds (7 Bristol-glazed, 2 Albany-glazed, 21 Lead-glazed, 9 Salt-glazed, 6 Salt-glazed/Albany-glazed, 28 Salt-glazed/Lead-glazed, 8 Bristol-glazed/Lead-glazed, 1 Bristol-glazed with cobalt, 1 Alkaline-glazed)
5 unidentified pieces of metal
1 shell casing
42 metal implement fragments
1 wire nail
1 porcelain button
1 porcelain vase sherd, ornamental
1 porcelain door knob
1 machine-made brick fragment
4 pieces of slate writing tablet
1 piece of plastic

41RR224

lot 1, surface collection

58 plain whiteware sherds
1 plain porcelain sherd
8 decorated whiteware sherds (2 relief-molded, 3 blue Fiesta ware, 3 green Fiesta ware [?])
1 decorated porcelain sherd (rim band)
1 porcelain doll leg
73 bottle glass body sherds (47 clear, 5 purple, 5 aqua, 5 brown, 2 blue, and 9 milk glass)
5 bottle glass base sherds (4 clear, machine-made, 1 purple, machine-made)
1 brown snuff bottle glass base
2 bottle glass lip sherds, 1 aqua 1880s, 1 clear, medicinal, machine-made
2 continuous thread fruit jar lips, machine-made
1 milk glass base sherd
3 wire nails
1 metal spoon
3 machine-made brick fragments
2 faunal remains

41RR225

lot 1-4, surface collection

408 bottle glass sherds (309 clear, 10 purple, 17 aqua, 53 brown, 10 blue, 2 light green, 17 milk glass)
7 bottle glass lip sherds (5 clear, 1 brown snuff, 1 aqua, machine-made)
7 bottle glass base sherds (5 clear, 2 brown snuff)
1 clear tableware glass base, floral motif
5 bottle glass sherds with markings
25 plain whiteware sherds
2 whiteware sherds with relief-molding, floral and ribbed
4 plain porcelain sherds
1 decorated porcelain sherd (1 decalcomania)
10 stoneware sherds (4 Bristol-glazed, 5 Lead-glazed, 1 Salt-glazed and Albany-glazed)
1 glass marble
1 metal strap
5 metal implement fragments
3 wire nails
2 unidentified pieces of metal
20 rubber pieces
10 machine-made brick fragments
1 fauna

41RR227

lot 1, surface collection

3 plain whiteware sherds
2 plain porcelain sherds
1 decorated whiteware sherd (hand-painted, polychrome, broad-line)
12 bottle glass body sherds (7 clear, 1 purple, 1 aqua, 3 milk glass)
1 aqua bottle glass base, machine-made
2 clear bottle glass lips, continuous thread, machine-made
2 unidentified metal pieces

41RR228

lot 1, surface collection

3 plain whiteware sherds
1 stoneware sherd (1 Bristol-glazed)
13 bottle glass body sherds (5 clear, 1 brown, 7 milk glass)
1 bottle glass base sherd (1 clear, machine-made)

41RR229

lot 1, surface collection

1 plain whiteware sherd
1 porcelain door knob sherd

41RR230

lot 1, surface collection

3 bottle glass
1 brick fragment

lot 4, shovel test #3

1 metal

41RR233

lot 4, surface collection

3 plain whiteware sherds
1 bottle glass

41RR236

lot 2, Shovel Test 7

1 iron screw head
1 saw blade fragment

lot 15, Unit 1, level 3

2 wire nail fragments
1 thin unidentified iron fragment

lot 9, Unit 2, level 1

2 bottle glass body sherds (1 brown, 1 purple)

lot 8, Unit 2, level 2

2 bottle glass body sherds (2 brown)

lot 6, Unit 2, level 3

1 bottle glass body sherd (1 aqua)
1 thin unidentified iron fragment

lot 30, Unit 3, level 2

3 snuff bottle glass sherds

lot 20, Unit 4, level 1

1 snuff bottle glass sherd
1 purple bottle glass sherd with marking, "SO"

lot 21, Unit 4, level 2

1 brown bottle glass sherd
2 wire nail fragments
1 thin iron fragment

lot 22, Unit 4, level 3

1 purple bottle glass sherd

41RR239

lot 1, shovel test #3

7 pieces of barbed wire

41RR242

lot 1, surface collection

10 plain whiteware sherds
1 whiteware maker's mark
2 decorated whiteware sherds (1 hand-painted whiteware, 1 possible mocha whiteware sherd)
1 stoneware sherd (1 Lead-glazed)
4 bottle glass body sherds (2 aqua, 2 brown)
2 bottle glass base sherds (1 aqua [pre-1880], 1 green, machine-made)

41RR243

lot 1, surface collection

1 plain whiteware sherd

41RR244

lot 1, surface collection

4 plain whiteware sherds
1 whiteware sherd maker's mark
4 bottle glass sherds (1 clear, 1 purple, 1 aqua, 1 brown)

41RR248

lot 1, surface collection

17 bottle glass body sherds (3 clear, 6 purple, 2 aqua, 5 brown, 1 milk glass)
2 bottle glass base sherds, purple, clear, machine-made
2 bottle glass lip sherds (1 brown, 1880s, 1 clear machine-made)
4 bottle glass sherds with embossed markings
14 plain whiteware sherds
5 whiteware with relief molded sherds, 4 floral and 1 dot
2 whiteware maker's marks
3 stoneware sherds (1 Salt-glazed/Lead-glazed, 2 Bristol-glazed/Lead-glazed)
1 wire nail
2 metal agricultural objects
1 rifle cartridge, shotgun, "REMINGTON No. 12, U.M.C."
1 shell button, 4-holes

41RR253

lot 3, surface collection

29 bottle glass body sherds (17 clear, 4 purple, 7 brown, 1 milk glass)
2 brown snuff bottle glass lip sherds
3 bottle glass base sherds, machine-made (2 aqua, 1 purple)
1 bottle glass with markings/embossed letters
14 plain whiteware sherds
1 whiteware with relief molded dots
11 stoneware sherds (6 Lead-glazed, 1 Salt-glazed, 4 Salt-glazed/Lead-glazed)
1 plain porcelain sherd
8 metal agricultural objects

41RR254

lot 1, surface collection

1 metal ring/chain

41RR256

lot 1, surface collection

3 plain whiteware sherds

41RR257

lot 1, surface collection

4 clear bottle glass sherds
1 pocket knife
1 1937 penny

41RR258

lot 1, surface collection

11 bottle glass body sherds (4 clear, 1 blue, 6 milk glass)
1 clear bottle glass lip, continuous thread, machine-made
1 brown beer bottle base sherd, machine-made
8 plain whiteware sherds
1 decorated whiteware sherd (relief-molded dots)
2 decorated porcelain sherds (decalcomania)
3 plain porcelain sherds
3 Bristol-glazed stoneware sherds
2 tin can fragments
1 brick fragment (machine-made?)
1 glass marble

41RR261

lot 1, surface collection

1 green bottle glass sherd
9 plain whiteware sherds

41RR264

lot 1, surface collection

5 clear bottle glass body sherds
1 brown (snuff), 1 blue bottle, glass bases, machine-made
1 clear bottle glass lip sherd, machine-made
1 bottle glass lip sherd (screw cap)
9 plain whiteware sherds
3 decorated whiteware sherds (relief-molded, floral)
1 unidentified metal piece
1 machine-made brick fragment

41RR265

lot 1, surface collection

120 bottle glass sherds (59 clear, 19 purple, 8 aqua, 26 brown, 1 amber, 1 blue, 2 green, 4 milk glass)
6 bottle glass lip sherds (2 aqua, condiments, 1 1880s, 1 hand-applied lip; 1 purple, hand-applied lip, 1 purple, 1880-1903, 2 aqua, condiments, machine-made)
7 brown snuff glass lip sherds
3 brown snuff glass base sherds
6 machine-made bottle glass base sherds (5 brown, 1 purple)
4 paneled bottle base sherds (4 aqua)
2 molded bottle glass base sherds (2 purple)
18 bottle glass sherds with embossed markings/ lettering
108 plain whiteware sherds
3 decorated whiteware sherds (3 relief-molded, floral)
2 whiteware maker's marks
3 plain porcelain sherds
51 stoneware sherds (7 Bristol-glazed, 1 Bristol-glazed/Albany-glazed, 4 Albany-glazed, 11 Lead-glazed, 1 Lead-glazed/Alkaline-glazed, 2 Salt-glazed, 2 Salt-glazed/Albany-glazed, 18 Salt-glazed/Lead-glazed, 2 Salt-glazed-Brown-banded, 2 Bristol-glazed/Lead-glazed)
3 wire nails
18 metal agricultural objects
2 horse/mule nails
1 horseshoe
2 shell casings
10 faunal remains

41RR266

lot 1, surface collection

5 bottle glass body sherds (1 clear, 1 aqua, 3 brown)
1 bottle glass lip sherd, aqua, hand-made
11 plain whiteware sherds
2 stoneware sherds (2 Salt-glazed/Lead-glazed)
6 decorated whiteware sherds (4 hand-painted, 2 relief-molded, floral)
1 porcelain sherd with ornamental molding
1 cut nail
1 piece of slate writing tablet
6 daub
2 animal bone

lot 2, shovel test #2

2 bottle glass sherds (1 brown, 1 light green)
1 plain whiteware sherd
2 plain porcelain sherds
2 cut nails
11 daub
3 faunal remains

lot 3, shovel test #1

1 bottle glass sherd with markings
3 cut nails
1 faunal remain
11 daub

41RR267

lot 1, surface collection

7 bottle glass body sherds (5 clear, 2 blue)
1 clear bottle glass base sherd, machine-made
1 clear glass chimney glass sherd lip
2 bottle glass sherds with embossed markings
3 decorated whiteware sherds (2 relief-molded, floral, 1 blue transfer-printed)
1 stoneware sherd

lot 2, shovel test #4

1 unidentified piece of metal

41RR271

lot 1, surface collection

34 bottle glass sherds (23 clear, 3 purple, 6 brown, 1 blue, 1 milk glass)
1 bottle glass sherd with markings-embossed letters
13 plain whiteware sherds
1 decorated whiteware sherd (relief-molded, floral)
3 stoneware sherds (1 Bristol-glazed with cobalt, 1 Lead-glazed, 1 Salt-glazed-Albany-glazed)
4 tin can fragments
1 metal latch
1 horse/mule shoe
2 unidentified metal pieces

41RR285

lot 1, surface collection

81 bottle glass (39 clear, 21 purple, 6 aqua, 5 brown, 2 blue, 4 green, 4 milk glass)
2 clear bottle glass base sherds, machine-made
3 continuous thread bottle glass lips, 1 blue Milk of Magnesia, 2 clear fruit jar
1 clear bottle glass lip, machine-made
1 purple bottle glass lip, 1880s, prescription-medicinal
34 plain whiteware sherds
5 decorated whiteware (1 decalcomania, 3 flown blue, 1 relief-molded, floral)
1 whiteware maker's mark
1 decorated porcelain sherd
14 stoneware sherds (1 Bristol-glazed, 7 Lead-glazed, 2 Salt-glazed, 1 Salt-glazed-Albany-glazed, 2 Salt-glazed/Lead-glazed, 1 Bristol-glazed with cobalt)
1 brass overall button, "ROUND HOUSE"
3 cast iron pieces, stove or kettle parts
1 machine-made brick

41RR286

lot 1, surface collection

11 bottle glass sherds (4 clear, 1 purple, 1 aqua, 1 brown, 1 blue, 1 dark green, 2 milk glass)
13 plain whiteware sherds
13 decorated whiteware sherds (1 decalcomania, 3 hand-painted, monochrome, 5 blue transfer-printed, 1 red transfer-printed, 1 blue shell-edged, UID rim form, 1 blue shell-edged, even scalloped rim, 1 decalcomania)
1 plain porcelain sherd
2 redware sherds

41RR287

lot 1, surface collection

6 window glass sherds
97 plain whiteware sherds
14 decorated whiteware (2 molded, 3 transfer-printed [blue and 2 red], 2 makers marks, 1 red stencil, 2 decalcomania, 3 flow blue, 1 green Fiesta ware)
3 decorated porcelain (1 decalcomania, 2 rim band)
4 plain porcelain sherds
141 bottle glass sherds (85 clear, 22 purple, 14 aqua, 12 brown, 4 blue, 4 blue-green)
3 clear bottle glass base sherds, machine-made
1 brown snuff glass base, machine-made
1 purple bottle glass base, paneled bottle
1 clear tableware glass base sherd, floral motif
5 clear fruit jar lips, continuous thread, machine-made
1 brown glass lip, continuous thread
1 aqua hand-applied bottle glass lip
2 clear bottle glass lip, 1880s, condiments
13 milk glass sherds
8 stoneware sherds (1 Lead-glazed, 7 Salt-glazed)
1 metal overall button ("TUF NUT")
3 glass marbles
1 clay marble
1 porcelain animal figurine fragment

41RR288

lot 1, surface collection

7 plain whiteware sherds
10 bottle glass body sherds (2 clear, 2 purple, 2 aqua, 2 amber, 2 blue)
1 aqua bottle glass base, machine-made
1 milk glass fruit jar sherd
1 metal plow part

41RR289

lot 1, surface collection

5 plain whiteware sherds
1 blue transfer-printed whiteware sherd (floral motif)
4 bottle glass body sherds (1 clear, 1 purple, 2 aqua)
2 milk glass sherds
1 Albany-glazed stoneware sherd
1 porcelain button, 4-holes

41RR290

lot 1, surface collection

1 shell casing ("PETERS")
1 metal button

1 porcelain button, 4-hole
50 plain whiteware sherds
3 decorated whiteware sherds (2 decalcomania, 1 molded rim)
3 plain porcelain sherds
3 window glass sherds
75 bottle glass body sherds (39 clear, 11 purple, 4 aqua, 4 brown, 1 amber, 3 blue, 13 green)
4 bottle glass base sherds (2 purple, machine-made, 2 clear, machine-made)
1 blue glass lip, continuous thread, Milk of Magnesia
4 bottle glass lip sherds (1 aqua, ca. 1880s, 1 purple, 1880s, 1 clear, 1880s, 1 clear, continuous thread, machine-made)
1 purple lamp chimney glass sherd
9 milk glass sherds
16 stoneware sherds (1 Bristol-glazed/Albany-glazed, 3 Lead-glazed, 1 Lead-glazed/Alkaline-glazed, 6 Salt-glazed, 3 Salt-glazed/Lead-glazed, 1 Bristol-glazed with cobalt, 1 Alkaline-glazed)

41RR294

lot 1, surface collection

5 stoneware sherds (3 Lead-glazed, 2 Salt-glazed/Lead-glazed)

41RR295

lot 1, surface collection

2 whiteware maker's marks
3 decorated whiteware sherds (1 green transfer-printed, floral, 1 decalcomania, 1 red stencil)
1 porcelain decalcomania

41RR296

lot 1, surface collection

1 lead bullet (.32 cal)
2 porcelain transfer-printed (Phoenix motif)
4 decorated whiteware (3 decalcomania, 1 decalcomania/red stencil)

41RR297

lot 1, surface collection

42 plain whiteware sherds
3 decorated whiteware sherds (2 relief molded, floral and ribbed, 1 decalcomania/rim band)
2 bottle glass body sherds (1 purple, 1 blue)
1 green bottle glass base sherd, machine-made
3 bottle glass lip sherds (1 blue, machine-made-continuous thread, 1 brown snuff, 1 purple, 1880s)
4 milk glass sherds
3 stoneware sherds (2 Bristol-glazed, 1 Salt-glazed/Lead-glazed)

41RR305

lot 1, surface collection

8 bottle glass body sherds (5 clear, 1 purple, 2 brown)
1 clear bottle glass lip sherd, continuous thread, machine-made
2 plain whiteware sherds
3 decorated whiteware sherds (2 hand-painted, 1 blue shell-edged)
2 machine-made brick fragments

APPENDIX IV, PLANT REMAINS FROM THE PINE CONE SITE (41RR236)

Gayle J. Fritz

This appendix presents the raw data on the plant remains recovered from one of the Caddo archeological sites (41RR236) investigated during the 1991 Texas Archeological Society (TAS) Field School on the Red River. Fritz (1992; see also Perttula et al. 2001; Perttula, ed., this volume) describes the paleobotanical findings at this and other Caddo sites worked on by the TAS in 1991.

One 2 liter flotation sample was obtained from Feature 1 (lot 37) at the Pine Cone site (41RR236). Table IV-1 summarizes the carbonized plant remains from the feature, Table IV-2 provides maize cupule measurements, and Table IV-3 lists the charred seeds found in the floated sample. Finally, Table IV-4 presents the Washington University Paleoethnobotanical Laboratory analysis forms for lot 37.

Table IV-1. Carbonized Plant Remains.

lot	wood ct.	wood wt.	cone wt.	cane ct.	cane wt.	maize wt.	cpul ct.	cpul frag	seed ct.	unk ct.	unk wt.
37	4	0.14	9.04	2	0.04	0.10	5	10	5	3	0.11

Note: all weights are in grams

Table IV-2. Maize Cupule Measurements.

Cupule Frag.	Whole Cupule	Cupule Width	Mean Cupule	I.L.	Mean Range (mm)	I.L. (mm)
10	5	5.0-7.5	5.78	2.0-	2.34	2.7

Table IV-3. Seeds.

Phalaris caroliniana	*Chenopod* sp.	*Portulacca oleracea*	*Pinus* sp.
1	1	1	2

Table IV-4. Paleoethnobotanical Laboratory Analysis Forms.

Light Fraction

Initial weight: 4.86 grams

Larger than 2.0 mm:

	Count	Wt. (g)
Wood:	2	0.10

Sieve size wt. (g):

#7 (2.80 mm):	2.70
#10 (2.00 mm):	0.49
#14 (1.40 mm):	0.50
#25 (0.71 mm):	0.62
#40 (0.425 mm):	0.25
Pan:	0.25

Seeds <2.0 mm: (Counts only)

Unknown: 1, 0.01 g

1 *Pinus* sp.
1 *Portulacca oleracea*

Other (describe):

Pine Cone frags: 300, 3.13 g

Heavy Fraction

Initial Weight: 12.34 grams

Larger than 2.0 mm

	Count	Wt. (g)
Wood	2	0.04
Cane Stem	2	0.04
Maize cupule	12	0.10

Sieve size wt. (g)

#6 (3.35 mm):	1.01
#7 (2.80 mm):	1.34
#10 (2.00 mm):	2.03
#14 (1.40 mm):	2.21
#18 (1.00 mm):	1.08
#25 (0.71 mm):	1.23
#40 (0.425 mm):	1.82
Pan:	1.59

Particles <2.0 mm; >0.7 mm (Counts)

3 Maize cupule fragments

Seeds < 2.0 mm (Counts only)

1 *Pinus* sp.
1 *Phalaris caroliniana*
1 *Chenopod* sp.

Other (describe):

Pine Cone frags: +412, 5.91 g

APPENDIX V, ANIMAL BONES FROM THE PINE CONE SITE (41RR236)

LeeAnna Schniebs

INTRODUCTION

The excavation of 41RR236 (the Pine Cone site) in Red River County, Texas, yielded 101 faunal specimens with a total assemblage weight of 19.55 grams. This includes all teeth and bone fragments. Faunal material was recovered from one shovel test, three excavation units, and one feature in this small, early McCurtain phase settlement site. The following sections discuss the methods employed in the faunal analysis, results of taxonomic identification and quantification, and distribution of these remains.

METHODOLOGY

All prehistoric vertebrate remains were inventoried and weighed, and Excel 5.0 for Windows was used to manipulate the generated data. An Ohaus digital scale, Model CT600-S, was used to record bone weight. All fragments recovered were analyzed by the author, using comparative collections on loan from or housed at the Institute of Applied Sciences, Zooarchaeology Lab, University of North Texas, Denton, Texas. Occasional supplements were required, using conventional osteological keys such as Olsen (1964), Gilbert (1980), and Schmid (1972). Identifications were made to the most specific category possible depending on the condition of the bone and available comparative material. Only positive identifications resulted in the assignment of elements to genus or species.

The animal bones were inventoried and bagged by the Texas Historical Commission, then submitted for identification and quantification. Both unidentifiable and identifiable pieces were analyzed in similar fashion. That is, the same attributes were recorded: taxon, element and portion of that element, anatomical location of the element, condition of the bone and any notes on age, taphonomy, burning or breakage patterns, and presence of modification, if applicable. Provenience information was also recorded.

Quantification of the assemblage is summarized as number of identified specimens per taxon (NISP) and as minimum number of individuals (MNI) for identified elements. MNI estimates were calculated according to the most frequently occurring element, based on symmetry and element portion (Munzel 1986). In the mammalian class, teeth were used whenever possible.

The faunal data tables in this appendix are standard species lists with the number of occurrences for each animal. Those specimens regarded as unidentifiable (those coded to only class) have been consolidated into two general categories. Elements of nondiagnostic skeletal value (unidentifiable fragments and long bone shafts; Olsen 1964), are coded in an indeterminate category by class and size range. For example, specimens counted as "mammal" are from indeterminate-size mammals, and "large mammal" refers to a deer-size mammal. Recording these specimens in a size category enables the most precise level of observation that the specimen allows. In small samples, taking note of weight and the size categories of nondiagnostic elements broadens the function of the bone assemblage. However, percentages are calculated by number of bones (NISP) rather than weight.

RESULTS

The only taxonomic class identified is mammal (artiodactyla). None of the faunal specimens are modified. Number of identified specimens (NISP) and minimum number of individuals (MNI) for each taxon are summarized in Table V.1, as are weights for each taxon and their percentages in the site assemblage. Composition of anatomical elements can be found in Table V.2.

ASSEMBLAGE COMPOSITION

Class Mammalia

Order Artiodactyla, Family Cervidae

Whitetail deer (*Odocoileus virginianus*) is represented by 16 tooth fragments recovered in Shovel Test 1. Whitetail Deer is the only species that currently occupies the general area, as it is found in forests, swamps, and open brushy areas (Burt and

Table V.1. Summary of Fauna Recovered from Pine Cone site.

Scientific name	Common name	NISP	MNI	Percent	Weight (g)
Mammalia	Mammal	4		4.0	0.05
Large Mammalia	Large Mammal	79		78.2	16.90
Medium Artiodactyl	Deer-sized Artiodactyl	2		2.0	0.8
Odocoileus virginianus	White tail deer	16	1	15.8	1.8
	Totals	101	1	100.0	19.55

Table V.2. Composition of Faunal Elements.

Scientific name	Common name	UID	Tooth Frags.	Long Bone Frags.	Ulna Frag.	Sesamoid
Mammalia	Mammal	4				
Large Mammalia	Large Mammal	75		4		
Medium Artiodactyl	Deer-sized Artiodactyl				1	1
Odocoileus virginianus	White tail deer		16			
	Totals	79	16	4	1	1

Grossenheider 1980). Prehistorically, other large mammal species may have been present in Red River County, but the elements found in this site assemblage are from smaller individuals. Whitetail deer are known for their small size, as compared to the larger mule deer of the western United States. At least one immature individual was present at the site.

The two medium artiodactyl bones recovered in Unit 4 are also probably the remains of whitetail deer. The medium artiodactyl sample consists of a burned ulna fragment and a podial bone. These are most likely the remains of deer rather than pronghorn (*Antilocapra americana)*. Both are similar in size, but pronghorn antelope are found in open prairies and sagebrush plains well outside of the project area (Burt and Grossenheider 1980).

Additionally, artiodactyl is probably represented in the unidentifiable large mammal category (n=79). Large mammal bones were recovered from Shovel Test 1, Units 1, 2, and 4, including Feature 1. Five fragments are burned.

ASSEMBLAGE CONDITION

In general, the faunal material from the site is highly fragmented. Taphonomic patterns were absent on 40 specimens (Table V.3). Surface observations include splintering, severe exfoliation, and abrasion. Only 6 percent of the site sample is burned (n=6). This may be evidence that the bone was boiled, possible for bone grease processing. The bones would have been broken into small pieces and boiled in water. The floating fat would then be skimmed from the top of the pot. The substance would have been used for frying and other culinary purposes. This practice has been well documented over a

Table V.3. Taphonomic Patterns.

Scientific name	Common name	Absent	Exfoliation	Severe Abraded	Splintered
Mammalia	Mammal	4			
Large Mammalia	Large Mammal	19	59	1	
Medium Artiodactyl	Deer-sized Artiodactyl	1			1
Odocoileus virginianus	White tail deer	16			
	Totals	40	59	1	1

Table V.4. Burned Faunal Specimens.

Scientific name	Common name		Degree of Burning	
		Not Burned	Black	White
Mammalia	Mammal	4		
Large Mammalia	Large Mammal	74	3	2
Medium Artiodactyl	Deer-sized Artiodactyl	1		1
Odocoileus virginianus	White tail deer	16		
	Totals	95	3	3

long span of prehistory and historic times, and is a method used by many different cultures (Leechman 1950). Summary of burned specimens can be found in Table V.4, and the six burned remains were found in Unit 1, level 4 (three large mammal), Unit 2, level 5 (two large mammal), and Unit 4, level 8 (one deer-sized artiodactyl).

Distribution

The distribution of faunal remains within analytical units is summarized in Table V.5. This section organizes the Pine Cone site faunal collection according to recovery by unit.

Shovel Test 1

Fourteen large mammal bone fragments and 16 deer tooth fragments were recovered from this shovel test. None of these pieces are burned.

Unit 1

Level 4 in Unit 1 (30-40 cm bs) yielded four large mammal bone fragments. Three pieces are burned.

Unit 2

Two large mammal bone fragments were recovered from Level 5 (40-50 cm bs) in Unit 2. Both pieces are burned.

Unit 4

A total of 65 faunal specimens were recovered from Unit 4. This includes 59 large mammal bone fragments from two levels (Levels 5 and 6, 40-60 cm bs) in Feature 1. None of these pieces are burned. The remainder of the unit sample consists of one medium artiodactyl bone from Level 4

Table V.5. Distribution of Faunal Remains.

Scientific name	Common name	ST1	U1, lv. 4	U2, lv. 5	F.1 40-60 cm	U4 lv. 4	U4, lv. 8
Mammalia	Mammal				4		
Large Mammalia	Large Mammal	14	4	2	59		
Medium Artiodactyl	Deer-sized Artiodactyl					1	1
Odocoileus virginianus	White tail deer	16					
	Totals	30	4	2	63	1	1

(30-40 cm bs), and one burned medium artiodactyl bone from Level 8 (70-80 cm bs).

SUMMARY

The small faunal collection from the Pine Cone site (41RR236) gives further evidence to the fact that the prehistoric Caddo living along the Red River supplemented their diet with large game. Specifically, the small amount of fauna from the test excavations includes the remains of white tail deer.

REFERENCES CITED

Burt, W. H. and R. P. Grossenheider
1980 *A Field Guide to the Mammals*. 3rd edition. Peterson Field Guide Series, edited by R. T. Peterson. Houghton Mifflin Co., Boston.

Gilbert, B. M.
1980 *Mammalian Osteology*. B. M. Gilbert, Publisher, Laramie.

Leechman, D.
1951 Bone Grease. *American Antiquity* 16(4).

Munzel, S.
1986 Quantitative Analysis and the Reconstruction of Site Patterning. Paper presented at the Vth International Conference of the International Council for Archaeo-Zoology, Bordeaux.

Olsen, S. J.
1964 *Mammal Remains from Archaeological Sites, Part I: Southeastern and Southwestern United States*. Papers of the Peabody Museum of Archaeology and Ethnology 56 (1). Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.

Schmid, E.
1972 *Atlas of Animal Bones*. Elsevier Publishing, Amsterdam.

The Archeology of the Roitsch Site (41RR16), an Early to Historic Caddo Period Village on the Red River in Northeast Texas

Edited by Timothy K. Perttula, with contributions by James E. Bruseth, James W. Cogswell, Gail M. Colby, Sharon M. Derrick, Gayle J. Fritz, Michael D. Glascock, S. Eileen Goldborer, William A. Martin, Hector Neff, Timothy K. Perttula, D. Gentry Steele, Bonnie C. Yates,

ABSTRACT

The 1991 and 1992 Texas Archeological Society Field Schools held along the Red River and tributaries in Northeast Texas were designed to obtain new and important information on the Caddo prehistory and early history of the middle reaches of the Red River, and they were a considerable success. Archeological investigations at the Roitsch (or Sam Kaufman) site (41RR16) recovered significant archeological evidence of Caddo structures and features, mound construction, and burial practices during the Early to Late Caddo periods, as well as a substantial faunal and floral data base on subsistence practices (particularly the use of maize), and from bioarcheological studies, a new appreciation of the health conditions and dietary adaptations of generations of Late Caddo (ca. A.D. 1300-1700) farmers who lived on Mound Prairie.

This article presents the results of the archeological investigations at the Roitsch site. It includes detailed discussions on the archeological, bioarcheological, paleobotanical, and faunal remains found in Early, Middle, Late, and possible Historic Caddo period contexts in the village, and considers the findings in light of the research goals developed during the course of the 1991 and 1992 TAS Field Schools.

INTRODUCTION

Timothy K. Perttula, William A. Martin, and James E. Bruseth

The 1991 and 1992 Texas Archeological Society (TAS) Field Schools were held in Red River and Lamar counties, Texas, under the direction of Dr. James E. Bruseth of the Texas Historical Commission (THC), and assisted by THC staff from the Department of Antiquities Protection (now the Archeology Division). The immediate impetus for holding the Field Schools in Northeast Texas was the devastating 1990 flood along the Red River, which washed away the West Mound at the Sam Kaufman (41RR16, now known as the Roitsch) site (investigated in 1968 by Skinner et al. [1969]), and future floods threatened to remove even more of this important prehistoric and early historic Caddo village. Furthermore, the Roitsch site was being subjected to the looting of prehistoric Caddo burials and other impacts associated with the modern farm use of the land, and it was our feeling that the archeological work that could be accomplished by the TAS would help to obtain significant information on the character of this prehistoric Caddo site and, moreover, increase our knowledge of the native history of the Caddo peoples (see Perttula and Bruseth 1998:1-5) who lived along the middle reaches of the Red River for at least a millennium.

In addition to the investigations completed at the Roitsch site, the subject of this article, the TAS Field School conducted work at the Fasken (41RR14), Jonesborough (41RR15), Salt Well Slough (41RR204), and Ray (41LR135) sites (Figure 1) during either or both years of the Red River field school effort (Bruseth et al. 2001; Kenmotsu 2001, 2006; Perttula et al. 2001; Prikryl 2001, see also this volume; Reese 2001). The TAS also completed an extensive archeological survey on the Roitsch farm lands, which was followed up by additional survey on the Tarrant farm lands, adjacent to the Wright Plantation Mound site (41RR7) (Perttula, this volume) (Figure 2).

As set out in Bruseth et al. (1991, 1992), our work was guided by several basic research goals, each designed to address research problems that we considered relevant to the kinds of archeological sites and deposits to be investigated during the Field School. Furthermore, they were research problems where substantial and pertinent evidence could be expected to be gathered during the course of the Field School work, not simply research problems posed that could only be addressed at the conclusion of a long-term research program in the Red River valley of Northeast Texas (and southeastern Oklahoma), an area unfortunately long-neglected by Caddo archeologists (see Story 1990; Kenmotsu and Perttula 1993; Bruseth 1998). Our goals included: (1) improving the regional chronology; (2) understanding the village structure at the Roitsch site, as well as the other Caddo sites in the vicinity; (3) understanding the internal characteristics of the mounds at the Roitsch and Fasken sites; (4) possibly identifying the historic tribal affiliation of any of the archeological deposits at the Roitsch site that may date from after ca. A.D. 1650 to ca. A.D. 1730; (5) analyzing the human subsistence strategies of the Caddo Indians living in the Red River valley of Northeast Texas through faunal, floral, and bioarcheological remains; (6) determining if the Caddo Indians were processing salt near the Roitsch site; and (7) examining early Anglo-American settlement and trade if the Jonesborough site could be definitely identified through archeological investigations (Bruseth et al. 1991:17-26; Bruseth et al. 1992:19-28; Perttula et al. 2001). We will discuss our findings relative to these goals in the concluding section of this article, and from time to time in different sections when it is relevant in evaluating site- or area-specific TAS findings.

In this article, then, we present the varied findings of the archeological investigations held at the Arnold Roitsch site, a major prehistoric Caddo village and ceremonial center on Mound Prairie in the Red River drainage basin of Northeast Texas (see also Perttula et al. 2001; Skinner et al. 1969). A substantial amount of work was accomplished there during the 1991 and 1992 Field Schools (300+ people do move a lot of dirt in a week, even when it rained!), and impressive amounts of archeological remains were recovered (i.e., more than 100,000 artifacts from the village areas at the

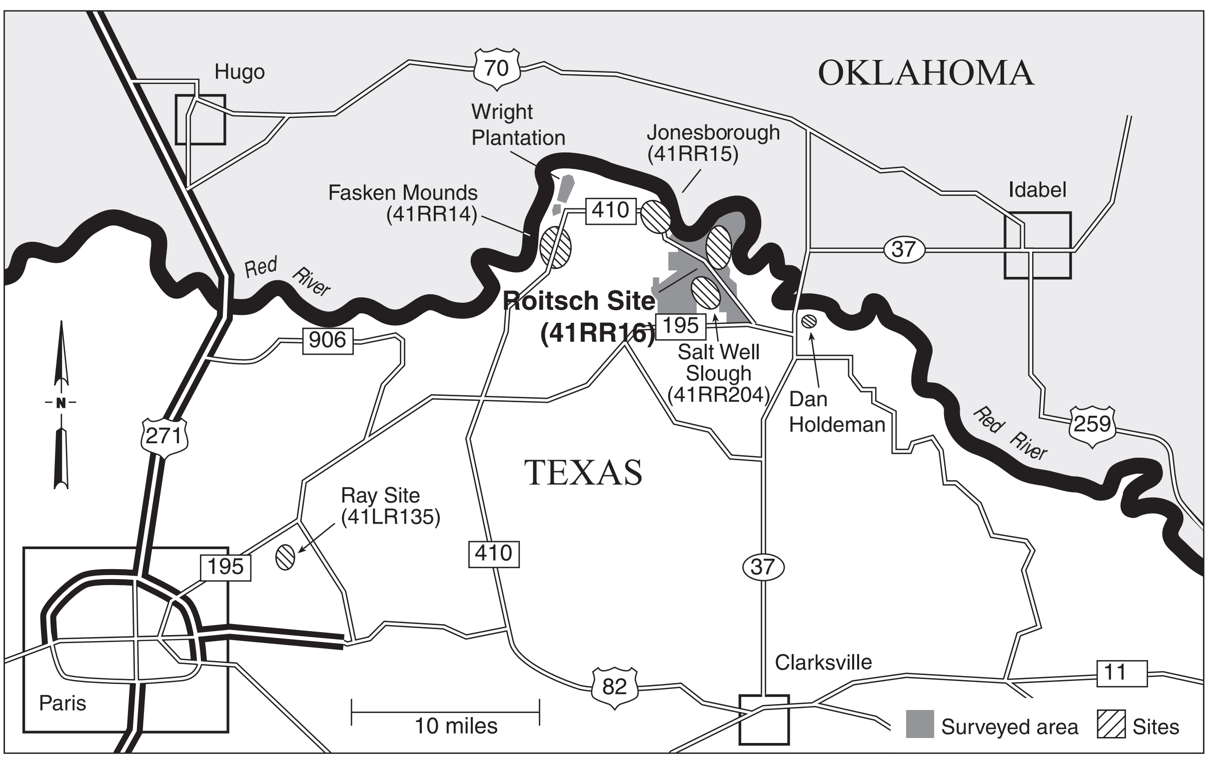


Figure 1. General Location of the 1991 and 1992 Texas Archeological Society Field Schools in Red River and Lamar counties, Texas.

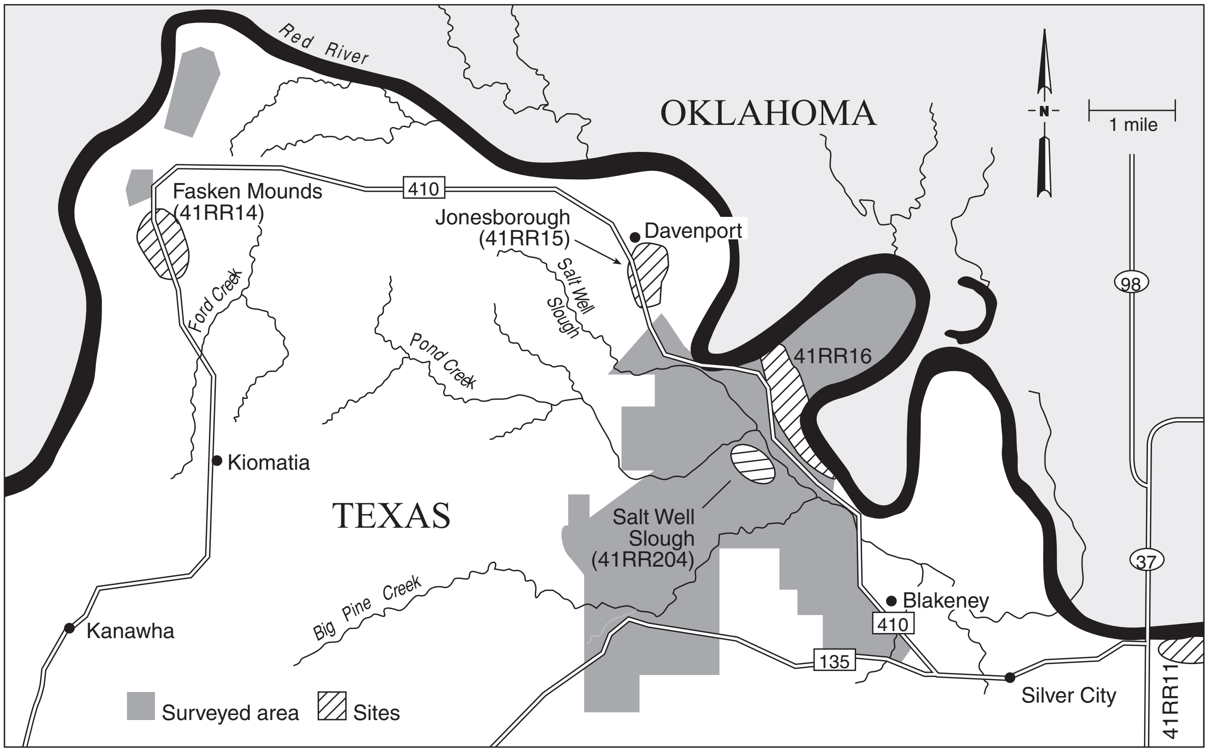


Figure 2. Close-up of the Mound Prairie area, Red River County, showing the location of the Roitsch (41RR16), Holdeman (41RR11), Fasken (41RR14), Salt Well Slough (41RR204), and Jonesborough (41RR15) sites, as well as TAS survey areas.

Roitsch site alone), along with interesting mound, cemetery, and village features (Figure 3).

Previous Investigations at the Sam Kaufman or Arnold Roitsch Site

The Roitsch site (formerly the Sam Kaufman site) represents a village and ceremonial center of the prehistoric and—perhaps historic—Caddo Indians, based on the results of sporadic archeological investigations over the past 50 years. Members of the Dallas Archeological Society (DAS), most notably the late R. K. Harris, conducted limited work at the site during the 1950s. Much of this effort was directed toward salvaging burials that were exposed by plowing (Harris 1951, 1953; Harris et al. 1954; Harris and Wilson 1956). Buddy Jones, then a student at the University of Oklahoma, excavated several other late McCurtain to early Historic Caddo burials (at least six) at the site in the early 1960s, although the results of that work have never been fully reported (Perttula 2006:133-135).

In 1968, Southern Methodist University (SMU), with funding from the National Park Service, conducted about one month of field work under the direction of Dr. Alan Skinner. The purpose of this field work was to gather data on the site, since even at that time it was in danger of washing into the Red River (Skinner et al. 1969). This effort concentrated on the two known mounds, and only limited work was conducted away from the mounds (Skinner et al. 1969: Figure 3). Although SMU's effort left much of the village deposits untouched, it was quite successful in gathering important information about certain aspects of the prehistoric Caddo occupation at the Roitsch site.

There are two other nearby sites that are actually portions of what was very likely a single Caddo village. The first is the Bob Williams site (Perino 1983), located immediately adjacent to the Roitsch site, with the distinction in site designation based largely on property ownership. The second is the Roden site (Perino 1981), located across the Red River in McCurtain County, Oklahoma.

The Williams site was investigated in the late 1970s by Gregory Perino of the Museum of the Red River (Perino 1983). The Museum's work uncovered two major and four minor cemetery areas,

Figure 3. Aerial overview of the Roitsch site during the TAS Field School. Note Block IV excavations on the center of the photograph, and the terrace area investigations at the right hand site of the photograph.

each associated with prehistoric and early historic Caddo household debris. A total of 74 burials was excavated; nearly all of the burials contained grave goods consisting of ceramic vessels, arrow points, and other types of artifacts. Southeast of the East Mound and perhaps in the Bob Williams site area, Harris (1953:63) had reported the discovery of a pit containing 20 human skulls, but no other bones. There were skulls of males, females, and children, and Harris suggested they may have represented the remains of captured enemies.

In the 1970s the Museum of the Red River, under Perino's supervision, also investigated the Roden site. Perino identified two mounds, one of which he investigated (the other had been leveled by a farmer), and several household areas with overlapping house patterns. Thirty-eight burials and a number of features were encountered, including household midden debris and associated bell-shaped pits. Perino (1981:3) also reported two shaft tombs—large, deep burial pits—that had been found by pot hunters or looters at the site before his work had begun. Each shaft burial contained six individuals laid in a row with elaborate grave offering including pottery vessels, copper-covered ear spools, arrow points, and shell gorgets (Perino 1981).

Similar archeological deposits from large prehistoric Caddo villages have also been reported from the Dan Holdeman (41RR11, see Figure 2) and Rowland Clark (41RR77) sites along the Red River (Perino 1994, 1995). These sites had extensive habitation deposits, including structures and many pit features, as well as large cemeteries (see also Perttula, this volume). The sites were occupied primarily in the Late Caddo period, during the McCurtain phase.

In 1999, Banks and Banks (2002) excavated a Late Caddo period burial in the southern part of the Roitsch site that had eroded out of CR 2381. The burial contained a number of funerary objects, including a possible iron knife fragment, and Banks and Banks (2002) have suggested that the evidence recovered from the discovery may relate to initial contacts between the Caddo and the De Soto-Moscoso entrada in the early 1540s. A radiocarbon date from charcoal in the burial fill has a calibrated intercept of AD 1470, with a two sigma age range of AD 1430-1630, suggesting that De Soto-Moscoso entrada contacts are at least within the realm of possibility in this context.

Based on the of investigations at the Roitsch site and surrounding sites, much can be said about the site complex. We know that the Roitsch site was first occupied over 1500 years ago by people that may be affiliated with the Woodland period Fourche Maline culture (see Schambach [1982, 1998, 2001, 2002] for a discussion of the Fourche Maline culture). The Fourche Maline culture is considered ancestral to the modern Caddo Indian peoples. A few artifacts found there, including Gary dart points and a Williams Plain pottery vessel, suggest limited occupation during this time (Skinner et al. 1969). There is also evidence of occupation at a slightly later time by people who made, or perhaps traded, lower Mississippi valley Coles Creek style ceramics. Little is known about the occupation at the site by these people, other than that they left behind a few ceramics from their occupation of the area. These people may also have been affiliated with the Fourche Maline or Woodland period culture (cf. Schambach 1982, 1998), or more likely, the Coles Creek style ceramics were traded to local Fourche Maline groups.

The earliest known Caddo occupation of the Roitsch site occurred around A.D. 1000 to A.D. 1100, during the Formative to Early Caddo period. Locally, this period of time is referred to as the Albion phase (see below). The settlement, whose nature and extent are poorly known, is represented by a few rectangular houses in the vicinity of the East Mound, and a number of burials. Many of these burials have been disturbed by the pot hunting activities at the site, and thus a consistent and characteristic cultural assemblage has not been defined for this period. Excavations by the Museum of the Red River at the nearby Holdeman site in Red River County, Texas, documented an extensive occupation from this period (Loveland 1987; Perino 1995).

Major occupation at the site occurred after about A.D. 1300 (Late Caddo period), during the McCurtain phase, when a village was established. This occupation probably looked much like the settlement shown on a map made in 1691 by the expedition of Domingo Terán de los Rios during a visit to the Red River to investigate the possibility of establishing Spanish missions among the Caddo (see below). The map shows one of the historic Kadohadacho or Nasoni villages that was located northwest of present day Texarkana, Texas (e.g., Schambach 1983; Wedel 1978), most likely at the Hatchel site (41BW3) and other nearby archeological sites (Perttula 2005). The map shows that the village consisted of scattered farmsteads, each with a house and a roofed structure that probably served as an arbor, or covered work area. Each farmstead was surrounded by what appear to be hedgerows, or fence-like alignments of vegetation demarcating individual family compounds. It is likely that fields of corn, beans, and squash were grown on each plot or compound. On one side of the map, an earthen mound is pictured with a structure partially buried on top of it. This was likely a temple where religious and ceremonial-ritualistic activities took place.

The two earthen mounds at the Roitsch site probably served a function similar to the mound illustrated on the 1691 Terán map. One of the mounds, referred to as the East Mound, was constructed up to a height of about 1 m and covered the remains of a structure (Skinner et al. 1969: Figure 5). At the death of a prominent person —perhaps a Caddo tribal political leader (a *caddi*)— a large pit measuring 4 m in diameter and over 1.8 m deep was excavated through the floor of this structure and used as a burial tomb. The grave pit was discovered and excavated in 1968 by SMU (Skinner et al. 1969: Figures 10 and 11). This work showed that the remains of a deceased adult male were placed into the pit along with a female, who may have been his principal wife, and nine other individuals—probably retainers or slaves. Many artifacts were also placed in the pit, including elaborately decorated ceramic vessels, finely made arrow points, shell and turquoise beads traded from other areas, and ground stone celts. The artifacts, representing the wealth of the deceased leader, were most likely used to provision his entourage during their journey to the land of the deceased.

The West Mound was about 60 m in length, 46 m in width, and over 2.1 m tall. Based on SMU's excavations, the mound apparently consisted of superimposed burned layers from former deliberately destroyed structures (Skinner et al. 1969). We believe that this mound also served as a platform for a temple much like the one depicted in the Terán map. The mound was destroyed by erosion during flooding of the Red River in the Spring of 1990.

In 1991, in response to the destruction of the West Mound, the TAS approached Mr. Arnold Roitsch, then the owner of the site, and requested permission to conduct the 1991 TAS Field School at the site in order to retrieve as much information as possible before the river could destroy any more of the deposit. The staff of the Department of Archeological Planning and Review (now the Archeology Division) at the THC was recruited to direct the Field School and conduct all analysis and report preparation tasks. The TAS chose to return to the Roitsch site and northeastern Texas for the 1992 Field School, also directed by the THC staff.

Summary of the Investigations and Contents of this Article

The field work proposed for the site during the two Field Schools included work in a number of different parts of the Roitsch site. This included: (1) opening Blocks I, II, and IX and examining the sub-mound deposits beneath the East Mound, as well as any features exposed within the mound; (2) exposing, mapping, and sampling features such as house patterns, hearths, and pits within the McCurtain phase village area blocks (Blocks III and IV, and probably Block V); (3) conducting excavations in earlier prehistoric Caddo archeological deposits preserved within the village (Blocks VI and 1991 Youth Area); and (4) investigating and documenting the Late McCurtain phase burials exposed by erosion and pot hunter looting in the Terrace area.

Various sections of this article will discuss the results and findings of the archeological investigations in each of these parts of the Roitsch site. Another section (by James W. Cogswell, Hector

Neff, and Michael D. Glascock) is a discussion of the chemical variation in Caddo ceramics found at the Red River Field School sites, as well as other Caddo sites in northeastern Texas, based on instrumental neutron activation analysis (INAA) of the clay paste in those ceramics. Sharon Derrick and colleagues present their detailed analysis of the human remains recovered from the Roitsch site in another section, focusing on evidence for medical disorders, bone infections and pathologies, evidence for cranial modeling (Derrick and Wilson 1997), and dietary practices. The use of both wild and cultivated plant foods by the occupants of the Roitsch site are discussed in two succeeding sections by Gayle J. Fritz and S. Eileen Goldborer, respectively, supplemented with paleobotanical findings from other sites investigated by the TAS during the 1991 and 1992 Field Schools. A section by Bonnie C. Yates presents an analysis of the faunal remains recovered from the Field School sites, particularly from the Roitsch and Ray sites. In the concluding section of this article, the overall results and findings are summarized of the 1991 and 1992 Texas Archeological Society Field School excavations at the Roitsch site.

This article also contains a number of appendices, most of them pertaining either to the Caddo burials and human remains excavated in the East Mound and the Terrace areas (see Appendix II-VI) or are inventories of the faunal remains from the Roitsch and Ray sites (Appendix VII and VIII). Appendix I presents the compositional results of the Red River Caddo ceramic sherds analyzed by INAA. Appendix IX provides morphological descriptions and measurements for the chipped stone and ground stone tools from the different excavation areas at the Roitsch site, while Appendix X is a listing of relevant radiocarbon and Oxidizable Carbon Ratio (OCR) dates from the Red River Field School sites, particularly Roitsch, along with calibrated radiocarbon dates obtained at the time of the Field School investigations from Caddo burials at the nearby Roden (34MC215), Holdeman (41RR11), and Rowland Clark (41RR77) sites.

CULTURAL AND NATURAL SETTING

James E. Bruseth and Timothy K. Perttula

Extensive discussions of the cultural and natural settings of this part of northeastern Texas can be found in a number of recent publications, including Story (1990), Kenmotsu and Perttula (1993), Bruseth (1998), and Perttula (2004). Most of the Field School sites lie in the northwestern portions of Red River County, in Northeast Texas, while the Ray site (41LR135) is in northern Lamar County, about 25 km southwest from the Roitsch site (see Figure 1).

The ecotonal setting of the Field School sites in the West Gulf Coastal Plain (Fenneman 1938) centers on the Red River valley, with widely scattered intermittent and/or permanent streams (such as Nolan Creek, one of the northward-flowing tributaries of the river) that eventually flow into the Red River. While now mainly agricultural fields, pasture, and second growth pines and hardwoods, this part of Northeast Texas was an area of mixed oak woodlands and mixed pine-hardwood forests (Diamond et al. 1987; Brown et al. 1998) in the uplands and hardwoods, swamps, and marshes in the broad Red River riparian bottomlands. Also present in these floodplains were sloughs, abandoned channels, and oxbow lakes, and many have fertile sandy loam elevated terraces and natural levees (Thomas 1977) adjacent to them that were ideal habitation areas for foragers and agriculturists alike. While the Tall Grass Prairie or Blackland Prairie habitat and black clay soils are situated to the west and south of the Roitsch site, there were scattered prairies in Red River County (see Jordan 1981). These include small prairie patches downstream from the Roitsch site in the Pecan Point area and Shawnee Prairie in the Sulphur River drainage, as well as Mound Prairie (or Jonesborough Prairie) from the confluence of the Kiamichi and Red rivers (near the Fasken and Wright Plantation sites) as far downstream as the mouth of Big Pine Creek, several km below the Roitsch site itself.

In modern times, the middle reaches of the Red River were well-watered, with about 110-120 cm of precipitation annually. The area also has a mild, humid, sub-tropical climate with more than a 220 day growing season (Thomas 1977:88). Generally modern climatic conditions were established in the region about 5000 years ago.

This part of Northeast Texas was settled first by mobile hunter-gatherers as early as 12,000 years ago (the Paleoindian period), if not before, and was used by Archaic foragers for millennia (Bousman et al. 2004; Fields and Tomka 1993). About 2000-2500 years ago in Northeast Texas, however, around the onset of the Woodland period, the prehistoric Native Americans living in the Red River basin began to settle down in small hamlets and camps dispersed across recognizable territories (Bruseth 1998; Perttula et al. 1993; Schambach 1982). These Native American groups made thick and usually plain grog-tempered pottery (Williams Plain), and used Gary and Kent dart points for hunting and other tasks (Story 1990). About A.D. 700, these groups began to make and use small stemmed arrow points for hunting.

The principal occupation of Red River and Lamar counties in prehistoric and early historic times (up to about A.D. 1800) was by Caddo speaking groups (specifically the Kadohadacho and affiliated groups, see Swanton 1942) that lived in settled horticultural and agricultural communities (principally farmsteads and small hamlets), and larger villages were situated along the Red River during much of the prehistoric and early historic era along the Red River (e.g., Story 1990; Perttula 1992; Bruseth 1998:55-62). The current chronology of prehistoric and early historic Caddo periods and phases in the middle Red River valley is provided in Table 1.

Caddo archeological sites in the region are known to be located on elevated landforms (alluvial terraces and rises, natural levees, and upland edges) adjacent to the major streams, as well as along the minor tributaries and spring-fed branches. They are also located in proximity to arable sandy loam soils, presumably for cultivation purposes (see Perttula 2001, this volume). These Caddo groups were powerful theocratic chiefdoms that built mounds for political and religious purposes and functions, traded extensively across the region and with non-Caddo-speaking groups, and in certain settings (including the Red River basin), developed intensive maize-producing economies.

Certainly the best known prehistoric Caddo period in the middle Red River valley is the Late Caddo period and the McCurtain phase. Bruseth (1998) provides the most current discussion of the archeological character of the Late Caddo McCurtain phase, which includes farmsteads, villages, and mound centers along a 50 km stretch of the Red River in northeastern Texas and southeastern Oklahoma, as well as on tributaries (such as Mountain Fork River, Kiamichi River, Glover Creek, and the Little River) that drain the southern Ouachita Mountains (see Bruseth 1998:Figure 3-9). From stable isotope and bioarcheological evidence, the McCurtain phase Caddo were agricultural peoples, depending heavily on the cultivation of maize as the main staple of the diet (Rose et al. 1998; Colby 1997). Like other Late Caddo period groups on the Red River, the McCurtain phase settlement pattern includes numerous habitation sites (with household cemeteries) and mound centers—such as the Roitsch, Dan Holdeman (Perino 1995), and Rowland Clark (Perino 1994) sites in northeastern Texas, and A. W. Davis (Wilson 1962), Clement (Bell and Baerreis 1951), and Cowell (34MC221) sites in southeastern Oklahoma—although the mounds appear to have mainly been constructed between ca. A.D. 1300-1500.

Bruseth (1998:62) suggests that the Caddo settlements along this stretch of the Red River resembled the Teran-Soule model (i.e., Schambach et al. 1983; Trubowitz 1984) in that Caddo villages were composed of individual compounds of houses and other structures associated with mounds and the residence of a *caddi* or chief (Figure 4). There is no evidence of vacant areas around these Red River ceremonial centers, however, as Schambach et al. (1983) had postulated when they developed the Teran-Soule model.

Table 1. Caddo periods and phases in the Middle Red River Valley.*

Period	Phase	Time
Formative Caddo	Albion	A.D. 900-1100
Middle Caddo	Mound Prairie	A.D. 1100-1300
Late Caddo	early McCurtain	A.D. 1300-1500
	late McCurtain	A.D. 1500-1700
Historic Caddo	—	A.D. 1700-1730+

* modified from Bruseth 1998:Figure 3-4

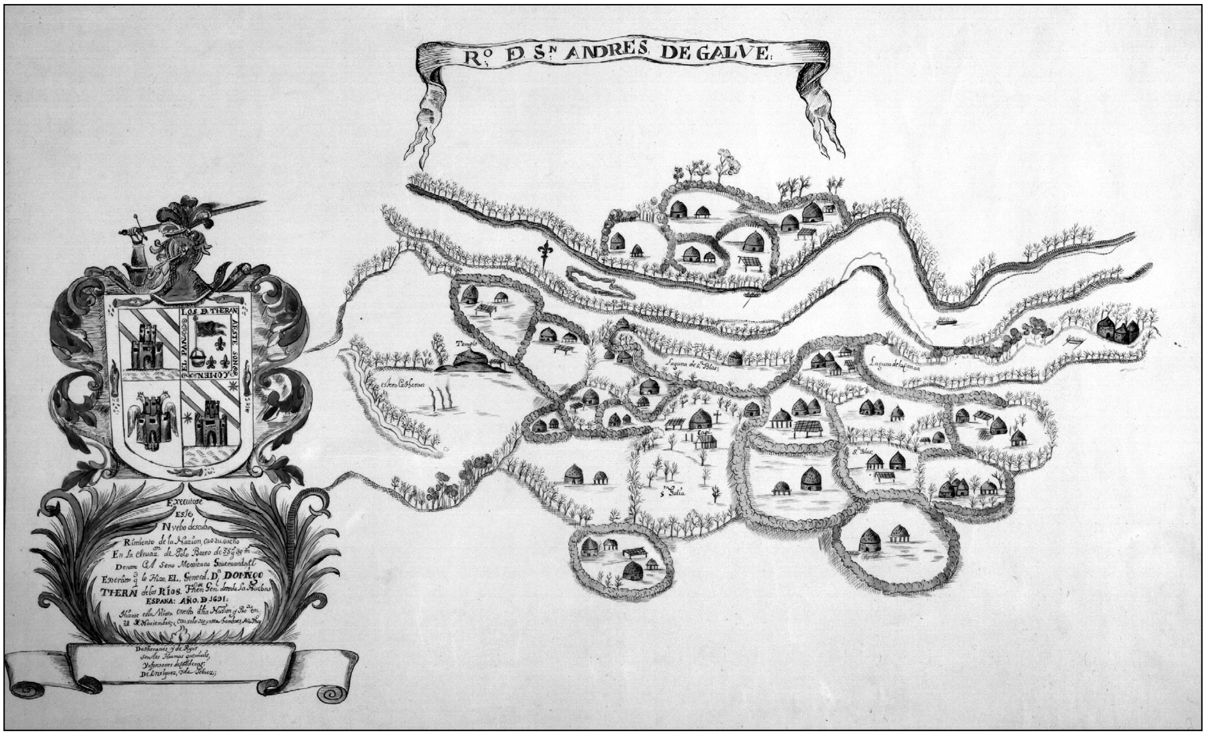


Figure 4. Teran map of 1691.

The density of McCurtain phase sites indicates that "greater numbers of people were living in closer proximity than before" (Bruseth 1998:64). At the Roitsch site, the mound in McCurtain phase times was used as a place for the burial of the social elite, as a shaft tomb with 10 individuals and many grave goods was located near the center of the mound (Skinner et al. 1969). Special purpose salt-processing sites (such as the Salt Well Slough site [41RR204]) are also common in the vicinity of the Roitsch site (see Kenmotsu 2001, 2006).

Due to diseases introduced by Europeans, and the incursions of the Osage into the Red River valley to obtain deer hides and Caddo slaves, by the late 1700s (ca. 1795), the Kadohadacho groups had abandoned the Red River basin (see Smith 1998, 2005). These Caddo groups subsequently moved to the Caddo Lake area along the Louisiana and Texas borders (see Parsons et al. 2002) as well as various settlements south of Caddo Lake (Tiller 2007).

Culture Historical Overview

The Arnold Roitsch site and other sites that were investigated for the Field School have occupations extending from the Late Archaic through the Historic periods. It was doubtful that occupations earlier than this would be found at the sites selected for the Field School since they are situated on landforms in the Red River alluvial valley that appear to have formed over the last 2000 to 3000 years. Consequently, this cultural historical overview will begin with the Late Archaic period and extends through the early part of the Historic period.

Late Archaic Period (2000 B.C. to 500 B.C.)

The Late Archaic period is generally thought to reflect a mobile hunting and gathering way of life by the aboriginal occupants of the Red River valley and local region. During this time, small bands of people moved from place to place in search of wild game and plants for food. A wide variety of faunal and floral resources was exploited, although few subsistence data exist to support this conclusion. Much of our assessment of the Late Archaic period in the middle Red River area is based on references to surrounding areas where better information is available. A number of archeologists (e.g., Story 1985; McGregor 1987; Bruseth and Martin 1987; Fields and Tomka 1993) have suggested that populations densities during this period were high relative to earlier periods, and it is probable that this led to a reduction in the sizes of band territories as well as increased settlement permanence.

Common artifact styles for the Late Archaic period along the Red River valley of Texas include Edgewood, Ellis, Gary, Palmillas, and Yarbrough dart points and several types of ground stone objects, including grooved stone axes, and less frequently, gorgets. Chipped stone axes and stemmed hoes are also seen in artifact assemblages. Within the Late Archaic period, there is little available data to support a more detailed artifact sequence because few well stratified sites have been excavated in Northeast Texas (Story 1990a).

Woodland Period (500 B.C. to A.D. 900)

The Woodland period is generally noted by the first occurrence of ceramics on archeological sites along the Red River and tributaries. Sites of this period are often small, apparently impermanent or semi-permanent, habitations located in elevated landforms bordering natural lakes, relic channels, and terraces of major river systems. Some sites can be larger and contain significant quantities of midden deposits, forming "midden mounds" (see Galm 1984), although such midden mounds have not been identified to date in northeastern Texas

Sandy paste wares—vessels with great quantities of sand added to the clay—are among the first ceramics to occur in northeastern Texas (Story 1990a), but plain grog-tempered pottery has been found in early Woodland contexts (see Rogers et al. 2001) in the Sabine River basin in northeastern Texas as well as along the Red River (Schambach 1982, 1998, 2002). It is possible that the introduction of ceramics may have occurred earlier than the date we have listed for the beginning of this period (cf. Galm and Flynn 1978:155-156), but the lack of dated components for the Red River valley requires a conservative estimate at this time.

Other artifacts diagnostic of the Woodland period include double-bitted axes, dart points most commonly of the small and relatively narrow contracting stem Gary type, and at ca. A.D. 700, expanding stem arrow points, such as Scallorn points. The arrow points, importantly, signal the introduction of the bow and arrow technology that quite likely resulted in an increase in hunting efficiency.

Fourche Maline is a cultural designation used for Woodland period sites in southwestern Arkansas, southeastern Oklahoma, and parts of northeastern Texas by Schambach (1982, 1998, 2001, 2002). It is noted by the presence of thick flowerpot-shaped, bone-tempered, grit-tempered, or grog-tempered vessels. Other artifacts include Gary projectile points, double-bitted chipped stone axes or hoes, platform type pipes, Poole ceramic pipes, and boat stones. Burials are often flexed or semi-flexed, and found in village middens, although some are cremated or buried in small earthen mounds (see Schambach 1982; Webb 1984). Presently, it is not clear how far the Fourche Maline culture extends into the Red River valley of Texas.

Coles Creek is another culture for which artifacts are occasionally found along the Red River valley of Texas and surrounding areas in contexts apparently dating before A.D. 900. This culture was originally defined for the lower Mississippi valley by Ford (1936:172-218) and is used to refer to sites with predominantly horizontally incised ceramics and the wide-spread use of flat-topped, rectangular or square platform mounds at ceremonial sites (Haag 1971:22-28). The occurrence of Coles Creek style ceramics on middle Red River sites is most likely the result of the trade and exchange of pottery vessels—as well as a borrowing of ceramic styles—rather than a product of settlement by lower Mississippi valley aboriginal groups.

Formative Caddo and Middle Caddo Periods (A.D. 900 to 1300)

Archeological sites dating after ca. A.D. 900 are abundant in the middle part of the Red River basin in northeastern Texas and southeastern Oklahoma. Formative Caddo period Albion phase components are present all along the Red River valley of Texas and along major tributaries such as Big Pine Creek. A number of cultural innovations caused significant changes during this period. First, a more efficient hunting strategy continued to develop following the introduction of the bow and arrow during the Woodland period. We see the nearly total replacement of dart points by arrow points in the archeological record after ca. A.D. 700. Second, the likely introduction of more productive varieties of maize and other tropical cultigens, especially during the Middle Caddo period Mound Prairie phase, supplemented the collecting of wild plants and the hunting of animals. Hunting-fishing-gathering activities were still important, however, particularly the exploitation of deer, fish, and small mammals. Sedentary communities, mound centers, and short-term campsites reflect the dispersion of the population near arable soils, forested habitats, and dependable freshwater sources.

During these periods a wide variety of finely made ceramics were made by the prehistoric Caddo peoples. Many of the ceramics were quite elaborately decorated and have been classified as types Crockett Curvilinear Incised, East Incised, Holly Fine Engraved, Hickory Fine Engraved, Maxey Noded Red Ware, Pennington Punctated-Incised, Sanders Engraved, and Spiro Engraved (Suhm et al. 1954; Suhm and Jelks 1962). Several varieties of Red River style long-stemmed clay pipes were manufactured during this period (see Hoffman 1967). Common arrow points include stemmed varieties such as the Alba, Bonham, Hayes, and Morris types.

Late Caddo Period (A.D. 1300 to 1700)

A similar way of life for the Caddo peoples of the Red River valley of Texas continued into the Late Caddo period McCurtain phase. The production and utilization of maize, beans, and squash appears to have become a more important part of the economy, although hunting remained an important subsistence practice. While there may have been changes in regional settlement, the basic types of sites remained the same: small settlements of one to several farmsteads, and larger communities with mounds; the communities probably resembled the Nasoni Caddo village mapped in 1691 by Domingo Teran de los Rios—referred to as the "Teran Map" (see Figure 4). All these types of Late Caddo period settlements are known to occur in the local area. Another type of site that might be present is a salt-making camp. Salt springs are known along Salt Well Slough, and three sites are known to occur in association with a salt spring in the vicinity of the Roitsch site (see Figure 2 and Kenmotsu 2001, 2006).

Common artifacts for this period include a number of ceramic and arrow point types. The most distinctive ceramic type—and likely to be the most frequently found during excavations—is the red slipped vessels of Avery Engraved, a well-crafted fine ware. The distinctive design of this type is a rising sun motif appearing on the rim of vessels (see Suhm and Jelks 1962: Plates 1 and 2). Other types include Emory Punctated-Incised, Nash Neck Banded, Simms Engraved, and Taylor Engraved. Arrow point types include Fresno, Maud, and Bassett.

Historic Period (A.D. 1700 to 1850)

Historic Caddo Indian occupations, with European trade goods (particularly glass beads), have been reported from a number of sites on the Red River in Northeast Texas, including Sam Kaufman, Bob Williams, and Wright Plantation in the Mound Prairie area (Perino 1983; Perttula 1989, 1993). Recent excavations across the region indicate that Historic Caddo settlements were primarily small dispersed farmsteads and hamlets with associated household cemeteries (cf. Story 1995). Although the reasons are not clearly established, the regional population appears to have been much lower than during the Late Caddo period, and it is likely that the introduction of European epidemic diseases and Osage Indian depredations contributed to the decreasing permanent Caddo settlement of the Red River valley after the beginning of the 18th century. Archeological evidence suggests that the Caddo settlement of the local area lasted primarily until ca. A.D. 1730.

Material culture items on Historic Caddo archeological sites include a wide variety of native ceramics, including Emory Punctated-Incised, Hodges Engraved, Foster Trailed-Incised, Hudson Engraved, Nash Neck Banded, Natchitoches Engraved, and Simms Engraved, along with stone, bone, and shell tools, implements, and ornaments. Arrow points include the Maud type. These artifacts are often accompanied by such European trade goods as guns and gun parts, glass beads, metal kettles, hatchets, knifes, hoes, lead balls, and silver, brass, copper, and iron ornaments. Most of these items were obtained by the Caddo from the French as annual presents or as payments for maize, deer or bison pelts, horses, and bear oil obtained from Caddo traders.

Archival and historical documents indicate that in the early part of the 19th century the Western Cherokee had a village on the Red River near the mouth of the Kiamichi River (Everett 1990:34, 51) and near to the Anglo-American community of Jonesborough. This village was called Tahchee's Village. There currently is no known archeological evidence of this Cherokee village, but we might expect with some scrutiny to find Cherokee pottery, silver ornaments, metal arrow points, chipped bottle glass, glass beads, and Euro-American ceramics, gun parts, gunflints, and metal tools in the area.

The town site of Jonesborough (see Figure 2) is reported to be one of the two earliest

Anglo-American settlement in Texas (Webb 1952:928), and was settled in 1814, several generations after the Caddo had left this part of northeastern Texas. At that time, the site was part of Hempstead County in Arkansas Territory. Jonesborough was largely abandoned in the mid-1840s (Reese 2001; Steely n.d.). The town was visited by many persons who are famous in Texas history, including David Crockett, Jim Bowie, and Stephen F. Austin.

RESEARCH GOALS OF THE ARCHEOLOGICAL INVESTIGATIONS

by James E. Bruseth and Timothy K. Perttula

Goals of the Field School Investigations

Several research goals developed prior to the 1991 and 1992 excavations guided the archeological investigations at the Roitsch site and neighboring sites during the Texas Archeological Society Field Schools on the Red River and tributaries. In this section these problems are defined and discussed; a few comments are also in order about the research problems that are discussed below. Many are broad and addressable only by the analysis of archeological data from many sites beyond that of what may be recovered from the Roitsch site. In 1991 and 1992, we viewed the Field School as an initial study of the archeology of the Red River valley, an area that has been neglected by recent archeological researchers in Texas. We have tried to focus on those research issues most in need of study at that time. Although some of the problems are quite broad, we were confident that data would be collected during the Field School to begin addressing most, if not all, of them.

More comprehensive resolution of the research problems will come from comparison with archeological data that may be obtained from surrounding sites in the Red River valley. It is also probable that some of the problems will only be fully resolved through future fieldwork at new sites. To ensure that there is a continuity in the resolution of such research problems, the Field School efforts were used to develop study units for the Northeast Texas Archeological Plan, developed by the Texas Historical Commission (Kenmotsu and Perttula 1993). This should hopefully encourage future archeological projects to address unresolved research problems for the Red River valley.

Improve the Chronology

Unquestionably, the most basic archeological research problem for the Red River valley is improving our understanding of the prehistoric chronology and cultural historical sequence for the area. Few detailed chronological studies have been undertaken at sites in this area; instead, attempts to develop and understand the Red River valley of Texas temporal framework have borrowed heavily from surrounding regions. While the chronology of all major prehistoric periods are in need of re-examination, the Woodland through Late Caddo periods are in greatest need, and these are the periods for which we expected to recover relevant archeological and chronological data during the Field Schools. Greater details on the major chronological issues are described below.

A brief note is needed at this point on the use of the term *focus* in the following discussion. In recent years, the convention has been to discard the term *focus* for the use of the word *phase,* or in some instances, the broader word "culture" (a collection of related phases). While we support this change and the accompanying taxonomic clarity achieved (cf. Willey and Phillips 1958), our purpose here is to describe the present chronological framework as it existed in 1991-1992 when these research goals were formulated, and to indicate areas where revisions were sorely needed. It was assumed that as the research design was implemented, and new archeological and chronological data was obtained, new *phases* would be defined from the old foci for the Red River valley of Texas; such is indeed the case (see Table 1), as is discussed throughout this article.

Fourche Maline Culture

One of the more troublesome issues is the paucity of Fourche Maline sites in the Texas and Oklahoma portions of the Red River valley. As noted previously, these sites are defined for the Woodland period along the Red River in southwestern Arkansas, and are proposed for much of eastern Texas by Schambach (1982:133, 1998, 2001, 2002). Story (1990a:293) has argued that Schambach's Fourche Maline culture is too long-lived and likely includes culturally diverse groups. As an alternative for the southern portions of eastern Texas, she identifies the Mossy Grove culture for Woodland period peoples who made sandy paste ceramics and used Gary dart points (Story 1990a:256). This cultural group is thought to have lived primarily south of the Sabine River of Northeast Texas. Were Fourche Maline people present along the Red River in Texas? Does the Mossy Grove concept apply north of the Sabine River for groups living in Northeast Texas?

Since artifacts that relate to the Woodland period—namely Williams Plain ceramics and Gary dart points—have been found at the Roitsch site in the past (Skinner et al. 1969; Harris 1953), future work at the site was considered likely to provide additional data to help understand the types of Woodland period occupations that occurred in this portion of the Red River valley. We also anticipated that data from this period would be obtained from work at other sites found during the archeological survey of the Roitsch property (and a few sites dating to this period were found, see Perttula 2001, and this volume), and quite possibly during testing at the Fasken Mound (see Prikryl 2001, and this volume). As part of the analysis and synthesis of the archeological data, should discrete Woodland period archeological deposits be identified during the Field Schools, the concepts of Mossy Grove and Fourche Maline were to be reviewed, and examined for their applicability to this part of the Red River valley of Texas. We believe that the resolution of this research problem will come from careful examination of the existing data base combined with analysis of relevant archeological data recovered from the Field School survey and excavation data.

Coles Creek Culture

As noted above, Coles Creek is a lower Mississippi Valley cultural designation for sites dating from ca. A.D. 700-1200, that among other cultural traits had distinctively decorated ceramics and flat-topped, rectangular, or square-shaped earthen mounds (see Kidder 1998:129-130 and Figure 6.2). Over the years, researchers have noted the occurrence of Coles Creek type ceramics at several sites in northwestern Louisiana, southeastern Arkansas, and northeastern Texas (Dickinson 1936:68; Webb and Dodd 1939:115-118; Hoffman 1970:154; Story 1990b).

A number of arguments have been made regarding the presence of Coles Creek ceramics in the Red River valley. For instance, Gregory (1991) had hypothesized that early Coles Creek ceramics were simply a type of ceramics used by Alto phase Caddo peoples. Such an interpretation would not require the introduction of new people into the area, but would instead view these Coles Creek ceramics as simply the addition of new decorative styles to a pre-existing ceramic assemblage. Moreover, he suggested that Coles Creek style ceramics were made later than generally thought by most Texas archeologists working in Northeast Texas, as late as A.D. 1200 (Pete Gregory, personal communication, 1991).

Others have noted that Coles Creek ceramics precede Caddo style ceramics where good archeological and/or stratified contexts have been observed, particularly in burial mounds (Schambach 1982; Durham and Davis 1975), such as at the Crenshaw site in southwestern Arkansas. To some, this might seem to present an obstacle to the acceptance of Gregory's hypothesis regarding the occurrence of Coles Creek ceramics in the Caddo archeological area. Story (1990a:323) has also noted that the initial development of Caddo culture is preceded by the occurrence of lower Mississippi Valley (LMV) type ceramics on Woodland sites in the region, and that the development of prehistoric Caddo society and the appearance of LMV ceramics must be related phenomena, but she provided no additional suggestions on what the relationship might be.

Since Coles Creek type ceramics have been found at the Roitsch site (Skinner et al. 1969) and at the neighboring Williams site (Perino 1983), it was considered likely that additional Coles Creek ceramics will be found during the Field School. The controlled recovery of these ceramics in datable archeological contexts, in addition to those previously collected, may provide an opportunity to address the issue of what Coles Creek and Coles Creek ceramics represent culturally in the Red River valley of northeastern Texas.

Sanders Focus or Phase

The Sanders focus represents one of the more commonly used cultural terms in Northeast Texas archeology, yet one of the most poorly defined, as has been pointed out repeatedly by Schambach (1999, see also Schambach 1995). Temporal placement of the Sanders focus or phase is generally accepted to be between ca. A.D. 1100 and 1300.

The concept of the Sanders focus was originally formulated by Krieger (1946:172) to describe a cultural manifestation that occupied either side of the Red River on the border between the eastern forests and the western prairies (see Bruseth 1998: Figure 3-8). The definition of the focus was based largely on excavations at the Sanders site (41LR2), located near the Red River in Lamar County, Texas. Excavations were conducted by a Works Progress Administration (WPA) crew, under the direction of A. T. Jackson, primarily in one of two mounds at the site. Twenty-one burials were recovered, and a number of associated grave goods were found, including distinctively decorated ceramic vessels, copper-covered ear spools, shell beads, and engraved conch shell. Ceramic types included Sanders Engraved, Sanders Plain, and Maxey Noded Redware; the Bonham arrow point type was the principal arrow point affiliated with the Sanders focus. Krieger (1946:172) noted that a second grouping of Sanders focus sites lie in the upper reaches of the Sabine River in Van Zandt, Wood, and Hopkins counties.

A short time later, Bell and Baerreis (1951:53) defined the Nelson focus from the WPA excavations at the Cook and Nelson sites, located directly across the Red River in Oklahoma (see Bruseth 1998: Figure 3-8), as a separate focus from the Sanders focus. They, however, did note:

> Though there are important differences [between the Nelson and Sanders foci], the complex designated as the Nelson focus shares a large series of traits with the Sanders focus now known primarily through manifestations in Texas. The Nelson focus may possibly represent a peripheral variant of this culture, strongly influenced and modified by contacts with Spiro focus components in Oklahoma.

The excavations at the Nelson and Cook sites have never been published, and we have little information on which to judge the validity of the Nelson focus as a separate cultural designation from the Sanders focus. From work across the Red River at Hugo Reservoir on the Kiamichi River, several sites were investigated that contained components relating to the Sanders focus (Burton 1970; Rohrbaugh 1973), but this work provided little help in sorting out the elements of the Sanders Focus. In fact, quite to the contrary, Rohrbaugh (1973:205-210) added to the taxonomic confusion by creating the Apple phase, a new taxonomic designation for these Early Caddo to Middle Caddo period components. There is even considerable doubt about the utility of the Sanders focus, since it is based largely on work from only the Sanders site, and the entire issue of the Early to Middle Caddo period phases on the Red River is badly in need of overhaul.

Since ceramics and features radiocarbon-dated to the time of the Sanders focus have been found at the Roitsch site (Skinner et al. 1969), we considered it quite likely that additional artifacts and features of this cultural phase would be encountered during the TAS Field Schools. In fact, to the north and east of the East Mound, many artifacts and features may be encountered that could be associated with a Sanders focus or phase occupation, based on the results of the 1968 work by SMU (Skinner et al. 1969: Figure 5). Possible Early to Middle Caddo components have been seen at other sites further down the Red River as far as the Holdeman site (41RR11) at Albion, Texas, and information from these sites may also be relevant to gaining a better understanding of the Sanders focus or phase, as well as the archeology of the Early to Middle Caddo periods on the Red River. Based on the recovery of grog-tempered ceramics from the Fasken site and vicinity, and the type of mound construction—with the large platform mound—it was thought to be probable that the work at the Fasken Mounds site would yield data relating to this phase, and in fact, the occupation of the site and construction of its various mounds may date principally to ca. A.D. 1100-1300 (see Prikryl 2001, and this volume).

McCurtain Focus or Phase

The McCurtain Focus was defined by Bell and Baerreis (1951:53-61) to describe Late Caddo period manifestations in southeastern Oklahoma on the basis of excavations at the Clement and McDonald sites (see Bruseth 1998: Figure 3-9). The most distinctive element of the focus or phase are the ceramics, with the type Avery Engraved being most commonly recovered and viewed as diagnostic of the focus. Subsequent workers in Northeast Texas have used this cultural designation, and have temporally expanded it to a temporal range of A.D. 1300 to 1700 (Perino 1983:72). Others in southeastern Oklahoma have further modified the concept by equating portions of the McCurtain focus with sites belonging to the Mountain Fork complex in the southern Ouachita Mountains (Wyckoff 1967), mixing elements from what appear to be several cultural phases. The net result was, as aptly noted by Story (1990a:331), to make the McCurtain focus a hodgepodge.

Much of the data from work at the Roitsch site and other sites to be found during the archeological survey of the Roitsch Farm will undoubtedly come from components that can be classified as belonging to the McCurtain focus or phase. The large shaft grave and a majority of other graves found at the site by Skinner et al. (1969) are representative features of the McCurtain focus or phase, and it was probable that other features and burials would be found during the TAS Field Schools that relate to this focus or phase. These archeological data, together with existing information from other sites, and a suite of radiocarbon dates from good occupational contexts (e.g., Bruseth 1998: Figure 3-3), should be suitable to work the McCurtain focus or phase into more meaningful cultural taxonomic units. Several people have suggested that certain ceramic styles change over the duration of the focus or phase (Skinner et al. 1969; Perino 1983:72; Perttula 1992), and that they can be used to seriate the different components that comprise the focus or phase. These suggestions can be explored during the course of the archeological investigations at the Roitsch site, and should well-preserved features (including burial features) be encountered, a seriation of McCurtain focus or phase archeological deposits and burials at the site can be attempted utilizing the whole vessels found in association with them.

Understanding The Village Structure at the Roitsch Site

Although professional and avocational archeological excavations have been undertaken at the Roitsch site over a period of at least 40-50 years, most of this work was devoted to uncovering burials. Well over a hundred burials have been recovered by these efforts. Pot hunters have also been looting the site for more than 60 years, and it is estimated that these individuals have dug several hundred other burials (Perttula 1993, see also below). The fact that so many burials have been excavated is testimony to the intense settlement that occurred at the site in prehistoric and early historic period times over several hundred years by the Caddo people.

But the emphasis of previous efforts on the cemeteries at the Roitsch site underscores one of the major weakness of the present data base: namely, we have little systematically collected data from habitation areas. Features such as house patterns, hearths, pits with food remains, and artifact caches have been found, but little attention has been given to their careful excavation and detailed reporting. Consequently, this will be a major focus of our efforts at Roitsch, and by doing so, we hopefully should learn more about the intra-site arrangement of activities within the Caddo community that is represented by the Roitsch site.

We propose, however, to also spend some time re-investigating the East Mound, and its function within the Roitsch site village. SMU spent considerable effort in this part of the site, and dug many backhoe trenches and examined several features, including the deep shaft burial described earlier. Based on their work, they concluded that the mound was not a man-made structure in the usual sense of a mound, but that it might represent the product of flood deposition (Skinner et al. 1969:17). Although SMU workers may be correct in their assessment, certain characteristics of the East Mound bear closer inspection during the TAS Field Schools. First, the large shaft grave was found directly below the central portion of the mound. This is a tradition often seen at earlier Caddo civic-ceremonial sites where a mound was constructed over a burial tomb for an important person. The best example of this is the grave beneath Mound C at the George C. Davis site (Story 1990a:339-341, 1997). Second, the shaft burial at the Roitsch site was found within a rectangular structure that may have served as a ceremonial temple or perhaps as a charnel house. The fact that both the house and the shaft grave were directly underneath the mound was reason enough to propose reopening the mound trenches and re-examining the profiles. The ceramics from the shaft grave date the feature to the Late Caddo period, McCurtain phase; calibrated dates from two of the individuals buried in the shaft tomb range from AD 1412-1511 and AD 1431-1513 (Perttula 1998: Table 1). If the mound is found to be a man-made feature during the TAS work, this would be evidence that mound building—long considered to be principally an Early to Middle Caddo period activity in the Middle Red River—continued at this site into the Late Caddo period.

At a broader level, we propose to also collect archeological information during the Field School to test the appropriateness of the Teran map as a model of inter-site settlement for the Roitsch area along the Red River. This will be accomplished by trying to identify separate contemporaneous household areas in patterns similar to that shown in the 1691 Teran map (see Figure 4). The individual house and cemetery areas found by Perino (1983) at the adjoining Williams site provide initial support for this supposition, but additional habitation data from the Roitsch part of the village are needed to fully explore this research issue.

To begin to test the appropriateness of the Teran map as a settlement model, a broader area than the Roitsch site will need to be investigated. Therefore, we propose that an intensive survey be undertaken of hundreds of acres of adjacent land. The owner of the site, Mr. Arnold E. A. Roitsch, is allowing us to survey portions of his 7,000 acre farm, and this survey should undoubtedly locate several associated farmsteads and other domestic and residential Caddo sites (see Perttula 2001, and this volume). In fact, from the earlier efforts of SMU (Hyatt and Mosca 1972) in this area, we already know of several prehistoric Caddo sites on the Roitsch property. After these sites are recorded, testing may be conducted at one or two that offer the greatest promise for testing the applicability of the Teran map vis a vis how individual prehistoric Caddo households were organized. These will be the types of sites most likely to contain evidence of structures, pits, and post holes, as well as good evidence for contemporaneous occupation with the Roitsch and Bob Williams household clusters (i.e., date to a certain segment of the McCurtain focus or phase). They may also have datable deposits, and preserved animal and plant remains, that will allow us to investigate Late Caddo subsistence patterns.

Identify the Historic Tribal Affiliation of the Sam Kaufman or Roitsch Site

Harris (1953), Skinner et al. (1969), Wright (1938), and Perino (1983) have all noted the presence of historic European trade materials with the aboriginal Caddo occupations at the Roitsch and adjoining Williams sites (see also Banks and Banks 2002). These have been found in burials, where they are associated with what would otherwise be classified as prehistoric artifacts, and from the surface of the site. Perino (1983) suggested that the Williams site dates to as late as A.D. 1700, although artifacts found by Harris (1953) would suggest a somewhat later date for the Roitsch site Caddo occupation; the recovery of Keno Trailed, *var. Phillips* vessels at the site suggest a Caddo occupation of some parts of the site dating as late as the early 18th century (Perttula 2006:135). Given the fact that the site has a historic component, there may be a possibility of relating the archeological deposits to one of the historic Native American groups from the area noted by early travelers and explorers, although it seems most likely that this historic component is the product of a Caddo settlement.

Further down the Red River, around the Great Bend, Hoffman (1970) has associated the Little River phase with the Upper Nasoni Caddo, and Schambach (1983:10) has related the Chakanina phase with the second village (late 1780s) of the Kadohadacho. Can the Roitsch and Williams sites be associated with another grouping of the historic Caddo, such as the Nanatsoho (Swanton 1942)? Little is know about this group of historic Caddo tribes that lived on the upper Red River, and after about 1750 they apparently disappeared as a distinctive group.

Alternatively, Williams (1964:565) had suggested some years ago that the Roitsch site may be associated with the historic Kichai. Although many people relate this group to the Historic Wichita tribes that moved into Texas during the early 18th century, others have suggested that they resided south of the Sabine River during prehistoric times (Story 1990a:346; Hughes 1968:297; Lorrain 1967:33-37). This latter situation would make an ethnic association with the Roitsch site a possibility, although remote.

More archival research in the Spanish and French documents and careful analysis of the existing artifactual and archival data, together with a thorough examination of any new archeological data from ca. A.D. 1700-1730 contexts collected during the Field School, may allow this issue to be addressed in more detail. Determining the ethnic affiliations of the Roitsch site historic occupation would have important implications for the area's archeology, as would a more definitive association with another, but heretofore unsuspected, aboriginal Red River group. For instance, if the historic occupants at the Roitsch site can be convincingly linked to one of the historic Caddo groups known to have lived in this part of the Red River valley (cf. Swanton 1942: Figure 1), this would imply that the Caddo occupied a longer stretch of the Red River in northeastern Texas than has previously been recognized simply from the historic documents, which date primarily after the mid-part of the 18th century. While archeologically this has long been known, historically (i.e., from the mid-18th century on) the Caddo are not reported as occupying the Red River as far upstream as the Roitsch site. If, alternatively, the Kichai were the historic occupants of the Roitsch site, then we would have intriguing information as to the origins of this tribe, known almost exclusively through historic documents and archival sources. The Kichai are conventionally considered to have come into Texas from the north in the late 17th century and to be affiliated with the Wichita tribe (Rohrbaugh 1982). As a cautionary note, however, it should be mentioned that we may recover too little archeological data to link the historic occupation of the site to any known historic aboriginal group.

Analyze Human Subsistence in the Red River Valley of Texas

There are a number of ways in which we can study the nature of human subsistence in this part of the Red River from the Late Archaic to the Historic Caddo periods. The most basic ways are to directly examine and identify the plant and animal remains preserved in datable archeological deposits in the TAS Field School sites. Specialists with expertise in the analysis of these materials will attempt to document patterns of plant and animal use through time, and based upon their absolute and relative frequencies in archeological deposits, they can offer evidence to determine the types of resources that were most important to the prehistoric and/or early historic inhabitants of the Red River Valley.

Bonnie C. Yates, Brian Shaffer, and Bill McClure have studied the animal remains from the Field School sites (see below). Both the Roitsch and the Ray sites contained well-preserved animal remains. The types of research problems they were to pursue included: (a) determining patterns of important game animal exploitation (such as deer) by Woodland and Caddo populations living along a major stream such as the Red River as opposed to populations living on tributary streams and in upland habitats, and (b) the exploitation of prairie animal species (such as bison). Also of interest in investigating human subsistence from animal remains was how antler and bone tool technologies changed through time in horticultural and agricultural Caddo economies, as these tools should be informative about changes in the processing and use of wild animals, especially the exploitation of large game animals.

Gayle J. Fritz and S. Eileen Goldborer analyzed the charred and preserved plant remains from the different excavated Field School sites (see below, this article). Charred remains were recovered in 1991 through the flotation of soil fill from a variety of cultural features at the Roitsch, Ray, Fasken, and Salt Well Slough sites, and considerable numbers of features in 1992 from Roitsch, Ray, and Fasken also contained charred plant remains. We expected that corn should be recovered from a number of samples at the Roitsch and Ray sites, along with charred seeds, nuts, and various woods. Similar types of plant remains should also be found at Fasken and Salt Well Slough, although with the limited number of features likely to be encountered it is possible that less diverse plant remains will be documented there.

Of particular research interest for the study of the plant remains is how did Woodland and prehistoric Caddo subsistence patterns change with the introduction and adoption of tropical domesticates such as corn, beans, and squash. Available plant and bioarcheological data (especially stable carbon isotope analyses of prehistoric Caddo human remains) suggests that corn did not become the predominant food source in much of the Caddo archeological area until after ca. A.D. 1300 (see Perttula 1996, 2008), but the timing of such subsistence changes in the Red River valley is still poorly understood. Data from the Field School should contribute to a better understanding of subsistence changes through time. Before corn became an important resource, native seed-bearing domesticates such as sumpweed, sunflower, knotweed, chenopod, maygrass, amaranth, and little barley were cultivated in parts of what are considered the Caddo archeological area (especially on the Arkansas River and the Ozark Highland) (Fritz 1990). It will be important to determine if these plants were also cultivated in the Red River valley, and to determine when did their use become common.

The human skeletal remains from the Roitsch site will be studied by D. Gentry Steele and colleagues at Texas A&M University (see Derrick et al., this article). Physical anthropological observations and stable isotope analyses of the remains should contribute important information on Late Caddo period adaptive efficiency, nutritional status, and the character of their diet since the recovered burials from the Field School are expected to date from McCurtain phase times.

In an excellent synthesis of the bioarcheology of the human skeletal populations from the Red River valley, Burnett (1990) offered a number of interesting comments. Most importantly for the archeological study of the Red River valley of Texas, she noted:

> ...the caries [cavities] data suggest that the Caddoan [sic] residents of Kaufman-Williams-Roden relied upon a different diet, likely dependent upon maize with some indication of nutritional inadequacy. Conversely, their neighbors, the Late Caddoan [sic] residents of the Hatchel-Mitchell [-Moores] sites, relied upon a diet that was not carbohydrate rich and was more nutritionally adequate (Burnett 1990:395).

Burnett suggested that the Late Caddo and Historic Caddo period inhabitants of the Hatchel-Mitchell-Moores area in Bowie County, Texas, were not utilizing maize, but were instead relying on food sources only available from the Piney Woods region of the eastern portions of the Red River valley of Texas. This possible Late Caddo adaptation to the Piney Woods is intriguing, but is not in keeping with the documentary evidence which suggests that the historic Caddo groups were all horticulturists—and fairly intensive ones at that—especially those groups living in the Great Bend area of the Red River (Swanton 1942). Furthermore, the analysis of Caddo site locations by landform undertaken by Gilmore and McCormick (1982:Figure 11) for the Red River valley shows a marked tendency for Caddo sites to be situated on alluvial terraces of the Red River. This is likely due to the adoption of maize horticulture and the need to exploit the highly fertile soils that occur on the first and second terraces of the Red River valley, as well as natural levees and point bars. This settlement pattern focus intensified during the Late Caddo period when virtually all of the villages were located along the Red and Little River valleys, with little or no occupation on tributary streams or upland landforms away from the rivers. These data are at variance with Burnett's hypothesis, and we suggest instead that a further intensification of horticultural activity occurred at this time.

As Burnett (1990:395) noted, the incidence of caries in human skeletal populations only indicates an increase in carbohydrate consumption. To adequately determine if maize was the cause of the caries in dental remains, stable carbon isotope assays are also needed, along with other bioarcheological measures of fitness and stress that seem to correlate with a maize agricultural subsistence system. We, therefore, propose to undertake a stable carbon isotope analysis of populations from different sites in the Red River valley of Texas as part of the TAS Field School analysis effort. We will attempt to include stable carbon isotope analyses of archeological samples possessing both spatial variability (e.g., the Kaufman-Roden-Williams sites versus the Hatchel-Mitchell-Moores sites, as well as Caddo sites outside the Red River valley) and temporal variation (e.g., Woodland, Early to Middle Caddo, and Late Caddo) in the analysis, to test the hypotheses of intensification of maize use over time and whether there is a Piney Woods adaptation based on a largely non-maize economic system.

Determine If the Caddo were processing Salt near the Roitsch Site

There is good archeological evidence in the Caddo archeological area that during the Late Caddo period, Caddo groups in southwestern Arkansas and northwestern Louisiana were making salt (Early 1993; Girard 2006; Gregory 1973). The Caddo were apparently making salt for their basic agricultural subsistence needs, and also as a prized item for trade with other aboriginal agricultural groups, and then later, with the Europeans.

There appear to have been several different methods by which the Caddo made salt, but the most common way was to collect water from a salt spring in a ceramic container, then heat the container over a large fire until the water evaporated, leaving the salt residue. The fires must have been fairly hot and intensive, because at known salt springs, the hearths exhibit extreme oxidation, and there are very high quantities of discarded sherds (either thick salt pans, as at the Hardman site [Early 1993] or the typical Caddo utility wares common to the Late Caddo period in the Red River basin, such as Nash Neck Banded jars).

The first challenge for this research problem was to attempt to locate any Caddo salt-making sites. We concentrated our survey and any testing efforts along Salt Well Slough, a known location for salt springs. We already knew of three sites along Salt Well Slough that were candidates for salt processing locales (see Figure 2), including the Salt Well Slough site (see Kenmotsu 2001, 2006). When feasible, we proposed to shovel test a range of Late Caddo sites along the slough, as well as gather controlled surface collections of diagnostic artifacts, looking for evidence of large (5-10 m diameter) oxidized hearths, middens with extremely high densities of utility wares, and evidence for the use of thick, plain, shell-tempered salt pans like those recovered on Caddo salt-making sites in southwestern Arkansas (Early 1993). Should a site fulfilling these criteria be located, and the Salt Well Slough site (41RR204) was an excellent candidate (cf. Kenmotsu 2001, 2006), we planned to sample the archeological deposits in an attempt to better understand the material content and functional character of a salt-making Caddo site along the Red River valley in Texas.

Examine Early Anglo-American Settlement and Trade

The research problem concerning early Anglo-American settlement and trade was to be addressed if archeological deposits associated with the early town of Jonesborough could be identified, or if other early (pre-1850) archeological components could be documented during the course of the TAS Field Schools. First, although we knew a fair amount about Jonesborough from the archival records (Steely n.d.), in 1991-1992 we had little idea about the nature of the archeological deposits that may be preserved there. It had been suggested by some that the site was largely washed away during a major flood earlier in the 20th century, and others had indicated that there were only a few artifacts and a foundation or two remaining to mark the site.

The first and foremost problem for the Jonesborough site area was to determine what was left of the town site, if anything. If we could confidently identify the site through archeological investigations—with special attention given to identifying features (i.e., building foundations) that would enable us to relate the archeological record to a town plan that survives today in the historical archives for the site—we wanted to look at the types of trade and interaction the inhabitants of Jonesborough had with surrounding groups, both aboriginal and Anglo-American. To the north were settlements of Choctaw Indians, and the Cherokee village of Tahchee was a short distance to the west. It is quite likely that some degree of trade by the Jonesborough inhabitants took place with these aboriginal peoples. Also, with Jonesborough being an Anglo-American settlement, considerable trade undoubtedly occurred with other Anglo-American settlements to the east in Arkansas and down the Red River to Louisiana.

The issues related to trade and interaction with surrounding groups were to come from examination of the kinds and quantities of material goods found at the site, as well as information contained in archival and historical documents (see Reese 1998, 2001). These kinds of items would be informative about the type of goods coming into the Texas frontier (actually the Arkansas frontier during the early occupation at the town). We would then be able to assess the relative proportions, and therefore the relative influence, of goods from Arkansas versus Louisiana and consequently the degree of interaction with each area.

Evidence of trade with the Choctaw or the Cherokee may be reflected in the occurrence of Indian trade good items, such as glass beads and copper and brass ornaments, and native-made pottery such as Chickachae Combed ceramics made by the Choctaw. The reader should refer to Reese's (2001) monograph on the TAS archeological investigations at the Jonesborough locale for more detailed information on the results of the work there.

THE ARCHEOLOGY OF THE EAST MOUND AT THE ROITSCH SITE: BLOCKS I, II, AND IX,

by Timothy K. Perttula, William A. Martin, and James E. Bruseth

INTRODUCTION

In this section, we are concerned with summarizing the archeological investigations completed by the Texas Archeological Society in 1991 and 1992 in the East Mound at the Roitsch site. This work established that the East Mound was a deliberately-mounded construction, built in the 14th century over earlier prehistoric Caddo habitation deposits of the pre-A.D. 1300 Albion and Mound Prairie phases in the local cultural sequence. We also discuss the kinds of material culture remains found in and around the East Mound.

R. King Harris (1953:43) had noted some 50 years ago that the "east mound… is probably only a natural rise with about two feet of accumulated midden material." He also went on to say that there was evidence of a burned Caddo house structure in the mound, as there were "many large pieces of burned clay daub… found over the surface." In the vicinity of the daub concentration, Harris (1953:43) had collected 4-5 European glass trade beads and 3-4 copper cones, either tinklers or awls/ rolled copper projectile points.

In 1968, Southern Methodist University (SMU), with funding from the National Park Service, conducted about one month of field work at the Sam Kaufman (now Roitsch) site) under the direction of Dr. S. Alan Skinner (Skinner et al. 1969). The work was done because there was a perceived threat to the site from flooding by the Red River. The SMU excavations concentrated on the two known mounds, and only limited work was conducted away from the mounds (see Skinner et al. 1969: Figure 3) in what were the prehistoric and early historic Caddo habitation areas.

The East Mound (Figure 5) was constructed up to a height of about 1 m and covered the remains of a structure. At the death of a prominent adult male in the late 15th or early 16th century (based on radiocarbon dates from two burials in the shaft tomb, see Appendix X, this article)—perhaps a tribal leader in the McCurtain phase community centered at the Roitsch site—a large pit measuring 4 m in diameter and over 1.8 m deep was excavated down through the mound fill and through the floor of this structure for use as a burial tomb (Skinner et al. 1969). The remains of the deceased were placed in the pit along with an adult female, who may have been the principal wife, and nine other individuals, probably retainers or slaves. Many artifacts were also placed in the pit, including elaborately decorated ceramic vessels, finely made arrow points, marine shell and turquoise beads traded from other areas, and ground stone celts. The artifacts, representing the wealth of the deceased leader, and perhaps his lineage, were most likely used to provision himself and his entourage during their journey to the land of the deceased.

1991 and 1992 Excavations at the East Mound

Due to its very low height and the absence of layers of burned structures like those found in the West Mound (destroyed by 1990 flooding), Skinner et al. (1969) concluded, as had Harris (1953) before them, that the East Mound may be a natural feature, resulting from flood deposits. Prior to the start of the 1991 TAS Field School, we wished to evaluate this conclusion, as it had significance in not only determining if it in fact was an earthen mound built by the Caddo, but also in characterizing the history of use by the Late Caddo, McCurtain phase community at the Roitsch site. Using three long backhoe trenches, SMU's old excavations were found and two perpendicular continuous profiles were exposed through the mound (Figures 6 and 7). In addition, during the 1991 Field School, individual 1 x 1 m units were excavated at various points around the mound to investigate the natural soil layers and compare them with those observed on the mound (see Figure 5). The results of this work allowed us to identify definite layers of mound fill and to convincingly demonstrate that the East Mound was man-made and built up to about 1 m in height.

All of the mound fill was removed from Block I by the last day of the 1991 Field School. Block II reached the base of the mound fill in the northern half of the block, coming down on top of a thin lens of charcoal in the southeastern part of the block believed to be the remains of a burned structure, probably related to the abandonment and destruction of House 2 that had been uncovered by Skinner et al. (1969) immediately below the East Mound fill (see Figure 6). Excavation in the southern end of Block II ceased at various levels in different units. Both blocks were covered with a layer of plastic and backfilled at the end of the 1991 Field School.

Because all of Block I was taken down to the same level, just above the contact with the underlying black clay, we were able in 1992 to remove all backfill by scraping the area with a bulldozer, stopping just above this contact between mound fill and the buried natural Redlake soil (see Thomas 1977:28). We scraped an area much larger than Block I, in order to encompass the post holes observed in the backhoe trenches in 1991 (see Figure 6). The grid was reestablished over the scraped area and excavation began again at this point. Because Block II was deeper and more complex than Block I in the kinds of mound fill it contained, the excavation units had stopped at various levels in 1991. Prior to the start of the 1992 Field School, the back dirt was removed from Block II and excavations resumed where they had left off in 1991.

Most excavation occurred within two 4 x 8 m block units (Blocks I and II) (Figure 8). These blocks

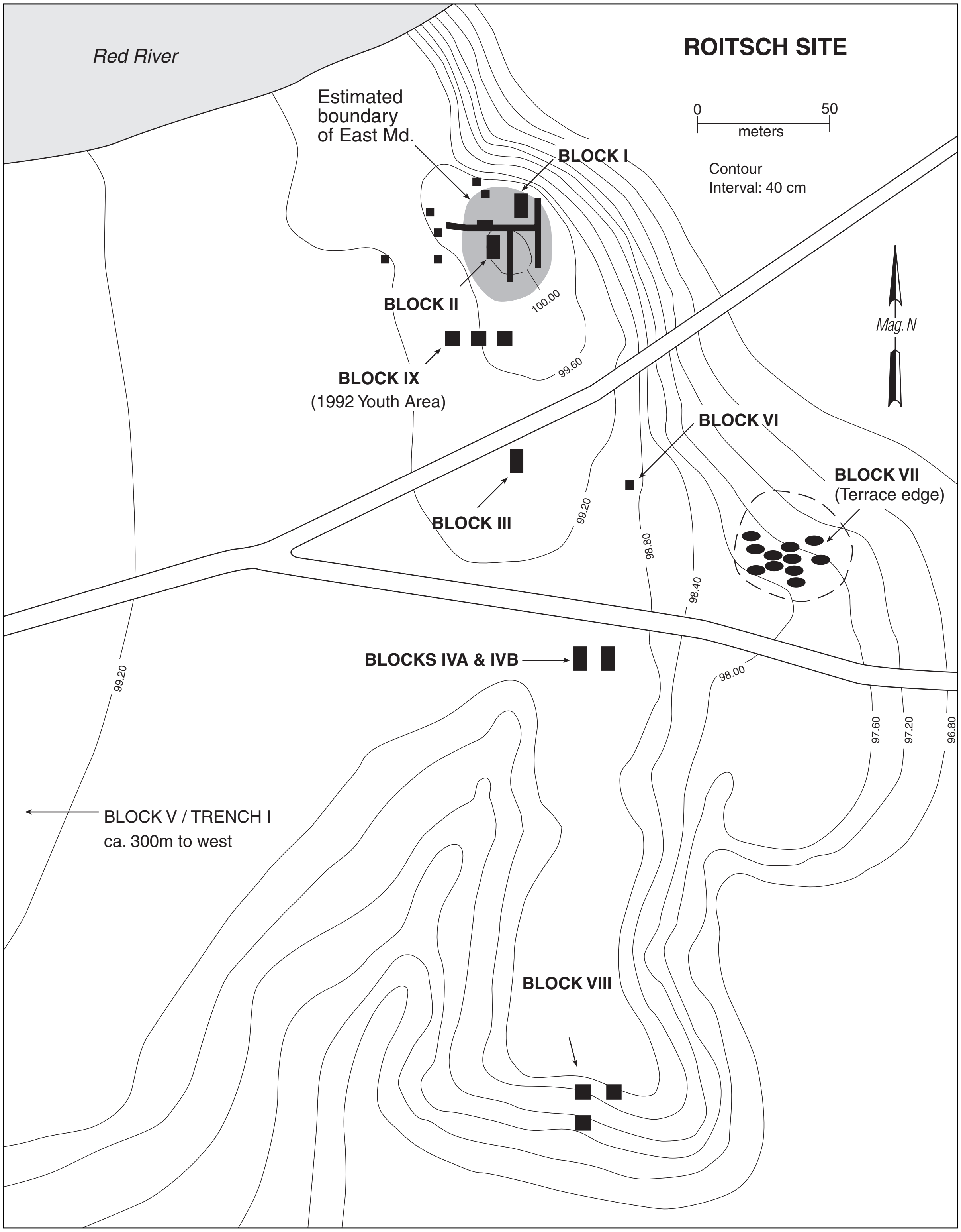


Figure 5. General map of the Roitsch site, showing the East Mound, TAS Block excavations, and the Terrace area cemetery.

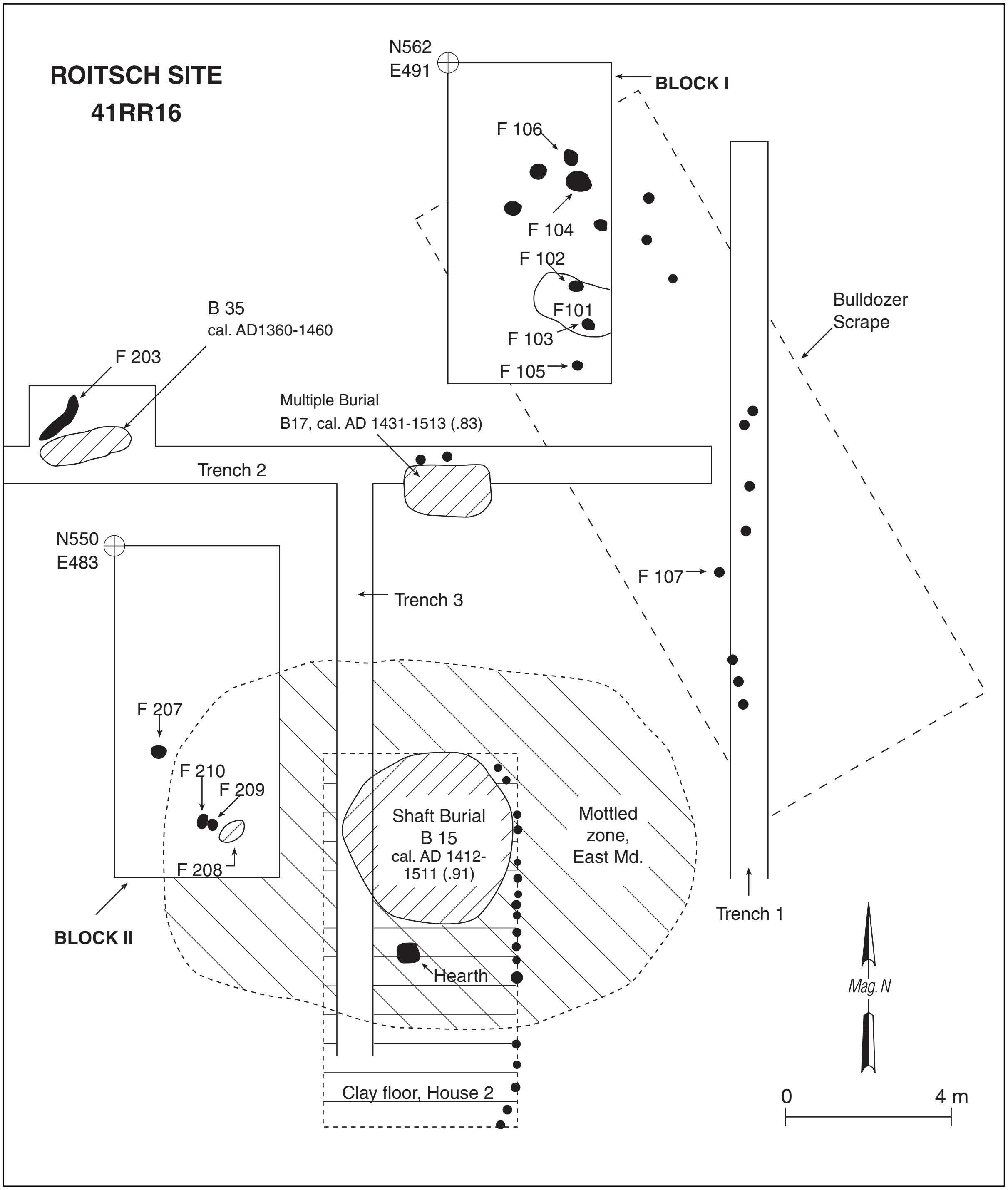


Figure 6. Block excavations on the East Mound, showing feature locations from TAS and SMU investigations.

Figure 7. Looking south at Trench 3 on the East Mound.

were positioned to avoid SMU's earlier excavation units (see Figure 6), and were intended to uncover artifacts and features related to the construction of the mound. In 1992, three 4 x 4 m units, called Block IX, were also excavated not far to the south of the East Mound (see Figure 5).

During both field seasons, a total of 42.5 m^3 of sediments were removed from the two main blocks in the East Mound; the mound fill was completely removed across both Block I and Block II. Another 4 m^3 was excavated in Block IX in 1992. Due to the heavy rains during the 1992 Field School, and the very muddy conditions around the blocks and in the bulldozer scrape area, excavations were difficult to carry out and complete. This was particularly the case for the shovel scraping and trowel work intended to identify and define features and cultural disturbances in the bulldozer scrape area in and southeast of Block I (see Figure 6).

Initial Construction of the East Mound and Features in the East Mound

The fill of the East Mound is composed of a mottled mixture of dark reddish-gray, reddish-brown, and yellowish-red sandy loam (zones 2, 3, and 8), the upper 20 cm of which (zone 1) has been plowed in modern times (Figure 9). The fill also has dark brown, red, and dark reddish-brown sandy loam and clay mottles, probably inclusions from the dismantling and burning of House 2 and the subsequent excavation of the Burial 15 shaft tomb (see Figure 6). The mound fill is about 50 cm thick in Block II. At its base, at least in parts of Block II and in the area of Burial 15, is a ca. 5 cm thick lens of red clay that marks the prepared clay floor of House 2 (see zone 4 in Figure 9). The floor of House 2 was placed on top of the natural A-horizon of the Redlake soil, and the A-horizon does not appear to have been removed or artificially leveled prior to the construction of the clay house floor.

Underneath the mound fill, at least to a depth of 125 cm bs, are the top three zones of the buried Redlake soil (see Figure 9). Zone 5 is a 15 cm thick reddish-brown A-horizon that is underlain by dark reddish-brown B21 and B22 clays (zones 6 and 7).

Other than the mound fill, few cultural features were documented in the East Mound excavations (see Figure 6). In Blocks I and II, this included five post holes, a large pit (Feature 101), and a clay hearth (Feature 104) in Block I, and three post holes and a burial (Feature 208, Burial 36) in Block II (see Figure 6). One other post hole (Feature 107) was identified in the bulldozer scrape area southeast of Block I, and an extended burial (Feature 204, Burial 35) and a charcoal concentration (Feature 203) were exposed on the north side of Trench 2, about 2 m north of Block II. Other

Figure 8. Block II excavations, looking south.

possible features exposed on the East Mound include a number of probable post holes along the eastern edge of the mound (in Trench 1). These were identified in the natural soil under the mound, and probably relate to a rectangular structure or structures (similar to those exposed by Skinner et al. [1969: Figures 5 and 7]) that probably date to the Albion or Mound Prairie phases of the Early to Middle Caddo period occupations at the Roitsch site.

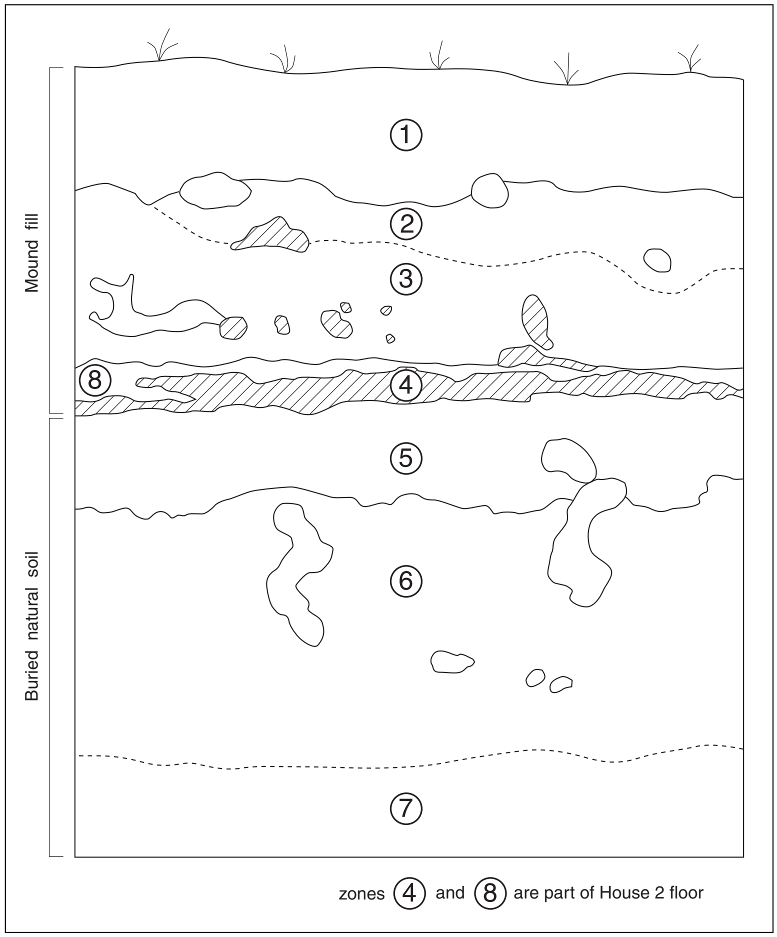


Figure 9. Profile of Block II, east wall of N543E486.

Feature 101

At the close of the 1991 Field School, a large "bathtub"-shaped pit feature (Feature 101) was uncovered as the last of the mound fill was removed from level 4 along the eastern edge of Block I (see Figure 6). This feature contained ash and charcoal from a fire that appeared to have burned sometime during the actual construction of the mound. Thus, the calibrated 1-sigma radiocarbon age of AD 1275-1383 (relative area under probability distribution=1.00) obtained from the charcoal provides a date for the initial construction of the East Mound during the early part of the McCurtain phase, suggesting it commenced sometime during the 14th century A.D.

Measuring approximately 110 x 190 cm in size, most of this large pit feature fell within Block I (see Figure 6). However, a small portion extended east of the block, so the actual length of the feature was probably closer to 230 cm, assuming that the pit was symmetrical in shape (Figure 10). This feature, which originated just above the natural ground surface below the mound at the base of level 4, ca. 33-37 cm bs, was excavated by THC personnel in the days following the 1991 Field School. The bottom of the pit was first reached about 5 cm into level 9 along the northern edge and near the base of level 9 on the eastern edge, between 81-87 cm bs, which means that the pit was approximately 48-50 cm deep when it was dug by the Caddo.

Four 1 x 1 m units encompassed the feature, forming a small block from N555 to N557 and E493 to E495. The feature was the size and shape of a grave, so it was excavated with special care in 10 cm levels. The feature outline became very clearly visible at the base of level 5 and a plan map was drawn at that level (see Figure 10). Also clearly visible was a thin layer of red clay, perhaps oxidized from burning, that paralleled the pit outline on the two long edges of the pit (however, it was not visible along the western edge). The red clay appeared as a 2 cm thick lens that was visible about 1-2 cm inside the wall of the pit (see Figure 10). It appeared to be an intentional clay lining. Although it may have been oxidized due to burning, the clay was relatively soft, unlike the hardened clay that was lining the bottom of Feature 601 in Block VI that had obviously undergone intense burning (see Block VI excavations below). The red clay lining was observed down to level 8 (ca. 71-77 cm bs), but only a few scattered patches remained visible at that depth near the bottom of the feature.

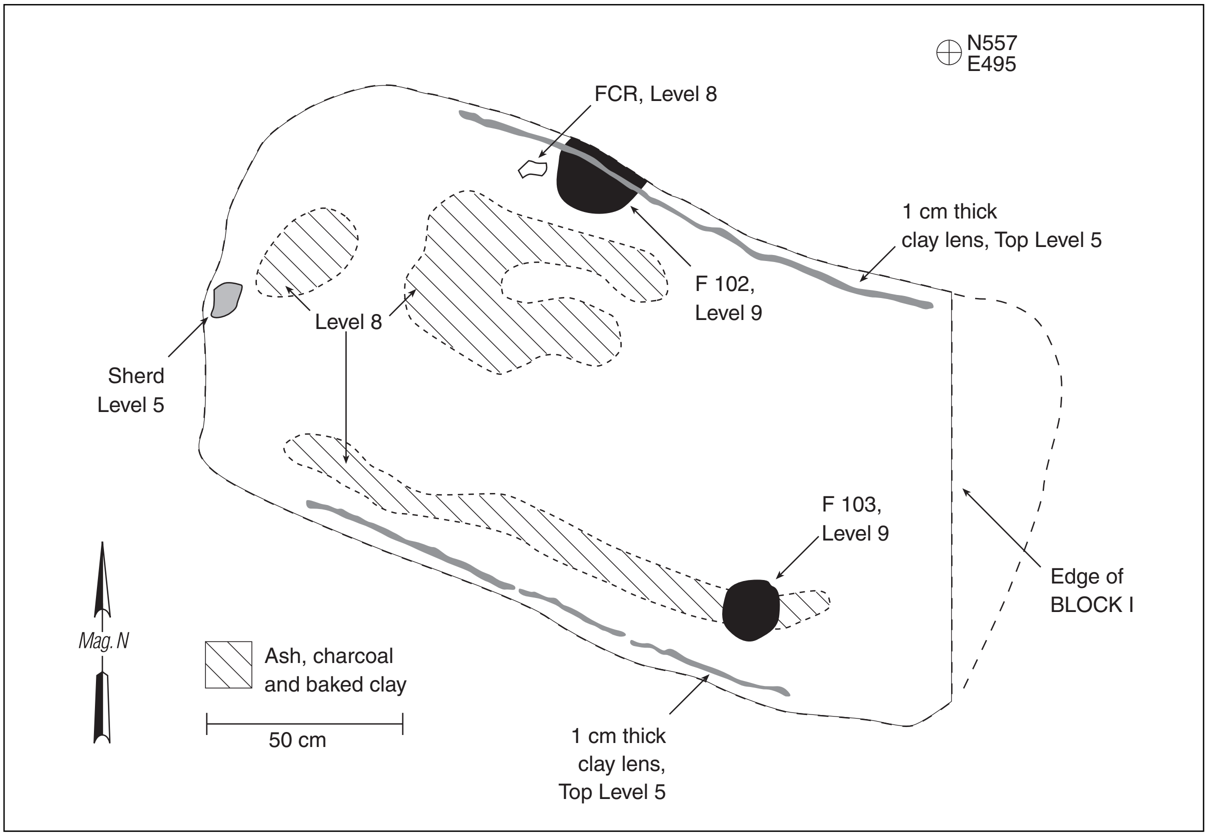


Figure 10. Plan map of Feature 101, and Features 102 and 103 below it.

About 5 cm into level 8, the same depth to which the clay lining extended, a layer of ash was observed (Figure 11). By the time this level was completed, three large concentrations of charcoal were also visible (see Figure 10). The ash and charcoal concentrations were lying near the bottom of the pit along with baked clay. At least one of the ash and charcoal concentrations was linear, paralleling the long axis of the feature. In fact, the wood grain of the charcoal also appeared to parallel the orientation of the pit, suggesting that these were the remains of logs that burned in place and were subsequently backfilled. The previously mentioned radiocarbon sample was taken from this charcoal concentration.

The bottom of level 9 was beneath the feature fill. The bottom of the pit was observed about 5 cm into level 9, where the reddish-brown compacted sand layer that is transitional between the A-horizon and the underlying red clay B-horizon began to show up. The western half of the pit was taken down beneath the feature matrix and a profile was drawn and photographed of the bisected ash and charcoal concentration. Once the pit fill was completely removed, two intrusive post holes (Features 102 and 103) were identified in the lighter-colored soil beneath Feature 101 (see Figure 10).

The feature matrix contained a red-slipped and everted rim sherd reminiscent of that from an effigy vessel; it was found at the top of the pit, along its western edge (see Figure 10). The sherd appears to represent trash incorporated into the pit fill, since no other related sherds from this vessel were found in the pit fill. A total of 78 sherds were recovered from Feature 101, as well as 167 pieces of daub and burned clay, eight fire-cracked rocks, and seven long-stemmed Red River pipe sherds from at least two different pipes. Throughout the excavation of the pit matrix, it was also apparent that the density of lithic debris (n=183) inside the feature was higher than what was recovered from the portions of the 1 x 1 m units excavated outside the feature; perhaps these represent sweepings from a nearby knapping area. Flotation samples were taken from the matrix at the bottom of the pit. Analysis of floated materials indicated the presence of wood charcoal, cane, and two charred seeds (see Fritz, this article).

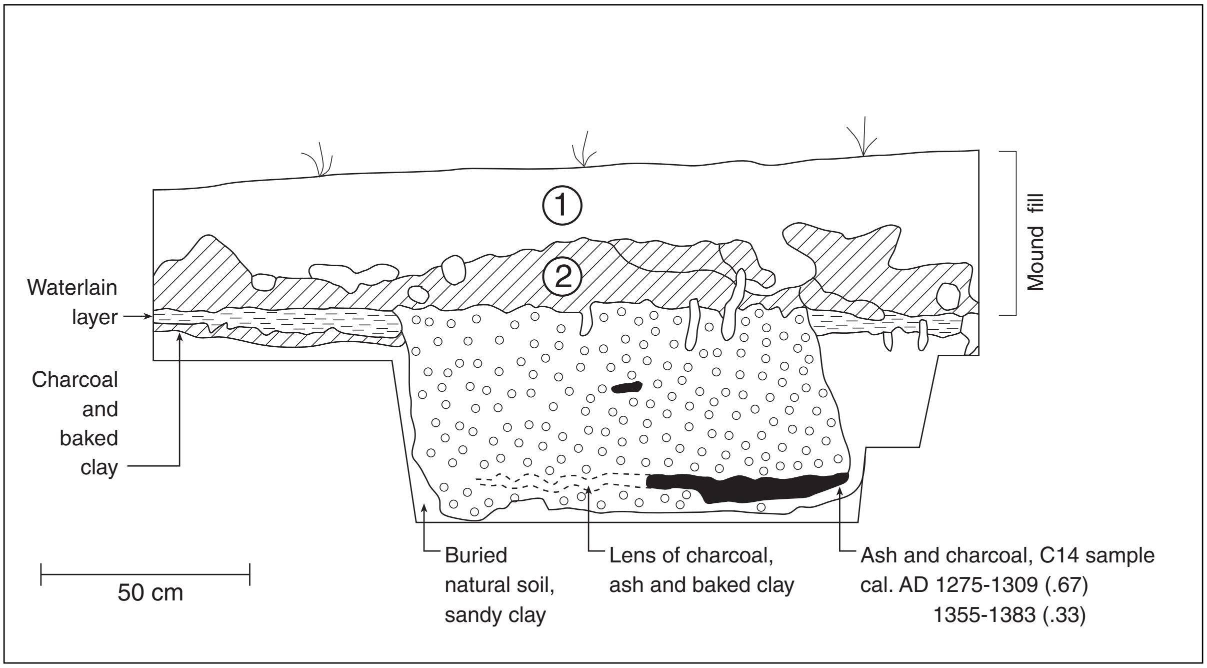


Figure 11. East profile of Feature 101, N555-556 E494.

The fact that part of the feature extended outside of Block I proved to be a very fortunate circumstance because it allowed us to examine a profile that provided critical information for dating the mound construction. It is clear from examining the profile in Figure 11 that the pit penetrated a layer of water-lain sand with siltation lenses that was about 10 cm thick. This layer rested on top of a 2 cm thick lens of charcoal and burned clay on the northern side of the pit (see Figure 11), and this lens in turn rested on the buried A-horizon of the natural soil.

Identical siltation lenses were observed in backhoe trench profiles where the trenches bisected excavation units from the 1968 SMU excavations. Heavy rains occurred during those excavations, and sand was washed into the units. The same phenomenon was observed in excavation units during the TAS Field School after a rain. It appears that some basket loads of sandy mound fill had been dumped adjacent to Feature 101 during initial mound construction (which covered the thin charcoal and baked clay lens, probably from a burned and dismantled structure), then a rain event washed some of the sand into low spots nearby. Shortly thereafter, Feature 101 was dug, a burning episode occurred, the feature was backfilled, and then the remaining mound fill was added that capped it. Given the fact that a date was obtained from charcoal at the base of the feature, and the feature appears to have been used while initial mound construction was underway, we can place the construction (with a 66% probability or 1 sigma age range) of the East Mound between cal AD 1275-1383.

A basin-shaped hearth (Feature 104) was exposed at ca. 55 cm bs in Block I (see Figure 6), under the mound fill. It was about 66 cm in diameter, and extended to ca. 70 cm bs. The hearth was filled with an ash lens that was 1-4 cm thick, charcoal, and clumps of burned clay. One shell-tempered Nash Neck Banded sherd was in the fill. Underneath the hearth was a 21 cm diameter post hole (Feature 108) with a flat bottom that reached to 86 cm bs. This particular post hole almost certainly represents the hole where the central post of a Caddo structure was removed after the structure had been built (see Swanton 1942:150), and the basin-shaped hearth was then constructed over the filled-in post hole.

There were two McCurtain phase Caddo burials excavated in the East Mound during the TAS Field School. The first is an extended burial of an adult female (Burial 35) on the north side of Trench 2, and a 6-12 month old child burial (Burial 36) in Block II. The adult (30-35 years old) Caddo female burial was placed in a 197 cm long pit that was oriented northeast-southwest and extended to 160

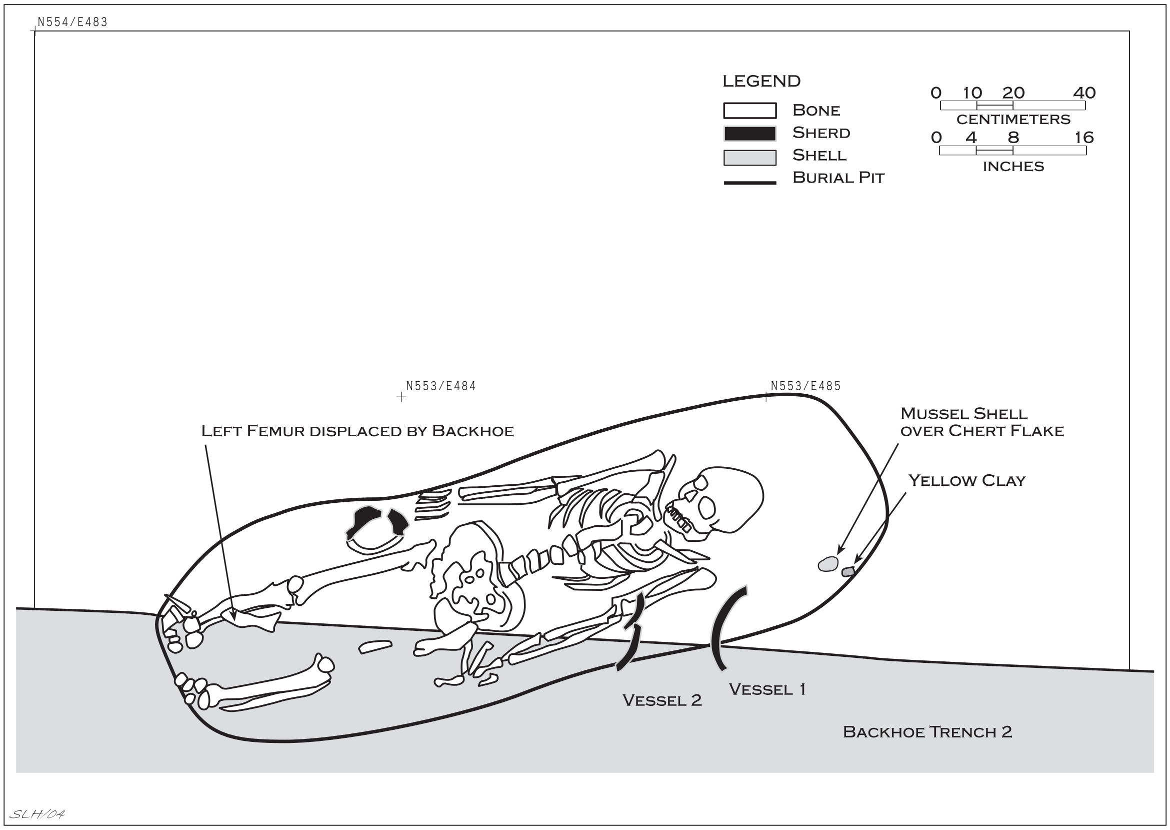


Figure 12. Burial 35 plan.

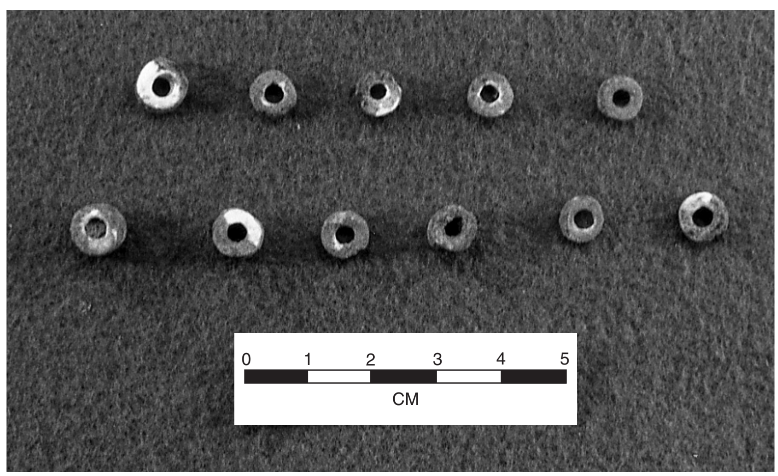


Figure 13. Bone disc beads from Burial 35 in the East Mound.

cm bs, with the head at the eastern end of the grave and facing west (Figure 12). The other Late Caddo period burials at the Arnold Roitsch site (see below) have the same orientation. Funerary objects placed with this woman included an Avery Engraved bowl by her left arm, a Nash Neck Banded jar by the left shoulder, a mussel shell south of her head, as well as a lump of yellow clay (pigment?) next to the mussel shell (the pigment may have rested in the mussel shell); there were also apparently unassociated shell-tempered sherds (n=16) in the grave fill, including one Simms Engraved sherd and another with an appliqued decoration. Other funerary objects included 13 small bone disc beads, each about 7.3 mm in diameter and with 3.1 mm perforations for stringing (Figure 13). Immediately outside the grave pit was a linear concentration of charcoal (Feature 203) and lumps of red clay. The charcoal lay atop the buried A-horizon.

The child burial (Burial 36) had been placed in a 50 cm diameter pit that was dug from the surface under the mound, probably from the McCurtain phase house floor covered by the East Mound. The child was between 6-12 months of age when it died (see Dockall et al., this article). The pit was 21 cm in depth. No clear funerary objects were placed with the child, although there were several burned corn cob fragments in the eastern part of the grave, perhaps representing food offerings (see Gonzalez 2005:55-59).

Artifacts from the East Mound

The ceramics from the East Mound investigations, as well as from many other parts of the Roitsch site, are indicative of lengthy and repeated occupations during much of the Caddo settlement of the Mound Prairie area along the Red River. The sherd sample from the three blocks includes 70 plain rims and 195 decorated sherds, 230 from Blocks I and II and 35 from Block IX, along with 7599 plain body and base sherds (Table 2).

The density of sherds in the East Mound ranged from 86-714 per m^3, with the lowest densities in Block I (86 sherds per m^3) and the highest density in Block IX, just south of the mound; the sherd density in Block II is 150 per m^3. The low density of sherds is apparently restricted to the crest of the mound (Blocks I and II), and the fact that the proportion of shell-tempered sherds is quite low (see discussion below) there when compared to Block IX, suggests that most of the sherds in the mound fill on the East Mound crest became incorporated in the fill from trash deposits produced during the Albion and Mound Prairie phase Caddo occupations in the vicinity of the mound. The very high sherd density in Block IX, and the correspondingly high proportions of shell-tempered sherds (80 percent), also suggests that the archeological deposits there are the product of a discrete Late Caddo period habitation near the southern mound slope.

Other than the ceramics from the 1991 Youth Area excavations (see discussion below; see also Perttula and Iruegas 2001), and Blocks V and VI (all of which have relatively small samples of decorated sherds) in widely separated parts of the village, only the collection from Blocks I and II has a predominance of grog-tempered, grit-tempered (i.e., crushed rocks, including sandstone and hematite), and bone-tempered sherds in the ceramic assemblage. Shell-tempered sherds comprise only about 42 percent of the sherds from Blocks I and II, compared to between 90-95 percent shell-tempered sherds in Blocks III and IV as well more than 97 percent of the sherds and vessels in the Terrace area. Indeed, as mentioned above, the percentage of shell-tempered sherds from Block IX, near the south end of the East Mound (see Figure 5), is 80 percent. Clearly the main focus of the Late Caddo, McCurtain phase, settlement at Roitsch (with the exception of burial interments) was along a ca. 200 m long stretch across the alluvial terrace south of the East Mound, not concentrated on the East Mound itself.

The grog-, grit-, and bone-tempered ceramics are almost exclusively from the Middle Caddo Mound Prairie phase occupation in and beneath the mound. Several Coles Creek Incised sherds (including one with incised lip lines) from Blocks I and II also suggest occupation of the Roitsch site during the latter part of the Woodland period, from ca. A.D. 700-900 (cf. Story 1990b). Coles Creek Incised ceramics have been previously noted in low frequencies in the East Mound (see Skinner et al. 1969), as well as at other large prehistoric sites along the Red River, such as Rowland Clark, Bob Williams, and Dan Holdeman (Bruseth 1998; Perino 1983, 1994, 1995), and the Ray site (see Bruseth et al. 2001).

Table 2. Archeological materials from the East Mound excavations.

Block	Plain Sherds	Decorated/ Rim Sherds	Lithic Sherds	Stone Tools	Daub/ Burned Clay	Fire-cracked Rocks	Clay Pipes	N
I	1756	69	926	13	1332	48	16	4160
II	3023	161	1788	21	2404	100	8	7505
IX	2820	35	238	8	680	5	1	3787
Totals	7599	265	2952	42	4416	153	25	15,452

The Middle Caddo Mound Prairie phase ceramics from Blocks I and II include plain, red-slipped bowl sherds (n=3) (cf. Sanders Plain), as well as sherds from plain bowls, bottles, and jars without slipping (n=27), and diagonal engraved sherds from carinated bowls, some of which have a red slip (cf. Sanders Engraved, see Krieger 2000; Suhm and Jelks 1962). Grog, grit, and bone-tempered incised (n=37) and punctated (n=13) sherds from utility vessels of Canton Incised are also common in the Mound Prairie phase deposits.

The McCurtain phase ceramics from the East Mound include shell-tempered sherds with a variety of engraved, punctated, punctated-incised, appliqued, and neck banded decorations. Avery Engraved and Emory Punctated-Incised sherds are the most frequent decorated sherds in the assemblage, and Nash Neck Banded jar sherds are also present in abundance; the latter, however, only represents about 11 percent (n=13) of the rim and decorated shell-tempered sherds from the East Mound compared to more than 21 percent from the Block III and IV village areas. It has not been determined whether this difference represents ceramic functional variability between the two areas of the site, or is instead related to temporal differences in when the two areas were occupied during the McCurtain phase. Other engraved wares include Simms Engraved and Hudson Engraved (see Suhm and Jelks 1962), shell-tempered fine wares that were made and used by the McCurtain phase Caddo between ca. A.D. 1500-1650, or even later.

The investigations by R. King Harris (1953) and Skinner et al. (1969) in the East Mound disclosed continued Caddo use of the mound slopes primarily for burial interments after about A.D. 1650, and the decorated shell-tempered ceramics from Blocks I and II reaffirm their findings. Although not present in great quantities, as mentioned above, Hudson Engraved, Keno Trailed, and Simms Engraved sherds, typical of the kinds of decorated ceramics to be expected in post-A.D. 1650 archeological deposits along the middle Red River (cf. Bruseth 1998; Perttula 1992), were found from several different contexts across the mound.

Burial 35 is also indicative of the McCurtain phase use of the East Mound. Grave goods with the burial include a portion of a vertical-rimmed Avery Engraved bowl and a Nash Neck Banded jar with a peaked rim and strap handles (Figure 14). Based on changes in the form and design of McCurtain phase ceramics from the Rowland Clark site (cf. Perino 1994:28-29), Burial 35 may have been placed in the mound during the earlier part of the phase; that is, before A.D. 1450.

There are 27 ceramic pipe sherds in the East Mound excavations: 16 from Block I, eight from Block II, two from Backhoe Trench 2, and one from Block IX south of the mound. Twenty-six of the pipe sherds, tempered primarily with burned bone, are from long-stemmed Red River pipes (see Hoffman 1967), including nine bowl, 15 stem, and two butt sherds. The one elbow pipe stem sherd, made with shell temper, is from Block IX.

More than 4400 pieces of daub and burned clay have been recovered in Blocks I, II, and IX. The highest densities (170 per m^3) occur in Block IX in association with a McCurtain phase habitation area that also has abundant ceramic sherds (see Table 2); there must have been a clay-thatched Caddo structure in this area. Proportionally, however, the amount of daub and burned clay in the East Mound deposits to ceramic sherds is 2.5 times less than in the McCurtain phase Village areas at Roitsch.

Lithic debris (n=2953, including one core) and chipped (n=36) and ground stone (n=6) tools, as well as fire-cracked rocks (n=153), are relatively abundant in the East Mound archeological deposits, at least in comparison with the number of sherds and pieces of daub/burned clay (see Table 2). The density of lithic debris, tools, and fire-cracked rock ranges from 46.6-90 artifacts per m^3 in Blocks I, II, and IX, with the highest density of chipped stone tools in Block IX, and the highest densities of lithic debris and fire-cracked rocks in the Block II excavations. The manufacture and use of stone tools, as well as

Figure 14. Nash Neck Banded vessel from Burial 35 in the East Mound.

the occasional use of stones for boiling and cooking of foodstuffs, appears to have been more prevalent in pre-A.D. 1300 archeological contexts. Much of the evidence was incorporated in the mound fill from earlier Caddo habitation deposits on the terrace where the East Mound was subsequently constructed in Late Caddo, early McCurtain phase times.

The chipped stone tools in Blocks I, II, and IX, as well as other contexts in the East Mound, are dominated by stemmed and triangular arrow points (n=14) (see Appendix IX, this article). There are also drills and perforators (n=5), arrow point fragments (n=9), scrapers (n=5), expedient flake tools (n=6) with minimal use wear, and small bifacial tools or tool fragments (n=8). One dart point was found in the Block I mound fill.

The stemmed arrow points and arrow point fragments, including Formative to Middle Caddo period Catahoula (Category VI, n=2), Alba (Category VIII, n=3), and Hayes (Category XIII, n=1) styles (see Turner and Hester 1999) as well as unifacially retouched specimens, are found in the mound fill but are also present in the buried natural soil under the mound. Two others are identified as Category VII points (n=2), which have very long and serrated blades, and are stemmed, but the stem form itself is not identifiable because of point breakage. The stemmed Catahoula, Hayes, and Pocola types also commonly have very long and serrated blades (see Brown 1996) like the Category VII points at the Roitsch site, especially the Hayes and Pocola types. Only 11 percent of the stemmed arrow points are made from novaculite. The remainder are manufactured from brown chert (n=4 or 44 percent), brown jasper (n=1 or 11 percent), claystone-siltstone (n=1 or 11 percent), and quartzite (n=2 or 22 percent). These materials were available in Red River gravels and in Red River alluvial terraces (see Banks 1990; Mallouf 1976).

There are five triangular style Late Caddo McCurtain phase arrow points from the East Mound excavations. Two Maud points (Category II) were found in the upper 30 cm of the mound fill in Blocks I and IX, as was one Talco (Category I) in Block I. A single Harrell point came from Block II excavations, and a Washita point (Category V) was recovered in the Burial 35 pit fill (see Appendix IX, this article). The later style East Mound arrow points have been manufactured from a variety of locally available lithic raw materials, including novaculite, gray chert, brown chert, yellowish-brown chert, claystone/siltstone, brownish-gray chert, Big Fork chert, dark brown chert, and Ogallala quartzite. Eighty percent of the triangular arrow point types were made from gray novaculite.

As we mentioned, there are eight bifaces or bifacial fragments in the chipped lithic tools from the East Mound excavations (see Appendix IX, this volume). One brown chert bifacial fragment was in the Burial 35 pit fill, but it was not placed on the floor of the burial pit as a funerary offering, and is likely an accidental inclusion in the burial pit fill itself. The most significant bifacial tool came from Block IX (N508 E490). It is a large (98.9 x 38.9 mm in length and width) beveled knife made from Florence-A chert (otherwise known as Kay County chert); this lithic raw material has its source in the Flint Hills of southern Kansas and northern Oklahoma, centered in the Arkansas River basin (Banks 1990; Stein 2006). Another large biface of the same material was recovered from the McCurtain phase shaft tomb in the East Mound (see Skinner et al. 1969: Figure 27o), and Harris (1953: Plate 3, no. 15) found a similar large beveled knife in a McCurtain phase burial at the site from a cemetery area northeast of the Roitsch site village.

The one dart point from the East Mound excavations is a Gary point made from Big Fork chert; the blade had been resharpened into a bifacial drill bit. The point is 6.4 mm thick, suggesting it is a Gary, *var. Camden*, indicating some use of the East Mound area in the latter part of the Woodland period (cf. Schambach 1982, 1998).

The flake tools found in the East Mound excavations include several drills and perforators (n=5), and they appear to be more common in these deposits than they are in the Block III and IV Late Caddo habitation areas. Formal retouched and hafted scraping implements, including side scrapers, end scrapers, and thumbnail end scrapers, also seem to be an important part of the tool kit in the East Mound archeological deposits; 25 percent of the chipped stone tools in Block IX, for instance, are formal scraping tools, and 45 percent of all the flake tools from the East Mound excavations are scraping tools. This suggests the considerable importance during some parts of the Caddo occupation, primarily the latter part of the McCurtain phase, at the Roitsch site for the intensive processing of hunted resources, apparently deer (see Yates, this article). The scraping tools are made primarily from novaculite and Big Fork chert. The expedient flake tools are made from several kinds of chert as well as quartzite (see Appendix IX, this article).

There are differences in the use of lithic raw materials for chipped stone tools between the three excavation blocks on the East Mound. In the later McCurtain phase deposits in Block IX, novaculite and Big Fork chert from the Red River gravels comprise 63 percent of the tools, while brown chert and a yellowish-brown chert are more common in Block I (60 percent); novaculite is absent in the Blocks I and II tools. In Block II, Big Fork chert and claystone/siltstone are the most abundant raw materials used for tools. These differences between the three blocks—particularly between Blocks I/II and Block IX—suggest that there were changes through time in the use of locally available raw materials, and perhaps also in the sources that were collected by the Caddo toolmakers for knappable stone. High-quality Red River gravel cherts represent only 30 percent of the tools in Block I, 53 percent of the Block II tools, and 88 percent of the tools in Block IX. Coarse-grained cherts and quartzites, available either in Red River gravels or gravels mantling uplands and alluvial terrace landforms, comprise 70 percent of the Block I tools, and only 47 and 12 percent of the Block II and IX tools, respectively.

The six ground stone tools from the East Mound block investigations (two tools from Block I and four from Block II) at the Roitsch site include three manos or mano fragments and three grinding slabs. Sixty-seven percent of the mano and grinding slab tools are made from a locally available sandstone, with the remainder are manufactured from a coarse-grained quartzite. Other contexts in the East Mound had another grinding slab fragment as well as a polished celt flake fragment made from a Ouachita Mountains metamorphic material.

ARCHEOLOLGICAL INVESTIGATIONS IN THE LATE CADDO VILLAGE AREAS AT THE ROITSCH SITE

by Timothy K. Perttula

Texas Archeological Society Field School excavations in Blocks III and IV of the Roitsch site explored primarily Late Caddo McCurtain phase, archeological deposits in habitation areas on the alluvial terrace, and the findings from that work are the main focus of this section. However, a small earlier Caddo occupation is also apparently present (based on the recovery of temporally diagnostic decorated sherds) in both block areas that perhaps is contemporaneous with the Mound Prairie phase Caddo archeological deposits that have been radiocarbon dated at cal AD 1154-1296 (1 sigma) in Block VI (see below) or in House 3 by the East Mound (with four calibrated dates that range at 1 sigma between AD 982-1250, see Perttula 1998: Table 1). These Late Caddo remains in Blocks III and IV consisted of an extensive and dense midden deposit built up around and in a number of house structures and outdoor features, and the deposits contain large amounts of sherds from broken and discarded pottery vessels and daub/burned clay from plastering structure walls with mud, lining hearths with clay, and the outdoor firing of hearths and pits.

The Block III and IV excavations were located about 100-200 m south of the East Mound (see Figure 5), and near the crest of the alluvial terrace (Figures 15 and 16). The two blocks were approximately 60-70 m apart. In Block III, hand excavations were conducted during both the 1991 and 1992 TAS Field Schools, with a total of 33 m^2 carried down to 50 cm bs (Figure 17a-b), while 24.25 m^2 were excavated as three separate 1 x 8 m trenches in Block IV during the 1991 field season. In 1992, two narrow trenches (Scrape 1 and 2) were machine-scraped to remove the plow zone on either side of Block III in an attempt to locate cultural features, including post hole patterns from Caddo structures (see Figure 15); these trenches were approximately 2-2.5 m in width and 20 m in length.

The Block III archeological deposits consisted of a ca. 18 cm thick plow zone overlying a midden area with an abundance of daub and burned clay near the top of the midden (ca. 22-25 cm bs) (see Figure 17b). The midden also contained quantities of ceramics and animal bone. Underlying these zones was a dense red B-horizon clay encountered at about 50 cm bs.

A number of cultural features and possible features were exposed in Block III and the two scraped areas east and west of the trench (Figure 18). Of the features that were identified, profiled, and excavated, there were 22 post holes, two possible post holes, two hearths (Features 310 and 323), a small daub-filled pit (Feature 317), an animal bone concentration (Feature 356), and a dog burial (Feature 346). Two of the post holes (Features 302 and 304) were overlain by sherd/vessel concentrations at 25-28 cm bs, with the underlying post holes extending to about 53 cm bs.

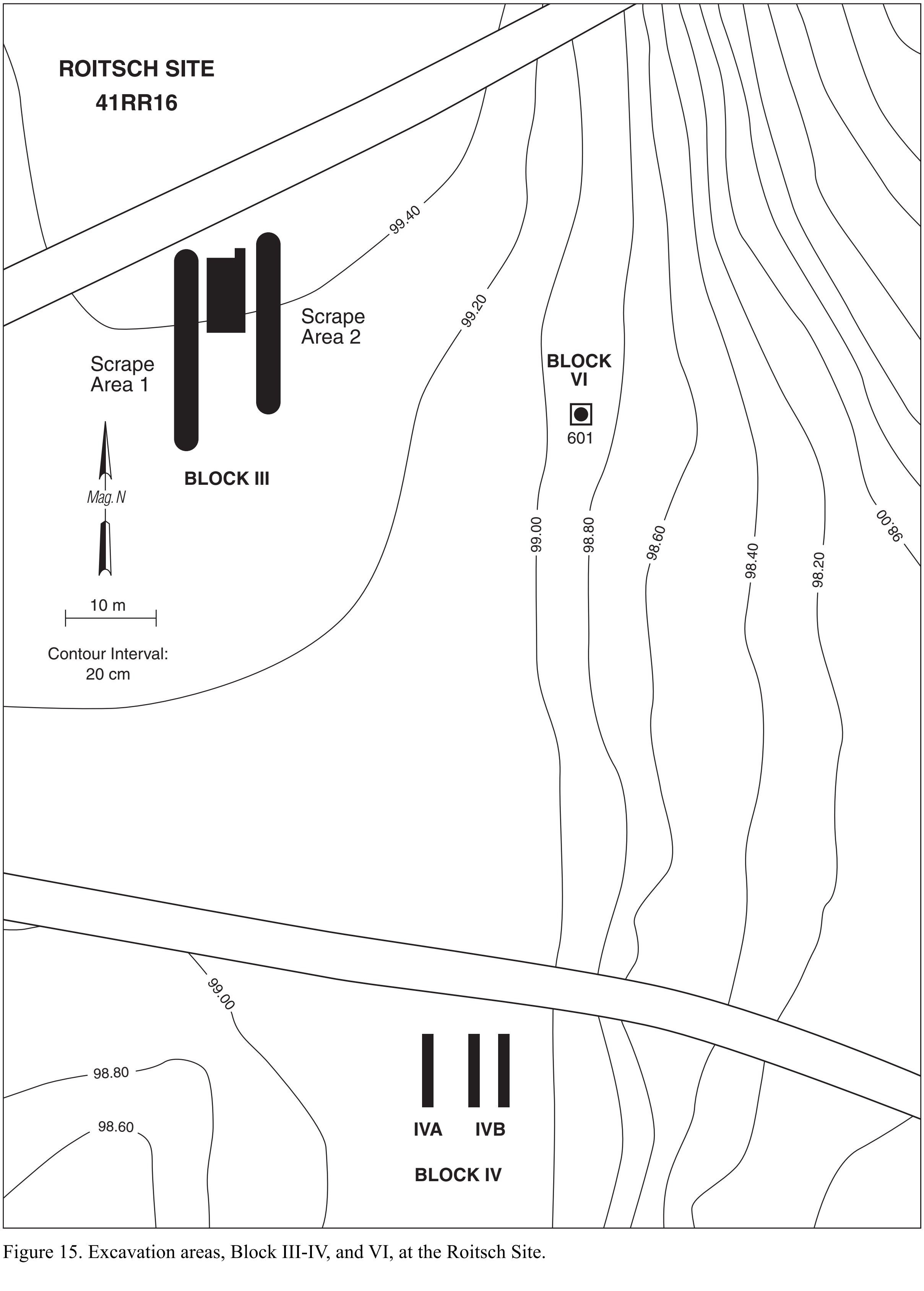


Figure 15. Excavation areas, Block III-IV, and VI, at the Roitsch Site.

Figure 16. Aerial view of the Block III excavations in June 1991.

The Feature 310 hearth appears to have been resting at ca. 25 cm bs on the original surface or floor of a Caddo structure—it probably was situated in the center of the structure, as are most structure hearths in the Caddo archeological area of northeastern Texas—with the top of the hearth at 14-16 cm bs. It was composed of burned or fired clay and contained an abundance of ash. To the north and west of the hearth in the block was an extensive amount of daub and burned clay between ca. 22-25 cm bs, probably representing the collapsed remnants of the structure walls. A possible arc of post holes that may be associated with Feature 310 is represented by Features 305-308 to the north and east (see Figure 18) and Features 302-304 to the south. In this scenario, the Feature 346 dog burial would have been placed outside the structure walls. Some of the post holes in this area of the excavations contain quantities of charcoal, ash, and burned clay, suggesting that the structure(s) had been burned before collapsing. Daub-burned clay concentrations within Block III are confined almost exclusively to the units north of Feature 310 (perhaps suggesting the direction in which the structure walls collapsed) (see Figure 18), while the ceramic sherds and animal bones occurred in high densities to the south of the central hearth, but probably still within the structure itself.

A second hearth (Feature 323) is approximately 4.5 m to the west-southwest (see Figure 18), and may also represent an interior central hearth for another structure as there are several post holes (running in an north-northwest arc) 2-3 m from the feature. A third cluster of post holes (Features 327-331) in the western scrape trench (Scrape Area 1) may belong to a third structure, based at least in part on their distance from the two hearths as well as their distinctive size and depth (see below).

The post holes in the near vicinity of the Feature 310 hearth (2-2.5 m from the hearth) and the Feature 323 hearth probably represent wall support posts (rather than interior roof supports) as they are approximately 20-24 cm in diameter and set 10-15 cm into the B-horizon clay. By contrast, roof supports and central posts may range in size to as large as 40-50 cm in diameter on Caddo structures. The Feature 327-331 post holes are slightly larger in size (24-30 cm in diameter), and set more deeply into the B-horizon clay, suggesting that they are wall post supports for a larger structure that stood in this part of Block III. The various hearths and post holes clearly suggest that this part of the McCurtain phase Caddo village was repeatedly occupied by Caddo families that built and rebuilt a succession of structures in close proximity to one another.

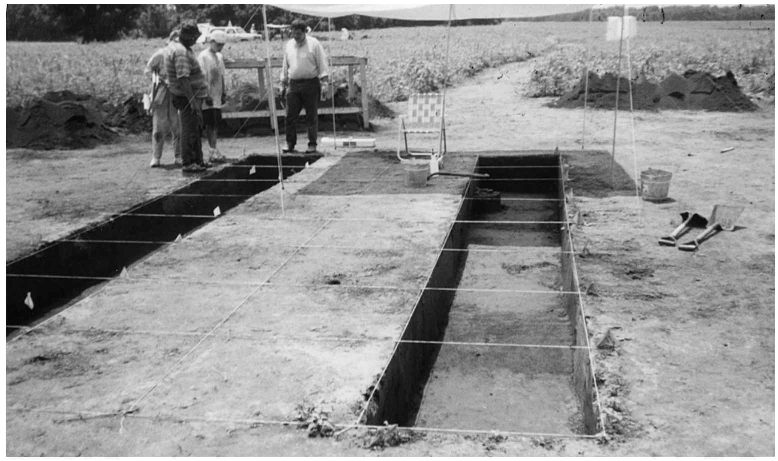
The one dog burial in the Block III area (see Figure 18) was exposed in Scrape Area 2. The adult-sized dog had been buried on its side in a ca. 80 cm diameter pit (Figure 19), with its head at the eastern end of the pit, and the front and back legs were partially flexed. There were no artifacts deliberately placed in the pit with the dog, although there was a mussel shell near the back legs. There were also patches of oxidized soil near the head and front legs, and these are probably the more-scattered remains of a burned structure in the block area; the dog was apparently buried after the structure had been burned and collapsed.

In Block IV, the midden deposits were less substantial, as were the quantities of features and artifacts from the Late Caddo McCurtain phase occupation (see below). Excavations here identified three cultural features and seven possible post holes, mainly at the northern end of the block trenches (Figure 20). The features included a flexed dog burial (Feature 401) between 40-60 cm bs (Figure 21), a small charcoal-filled pit with a broken Nash Neck Banded jar (Feature 405) that overlay a

19 cm diameter post hole, and an ash and burned clay basin hearth (Feature 402) at 24.5-40 cm bs (see Figure 20). The Feature 405 pit with the broken ceramic jar resembles two features in Block III (Features 302 and 304) where a post hole was identified immediately underlying ceramic sherd/vessel concentrations. From this, it appears to be the case that the broken ceramics were stuffed in the top of the post hole after the poles had been pulled and the hole filled with sediments.

The more definite post holes (Features 404 and 405, and possible post hole 5) ranged from 19-20 cm in diameter, consistent with wall support posts. They were exposed between 25-30 cm bs, and were anchored by digging the holes solidly into the B-horizon clay.

The occurrence of most of the post holes in Block IV in proximity to the basin hearth (probably a central hearth) suggests that a portion of a Late Caddo McCurtain phase structure was present in the northern part of the block (see Figure 20). The posts and possible post holes are ca. 2-4 m distance from the hearth, hinting at a structure that may have been circular in shape and as much as 8 m in diameter. Much of the daub and burned clay pieces found in the excavations are distributed in the northern part of the block (as are the highest densities of ceramic sherds), and they may demarcate the general area of the house. The units containing the highest densities of animal bone occur in the southwestern part of Block IV, south of Feature 405, and in the area of the Feature 401 dog burial (which was surely placed outside the house) (see Figure 20).



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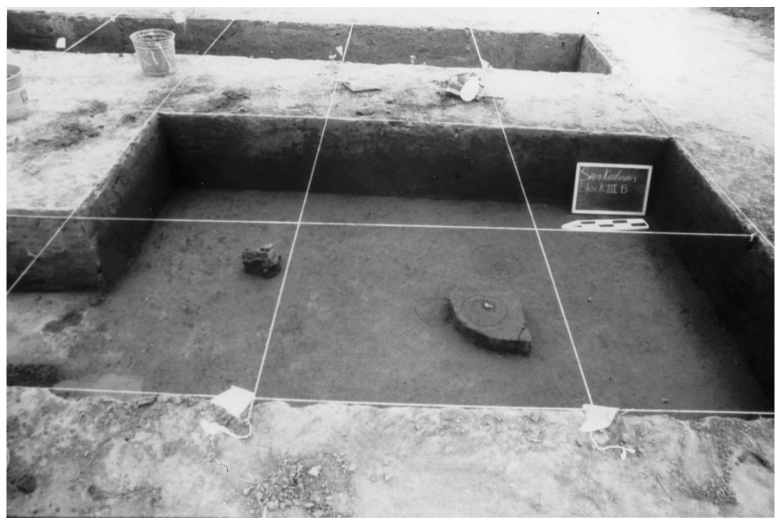


b

Figure 17. Block III excavations in June 1991: a, looking north; b, Block IIIB, looking east.

Artifact Assemblage, Blocks III and IV

A substantial assemblage of artifacts were recovered in these village areas at the Roitsch site, particularly in the quantities of daub/burned clay, ceramic sherds, and lithic debris, with much smaller amounts of chipped (n=80) and ground stone (n=10) tools and fire-cracked rocks (Table 3). The densities of artifacts per m^2 in Block III were about five times higher than in Block IV, primarily because of the very high densities of ceramic sherds, burned clay/daub, and animal bone, indicating a much more intensive occupation (i.e., more substantial midden deposits) there during the McCurtain phase.

By way of comparison with other areas of the Roitsch site, Table 4 provides more specific information on the density of archeological materials from Blocks III/IV, V, and VI in the village. The Block III artifact density stands head-over-heels higher than the density in either Blocks IV, V, and VI, particularly in the quantities of sherds (3-4

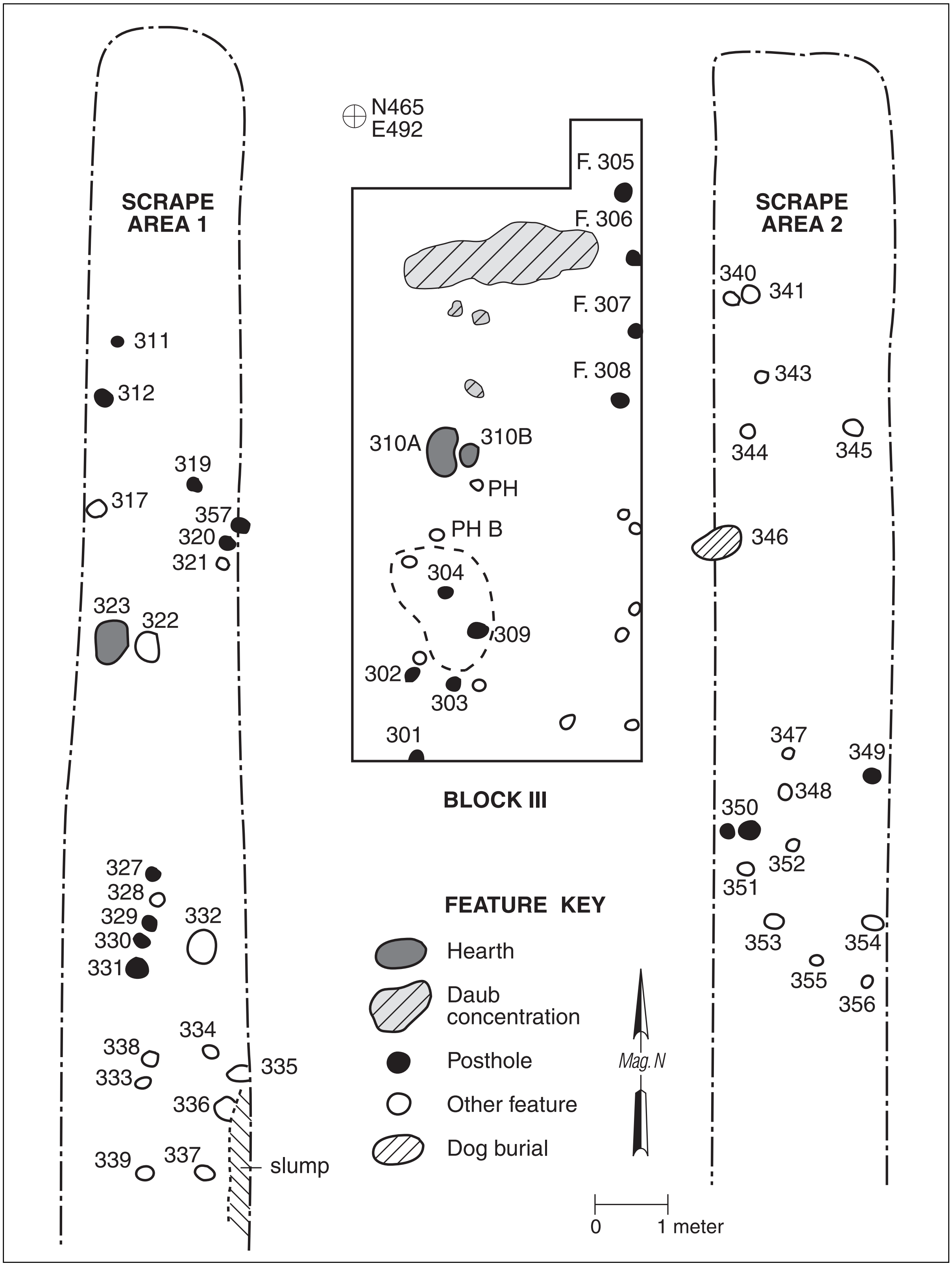


Figure 18. Features and possible Features, Block III.

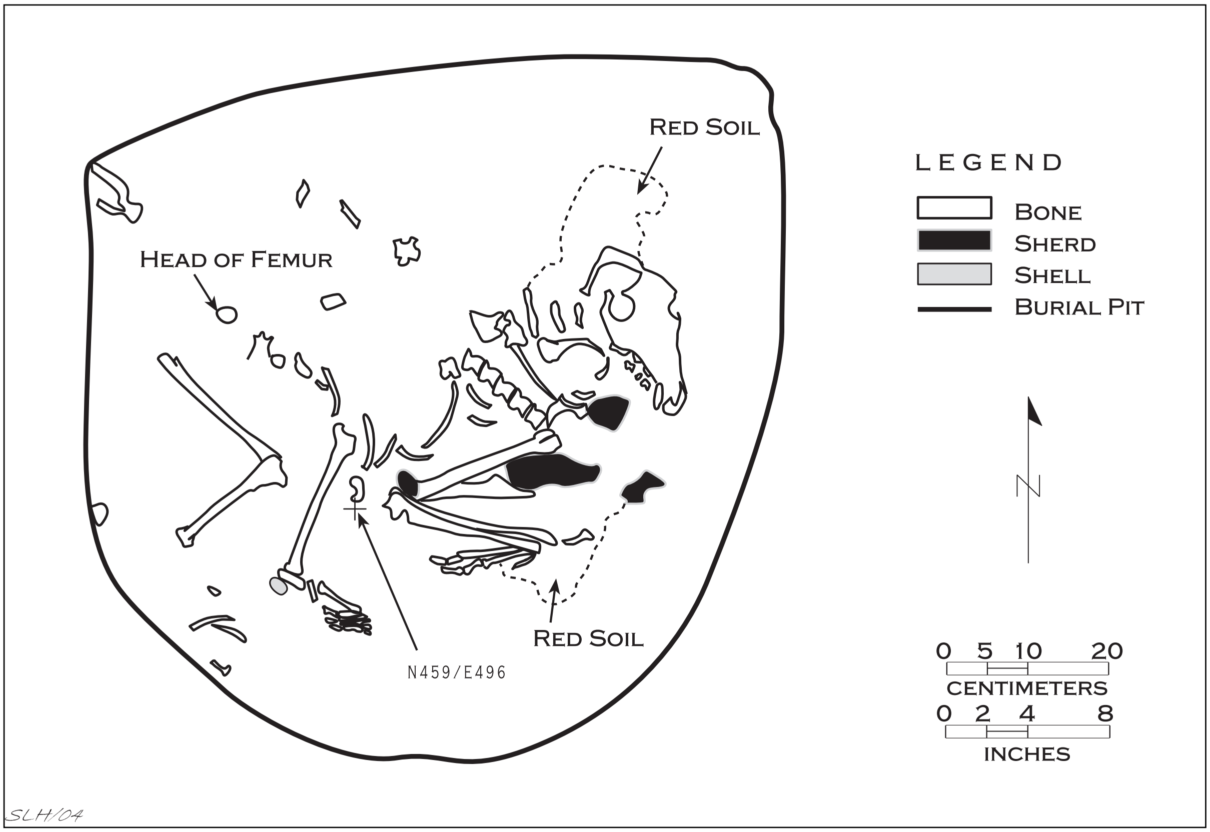


Figure 19. Plan of the Fea. 346 dog burial.

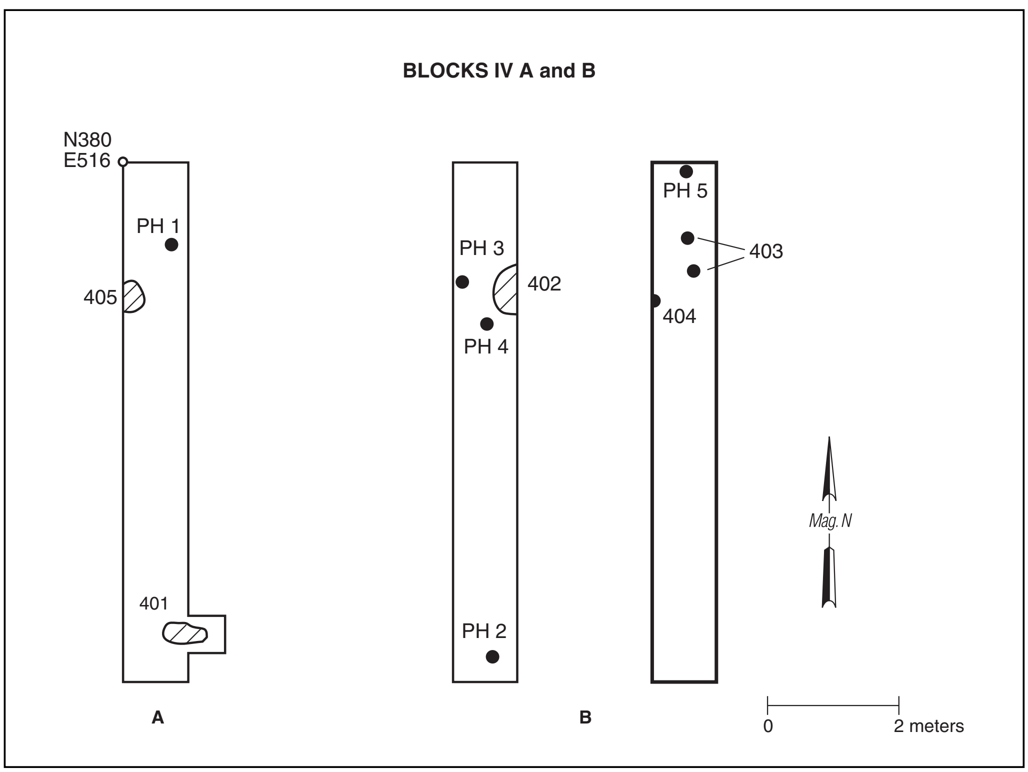


Figure 20. Block IV Excavation Plan and Features.

Figure 21. Feature 401 dog burial in Block IV at the Roitsch site.

times higher than in Blocks IV and VI, and 33 times higher than in Block V!), animal bone (3-4 times higher than in Blocks IV and VI, and 63 times higher than in Block V), and burned clay/daub. The density of burned clay/daub in Block III is 3.5-7 times higher than in Blocks IV, V, and VI (see Table 4). These archeological data clearly indicate that while all four block areas contain habitation debris from prehistoric Caddo settlements, the intensity of the occupation in Block III is notable.

More specific provenience data on the range of artifacts found in the Block III and Block IV excavations are provided in Tables 5 and 6. The assemblages are dominated by ceramic sherds (both shell-tempered and non-shell-tempered), daub, and burned clay, as these artifact comprise approximately 90 percent of the recovered materials, followed by animal bones, lithic debris, a few chipped and ground stone tools, fire-cracked rocks, and fresh water mussel shell; the preservation of mussel shell, albeit only in limited quantities, is due to the enhanced organic content of the archeological deposits in the two block excavations. Generally speaking, the units in both blocks with the highest densities of daub and burned clay pieces also have the highest numbers of ceramic sherds.

An extensive prehistoric Caddo ceramic assemblage was recovered from Blocks III and IV, comprised of 136 plain rims and 879 decorated rim and body sherds, as well as approximately 38,290 plain body and base sherds. No whole vessels were encountered in these habitation deposits, although portions of a Nash Neck Banded jar was recovered from Feature 405. The proportion of decorated sherds in the assemblage is only 2.2 percent (i.e., a plain: decorated sherd ratio of 43.7:1), which

Table 3. Artifact assemblages in Roitsch site village areas.

Block	Sherds	Arrow Point	Dart Point	Lithic Debris	Tools	Ground	FCR	Bone	Shell	Daub/ Burned Clay
III*	32,409	40	1	3018	26	4	38	5773	69	50,006
IV	6896	9	0	506	4	6	39	1033	30	5135
V	699	4	0	198	0	1	9	69	0	6459
VI	1086	3	1	353	1	1	9	217	46	1750
N	41,130	56	2	4075	31	12	95	7092	145	63,350

* Not included in the tabulation is a single chert gunflint from N459 E493; FCR=fire-cracked rock

Table 4. Density of archeological materials from different village areas at the Roitsch site.

Block	Sherds*	AP	DP	LD	Tools	GS	Bone	Shell	Daub/ Burned Clay	FCR	Totals/ m^2
III	997	1.2	+	93	0.8	0.12	177	2.1	1539	1.2	2887
IV	306	0.4	–	22	0.2	0.24	46	1.3	228	1.7	607
V	29	0.2	–	8.2	–	0.04	2.8	–	269	0.4	310
VI	256	0.7	0.2	83	0.2	0.2	51	10.8	412	2.1	816

* Frequencies per m^2; AP = arrow points; DP = dart points; LD = lithic debris; GS =ground stone tools; FCR = fire-cracked rock

is quite low by comparison with the ceramic assemblages found among contemporaneous Caddo groups living to the south in the Pineywoods and Post Oak Savanna of Northeast Texas (Perttula 2004; Perttula et al. 1995), and downstream along the Red River, but consistent with ceramic assemblages from the Fasken and Salt Well Slough sites in the Mound Prairie area (Kenmotsu 2001, 2006; Prikryl 2001, this volume). Unlike contemporaneous Late Caddo groups in northwestern Louisiana and eastern Texas that made ceramics where large portions of vessel surfaces were decorated (particularly with the introduction of brushing on the bodies of utility jars), and the proportion of decorated sherds may be as much as 50-60 percent of the sherds (with plain: decorated sherd ratios of less than 1.0), McCurtain phase ceramics are clearly from a different Late Caddo ceramic stylistic tradition. At the Roitsch site, the ceramic tradition comprised one with predominantly plain vessels and large rim-decorated vessels with plain and expansive bodies.

About 90 percent of the rim and decorated sherds have shell tempering, and the other 10 percent of the sherds are tempered with grog, or combinations of grog, bone, and grit (crushed rock and pebbles) (Table 7). Most of the latter sherds were found in Block III.

The relative frequency of shell-tempered ceramics in these habitation areas is, of course, completely consistent with a Late Caddo McCurtain phase occupation on this part of the Roitsch site. The non-shell-tempered ceramics, with a few exceptions (i.e., at least one Keno Trailed bottle sherd with finely crushed grog tempering), denote the prehistoric Caddo use of the area to some extent prior to ca. A.D. 1300, after which the use of shell tempering began to completely dominate Caddo ceramic assemblages along the middle Red River. The McCurtain phase occupation was clearly the most intensive Caddo settlement of this part of the Roitsch village.

The earlier Caddo decorated ceramics from Blocks III and IV principally include diagonal and horizontal incised motifs, along with punctated and punctated-incised decorations on the vessel rim; the latter have zones of punctations delimited by broad incised lines, and may be from Canton Incised or Pennington Punctated-Incised bowls and jars (Figure 22). Among the utility wares, incised sherds comprise 44 percent of the decorated sherds from the earlier Caddo component here (see Table 7), followed by punctated (11 percent), punctated-incised (7.9 percent), and appliqued (9 percent). Among the fine wares, engraved sherds (n=21) are comprised of fine-line horizontal and diagonal decorative elements along the rim of carinated bowls, and along the neck and bodies of bottles, as with Sanders Engraved and Hickory Engraved types.

There are four non-shell-tempered red-slipped sherds in the Block III and IV assemblage (see Table 7 and Figure 22, far right, 2nd and 3rd rows). Three are from plain red-slipped bowls or carinated bowls (cf. Sanders Plain, see Brown 1996), and the fourth is a red-slipped and punctated bottle sherd, probably from a Maxey Noded Redware bottle. Both types of red-slipped ceramics are present in other Mound Prairie phase contexts at the Roitsch site.

Another ceramic form present among the earlier Caddo ceramic assemblage from Blocks III and

Table 5. Archeological Materials from Block III.

Provenience (N-E)	Sherds	AP	LD	Tools	GS	Bone	Shell	Daub/ Burned Clay	FCR
456-492	1021		71	1		220	7	751	1
456-493	2178	2	88	1		120	8	1734	5
456-494	947	1	32	1		89		709	2
456-495	966	2	89			241	9	1364	1
457-492	1162		117			295	4	1824	
457-493	1460		92			135	5	2315	3
457-494	888	1	63			41		769	2
457-495	1161	3	154	1		250	6	1226	
458-492	1276	1	111			319	4	2581	2
458-493	980	3	70	2		65	2	1113	
458-494	892		43	1		99		769	
458-495	1198		106	1	1	197		2231	
459-492	1206	3	121			294	4	1391	
459-493	1147		130	2		141		1534	
459-494	815	1	39	1		125		701	
459-495	1131	1	129	2		218	1	1665	1
460-490	358		33			153	1	711	
460-492	665	2	99			189	2	1000	
460-493	672		46			100		955	
460-494	839		81	1		182		1147	
460-495	687	2	135			236	3	1953	2
461-492	561		135	1		247		1894	3
461-493	1127	3	76			238		1574	3
461-494	648	1	42			69		940	1
461-495	1249		154			220	3	2825	2
462-492	1039		64			235	3	2015	
462-493	759	1	59	2		185		3024	8
462-494	571	2	67			122		1734	
462-495	558	2	90			82	1	341	
463-492	401		73	1	1	203		2071	
463-493	389		22	1		51	2	411	
463-494	765	1	27	1		80		819	1
463-495	811	1	140	1		138		1838	1
464-495	1822	1	218	2		174	4	2088	
Fea. 310			1		1				
Totals	32,409	35	3016	23	3	5773	69	50,006	38

AP=arrow point; LD=lithic debris; GS=ground stone tool; FCR=fire-cracked rock.
Note: also recovered in Block III was a single dart point from the following provenience: N457 E495.

Table 6. Archeological Materials from Block IV.

Provenience (N-E)	Sherds	AP	LD	Tools	GS	Bone	Shell	Daub/ Burned Clay	FCR
372-516	410		17			66		348	1
372-521	246				1	34		139	3
372-524	258		11			9		262	1
372.5-517	114		11			40		29	1
373-516	410		29			112		143	2
373-521	237	1	5			40	1	229	
373-524	254	1				27	1	302	
374-516	244	1	44			65		231	
374-521	262		22		1	40	1	158	
374-524	254	1				8		83	2
375-516	252		55			40	4	250	2
375-521	237	1		1		36	2	223	1
376-516	520		38	1		124	1	89	4
376-521	342		24		1	36		234	
376-524	102	1		1		21	1	75	
377-516	478	1	41		1	49	13	246	11
377-521	393		28			32	1	196	
377-524	110		7			22	1	103	
378-516	323	1	60			8		271	1
378-524	440				1	58		340	
379-516	140		36			22		276	1
379-521	276	1	2		1	50		516	5
379-524	360					73	2	368	3
380-520	177		19			29	1	95	1
380-530	57		14	1		12	1	74	
Totals	6896	9	503	4	6	1033	30	5135	39

AP=arrow point; LD=lithic debris; GS=ground stone tool; FCR=fire-cracked rock.

IV is the thick-walled, flowerpot-shaped Williams Plain vessel; at least three basal sections of such vessels were recovered in our investigations here. Williams Plain vessels were first manufactured during the Woodland period in Northeast Texas (e.g., Schambach 1982, 1998; Bruseth 1998), but they apparently also continued to be produced into the earlier part of the Caddo occupation of the region.

The Late Caddo McCurtain phase ceramic assemblage from Blocks III and IV is dominated by Nash Neck Banded jar sherds (approximately 39 percent of the shell-tempered decorated sherds). Almost 30 percent of the 254 shell-tempered rim sherds from this part of the site are from Nash Neck Banded jars (see Table 7). The neck banding was confined to several corrugated bands along the rim of large rounded to globular jars (Figure 23). In addition, most of the incised/appliqued (n=15), noded (n=14), and punctated/noded (n=7) sherds (and probably many of the vertical incised lines or dashed decorations, and many of the appliqued ridges and fillets, on body sherds) are from Caddo potters decorating the bodies of Nash Neck Banded jars with vertical incised lines and/or appliqued triangles and chevrons (Figure 24). The nodes and the punctated/noded sherds are probably from rim

Table 7. The kinds of decorated sherds in the shell- and non-shell-tempered ceramics from Blocks III and IV.

Decorative method	Rim Sherds	Body Sherds	N
Non-Shell-tempered			
Plain rim	20	-	20
Incised	6	33	39
Engraved	2	19	21
Punctated	1	9	10
Appliqued	-	8	8
Punctated-incised	-	7	7
Red-slipped	3	-	3
Red-slipped-punctated	-	1	1
Sub-total	32	77	109
Shell-tempered			
Plain rim	116	-	116
Neck Banded	75	230	305
Appliqued	8	124	132
Punctated	20	93	113
Engraved	11	85	96
Engraved-red-slipped	9	63	72
Incised	3	45	48
Red-slipped	9	3	12
Trailed	-	5	5
Lip notched	3	-	3
Punctated-incised	-	2	2
Neck Banded-punctated	-	1	1
Brushed-punctated	-	1	1
Sub-total	254	652	906
Totals	286	729	1015

nodes placed in sets of four around the rim (see Perino 1994:Figure 7a, c-e). Based on the Caddo vessel data from the contemporaneous Rowland Clark and Holdeman sites a few miles downstream from Roitsch (e.g., Perino 1994, 1995), this type of rim decoration on Nash Neck Banded vessels was used throughout the McCurtain phase.

Emory Punctated-Incised appears to also be well represented in the collection from the two blocks, as shell-tempered incised and punctated sherds account for about 21 percent of the decorated and rim sherds (Figure 25; see Table 7). The Emory Punctated-Incised sherds are from relatively squat jars with everted rims. Most of the incised and punctated sherds seem to be from Emory Punctated-Incised vessels with body decorations of rows of horizontal punctations, diagonal incised lines, and/or incised lines between vertical appliqued ridges, although some of the vessels simply have a few rows of horizontal punctations on the rim. That particular

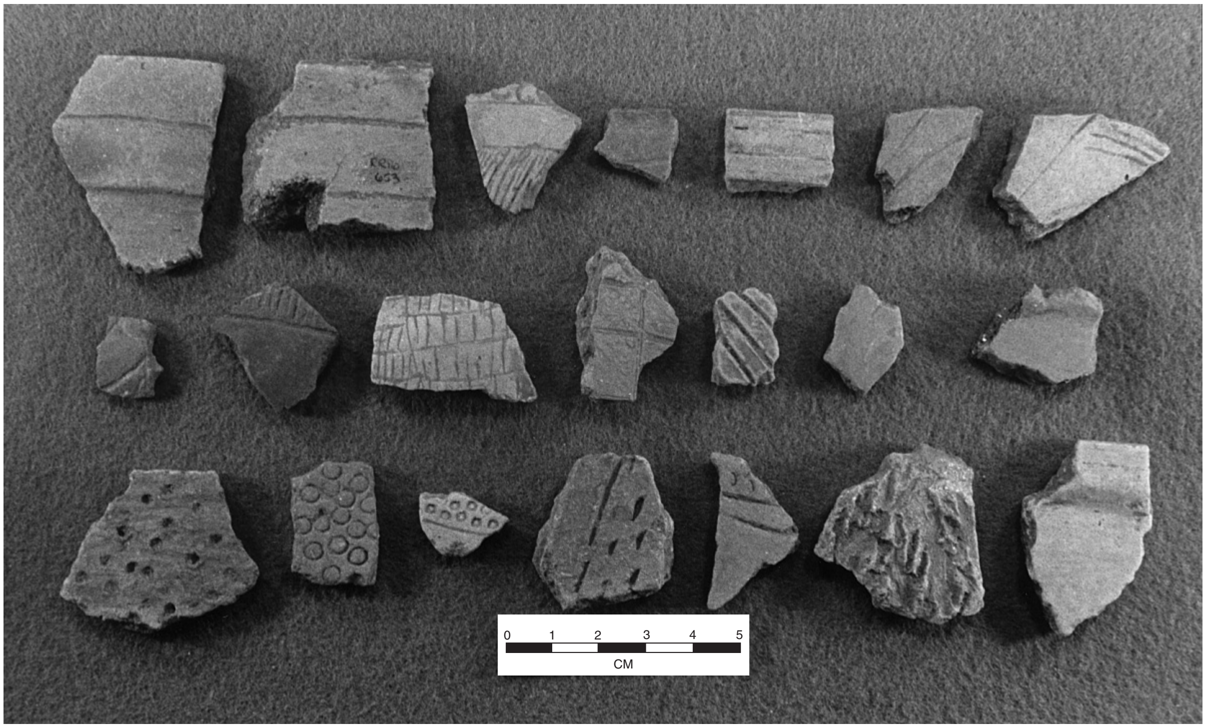


Figure 22. Pre-A.D. 1300 decorated sherds from Blocks III and IV at the Roitsch site.

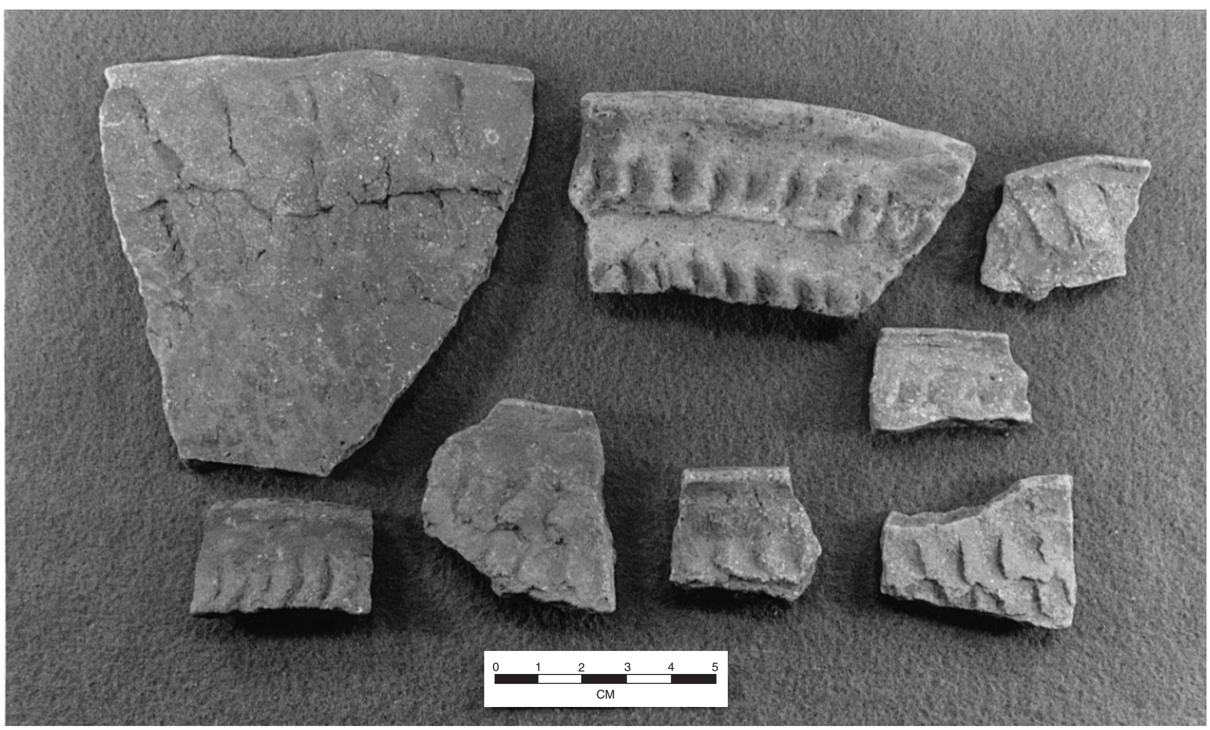


Figure 23. Nash Neck Banded ceramics from Blocks III and IV.

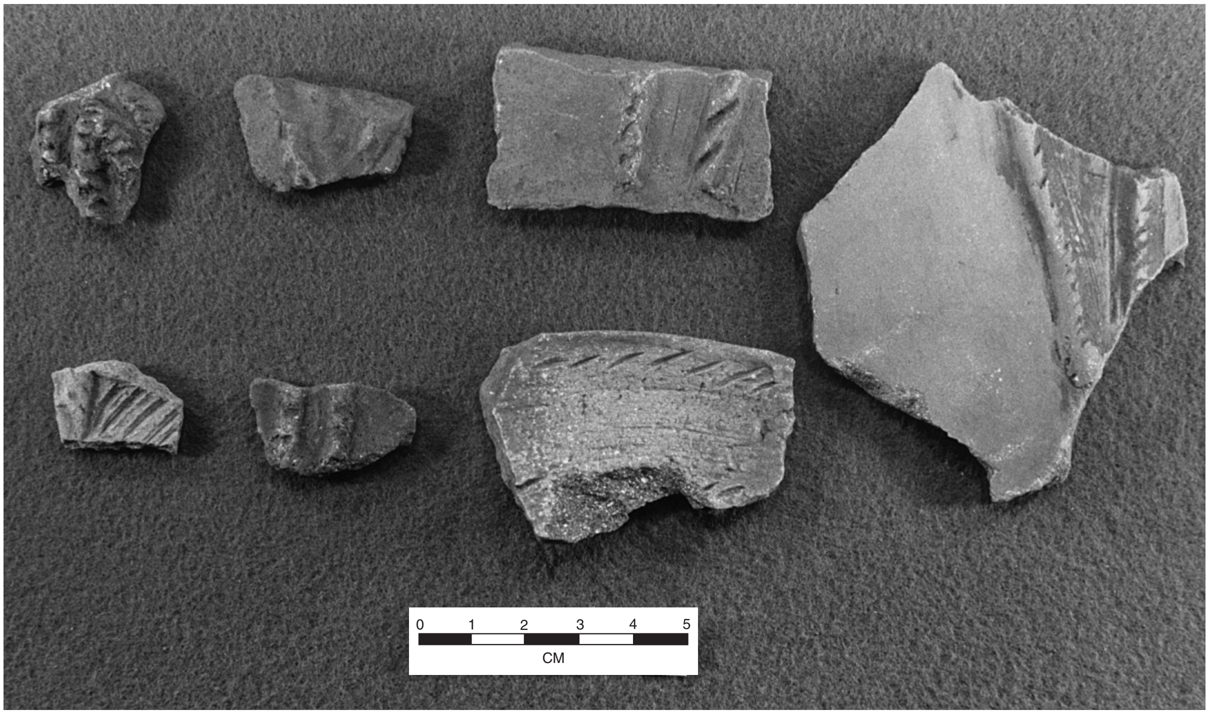


Figure 24. Appliqued and appliqued-incised elements, probably from Nash Neck Banded jars.

Figure 25. Emory Punctated-Incised sherds from Blocks III and IV.

form of the Emory Punctated-Incised jar seems most common during the later part of the McCurtain phase (after ca. A.D. 1600), but the other decorative combinations are the same as what Perino (1981:33) called the "Early Emory Punctated."

Engraved sherds from Avery Engraved bottles and bowls (Figure 26) are common in the Block III and IV ceramic assemblages, and Simms Engraved bowls with inverted rims are also present. All told, 21 percent of the decorated sherds from

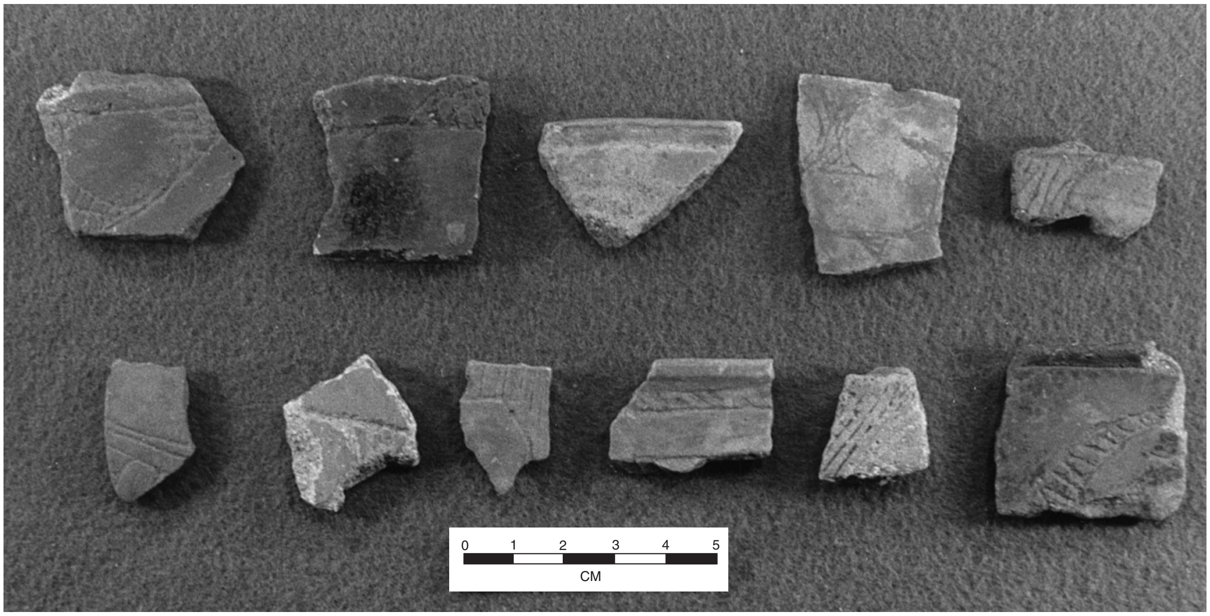


Figure 26. Shell-tempered Avery Engraved sherds from Blocks III and IV.

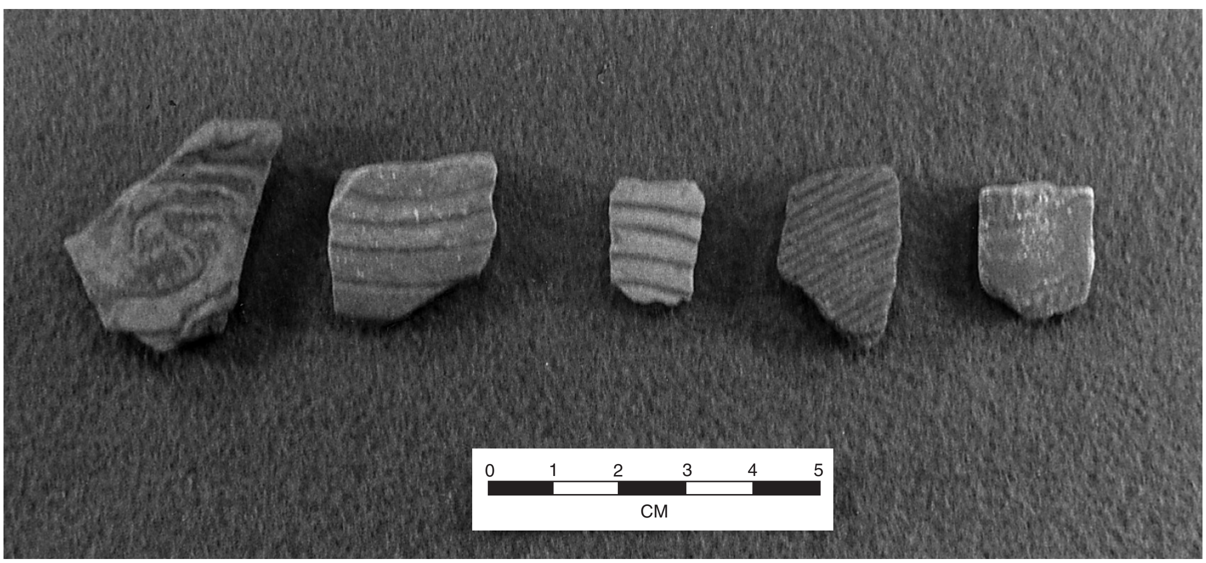


Figure 27. Keno Trailed sherds from Blocks III and IV at the Roitsch site.

this residential area are from fine wares, but including only 8 percent of the rim sherds (see Table 7). Some of the scroll and circle motifs on engraved bowls resemble decorative elements seen on Clark Engraved bowls from the Rowland Clark site (see Perino 1994:Figures 13 and 14). These types of engraved bowls were common at Rowland Clark in the earlier part of the McCurtain phase (ca. A.D. 1300-1450). Many of the engraved sherds (particularly from Avery Engraved carinated bowls, deep bowls, and bottles) are from vessels that were also red-slipped; almost 43 percent of the engraved sherds from these two blocks are from red-slipped vessels (see Table 7).

Noticeably absent from the ceramics in Blocks III and IV is Hudson Engraved, a consistent marker for a very late (ca. A.D. 1650+) McCurtain phase occupation in the Middle Red River area. However, there are a few (n=5) shell-tempered Keno Trailed bottle sherds (Figure 27) from the village areas, hinting at a limited late 17th to early 18th century Caddo domestic use of this part of the Roitsch village.

Other fine wares are red-slipped bowls and carinated bowls that were otherwise undecorated. About 1.5 percent of the decorated shell-tempered sherds are red-slipped, including nine rims (see Table 7). These are from Clement Redware (cf. Flynn 1976) vessels, although Perino (1981) labels similar plain red-slipped shell-tempered vessels from the Roden site as Roden Ware.

Pipe sherds were abundant in Blocks III (n=28) and IV (n=8), particularly in two small clusters south and east of Feature 310 in Block III, the probable central hearth to a Late Caddo McCurtain phase structure. Three of the sherds are from the bowls of elbow pipes, and the remainder are from the long-stemmed Red River style clay pipes (cf. Hoffman 1967); the latter apparently continued to be made until ca. A.D. 1450, before they were completely replaced by the elbow pipe. Among the Red River pipe sherds from these blocks are 26 stems, two stem/bowl base sherds, two bowl sherds, and three sherd from the butt end of variety Haley Red River pipes.

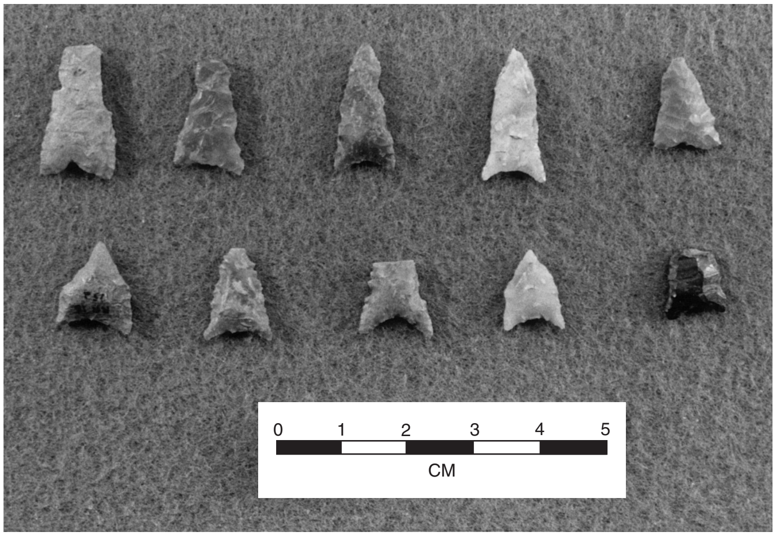
While the types of shell-tempered ceramics and pipe sherds present in Blocks III and IV indicate Caddo domestic use of this area between approximately A.D. 1300-1650, our general impression based on particular decorative styles and comparisons with other excavated Late Caddo period sites along this part of the Red River valley is that this area was primarily occupied before about A.D. 1450, with only a limited use in the 17th century. As such, the occupation here is earlier in the McCurtain phase than the component in the Block I, Block II, or Terrace areas at Roitsch. Further stylistic and decorative element analyses of McCurtain phase ceramics from contemporaneous habitation sites (as well as from mortuary contexts), in conjunction with additional radiocarbon dates from McCurtain phase occupations along the middle reaches of the Red River, should help refine the chronological position of these deposits based on stylistic changes in fine ware and utility ware decorations.

Block III tools are dominated by arrow points, arrow point preforms, and arrow point fragments (n=11), as they comprise 57 percent of the chipped and ground stone tools (see Tables 4-6); in Block IV, arrow points account for 47 percent of the stone tools. The arrow points in Block III were recovered from the southern half of the probable structure area delimited by the Feature 310 hearth, the daub/burned clay concentrations, and the Block III post holes (see Figure 18). Clearly the hunting of game animals using stone-tipped arrow points, probably large game animals such as deer (see Yates, this article), was a significant activity during the McCurtain phase occupation at the Roitsch site.

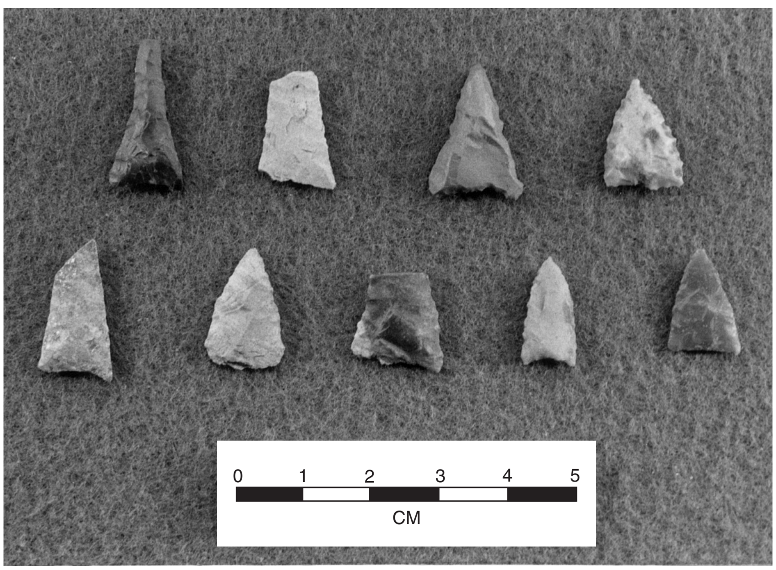
The dominant Late Caddo arrow point forms in Blocks III and IV, and nearby excavations (i.e., 50 x 50 cm units and Scrape Area 2 by Block III) are triangular forms, including Maud (n=19, Class II), Talco (n=1, Class I), Washita (n=1, Class V) and Harrell (n=1, Class III) types (Figure 28a-b and Figure 29, top row). The Maud points have short blades and shallow basal concavities, and tend to be made from novaculite and Big Fork chert. The blades on the Maud points are commonly serrated, but not to the same degree as Class I Talco arrow points. The one Talco point from Block III is made from quartzite. These points have long and well-serrated blades and a shallow basal concavity. The Harrell and Washita points are made from local raw materials of lesser knapping quality than the Maud points, namely quartzite and claystone-siltstone. Harrell points are triangular in shape, with a short blade, shallow side notching, and a deep basal concavity. Washita points, by contrast, have a short and concave stem, but are also side-notched (see Figure 29, top row). The proportion of triangular to stemmed arrow points in Block III is 19 to 7 (2.7:1) compared to 3 to 4 (0.75:1) in Block IV, with a much higher proportion of triangular-shaped and unstemmed arrow points in Block III. Since the unstemmed triangular-shaped arrow points tend to date to the Late Caddo period (after ca. A.D. 1300), later than the stemmed arrow point forms, it seems obvious that there was a more substantial and long-lasting Late Caddo occupation in Block III than in Block IV, at least with respect to the manufacture, use, and discard of chipped stone arrow points.

There are nine ovoid to triangular arrow point preforms in the Block III and IV excavations (see Figure 28b, 2nd row, 2nd and 3rd from left), and all of them are from Block III. Arrow point knapping activities were clearly concentrated in Block III during the McCurtain phase residential occupation. The preferred raw material in arrow point manufacture must have been novaculite, as 55 percent of the preforms were on this raw material. Other lithic raw materials represented among the preforms are Big Fork chert (n=2), a reddish-brown chert (n=1), and a brown chert (n=1).

Among the stemmed forms, most of which are



a



b

Figure 28. Class II Maud arrow points and one Class III Harrell point at the Roitsch site: a, Maud and Harrell points; b, Maud arrow points and preforms.

from arrow points made and used prior to A.D. 1300, two rectangular-stemmed Alba specimens (Class VIII) were recovered in the excavations, along with a broken Kent dart point made from a dark gray chert in Block III. The Alba points (both with rectangular barbs) are made from novaculite and a dark brown chert. There are several other stemmed arrow point forms in the Block III and Block IV archeological deposits (see Figure 29, bottom row).

There is one Class IV Reed or Haskell point of claystone-siltstone in Block IV; this is a side-notched form with a broad and flat stem. A single Catahoula point (Class VI) of white novaculite also came from Block IV. This point has an expanding stem and is corner-notched, with a broad blade and wide, expanding barbs. The one Morris point (Class IX), in Block III, is corner-notched, with a short blade and a deep and broadly concave stem. It is made from a chalcedony. Also found in Block III is a Class X Homan point made from white novaculite. Homan points, probably from a relatively early Caddo use of the area, have a broad expanding stem and a convex base. A single Massard point (Class XII) of dark gray chert also came from Block III. These points, probably in use during the earlier part of the McCurtain phase (cf. Brown 1996), have an expanding stem and are corner-notched, and the stem is short with a flat base. The blades on Massard points also tend to be relatively short.

There are three Hayes points (Class XIII), short variety (cf. Brown 1996), in the Block III and IV arrow points. These have a short, expanding, and bulbous stem, with a convex base. As the name implies, the blades are relatively short compared to the very long and often serrated blades noted on many Hayes points. Two of the three points are made from brown or grayish-brown chert, while the other is made from gray novaculite. The final arrow point is a Class XI form from Block III, made from gray novaculite (see Figure 29, bottom row, far right). This form is side-notched, with a short blade and a convex base.

Also present throughout the block excavations in the McCurtain phase residential areas are a variety of flake tools, including drills and perforators (Figure 30), side scrapers, thumbnail scrapers, end scrapers, and expediently utilized flakes (Figure 31). In Block III, there are 11 formal scraping

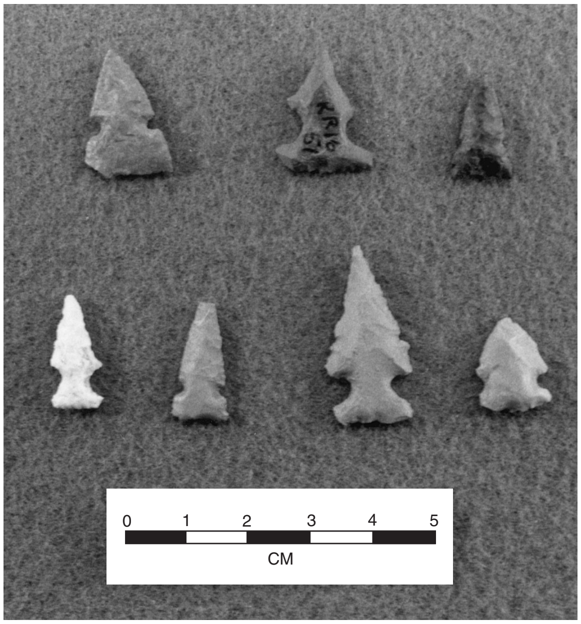


Figure 29. Side-notched Class IV and V arrow points at the Roitsch site.

Figure 30. Chipped stone tools from village areas at the Roitsch site: drills and perforators.

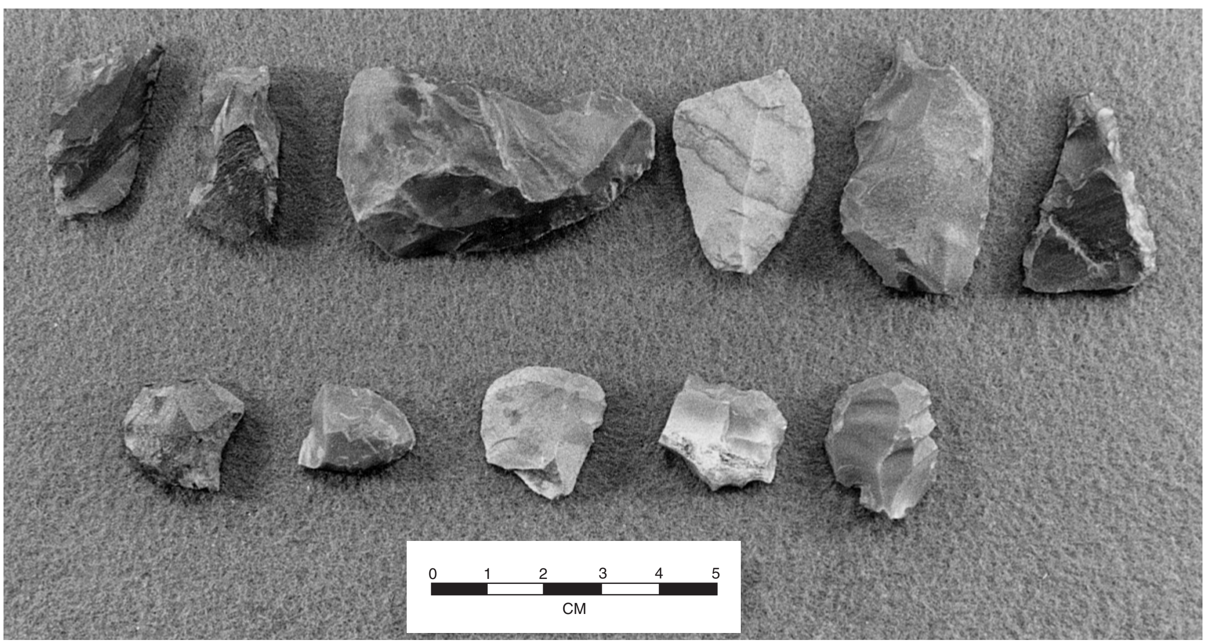


Figure 31. Scraping tools at the Roitsch site.

implements and four expedient flake tools (a ratio of 2.75:1), while in Block IV there is only a single end scraper and two expedient flake tools. The drills and perforators are primarily found in Block III (n=4), and only one Big Fork chert perforator came from Block IV. The Block III drills/perforators are made from novaculite (n=3) and Big Fork chert (n=1).

Among the bifaces, all from Block III (n=7) or in 50 x 50 cm units near Block III (n=2), there are four bifacially-worked pieces from completed tools that may be knifes, and one (from N463 E493) has a beveled blade. The bifaces are made from Big Fork chert (n=2), novaculite (n=2), quartzite (n=1), dark gray chert (n=3), and a brown chert (n=1).

As mentioned above, only a single dart point was found in the Block III or IV excavations. The one point is a Kent type, dating from the Woodland period and often found in association with Gary points, made from a dark gray chert. There are two cores in the Block III archeological deposits: a single platform core made from a brownish-red chert and a tested cobble made from the same chert material.

Among the few ground stone tools in Block III (see Table 6) are fragments of three green siliceous shale celts (three from surface contexts) (Figure 32) and a mano fragment of sandstone. These tools occur both north and south of the Feature 310 hearth. In addition to the relatively abundant lithic debris (93 pieces per m^2), other evidence for the manufacture and maintenance of lithic tools in Block III include the two cores, the arrow point preforms, and several broken and discarded biface fragments.

Including two cores, 19 chipped and ground stone tools were found in the Block IV excavations (see Table 6). This includes a variety of arrow points (both stemmed and unstemmed triangular forms, with the Maud point being the most common type), along with four arrow point tips and blades. There are also three flake tools, a perforator, and several ground stone tools, including three hammerstones, grinding slab fragments (n=2), a metate fragment, and a mano fragment. The ground stone tools are made from local quartzite and sandstone.

Block V/Trench I

The Block V or Trench I excavations in 1991 and 1992 took place along the south side of the Red River alluvial terrace, some 400 m southwest of the East Mound and 120 m south of the current bank of the Red River (see Figure 5). They were placed about 20 m west of a phone pole, 20-40 m south of a terrace knoll, in an area where a Historic Caddo period burial (probably dating to the late 17th-early 18th century) with glass beads was reportedly found some years previously (Figure 33).

A total of 24 m^2 were excavated during the Field School in this area, 14 m^2 in a 2 x 7 m trench and the other 10 m^2 in a 2 x 5 m trench (Figures 34 and 35). The archeological deposits were confined to a shallow plow zone and reddish-brown Redlake sandy loam A-horizon (approximately 30 cm in total thickness) overlying a B-horizon clay. No midden deposits were present in the Block V archeological deposits. During the excavations, seven post holes and two possible post holes (Features 510 and 511) were identified, but (due

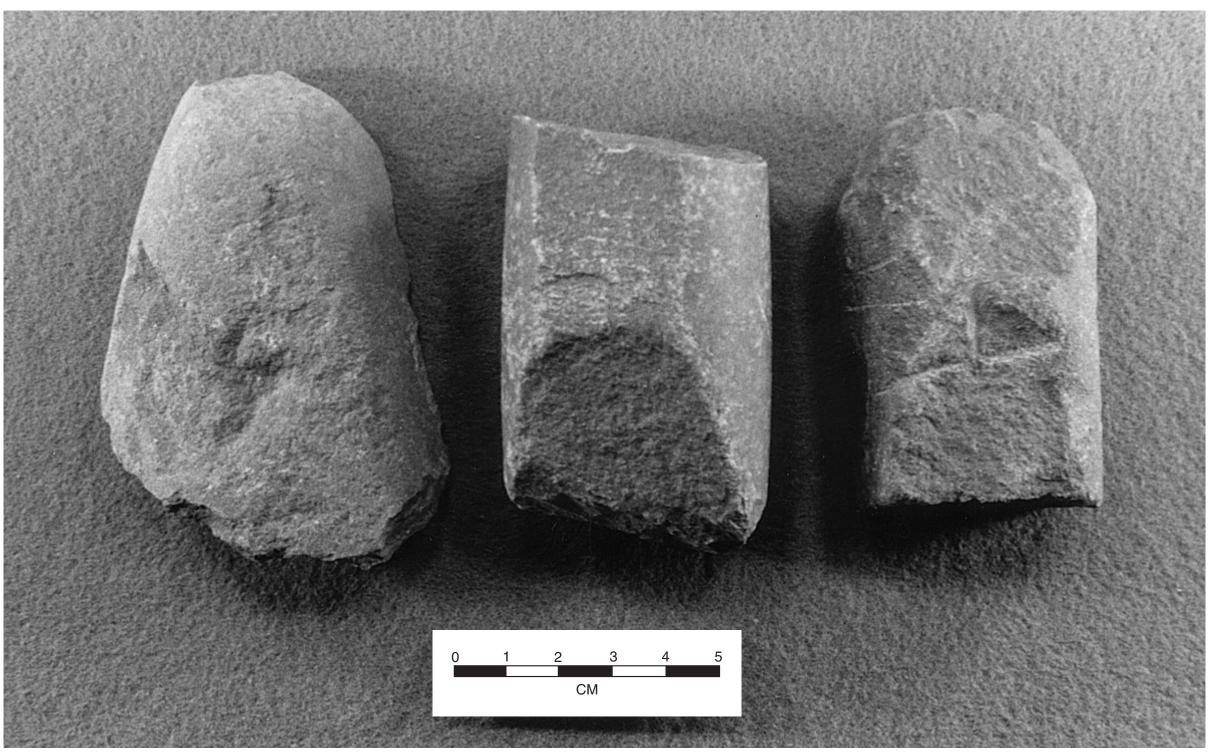


Figure 32. Ground stone tools from Blocks III and IV.

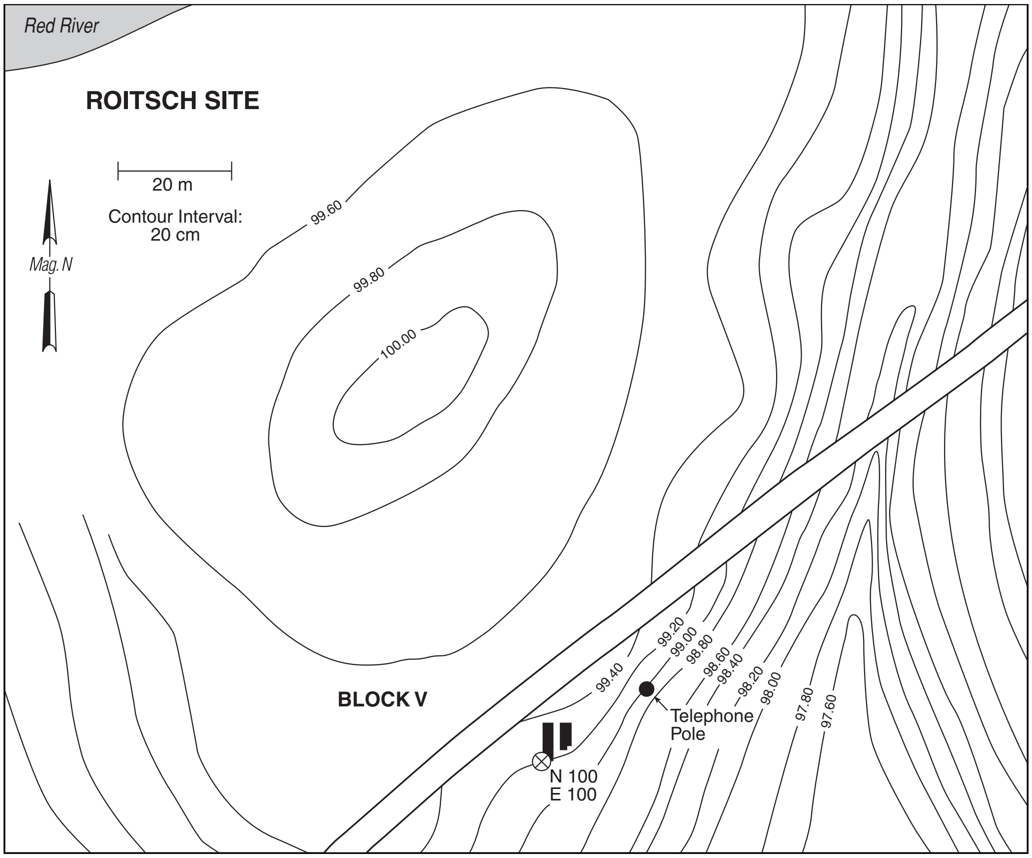


Figure 33. Topographic map of the general Block V/Trench I Area.

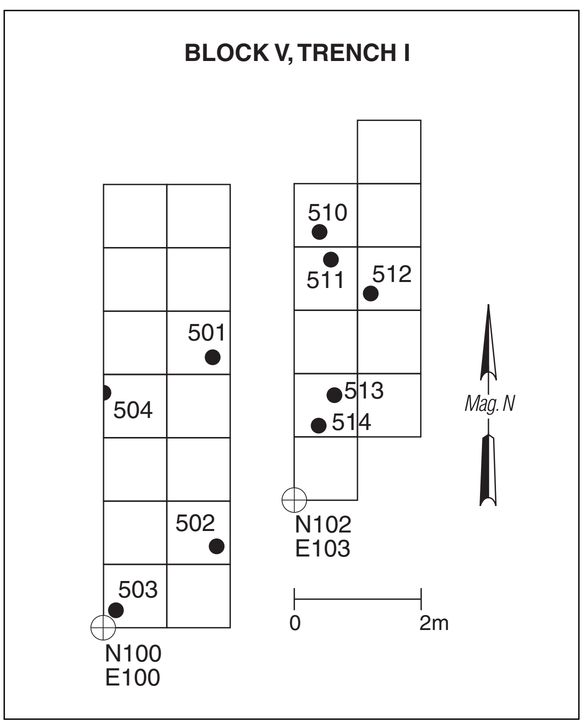


Figure 34. Excavation plan, Block V/Trench I, and Features.

at least in part to the limited excavations) they formed no obvious pattern; two of the post holes contained small amounts of archeological materials. The diameter of the various post holes (ca. 20 cm in diameter) suggests they are wall posts, not interior support or center posts. Nevertheless, they do constitute evidence, along with the substantial amount of daub and burned clay recovered in the excavations (n=6459), that a clay and thatched Caddo structure(s) stood in the area. We may speculate that the concentrations of daub, animal bone (n=69) and ceramics in the northwestern part of Block V/Trench 1 represent floor debris from the interior of the postulated structure.

In addition to the daub/burned clay and animal bone recovered in the excavations, a small amount of ceramic sherds (n=699), lithic debris (n=197), and stone tools (n=4) were also present in the area (Table 8; see also Table 4). These material remains appear to comprise household trash discarded in and around a single Caddo structure during the course of its residential use. Other than daub/burned clay, the very low density of Caddo artifactual debris from Block V/Trench I—namely 9 to 30

Figure 35. Completed excavations in Block V/Trench I, 1991 Field School.

Table 8. Archeological Materials from Block V/Trench I.

Provenience (N-E)	Sherds	AP	LD	Tools	GS	Bone	Shell	Daub/ Burned Clay	FCR
F. 502					1				
F. 504	4		4					9	
100-100	24		1			2		323	
100-101	20		1					301	
101-100	68		23			8		430	
101-101	5		1					6	
102-100	34		21			10		497	
102-101	18		10			2		133	
102-103	5		3			1		143	
103-100	42		14			4		530	
103-101	48	1	18			4	2	422	1
103-103	20		4					120	
103-104	13		2			1		111	
104-100	29		6					102	
104-101	15		3			1		107	
104-103	27		12					200	
104-104	17		2					130	
105-100	57	1	22			15		910	8
105-101	30		6					149	
105-103	22		2					178	
105-104	11		15			2		169	
106-100	71		14			11		693	
106-101	66		10			1		349	
106-103	11		1					155	
106-104	13	1	1					111	
107-104	29	1	1			7		73	
Totals	699	4	197	0	1	69	2	6459	9

AP=arrow point; LD=lithic debris; GS=ground stone tool; FCR=fire-cracked rock times lower in artifact density than either Blocks III and IV in the heart of the site (see Tables 3 and 4) during the McCurtain phase occupation—clearly suggests that this part of the Roitsch site was utilized for only a limited time, perhaps less than 5-10 years in toto.

The small lithic tool assemblage is represented by four arrow points and a quartzite mano. With the exception of a single arrow point blade fragment from N107 E104, the remainder of the stone tools were found within the interior of the possible Block V/Trench I structure. The unbroken mano was recovered in Feature 502 (see Table 8).

Two of the four Block V arrow points are broken Maud points (Class II forms) made from gray novaculite or Big Fork chert. These points are triangular-shaped, with short blades, and shallow basal concavities. They are also very common in Blocks III and IV. Another is a red jasper stemmed arrow point fragment with a long, serrated blade, possibly from a Catahoula, Hayes, or Pocola point, but not enough of the stem remains on the point to make a definitive typological identification. The last arrow point is a Big Fork chert tip from N106 E104.

The Block V/Trench I ceramics (n=699) are uniformly small in size, and the decorative elements/motifs on the 17 decorated sherds are difficult to discern. A single plain grog-tempered rim sherd was also found in the Block V/Trench I investigations. A mixture of shell- and non-shell-tempered ceramics were recovered from this block, with the non-shell-tempered sherds (primarily tempered with grog) representing 44 percent of the small rim/decorated sherd assemblage.

The non-shell tempered sherds (n=7) are primarily decorated on the body and rim with broad incised lines and/or punctations, although one small incised sherd of indeterminate design is also present in the Block V/Trench I collection, along with a cross-hatched incised piece and one with an exterior red slip. While the sample of non-shell-tempered sherds is very small, the relative frequency of incised and zoned punctated sherds is consistent with a ceramic assemblage that dates relatively early in the prehistoric Caddo settlement of the Roitsch site (i.e., prior to ca. A.D. 1300). The shell-tempered decorated sherds (n=10), on the other hand, include Nash Neck Banded decorations (n=1), horizontal punctations (n=3) from Emory Punctated-Incised jars, three broad incised or trailed sherd from Keno Trailed bottles, and two engraved sherds, one of which may be from a distinctively shaped and short-rimmed Simms Engraved shouldered bowl and the other is from an Avery Engraved vessel.

The ceramics from the Block V/Trench I investigations do not clearly support the suggestion (Bruseth et al. 1992) that this area has any sort of substantial Historic Caddo period occupation, although the shell-tempered sherds from Keno Trailed bottles may be indicative of a limited mid- to late 17th century use by Caddo peoples (cf. Bruseth 1998:62). Other ceramic information that argues against a single component Historic Caddo period occupation, or even an occupation primarily limited to the Late Caddo McCurtain phase, however, is the relatively low frequency of shell-tempered sherds (56 percent) in the small ceramic assemblage compared to other parts of the Roitsch site village. Ceramic evidence from other areas at Roitsch (particularly Blocks III/IV and the terrace area), as well as other nearby Caddo village sites (such as Rowland Clark, Roden, Holdeman, and Bob Williams [Perino 1981, 1983, 1994, 1995], is conclusive that shell-tempered ceramics fully dominate the ceramics made and used by the Caddo on sites dating after ca. A.D. 1300 in this part of the Red River valley. Thus, the Block V/Trench I ceramics suggest at least two occupations on this part of the site, one during the earlier part of the prehistoric Caddo sequence at Roitsch (perhaps broadly contemporaneous with the Mound Prairie phase occupation in Blocks I/II), and the other at the latter end of the McCurtain phase, dating ca. A.D. 1650-1700 (e.g., Perino 1994:28).

EXCAVATIONS IN A LATE MCCURTAIN PHASE CEMETERY: TERRACE AREA (BLOCK VII)

by Timothy K. Perttula

In addition to archeological investigations in various Late Caddo habitation areas at the Roitsch site, part of the Texas Archeological Society (TAS) Field School work in 1991 took place in an associated cemetery area on the eastern edge of the alluvial terrace (Figure 36a-b). The terrace area (see Figure 5) contained a looted and disturbed Late Caddo McCurtain phase cemetery, including two separate areas where several domesticated dogs were also interred (see Yates, this article). The terrace area was heavily eroded, and 10 clusters

a

b

Figure 36. TAS excavations of the aboriginal cemetery along the terrace slope: a, looking north at eroded terrace edge; b, looking east at the excavations in progress.

of human remains were visible on the disturbed surface east of the more intact burials farther up the terrace slope (Human Bone Concentrations 1-10 on Figure 37); the surface exposed human remains and the burials covered an area approximately 25 x 25 m in size. The area also contained a light scatter of Late Caddo period occupational debris that probably has been eroded from the terrace edge and the village settlement investigated in Block III/IV as well as from a small knoll about 40 m south of the cemetery area (see Figure 5). Eleven burials (Burials 24-34) were excavated by the TAS in the terrace area.

The burials that were exposed and excavated during the course of the TAS Field School investigations were all apparently previously eroded,

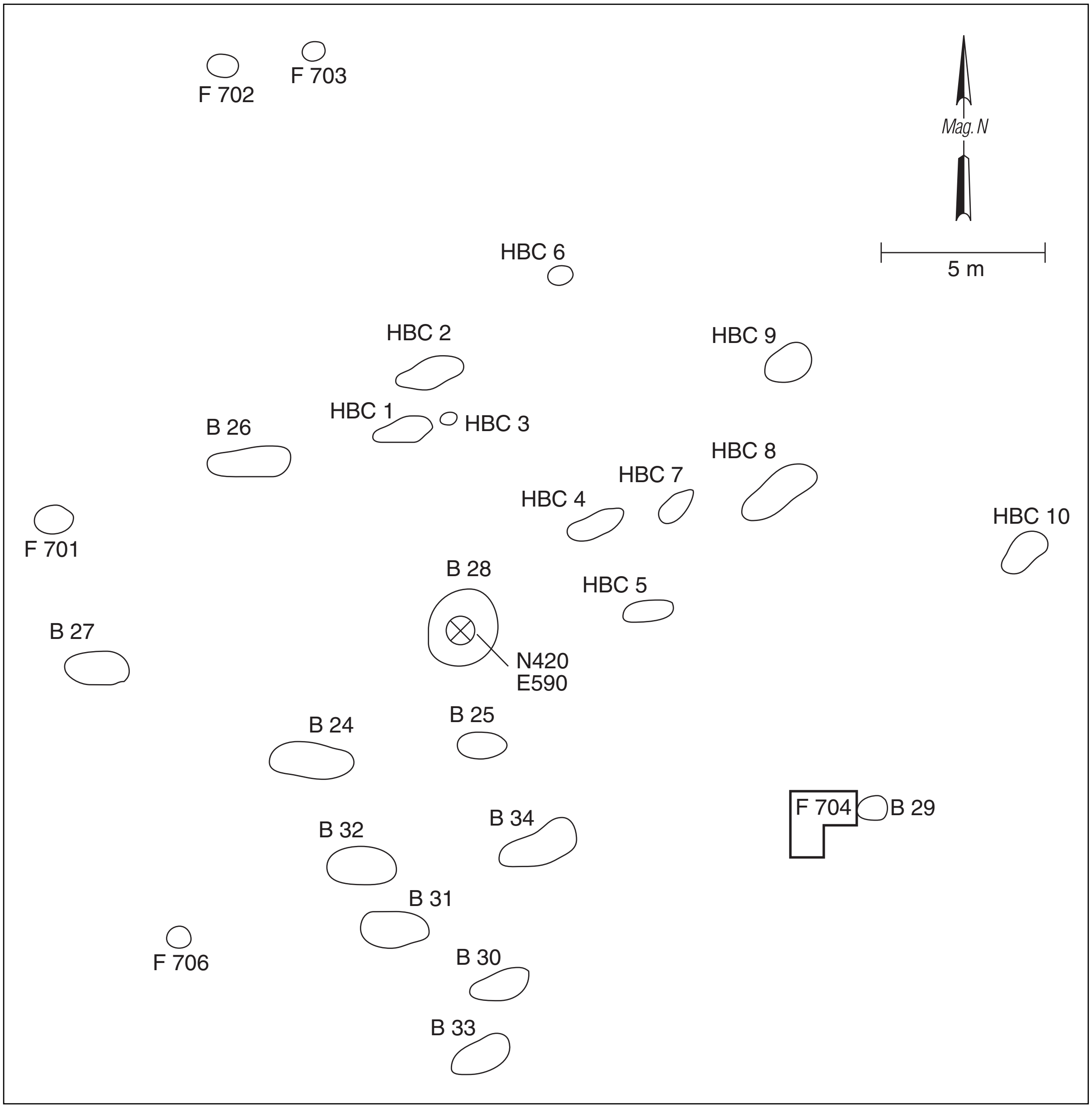


Figure 37. Burials, Human Bone Concentrations, Features, and Scraped Areas.

disturbed, and/or disarticulated as a result of 1990 flooding, pot hunting and grave looting, as well as landowner farming and grading activities. Nevertheless, significant bioarcheological information was obtained on the age, sex, health, and diet of these Late Caddo McCurtain phase individuals (see Derrick et al., below), as well as a modicum of archeological information on the kinds of grave goods placed with these people at the time of their death. The vast majority of the grave goods, however, had already been previously removed by the grave looters.

Burial 24

About half of this extended burial, an adult Caddo male, had been previously removed by erosion (Figure 38), and the remainder was exposed along an active erosional gully. The head was at the eastern end of the burial pit, and it faced almost due west. There were a number of shell-tempered pottery sherds (n=59) scattered through the burial pit fill, from Avery Engraved, Hudson Engraved, and Emory Punctated-Incised vessels, and portions of one Nash Neck Banded vessel (including five

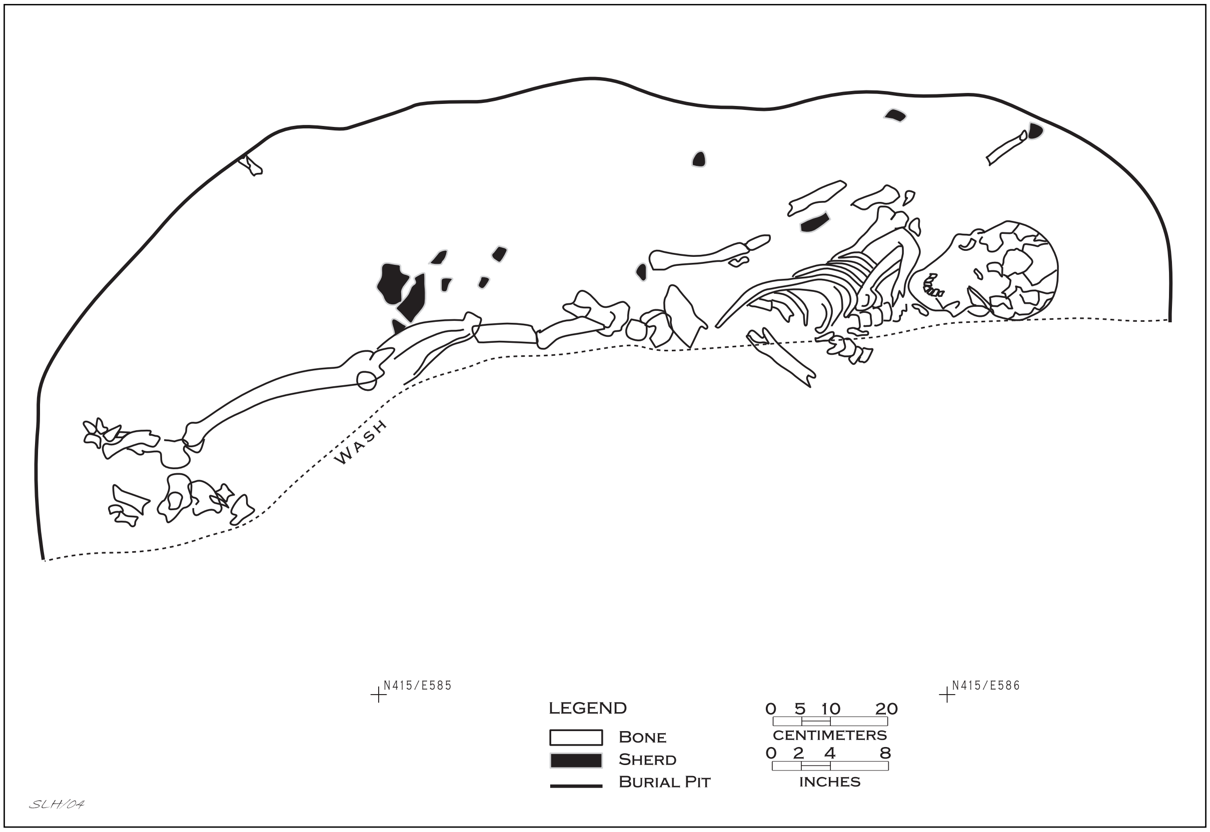


Figure 38. Burial 24 plan.

rim sherds) was found roughly in place by the right knee (see Figure 38).

Other artifacts recovered from the burial pit fill, but not apparently directly associated funerary objects, are a few pieces of daub and an arrow point preform. A single marine shell disk bead (9 mm in diameter) was also found in the burial fill, and may have adorned the body of the deceased adult Caddo male when the body was placed in the burial pit.

Burial 25

This burial, an old adult (40-55 years of age) of undetermined sex, had been thoroughly disturbed by erosion and looting activities. The bones were scattered through the burial pit itself, which was about 100 cm in width. The western half of the burial pit had been destroyed by erosion. The only articulated human remains in the pit were several vertebrae from the vertebral column.

There were no obvious funerary objects remaining in the burial pit, although there were a few shell-tempered pottery sherds (n=41). Among the sherds were a bottle sherd from a Hudson Engraved vessel, three Emory Punctated-Incised rim sherds from a cooking jar, nine Nash Neck Banded jar sherds, and eight Avery Engraved sherds from two different vessels; one had a red slip on both vessel surfaces, while the other was a black polished bottle fragment. A small jasper core was also in the burial fill.

Burial 26

The northeastern part of Burial 26 had been disturbed by erosion and looting, as was the lower leg area (Figure 39). The burial pit is approximately 180 cm in length and 90 cm in width. Bioarcheological analysis of the recovered human remains indicates that thus burial included two individuals, an adult female, and a 1-2 year-old child. The adult female was laid out on her back, with her head at the eastern end of the burial pit (see Figure 39). The exact location of the child within the burial pit is not known because of the admixture of bones from earlier erosion and looting.

There were no funerary objects left in the burial pit. Among the artifacts in the burial pit fill

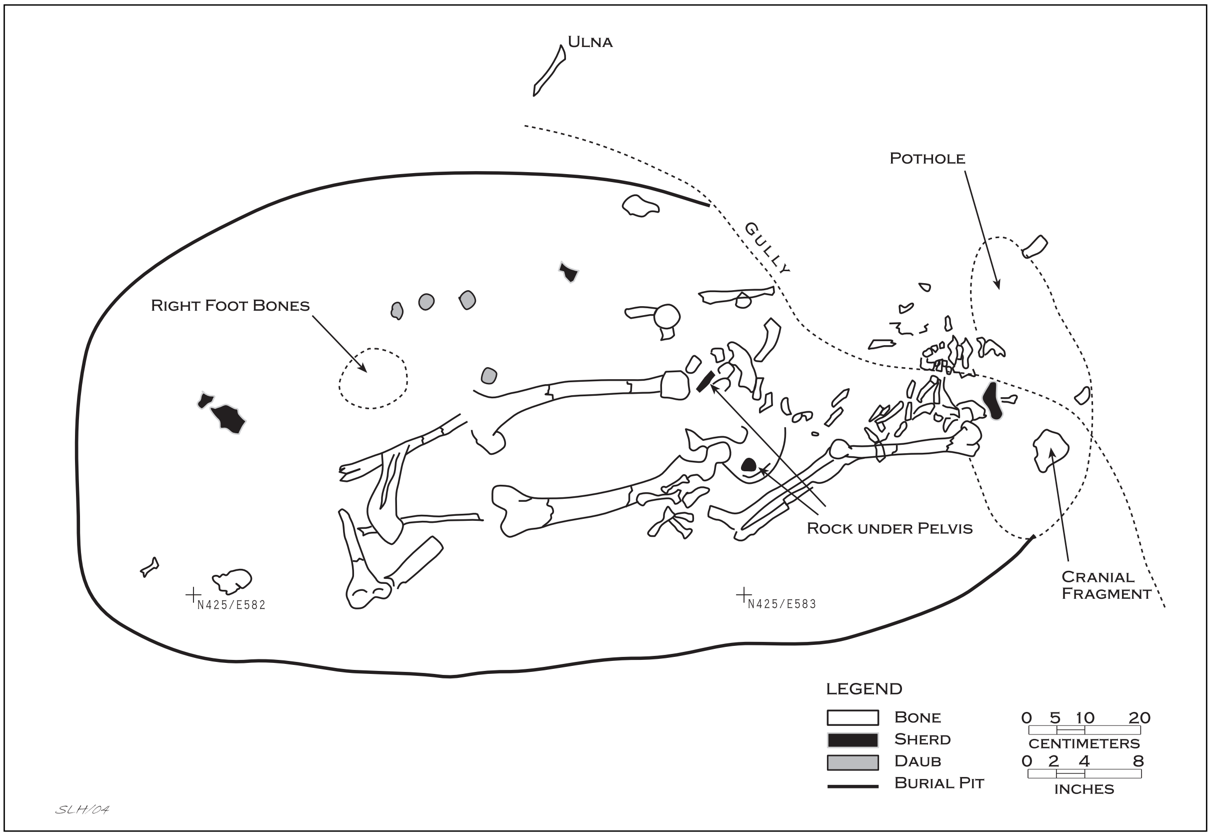


Figure 39. Burial 26 plan.

were apparently pieces of daub by the right knee, two unmodified rocks under the hip area, and several shell-tempered pottery sherds (n=25). These were from utility wares (Emory Punctated-Incised and Nash Neck Banded jars) as well as fine wares (a black polished Simms Engraved bowl), among them a Keno Trailed body sherd.

Burial 27

This disturbed burial contained the jumbled remains of two individuals, one that of a young adult female Caddo (and the more intact of the two individuals) and the other a 10-14 year old of unknown sex. There was no obvious burial pit.

During the excavations, the crushed remnants of a shell-tempered Hudson Engraved bowl (Vessel 1) was recovered by the right leg of the young adult female. Additionally, there were 29 shell-tempered sherds recovered in the excavations of Burial 27, including sherds from Emory Punctated-Incised and Nash Neck Banded jars as well as a Keno Trailed bottle. Two marine shell beads and a large columella bead were found in the excavated matrix directly underneath the bones, and these were likely ornaments that accompanied either one or both of the deceased individuals. A chert core was also found in the exposure of Burial 27.

Burial 28

This burial was exposed in an erosional gully, and the eastern half of the burial had been disturbed by looting activities. The burial pit itself could not be readily discerned during the excavations. Bioarcheological analysis of the recovered human remains indicate that the commingled remains represent parts of four different individuals, including three adults of unknown sex and one young child (see Derrick et al., this article).

Parts of five different ceramic vessels were noted in apparent association with at least one of the individuals in Burial 28. The vessels were placed either near the foot of the grave or along the right side of the body, fairly close to the head. The five vessel sections include a Taylor Engraved deep bowl (Vessel 1), an Emory Punctated-Incised jar (Vessel 2), two Nash Neck Banded jars (Vessels

3 and 4), and a Hudson Engraved vessel (Vessel 5). There were also 116 miscellaneous shell-tempered sherds found in the Burial 28 investigations, among them 16 red-slipped sherds (either the plain portions of Avery Engraved vessels, or from plain red-slipped Clement redware [Flynn 1976]), 21 Nash Neck Banded sherds, four Emory Punctated-Incised sherds, eight Avery Engraved sherds, and one Keno Trailed sherd.

One large columella bead was found resting on the vertebral column. The bead may have been worn as a necklace by one of the adults placed in the burial pit. There were also a few animal bones and mussel shell fragments found in the vicinity of Burial 28.

Burial 29

This burial is that of a very young child, perhaps only two months old at the time of death (see Derrick et al., this article). It appears to have been recently exposed through erosion, and was marked by a 40 cm diameter cluster of human remains on the surface near Feature 704 (see Figure 37). There were no associated funerary objects with Burial 29.

Burial 30

Burial 30 is a young adult (17-23 years old) male placed on its back in the burial pit (Figure 40). The head was at the eastern end of the burial pit, and faced almost due west; the male's arms rested at his sides. There was a looter's pit near the head and covering the upper part of the body, and this looting probably removed most of the associated funerary objects (i.e., ceramic vessels), but it was relatively intact compared to most of the Caddo burials documented in the terrace cemetery.

Found associated with the young male was a clay elbow pipe by his right hand (see Figure 40), and a modified bone tool under his lower left arm. One of the two Talco arrow points in the burial pit was found placed near his feet. Among the ceramics found in the burial pit fill were 33 sherds from a single Keno Trailed vessel (Vessel 1) and 104 other shell-tempered sherds. These included a small number of sherds from Emory Punctated-Incised and Nash Neck Banded vessel fragments and four red-slipped shell-tempered sherds.

There were also a number of drilled animal ribs around the right and left elbow areas (see Figure 40),

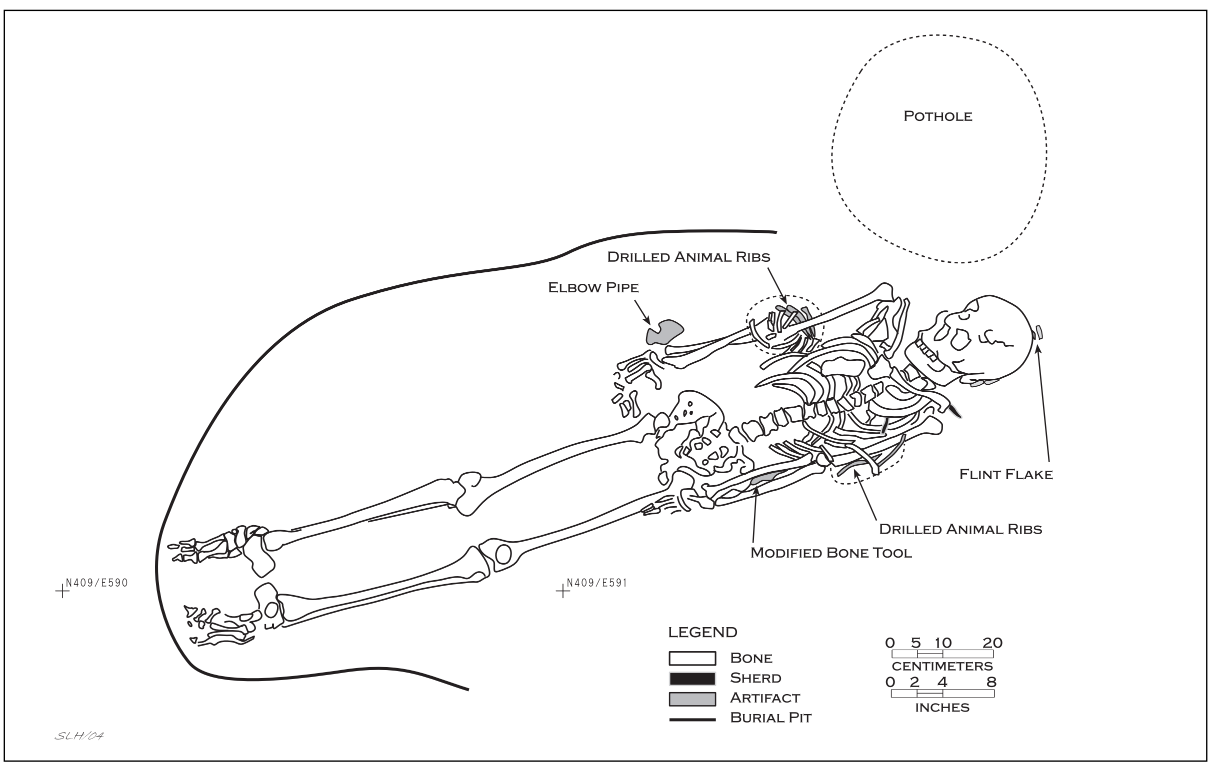


Figure 40. Burial 30 plan.

suggesting this individual may have been wearing some sort of a cloak with attached animal rib ornaments. A small patch of red ochre powder was also noted in the left elbow area. Finally, there was a large mussel shell that had been placed in the upper body area (perhaps to hold pigments), along with a piece of freshwater mussel shell under the skull.

Burial 31

This is the burial of a female who was in her early to late 30s when she died. She was laid out in an extended position, like the other burials in the terrace cemetery, with her head at the eastern end of the grave, and facing west-southwest (Figure 41). The burial had been disturbed by erosion, particularly on the left side of the body, as well as around both feet.

One of the most notable features of this burial was the apparent marine shell headdress that was documented during the excavations. Approximately 35 marine shell beads or bead fragments were found around and along the head (see Figure 41), and most of them were still aligned or attached together, apparently marking where the beads had been sewn onto a headdress that has long since decayed away. One blue glass bead was also recovered in the pelvic area. Its recovery clearly indicates that Burial 31 was interred sometime after about A.D. 1690, when we may expect European trade goods to have been available in limited quantities to Red River Caddo peoples from French and Spanish trade sources.

There were a wide variety of shell-tempered sherds (n=258) in the Burial 31 fill, including sections of two different engraved vessels (Avery Engraved and Hudson Engraved). Decorated sherds include several from different Emory Punctated-Incised, Nash Neck Banded, Avery Engraved, Hudson Engraved, and Simms Engraved vessels.

Burial 32

Most of this burial had been badly disturbed by erosion, and the majority of the human remains themselves have been displaced. The placement of the left and right humerus suggest that the burial, that of a 45-49 year old female, was in an extended

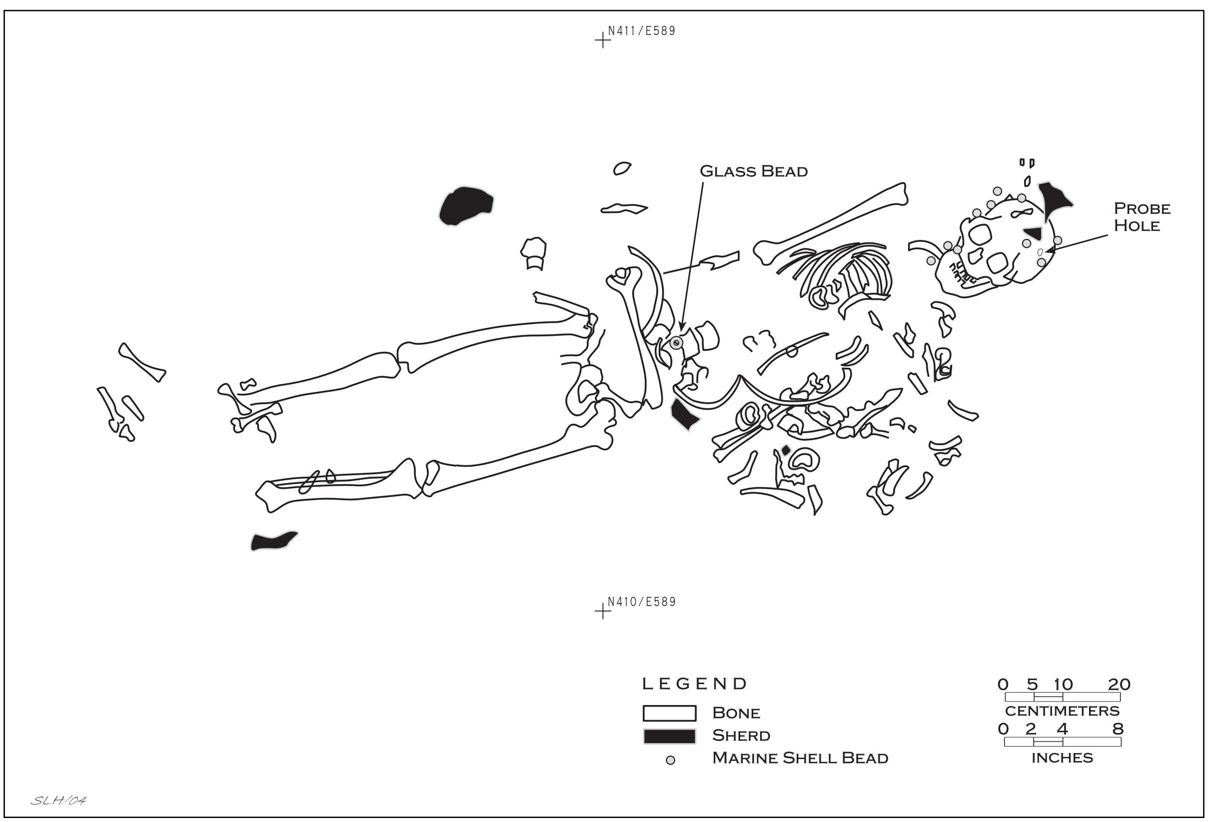


Figure 41. Burial 31 plan.

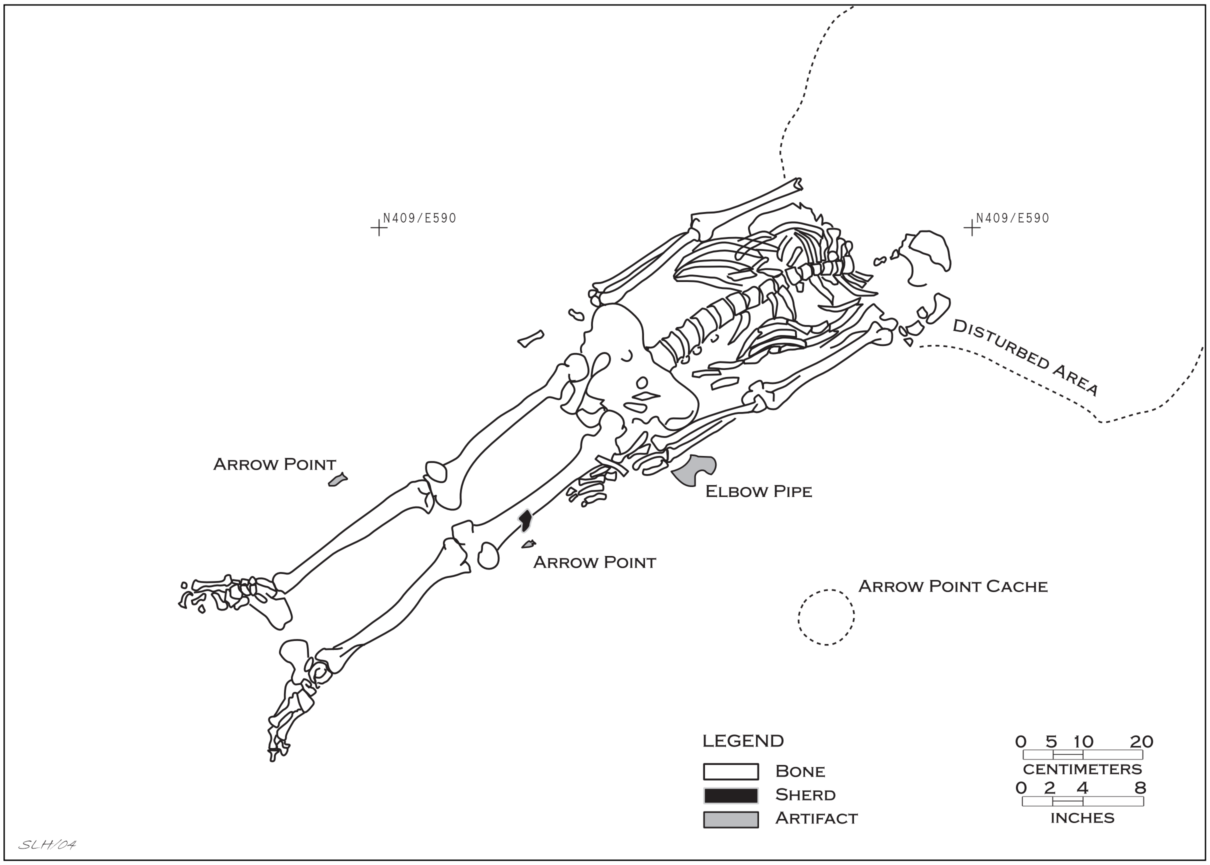


Figure 42. Burial 33 plan.

position, with the head facing to the west. A mass of pottery sherds to the right side of the head area may represent part of a broken shell-tempered Emory Punctated-Incised vessel (Vessel section 1) placed with the female in the burial pit.

More than 70 other shell-tempered sherds (most of which are undecorated) were found in the burial pit, as was an expanding stem arrow point made of white novaculite. The shell-tempered pottery is from Hudson Engraved and Nash Neck Banded types.

Burial 33

This adult male (25-35 years of age at death) had been disturbed by looters, particularly around the head area (Figure 42), but otherwise it appeared to be mostly intact. The body was oriented northeast-southwest in the burial pit, with the head at the eastern end of the pit and the feet at the western end of the burial. The looter disturbances moved what was left of the skull approximately 30 cm above and 70 cm to the south of the original location (see Figure 42).

Associated funerary objects include a clay elbow pipe by the left hand of the adult male and a quiver of arrow points about 60 cm south of the left arm (see Figure 42). Two other arrow points—perhaps dislodged from the quiver—were documented near both the left and right legs (see Figure 42). Over 135 shell-tempered sherds came from the burial pit fill, most of them plain body sherds. The few decorated sherds include six Nash Neck Banded, three Emory Punctated-Incised, and three Avery Engraved vessel sherds, along with 13 red-slipped shell-tempered sherds.

Burial 34

This is a very badly disturbed burial in the southern part of the terrace cemetery (see Figure 37). Included with the burial are the remains of an adult male, late 40s to mid-50s in age, and a 3-9 month old child (see Derrick et al., this article). None of the human remains in this burial pit area appear to be in situ, and all had been jumbled by looting activities. There were several concentrations of sherds in the southern part of the burial pit, and these probably represent the remnants of at least three vessels that had been placed at the time of interment with the deceased. Although not noted in the field notes, a limonite pebble (33 x 33 x 23 mm) with ground facets and scratch marks was also found amidst the sherd concentrations in the Burial 34 fill.

The base and lower body of a plain shell-tempered vessel (Vessel section 1) was reconstructed from sherds in the burial pit area, and a second vessel section consisted of 49 plain shell-tempered sherds. The third vessel section was the upper portion of a red-slipped Taylor Engraved deep bowl.

To summarize the results of the TAS excavations, the available information on grave orientation and body position of the terrace cemetery burials indicates that these Caddo individuals were buried in pits generally laid out in an east-west direction (see Figures 37 to 42). Each body was laid on the grave floor in an extended supine position with the head at the eastern end of the grave and facing west. A variety of grave goods or funerary offerings would have been placed with the individuals—including ceramic vessels (probably containing foodstuffs and liquids), ceramic pipes, arrow point quivers, celts, bone tools, and shell and bone ornaments—depending upon their age, sex, and social position in the local Caddo community.

As mentioned earlier, there were several notable kinds of grave goods placed with the deceased Caddos in the Terrace area cemetery. Among them are an elbow pipe, three arrow points, red ochre (in the elbow region), marine shell beads (at the skull), and at least four drilled animal rib ornaments with Burial 30 (a young adult male), a shell bead headdress and a European glass trade bead with Burial 31 (adult female), and an elbow pipe and a cache of arrow points with Burial 33 (an adult male).

The glass bead in Burial 31 is a small, round, and drawn Robin's Egg Blue-colored bead, about 5.3 mm in diameter. According to the Kidd and Kidd (1970) scheme for the classification of glass beads, the Burial 31 bead is a IIa40 variety. It is a common bead type on historic Caddo sites in northeastern Texas, and Brain (1979:102) suggests a manufacture age range of AD 1600-1836, with a median date of A.D. 1737. Caddo sites in the region with this bead variety date from ca. A.D. 1700-1770.

Four of the burials also had marine shell bead grave offerings. In Burial 31, there were 20 shell disc beads about 6.3 mm in diameter, 10 large (6.6 mm in length) barrel-shaped shell beads, and one small (3.8 mm in length) barrel-shaped shell bead (Figure 43). A large (11.0 mm) bird bone bead was also found amidst the shell beads in the probable shell headdress.

Burial 24 had a single small marine shell disc bead (Figure 44a), and Burial 27 had two small disc beads and a large columella bead. This bead was 19.6 mm in length and 9.7 mm in diameter, with a 3.6 mm perforation for stringing. The HBC 10 bead was a large shell disc bead, 8.9 mm in diameter and with a 3.6 mm perforation. Burial 28 had a very large marine shell columella bead (see Figure 44f) that was 65.5 mm in length, 14.0 mm in diameter, and had a 6.5 mm perforation.

Other ornaments were made from animal bone, as was noted above in the discussion of the marine shell headdress from Burial 31; there was one bone bead in the headdress. As previously mentioned, Burial 35 in the East Mound had 13 bone disc beads. In Burial 30 were sets of drilled animal ribs as well as a spatulate-shaped bone tool.

The drilled animal ribs (Figure 45) were found around both elbows, and probably were attached to clothing or a cloak worn by the adult male when he was placed in the burial pit. The drilled animal ribs would apparently have been suspended from the cloak or clothing. In the left arm area, there were eight animal rib sections, the longest of which was 78 mm, and one rib with a broken perforation; the single perforations were drilled through the uppermost end of the rib. There were four complete drilled ribs under the right arm, as well as 12 rib section fragments. The complete ribs were 3.6 mm thick, with 3.1 mm perforations (see Figure 45). From miscellaneous contexts in the burial, there were also recovered 10 more rib section fragments and two ribs with perforations. Thus, there may have been as many as seven drilled animal ribs attached to a cloak or clothing worn by the Burial 30 Caddo male.

The bone tool in Burial 30 (Figure 46) was found under the left arm, and it was poorly preserved. It had a spatulate form with a beveled interior and top element, and a rounded tip. It is only 3.5 mm thick, and must have been used for more delicate activities, perhaps the shaving and final smoothing of hides or textiles. Its total length is 15.5 cm, and its greatest width is 2.24 cm, near the top part of the tool.

The two elbow pipes (from Burials 30 and 33, both adult males) have short stems and bowls,

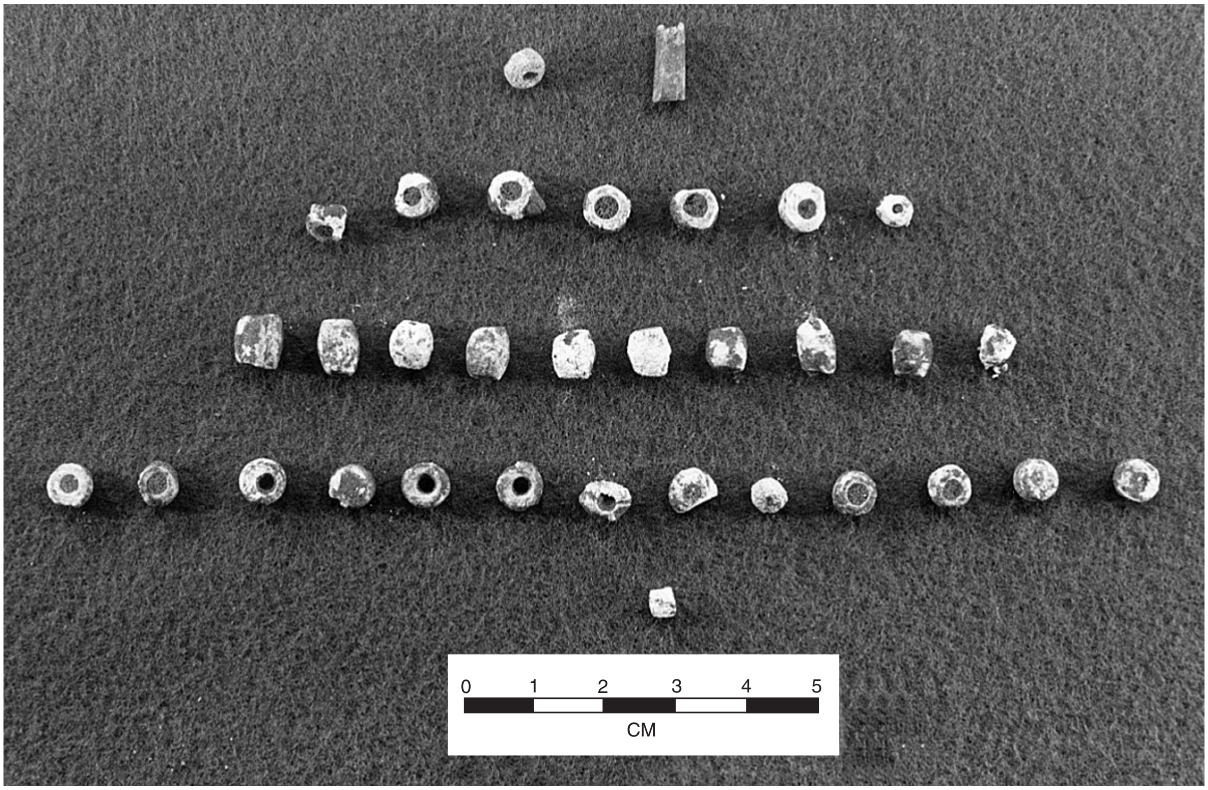


Figure 43. Marine shell beads from Burial 31.

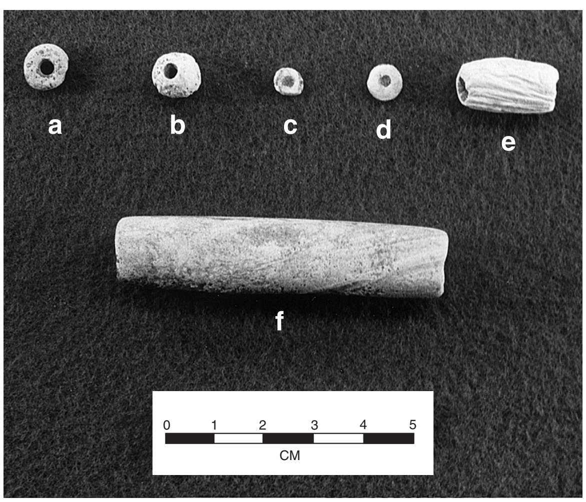


Figure 44. Marine shell beads and columella beads from Burial 24, 27, 28, and HBC 10: a, Burial 24 small disc; b, HBC 10 small disk bead; c-d, Burial 27 small disc beads; e, Burial 12 columella bead; f, Burial 28 large columella bead.

with a rounded shoulder. They are shell-tempered (Figure 47). The stems varied from 45-56 mm in length, with bowl heights between 19 and 32 mm. The bowls are fairly large (37.5-47 mm in orifice diameter), and could have held considerable amounts of tobacco or other smoking substances used by the Caddo.

Most of the burials had ceramic sherds in the grave fill, as well as broken remnants of vessels (whole vessels had generally been previously removed by pothunters). Table 9 provides a listing of the artifacts found in the terrace cemetery as well as Burial 35 in the East Mound. This list includes artifacts that were clearly placed in the burial pits as funerary objects; artifacts found in the general burial fill; and artifacts found during the documentation of human bone concentrations or burials where no specific burial pit could be discerned. The quantities and kinds of artifacts listed in Table 9 supersedes the earlier version of this table in Perttula et al. (2001: Table 4).

One of the Terrace area graves contained only a subadult (Burials 29), another six had adults (Burials 24, 25, 30-33), and the remainder contained both adults and subadults. The subadult (Burial 29) was buried next to a burned clay hearth and hard-packed surface, which probably marks the remnants of a house floor. Children were commonly buried below the floors of prehistoric and early historic Caddo

Figure 45. Drilled animal ribs from Burial 30: top row, found at the upper right arm at elbow; bottom, found at the left arm.

structures, probably as a means to consecrate the area. All the single adult burials were confined to a small area at the southwestern margins of the cemetery, with adult/subadult interments to the east and north (see Figure 37).

In addition to the burials, five other features were identified and excavated in the Terrace area: three features with dog burials (Features 701-703), a possible burned clay hearth (Feature 704), and an isolated Nash Neck Banded jar (Feature 706). All of these features occur at the margins of the cemetery (see Figure 37), clearly indicating that the cemetery had well-recognized and sacred boundaries during its use.

The four dog burials (Feature 703 contained two dogs, an old adult and a puppy) were not apparently placed with deliberation in pits, or if they were in pits, they were very shallow, and their outlines had been disturbed and removed during modern plowing and agricultural activities. The Feature 701 dog, an adult, was lying on its left side, with the head to the east, and facing south; its legs were flexed. A puppy was found in Feature 702, buried in a tight bundle about 22 cm in diameter. The field notes indicated that there was a burned clay cap overlying the puppy skeleton, although it was not clear whether the clay cap was the remnant of a

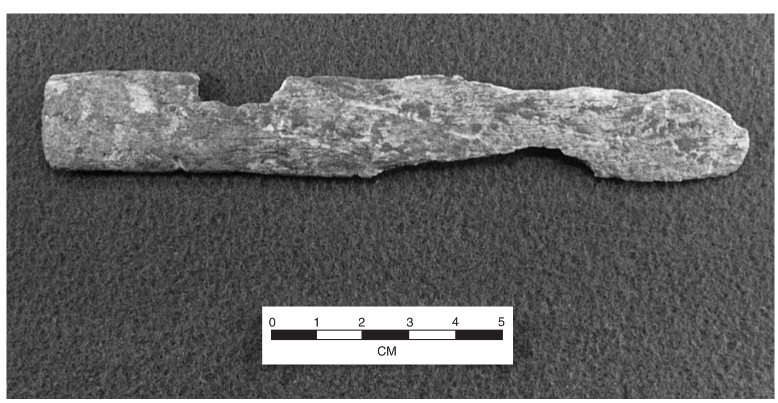


Figure 46. Bone tool from Burial 30.

Figure 47. Elbow pipes from Burials 30 and 33: a, Burial 33; b, Burial 30.

house floor or a deliberate capping of the dog burial itself, perhaps as a form of special treatment upon its death; the former seems more likely. The two dogs in Feature 703 were found jumbled together in a pit, suggesting they had been placed or tossed rather unceremoniously head first into the grave. Based on the recovery of shell-tempered pottery sherds (found underneath the bodies) in association with Feature 703, one of which is a late variety of Nash Neck Banded (cf. Perino 1981: Figure 20), and their proximity to the terrace cemetery, the dog burials also date to the Late Caddo period McCurtain phase occupation. There apparently existed a special relationship between the Caddo living at the Roitsch site and their dogs, probably because they were pets to families, and also were valuable hunters in their own right. There is no evidence to indicate that the dogs at the Roitsch site were a source of food.

Feature 704 (see Figure 37) consisted of a shallow burned clay concentration and a related hard-packed surface, perhaps a house floor remnant, exposed in a 2 x 1 m excavated and troweled area a few m southeast of the terrace cemetery, and just east of Burial 29, that of an infant. There were pieces of charcoal and burned clay chunks found in association with the feature, which was exposed only a few centimeters below the surface. A single Emory Punctated-Incised rim was recovered from the feature. Other shell-tempered decorated sherds from the general vicinity of Feature 704 include two Nash Neck Banded sherds, seven Avery Engraved (all of which are on red-slipped vessels) sherds, and two plain rim sherds. One of the rim sherds, probably from a carinated bowl, had a red slip on interior and exterior surfaces.

Feature 706 was a single shell-tempered Nash Neck Banded vessel, found lying on its side near the edge of the cemetery (see Figure 37). It does not appear to be directly associated with a burial, and may be a more general votive offering associated with the use and consecration of the terrace cemetery by the Caddo living at the Roitsch site. Found with the Feature 706 ceramic jar was a single unmodified freshwater mussel shell. The jar itself stood 23.8 cm in height, and had a 15.7 cm orifice diameter. There were charred organic residues on the upper body of both interior and exterior surfaces, and there was evidence of polished wear/use on the interior rim. The rim had several rows of neck bands, rim nodes, and a series of vertical body nodes, and the remainder of the body was covered with horizontal and vertical rows of fingernail punctations around the vessel's midsection (Figure 48).

A wide assortment of archeological remains were recovered in the investigations of the Terrace area other than the funerary objects found in the various burial features, particularly Caddo ceramics, along with a small variety of chipped and ground stone tools. Much of the material probably represents broken and disturbed vessels and vessel sections that had been originally placed as grave goods, although some habitation debris is present around Feature 704, the probable burned clay hearth. The total sample of decorated and/or rim sherds, and whole or partial vessels, from the terrace area is extensive: 11 vessels or vessel sections, and 391 decorated and/or rim sherds (both plain and decorated). Of this total, all the vessels or vessel sections and 314 of the sherds are from human bone concentrations or the terrace area burials (see Table 9). The remainder (n=77) are from terrace area surface collections and limited excavations of Features 703 and 704.

Table 9. *(Continued)*

Human Bone Concentration (HBC) 1
- 1 shell-tempered Hudson Engraved sherd

HBC 2
- None

HBC 3
- None

HBC 4
- 8 plain shell-tempered body sherds
- 1 shell-tempered Hudson Engraved sherd
- 1 shell-tempered incised sherd
- 2 shell-tempered appliqued sherds
- 2 shell-tempered neck-banded sherds

HBC 5
- 7 plain shell-tempered body sherds
- 1 plain shell-tempered rim sherd
- 1 red-slipped shell-tempered body sherd
- 1 shell-tempered neck-banded sherd

HBC 6
- 1 plain shell-tempered body sherd
- 1 red-slipped shell-tempered body sherd
- 1 slate or siliceous shale ground stone tool fragment (Celt?)

HBC 7
- 1 fossil shell valve
- 1 mussel shell valve fragment

HBC 8
- 6 plain shell-tempered body sherds
- 6 red-slipped shell-tempered body sherds

HBC 9
- 10 plain shell-tempered body sherds
- 1 shell-tempered Avery Engraved sherd

HBC 10
- 16 plain shell-tempered body sherds
- 1 plain shell-tempered rim sherd
- 2 red-slipped shell-tempered rim sherds
- 3 shell-tempered engraved sherds (Hudson Engraved)
- 1 shell-tempered Simms Engraved rim sherd
- 2 red-slipped engraved shell-tempered sherds
- 1 shell-tempered Avery Engraved sherd
- 1 shell-tempered incised sherd
- 2 Nash Neck Banded sherds
- 3 shell-tempered Emory Punctated-Incised sherds
- 2 shell-tempered appliqued sherds
- 1 medium-sized marine shell disc bead

Burial 24
- 35 plain shell-tempered body sherds
- 4 plain non-shell-tempered body sherds
- 1 engraved non-shell-tempered sherd
- 2 plain shell-tempered rim sherds
- 2 red-slipped shell-tempered sherds
- 11 Avery Engraved shell-tempered sherds
- 2 Hudson Engraved shell-tempered sherds
- 2 engraved shell-tempered sherds
- 18 Nash Neck Banded shell-tempered sherds, including five rim sherds from a vessel section
- 1 shell-tempered appliqued sherd
- 4 Emory Punctated-Incised shell-tempered sherds
- 4 daub
- 1 small marine shell disc bead
- 1 arrow point preform

Burial 25
- 11 plain shell-tempered body sherds
- 1 plain non-shell-tempered body sherd
- 5 plain shell-tempered rim sherds
- 1 red-slipped shell-tempered sherd
- 8 Avery Engraved shell-tempered sherds
- 1 shell-tempered Hudson Engraved sherd
- 3 shell-tempered Emory Punctated-Incised sherds
- 2 shell-tempered appliqued sherds
- 1 non-shell-tempered appliqued sherd
- 9 shell-tempered Nash Neck Banded sherds
- 1 shell-tempered noded sherd
- 1 jasper core

Burial 26a-b
- 8 plain shell-tempered body sherds
- 1 plain non-shell-tempered body sherd
- 1 plain shell-tempered rim sherd

Table 9. *(Continued)*

2 red-slipped shell-tempered body sherds
1 engraved and red-slipped body sherd
2 shell-tempered Simms Engraved sherds
1 Keno Trailed shell-tempered body sherd
4 shell-tempered Emory Punctated-Incised sherds
2 shell-tempered appliqued sherds
4 shell-tempered Nash Neck Banded sherds

Burial 27a-b
8 plain shell-tempered body sherds
1 plain shell-tempered rim sherd
3 shell-tempered engraved sherds
3 shell-tempered Emory Punctated-Incised sherds
3 shell-tempered appliqued sherds
1 shell-tempered Nash Neck Banded sherd
2 shell-tempered noded sherds
1 Hudson Engraved bowl (Vessel 1)
8 Keno Trailed shell-tempered body sherds
1 plain non-shell-tempered sherd
1 curvilinear engraved non-shell-tempered sherd
2 small marine shell disc beads
1 large columella bead
1 chert core

Burial 28a-d
60 plain shell-tempered body sherds
16 plain shell-tempered rim sherds
1 red-slipped shell-tempered sherd
1 appliqued shell-tempered sherd
21 shell-tempered Nash Neck Banded sherds
4 Emory Punctated-Incised shell-tempered sherds
8 Avery Engraved shell-tempered sherds
1 Keno Trailed shell-tempered body sherd
3 shell-tempered engraved sherds
1 shell-tempered engraved/lip notched rim sherd
Taylor Engraved shell-tempered vessel section (Vessel 1)
Emory Punctated-Incised shell-tempered vessel section (Vessel 2)
Nash Neck Banded shell-tempered vessel section (Vessel 3)
Nash Neck Banded shell-tempered vessel section (Vessel 4)
Hudson Engraved shell-tempered vessel section (Vessel 5)
2 Hudson Engraved shell-tempered sherds
3 plain non-shell-tempered body sherds
2 animal bones
3 mussel shell valve fragments
1 large columella bead

Burial 29
None

Burial 30
94 plain shell-tempered body sherds
1 plain shell-tempered rim
1 shell-tempered and red-slipped engraved sherd
33 shell-tempered sherds from Keno Trailed vessel (Vessel 1)
4 red-slipped shell-tempered body sherds
3 shell-tempered Emory Punctated-Incised sherds
1 shell-tempered Nash Neck Banded sherd
1 ceramic elbow pipe
2 mussel shell valve fragments
1 bone tool
4+ drilled animal ribs
1 lithic debris
3 Talco arrow points

Burial 31
208 plain shell-tempered body sherds
1 plain shell-tempered rim sherd
10 red-slipped shell-tempered body sherds
16 Emory Punctated-Incised shell-tempered sherds
6 Nash Neck Banded shell-tempered sherds
5 shell-tempered appliqued sherds
shell-tempered Avery Engraved vessel section (Vessel 1, 38 sherds)
4 shell-tempered Avery Engraved sherds
shell-tempered Hudson Engraved vessel section (Vessel 2, 33 sherds)
5 Hudson Engraved shell-tempered sherds
1 shell-tempered Simms Engraved sherd

Table 9. *(Continued)*

2 shell-tempered engraved body sherds
20 marine shell disc beads
11 barrel-shaped marine shell beads
1 bone bead
1 animal carpal bone
1 glass trade bead
1 mussel shell valve fragment

Burial 32
59 plain shell-tempered body sherds
3 plain shell-tempered rim sherds
1 shell-tempered engraved sherd
2 shell-tempered Hudson Engraved sherds
1 shell-tempered engraved and red-slipped sherd
4 shell-tempered incised sherds
5 shell-tempered Emory Punctated-Incised sherds (Vessel section 1)
2 shell-tempered Nash Neck Banded sherds
1 arrow point, Category X

Burial 33
108 plain shell-tempered body sherds
6 non-shell-tempered plain body sherds
3 shell-tempered Avery Engraved sherds
6 Nash Neck Banded shell-tempered sherds
3 Emory Punctated-Incised shell-tempered sherds
1 shell-tempered engraved sherd
13 red-slipped shell-tempered sherds
2 shell-tempered incised sherds
1 shell-tempered appliqued sherd
1 ceramic elbow pipe
1 mussel shell valve fragment
8 arrow points

Burial 34a-b
1 reconstructed base/lower body of plain shell-tempered vessel (Vessel section 1)
49 plain shell-tempered body sherds (Vessel section 2)
Taylor Engraved shell-tempered vessel section
41 plain shell-tempered body sherds
10 shell-tempered red-slipped body sherds
3 Emory Punctated-Incised shell-tempered sherds
1 non-shell-tempered base sherd
1 limonite pebble with ground facets

Burial 35 (from the East Mound)
11 plain shell tempered body sherds
5 shell-tempered engraved sherds (Avery Engraved vessel section)
1 shell-tempered Simms Engraved sherd
1 shell-tempered Nash Neck Banded rim sherd
Nash Neck-Banded jar with strap handles
2 plain rims, shell-tempered
1 shell tempered appliqued sherd
13 small bone disc beads
1 mussel shell valve fragment

Burial 36 (from the East Mound)
None

All the vessels, and about 97 percent of the sherds in the grave fill, are shell-tempered, and thus are from the Late Caddo McCurtain phase use of the terrace area (see Table 9). The non-shell-tempered rim and/or decorated sherds were found primarily in the general surface collections of the eroded terrace (n=10) as well as in the fills of Burials 24 and 25, and signify a very limited prehistoric Caddo use of the area before ca. A.D. 1300. Noted among the non-shell-tempered decorated sherds were several rims with sets of horizontal incised lines: these are from vessels with flat lips, possibly Coles Creek Incised vessel sherds. One of these is decorated on the lip with deep incised lines and five rows of small tool punctates. Other decorated sherds from this earlier prehistoric Caddo component include one with cross-hatched engraving; a rim with cross-hatched incised lines; another rim with a zoned punctated-diagonal incised decorative element; and a body sherd with rows of fingernail punctates.

Not including the isolated vessel in Feature 706 (see Figure 48), the whole or partial vessels/vessel sections were found as grave goods in Burials 27, 28, 30, 31, 32, and 34 (Table 10). In general, the

Figure 48. Nash Neck Banded jar in Feature 706.

whole and partial vessels found in the terrace area are from a Late Caddo McCurtain phase occupation postdating ca. A.D. 1450 (see discussion in Perino [1994:28]), and the Hudson Engraved and Keno Trailed vessels bespeak continued use of the area (as well as the East Mound) for interments to at least A.D. 1650. The recovery of Talco arrow points from two different burials (Burials 30 and 33) also indicate that the cemetery was used by the Caddo peoples after A.D. 1600. Finally, Burial 31 had a single glass bead in the burial fill, and this interment likely dates to the late 17th to early 18th century.

The vessels and vessel sections included a Hudson Engraved bowl with a short everted rim (and a small node below the lip) in Burial 27 (Figure 49a-b), and another (Vessel 5) in Burial 28. This was a black polished bottle vessel section, with very thin body walls (3.1 mm). There were parts of two Nash Neck Banded jars in Burial 28 (Figure 50), and other Nash Neck Banded rim and body sherds from various burial features that have appliqued lines or ridges extending downward from the shoulders of the vessels.

A red-slipped and shell-tempered Avery Engraved vessel section was found in Burial 31 (see Table 10). Two different burials (Burials 28 and 32) had Emory Punctated-Incised vessel sections (Figure 51). The Burial 28 vessel had a single row of deep punctations under the lip. There were also the reconstructed base and lower body of two plain shell-tempered jars in Burial 34 (see Table 9). Although not readily reconstructed, some 33 sherds from a Keno Trailed bottle were part of the grave goods in Burial 30 (Figure 52); three other burials also had sherds of Keno Trailed.

Burials 28 and 34 had vessel sections of shell-tempered Taylor Engraved deep bowls (cf. Suhm and Jelks 1962: Plate 75d, g). The Burial 28 vessel (represented by 61 sherds) had a short, plain rim and a broad scroll element on the upper body (Figure 53). There was a red ochre-rich clay pigment smeared in the engraved lines, and there are two pot hunter probe holes visible on the vessel. The large Burial 34 Taylor Engraved vessel (30 cm orifice diameter) is red-slipped on both interior and exterior surfaces, and has a decorative motif of scrolls and hatched triangles pendant from the upper and lower rim. Similar decorative elements were noted on Taylor Engraved vessels from the Rowland Clark site (Perino 1994: Figure 12e).

Decorated pieces and rims of shell-tempered sherds were recovered in the following burial features: Human Bone Concentrations (HBC) 1, 4, 5, 6, 9, and 10, as well as Burials 24-28, 30-34 (Figure 54); only Burial 29 did not have any shell-tempered pottery, plain or decorated. Engraved vessels and sherds (n=79) of Avery Engraved (usually red-slipped), Simms Engraved, and Hudson Engraved are well represented in the collections, and engraved sherds were found in all the burial features with the exception of HBC 5 (see Table 9). Plain red-slipped vessels (i.e., Clement redware) were also an important part of the fine wares in the terrace area cemetery. More than 5 percent of the plain shell-tempered rims are red-slipped, and almost 19 percent of the decorated shell-tempered sherds have only a red slip on one or both vessel surfaces.

The recovery of incised and/or punctated sherds (n=44) from broken Emory Punctated-Incised jars in HBC 4 and 9, as well as all the burial features (see Table 10), suggest that these were certainly also common grave good inclusions during the later part of the McCurtain phase. Neck banded sherds (n=56) from the terrace

Table 10. Distribution of decorated shell-tempered ceramic types in the terrace area cemetery.

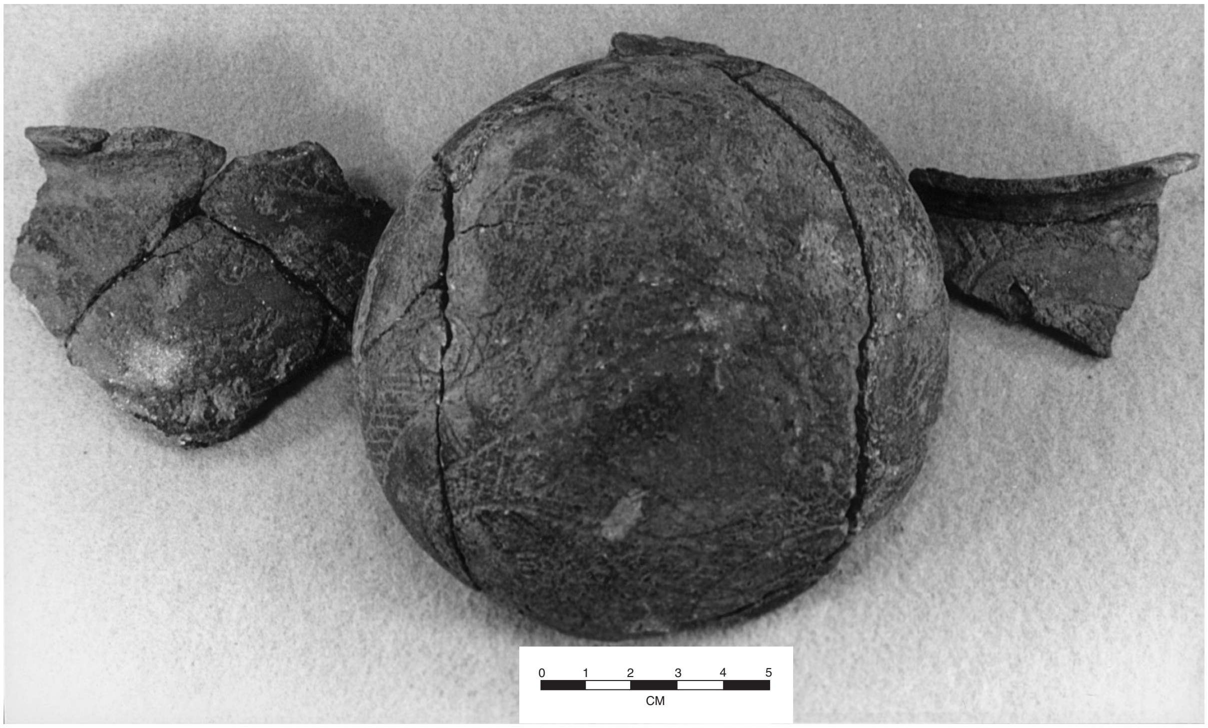
Provenience	Hudson Engraved	Nash Nb	Avery Engraved	Emory P-I	Simms Engraved	Keno Trailed	Taylor Engraved
HBC 1	X	-	-	-	-	-	-
HBC 4	X	X	-	X	-	-	-
HBC-5	-	X	-	-	-	-	-
HBC 9	-	-	X	-	-	-	-
HBC-10	X	X	X	X	X	-	-
Burial 24	X	X	X	X	-	-	-
Burial 25	X	X	X	X	-	-	-
Burial 26	-	X	-	X	X	X	-
Burial 27	X	X	-	X	-	X	-
Burial 28	X	X	X	X	-	X	X
Burial 30	-	X	-	X	-	X	-
Burial 31	X	X	X	X	X	-	-
Burial 32	X	X	-	X	-	-	-
Burial 33	-	X	X	X	-	-	-
Burial 34	-	-	-	X	-	-	X
Fea. 706	-	X	-	-	-	-	-
no. of occurrences	9	13	7	12	3	4	2

X=present; Nb=neck banded; P-I: punctated-incised

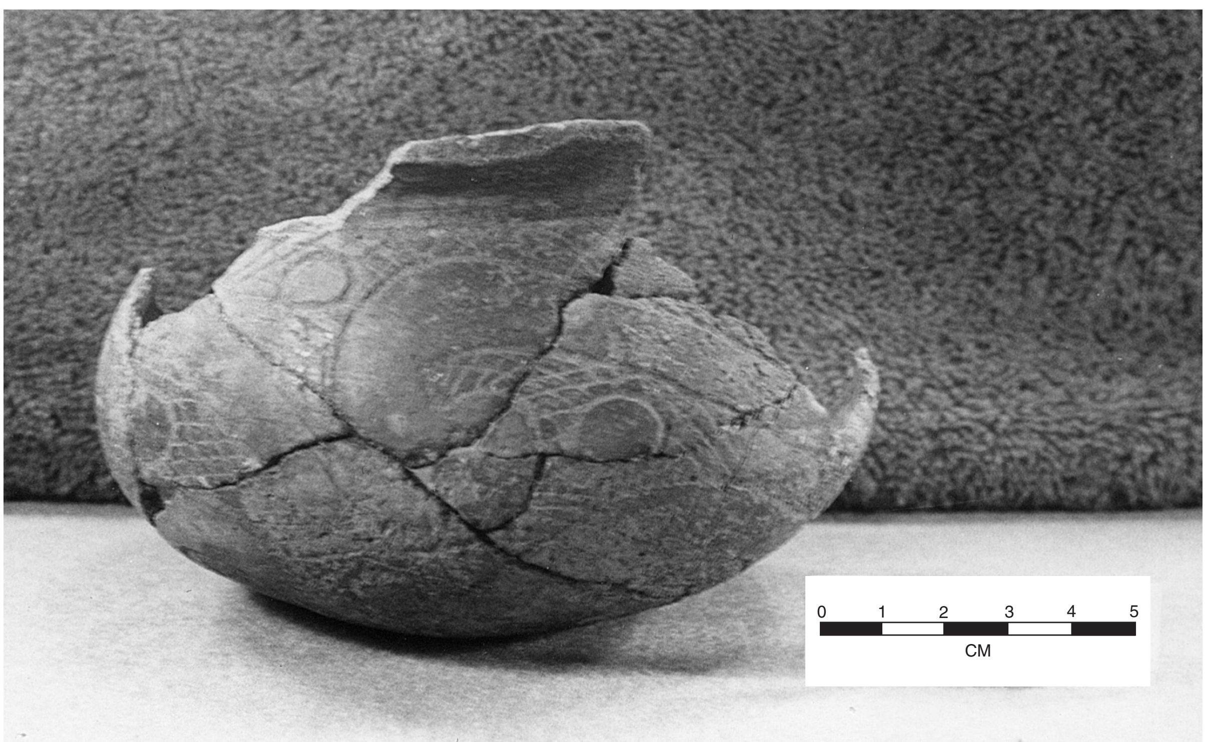
area, sherds with nodes (n=4), and sherds with appliqued ridges and triangles (n=30) are also from Nash Neck Banded jars. The common use of appliqued decorations on the shoulders of these vessels also suggest that the burials and HBC's with neck-banded vessels date late in the McCurtain phase occupation of the site, probably well after A.D. 1450. Neck banded sherds were found in HBC 4 and 5, and in all the burial features (see Table 10).

Lithic tools, including cores (n=3), from the Terrace Area are dominated by arrow points (n=15). Among the arrow point types represented are four Talco points, three Maud points, four Massard A or Massard B points (see Brown 1996), and a single example of a Homan point (Class X); the latter is from Burial 32. The Talco points are from Burial 30 and Burial 33, and all four of the Massard points (Class XII) are from Burial 33 (Figure 55).

The prevalence of Talco points in two of the Roitsch burials in the terrace cemetery is consistent with the primary use of the Terrace area well after ca. A.D. 1500-1600. These Talco points are made exclusively from novaculite (and 80 percent of the terrace cemetery arrow points are made from this distinctive lithic raw material, which is present in local Red River gravels, with an ultimate source in the southern Ouachita Mountains), and have long resharpened and serrated blades and a shallow basal concavity. At the Roitsch site, only two other Talco points have been recovered besides those from the cemetery, one in Block I and the other in Block III (see Appendix IX, this article). The Talco points from the Roitsch site are identical to a cache of 19 Talco points from Burial 28 at the Alex Justiss site (41TT13), a 17th century Titus phase Caddo cemetery in the Big Cypress Creek basin, at least 80 km away. Most of these were made from novaculite (Rogers et al. 2003:98 and Figure 40a-s), and were probably obtained in trade with Late Caddo McCurtain phase groups living along the middle reaches of the Red River.



a



b

Figure 49. Hudson Engraved, Burial 27, Vessel 1: a, view of base and rim sections; b, side view.

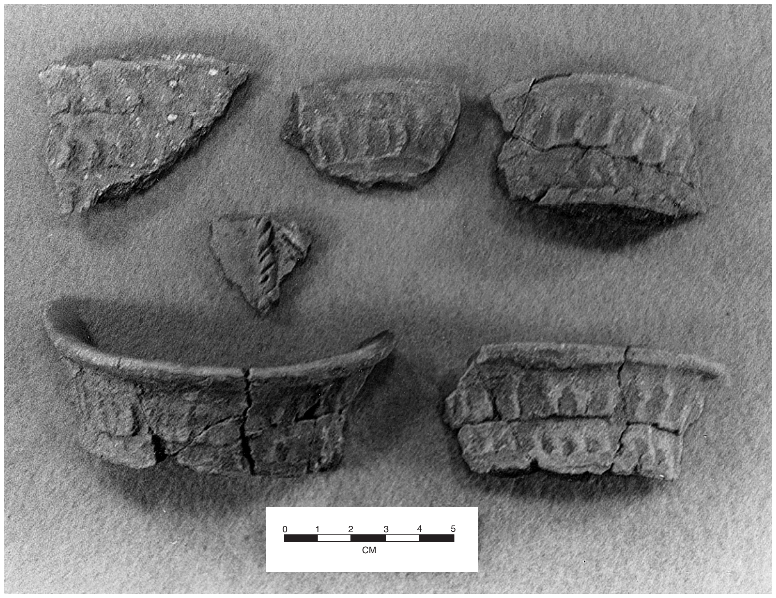


Figure 50. Nash Neck Banded vessel section in Burial 28.

The Class X Homan point from Burial 32 has a broad expanding stem, a short and resharpened blade, and a convex base. It is made from white novaculite. Three of the four Class XII Massard points (see Figure 55a-d) are also made of novaculite, and the other was made from a dark brown chert. These arrow points have an expanding stem, and are corner-notched, with a short stem and blade, along with a flat base; the blade is carefully serrated on each of the four points in Burial 33. Other examples of the Massard point at the Roitsch site are limited to Block III, in the Late Caddo McCurtain phase village area (see Appendix IX, this article).

Other lithic tools from the terrace area include four celt fragments from surface contexts, a sandstone grinding slab from Burial 24, and a quartzite hammerstone fragment from Burial 34. One single platform core of Big Fork chert came from unit N414 E600, and two other cores (single and multiple platform flake cores of brownish-gray chert and red jasper, respectively) were found in the excavations of Burial 25 and Burial 27.

VESSELS FROM THE ROITSCH SITE IN THE ROITSCH COLLECTION

Mr. Arnold Roitsch had a number of Caddo ceramic vessels in his possession that came from burials on his property. He recently donated these vessels to the Caddo Nation of Oklahoma, and the Caddo Nation have generously allowed them to be documented as part of the Nation's museum inventory process. Descriptions of selected examples are included herein.

Of the 28 vessels in the Roitsch collection, three appear from stylistic criteria to be from Mound Prairie phase contexts at the Roitsch site. Excavations by Skinner et al. (1969) and the excavations completed by the Texas Archeological Society have shown that Mound Prairie phase archeological deposits are widely scattered across the village area, but are concentrated around (and under) the East Mound. These vessels in the Roitsch collection include a red-slipped Maxey Noded Redware bottle with sets of punctations around the upper body (Figure 56a), a carinated bowl with engraved pendant triangles and a notched lip (Figure 56b), and another carinated bowl with a scalloped rim/lip and engraved circles

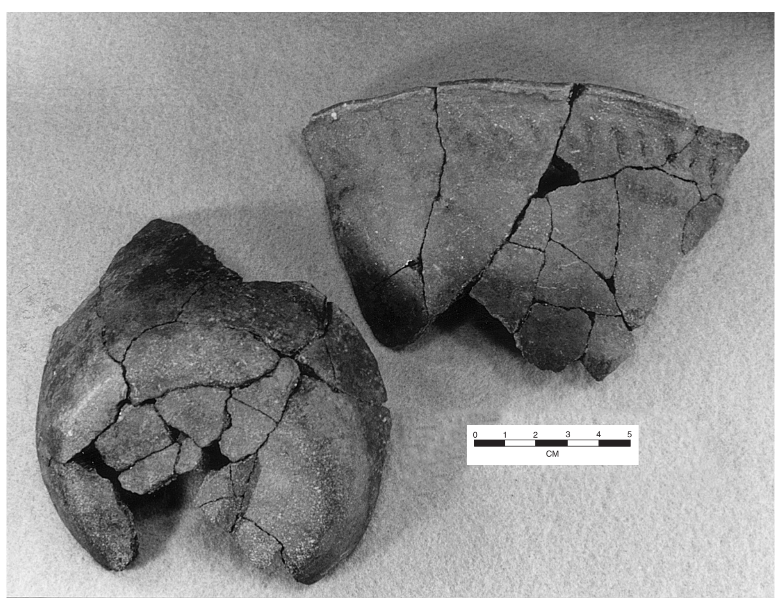


Figure 51. Emory Punctated-Incised vessel (vessel section 2) from Burial 28.

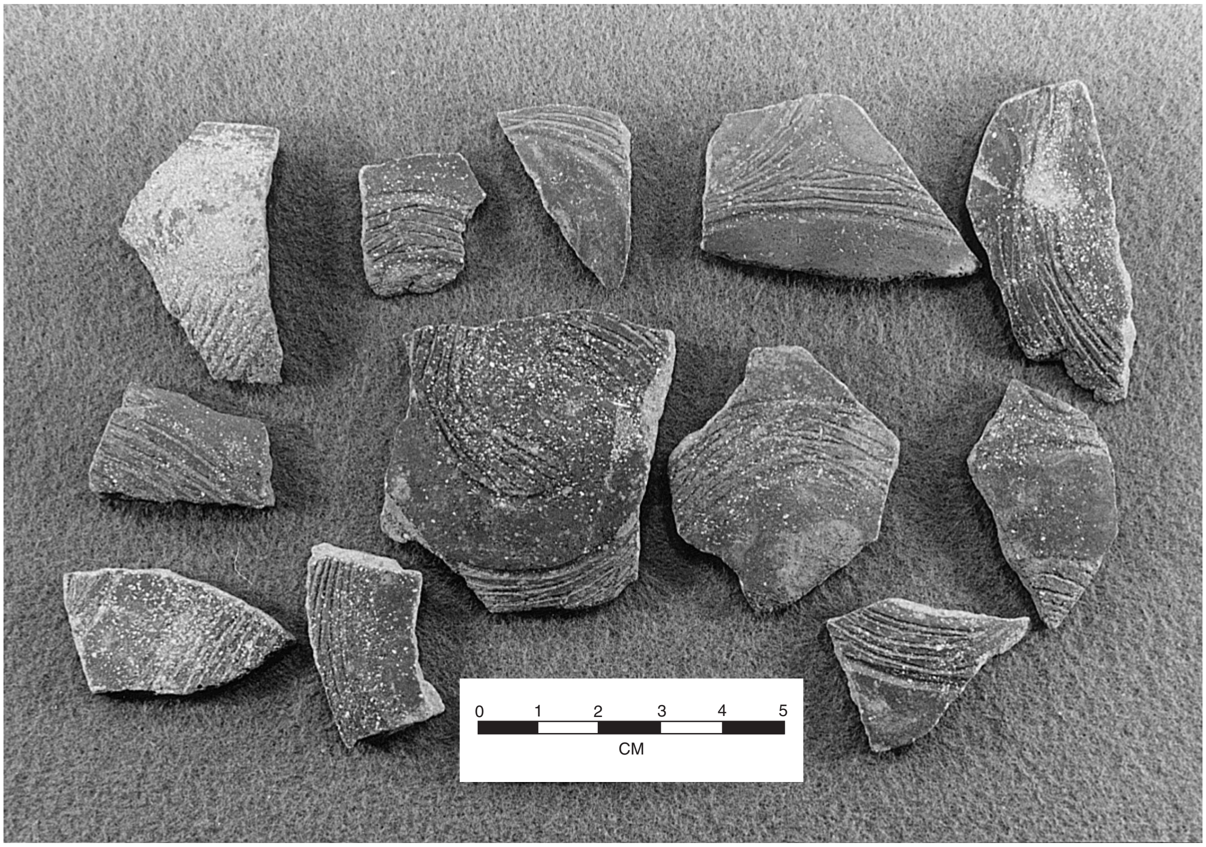


Figure 52. Keno Trailed vessel section, Burial 30.

divided by hatched panels (Figure 56c).

The majority of the vessels in the Roitsch collection are from Late Caddo McCurtain phase contexts. The fine ware ceramic vessels include shell-tempered Avery Engraved deep bowls, bottles, and compound bowls (Figure 57a-d), usually with a red slip, and small Simms Engraved bowls with distinctive short rims (Figure 57e). The utility wares are dominated by Nash Neck Banded and Emory Punctated-Incised jars (Figure 58a-c). There are also four plain bottles in the collection, as well as a distinctive noded bowl (Figure 59). The noded bowl has four knobs attached to the rim of the vessel, and smaller nodes covering the entirety of the vessel surface. This example from

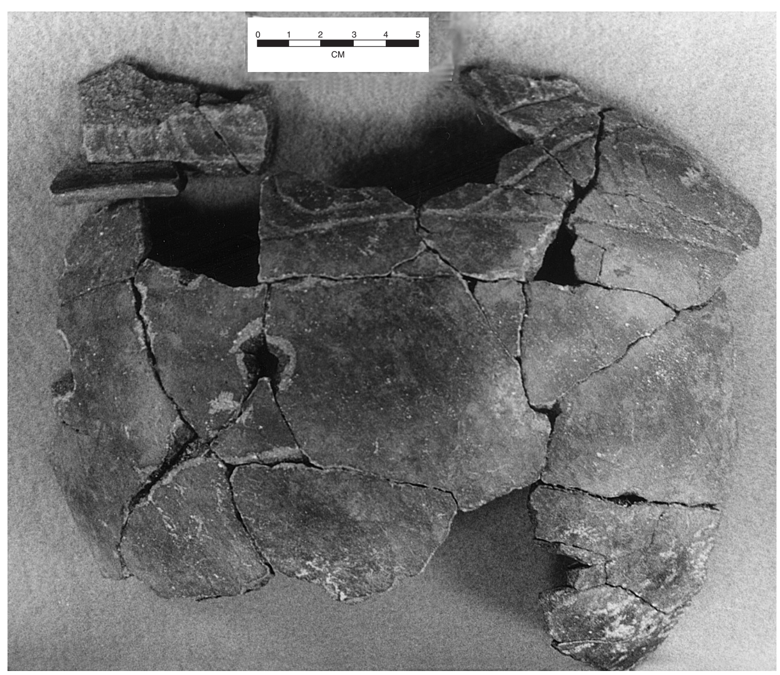


Figure 53. Taylor Engraved vessel (vessel section 1), Burial 28.

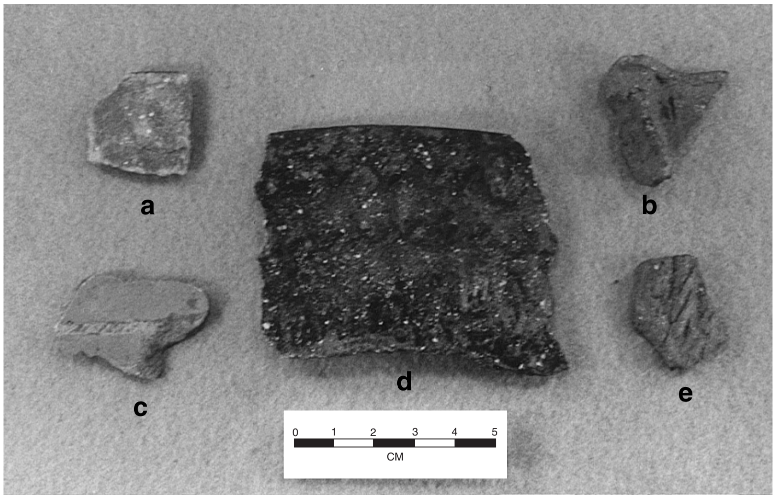


Figure 54. Decorated sherds from burial features: a, c, engraved; b, e, appliqued; d, neck banded.

the Roitsch site closely resembles other noded bowls from the contemporaneous Hatchel site (41BW3) near Texarkana, Texas (see Suhm and Jelks 1962:Plate 26b, d). Similar knobby or noded vessels found in the American Southwest have been suggested to have been ceramic datura fruit effigies used for the storage and consumption of prepared datura (or jimson weed), a hallucinogenic plant (Huckell and Vanpool 2006:152-153). The Caddo were known to consume datura and peyote as part of shamanistic rituals (see Swanton 1942), and perhaps this one vessel is reflective of these rituals being used at the Roitsch site in prehistoric McCurtain phase times.

SUMMARY OF THE BIOARCHEOLOGICAL INVESTIGATIONS AT THE ROITSCH SITE

Archeological investigations in the East Mound and the Terrace areas of the Roitsch site uncovered 13 human burials and 22 individuals associated with the Late Caddo McCurtain phase occupations of the site. Analyses of the human remains, most of which were highly fragmented by erosion and weathering, as well as from the recent grave looting and vandalism activities of pothunters, were completed by Derrick et al. (see below, as well as Appendix II-VI, this article).

Based on stratigraphic context, artifact associations, and calibrated radiocarbon dates from Burials 24 and 35, Burial 24 probably dates to the earlier part of the Late Caddo McCurtain phase (ca. A.D. 1300-1400), while all the other interments date after ca. A.D. 1450-1500. The one radiocarbon date (Tx-8076) from Burial 24 has a calibrated age range of AD 1280-1396 (relative area under probability distribution =1.00, 1 sigma). The Burial 35 date (Tx-8077) has a considerable standard deviation ($\pm$ 273 years), unfortunately, and thus the 1 sigma calibrated age range is AD 1231-1678 (relative area under probability distribution =0.93), proving to be of little chronological worth.

Represented in the burials are five adult males, seven adult females, three adults of indeterminate

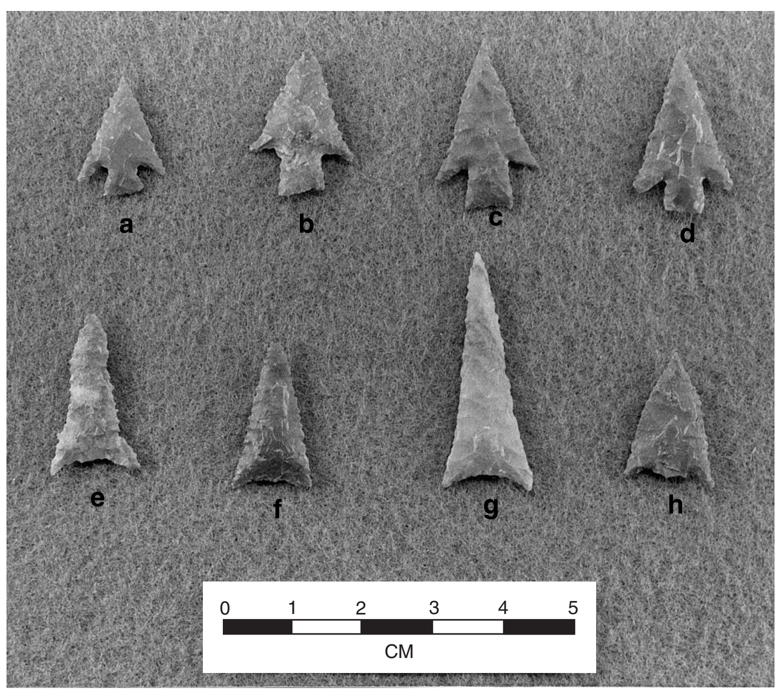
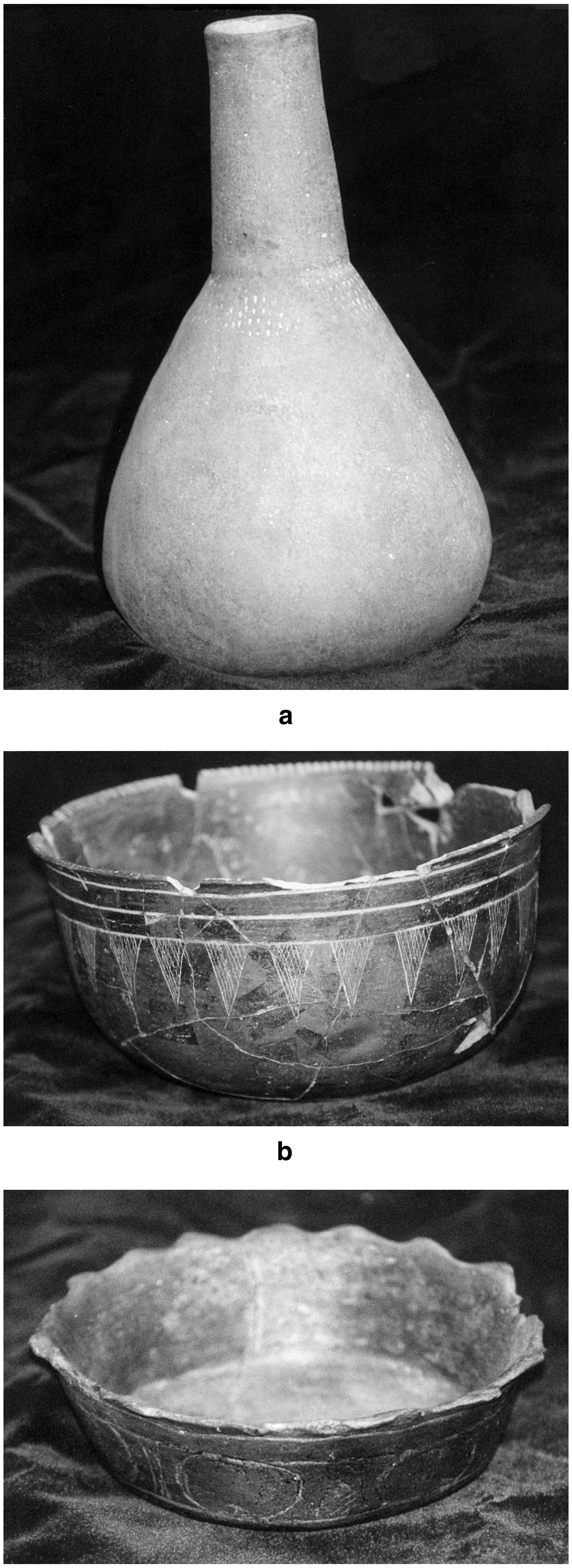


Figure 55. Arrow points from Burial 33 in the Terrace Area: a-d, Massard; e-f, h, Maud; g, Talco.



a

b

c

Figure 56. Mound Prairie phase vessels in the Roitsch collection: a, Maxey Noded Redware; b-c, engraved carinated bowls.

sex, and seven subadults (Table 11) (Derrick et al. 1994, see Derrick et al., below). Adults ranged in height from 153.22 cm (young adult female) to 163.32 cm (a male in his late 40s to mid-50s), indicating these Caddo were short in height. Most of the individuals at the Roitsch site died before they were 40 years of age, although some of the adults lived to old age (between 55 and 60 years of age at death).

A number of medical disorders were identified by Derrick et al. (see below), with degenerative joint diseases, osteoarthritis, and vertebral osteophytosis being particularly common among both adult males and females at Roitsch (see Table 11). Bone infections were also prevalent in the Roitsch human remains, especially healed supra-inion depressions on the occipital bones which Derrick et al. attribute to infections associated with the practice of cranial modeling among the Caddo populations at the site. As Derrick et al. note, cranial modeling is a common practice among Caddo groups on the Red River (see also Loveland and Bass 1983; Loveland 1987; Derrick and Wilson 1997), and Burials 24, 27b, 28 (it is not clear which of the four individuals [Burial 28a-d] had cranial modeling because of the erosional commingling of individuals in the burial deposit), 31, 33, 35, and 36 exhibit the shaping of the frontal and occipital areas of the head.

Pathologies indicative of nutritional and developmental disorders are present only in low frequencies in the Roitsch burials (see Table 11). However, there is a high incidence of local traumas in a number of the individuals—both male and female—including healed skull and postcranial fractures, a damaged tooth, and trauma damage to a shoulder joint and patella.

All of the adult individuals from the Roitsch site had dental caries, and the dental caries rate is substantial per person (Derrick et al., below). There is less tooth wear among the Caddo populations living at Roitsch compared to other aboriginal populations living in Texas (cf. Colby 1997), which may relate to the "use of wooden mortars and pestles when grinding corn" (Derrick et al. 1994:13).

The prevalence of caries among the adults, significant tooth loss and abscesses among the adults, and the high stable carbon isotope rates from burials 24 and 35, as well as similar high rates from two individuals in the East Mound shaft tomb at Roitsch (Skinner et al. 1969) analyzed by Derrick

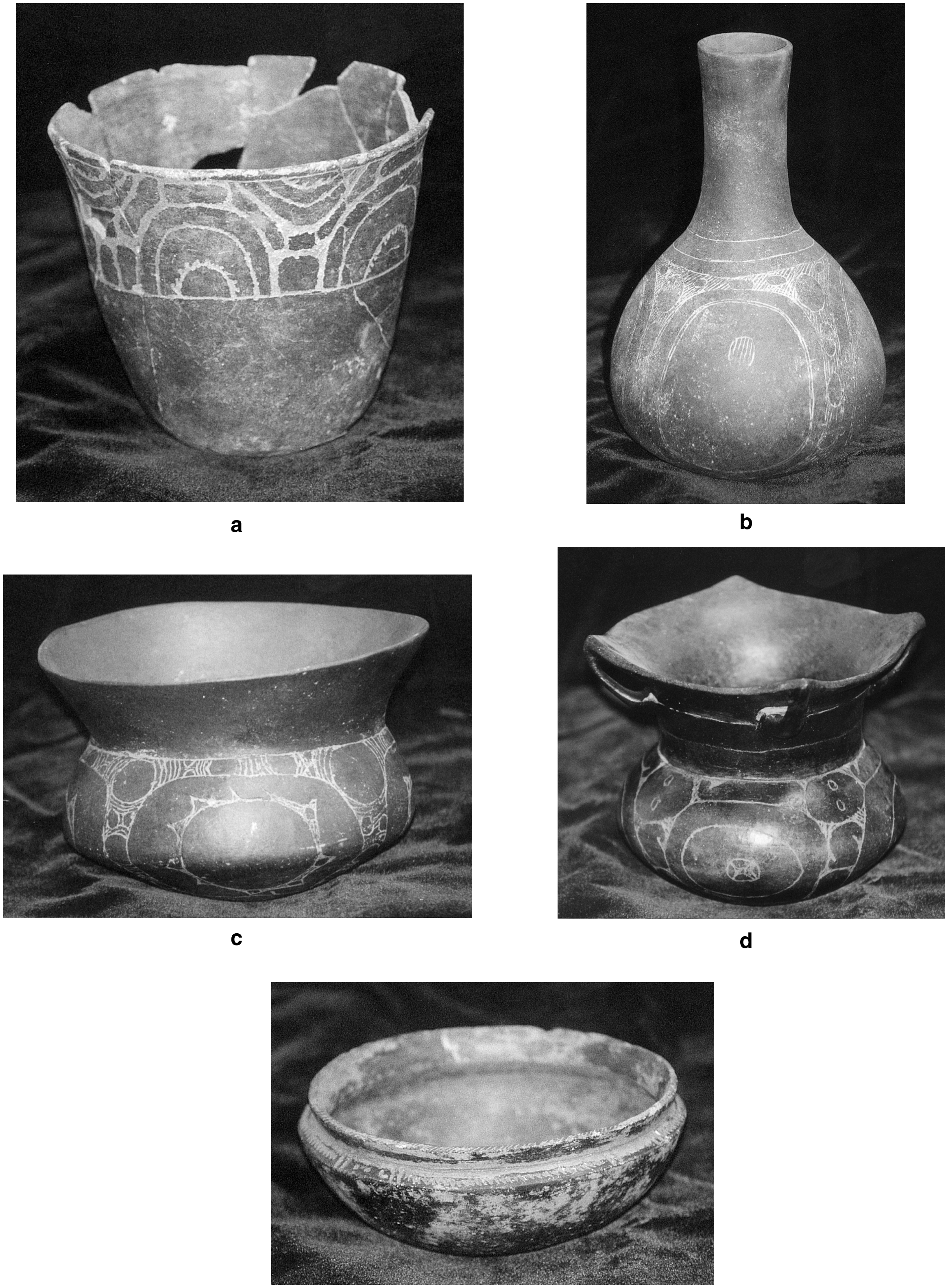


Figure 57. McCurtain phase fine wares: a-d, Avery Engraved; e, Simms Engraved.

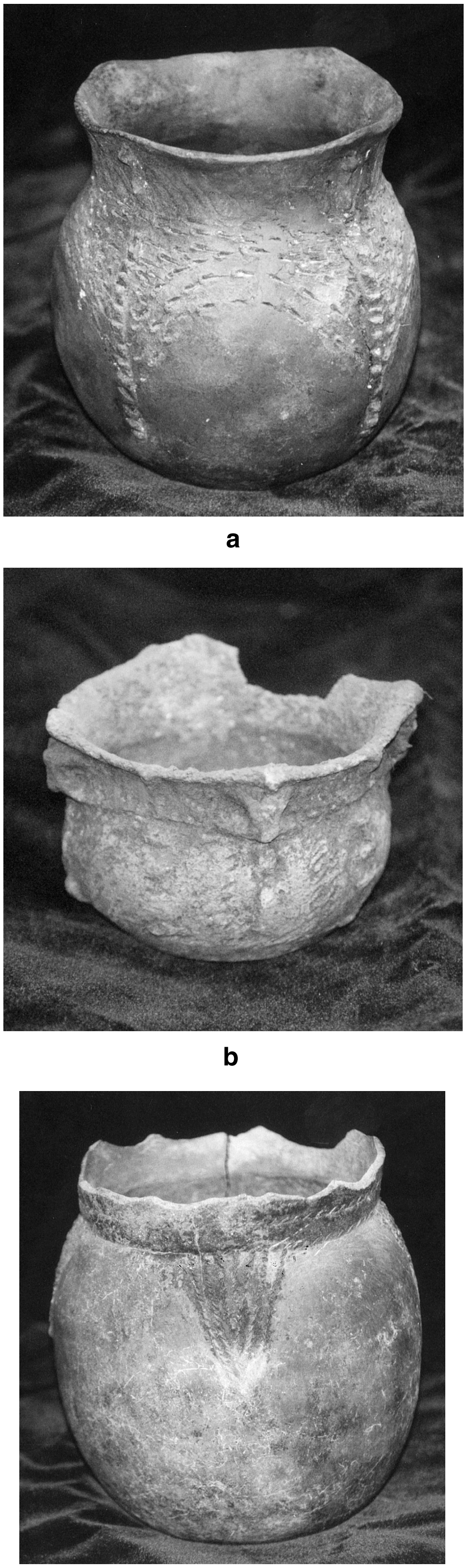


Figure 58. McCurtain phase utility wares: a-b, Nash Neck Banded; c, Emory Punctated-Incised.

Figure 59. Noded bowl.

et al., all are clear evidence that the Caddo groups at Roitsch were agriculturists who consumed large quantities of maize (see also Fritz and Goldborer, this article). Interestingly, there were no real differences between males and females in the stable carbon isotope values, suggesting that the Caddo population at Roitsch had a relatively homogenous diet, regardless of status or sex. Stable carbon isotope results from other Caddo populations in the Middle Red River (e.g., from the Roden, Holdeman, and Rowland Clark sites; data on file at the Texas Historical Commission, see also Appendix X, this article) further suggest that the intensive consumption of maize by the Caddo occurred only after ca. A.D. 1200 (cf. Perttula 2008).

ARCHEOLOGICAL INVESTIGATIONS IN MIDDLE CADDO CONTEXTS IN THE VILLAGE AREAS, BLOCK VI

by Timothy K. Perttula

The vast majority of the archeological deposits at the Roitsch site are part of the Late Caddo McCurtain phase community along the Red River, and most of the work completed during the Texas Archeological Society (TAS) Field School was in this extensive archeological component. However, during the course of the field work, pre-A.D. 1300 archeological deposits were encountered in several areas of the site, including the 1991 Youth Area (see below) and Block VI.

Block VI is a small excavation (4.25 m^2) centered over a large Middle Caddo period, Mound Prairie phase, ash and midden-filled pit feature

Table 11. Burial descriptions from the TAS Field School excavations.

Burial	Sex	Age (years)	Stature	Medical Disorders	Cranial Modeling
24	male	30-35	Unknown	Supra-inion depression, caries, abscesses	Present
25	IND	40-55	160.92 cm	DJD*, osteophytosis, trauma, caries	IND
26a	female	20-24	159.82 cm	Caries, frontal bone pitting	IND
26b	sub-adult	18 ± 6 mos.	Unknown	None	IND
27a	sub-adult	12 ± 2.5	Unknown	Caries, dead tooth (trauma?)	IND
27b	female	young adult	153.22 cm	Trauma, caries, abscesses, roughened palate	Present
28a-d	commingled	3 adult, 1 sub-adult	Unknown	Periodontal disease, roughened palate, caries	Present
29	sub-adult	birth ± 2 mos.	Unknown	None	IND
30	male	17-23	163.20 cm	Osteochondritis, supra-inion depression, trauma, caries	IND
31	female	early-late 30s	156.80 cm	Osteoarthritis, DJD, supra-inion depression, caries, and abscesses	Present
32	female	45-49	154.21 cm	DJD, trauma, caries	IND
33	male	25-35	157.44 cm	Nutritional stress, trauma, caries, abscesses	Absent
34a	male	late 40s-mid 50s	163.32 cm	DJD, S. nodes, periostitis, periodontal disease, caries	Absent
34b	sub-adult	6 ± 3 mos.	Unknown	Otitis media, occipital infection	IND
35	female	30-35	158.35 cm	DJD, supra-inion depression, periodontal disease, caries	Present
36	sub-adult	9 ± 3 mos.	Unknown	Supra-inion depression	Present

* DJD=degenerative joint disease; IND=indeterminate; S. nodes=Schmorl's nodes

(Fea. 601) identified during core probing of the alluvial terrace south of the East Mound conducted at our request by Mr. Greg Perino of Idabel, Oklahoma. The block is approximately 35 m east-southeast of Block III (see Figure 5).

Feature 601 is a 1.2 m diameter circular pit (Figure 60) that extends from 23-83 cm bs, with relatively straight walls and a flat, level floor (Figure 61). The pit extends almost 40 cm into the B-horizon, a red sandy clay. The pit feature had unfortunately been previously disturbed by pothunters, but its overall character and contents were still readily ascertained. The feature was excavated well into the underlying clay B-horizon, and it was filled primarily with midden debris (including ceramics, animal bone, daub/burned clay, and freshwater mussel shells), but the lower 25 cm of the pit was composed of an homogenous bed of ash (Figure 62a-b, see also Figure 61). The pit walls had been fired red, to the extent that a 3 cm thick fired lining was apparent around the edges of the feature. The high heat that created the fired walls, and the thick ash bed, suggest that Feature 601 was a heavily utilized cooking feature. Similar kinds of ash-filled pit features were noted at the nearby Rowland Clark site (Perino 1994:Table 2). A radiocarbon sample

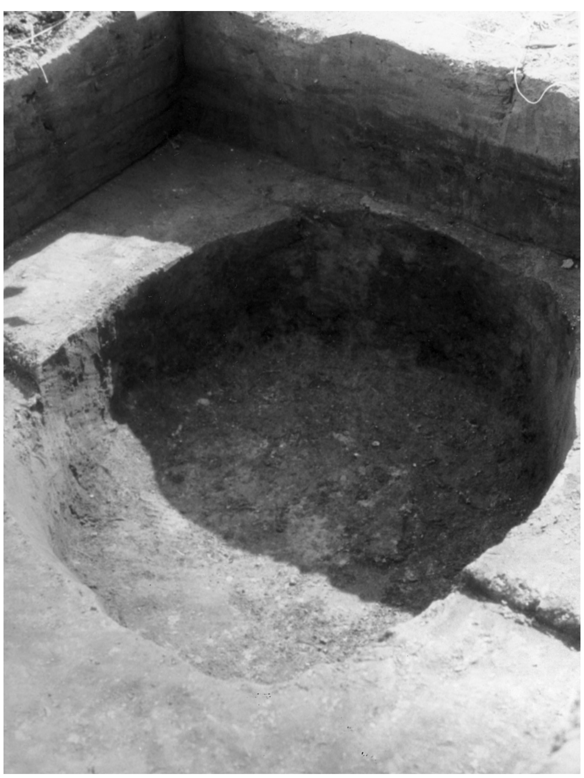


Figure 60. Completed excavations of Fea. 601.

on charred nutshells from the feature in Block VI dates to cal A.D. 1154-1296 (RA=0.75, 1 sigma) (Beta-46957).

A high density of archeological materials were recovered from the Block VI excavations, particularly ceramic sherds, animal bone, burned clay and daub, and pieces of freshwater mussel shell (Table 12). The overall density of material remains is more than 810 artifacts per m^2, slightly more than the artifact density in the Block IV McCurtain phase archeological deposits (see Table 3).

Twenty-six decorated sherds and seven plain rims were found in the Block VI excavations, along with 1053 plain body and base sherds. About 45 percent (n=15) of these decorated sherds and plain rim sherds were recovered in the fill of Feature 601, the large ash-filled pit, with the remainder being scattered from 0-40 cm bs in general midden and habitation contexts outside of the feature itself. The feature has a mixture of Mound Prairie phase and McCurtain phase ceramics, another indication that the feature had been disturbed by looting activities sometime before the TAS investigations.

Most of the sherds (72 percent) were tempered with grog, grit, or bone. These sherds are from the Mound Prairie phase use of the feature in that horizontal engraved (n=1), plain grog-tempered and non-slipped bowls, and a Pennington Punctated Incised rim from a large bowl were identified in this sherd assemblage (Figure 63b).

Six of the 19 Mound Prairie phase rim and decorated sherds are plain rims, suggesting that plain vessels were relatively common in the ceramic assemblage. By comparison, only 7 percent of the shell-tempered rim and decorated sherds are plain rim fragments. These rims have direct or standing profiles (see Figure 63e), with flat lips. One is also interior thickened, another possible diagnostic attribute of Mound Prairie phase ceramics. The majority of the decorated sherds are incised (n=8), followed by punctated (n=2), punctated-incised (n=2), and engraved (n=1).

The incised sherds have horizontal, parallel (orientation of the sherds is indeterminate), curvilinear (see Figure 63h), and diagonal incised elements. The horizontal and parallel elements comprise 63 percent of the non-shell-tempered incised sherds from Block VI. Both of the punctated sherds have at least one row of tool punctations (see Figure 63c). The first punctated-incised sherd is a rim with a row of fingernail punctates below the lip, and placed above two horizontal incised lines (see Figure

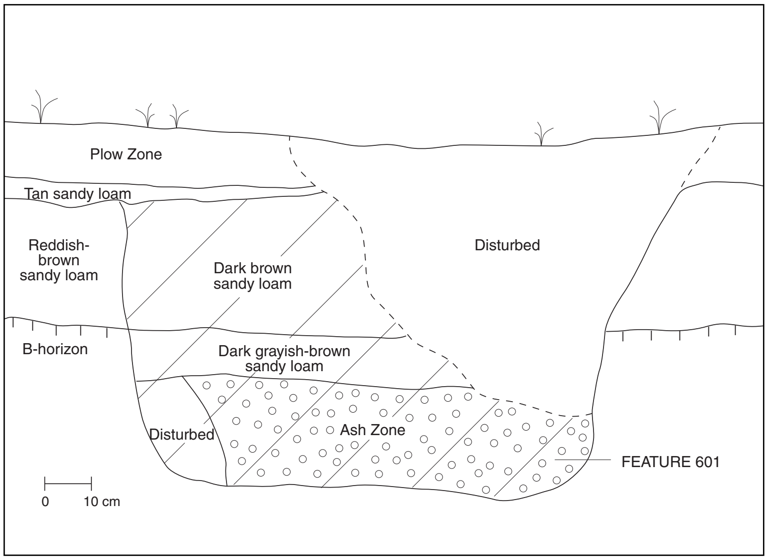


Figure 61. Profile of Feature 601, Block VI.

63d). The other is the Pennington Punctated Incised body sherd with an incised zone filled with large cane punctates (see Figure 63b). The engraved sherd, from a red-slipped vessel, has horizontal engraved lines on it (see Figure 63g).

The remainder of the rim and decorated sherds (n=14) in Block VI have abundant burned shell fragments added as temper to the paste, and these are likely associated with the large McCurtain phase village deposits encountered in nearby Blocks III and IV. Of the shell-tempered sherds in these excavations, five are from Nash Neck Banded jars, two are red-slipped rims (see Figure 63a), one is a plain rim, and the others include engraved (n=3), incised (n=2), and appliqued (n=1, see Figure 63f) elements; this last sherd is probably from an Emory Punctated-Incised jar. The incised sherds have either a single straight line or a set of diagonal incised lines, and these are also likely from Emory Punctated-Incised vessels. All three of the engraved sherds are from red-slipped vessels, suggesting they are from Avery Engraved bowls and bottles. One bottle sherd has two parallel engraved lines on it, while the others have only a single engraved line of indeterminate orientation or decorative element.

Although the sample is small, the frequency of shell-tempered neck banded sherds in the Block VI ceramics is consistent with the Block III/IV and earlier McCurtain phase ceramic assemblage, rather than to the later (after ca. A.D. 1600) McCurtain phase ceramics on the East Mound and in several of the very Late Caddo graves on the terrace. This suggests that the archeological deposits in Blocks III/IV are generally contemporaneous with the more limited McCurtain phase use of the Block VI area.

Four Red River style long-stemmed pipe sherds were found in Block VI, three stem sherds and a bowl sherd; the stems were all from Feature 601. The bowl sherd is from N447 E532. All the pipe sherds were tempered with finely-crushed bone, and both bowl and stem pieces had remnants of a red slip on the exterior of the pipe.

a b

Figure 62. The ash-filled zone in Fea. 601: a, in cross-section; b, in plan view.

Table 12. Archeological materials from the Block VI excavations at the Roitsch site.

Unit (N-E)	Sherds	AP	LD	Tools	Bone	Shell	BC/D	FCR	DP	GS
446-531	199	1	111	1	8	4	741	1	-	-
446-532	317	1	59	-	76	19	212	6	1	-
447-531	230	-	88	-	52	20	389	-	-	1
447-532	283	1	75	-	62	-	370	1	-	-
449-532*	57	-	20	-	19	3	38	1	-	-
Totals	1086	3	353	1	217	46	1750	9	1	1

AP=arrow point; LD=lithic debris; BC/D=burned clay/daub; FCR=fire-cracked rock; DP=dart point; GS=ground stone tool
*50 x 50 cm unit; the others are 1 x 1 m units

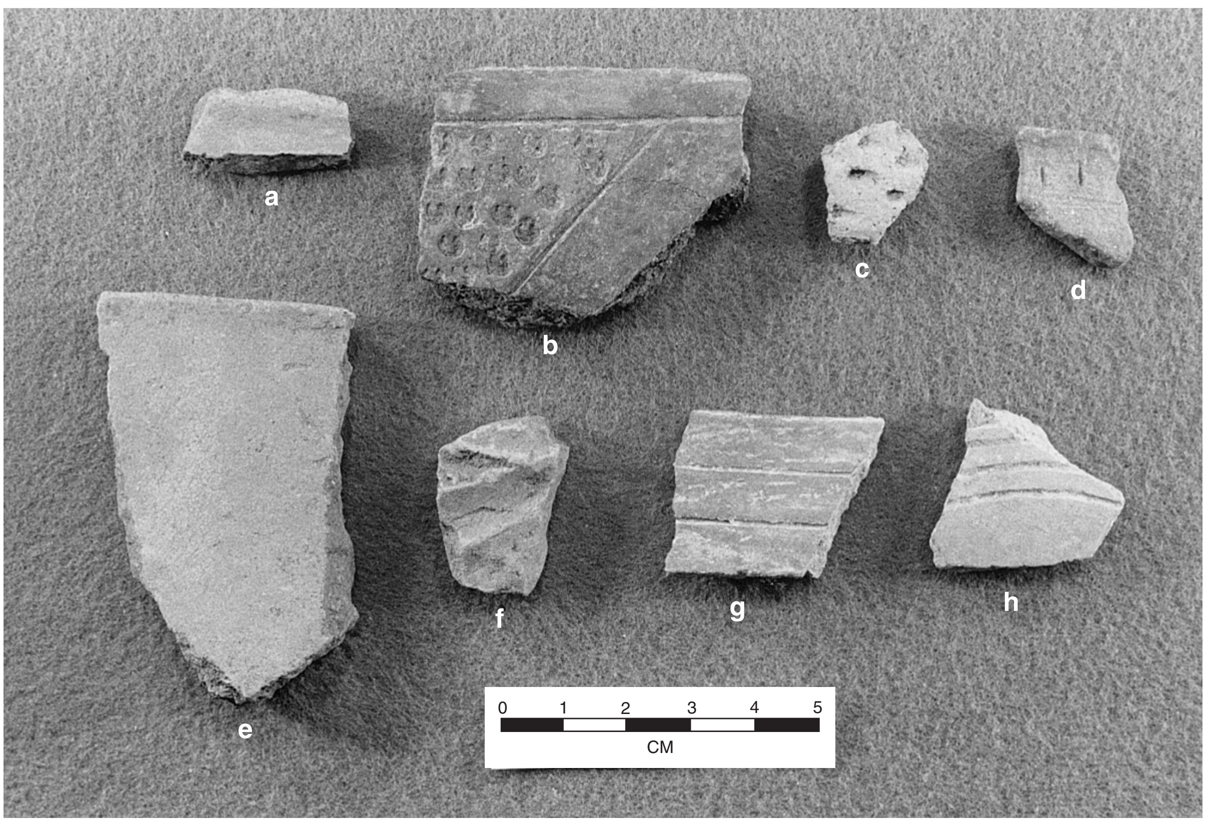


Figure 63. Decorated sherds from Block VI.

Only six lithic tools were found in the Block VI excavations, three arrow points, a flake tool (N446 E531, see Table 12), a contracting stem Gary dart point (N446 E532) made from a heat-treated quartzite, and a fragment of a ground and polished celt made from Ouachita Mountains greenstone (N446 E531). The arrow points include an Early to Middle Caddo period Catahoula specimen from N446 E531, made of local claystone-siltstone, and a broad side-notched specimen (with a flat base), probably of the Reed or Haskell types (see Brown 1996). The one Late Caddo arrow point is from 0-10 cm bs. It is a Big Fork chert Maud point, also a common find in Blocks III and IV.

The thickness and stem width of the Block VI dart point is consistent with a Gary, *var. LeFlore* specimen, estimated to date from 2400-1700 years ago by Schambach (1982, 1998). The recovery of this one point implies a limited use of this part of the alluvial landform during the earliest part of the Woodland period.

1991 YOUTH AREA ARCHEOLOGICAL INVESTIGATIONS AT THE ROITSCH SITE (41RR16)

Timothy K. Perttula

INTRODUCTION

The 1991 Texas Archeological Society (TAS) Youth Area excavations were placed at the extreme south end of the large alluvial terrace some distance away from where most of the field school investigations took place at the A. E. Roitsch site. The terrace overlooks a small drainage, probably an old filled-in Red River channel, that flows between Salt Well Slough and Big Pine Creek.

Extensive Formative-Early to Late Caddo habitation areas are located some 300-400 m north of the Youth Area along the same terrace (Figure 64). Blocks III-IV and VI were excavated in these areas during the field school. Other evidence of prehistoric to early Historic Caddo settlement is present south of the Youth Area at the Bob Williams farm (Perino 1983), and the Roitsch site itself stretches for more than 1.5 km along the river.

This southern part of the Roitsch site was selected for investigations because the Texas Historical Commission staff and TAS volunteers had been able to locate, by shovel testing and 50 x 50 cm excavation units completed before the field school began, intact but fairly shallow archeological deposits containing a variety of stone and ceramic artifacts that appeared to be either Woodland or Formative Caddo period in age. More importantly, no Late Caddo materials seemed to

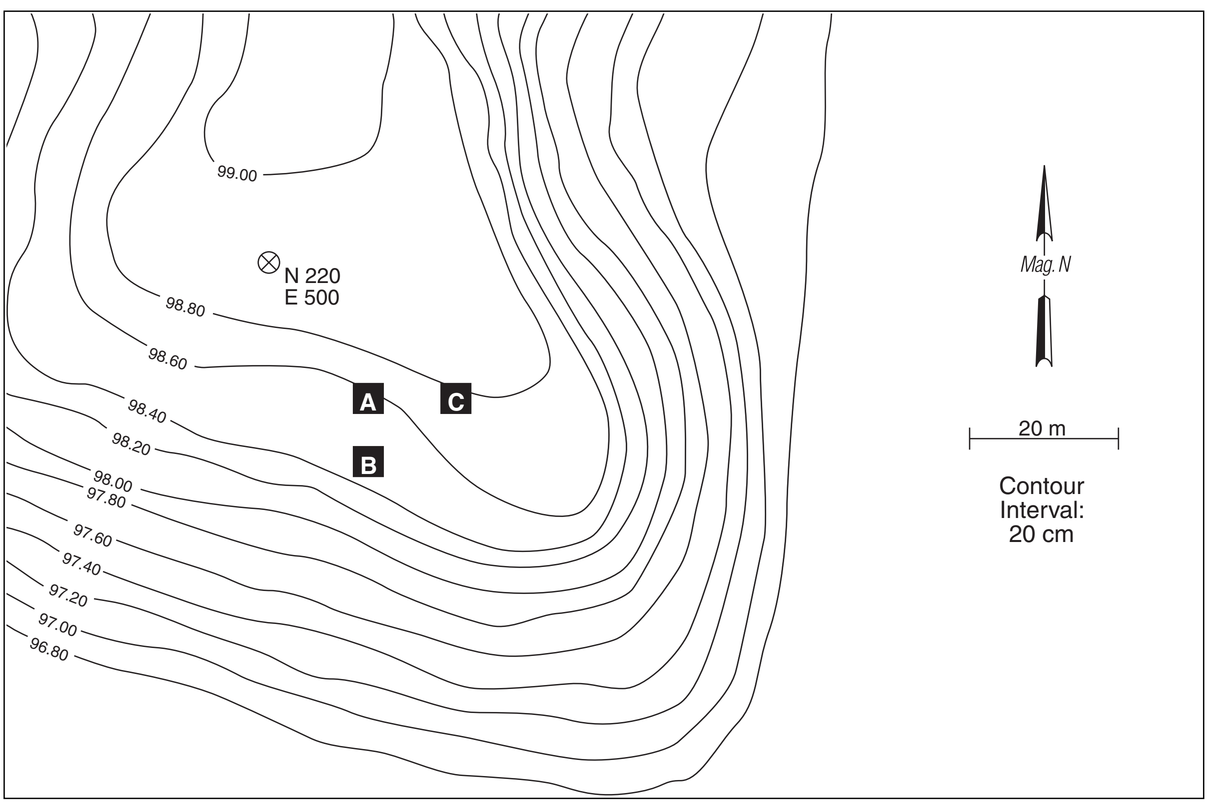


Figure 64. Location of 1991 Youth Area at the Roitsch site.

be present here. It was thus hoped that excavation work by the children in this Youth Area would be able to retrieve useful archeological information on the material culture and features from these earlier occupations—which are somewhat masked by Late Caddo period occupational remains elsewhere on the site—thus contributing to our overall understanding of the village structure and use of the Roitsch site during several cultural periods (e.g., Bruseth et al. 1991:21-22).

The Youth Area Director for the work was Sallie Taylor. Three 4 x 4 m blocks (Blocks A-C) were laid out near the edge of the terrace, and a total of 20 1 x 1 m units within the three blocks were excavated during the course of the Field School (Figure 65). The units were excavated in 10-cm thick levels to between 20 and 50 cm below surface (bs), depending on the unit. In no case were culturally sterile deposits reached during the work, although the greatly diminishing artifact densities below 40-50 cm bs suggest that excavations had sampled the principal occupational deposits in the Youth Area. Supervising the children in the three blocks were Pat Brown (Block A, kindergarten through second grade), Lynda Cockburn (Block B, third-fifth grade), and Deana Grubis (Block C, sixth-ninth grade).

RESULTS OF THE EXCAVATIONS

The 1991 work at the Youth Area documented a fairly dense archeological deposit pertaining almost exclusively to a Mound Prairie or Middle Caddo period (ca. A.D. 1100-1300) occupation on this part of the alluvial terrace. A few artifacts may also be indicative of both limited Woodland period (ca. A.D. 1-800) and Late Caddo period McCurtain phase (ca. A.D. 1300-1600+) use of the area, but substantial occupations during those times were not present. The

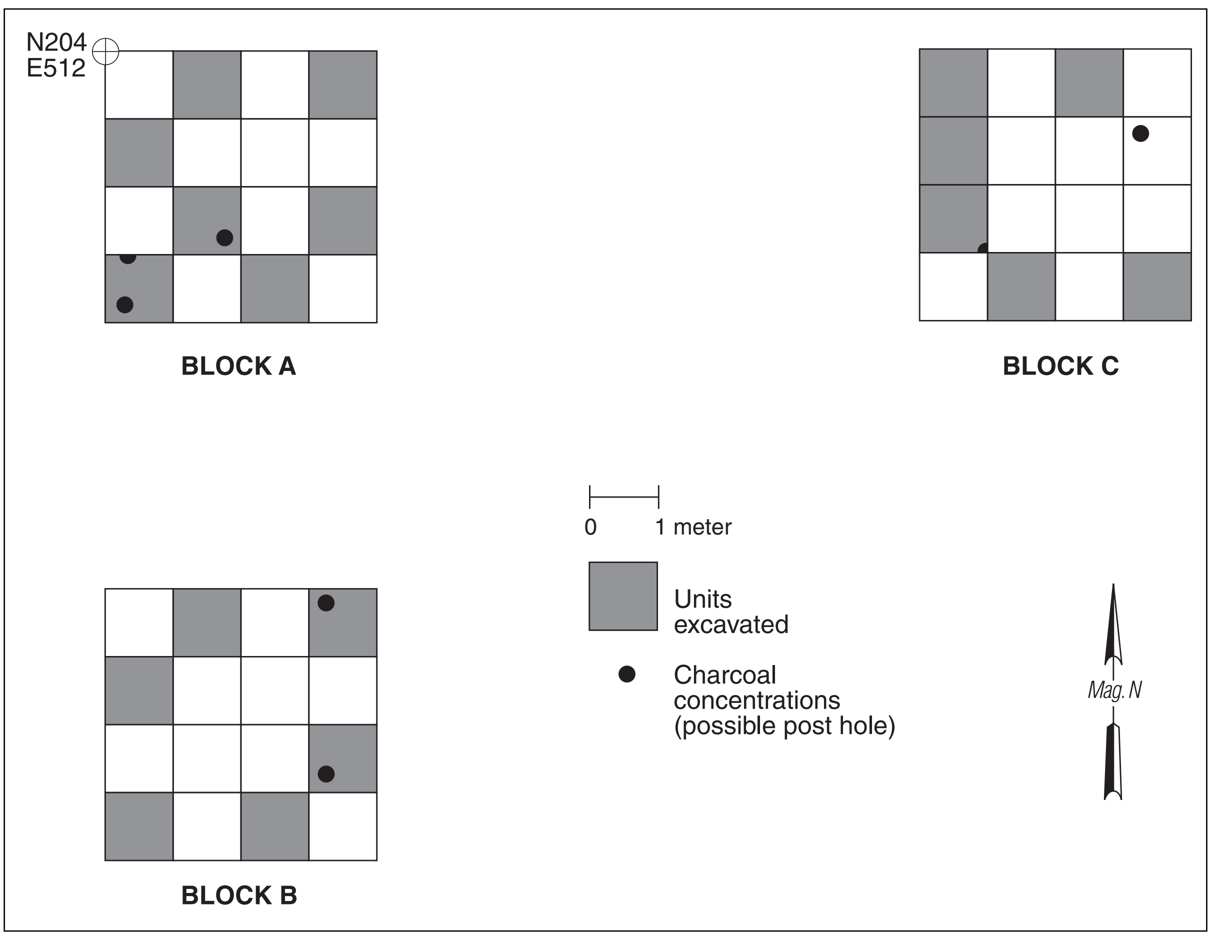


Figure 65. Block Map for 1991 Youth Area, showing the units excavated, and the locations of the possible post hole and charcoal concentrations in Blocks A-C.

archeological materials are confined to a ca. 40-50 cm thick brown sandy loam A-horizon alluvial sediment overlying a B-horizon sandy clay subsoil.

No cultural features were documented in the excavations, although one possible post hole stain was noted at the base of the A-horizon in Unit N202 E527 (Block C). Six other widely scattered charcoal stains were described in the field notes as lying between 20-40 cm bs in the three blocks (see Figure 65). These charcoal stains might represent additional post holes, but excavations were not carried to a sufficient depth (and the charcoal stains were not sectioned or profiled) to determine their cultural origin, functional character, or determine if they exhibited any spatial patterning. Nonetheless, if they are cultural rather than natural features, as seems likely, we may presume that they probably represent vestiges of a prehistoric Caddo structure (or structures) that stood on the terrace. Additionally, the quantity of daub recovered in the excavations in the Youth Area suggests that structures were present in this area of the site. Substantial amounts of fire-cracked quartzite and sandstone pieces throughout the three blocks hint that hearths and cooking features (i.e., pits and ovens) may also be preserved in the Youth Area.

DESCRIPTION OF CULTURAL MATERIALS

A large quantity of cultural materials were recovered in the block excavations, including 627 pottery sherds (among them two sherds from long-stemmed Red River pipes), 65 chipped and ground stone tools, 1550 pieces of lithic debris (some 1 percent of which are flakes from the resharpening of ground stone celts) and cores, 72 pieces of daub and fired clay, 308 fire-cracked rocks, 136 animal bones, and one mussel shell fragment (Table 13).

Table 13. Vertical Distribution of Prehistoric Artifacts from the 1991 Youth Area.

Artifact Category	Level 1	2	3	4	5	N
Pottery*	257	248	107	15	-	627
Arrow point	6	3	2	3	-	14
Dart point	1	-	-	-	-	1
Biface	1	3	2	1	-	7
Unifacial tool	20	3	14	3	-	40
Ground stone	1	1	1	-	-	3
Lithic Debris	466	548	355	139	29	1537
Cores	4	4	1	4	-	13
Daub/Burned Clay	18	31	16	7	-	72
FCR**	79	116	95	14	4	308
Animal Bone	9	46	66	11	4	136
Mussel Shell	-	1	-	-	-	1
Totals	862	1004	659	197	37	2759
Density/m^3	415	484	394	125	23	

* Includes ceramic pipe sherds
** FCR=Fire-cracked rock

Table 14. Body and Base Sherd Thickness and Sherd Tempers.

Temper Class	Body Thickness (mean in mm)	Base Thickness (mean in mm)
Grog	7.13 (n=17)*	11.8 (n=4)
Shell	6.75 (n=2)	9.6 (n=1)
Grog-grit-bone	7.00 (n=1)	11.0 (n=1)
Bone-grog	7.92 (n=10)	-
Grog-grit	6.57 (n=3)	-

* n=the number of analyzed sherds from each temper and sherd class. A total of 39 sherds were measured for thickness.

Some 92 percent of all the artifacts recovered in the Youth Area come from the top 30 cm of the A-horizon deposit, with very low densities of materials below those depths.

Ceramic Sherds and Pipes

The 627 ceramic vessel sherds from the Youth Area were recovered from the three blocks (n=597) and the few 50 x 50 cm units (n=30). Most of the ceramics from the Youth Area are relatively thin and plain, grog-tempered (62 percent), and grog-bone-tempered (27) percent) wares. Bone, bone-grog-grit (crushed pieces of rock, including hematite and sandstone), and grog-grit tempers were less common aplastic combinations in the ceramic assemblage. A single thick Williams Plain flowerpot-shaped base sherd was found in the block excavations, but in general the ceramic sherd walls range between 6.6-7.9 mm in thickness (for body sherds) (Table 14), and are not as coarsely tempered as is the Williams Plain ceramics found on Woodland period sites along the middle Red River and elsewhere in Northeast Texas, southwestern Arkansas, and southeastern Oklahoma (see Schambach 1998, 2001, 2002). The variety of decorated sherds in the sample indicate that it is more likely that the plain sherds derive instead from undecorated parts of vessels from a prehistoric Caddo occupation in the 1991 Youth Area.

Some eight percent of the grog-tempered body and base sherds (and one bone and grog-tempered sherd) have a hematite-derived red slip (Table 15) that was applied to the exterior surface of bowls and bottles; this is probably Sanders Plain (cf. Brown 1971, 1996), an apparently rather popular Formative to Middle Caddo period ceramic type along the middle reaches of the Red River (see Krieger 1946, 2000). One grog-tempered sherd has a black slip, indicating that the hematite-rich slipped vessel had been reduced during firing, rather than being oxidized as with the other sherds. The proportion of slipped sherds (5.2 percent, but ranging from 2-9.3 percent by block) from the body and base sherds is considerably higher than the amount of slipped sherds at the contemporaneous Fasken site, where only 0.8 percent of the 4228 sherds have a slip (see Prikryl, this volume: Table 10).

A more detailed analysis of the surface treatment of a select sample of the plain sherds from the 1991 Youth area indicate that between 20-27.5 percent had smoothed interior or exterior smoothing or burnishing, and about 20 percent of the interior surface of the sherds had smudging or soot marks from the use of vessels over an open fire; residues of organic remains also indicate their use for cooking (Table 16). The generally low percentage of evidence of surface treatment is likely a product of post-depositional conditions (erosion and weathering) that have degraded the interior and exterior walls of the ceramic sherds, but the amount of smoothed and/or burnished surfaces among the different temper classes suggests that exterior roughened and interior smoothed/burnished vessels were manufactured and used to ensure better control of thermal shock resistance (Schiffer et al. 1994:210) and lower vessel permeability, hence improving a vessel's heating effectiveness (Rice 1996:148).

Tables 17-19 provide information on the

Table 15. Youth Area, Plain Body and Base Sherds.

Temper Class	Block A	Block B	Block C	Percent slipped	N
Bone	3	9	5	0.0	17
Bone-Grog	44	47	58 (1)*	0.7	149
Bone-Grog-Grit	5	6	4	0.0	15
Grog	84 (3)	141 (9)	122 (17)	8.3	347
Grog-Grit	1	5	2	0.0	8
Shell	10	14	2	0.0	26
Percent slipped	2.0	4.0	9.3	5.2	-
Total	147	222	193	-	562

* Number of slipped (red and black) sherds

Table 16. Surface Treatment, Plain Sherd Sample.

Temper Class	% Slipped	% Smoothed/ Burnished		% Smudged		% Residue		N
		I*	E	I	E	I	E	
Grog	13.6	22.7	27.3	18.1	4.5	9.1	0.0	22
Shell	0.0	0.0	33.3	0.0	0.0	0.0	0.0	3
Grog-Grit-Bone	0.0	0.0	0.0	50.0	0.0	50.0	0.0	2
Bone-Grog	10.0	20.0	40.0	20.0	0.0	10.0	0.0	10
Grog-Grit	0.0	33.3	33.3	33.3	0.0	0.0	0.0	3
Mean Percentage	10.0	20.0	27.5	20.0	2.5	10.0	0.0	40

* I=interior vessel surface; E=exterior vessel surface

horizontal and vertical distribution of the plain body and base sherds by temper classes in the 1991 Youth area. About 80 percent of the sherds are concentrated in the upper 20 cm of the alluvial terrace deposits, and grog-tempered and bone-grog-tempered wares comprise between 85-93 percent of the sherds from each of the three blocks. The bone-tempered, grog-grit-tempered, and bone-grog-grit-tempered plain sherds each amount to between 1-4 percent of the sherds from the different blocks. Clearly, the ceramics from the 1991 Youth area at the Roitsch site are homogenous in character.

The decorated sherds (Table 20) include small samples of incised (n=11), punctated (n=6), and punctated-incised (n=1) body and rim sherds from Canton Incised, East Incised, or Crockett Curvilinear Incised vessels, along with diagonal and horizontal engraved decorative elements (n=5) that are probably from carinated bowls of the Sanders Engraved and Hickory Fine Engraved types (Figure 66). Although the red-slipped sherds are considered a form of surface treatment (see Tables 15 and 16), they are also a form of decoration, and are included in the discussion that follows. The plain red-slipped sherds include both rims (n=2) and body sherds (n=30)

These kinds of decorated Caddo ceramics have been found in a Mound Prairie phase Caddo component around the East Mound (Blocks I/II) at Roitsch, and in abundance in grave lots at the western end of the Holdeman site (41RR11), a few km downstream from the Roitsch site along the Red River (Perino 1995; Perttula, this volume). One grog-tempered and red-slipped noded-punctated sherd (N200 E525, level 2) is from a Maxey Noded Redware bottle (see Figure 66, top row, left), another kind of ceramic found consistently but in low frequencies in Middle Caddo period or Sanders phase contexts along the middle Red River (see Krieger 1946, 2000; Perttula 1997a, 1997b) as well as other parts of northeastern Texas north of the Sabine River.

The proportion of slipped sherds in the 1991 Youth area assemblage at Roitsch is substantial compared to the ca. A.D. 1100-1300 ceramic assemblage documented at the Fasken mound site. At Roitsch, approximately 5.1 percent of all the rim, body, and base sherds have a red slip, along with 57 percent of the decorated sherds (see Tables 15 and 20). By comparison, only 0.8 percent of the sherds at the Fasken site have a red slip, and 25 percent of the decorated sherds are slipped (see Prikryl, this volume: Table 10). Furthermore, although there are differences in sample sizes (i.e., Roitsch Youth area has 627 sherds and Fasken has 4428 sherds), the proportion of decorated sherds in the Youth area ceramic assemblage (9 percent) is three times greater than at Fasken (3 percent), and four to five times greater than in the McCurtain phase village deposits at the Roitsch site. This suggests a considerable diminishing of decorated vessels (or at least a diminishing in the amount of surface area on vessels covered with a decorative element) from Formative-Early to Late Caddo period contexts on Mound Prairie, as well as differences between residential and civic-ceremonial sites of the Formative-Early and Middle Caddo period in ceramic vessel assemblages.

There are also nine plain rims in the 1991 Youth area ceramic assemblage (one each from N192 E512, level 1; N193 E515, level 2; N195 E513, level 3; N200 E514, level 1; N200 E525, level 1; N203 E513, level 1; and three from N194 E512, level 1). They have standing (or vertical) profiles, ranging in thickness from 5.5-8.5 mm, with rounded to flat lips. One rim from a carinated bowl sherd in unit N193 E515, level 2 also has an exterior fold. Two of these plain rims (grog and grog-bone-tempered) have a hematite-rich red slip added to interior and/or exterior surfaces.

About five percent of the plain body sherds from the Youth Area are from plain shell-tempered vessels (likely jars), most coming from the upper levels (0-20 cm) of blocks A (n=6.8 percent) and B (n=6.3 percent); only 1 percent of the sherds from Block C had shell tempering. These indicate some limited use of this end of the alluvial terrace during the early part of the Late Caddo period McCurtain phase, probably between ca. A.D. 1300-1500, as this would be contemporaneous with the main Late Caddo occupational deposits elsewhere on the alluvial terrace (particularly in Blocks III and IV).

The two long-stemmed Red River pipe sherds, from an unknown variety (e.g., Hoffman 1967), were found in nearby units in Block B (N192 E 514, level 3 and N195 E513, level 2), although from temper and surface treatment attributes they appear to be broken fragments from two different long-stemmed pipes. The bowl sherd from N195 E513 is 3 mm thick, has no apparent temper, and the surface is unsmoothed and undecorated. The medial pipe stem in N192 E514 was tempered with burnt bone, and the surface is well-smoothed; the stem opening diameter is 6.5 mm.

Daub and Burned Clay

A small amount of burned clay and daub is dispersed throughout the archeological deposits in the Youth Area (Table 21), with the majority of the pieces in levels 2 and 3 (10-30 cm bs). The burned clay probably represents the remnants of Caddo clay-lined hearths and mud applied to grass and stick-lined structure walls that did not preserve impressions, while the daub are pieces of fired clay from structure walls that did retain impressions of the grass and stick "wattle." Most of the daub has either unidentifiable or grass impressions, but one piece of daub from Block B shows small stick impressions (see Table 21).

Lithic Artifacts

The 14 arrow points include three of the Alba type, and one Catahoula, along with 10 unidentifiable arrow point blade and tip fragments

Table 17. Block A Plain Body and Base Sherds.

Unit			Temper Classes				Total
Level	Bone	Bone & Grog	Bone, Grit & Grog	Grog	Grog & Grit	Shell	
N200 E512							
1		2		2	1	1	6
2	1	3		5			9
3		2		3		1	6
4		2					2
N200 E514							
1		2		1		2	5
2	1	2		11		1	15
3		1		2			3
N201 E513							
1		2		5 (2*)			7
2			1	1			2
3		3		1			4
4				5			5
N201 E515							
1		4		11			15
2			2	2			4
3	1	5		3			9
N202 E512							
1		4		8			12
2		1		7			8
N203 E513							
1		4		3		1	8
2		1		2			3
3		3		6 (1*)		3	12
N203 E515							
1		2	1	3			6
2		1	1	3		1	6
Totals	3	44	5	84	1	10	147

* Number of red-slipped sherds

Table 18. Plain Body and Base Sherds, Block B.

Unit	Temper Classes						Total
Level	Bone	Bone-Grog	Bone-Grog-Grit	Grog	Grog-Grit	Shell	
N192 E512							
1	6	6		12			24
2		4	1	25 (1*)	1	4	35
N192 E514							
1	1	1		9		4	15
2		2	1	8 (3*)			11
3				4 (1*)			4
N193 E515							
2	2	7	2	22 (1*)	2	3	38
N194 E512							
1		8		24 (1*)			32
2		8		9			17
3				7 (1*)			7
N195 E513							
1		2		5			7
2		1		7		2	10
3		2	2	4 (1#)	1	1	10
N195 E515							
2		5		3			8
3				2	1		3
4		1					1
Total	9	47	6	141 (9*)	5	14	222

* Number of red-slipped sherds
# Number of black-slipped sherds (i.e., fired in a reducing environment)

(Figure 67). These kinds of stemmed arrow points are principally recovered in Formative to Middle Caddo period contexts in northeastern Texas.

The Alba arrow points, all fragmentary, have parallel stems, rounded bases, and serrated blades, ranging in thickness from 2.5-4 mm. Two were manufactured on claystone/siltstone (N192 E512, level 2 and N195 E513, level 2), and the third was made on a heat-treated Ogallala quartzite (N203 E524, level 1). The Catahoula specimen, from N202 E527, level 1, has characteristic broad and prominent barbs, deep corner-notches, and a short expanding stem; the blade is serrated. It was manufactured on a Ouachita Mountains chert originating in the Red River gravels.

The only complete arrow point from the 1991 Youth Area has an expanding stem, a rudimentary shoulder on one side of the point, a flat base, and a

Table 19. Plain Body and Base Sherds, Block C.

Unit			Temper Classes				Total
Level	Bone	Bone-Grog	Bone-Grog-Grit	Grog	Grog-Grit	Shell	
N200 E525							
1		5		9 (2*)			14
2				4 (3*)			4
3			1				1
N200 E527							
1		6		12			18
2		7		8			15
3		1					1
N201 E524							
1	2		2	16 (1*)			20
2		1		8			9
3				2 (1*)			2
N202 E524							
1		7	1	2	1		11
2		1		9 (2*)			10
3		1		1			2
N202 E527							
1		3		22 (7*)	1	1	27
2	2	4		5			11
3		4		7			11
N203 E524							
1		3		3 (1*)			6
2		3					3
3		2		2			4
N203 E526							
2		2		7		1	10
3	1	6 (1*)		2			9
4		2		3			5
Totals	5	58 (1*)	4	122 (17*)	2	2	193

* Number of red-slipped sherds

Table 20. Decorative Elements and Temper Associations.

Rim/Decoration	Grog	Grog-Bone	Bone	Grog-Grit	Grog-Grit-Bone	Totals
Punctated-Incised		1				1
Noded-Punctated	1*					1
Engraved	2		2	1		5
Incised	5	1	2	3		11
Punctated	2	2		1	1	6
Plain rim	2*	4*	3			9
Red slipped body	29	1				30
Totals	41	9	7	5	1	63

* includes one red-slipped sherd

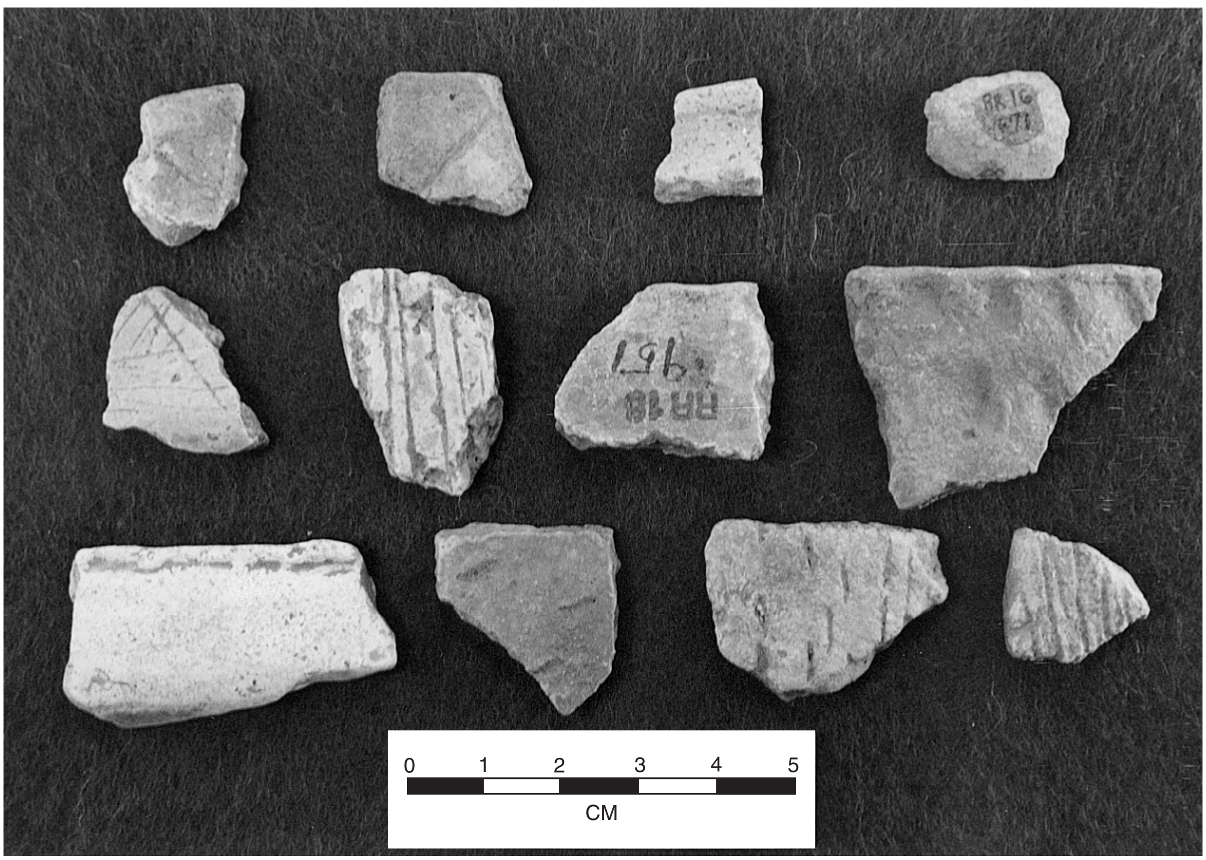


Figure 66. Decorated Sherds from the 1991 Youth Area at the Roitsch Site.

long, narrow blade (see Figure 67h). It is roughly-flaked, lacking fine pressure flakes usually applied in the final finishing and shaping of the tool, and may not have been completed before it was discarded. The point, made on a black siliceous shale, was recovered in N202 E527, level 3.

The other nine arrow points are represented by: (a) a small oval preform (N194 E512, level 1) of Red River gravel cherts, measuring 24 x 11.5 x 3 mm in length, width, and thickness; (b) three blade

Table 21. Daub and Burned Clay.

Provenience	Burned Clay	Daub UID impressions	Daub stick	Daub grass
Block A				
level 1	1			
level 2	1	3		1
level 3	2	1		3
level 4	1			2
Block B				
level 1	1	8		4
level 2	2	2		2
level 3	1	3		
level 4			1	
Block C				
level 1	3			1
level 2	5	2		5
level 3	1	3		
level 4	2	1		
50 x 50 cm units				
level 1				
level 2	7	1		
level 3	2			
Totals	29	24	1	18

UID=unidentified

fragments (N200 E512, level 1, N200 E527, level 4, and N203 E515, level 1) of chalcedony, claystone/siltstone, and jasper; (c) four distal tips—two of Red River gravel cherts (N192 E512, level 1, and N201 E524, level 4), one unifacially worked tip of chalcedony (N203 E513, level 2) with a serrated blade, and one claystone/siltstone (N200 E527, level 3)—and (d) a basal fragment of chalcedony found in unit N195 E515, level 4. The broken arrow point fragments are evenly dispersed across the three excavation blocks in the 1991 Youth Area.

A single small contracting stem Gary dart point made of Red River claystone/siltstone, was recovered in unit N194 E512, level 1 of Block B (see Figure 67a). The point has irregular margins and lacks fine-pressure flaking along the blade edges, suggesting either it was not completed before it was broken, or that the blade edges were worn from use. The dart could represent evidence for a Woodland period occupation or transitory use of the Youth Area based on its stem width (17.5 mm) and thickness (6.0 mm) (cf. Schambach 1982:176 and Table 7-3), which are consistent with the *variety LeFlore* style of Gary points, or instead its use as a multi-purpose tool (such as a knife or scraping implement) employed by the prehistoric Caddo occupants.

Other lithic tools in the assemblage include unifacial retouched pieces, gravers, drills, and perforators, bifacial tool fragments and bifacial arrow point preforms, fragments of three ground stone manos, and part of a ground stone celt made from Ouachita Mountains siliceous shale. The sandstone and quartzitic sandstone manos were all fire-cracked and fragmentary, having been recycled from tools to hot rocks in hearths and ovens. One or two surfaces of the tools were ground, and one mano cobble (N201 E524, level 2) had been edge-modified by pecking and hammering.

The quantity of cores (n=13), lithic debris, and bifacial preforms (n=4) from the excavations indicate that stone tool manufacturing and refurbishing tasks were important activities during the prehistoric Caddo use of the Youth Area. Additionally, some of the fire-cracked rock may be from the heat-treating of local quartzites and cherts to improve their knappability (Larry Banks, 1991 personal communication). Most of the lithic raw materials, however, are fairly high-quality Ouachita Mountain chert and quartzite raw materials collected in Red River gravels.

Several different kinds of flake cores are present in the 1991 Youth Area lithic assemblage: tested and split-cobble (n=2), bipolar (n=3), single platform (n=5), and multiple platform (n=3). As expected for flake cores, these are uniformly on small (22-65 mm in length, 11-45 mm in width, and 9-28 mm in width), stream-rolled pebbles with a limited number of flake removals, and the size of flakes removed would have been suitable for the manufacture of tools such as arrow points, drills, and retouched/utilized flakes. The presence of bipolar cores is indicative of lithic reduction strategies constrained by the small size of the available raw materials, in that the small pebbles are easiest to reduce for flakes by placing them on a hard surface, then smashing them with a hammerstone.

The pebbles were collected from Red River gravels, with the specific materials selected for the production of flake tools primarily including fine-grained Red River chert (n=5), jasper (n=4), chalcedony (n=1), and claystone/siltstone (n=1). The two coarse-grained quartzite and petrified wood pebble cores had been roughly tested and split, apparently to check their knapping quality, and they subsequently were discarded without further flake or core reduction.

The cores are concentrated in Block B. Some 77 percent of the cores were in this block, particularly

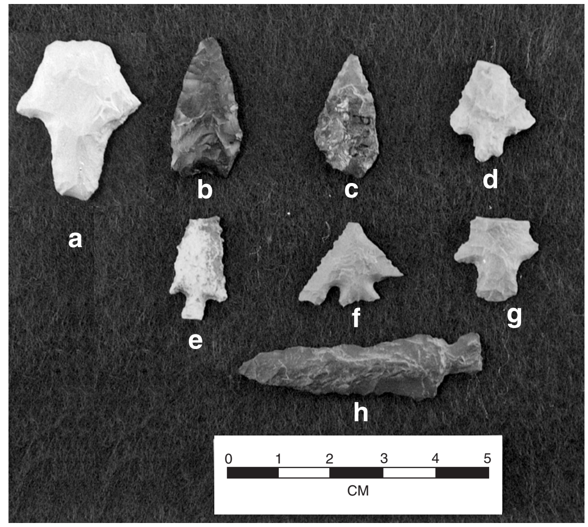


Figure 67. Arrow points and Dart Point from the 1991 Youth Area.

in units N194 E512 and N195 E515. Lithic debris is also concentrated in this block, at densities 40-160 percent higher than in Blocks A and C, respectively. Each of the different kinds of flake cores are represented in Block B, indicating it was a loci of general tool manufacture, while Block A has only a single jasper multiple platform core (N201 E513, level 4) and Block C simply has a Red chert bipolar core from unit N203 E526 (level 2) and a jasper single platform flake core in N200 E525, level 4.

Faunal Remains

The analysis of the 1991 Youth Area faunal remains was completed by Bonnie C. Yates, the TAS Field School zooarcheologist. Only a small amount of fauna was present in this part of the Roitsch site, and this is primarily due to poor preservation conditions created by the shallow, acidic sediments that comprise this part of the alluvial terrace deposits. The faunal remains were concentrated (ca. 89 percent) in the upper 30 cm of the archeological deposit, and the small amount of fauna below 30 cm has probably been moved down by bioturbation and pedoturbation actions.

Of the 136 pieces of animal bone from the block excavations, 78 faunal elements were identified to the species or genera levels from the three blocks in the Youth Area. This includes elements from white-tailed deer (n=5), turtles (n=4), mud turtle (n=1), and eastern cottontail rabbit (n=2), species that are abundant in riverine and floodplain habitats in Northeast Texas. All species were commonly exploited by prehistoric Caddo hunters living in the middle Red River valley (see Yates, this article). Also in the assemblage were 31 elements from medium/large mammals, 28 from vertebrates, six from small/medium mammals, and one from a small mammal. In all these cases, species were not identifiable from these remains.

Historic Artifacts

The sample of historic artifacts includes six (post-1900) artifacts from levels 1 (n=2) and 2 (n=4) in Block A. Two are modern orange glass and plastic beads, probably residue from one of the bead-making classes held by the Youth Area group during the 1991 Field School, while the others are a single wire nail fragment and three body pieces of purpled (1880-1918) bottle glass.

SUMMARY

The Texas Archeological Society excavations at the Roitsch site by the Youth group in 1991 barely scratched the surface of a potentially very interesting prehistoric Red River Caddo habitation locale occupied between about 650-900 years ago. Through the well-placed and well-supervised efforts and hard work of the Youth group and the Youth Area supervisors, some 20 m^2 of archeological deposits were excavated and studied during the 1991 Field School, resulting in the recovery of a substantial archeological assemblage of lithics, ceramics, and bone that helps to tell the story of the prehistoric Caddo people's settlement of the Red River Valley of Northeast Texas. Best of all, much of this part of the site remains untouched and undisturbed, waiting to disclose its secrets to future archeologists.

To summarize the findings from the 1991 Youth Area, limited excavations in this area of the Roitsch site identified prehistoric use of the alluvial terrace during Woodland, Formative to Middle Caddo, and Late Caddo periods. Based on the kinds of ceramics and lithic artifacts recovered in the three small blocks, by far the most intensive occupation took place sometime during the Middle Caddo period or Mound Prairie phase, which is estimated to date from ca. A.D. 1100-1300 through comparisons with archeological findings elsewhere at Roitsch and at the Fasken site (see Prikryl, this volume), and at other prehistoric Caddo sites in the middle Red River valley (e.g., Banks and Winters 1975; Perino 1995). One post hole and several charcoal concentrations likely part of that occupation may represent the elusive remains of a grass and mud-covered Caddo structure(s) built during this period of time at the site.

CHEMICAL VARIATION IN NORTHEASTERN TEXAS CERAMICS, INCLUDING ANALYSES OF SHERDS FROM FOUR RED RIVER COUNTY SITES

James W. Cogswell, Hector Neff, and Michael D. Glascock

INTRODUCTION

This section of the article summarizes the results of instrumental neutron activation analysis (INAA) of ceramic samples from four Caddo sites in the Red River valley in northeastern Texas, as well as other Northeast Texas sites, conducted at the Missouri University Research Reactor. These samples, 76 pottery sherd samples and five ceramic pipe samples, are part of an ongoing investigation of compositional variation in Caddo ceramics from northeastern Texas. The main goals of this project are: (1) to assess the compositional diversity of the assemblage from several investigated sites; (2) to determine if compositional groups are associated with specific vessel types, forms, or decorative elements; and (3) to see if compositional variation at sites changed over time and thus reflect differing ceramic-resource exploitation strategies or vessel-movement patterns.

The first samples submitted for this project were recovered from the Hurricane Hill site (41HP106; 40 samples) and the Mockingbird site (41TT550; 10 samples) (see Neff et al. 1998a, 1999). An additional 39 samples, all from the Oak Hill Village site (41RK214), were subsequently submitted for INAA (see Rogers and Perttula 2004). The most recent 81 samples include three sherds from the Dan Holdeman site (41RR11), two from the Fasken site (41RR214), 21 from the Roitsch site (41RR16), and 10 from Salt Well Slough (41RR204), all from Texas Archeological Society (TAS) investigations (Table 22), along with 40 sherds and five ceramic pipe fragments from Oak Hill Village. The remaining 134 sherd samples comprise the total data set reported in Table 23. Comparative data from a regional

Table 22. Compositional Affiliations for Red River Ceramics.

Chemical Group	ID	Site	Prov.	Type	P*	Temper S	Temper Tr	Period	Group Membership Probabilities** Titus	Group Membership Probabilities** Red River
Red River	TKP041	41RR204	N116/ E90	Nash NB	Shell	-	-	LC+	0.000	44.458
Red River	TKP042	41RR204	Fea. 11	Nash NB	Shell	-	-	LC	0.000	24.681
Red River	TKP043	41RR204	N105/ E100	Avery E	Shell	-	-	LC	0.000	64.042
Red River	TKP044	41RR204	N116/ E90	Nash NB	Shell	sand	-	LC	0.000	73.132
Red River	TKP045	41RR204	N116/ E90	Avery E	Shell	sand	-	LC	0.000	72.183
Red River	TKP046	41RR204	Fea. 5	Nash NB	Shell	sand	-	LC	0.000	90.897
Red River	TKP047	41RR204	Fea. 9	Nash NB	Shell	-	-	LC	0.000	1.592
Red River	TKP048	41RR204	N116/ E90	Avery E	Shell	-	-	LC	0.000	94.441
Red River	TKP049	41RR204	N116/ E90	Nash NB	Shell	-	sand	LC	0.000	58.027
Red River	TKP050	41RR204	Fea. 11	Nash NB	Shell	-	-	LC	0.000	96.157
Red River	TKP051	41RR11	Area A	Sanders E	clay	sand	-	MC	0.000	14.205
Rusk	TKP052	41RR11	Lot 20	Sanders Plain	Clay	Sand	Bone?	MC	0.000	0.000
Red River	TKP053	41RR16	Bl. IV	Nash NB	Shell	-	-	LC	0,000	0.449
Ungrouped	TKP054	41RR16	Bl. VI	Pennington	?	-	-	MC	0.005	0.001
Ungrouped	TKP055	41RR16	Terrace	Avery E	Shell	-	-	LC	0.000	0.000
Red River	TKP056	41RR16	Terrace	Nash NB	Shell	-	-	LC	0.000	61.569
Ungrouped	TKP057	41RR16	Terrace	Nash NB	Clay	shell	sand	LC	0.000	0.000
Ungrouped	TKP058	41RR16	Bl. I/II	Nash NB	Shell	-	-	LC	0.000	0.001
Red River	TKP059	41RR16	Bl. I/II	Avery E	Shell	-	-	LC	0.000	4.319
Red River	TKP060	41RR16	Bl. I/II	Clement R	Shell	clay	sand	LC	0.000	4.291
Red River	TKP061	41RR16	Village	Emory P-I	Shell	-	sand	LC	0.000	42.202
Red River	TKP062	41RR16	Village	Simms E	Shell	-	sand	LC	0.000	96.253
Ungrouped	TKP063	41RR16	Village	Hudson E	Shell	-	sand	LC	0.000	0.000
Red River	TKP064	41RR16	Village	Sanders P	clay	sand	-	MC	0.000	0.199
Red River	TKP065	41RR16	Bl. III/IV	Nash NB	Shell	-	-	LC	0.000	90.913
Red River	TKP066	41RR16	Bl. III/IV	Nash NB	Shell	-	-	LC	0.000	56.721
Red River	TKP067	41RR16	Bl. III/IV	Keno T	Clay	-	-	LC	0.002	99.091
Red River	TKP068	41RR16	Bl. III/IV	McKinney	Shell	-	-	LC	0.000	96.706
Red River	TKP069	41RR16	Bl. III/IV	Avery E	Shell	-	-	LC	0.000	40.523
Red River	TKP070	41RR16	Bl. III/IV	Emory P-I	Shell	-	-	LC	0.000	39.622
Red River	TKP071	41RR16	Bl. III/IV	Hudson E	Shell	-	-	LC	0.000	76.374
Red River	TKP072	41RR16	Bl. III/IV	Nash NB	Shell	-	-	LC	0.000	66.980
Ungrouped	TKP073	41RR16	Bl. III/IV	Sanders P	Bone	sand	-	MC	0.704	0.392
Ungrouped	TKP074	41RR14	Area A	Sanders P	Clay	sand	-	MC	0.237	0.652

Table 22. *(Continued)*

Chemical Group	ID	Site	Prov.	Type	P*	Temper S	Temper Tr	Period	Group Membership Probabilities** Titus	Group Membership Probabilities** Red River
Ungrouped	TKP075	41RR14	Area A	Holly/ Hickory E	Clay	sand	limonite	EC/MC	0.015	0.093
Red River	TKP076	41RR11	Area B	UID E	Shell	-	-	LC	0.000	24.232

* P=primary; S=secondary; Tr=trace; E=engraved; NB=neck banded; P-I=punctated-incised; R=redware; P=Plain; T=trailed; UID=unidentified
** Membership probabilities are based on calculations using the entire 29 element data set
+EC=Early Caddo; MC=Middle Caddo; LC=Late Caddo

Table 23. Compositional Affiliations for other Northeastern Texas Caddo Ceramics.

Chemical Group	ID	Site	Prov.	Type	P*	Temper S	Temper Tr	Period	Group Membership Probabilities** Titus	Group Membership Probabilities** Red River
Hurr-1	TKP001	41HP106	Bl. A	C-H Incised	Clay	-	-	EC	55.824	0.000
Hurr-1	TKP003	41HP106	Bl. A	Diagonal I	Clay	-	-	EC	3.237	0.000
Hurr-1	TKP004	41HP106	Bl. A	Curvi. I	Clay	-	-	EC	0.005	0.000
Hurr-1	TKP006	41HP106	Bl. A	Punctated rim	Clay	-	limonite	EC	0.000	0.000
Hurr-1	TKP007	41HP106	Bl. A	Diagonal I	Clay	limo.	sand	EC	2.156	0.000
Hurr-1	TKP010	41HP106	Bl. A	Sanders E	Clay	sand	-	EC	3.067	0.000
Hurr-1	TKP014	41HP106	Bl. A	Diagonal zoned I-P	Clay	bone	-	EC	5.072	0.000
Hurr-1	TKP015	41HP106	Bl. A	Brushed	Shell	-	-	MC	0.851	0.000
Hurr-1	TKP016	41HP106	Bl. A	Punctated	Clay	bone	-	EC	2.993	0.000
Hurr-1	TKP020	41HP106	Bl. A	Engraved	Clay	-	-	EC	0.006	0.000
Hurr-1	TKP022	41HP106	Bl. B/C	Punctated	Clay	-	-	MC	45.482	0.000
Hurr-1	TKP023	41HP106	Bl. B/C	Brushed	Clay	-	-	MC	16.057	0.000
Hurr-1	TKP026	41HP106	Bl. B/C	Fingernail P	Clay	bone	-	MC	4.729	0.000
Hurr-1	TKP027	41HP106	Bl. B/C	Incised-Punct.	Clay	-	-	MC	13.689	0.000
Hurr-1	TKP030	41HP106	Bl. B/C	Diagonal E	Clay	-	-	MC	4.348	0.000
Hurr-1	TKP032	41HP106	Bl. B/C	Cross-hatched I	Clay	-	-	MC	7.840	0.000
Hurr-1	TKP034	41HP106	Bl. B/C	Diagonal I	Clay	-	-	MC	0.565	0.000
Hurr-1	TKP036	41HP106	Bl. B/C	Diagonal I	Clay	-	-	MC	0.259	0.000
Hurr-1	TKP038	41HP106	Bl. B/C	Plain rim	Clay	bone	-	MC	8.065	0.000
Hurr-1	TKP039	41HP106	Bl. B/C	Plain rim	Clay	sand	bone	MC	29.133	0.000
Red River	TKP002	41HP106	Bl. A	Curvi. I	Clay	limo.	sand	EC	0.000	83.706
Red River	TKP012	41HP106	Bl. A	Curvi. I-P	Clay	-	-	EC	0.000	33.813
Red River	TKP013	41HP106	Bl. A	Horiz. I	Clay	limo.	bone	EC	0.000	30.238
Red River	TKP019	41HP106	Bl. A	Hor. I-impressed triangles	Clay	sand	bone	EC	0.000	25.804
Red River	TKP025	41HP106	Bl. B/C	Cane P rim	Clay	bone	-	MC	0.000	67.260
Red River	TKP028	41HP106	Bl. B/C	Zoned I-P	Clay	-	-	MC	0.000	30.152

Table 23. *(Continued*

Chemical Group	ID	Site	Prov.	Type	P*	Temper S	Temper Tr	Period	Group Membership Probabilities** Titus	Group Membership Probabilities** Red River
Red River	TKP031	41HP106	Bl. B/C	Diagonal E	Clay	bone	limonite	MC	0.000	3.498
Red River	TKP033	41HP106	Bl. B/C	Diagonal I rim	Clay	sand	bone?	MC	0.000	23.006
Titus	TKP009	41HP106	Bl. A	Red-slipped	Clay	sand	bone	EC	86.277	0.000
Ungrouped	TKP005	41HP106	Bl. A	Punctated	Clay	-	sand	EC	0.000	0.000
Ungrouped	TKP008	41HP106	Bl. A	Curvi. E	Clay	-	sand	EC	0.000	0.000
Ungrouped	TKP011	41HP106	Bl. A	C-H Incised	Clay	sand	-	EC	0.268	0.000
Ungrouped	TKP017	41HP106	Bl. A	Incised-Punc.	Clay	bone	sand	EC	0.000	0.007
Ungrouped	TKP018	41HP106	Bl. A	Small Punct.	Sand	clay	-	EC	0.879	0.006
Ungrouped	TKP021	41HP106	Bl. B/C	Plain rim, thickened	Sand	-	-	MC	0.000	0.098
Ungrouped	TKP024	41HP106	Bl. B.C	Maxey Noded Redware	Clay	bone	-	MC	0.000	0.022
Ungrouped	TKP029	41HP106	Bl. B/C	Engraved ladder	Clay	-	-	MC	0.293	0.000
Ungrouped	TKP035	41HP106	Bl. B/C	Diagonal I	Clay	bone	-	MC	0.000	0.882
Ungrouped	TKP037	41HP106	Bl. B/C	Plain rim	-	clay	-	MC	0.017	0.000
Ungrouped	TKP040	41HP106	Bl. B/C	Plain rim	Clay	bone	-	MC	0.000	0.000
Rusk	EHA002	41RK214		engraved	Clay	sand	limonite	MC	32.825	0.000
Rusk	EHA003	41RK214		decorated	Clay	sand	-	MC	0.000	0.000
Rusk	EHA009	41RK214	Tr. 5	plain	Clay	sand	limonite	MC	0.000	0.000
Rusk	EHA011	41RK214	Tr. 15	plain	Clay	sand	-	MC	32.596	0.033
Rusk	EHA012	41RK214	Tr. 16	P-B	Clay	sand	limonite	MC	2.427	0.001
Rusk	EHA015	41RK214	Bl. 2	plain	Clay	sand	-	MC	34.858	0.001
Rusk	EHA017	41RK214	Bl. 2	plain	Clay	sand	-	MC	3.463	0.001
Rusk	EHA018	41RK214	Bl. 2	Punctated	Clay	limon.	sand	MC	0.298	0.000
Rusk	EHA019	41RK214	Bl. 2	plain	Clay	limon.	sand	MC	32.926	0.005
Rusk	EHA022	41RK214	Bl. 2	Engraved	Clay	sand	-	MC	0.000	0.000
Rusk	EHA024	41RK214	Bl. 3	plain	Clay	sand	limonite	MC	7.002	0.000
Rusk	EHA027	41RK214	Bl. 4	plain	Clay	sand	-	MC	0.022	0.000
Rusk	EHA034	41RK214	Bl. 1	plain	Clay	sand	-	MC	1.467	0.000
Rusk	EHA036	41RK214		Punctated	Clay	sand	limonite	MC	0.024	0.000
Rusk	EHA039	41RK214	Bl. 5	plain	Clay	limon.	sand	MC	0.000	0.000
Rusk	EHA040	41RK214		plain	Clay	sand	-	MC	31.803	0.000
Rusk	EHA041	41RK214	Mid. A	Caddo pottery	Sand	-	-	MC	32.184	0.000
Rusk	EHA048	41RK214	Mid. A	Caddo pottery	Clay	sand	-	MC	19.423	0.000
Rusk	EHA050	41RK214	Tr. 14	Caddo pottery	Sand	-	-	MC	0.000	0.000
Rusk	EHA051	41RK214		Caddo pottery	Clay	sand	-	MC	1.285	0.000
Rusk	EHA052	41RK214	Mid. A	Caddo pottery	Clay	sand	-	MC	0.004	0.000
Rusk	EHA053	41RK214	Str. 5	Caddo pottery	Chert	limes.	-	MC	0.002	0.000
Rusk	EHA054	41RK214	Str. 5	Caddo pottery	Clay	sand	-	MC	0.000	0.000
Rusk	EHA059	41RK214	Str. 5	Caddo pottery	Clay	sand	bone	MC	2.808	0.000
Rusk	EHA063	41RK214	Bl. 3	Caddo pottery	Bone	sand	-	MC	0.011	0.000

Table 23. *(Continued*

Chemical Group	ID	Site	Prov.	Type	P*	Temper S	Temper Tr	Period	Group Membership Probabilities** Titus	Group Membership Probabilities** Red River
Rusk	EHA065	41RK214	Bl. 4	Caddo pottery	Clay	sand	limonite	MC	0.045	0.000
Rusk	EHA084	41RK214	Str. 10	Red River pipe	-	sand	-	MC	0.018	0.000
Titus	EHA001	41RK214		plain	Clay	-	sand	MC	73.321	0.809
Titus	EHA005	41RK214		punctated	Clay	sand	-	MC	48.274	0.000
Titus	EHA006	41RK214		plain	Sand	clay	-	MC	88.616	0.014
Titus	EHA007	41RK214		punctated-brushed	Clay	sand	-	MC	92.946	0.000
Titus	EHA008	41RK214	Tr. 2	punctated-brushed	Clay	sand	-	MC	73.593	0.009
Titus	EHA010	41RK214	Tr. 13	plain	Clay	sand	-	MC	46.437	0.000
Titus	EHA014	41RK214	Bl. 2	incised	Clay	sand	-	MC	62.276	0.002
Titus	EHA016	41RK214	Bl. 2	plain	Clay	limon.	sand	MC	1.529	0.025
Titus	EHA020	41RK214	Bl. 2	plain	Clay	limon.	sand	MC	94.707	0.139
Titus	EHA021	41RK214	Bl. 2	plain	Clay	sand	-	MC	90.635	0.002
Titus	EHA025	41RK214	Bl. 4	plain	Clay	sand	-	MC	39.349	0.100
Titus	EHA026	41RK214	Bl. 4	plain	Clay	sand	bone?	MC	49.842	0.000
Titus	EHA028	41RK214	Bl. 1	plain	Clay	sand	-	MC	94.697	0.003
Titus	EHA029	41RK214	Bl. 4	plain	Clay	sand	-	MC	11.808	0.000
Titus	EHA030	41RK214	Bl. 1	plain	Clay	sand	limonite	MC	9.132	0.000
Titus	EHA031	41RK214	Bl. 1	plain	Clay	sand	-	MC	2.186	0.000
Titus	EHA035	41RK214		Punct-Incised	Clay	sand	-	MC	94.132	0.000
Titus	EHA037	41RK214		plain	Clay	sand	limonite	MC	62.788	0.000
Titus	EHA038	41RK214	Surf.	Punctated	Clay	sand	-	MC	70.460	0.001
Titus	EHA043	41RK214	Mid. A	Caddo pottery	Clay	-	-	MC	72.455	0.001
Titus	EHA044	41RK214	Mid. A	Caddo pottery	Sand	clay?	-	MC	2.564	0.000
Titus	EHA045	41RK214	Mid. A	Caddo pottery	Clay	sand	-	MC	6.812	0.000
Titus	EHA046	41RK214	Mid. A	Caddo pottery	-	-	-	MC	19.958	0.000
Titus	EHA047	41RK214	Mid. A	Caddo pottery	Clay	sand	-	MC	76.582	0.051
Titus	EHA049	41RK214	Tr. 4	Caddo pottery	Clay	-	-	MC	16.264	0.004
Titus	EHA055	41RK214	Str. 5	Caddo pottery	Clay	sand	chert?	MC	77.593	0.000
Titus	EHA056	41RK214	Str. 5	Caddo pottery	-	-	-	MC	43.764	0.003
Titus	EHA058	41RK214	Str. 5	Caddo pottery	Clay	sand	limonite	MC	64.197	0.016
Titus	EHA061	41RK214	Bl. 3	Caddo pottery	Clay	sand	-	MC	86.189	0.001
Titus	EHA062	41RK214	Str. 5	Caddo pottery	Clay	sand	-	MC	77.846	0.001
Titus	EHA064	41RK214	Bl. 4	Caddo pottery	Clay	sand	-	MC	25.272	0.029
Titus	EHA066	41RK214	Bl. 3	Caddo pottery	-	-	-	MC	76.925	0.059
Titus	EHA068	41RK214	Gr. D	Caddo pottery	Clay	sand	-	MC	72.368	0.001
Titus	EHA069	41RK214	Gr. D	Caddo pottery	Clay	sand	-	MC	31.550	0.000
Titus	EHA071	41RK214	Gr. B	Caddo pottery	Clay	sand	-	MC	21.356	0.000
Titus	EHA072	41RK214	Gr. G	Caddo pottery	Clay	sand	-	MC	78.152	0.373
Titus	EHA073	41RK214	Gr. G	Caddo pottery	Clay	-	-	MC	41.142	0.000
Titus	EHA075	41RK214	Gr. G	Caddo pottery	Clay	sand	bone	MC	98.995	0.001
Titus	EHA076	41RK214	Gr. B	Caddo pottery	Clay	-	-	MC	88.848	0.113
Titus	EHA078	41RK214	Str. 10	Caddo pottery	Clay	sand	-	MC	53.927	0.001

Table 23. *(Continued*

Chemical Group	ID	Site	Prov.	Type	P*	Temper S	Temper Tr	Period	Group Membership Probabilities** Titus	Group Membership Probabilities** Red River
Titus	EHA079	41RK214	Plaza	Caddo pottery	Clay	sand	-	MC	32.750	0.002
Ungrouped	EHA004	41RK214		decorated	Sand	clay	-	MC	0.096	0.000
Ungrouped	EHA013	41RK214		plain	Clay	-	sand	MC	0.000	0.000
Ungrouped	EHA032	41RK214	Bl. 5	plain	Clay	sand	limonite	MC	0.047	0.003
Ungrouped	EHA033	41RK214	Bl. 5	plain	Clay	sand	-	MC	0.000	0.000
Ungrouped	EHA042	41RK214	Mid. A	Caddo pottery	ND	-	-	MC	0.582	0.000
Ungrouped	EHA057	41RK214	St. 5	Caddo pottery	Bone	clay	limonite	MC	0.010	0.000
Ungrouped	EHA060	41RK214	Bl. 3	Caddo pottery	Clay	sand	chert	MC	0.599	0.000
Ungrouped	EHA067	41RK214	N615/	Caddo pottery	ND	-	-	MC	0.004	0.000
Ungrouped	EHA070	41RK214	Gr. B	Caddo pottery	Sand	clay	-	MC	0.000	0.000
Ungrouped	EHA074	41RK214	Gr. B	Caddo pottery	Clay	sand	-	MC	0.093	0.000
Ungrouped	EHA077	41RK214	Gr. B	Caddo pottery	Clay	sand	bone	MC	0.057	0.000
Ungrouped	EHA080	41RK214	Mid. A	Caddo pottery	Sand	-	limonite	MC	0.013	0.000
Ungrouped	EHA081	41RK214	Str. 5	Red River pipe	Sand	-	-	MC	0.268	0.000
Ungrouped	EHA082	41RK214	Str. 6	Elbow pipe	Sand	-	-	MC	0.000	0.000
Ungrouped	EHA083	41RK214	Str. 4	Red River pipe	Bone	sand	-	MC	0.026	0.000
Ungrouped	EHA085	41RK214	Mid. A	Caddo pottery	Bone	sand	-	MC	0.008	0.002
Titus	F3, V3	41TT550	Fea. 3	Simms Engraved	Sand	clay	-	LC	42.730	0.017
Titus	F4, V3	41TT550	Fea. 4	Plain bowl	Clay	sand	-	LC	11.313	0.000
Titus	F5, V1	41TT550	Fea. 5	Plain bowl	Clay	bone	sand	LC	8.938	0.000
Titus	F6, V2	41TT550	Fea. 6	Ripley Eng?	Clay	sand	-	LC	6.755	0.000
Titus	F7, V12	41TT550	Fea. 7	Mockingbird P	Clay	sand	-	LC	45.991	0.000
Titus	F9, V1	41TT550	Fea. 9	Ripley E	Clay	sand	bone	LC	12.548	0.000
Titus	F9, V11	41TT550	Fea. 9	Maydelle I	Clay	sand	-	LC	7.312	0.000
Titus	F10, V11	41TT550	Fea. 10	Pease B-I	Sand	clay	bone?	LC	37.692	0.001
Titus	F10, V12	41TT550	Fea. 10	Ripley Engraved	Clay	-	-	LC	43.062	0.000
Ungrouped	F1, V4	41TT550	Fea. 1	Ripley Engraved	Clay	sand	-	LC	0.005	0.000

analysis of ceramics (Steponaitis et al. 1996) also were incorporated when appropriate.

Previous Research

The original INAA report (Neff et al. 1996, 1998a) indicated that pottery from the Late Caddo period Titus phase Mockingbird site formed a single compositional group, named the Titus Group. Hurricane Hill pottery samples (Neff et al. 1999) comprised two compositional groups: Hurricane 1, which had affiliations to the Titus Group, and Hurricane 2, which we suggested had an affiliation to pottery from the Great Bend area of the Red River analyzed by Steponaitis et al. (1996). A preliminary analysis that combined 39 samples from the Oak Hill Village with the original 50 sample data set (Neff 1998) increased the similarity between the Hurricane 1 and Titus groups, and suggested that two additional sub-groups existed in the data set, Rusk 1 and Rusk 2. The latter groups consisted only of samples from the Oak Hill Village. Further, the Titus Group contained specimens from the Oak Hill Village site, indicating that this group is composed of sherd/vessel samples recovered from a wide area, including parts of Rusk and Titus counties in northeastern Texas. In sum, then, previous research suggested that the Hurricane 1, Titus, Rusk 1, and Rusk 2 groups may represent points along a continuum from low rare earth, high alkali paste compositions in the northwestern, upstream clay sources, to higher rare earth, low alkali compositions in southeastern, downstream sources. The addition of 81 samples, including the 36 from four Red River County Caddo sites, to the total data set affords an opportunity to test the various hypotheses that have emerged from these earlier investigations.

Sample Preparation

Sample preparation for the additional 81 sherd samples was identical to that of the previous samples (Neff et al. 1996, 1998a, 1999; see also Glascock 1992), and thus will not be detailed here. Briefly, the samples were burred with a silicon-carbide drill to remove surface contamination, rinsed with deionized water, dried, and then ground to a powder. Activation was accomplished in two irradiations, and analysis was accomplished with three gamma-ray counts, which yielded information on 33 chemical elements.

Data Analysis

As with sample preparation, a discussion of the statistical methods was presented earlier (Neff et al. 1996, 1998a). Nickel and zirconium were eliminated from the analysis because too many values were below detection limits. Calcium and strontium were also eliminated because of their presence in shell temper (see below), thus leaving data from 29 elements available for analysis (see Appendix I, this article). Raw data were transformed to $\log_{10}$ values for subsequent statistical analysis. Principal components analysis (PCA) calculated from the variance-covariance matrix was employed to look for structure in the overall data set by using RQ-mode biplots. Principal components also were used to determine Mahalanobis-distance based membership probabilities when group sizes were relatively small. The additional 81 samples permitted calculation of membership probabilities using all 29 elements for the major compositional groups, which is generally the preferred method for such calculations. Inspection of bivariate plots of elemental concentrations also was also used to assess compositional trends found by PCA.

Many samples from the Red River area were tempered with varying amounts of shell (see Table 22). Addition of this calcium-rich material to a vessel's paste has the effect of inflating calcium values and correspondingly decreasing values for other elements compared to non-shell-tempered samples. Steponaitis et al. (1996; see also Steponaitis and Blackman 1981) developed a mathematical correction for shell-tempered pottery:

$$e' = \frac{10^6 e}{10^6 - 2.5c}$$

Where *e'* is the corrected concentration of a given element in parts per million (ppm), *e* is the measured concentration of that element in ppm, and *c* is the calcium concentration in the sample in ppm. The gravimetric factor 2.5 compensates for the amount of calcium in calcite ($CaCO_3$). Based on research conducted at MURR, Neff developed correction factors for barium, manganese, sodium, and strontium, additional elements in shell that may exceed values present in clays. Subsequent investigations (Cogswell et al. 1998a) confirmed the usefulness of this mathematical correction. Fortunately, this project provides empirical support for the mathematical correction: when employed on the shell-tempered sherds from the Red River area, the corrected values for other elements closely match those for non-shell-tempered samples from the Red River analyzed previously by Steponaitis et al. (1996) (Figure 68). Accordingly, calcium and strontium were deleted from the suite of elements employed in this analysis, and the corrected values of the other elements were used in pattern-recognition and statistical analysis.

Preliminary inspection of paste mineralogy by binocular microscope revealed that clay (grog), sand, bone, and iron-rich inclusions were also paste constituents (see Tables 22 and 23). Clay tempering may cause the most obfuscation of clay-source determinations because of its overall compositional similarity to the raw clays used to create a vessel (Neff et al. 1988, 1989). Without analyzing the composition of clay temper separated by techniques such as electron microprobe (Cogswell et al. 1998b; Neff et al. 1998b), bulk compositional data should be accepted with caution. However, the results obtained so far have considerable ground truth when compared to geographic and archeological data. This suggests that further corrections for temper may not be necessary.

Results of the Analyses

Principal components analysis of the data set (Figure 69) supports the original observation that the

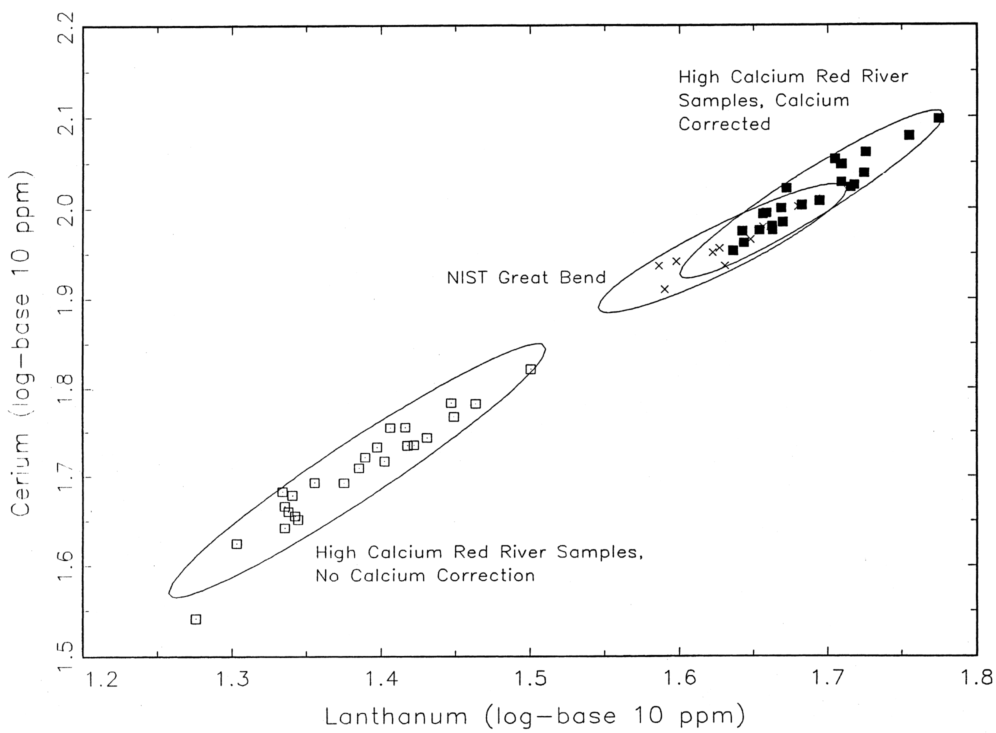


Figure 68. Bivariate plot of lanthanum vs. cerium $\log_{10}$ concentrations of Great Bend samples analyzed at NIST and high calcium Red River samples, before and after applying a mathematical correction for shell temper effects. Ellipses represent 90 percent confidence levels for group membership. Note that the correction causes the elemental values in the Red River samples to approach the Great Bend samples.

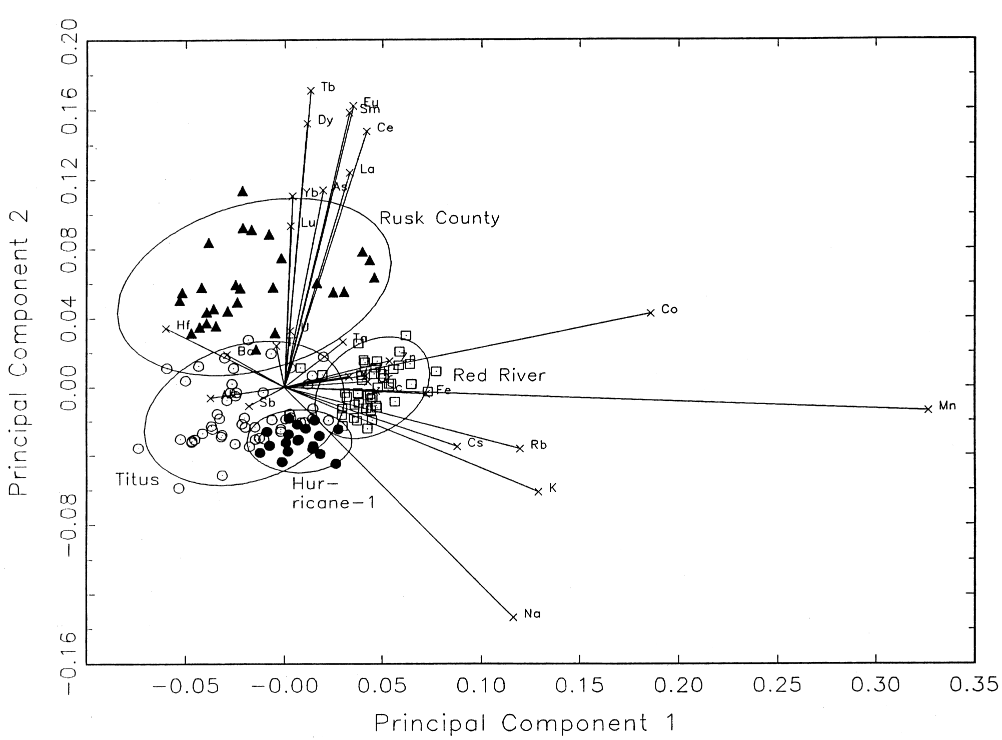


Figure 69. RQ-mode biplot of principal components 1 and 2 based on the variance-covariance matrix. Ellipses represent 90 percent confidence levels for group membership. Note the partitioning of the Hurricane 1, Titus, and Rusk County groups along the axis of rare earths.

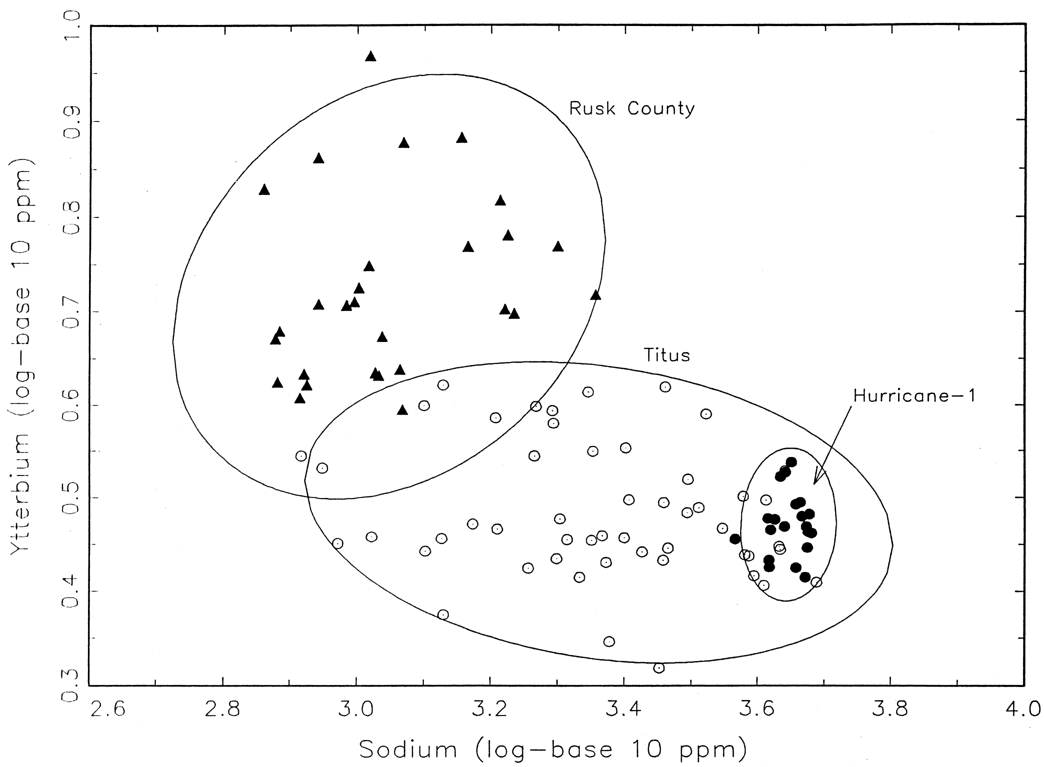


Figure 70. Bivariate plot of sodium vs. ytterbium $\log_{10}$ concentrations for the Hurricane 1, Titus, and Rusk County compositional groups. Ellipses represent 90 percent confidence levels for group membership. Note that the Hurricane 1 samples fall entirely within the Titus group ellipse.

Hurricane 1 group is closely affiliated with the Titus group and may be considered to be a sub-group that is identified on geographic grounds. For example, a bivariate plot of sodium vs. ytterbium (Figure 70) shows that, while Hurricane 1 samples are at the extreme of the Titus group compositional range, they are nevertheless contained within it. The addition of sherd samples from Red River County has considerably strengthened the argument that Hurricane 2 pottery comes from the Red River (Neff et al. 1996, 1999; Neff 1998), an inference previously based only on apparent similarities between the Hurricane 2 and Great Bend-area samples (Steponaitis et al. 1996). Hurricane 2 samples are subsumed within the newly defined Red River compositional group (see Tables 22 and 23), and the MURR Red River Group—defined from the sherds from the TAS investigations—overlaps the NIST Great Bend Group on most projections of the data.

The separation of Rusk County samples into two groups, Rusk 1 and Rusk 2 (Neff 1998), is not supported by analysis of the entire data set. Instead, a single Rusk County group is currently the most defensible interpretation of the data.

As suggested in a previous report (Neff 1998), the Titus, Hurricane 1, and Rusk groups may be discernible subsets in a compositional continuum of pottery found between the Sulphur and Sabine river drainages; the Red River group is compositionally distinct. A plot of $\log_{10}$ concentrations of the rare earths europium and samarium (Figure 71) clearly shows that there is an extremely high correlation of these elements across the three groups, and that the groups themselves overlap considerably. These sub-groups may be apparent because of sampling strategies. Only sherds from one site each from Hopkins, Rusk, and Titus counties currently have been sampled, and no sites from intervening areas have been sampled. Samples from additional sites would contribute to resolving the question of compositional continuity.

Two factors in the northeastern Texas environment may explain the overall similarity of pottery compositions and the broad trend of rare earth enrichment (see Figure 71) and alkali dilution (see Figure 70) along a roughly northwestern-to-southeastern axis. First, average rainfall increases slightly from north to south in the project area, and from west to east (Ar-

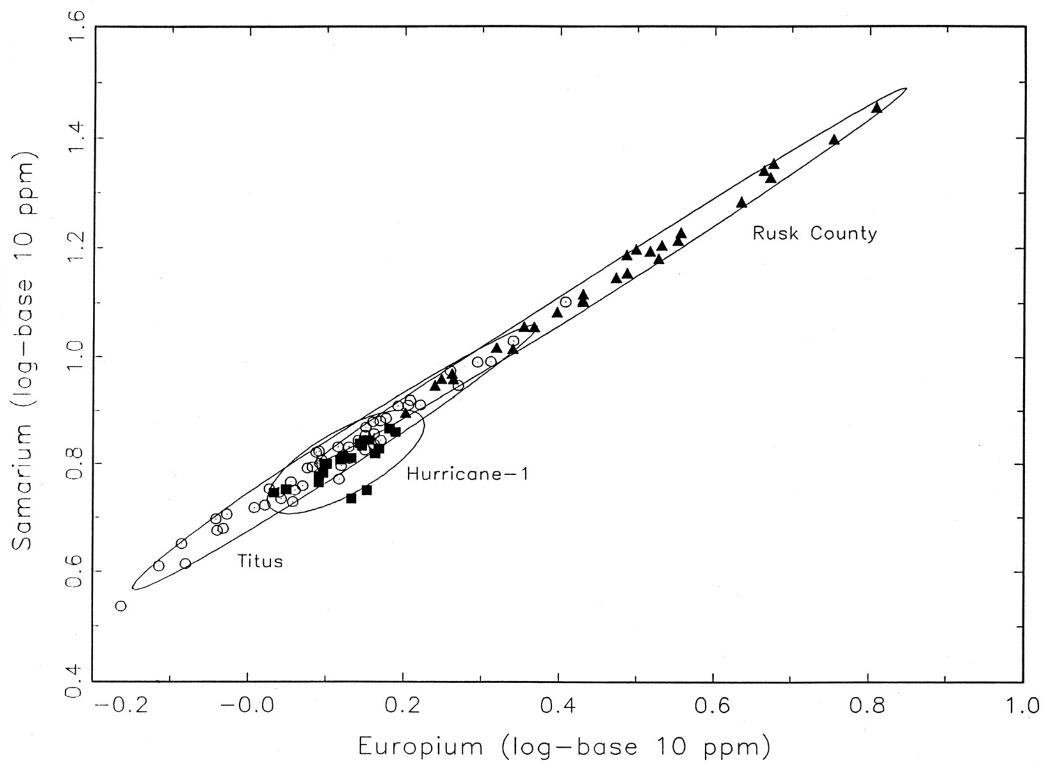


Figure 71. Bivariate plot of europium vs. samarium $\log_{10}$ concentrations for the Hurricane 1, Titus, and Rusk County compositional groups. Ellipses represent 90 percent confidence levels for group membership. Note the high correlation of these elements and the overlap of all three compositional groups.

bingast et al. 1973). Increased precipitation may cause alkali elements such as sodium to be preferentially leached from raw clays or from pottery deposited in the ground, thus causing the observed trend of dilution of alkali elements in pottery from north to south and from west to east. Second, while the Sulphur and Sabine rivers, which flow through Hopkins, Titus, and Rusk counties, start in the predominantly marly deposits of the Taylor formation and work through predominantly limestones and sandstones in the area (Stone 1937), the clay deposits in the more northerly Hopkins and Titus counties (Macon 1979) are characterized by kaolin, a mineral that is generally depleted in rare earths, while the clays in Rusk County to the south are characterized by montmorillonite, a mixed-layer clay that generally contains higher amounts of rare earths. Pottery made from kaolins from Hopkins and Titus counties would presumably be depleted in rare earth elements compared to montmorillonite-rich pottery produced in Rusk County. However, montmorillonite often contains considerable amounts of alkali elements, including sodium, which conflicts with the generally lower sodium content of the Rusk group. Clay samples from northeastern Texas would help to reconcile these potential explanations for the observed trends in element concentrations among the ceramic groups.

The expanded data set has enabled us to refine further our previous hypotheses concerning the compositional diversity of ceramics recovered from northeastern Texas Caddo sites. The compositional diversity of the pottery recovered from the Oak Hill Village site is not as great as reported earlier (Neff 1998). Samples from this site are included in the Titus and Rusk County groups, but there are no longer any Hurricane 1 specimens from the site. The Titus group is currently somewhat of a misnomer, because there are now more samples in it from Rusk County than from Titus County. The name "Titus" for this group is preserved because all of the assignable Titus County samples from the Mockingbird site are in the Titus group while there are Rusk County samples in both the Titus and Rusk compositional groups. There are two possible explanations for the fact that there are two compositional groups at the Oak Hill Village site. First, it is possible that there was significant movement of ceramics from Titus County to the Oak Hill Village site in Middle Caddo period times.

Reciprocal movement of ceramics in the opposite direction has not yet been found (i.e., there are no Titus County specimens from the Mockingbird site in the Rusk County group, but this should not be surprising in the small INAA sample given that the Mockingbird site dates 100-150 years later in time than the Oak Hill Village). Alternatively, the Titus group could be a generalized compositional profile from an area encompassing part of the river catchments for all of the sites (namely the Sulphur River, Big Cypress Creek, and the Sabine River), except for those sites along the Red River, which are a chemically distinct group. This profile for the Titus group would tend to negate the above inferences of vessel movement.

Compositional diversity is more clearly a result of movement of ceramics at the Hurricane Hill site (Neff et al. 1999). There, the assemblage includes presumed local products belonging to the Hurricane 1 group, imports from the Red River belonging to the Red River group, and possibly one import (TKP009 on Table 23) from points south and east in the Titus group. There is also evidence that some ceramics moved from the Titus County to Rusk County area north to the Red River valley in Middle Caddo times. Sherd sample TKP052, a grog-tempered red-slipped bowl sherd from the Dan Holdeman site (41RR11) in the Red River valley, is a member of the Rusk County group (see Table 22).

A plot of the unassigned samples against the 90 percent membership ellipses for the identified groups (Figure 72) suggests that most of these samples are probably most similar to the Titus group, or at least to an as yet undetermined resource zone in the northern part of the study area. Exceptions are samples EHA070 and EHA082 from the Oak Hill Village site (see Table 23), which plot in or near the Rusk County group, and TKP008, an Early Caddo period curvilinear engraved sherd from the Hurricane Hill site (see Table 23), which plots in the Red River ellipse. Note that these appraisals are based on the first two principal components, which subsume 60 percent of the total variance. Membership probabilities based on all 29 elements are <1 percent for any of the unassigned samples to belong to either the Titus or Red River groups (see Table 23).

One of the major research questions for this project is whether associations exist between vessel

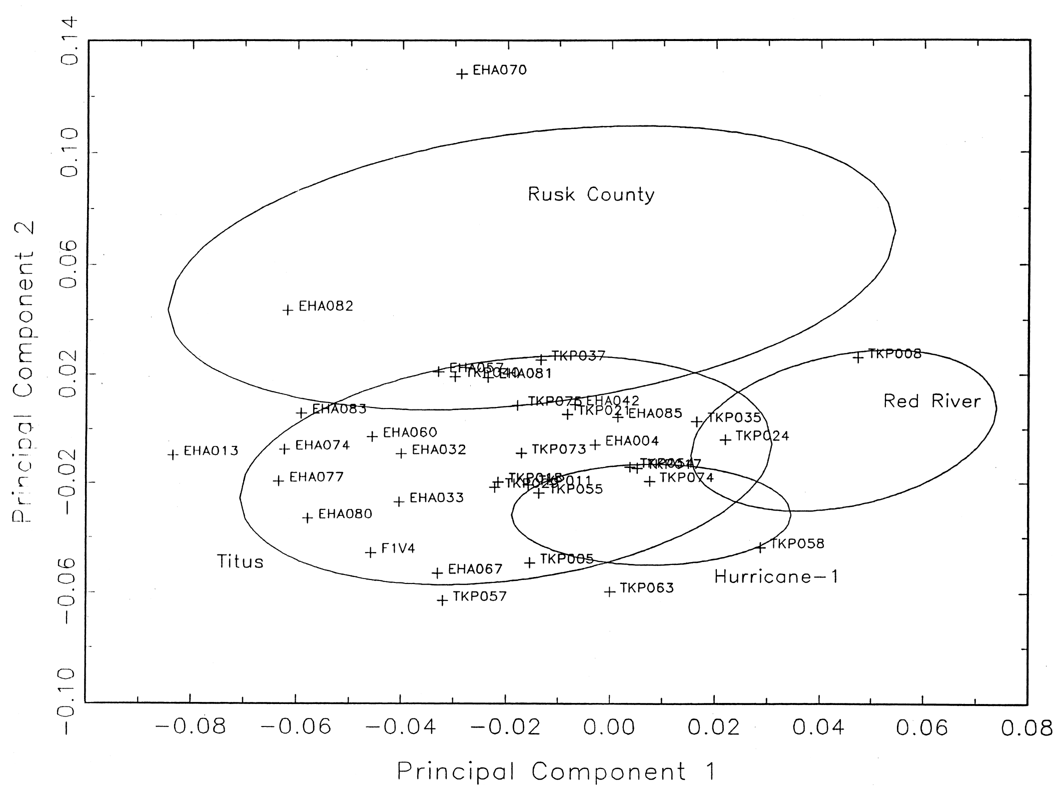


Figure 72. Bivariate plot of unassigned northeastern Texas samples against compositional groups using principal components 1 and 2 from the variance/covariance matrix. Ellipses represent 90 percent confidence levels for group membership. Note that most of the unassigned samples cluster near the Titus group.

types, forms, or decorative motifs and compositional groups. While recognizing that such associations are best made by someone more familiar with the pottery in the data set (see Perttula 1999, 2002), at present we have insufficient information to address this question adequately. The general decorative motifs of engraving, incising, and punctation are present in all compositional groups. Of the unassigned pottery samples, three have type designations that are not shared with other grouped samples. One of these samples, TKP054 (Pennington Punctated-Incised) is from Middle Caddo period contexts in Block VI in the village area at the Roitsch site. The other two, TKP024 (Maxey Noded Redware) and TKP075 (Holly/Hickory Engraved) are from Middle Caddo contexts at the Hurricane Hill and Fasken sites, respectively (see Perttula 1999; Prikryl, this volume).

Another of the interesting findings from this analysis concerns the five ceramic pipe fragments from the Oak Hill Village site. Only one (EHA084) can be assigned to a compositional group, in this case to the Titus/Rusk County sub-group. The four unassigned samples suggest that these pipes were brought to the Oak Hill Village from regions currently unknown, and further suggests that ceramic pipes may have been a highly mobile commodity. These pipe samples have no unusual temper characteristics (see Table 23) that would tend to separate them from the analyzed pottery.

Concerning the third research question, currently there is no indication that pottery production or raw material exploitation varied between the Early and Late Caddo periods. Instead, evidence suggests that site occupants exploited locally available clays regardless of the age of the respective occupations by Caddo peoples. We must point out, however, that specific time placement is lacking for the submitted ceramic samples from the Oak Hill Village site (see Table 23), although it is known that the site was occupied from ca. A.D. 1150-1400 (Rogers and Perttula 2004). Furthermore, no clay source samples have been analyzed that could identify production areas.

Suggestions for Further Research

All of the results achieved to date are based exclusively on archeological samples. A raw materials survey focusing on available clay sources in the research area could provide important information on a variety of questions, such as whether there is a climatological or geological explanation for the chemical variability observed in the Titus Group pottery. This survey also would more effectively pinpoint likely clay resource areas for northeastern Texas pottery, and address whether there is a compositional continuum in the northeastern Texas clays, as suggested by this analysis.

We should make clear that while additional samples have allowed us to refine our interpretations, we are not at the point of sampling to redundancy needed to address the research goals proposed for this project. Therefore, additional Caddo ceramic samples from dated contexts at additional sites in Hopkins, Rusk, Titus, and neighboring counties clearly would help to address these goals.

Acknowledgments

We thank Kari Kipper and R. Sergio Herrera for their assistance in this project. Operating support for the Archaeometry Laboratory is provided by the University of Missouri and the National Science Foundation (grant #SBR 95-03035).

ANALYSIS OF HUMAN REMAINS FROM THE ARNOLD ROITSCH SITE (41RR16)

Sharon McCormick Derrick, Gail R. Colby, and D. Gentry Steele

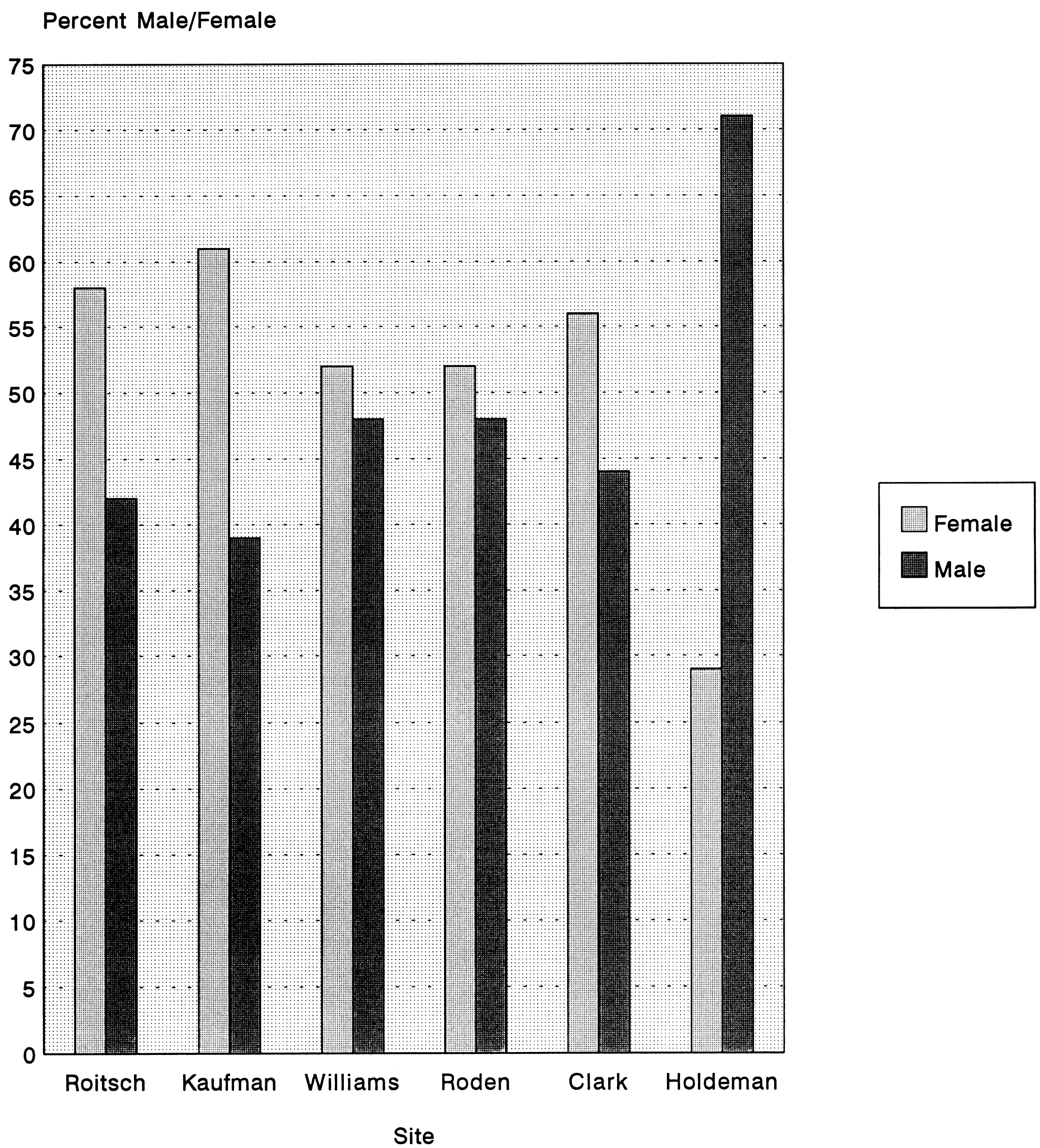
INTRODUCTION

This study is based on the analysis of human remains recovered from the Arnold Roitsch site (41RR16, also known previously as the Sam Kaufman site) by participants in the 1991 and 1992 Texas Archeological Society (TAS) Summer Field Schools. The Roitsch site, located in northern Red River County near Manchester, Texas, is the remains of a Caddo ceremonial center and several dispersed villages that were occupied from approximately A.D. 1050-1730 (Skinner et al. 1969; Bruseth 1998; see also radiocarbon analyses performed by the University of Texas Radiocarbon Laboratory, Appendix X, this article). Thirteen burials containing 20 individuals (five adult males, seven adult females, two adults of indeterminate sex, and six subadults) were recovered through excavation; additional human bone from the surface was also collected (Table 24 and Figures 73 and 74; see also Appendix II, this article). Since the

Table 24. Burial Descriptions.

Burial Number	Sex	Age	Stature	Medical Disorders	Cranial Modeling
24	Male	30-35 Years	NOT/EST*	Supra-Inion Depression, Caries, Abscesses	P
25	IND**	40-55 Years	160.92 cm	DJD, Osteophytosis, Trauma, Caries	IND
26a	Subadult	18 ± 6 Months	NOT/EST	None	IND
26b	Female	Adult	159.82 cm	Caries, Frontal Bone Pitting	IND
27a	Subadult	12 ± 2.5 Years	NOT/EST	Caries, Dead Tooth (Trauma?)	IND
27b	Female	Young Adult	153.22 cm	Trauma, Caries, Abscesses, Roughened Palate	IND
28	Commingled (4)	Commingled	NOT/EST	Periodontal Disease, Roughened Palate, Caries	P
29	Subadult	Birth ± 2 Months	NOT/EST	None	IND
30	Male	17-23 Years	165.71 cm	Osteochondritis, S-I Depression, Caries	IND
31	Female	Early To Late 30s	159.30cm	Osteoarthritis, DJD, S-I Depression, Caries, Abscesses	P
32	Female	45-49 Years	156.71 cm	DJD, Trauma, Caries	IND
33	Male	30-40 Years	159.94 cm	Nutritional Stress, Trauma, Caries, Abscesses	A
34a	Male	Late 40s To Mid-50s	165.82cm	DJD, S. Nodes, Periostitis, Periodontal Disease, Caries	A
34b	Subadult	6 ± 3 Months	NOT/EST	Otitis Media, Infection of Occipital	IND
34c	Ind	IND	NOT/EST	None	IND
35	Female	30-35 Years	160.85 cm	DJD, S-I Depression, Periodontal Disease, Caries	P
36	Subadult	9 ± 3 Months	NOT/EST	Supra-Inion Depression	P

*NOT/E = Not Estimated, P = Present, A = Absent, **IND = Indeterminate; DJD = degenerative joint disease; S-I = Supra-Inion



***All percentages represent the total number of individuals for whom sex could be determined.**

Figure 73. Sex Distribution.

surface material may actually represent elements scattered when the burials were disturbed, this material is described separately from the burials and is not included in the minimum number of individuals (MNI) calculation.

Excavation of the Red River drainage system has produced a large number of Caddo mortuary components and individual sets of human remains (Rose and Burnett 1990). The Bob Williams site (one part of the 41RR16 site complex), the Roden site (34Mc-215), and the Sam Kaufman site (41RR16, renamed the Roitsch site) form a related archeological complex in the Red River drainage area on the border of Texas and Oklahoma. Previously recovered skeletal samples from this complex, dating broadly to ca. A.D. 1300-1700, were described by Butler (1969), Loveland (1980, 1994a), Loveland and Bass (1983), and Rose et al.

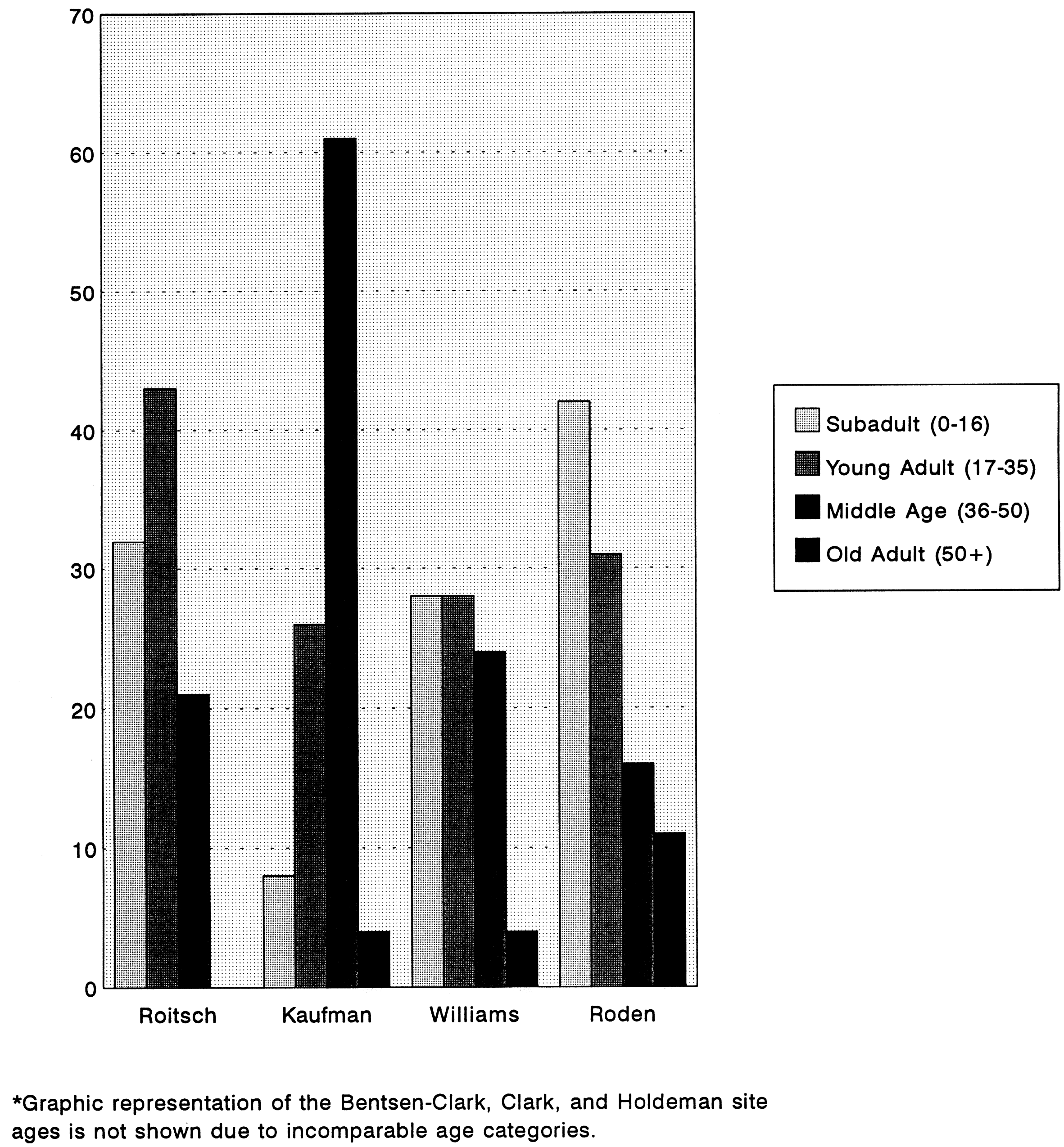


Figure 74. Age Distribution.

(1981). Human remains recovered from two other nearby sites that are also closely related in time, the Rowland Clark (41RR77) and Dan Holdeman (41RR11) sites, were described by Loveland (1986, 1994b). Additionally, Buikstra and Fowler (1975) compared the human remains and burial program from another roughly contemporaneous (A.D. 1300) Red River drainage site, Bentsen-Clark (41RR41), with that of the Sam Kaufman site.

This study provides detailed descriptions of the 20 individuals recovered from the Caddo burials at the Roitsch site in 1991 and 1992 (see Appendix II, this article), and synthesizes the data retrieved from this sample with the demographic, pathologic, metric, and non-metric data reported for the previously recovered samples from the Roitsch-Williams-Roden complex, the Clark and Holdeman sites, and the Bentsen-Clark site. Although much of the comparative data are from published reports (Buikstra and Fowler 1975;

Butler 1969; Loveland 1980, 1986; Loveland and Bass 1983; Rose et al. 1981), the human remains recovered in the 1968 excavation of the Roitsch site (see Skinner et al. 1969; referred to in this study under the original name of the site, Sam Kaufman, in order to differentiate between it and the subsequently excavated material) were also examined by the authors.

Previous bioarcheological studies of Caddo peoples were often impeded by a lack of informational synthesis, and for many years few long-term, problem-oriented studies were produced (Loveland and Bass 1983; Rose 1984; see also Powell 1997). Currently, several synthetic works are available that draw information together from various sites, such as those by Burnett (1988, 1989, 1993), Harmon and Rose (1989), Loveland (1980, 1986, 1994a), Perttula (1992), Rose and Burnett (1990), Rose et al. (1998), Story (1990a), Thurmond (1985), and Tine and Tieszen (1994). Consequently, a clearer picture of prehistoric Caddo peoples has emerged in terms of their settlement and mortuary patterns, demography, genetic affinity, nutrition, and morbidity and mortality rates. With the addition of the 1991 and 1992 Roitsch samples, the number of described individuals from the Roitsch-Williams-Roden complex is now close to 300. This is a significant pool of data concerning the Caddo peoples that lived in the Red River drainage area.

METHODOLOGY

The skeletal materials from the Roitsch site were still encased in protective soil when received in the Physical Anthropology Laboratory of Texas A&M University. All elements were cleaned and each individual was arranged in anatomical position for inventory and analysis (see Appendix III, this article). The crania and long bones were partially reconstructed with polyvinyl acetate (PVA) glue and standard measurements of the bones were taken as defined by Steele and Bramblett (1988) (see Appendix IV, this article). When possible, sex was determined for adults and older adolescents using metric and visual analysis of the pelvic bones and cranium. Femoral head diameter and regression formulae specific to calcaneus and talus measurements were also used as supporting evidence (Steele and Bramblett 1988) (Table 25). Sex determination for young subadults was not attempted.

The age of the adults was estimated from evaluation of auricular surface morphology (Lovejoy et al. 1985), pubic symphysis morphology (Suchey et al. 1988a, 1988b), tooth eruption and wear, and arthritic changes. Estimation of subadult age was performed using tooth eruption and wear (Steele and Bramblett 1988; Ubelaker 1978), and the stage of epiphyseal fusion (Steele and Bramblett 1988). Adult stature estimation was calculated using regression formulae specific to femoral

Table 25. Talus and Calcaneous Discriminant Functions.

Burial Number	Function One	Function Two	Function Three	Function Four	Function Five
24 (Male)	35.20	N/A	N/A	N/A	N/A
30 (Inconclusive)	33.15	37.80	87.41	48.15	47.46
31 (Female)	30.94	37.66	74.73	49.46	45.57
33 (Male)	32.21	42.25	79.88	53.80	50.58
35 (Female)	33.38	37.42	75.27	50.71	47.25
Section Point	32.00	38.75	75.44	50.05	47.30
Female Mean	30.42	36.62	73.84	47.68	44.72
Male Mean	33.57	40.87	79.09	52.41	49.88
Percent Accuracy	79	83	86	88	89

Formulae taken from Steele and Bramblett (1988:261)

Table 26. Stature Estimations (in cm).*

Burial Number (Sex)	Genoves (Femoral)	Trotter and Gleser (Femoral)	Steele (Humeral)	Trotter and Gleser (Humeral)
25 (F)	**	**	160.92 (segment)	**
26b (F)	**	**	159.82	159.25
27b (F)	**	**	153.22 (segment)	**
30 (M)	165.71	167.79	**	**
31 (F)	159.30	161.08	**	**
32 (F)	156.71	158.61	**	**
33 (M)	159.94	161.86	**	**
34a (M)	165.82	168.31	**	**
35 (F)	160.85	162.56	**	**
Roitsch Mean for Males:	**163.82**			
Roitsch Mean for Females:	**158.47**			

* Formulae after Steele (1970, in Steele and Bramblett 1988); Trotter and Gleser (1952); and Genoves (1967). Genoves advocates subtraction of 2.5 cm from the calculated stature to obtain living stature.
** Not Estimated

measurements (Genoves 1967; Trotter and Gleser 1952) when possible (see Tables 24 and 26). Some stature estimates were calculated from humeral measurements [Steele and Bramblett 1988; Trotter and Gleser 1952).

The skeletal elements were examined in order to describe the general morphology of the bone and to determine the presence of pathological lesions. Crania were visually evaluated for modeling (artificial cranial deformation) (see Table 24). The presence/absence of non-metric traits was scored using the Physical Anthropology Laboratory Data Form, a coding form produced in the Physical Anthropology Laboratory at Texas A&M University (Colby et al. n.d.) (Tables 27-30).

Table 27. Distribution of Temporomandibular Degenerative Joint Disease, and Number of Individuals Affected.

	Blue Bayou (41VT94)	Roitsch (41RR16)*
Males	2	9
Females	2	2
Percent of adults	10.1	32.4
Percent of population	8.2	22.0

* The combined Roitsch and Sam Kaufman sample

After the remains were examined, radiocarbon and nutritional isotope analyses were performed by the University of Texas Radiocarbon Laboratory on two individuals recovered from the Roitsch excavation (Burials 24 and 35) and two individuals recovered from the Sam Kaufman excavations (see below). A sample of 200 g of rib and vertebral material was submitted to the laboratory for each individual. These remains were found to be deficient in preserved collagen.

Living bone is composed of about 20 percent bone cells ensconced in a matrix of bioapatite and collagen (protein) fibers. The bioapatite crystals, held together by ions of citrate and carbonate (synthesized from blood bicarbonate that is produced by cellular respiration), attach to raised bands on the collagen fibers (Berger et al. 1964;

Table 28. Caries comparison.

Site	per tooth*	per individual**	per scoreable individual+	number of caries
Roitsch	0.64 (184)	5.9 (20)	7.38	(16) 118
Kaufman	0.56 (268)	5.0 (30)	6.52	(23) 150
41RR16#	0.59 (452)	5.36 (50)	6.87	(39) 268

*Includes all teeth in the sample
**All individuals included
+Includes individuals with at least one scoreable tooth present
#The combined Caddo sample of Roitsch and Sam Kaufman.

Table 29. Caries per tooth class and arcade, combined Roitsch and Sam Kaufman sample (41RR16).

	UI	UC	UP	UM	Totals
Teeth	18	12	23	40	93
Caries	21	13	26	63	123
	LI	LC	LP	LM	Totals
Teeth	6	8	29	58	101
Caries	6	10	34	95	145
	I	C	P	M	Totals
Teeth	24	20	52	98	194
Caries	27 (10%)	23 (9%)	60 (22%)	158 (59%)	268

Note: Teeth equal the number of affected teeth and caries equal the total number of caries.

Steele and Bramblett 1988; Tieszen 1994). After death, the collagen content begins to decrease. The amount of collagen that is left in an archeological skeletal sample varies with time and environmental conditions. Taphonomic processes such as moisture, heat, and faunal and floral activity can all destroy collagen (Berger et al. 1964). When collagen is poorly preserved, the small amounts retrieved during analysis may be contaminated (Ambrose and Norr 1992). Therefore, the University of Texas Radiocarbon Laboratory opted to use bioapatite (bone apatite) for the isotope.

The use of bioapatite causes some difficulties in data interpretation. One problem with using bioapatite data is the lack of comparative value with collagen isotope data from other site samples. The comparison is not strictly accurate because of the inherent differences between bioapatite carbon values and collagen carbon values (Ericson et al. 1989). However, a more serious drawback to using bioapatite lies in the possible exchange of carbonate with the environment. When carbonate from bioapatite comes into contact with soil and groundwater it can readily be exchanged with

Table 30. Wear scores and ratios for first incisors and molars, 41RR16.

	Wear	Ratio
UI1	4.43	0 55
LI1	4.32	0.54
I1	4.38	0.55
UM1	19.57	0.49
LM1	20.64	0.52
M1	20.12	0.50
UIl/UM1		1.12
LIl/LM1		1.04
I1/M1		1.10

Note: Ratios were obtained by dividing the mean wear score of the tooth by the maximum possible wear score. Incisor to molar ratios were calculated by dividing the incisor ratio by the molar ratio, and these are an indication of where in the arcade dental abrasion is concentrated: score of 1.00 indicates even wear across the arcade, <1.00 wear is concentrated on the molars, and >1.00 wear is greater in the anterior dentition. Scores are for the combined Caddo sample of Roitsch and Sam Kaufman.

radioactively dead carbonate (limestone). If this exchange has occurred, spurious isotope readings can result (Berger et al. 1964; Boutton et al. 1984; Schoeninger and De Niro 1982). Fortunately, this does not appear to be the case with the Roitsch results as the radiocarbon dates and nutritional isotope readings are congruent with the cultural evidence.

POSTMORTEM CONDITIONS

Taphonomic processes had an obvious effect on the preservation of much of the bone from the Roitsch skeletal sample. Many of the elements were fragmented or missing, due at least in part to erosion, weathering and sun exposure, adverse (wet) excavation conditions, and disturbance of the burials by pothunting activity, rodent activity, and encroachment of plant roots. As mentioned above, the bone collagen was not well preserved, probably due to heat and water exposure. Pothunter destruction was evident in the presence of several "pokey rod holes" in crania and vertebrae and the displacement or removal of skeletal elements before excavation. Several teeth were damaged by an unidentified erosional process. Black, spidery lines were etched into some of the bones. This etching phenomenon, also observed in skeletal samples from Cooper Lake Reservoir, Texas, and Galveston County, Texas, may have been caused by plant residues (Colby et al. 1992; Derrick and Steele 1993).

RADIOCARBON DATING RESULTS

All of the Roitsch sample remains (Burials 24-36, and surface collection), with the exception of Burial 35, were recovered from Block VII of the site (the Terrace area). These Block VII burials (with the exception of Burials 24 and 31) have been dated to approximately A.D. 1500-1700 in the late McCurtain phase, based on the presence of Hudson Engraved, Simms Engraved, and Keno Trailed ceramic vessel grave goods (see Perttula, this article). Burial 24 lacked diagnostic grave goods other than shell-tempered ceramics and was thus radiocarbon dated (see results below). Burial 31 was assigned an early historic date of ca. A.D. 1650-1700/1730 from cultural evidence, namely the presence of a European glass trade bead (Timothy K. Perttula, 1996 personal communication) in the burial fill. Burial 35, intrusive into the East mound, was dated to the early McCurtain phase on the basis of grave goods and an uncalibrated radiocarbon date of A.D. 1245 $\pm$ 45 (the calibrated 1-sigma age range is AD 1275-1383) obtained from a level below the burial (William A. Martin, 1996 personal communication). In a continuing effort to securely date both the Block VII cemetery and the construction of the East mound, four individuals (two recovered in the 1968 excavation and two, Burials 24 and 35, recovered in 1991) were selected for additional radiocarbon analysis.

According to the Sam Kaufman site report from the 1968 excavation (Skinner et al. 1969), two individual burials were removed from the river bank west of the West mound, and one individual burial was exposed in a backhoe trench bisecting the West mound. Five individual burials were recovered in the area of the East mound, as well as remains from a multiple burial containing four individuals, and a shaft burial containing 11 individuals. This skeletal sample, analyzed by Butler (1969), was loaned to the Physical Anthropology Laboratory at Texas A&M University for study and two individuals, Burials 15 and 17 were selected for isotope analysis based on their location in the shaft burial. After the isotope analysis had been performed, an ongoing study of the Sam Kaufman human remains revealed that due to mixing of unmarked skeletal elements at some point since their excavation, some of the remains assigned to those burial numbers probably belonged to other individuals. Therefore, it is impossible to say with conviction that the isotope results for Burials 15 and 17 represent discrete individuals from the shaft burial. In all likelihood, however, based on an assessment of the mixed elements, the results do represent individuals from the shaft burial in the East mound.

The results of the radiocarbon dating analysis placed the age of Burial 24 (from the 1991 excavation in the Block VII or Terrace area cemetery) at cal AD 1280-1396. The presence of shell-tempered ceramics in the burial fill suggests that this burial dates early in the McCurtain phase. The East mound individuals from the 1968 excavation and Burial 35 from the 1991 excavation date to approximately A.D. 1450-1500, as was expected from recovered cultural evidence and the uncorrected radiocarbon date of A.D. 1245 obtained from below Burial 35 (James E. Bruseth, 1996 personal communication; University of Texas Radiocarbon Laboratory).

NUTRITIONAL AND ISOTOPE ANALYSIS

Dietary and nutritional information provided by nondestructive examination of the human bone and teeth (Figure 75) in this study has been supplemented by nutritional isotope analysis. The same four individuals that were radiocarbon-dated (the two Sam Kaufman individuals and Burials 24 and 35 from the 1991 Roitsch excavation) were also analyzed for delta 13C values using bone apatite.

Plants utilizing the C3 photosynthetic pathway, such as grasses, have δ 13C values that average between -26.0 ‰ and -28 ‰, while plants utilizing the C4 photosynthetic pathway, such as corn, have average δ 13C values ranging between -12.5 ‰ and -14.0 ‰ (Boutton et al. 1984; Tieszen 1994). It is possible that the relative importance of corn in the diet of individuals living in an environment otherwise dominated by C3 plants, as was the Red River drainage area, can be estimated by analysis of δ 13C values. However, as a cautionary note, the range of δ 13C values can be affected by many factors, such as recycling respired CO_2, increased water stress, increased osmotic stress, and the addition of marine foods in the diet (Chisholm 1989; Tieszen 1994). Even considering these factors, humans consuming a significant amount of both corn and/or the flesh of animals eating C4 plants would be expected to have richer δ 13C values than those consuming less of these dietary components.

Chisholm (1989) states that a consumer eating both C3 and C4 species should produce a bone collagen δ 13C value between -21.5 ‰ and -7.5 ‰. However, bioapatite values on the whole for δ 13C tend to be larger than collagen values. Ericson et al. (1989) describe bioapatite δ 13C values from -8.5 ‰ to -3.7 ‰ as representative of a 40-60 percent proportion of C4 plants in the diet of prehistoric peoples in the Viru Valley, Peru.

The four bone apatite δ 13C values obtained for the Sam Kaufman and Roitsch individuals were quite uniform, ranging from -8.2 ‰ to -8.0 ‰ (Sam Kaufman individuals = -8.2 and -8.0, Roitsch Burial 24 = -8.2, Burial 35 = - 8.0). These results indicate that a large proportion of the diet of these individuals came from C4 plants, herbivores consuming C4 plants, a combination of these elements, or a marine diet. A likely conclusion, considering the high caries rate in this skeletal sample (described below), the inland location of the Roitsch site, and past archeological subsistence evidence from Caddo sites (Story 1990a; Perttula 1996) is that the inhabitants of the Roitsch site were eating corn as a staple of their diet.

Stable isotope values may also be used to distinguish variability in diet among members of a single population, such as those generated by differential access to food (Schurr 1992). The two Sam Kaufman individuals may have been associated with high status grave goods as well as an elaborate burial treatment (Skinner et al. 1969). Unfortunately, due to the mixing of skeletal elements described above, these isotope readings cannot be firmly associated with the high status burials. The Roitsch Burials 24 and 35 are male and female respectively, both in their 30s at the time of death. The lack of significant differences in the δ 13C values for all four individuals is interesting, especially in light of the fact that Burial 24 dated 200 years earlier and was excavated from a separate cemetery than the East Mound graves.

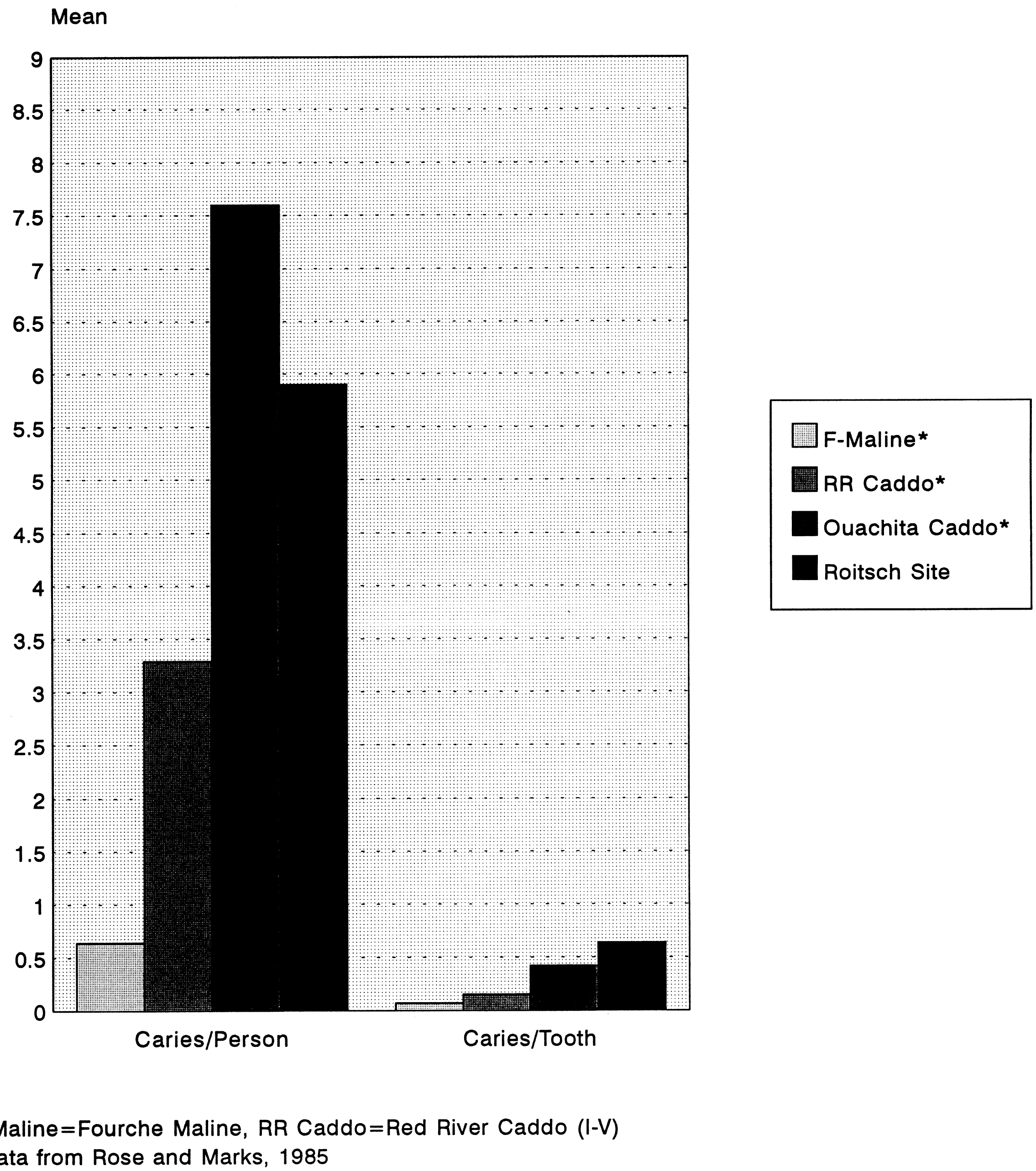


Figure 75. Proportion of Dental Caries per Person and Tooth in the Caddo Region.

Further testing of other individuals and analysis of additional isotopes would be necessary in order to produce more definitive answers to the question of status differences in diet at this site.

DEMOGRAPHY AND STATURE

The majority of individuals in the Roitsch sample are female, comprising 58 percent (n=12) of the adults for whom sex was assessed (see Figures 73 and 74). A review of the female to male ratios from the Bob Williams, Roden, Sam Kaufman, Rowland Clark, and Holdeman excavations reveals the presence of a higher proportion of females at all but the Holdeman site (see Figure 73). Females comprise 29-61 percent of these skeletal samples (Butler 1969; Loveland 1986; Buikstra and Fowler 1975; Loveland and Bass 1983; Rose et al. 1981). The smallest percentage of females (29 percent) is reported from the Holdeman site, where there are only four females identified out of the 14 adults for whom sex can be determined. The Bentsen-Clark sample is not compared here due to the fragmentary nature of the remains.

There are seven female adults present in the Roitsch sample, ranging in age from young adult to 59-60 years; five male adults, ranging from young adult to 55 years; two adults of indeterminate sex; and six subadults ranging from neonate to young adolescent (see Table 24 and Figure 73, also Appendix II, this article). The age composition of this sample is young: 38 percent of the individuals died between the ages of 17 and 40 years (n=13; excluding individuals for whom age was not assessed). Only 23 percent (n=13) were older than 40 years at death. Thirty percent (n=20) of the sample are subadults (see Figure 74), a proportion that is similar to those found in the Bob Williams (28 percent), Roden (22 percent), Rowland Clark (28 percent), and Holdeman (31 percent) samples (see Figure 74).

Children under the age of five years comprise 21 percent of the Roitsch sample (n=19; the Burial 28 subadult could not be assessed for age). In a survey of 18 Caddo sites, including previous data from the Red River area, Rose (1984) reports a mean of only 9.8 percent for this age category, but with a range of 0-37.5 percent. The percentage of children under five years of age recovered from the Bob Williams (13.3 percent), Roden (30.8 percent), Rowland Clark (33 percent), and Holdeman sites (50 percent) varies greatly (Loveland 1986; Rose 1984). The Sam Kaufman and Bentsen-Clark samples contained no children under five years of age.

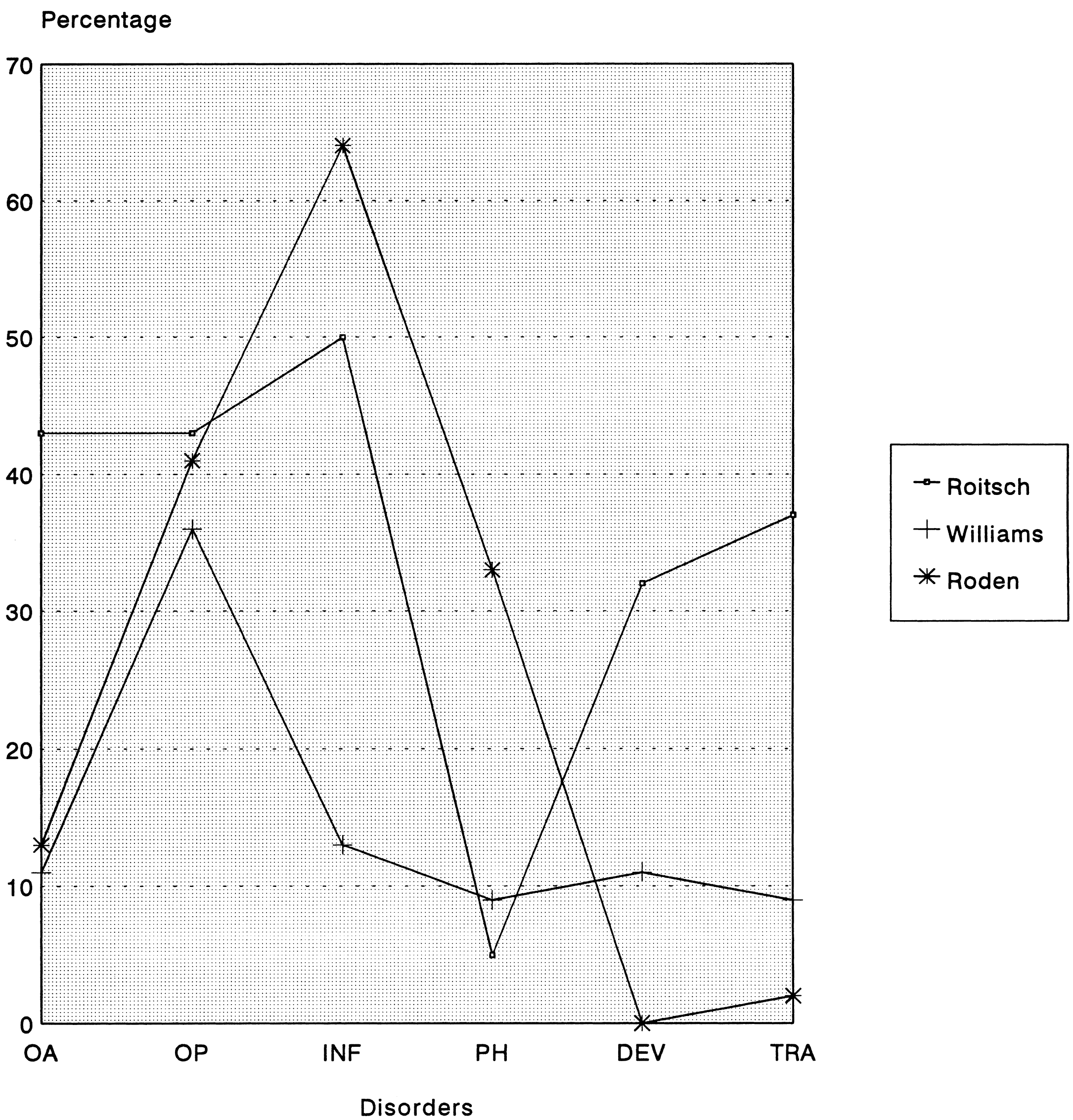
Stature was estimated for nine individuals from the Roitsch sample: three males, five females, and one probable female (see Tables 24 and 26). Male stature ranges from 160-166 cm (mean=163.82 cm) and female stature ranges from 153-161 cm (mean=158.47 cm). These stature estimates are a bit shorter than those reported by Loveland (1986) for the Rowland Clark and Holdeman samples (Rowland Clark male mean=170.48 cm; female mean=161.79 cm; and Holdeman male mean=166.25 cm; female single individual=169.99 cm) and the males of the Bob Williams sample (male mean=168.91 cm; female mean=156.33 cm). The Roitsch males are also a bit shorter than the males from the Sam Kaufman sample (mean=167.49 cm) as reported by Butler (1969), but the Roitsch females are taller (Kaufman mean=157.82 cm). Some of the discrepancy in height between the samples resulted from the use of different stature regression formulae by the analysts. The Genoves (1967) formulae, developed from a Mesoamerican sample, were used for the Roitsch stature estimations calculated from femur length, rather than those of Trotter and Gleser (1952), the formulae used for most of the other site stature estimations. A cross-check using the Trotter and Gleser formulae produced a male stature range of 162-168 cm (mean=165.99 cm) and a female range of 159-163 cm (mean=160.75 cm) for estimations calculated from femur length. However, all of the stature estimates from these Red River sites are within a comparable range. Conversely, the combined mean stature of individuals designated as "Caddoan" from the Cooper Lake Reservoir area, as reported by Westbury (1978) and Derrick and Steele (1993), are quite a bit taller (mean=178.08 cm for males and 166.37 cm for females).

MEDICAL DISORDERS

Degenerative Joint Disease

The most common disorder observed in the current sample, with the exception of dental caries, was degenerative joint disease manifested as vertebral osteophytosis and osteoarthritis of the weight-bearing joints. Degenerative joint disease (DJD) is represented in 43 percent (n=14) of the Roitsch adults (Figure 76). Four vertebrae from a middle-aged male (Burial 34A) provide an example of severe degenerative joint disease of the lumbar vertebrae with deterioration of the articular surfaces of the vertebral bodies and resultant Schmorl's nodes (depressed lesions of the vertebral centrum end plates). The Roitsch data for DJD and vertebral osteophytosis are quite comparable with those from the other Red River Caddo sites. Vertebral osteophytosis is present in 36 percent of the individuals recovered at the Bob Williams site and 40.9 percent of the sample recovered from the Roden site (Loveland and Bass 1983; Rose et al. 1981; see Loveland [1994a] for a comprehensive discussion of vertebral degenerative joint disease in the Bob Williams burial population). Degenerative joint disease is the most common pathological condition observed in the Sam Kaufman sample (Butler 1969).

Temporomandibular (TMJ) DJD can be indicative of habitual use of the anterior dentition as



***Some categories are not quantified for the Kaufman, Bentsen-Clark, Clark, and Holdeman sites.**
OA=Osteoarthrosis, OP=Osteophytosis, INF=Infection
PH=Porotic Hyperostosis, DEV=Developmental, TRA = Trauma

Figure 76. Frequency of Medical Disorders.

a tool in fiber processing or as a third hand (Kennedy 1989:138; Wilson 1994:144). Analysis of the Roitsch sample found four adults affected with slight to moderate temporomandibular joint DJD, mainly evidenced as porosity and pitting in the glenoid fossa. This represents 50 percent of the scoreable individuals (n=8), 33.3 percent of the adults (n=12), and 20 percent of the total sample (n=20). A combined sample of both Roitsch and Sam Kaufman has a total of 11 individuals with slight to moderate temporomandibular DJD representing 32.4 percent of the adults (n=34) and 22 percent of the total population (n=50) (see Table 27). Interestingly, of the 11 affected individuals, only two were female, which is counter to the modern clinical ratios of one affected male for every four affected females (Gerschman and Reade 1988:242). Only one case of TMJ DJD each was reported for the Bob Williams (male individual) and Holdeman (unknown sex) samples (Loveland 1986; Loveland and Bass 1983).

These data could indicate possible effects of cranial modeling on occlusion, differential diet, or more probably, a sexual division of labor with males pursuing activities requiring the use of the anterior dentition. Wilson (1994) suggested that females at the Sanders site, a Middle Caddo period site on the Red River in Lamar County, Texas, had a less stressful life overall and were probably accorded a higher status than males. The temporomandibular data from the combined sample of Roitsch and Sam Kaufman could lend credence to this interpretation. An analysis of this combined sample with a hunter-gathering sample from Blue Bayou (41VT94), a coastal population from Victoria County, Texas (Huebner and Comuzzie 1992), was done to evaluate differences in dental health from the two different subsistence modes (Colby n.d.). An even distribution of temporomandibular DJD was found in the Blue Bayou sample—two affected males and two affected females—representing 8.2 percent of the total population (n=49) and 10.1 percent of the adults (n=34) (see Table 27). The more even distribution seen in these hunter-gatherers could be the result of a more egalitarian diet and lifeway.

Posterior antemortem tooth loss (AMTL) has also been correlated with the presence of temporomandibular joint disease in modern clinical studies (Bergman and Hanson 1979). An analysis of a Medieval Nubian population from the Kuluhnarti site in Northern Sudan noted a significant correlation ($p < 0.01$) between long term posterior tooth loss represented by resorbed sockets and temporomandibular DJD (Sheridan et al. 1991:204). In the analysis of the combined Caddo sample from the Red River, Colby (n.d.) reported high first molar AMTL (26 out of 69 observable sockets), which is also probably contributing to the observed temporomandibular DJD in this combined sample. Supporting this conclusion is the relatively low incidence of first molar AMTL in the Blue Bayou sample, as only a total of two teeth were lost, and the relatively low incidence of temporomandibular DJD.

Osteoarthritis of the weight-bearing joints is present in 43 percent of the Roitsch sample adults, but only 11 percent of the Bob Williams sample and 12.5 percent of the Roden sample (Loveland and Bass 1983; Rose et al. 1981). Although both DJD and osteoarthritis were observed in the Bentsen-Clark, Rowland Clark, and Holdeman (DJD only) samples, fragmentation of the remains and poor representation of vertebrae hamper further comparisons of the skeletal data.

Infection

Signs of infection were observed in 50 percent of the Caddo individuals in the Roitsch sample (n=20), defined as either systemic infection or localized bone infection (see Figure 76). A 40 percent infection rate was recorded among subadults (n=5; Burial 26B, represented by one tooth, was not included in this figure). Otitis media, or ear infection, is represented by an infected temporal bone from the Burial 34B infant. Five adult individuals (Burials 24, 28, 30, 31, and 35) exhibit healed circular depressions, with evidence of previous bone infection located in the supra-inion area of the occipital bone. The Burial 36 infant exhibits a perforated lesion in the same area of the occipital, and this lesion, measuring 25 x 22 mm in diameter, was active at the time of death (photographs of these signs of infection in the Roitsch site skeletal remains are on file at Texas A&M University).

The incidence of infection varies in the other Roitsch-Bob Williams-Roden complex sites. There is an adult infection rate of 19.2 percent, and a 77.8 percent infection rate among subadults in the Roden sample, with a combined rate of 64 percent (Rose et al. 1981). The most common infectious condition is described as generalized periostitis. Periostitis was observed in only 10 percent (n=20) of the Roitsch sample, and in both cases this infection was limited to the ribs. Although the infection rate was not specified for the Bob Williams site, 17 tibiae with periostitis were recorded (Loveland and Bass 1983). Loveland (1994a) reported a 7.7 percent infection rate in pooled data from the fragmentary Rowland Clark and Holdeman samples, and Buikstra and Fowler (1975) described superficial remodeling of long bones in the Bentsen-Clark sample. No infectious conditions were noted by Butler (1969) for the Sam Kaufman sample, except for the presence of dental abscesses.

Nutritional and Developmental Disorders

A high rate of porotic hyperostosis (33.3 percent) was observed in the Roden site sample (Rose et al. 1981). There is only a single case of porotic hyperostosis present in the Roitsch sample (5 percent), which compares favorably with a rate of 11.5 percent from the Holdeman sample, 2.6

percent from the Rowland Clark sample, and a 9 percent rate observed in the Bob Williams sample (Loveland 1986; Loveland and Bass 1983). Six of the cases from the Bob Williams sample were observed as cribra orbitalia in subadults (Loveland and Bass 1983).

Developmental disorders observed in the Roitsch sample include osteochondritis dissecans, namely the formation of a loose cartilaginous body that calcifies and remains as a dead bone fragment, present on the superior articular facet of the axis from a young male, one malformed proximal phalanx of the foot, two incidences of fused vertebrae, several enamel hypoplasias, and two cases of slight scoliosis. Congenital or developmental abnormalities of a similar nature were observed in the Bob Williams sample (Loveland and Bass 1983). These disorders included three cases of fused vertebrae, one case of the atlas fused to the occipital, and several neural arch defects in the lumbar and sacral vertebrae. Four Holdeman skeletons exhibited developmental abnormalities in the form of one fibrous cortical defect, one fibrous dysplasia, and two enamel hypoplasias (Loveland 1986).

Trauma

Six cases of local trauma were noted in the Roitsch sample, excluding Schmorl's nodes. Schmorl's nodes were not categorized as trauma in this analysis, although they can be the result of stress trauma to the back.

Evidence of trauma includes: one healed skull fracture, one damaged tooth, evidence of damage to one shoulder joint, slight damage to one patella, and two postcranial fractures. The postcranial fracture rate for the sample is 10 percent, compared with an 8 percent postcranial fracture rate in the Bob Williams sample, and a norm of 2.2 percent for Texas archeological sites in general (Goldstein 1957; Loveland and Bass 1983). Other results of trauma in the Bob Williams sample were three skull fractures and two broken noses (Loveland and Bass 1983). Loveland (1986) reports three cases of traumatic injury for the Clark and Holdeman sites (excluding Schmorl's nodes).

Dental Disorders

Dental caries are exceedingly prevalent in this sample. All of the adults with preserved dentition had at least one caries, with a mean of 5.9 caries per person (using n=20 or the total population; see Figure 75). When taking into consideration only scoreable individuals (individuals with at least one scoreable tooth present), the caries rate rises to 7.38 caries per person (see Table 28). Tooth loss occurred in at least six (60 percent) of the adults, while abscesses also occurred in six (60 percent) of the adults and can be seen in two subadults. The overall caries rate is 64 percent. These results are high compared with the Sam Kaufman (16.2 percent), Roden (23.3 percent), Bob Williams (15.3 percent), Bentsen-Clark (14.1 percent), and Rowland Clark (5.6 percent) sites (Butler 1969; Loveland 1986).

In a reanalysis of the Sam Kaufman material (Colby 1995, 1997), the overall caries rate was found to be 56 percent, namely 150 caries in a total of 268 teeth, with 5.0 caries per person (n=30), and 6.52 caries per scoreable individual (n=23) (see Table 28). Combining the Roitsch and Sam Kaufman material shows that all classes of teeth were affected by caries, although as expected, the majority are located in the molars (59 percent) (see Table 29). The high antemortem tooth loss (AMTL) of first molars in this combined Caddo sample (26 out of 69 observable sockets) (Colby n.d.), probably as a result of caries-induced abscesses, would indicate that the number of molars affected was actually greater than the 59 percent seen here. Pain from caries and tooth loss must have affected the health and quality of life of many of the Caddo individuals living at the Roitsch site (a photograph of these dental disorders is on file at the Department of Anthropology at Texas A&M University). However, actual tooth wear is moderate to light (see Table 30 and Appendix V, this article).

The caries rate from the Roitsch sample also appears to be somewhat higher than that of other Caddo archeological area samples (see Figure 75), and considerably higher than that of the earlier Woodland period Fourche Maline peoples (Rose and Marks 1985). The increase in caries and the concomitant reduction of tooth wear seen in the Roitsch and Kaufman samples may have been a product of small sample size, increasing dependence on corn agriculture, or the use of wooden mortars and pestles when grinding corn. Powell and Rogers (1980) suggest that because the wooden surfaces of these tools expel less grit into the ground corn, people using wooden grinding implements should have reduced tooth wear and increased caries. The teeth, although protected from extreme wear, are not naturally cleansed by the smoother vegetable materials. As a consequence, there is more opportunity for sticky carbohydrates to remain in tooth fissures, causing carious lesions (Powell and Rogers 1980).

Wear patterns can also be indicative of cultural practices such as the extra-dietary use of the teeth, as well as in determining subsistence patterns and overall dental health (Colby n.d.; Molnar 1971; Ubelaker 1994). A higher degree of wear on the anterior dentition (canines and incisors) as opposed to the posterior dentition (molars and premolars) has been correlated with use of the teeth as tools. This has been reported in a study of precontact Omaha dentitions in Nebraska; females in this sample had pronounced anterior wear that was possibly related to processing hides by chewing to soften them (Reinhard et al. 1994:71). The combined dental sample from the Roitsch and Kaufman sites has first incisor to first molar ratios indicative of more anterior wear (see Table 30), as all three ratios (UIl/UM1, LI1/LM1, and I1/M1) are above 1.0, corresponding to even wear. This can be interpreted to mean that these Caddo peoples were using their teeth as tools to aid in material processing, or as a third hand to help grasp something. Because of the high incidence of first molar AMTL, this interpretation could be anomalous and simply a reflection of missing data. If these teeth were present, they might present higher wear stages than the molars scored, as wear and caries are both age-progressive conditions.

Abscesses are the penultimate result of wear and caries; the final stage of both is antemortem tooth loss. In order to fully understand the dental health of a population, all conditions and their causes must be examined, and for abscesses this means determining the basal cause of the pulpitis (infection of the pulp cavity) that results in the abscess. The Roitsch site had eight individuals with 22 abscesses, four males with 11 abscesses, three females with 10 abscesses, and one indeterminate individual with a single abscess. Interestingly, abscesses are concentrated in the younger portion of this sample with one individual each in the late child and adolescent/juvenile age categories having been affected (Table 31). Five abscesses were noted in young adults (63 percent), with only a single older adult being affected. Again the high posterior AMTL, also age progressive, as a result of abscesses, tends to skew the data towards the younger segment of the population. Note that more abscesses were found in this sample than total individuals in the sample. There is no statistical difference in the number of abscesses or the number of individuals affected between the sexes (Table 32). The combined sample of 23 individuals among the Roitsch and Sam Kaufman remains is similar to what has been found at the

Table 31. Number of individuals with abscesses by sample and site.

Age categories	41VT94	Roitsch	41RR16*	Total**
Late child	-	1	1	1
Adolescent/juvenile	-	1	1	1
Young adult	1	5	8	9
Old adult	1	-	3	4
Adult/old adult	2	1	1	3
Adult indeterminate	1	-	4	5
Indeterminate	-	-	1	1
Total	5	8	19	24

The differences between Blue Bayou (41VT94) and Roitsch, and Blue Bayou and 41RR16, are significant at the $p<0.05$.
*41RR16 is the combined Caddo sample from the Roitsch and Sam Kaufman excavations
**Total is combination of 41VT94 and 41RR16.

Table 32. Abscess breakdown by sex for number of individuals (Indiv.) and number of abscesses (#).

Site	Male		Female		Indeterminate	
	Indiv.	#	Indiv.	#	Indiv.	#
41VT94	3	9	1	1	1	2
Roitsch	4	11	3	10	1	1
41RR16	9	20	8	16	2	2

Test of Significance

	Roitsch	41RR16
Male vs. Female, Indiv.	N	N
Male vs. Female, #	N	N

Significance measured at the p <.05 level; Y=significant, N=not significant

Roitsch site, and there are no statistical differences between the number of affected individuals and the number of abscesses in males or females (see Table 32).

Abscess etiology in this sample follows what has already been seen, in that caries are the predominate cause of abscesses for these Caddo agriculturalists. Of the 22 abscesses noted, 13 (59 percent) were the result of caries breeching the pulp cavity and providing a hospitable environment for the commensal bacteria of the oral cavity to proliferate (Figure 77). No abscesses can be attributed to either wear or trauma; one abscess has an etiology of food impaction; and the remaining eight are of indeterminate origin (36 percent). Etiology could not be established for these eight indeterminate abscesses because, although there was still osseous evidence of the abscess, the tooth itself had been evulsed, making an etiological determination impossible.

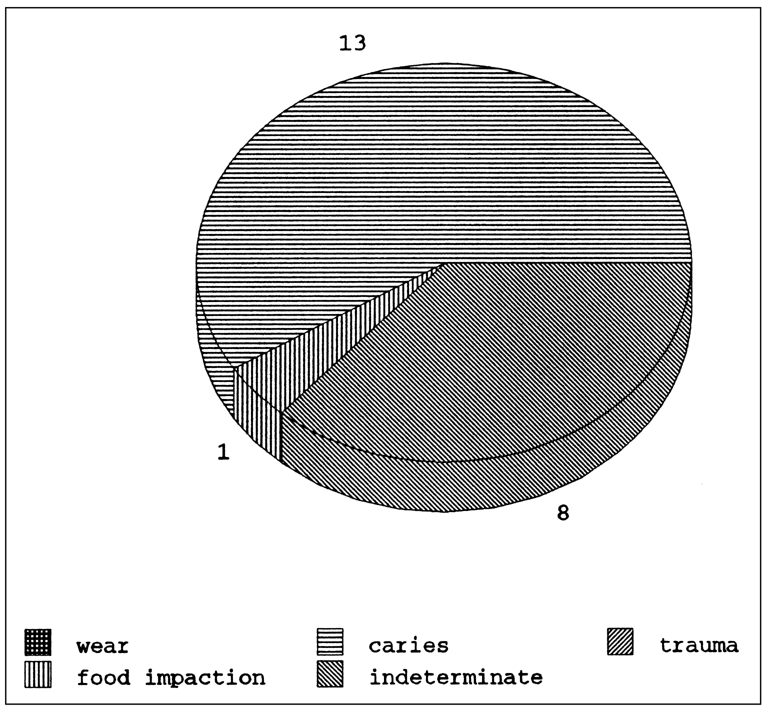


Figure 77. Abscess Etiology for the Roitsch Site.

In a comparison of the combined sample of Sam Kaufman and Roitsch with the hunter-gatherer sample from the Blue Bayou site, abscesses were found in a significantly higher frequency ($p < 0.05$) in the Caddo sample (see Tables 31 and 32) (Colby 1995, 1997). The physiological response of teeth to caries and wear differs. Although teeth are unable to repair themselves as bone can, they do react to external assault by producing dentin similar to the primary dentin that is the bulk of the tooth. Secondary dentin (a more calcified matrix than primary dentin) apposition on the worn occlusal surface will work to counteract occlusal wear once the primary dentin has been exposed to wear (Moss-Salentijn and Hendricks-Klyvert 1985). Reactive or reparative dentin deposition on the interior surface (pulpal cavity) of the dentin closes off the dentin tubules exposed to some external insult (Moss-Salentijn and Hendricks-Klyvert 1985). In combination, these would provide some protection to the pulp cavity, delaying or possibly averting the advent of pulpitis (Figure 78). Only the deposition of reactive dentin is possible in response to caries, whereas both secondary and reactive dentin are formed as a tooth is subjected to wear. When a tooth is exposed to gradual, continued wear, it can compensate and delay exposure of the pulp cavity, while caries is a decay process, that unless treated, will continue. Thus, the pulp cavity is exposed more quickly when a caries is present than during the gradual process of wear, and an abscess will occur. As has been shown in both the Roitsch sample alone and with the combined Roitsch and Kaufman sample, populations with a high caries rate can be expected to have a corresponding high abscess rate.

NON-METRIC TRAITS

Skeletal non-metric variation was recorded for this sample using the Texas A&M University Physical Anthropology Laboratory Data Form (Colby et al. n.d.). Although individual size variation and environmental factors may influence the expression of non-metric (discrete) traits (Konigsberg et al. 1993; Snyder Winder 1981), the heritability of these traits has been documented (Heuser and De Stefano 1989; Ossenberg 1976, 1977, 1986; Snyder Winder 1981), underscoring the importance of recording non-metric traits during skeletal analysis. A comprehensive record of the presence/absence and type variables of non-metric traits for the Roitsch sample will enable future investigation into the biological affinity of these Caddo people. The non-metric data for the Roitsch sample are summarized by burial number in Appendix VI (this article). Sex and side of body ratios and a summary comparison with the Sam Kaufman and Bob Williams samples are also reported, along with a non-metric trait summary for well-preserved skulls (see Appendix VI, this article). Unfortunately, a synthesis of non-metric trait information from the Bentsen-Clark, Roden, Rowland Clark, and Holdeman samples was not possible due to the lack of reported data. However, Buikstra and Fowler (1975) reported that the Bentsen-Clark sample was similar to the Sam Kaufman sample in the occurrence of non-metric traits.

CRANIAL MODELING

Cranial modeling is the custom of intentionally shaping the infant head, often referred to as artificial cranial deformation or modification. The human cranium is usually shaped at birth by stress placed on the head during delivery. During postnatal growth, the head takes on a natural shape as a result of genetic instructions, structural relationship to the attached face and neck, and environmental influences (Rogers 1975). Cranial modeling occurs when the infant cranium is permanently molded into an unnatural but desired shape.

Tabular fronto-parallelo-occipital and fronto-vertico-occipital modeling (cf. Neumann 1942) have both been described in Caddo skeletal samples (Bennett 1961; Loveland 1980). These styles of modeling were produced by placing a board on the forehead of the infant while the back of the head was held stationary on a cradleboard (Loveland

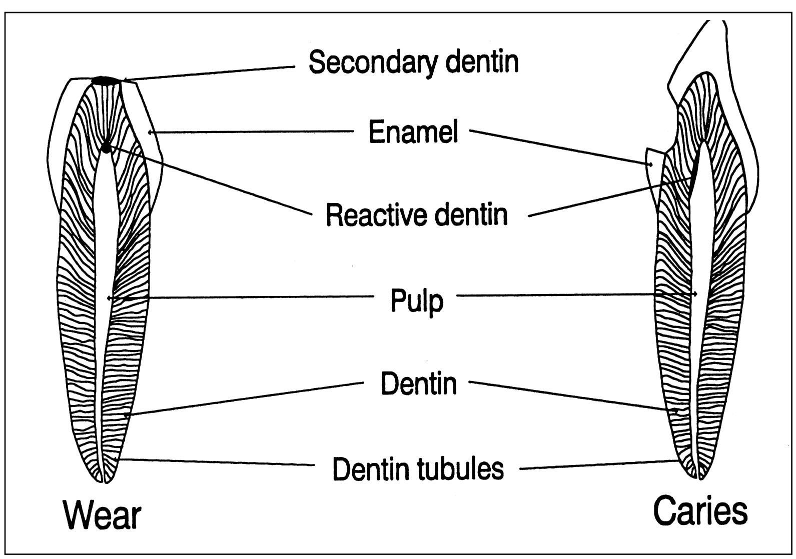


Figure 78. Tooth Cross Section.

1980). To prevent changes to the shape of the neck, a pad was placed at the base of the occipital, or the back of the head was placed into a shallow hole in the cradleboard (Loveland 1980). The objective appeared to be a parallel shaping of the frontal and the occipital areas of the head (Neumann 1942). Additional forms of these styles, produced by wrapping the head, have also been reported (Derrick et al. 1995; Derrick and Wilson 1997).

Tabularly modeled crania are present in the Roitsch site sample. Five individuals (Burials 24, 28, 31, 35, and 36) were modeled in the parallelo-fronto-occipital style (photographs of examples of cranial modeling in the Roitsch skeletal remains are on file at the Department of Anthropology, Texas A&M University; see also Table 24). The well-preserved crania of Burials 31 and 35 appear long and flat, with a quickly sloping forehead, bulging parietals, and a flattened occipital. Although the mandible of Burial 27B has large gonial angles and a jutting chin, and the bicondylar breadth appears large (all features that can be indicative of cranial modeling), the presence of modeling cannot be assessed without a more complete cranium (e.g., Chevrud and Midkiff 1992; Herring 1993). Seven adult crania (Burials 5, 7, 11, 13, 15, 16, and 18) from the Sam Kaufman sample are sufficiently well-preserved to determine the presence or absence of cranial modeling. All seven of these crania were modeled (see Butler 1969: Figure 34). The more complete specimens were determined to be of the tabular fronto-vertico-occipital style. The tabular fronto-parallelo-occipital style was noted in 96.4 percent of the 56 adult crania recovered from the Bob Williams site (Loveland and Bass 1983). Buikstra and Fowler (1975) reported simple tabular occipital cranial flattening for all but two of the crania from the Bentsen-Clark site. Cranial modeling was not described for either the Roden, Rowland Clark, and Holdeman samples in the original reports (Loveland 1986; Rose et al. 1981).

The occipital bones from Burials 24, 28, 30-31, 35, and 36 of the Roitsch sample and Burials 7, 10-13, 15, and 23 of the Sam Kaufman sample exhibit a distinctive occipital anomaly, the supra-inion depression. This anomaly occurred frequently in many prehistoric New World populations (Stewart 1976), and Rose (1984) has reported that these depressions are commonly observed in Caddo populations. The causative factor for the depressions has been debated (Beattie 1980; Burnett 1988; Cybulski 1980; Derrick n.d.; Holliday 1993; Hrdlicka 1908, 1909; Loveland and Bass 1983; Rose 1984; Stewart 1971, 1976; Weiss 1958, 1967). However, one hypothesis (Derrick n.d.; Holliday 1993; Stewart 1971, 1976) suggests that many supra-inion depressions were actually healed lesions, a result of infection associated with cranial modeling and environmental pathogens.

The association of supra-inion depressions with cranial modeling in the Roitsch and Sam Kaufman samples is striking. The five modeled Roitsch crania (and one cranium indeterminate for modeling), with the supra-inion area intact (Burials 24, 28, 30, 31, 35, and 36), all exhibit supra-inion depressions (Table 33). Supra-inion depressions are present on 57 percent of the modeled crania from the Sam Kaufman site. Although none of the adult depressions were

Table 33. Supra-Inion depression measurements.*

Burial #	Measurement	Age	Sex	Modeling
24	27 x 20	Adult	Male	Present
28	22 x 8	Adult	Indeterminate	Present
30	27 x 22	Adolescent	Male	Indeterminate
31	**	Adult	Female	Present
35	**	Adult	Female	Present
36	25 x 22	Subadult	Indeterminate	Present

*Measurement taken in mm

**Depression not sufficiently circumscribed for measurement active lesions at the time of death, the bone is remodeled, with evidence of sclerotic scarring. The presence of an active lesion on the occipital of the Roitsch Burial 36 infant supports the argument for an infectious origin for at least some of these depressions.

Cranial modeling appears to have been common among the Red River Caddo peoples (see Derrick and Wilson 1997). In addition, there is a high incidence of supra-inion depressions associated with cranial modeling in the Roitsch and Sam Kaufman samples. If the supra-inion depressions were caused by infection, then based upon evidence from these Caddo sites, the health of Caddo children may have been compromised by modeling practices. If so, examination of the practice of cranial modeling becomes an important facet in morbidity and mortality studies of Caddo children.

SUMMARY AND CONCLUSIONS

The purpose of this study has been to analyze and report on the Caddo human remains recovered from the Roitsch site during the 1991 and 1992 TAS Field School excavations and place the resulting data into a meaningful context. The results were compared with data from the analysis of skeletal samples recovered during the 1968 excavation at the site (then known as Sam Kaufman) and from other adjoining and approximately contemporary prehistoric Caddo sites along the middle reaches of the Red River.

The demographic data from the Roitsch site are within the range of those from the comparative samples. There is a slightly higher female to male ratio at Roitsch, and the number of subadults in the burial population is also higher. The average stature of the Roitsch individuals also appears to be slightly shorter than that of most of the other samples.

Dental caries and abscesses were the most common medical disorders recorded for the Roitsch-Williams-Roden sites. At 64 percent, the overall caries rate for the 1991-1992 Roitsch sample is higher than that of the other samples (see Figure 75). The rates of tooth loss and dental abscesses are also high, although tooth wear is only moderate to light. Wear patterns showing greater anterior tooth wear than posterior wear may indicate extra-dietary use of the teeth in material processing or as a third hand. A correlation between high caries rates and high abscess rates is supported by this study and can be related to the different physiological responses of a tooth to caries and wear.

Degenerative joint disease, manifested as osteoarthritis and vertebral osteophytosis, was the next most prevalent disorder, with high rates reported in all of the samples from which data were available. But in spite of this overall concordance, the rate of osteoarthritis in the weight-bearing joints is much lower in the Bob Williams and Roden samples than in the Roitsch sample at 11 percent, 12.5 percent, and 43 percent, respectively. The high occurrence in males of temporomandibular joint disease seen in the combined Roitsch and Kaufman sample (see Table 27) seems to indicate some sexual division of labor compounded by high posterior tooth AMTL.

Disorders with a possible nutritional etiology are rare in the Roitsch and Bob Williams samples. The porotic hyperostosis rate for Roitsch is only 5 percent and there is only a 9 percent rate for the Bob Williams sample. In contrast, a high rate of porotic hyperostosis (33.3 percent) was reported for the Roden site (Rose et al. 1981). The reasons for this disparity are unclear. However, evidence from the Roitsch and Kaufman samples, including the high rate of caries and tooth loss as well as δ 13C values (on apatite) of -8.2 ‰ to -8.0 ‰ from the stable isotope analysis of four individuals, indicates that corn was a dietary staple. Microwear analysis of teeth from the Roden site also support this conclusion (Rose et al. 1981). Further study is required to ascertain whether status or sex was a limiting factor in access to preferred foods.

Tabular cranial modeling appears to have been a common practice among the Red River Caddo peoples. Five of six well-preserved crania from the Roitsch sample were modeled, and the mandible from a seventh individual may also exhibit evidence of modeling. At least seven crania from the Kaufman sample, and 96.4 percent of the 56 adult crania recovered from the Bob Williams site, were modeled. Occipital flattening was described for the majority of individuals from the Bentsen-Clark site (Buikstra and Fowler 1975). An anomaly of the occipital, the supra-inion depression, appears to be associated with cranial modeling in the Roitsch and Sam Kaufman samples. These depressions may be the result of infection during the modeling process, and if so, would have ramifications for the future study of Caddo infant morbidity and mortality (Derrick n.d.; Holliday 1993; Stewart 1971, 1976).

The information garnered in this study, in conjunction with previously reported data for the Roitsch-Williams-Roden complex and adjoining sites, provides a significant body of data with which to study the biology of the Caddo peoples. Future work should include statistical analyses of metric and non-metric trait data for biological distance studies. Stress studies focusing on dentition, sexual dimorphism, and the presence of pathological conditions (similar to that of Loveland [1994a]), would also be valuable contributions to a better understanding of the health of prehistoric and historic Caddo peoples of the Red River drainage area.

ARCHEOBOTANICAL REMAINS FROM FIVE SITES ON THE RED RIVER, NORTHEAST TEXAS

Gayle J. Fritz

INTRODUCTION

Twenty-one samples of flotation-retrieved archeobotanical remains from the 1991 Texas Archeological Society Field School were sent to the Paleoethnobotanical Laboratory at Washington University in St. Louis for analysis. As summarized in Table 34, one sample came from the Pine Cone site (41RR236), one came from the Fasken site (41RR14), four are from Salt Well Slough (41RR204), six are from the Ray site (41LR135), and nine are from the Roitsch site excavations (41RR16—formerly known as the Sam Kaufman site). Two samples from the Ray site were labeled “1 of 2” and “2 of 2” from the same provenience. These were combined to facilitate recording and reporting, leaving a total of 20 flotation samples tabulated in this section.

Types of carbonized plant remains recognized during the analysis include wood charcoal, pine cone fragments (*Pinus* sp.), cane stem (*Arundinaria gigantea*), thick hickory nutshell (*Carya* spp.), thin hickory nutshell—probably pecan (*Carya illinoensis*)—walnut shell (*Juglans nigra*), acorn shell (*Quercus* spp.), squash or pepo gourd rind (*Cucurbita pepo*), seeds, and maize (*Zea mays* ssp. *mays*) in the form of both kernel and cob fragments. Table 35 summarizes the types of material recovered by provenience. In addition to the above-named plant types, most samples included unidentified carbonized material labeled as “Unknowns.” One sample contained fragments of fungal matter, and one included particles described as silica froth. Uncarbonized items in the form of rootlets, fresh (modern) seeds, bone, stone, pottery sherds, etc., are lumped together in the “Non-carbonized” category.

Soil samples to be floated were selected in the field by site supervisors and taken to the processing station at the main camp and field laboratory in Idabel, Oklahoma, just across the Red River from the excavations. Flotation was conducted by the “IDOT” box method, described by Pearsall (1989). The boxes were hand-held objects with solid U-shaped wooden sides to which were attached lengths of 1.0 mm wire mesh wrapping across the front, curved bottom, and back. The box was dipped into a barrel or trough of water, and, while submerged, soil matrix was added and agitated. A light fraction was obtained in the form of suspended organic material scooped into a hand-held strainer with 0.42 mm wire mesh. The heavy fraction consisted of all objects caught in the 1.0 mm mesh of the wire-wrapped box. Most light fractions were miniscule, with the vast majority of carbonized plant fragments recovered in the heavy fractions. Although light and heavy fractions were analyzed and tabulated separately, the results are combined here to yield a single set of values per sample. The volume of soil processed varied by sample (see Table 35), with a total of 223 liters floated from the 20 samples reported on herein.

METHODS OF ANALYSIS

Analysis was conducted by the author in the Paleoethnobotanical Laboratory at Washington University in St. Louis. Presorting was conducted by Steve Rhee, who sieved the heavy fractions and removed all carbonized pieces larger than 2.0 mm from the gravels, sherd fragments, bone fragments, and other non-carbonized materials that dominated these heavy fractions.

For both light and heavy fractions, samples were weighed and the contents then passed through a series of up to 10 graduated brass geological sieves to facilitate sorting. All archeobotanical remains larger than 2.0 mm were separated to the most specific taxonomic category possible, with the exception of wood charcoal, which was not identified to taxon. Both counts and weights (to the nearest 0.01 g) were recorded, with weights determined using an electronic, digital Sartorius balance. The size groups smaller than

Table 34. Summary of Flotation Samples by Site.

Site	Name	Lot #	Feature No.	Level
41RR236	Pine Cone	37	Fea. 1	
41RR204	Salt Well	98		L. 3
41RR204	Salt Well	99	Fea. 6	L. 2
41RR204	Salt Well	100	Fea. 8	L. 2
41RR204	Salt Well	101	Fea. 11	
41RR16	Roitsch	953	Fea. 601	
41RR16	Roitsch	1015	Fea. 101	L. 9
41RR16	Roitsch	1016	Fea. 601	
41RR16	Roitsch	1017	Fea. 405 Bottom	
41RR16	Roitsch	1018	Fea. 405	L. 4
41RR16	Roitsch	1019	Fea. 601	L. 4
41RR16	Roitsch	1020	Fea. 402	
41RR16	Roitsch	1021	Fea. 601	
41RR16	Roitsch	1025	Burial 20	L. 8
41LR135	Ray	124	Fea. 2	
41LR135	Ray	125	Fea. 1	
41LR135	Ray	126 *	Fea. 1	
41LR135	Ray	127	Hearth	
41LR135	Ray	128 *	Hearth Top	L. 4
41LR135	Ray	129	Hearth	
41RR14	Fasken	292	Fea. 2	

* These two samples were labeled “1 of 2” and “2 of 2,” and were combined during analysis

2.0 mm were carefully examined, but only a few categories of archeobotanical remains—maize, acorn shell, cucurbit rind, and seed material—were systematically removed from them. In addition, when wood charcoal, cane stem, or nutshell fragments were present in a sample only below the 2.0 mm screen size level, a count of one fragment and weight of 0.01 g was recorded. Counts and weights reported here, then, generally represent objects larger than 2.0 mm in size with the exception of maize, acorn shell, and cucurbit rind, which include recognizable fragments as small as 1.0 mm. All recognizable seeds, no matter how small, were pulled and counted.

One heavy fraction, from Feature 2 of the Ray site, did not receive the standard treatment for particles smaller than 2.0 mm. This sample consisted primarily of highly fragmented maize cupule and kernel pieces that would have required an excessive amount of time to sort out. Therefore, a thorough scan was conducted for seeds, acorn shell, and cucurbit rind (none were present), but the maize fragments smaller than 2.0 mm were not separated. Entire cupules, however, were pulled and measured along with those larger than 2.0 mm.

Examination was conducted with the aid of a low power (7X to 50X) Wild binocular microscope. Seed identifications were made by comparing archeological specimens in these samples to those in the reference collection of modern and archeological seed types and by referral to standard seed identification manuals (Delorit 1970; Delorit and Gunn 1986; Martin and Barkley 1961; Montgomery 1977).

Table 35. Carbonized Plant Remains from the 1991 TAS Field School.

Fea.	Lot	Vol. (L)	Wood Ct.	Wood Wt. (g)	Cone Wt. (g)	Cane Ct.	Cane Wt. (g)	Hickory Ct.	Hickory Wt. (g)	Pecan Ct.	Pecan Wt. (g)	Walnut Ct.	Walnut Wt.
41LR135													
2	124	2.5	109	1.30	-	-	-	-	-	-	-	-	-
1	125	18.0	21	0.24	-	-	-	32	0.71	-	-	-	-
1	126	15.0	36	0.44	-	-	-	62	0.41	3	0.04	-	-
Hearth	127	16.0	115	1.35	-	-	-	103	2.12	-	-	-	-
Hearth	128	4.0	9	0.06	-	-	-	4	0.08	-	-	-	-
Subtotal		55.5	290	3.39	-	-	-	201	3.32	3	0.04	-	-
41RR14													
2	292	14.0	23	0.16	-	-	-	17	0.18	-	-	-	-
41RR16													
601	953	15.0	2	0.03	-	-	-	-	-	-	-	-	-
101	1015	23.5	55	0.61	-	2	0.01	-	-	-	-	-	-
601	1016	11.0	11	0.15	-	-	-	-	-	-	-	-	-
405	1017	11.0	171	1.79	-	51	0.35	16	0.54	-	-	23	0.63
405	1018	8.0	183	1.56	-	48	0.26	23	0.64	-	-	33	1.07
601	1019	10.0	90	0.65	-	-	-	13	0.12	-	-	-	-
402	1020	8.0	82	0.57	-	-	-	23	0.40	2	0.01	-	-
601	1021	5.0	24	0.16	-	-	-	5	0.05	-	-	-	-
B-20	1025	9.0	55	0.43	-	-	-	9	0.20	-	-	-	-
Subtotal		100.0	673	5.95	-	101	0.62	89	1.95	2	0.01	56	1.70

Table 35. *(Continued)*

Fea.	Lot	Vol. (L)	Wood Ct.	Wood Wt. (g)	Cone Wt. (g)	Cane Ct.	Cane Wt. (g)	Hickory Ct.	Hickory Wt. (g)	Pecan Ct.	Pecan Wt. (g)	Walnut Ct.	Walnut Wt.
41RR204													
-	98	9.0	184	1.25	-	9	0.05	28	0.33	4	0.02	-	-
6	99	14.0	29	0.11	-	-	-	-	-	-	-	-	-
8	100	14.0	41	0.24	-	-	-	-	-	2	0.02	-	-
11	101	14.0	10	0.02	-	-	-	1	0.01	-	-	-	-
Subtotal		51.0	264	1.62	-	9	0.05	29	0.34	6	0.04	-	-
41RR236													
1	37	2.0	4	0.14	7.29	2	0.04	-	-	-	-	-	-
Totals	223.0	1254	11.26	7.29	112	0.71	336	5.79	11	0.09	56		1.70

Fea.	Lot	Jugl. Ct.	Jugl. Wt (g)	Acorn Ct.	Acorn Wt (g)	Crbt Ct	Crbt Wt (g)	Maize Wt (g)	Kernel Ct.	Kernel Frag.	Cupule Ct.	Cupule Frags.	Glume Ct.	Seed Ct.
41LR135														
2	124	-	-	-	-	-	-	3.29	-	-	109	225	40	-
1	125	-	-	1	0.01	-	-	-	-	-	-	-	-	-
1	126	3	0.03	3	0.01	-	-	-	-	-	-	-	-	-
Hearth	127	-	-	18	0.03	-	-	-	-	-	-	-	-	8
Hearth	128	-	-	3	0.01	-	-	-	-	-	-	-	-	-
Subtotal		3	0.03	25	0.06	-	-	3.29	-	-	109	225	40	8

Table 35. *(Continued)*

Fea.	Lot	Jugl. Ct.	Jugl. Wt (g)	Acorn Ct.	Acorn Wt (g)	Crbt Ct	Crbt Wt (g)	Maize Wt (g)	Kernel Ct.	Kernel Frag.	Cupule Ct.	Cupule Frags.	Glume Ct.	Seed Ct.
41RR14														
2	292	-	-	2	0.01	-	-	0.03	-	-	-	4	-	6
41RR16														
601	953	-	-	-	-	-	-	-	-	-	-	-	-	-
101	1015	-	-	-	-	-	-	-	-	-	-	-	-	2
601	1016	-	-	-	-	-	-	-	-	-	-	-	-	4
405	1017	50	0.42	7	0.02	1	0.01	0.16	-	11	6	45	3	10
405	1018	33	0.24	8	0.01	-	-	0.11	1	17	2	26	4	9
601	1019	4	0.03	8	0.02	-	-	0.02	-	-	-	6	-	17
402	1020	19	0.15	14	0.01	2	0.01	0.04	-	2	2	15	-	5
601	1021	-	-	4	0.01	-	-	0.01	-	-	-	4	-	14
B-20	1025	-	-	11	0.01	-	-	0.04	-	-	1	10	1	8
Subtotal		106	0.84	52	0.08	3	0.02	0.38	1	30	11	106	8	69
41RR204														
-	98	-	-	2	0.01	-	-	0.27	-	25	3	24	1	9
6	99	-	-	-	-	-	-	0.01	-	-	-	1	-	4
8	100	-	-	-	-	-	-	0.03	-	5	-	2	-	1
11	101	1	0.01	-	-	-	-	-	-	-	-	-	-	-
Subtotal		1	0.01	2	0.01	-	-	0.31	-	30	3	27	1	14
41RR236														
1	37	-	-	-	-	-	-	0.10	-	-	5	10	-	5
Totals		110	0.88	81	0.16	3	0.02	4.11	1	60	128	372	49	102

Table 35. *(Continued)*

Fea.	Lot	Unknown Count	Unknown Weight (g)	Fungal Ct.	Fungal Wt (g)	Non-Carbonized Weight (g)	Silica Ct.	Silica Wt (g)	Residue Wt (g)
41LR135									
2	124	18	0.08	-	-	14.44	-	-	-
1	125	7	0.06	-	-	53.51	-	-	52.20
1	126	12	0.08	-	-	78.04	-	-	79.30
Hearth	127	14	0.16	-	-	43.90	-	-	83.70
Hearth	128	1	0.01	-	-	12.68	-	-	7.79
Subtotal		52	0.39	-	-	202.57	-	-	222.99
41RR14									
2	292	10	0.01	4	0.01	5.49	-	-	16.88
41RR16									
601	953	1	0.02	-	-	69.30	-	-	61.62
101	1015	1	0.01	-	-	96.21	-	-	118.13
601	1016	2	0.03	-	-	123.64	-	-	82.80
405	1017	20	0.09	-	-	27.57	-	-	57.69
405	1018	24	0.13	-	-	16.70	-	-	26.04
601	1019	5	0.02	-	-	10.31	-	-	14.95
402	1020	5	0.04	-	-	9.00	-	-	12.76
601	1021	8	0.07	-	-	8.35	-	-	11.16
B.20	1025	1	0.01	-	-	11.84	-	-	10.28
Subtotal		67	0.42	-	-	372.92	-	-	395.43

Table 35. *(Continued)*

Fea.	Lot	Unknown Count	Unknown Weight (g)	Fungal Ct.	Fungal Wt (g)	Non-Carbonized Weight (g)	Silica Ct.	Silica Wt (g)	Residue Wt (g)
41RR204									
-	98	50	0.24	-	-	237.87	-	-	207.11
6	99	32	0.13	-	-	82.50	-	-	41.71
8	100	-	-	-	-	0.26	-	-	-
11	101	1	0.01	-	-	0.72	7	0.04	-
Subtotal		83	0.38	-	-	321.35	7	0.04	248.82
41RR236									
1	37	3	0.11	-	-	0.58	-	-	5.57
Totals		215	1.31	4	0.01	902.91	7	0.04	889.69

CONTENTS OF THE SAMPLES

Wood Charcoal, Pine Cone, and Cane Stem

A total of 1,254 pieces of wood charcoal larger than 2.0 mm were found in the 20 samples, weighing a total of 11.26 g. The single sample from the Pine Cone site (41RR236) contained only four wood charcoal fragments but was dominated by carbonized pine cone fragments weighing a total of 7.29 g. In addition to the pine cone fragments in the flotation sample, our lab received a vial containing 1.75 g of pine cone fragments hand-picked from the fill of this feature (Feature 1) during excavation. The species of *Pinus* represented could not be determined, but the fragments appear smaller than, and morphologically different from, *Pinus palustris*. Based on modern phytogeography, the most likely species are *Pinus echinata* and *Pinus taeda* (Nixon 1985; Texas A&M University 1975).

Fragments of cane stem (culm) are not infrequently found in archeobotanical samples from the Southeast U.S., likely representing remnants of matting, basketry, other utensils and tools, or construction material incorporated into houses and other structures. Five (25 percent) of the 20 samples from the 1991 Texas Archeological Society Field School excavations included cane stem fragments, with the total of 112 pieces weighing 0.71 g. Most cane stem came from the Roitsch site, with the two samples from Feature 405 accounting for 99 of the 112 specimens.

Nutshell

Fragments of nutshell were sorted into five categories: thick hickory, thin hickory, walnut, Juglandaceae, and acorn. Thick-shelled nuts grow on various hickory species in Northeast Texas, including shagbark (*Carya ovata*), mockernut (*C. tomentosa*), shellbark (*C. laciniosa*), swamp hickory (*C. leiodermis*), and black hickory (*C. texana*) (Nixon 1985; Texas A&M University 1975). The thin hickory nutshell probably came from pecans (*C. illinoensis*), although nutmeg hickory (*C. myristicaeformis*) and bitternut hickory (*C. cordiformis*) are other possibilities. The Juglandaceae category accommodates nutshell fragments that are either hickory or walnut but cannot be identified with confidence to either genus of the walnut family. These fragments tend to be among the smallest of the larger than 2.0 mm pieces. The 110 Juglandaceae fragments weigh a total of 0.88 g, whereas the 56 walnut shell fragments total 1.70 g in weight.

Thick hickory nutshell is the most common type in these assemblages, with 336 fragments weighing a total of 5.79 g, distributed among 13 samples (65 percent Ubiquity). Thin hickory, likely to be somewhat underrepresented due to its fragility, was found in only four samples (20 percent Ubiquity), with the 11 thin hickory nutshell fragments weighing a total of 0.09 g. Walnut shell was recognized in only two samples (5 percent Ubiquity)—both from Feature 405 at the Roitsch site—but two additional samples from Roitsch and two from other sites include Juglandaceae fragments that may represent walnuts.

Acorn shell is the most underrepresented of the edible mast types due to its thinness and low density. The 81 acorn shell fragments are nearly as ubiquitous as thick hickory. Acorn is present in 12 samples (60 percent Ubiquity), as compared to 13 samples containing thick hickory (a 65 percent Ubiquity value). The total weight of 0.16 g for acorn shell listed in Table 35 is not a meaningful figure, since weights of less than 0.005 g per sample were entered as 0.01 g.

Pecans and walnuts appear less significant than either acorns or thick hickories using this limited and perhaps unrepresentative set of samples. Walnut shell is concentrated in a Late Caddo hearth—Feature 405—but it would be premature to suggest heavier use of walnuts by Late Caddo McCurtain phase peoples as opposed to Early Caddo people living along the Red River. Systematic flotation recovery of many more samples from both periods would be necessary to confirm trends of this nature.

Cucurbit Rind

Three small fragments of *Cucurbita pepo* rind were present in samples from the Roitsch site: two from Feature 402 and one from Feature 405 in Block IV, located in the Late Caddo McCurtain phase village. The two rind fragments from Feature 402 are 0.8 mm thick; the piece from Feature 405 is 1.1 mm thick. Although all are thin enough to represent free-growing populations of texana-like gourds that would be classified as C. *pepo ssp. ovifera* var. *texana* following Decker (1988), it is more likely that they were cultigens. Carbonized pepo rind fragments from archeological sites do not necessarily reflect the original rind thickness of the gourd, squash, or pumpkin fruits they came from. Interior cell layers may have rotted, been scraped, or otherwise eroded away, and some shrinkage probably occurred during carbonization.

Since the Caddo Indians at European contact grew pumpkins, squashes, and "calabazas" (Swanton 1942), I believe these rind fragments probably came from domesticated rather than wild-growing fruits. If they were members of populations originally domesticated in Mexico that diffused into the Eastern Woodlands via the Greater Southwest, they would be classified as *C. pepo* ssp. *pepo*. This subspecies is likely to represent a separate lineage that today includes the jack-o-lantern pumpkin, zucchini squash, orange ball gourd, and other cultivated varieties such as traditional Mexican landraces (Fritz 1990; Heiser 1989; Smith 1987, 1989). If, however, the Roitsch site specimens came from fruits belonging to a lineage domesticated in eastern North America from a texana-like ancestor, they would be classified as *C. pepo* ssp. *ovifera* var. *ovifera*. This taxon includes modern cultivars such as yellow crookneck squash, scallop (pattypan) squash, and diverse ornamental gourds. It would include squashes grown prehistorically for seeds and/or for fleshy pulp as well as pepo gourds (not to be confused with the bottle gourd, *Lagenaria siceraria*) grown primarily for use as containers or other utensils.

Maize

Recognizable maize kernel and cob fragments were present in 12 samples, giving a ubiquity value of 60 percent. All five sites contained maize in at least one sample, with a total weight of 4.11 g. The overall maize assemblage consists of one virtually complete kernel (but missing the embryo), 60 kernel fragments, 128 virtually complete cupules, 372 cupule fragments, and 49 glumes or fragments of glumes. The measurable kernel is from Feature 405 at the Roitsch site, measuring 6.5 mm in width and 5.2 mm in height. Thickness (or internode length) could not be measured due to the shape distortion caused by carbonization. The width of one fragmentary kernel from Lot 98 at the Salt Well Slough site (41RR204) could be measured, yielding a value of 6.0 mm.

Table 36 presents measurements of entire cupules. Most of these (109 out of the total number of 128) were recovered from Feature 2 at the Ray site. The archeobotanical assemblage from this small pit consisted primarily of cupules, glumes, and fragments thereof, with corn fragments larger than 2.0 mm weighing 3.29 g. The only other categories of archeobotanical material represented in this pit were wood charcoal (109 pieces weighing 1.30 g) and unknowns (18 pieces weighing a total of 0.08 g). Many of the latter may well be unrecognizable fragments of corn cobs. As mentioned above, cupule fragments were not pulled from the smaller than 2.0 mm portion of this sample. The five complete cupules smaller than 2.0 mm, however, are included in the measurements. A number of cupules larger than 2.0 mm are still attached to adjacent cupules in the row, with six sets of three cupules joined along a row, and nine sets of two cupules. The pit probably contained larger cob segments that fell apart during flotation. Because none of the cob fragments submitted for analysis have more than a fraction of the cob's circumference, I could not determine row numbers. Wood charcoal from this feature yielded an uncorrected radiocarbon date of A.D. 740 $\pm$ 90 (the calibrated age range at 1-sigma is AD 759-895, with a 73 percent relative area under probability distribution). Calibrated radiocarbon ages on the corn itself in this feature date from AD 1000-1205 (Bruseth et al. 2001:206 and Table 11).

Cupule widths from Feature 2 of the Ray site range from 3.5 mm to 7.6 mm, with a mean of 5.60 mm (standard deviation= 0.740 mm). Mean cupule widths for the other three sites with measurable cupules vary between 4.60 mm and 5.78 mm, but no single sample other than the one from Feature 2 at the Ray site includes more than six measurable cupules.

In spite of the early radiocarbon date from Feature 2, the cupules are not notably different in size than those from the Early to Late Caddo period contexts represented at the other sites; indeed, the radiocarbon dates on the corn from Feature 2 indicate they accumulated in Formative to Middle Caddo period times. Internode lengths from the Ray site sample may appear to be significantly larger (mean=3.19 mm as compared to other means of 1.75 to 2.60 mm) but this is probably due to the fact that Ray site internode lengths include only those specimens that consisted of two to three adjoining cupules. The internode length measurements of single cupules from the other sites are likely to be unrealistically small.

Archeologists will need to recover and analyze assemblages that include complete cobs or segments having entire, intact circumferences before

Table 36. Maize Cupule Measurements.

Site	Lot #	Fea #	Cupule Frags.	Whole Cupule	Cupule Width Range (mm)	Mean Cupule Width (mm)	I. L. Range (mm)	Mean I. L. (mm)
41LR135								
	124	2	225	109	3.8-7.6	5.60	2.5-3.0	3.19
	125	1	-	-				
	126	1	-	-				
	127	Hearth	-	-				
	128	Hearth	-	-				
41RR14								
	292	2	4	-				
41RR16								
	953	601	-	-				
	1015	101	-	-				
	1016	601	-	-				
	1017	405	45	6	3.5-6.2	4.73	2.0-2.2	2.06
	1018	405	26	2	5.3-5.6	5.45	2.2-3.0	2.60
	1019	601	6	-				
	1020	402	15	2	5.0-5.2	5.10	1.5-2.0	1.75
	1021	601	4	-				
	1025	B. 20	10	1	5.1			2.3
41RR204								
	98	-	24	3	3.9-5.5	4.60	1.7-2.5	2.13
	99	6	1	-				
	100	8	2	-				
	101	11	-	-				
41RR236								
	37	1	10	5	5.0-7.5	5.78	2.0-2.7	2.34
Totals			372	128				

interpretations can be made about changes in maize morphology through time in the Red River Caddo area. The meager information available to date indicates that Early Caddo maize had a high proportion of small cobs with low row numbers (Jones 1949). Very late 18th century maize at the Roseborough Lake site consists of 8-row to 14-row cobs with a mean row number of 11.73 for the assemblage (Fritz 1986a). These few studies are insufficient for suggesting general trends.

Ceramics and other artifacts from the Ray site indicate that a Woodland period occupation occurred there, and the uncorrected radiocarbon date of A.D. 740 ± 90 from Feature 2 indicates that the corn from this pit may have been grown by some of the earliest farmers in the region. The two-sigma date range, however, extends beyond A.D. 900, as do the two-sigma ranges of two other radiocarbon dates from the site (Bruseth and Banks 1992). It is a source of some concern that corn is not present in any of the other Ray site flotation samples. A direct AMS date on cupules from Feature 2 should be obtained before concluding that this represents the earliest corn in Northeast Texas, especially since it gives no indication of differing morphologically from the Early Caddo through Late Caddo period corn from the Roitsch, Saltwell Slough, and the Pine Cone sites. Subsequent to the first writing of this section in 1992, AMS dates were obtained on the Feature 2 corn, as previously mentioned, and they indicate the corn "at the site was from a later Caddoan occupation" at the Ray site (Bruseth et al. 2001:213).

Seeds

The 20 flotation samples yielded a total of 102 fully or partially carbonized seeds. Seventy-seven of these—all from Feature 601 of the Roitsch site—are viewed with extreme suspicion due to the partially carbonized condition of many, the likelihood that they represent species not growing in North America before European contact, and the presence of carbonized wheat (*Triticum* sp.) and uncarbonized seeds such as Johnson grass (*Sorghum halapense*) that are undoubtedly Old World introductions. After subtracting the 27 suspected contaminants, the seed assemblage totals 75 (Table 37). Ten fully carbonized seeds from Feature 601 have not been subtracted. Nine of these represent common prehistoric seed types: four maygrass (*Phalaris caroliniana*), one little barley (*Hordeum pusillum*), one chenopod (*Chenopodium* sp.), one vetch-type (Fabaceae), one grape family (Vitaceae), and one purslane (*Portulaca oleracea*) that are present in other samples reported here. The 10th seed is unidentified. Because the Feature 601 samples are so contaminated, some analysts might prefer to disregard all seeds and other carbonized plant remains from this highly disturbed feature. An uncorrected radiocarbon date on charcoal of A.D. 1110 ± 120 (calibrated age range at 1-sigma is AD 1154-1296), however, demonstrates that some of the archeobotanical material is prehistoric in age. Middle Caddo period ceramic types were also present in the fill of the feature (see Block VI discussion, this article).

The most common seed type in the combined assemblage from the five sites excavated in 1991 is maygrass (*Phalaris caroliniana*), with a total of 21 specimens distributed across eight samples (Ubiquity value of 40 percent). Next most abundant is chenopod (*Chenopodium* sp.), with 15 seeds from six separate samples (Ubiquity value of 30 percent). Four purslane (*Portulaca oleracea*) seeds were found, each in a separate sample (20 percent Ubiquity). Four round seeds or cotyledons thereof, each in a separate sample and varying from 1.3 to 1.5 mm in diameter, have been classified as "vetch-type" because they likely represent one or more of the species of native *Vicia* or *Lathyrus*. All vetch-type specimens in these samples lack seed coat or hilum characters that would enable them to be identified to the genus or species level. Two fragmentary seeds in the grape family (Vitaceae) are likely to have come from grape fruits (*Vitis* spp.), but are not in good enough condition to be classified to that genus rather than others in the same family. Two pine seeds (*Pinus* sp.) were present in the sample from the Pine Cone site that consists primarily of pine cone fragments. The remaining seed types, each with a single representative, include amaranth (*Amaranthus* sp.), bedstraw or cleavers (*Galium* sp.), spurge (*Euphorbia* cf. *maculata*), and grass family (Poaceae).

As Story (1990a:253-255) has noted, there is currently little, if any, evidence indicating that people in the Red River Caddo archeological area grew native seed crops prior to the introduction of maize, or that they grew these crops along with maize during Early Caddo times. Insufficient flotation has been conducted at components in East Texas dating between 200 B.C. and A.D. 1250, the general time frame when the so-called Eastern North American Agricultural Complex flourished

Table 37. Seeds.

Lot #	Fea #	Phal. car.	Hord. pus.	Poa-ceae	Chen. sp.	Amar. sp.	Port. ole.	Gal. sp.	Euph. mac.	Faba-ceae	Vita-ceae	Pinus sp.	UNID seeds	Frags.*	Total
41LR135															
125	1	-	-	-	-	-	-	-	-	-	-	-	-	1	0
127	Hearth	7	-	-	-	-	-	-	-	1	-	-	-	-	8
41RR14															
292	2	-	-	-	-	1	1	-	1	-	-	-	3	7	6
41RR16															
1015	101	-	1	-	-	-	1	-	-	-	-	-	-	-	2
1017	405	3	-	-	1	-	1	-	-	-	-	-	5	10	10
1018	405	2	-	1	1	-	-	-	-	-	-	-	5	4	9
1019	601	2	-	-	1	-	-	-	-	1	1	-	1	6	6
1020	402	1	-	-	-	-	-	1	-	-	-	-	3	3	5
1021	601	2	-	-	-	-	-	-	-	-	-	-	-	16	2
1025	B-20	3	-	-	3	-	-	-	-	1	-	-	1	2	8
41RR204															
98	-	-	1	-	8	-	-	-	-	-	-	-	-	10	9
99	6	-	-	-	-	-	-	-	-	1	-	-	3	6	4
100	8	-	-	-	-	-	-	-	-	-	1	-	-	-	1
41RR236															
37	1	1	-	-	1	-	1	-	-	-	-	2	-	-	5
Totals		21	2	1	15	1	4	1	1	4	2	2	21	65	75

* Unidentifiable Seed Fragments are not included in Total Seed Counts

elsewhere, but negative evidence from small-scale sampling operations such as this TAS Field School make it seem increasingly unlikely that native seed plants were significant crops in this region.

Maygrass is considered a cultivated seed plant when recovered from sites in the Midwest, where it does not grow spontaneously today but constitutes a significant proportion of Late Woodland and Early Mississippian period seed assemblages. The maygrass seeds from Roitsch, Ray, and the Pine Cone sites may also have been harvested from cultivated plants, but it seems equally, if not more likely, that Red River Caddo people utilized the native maygrass from wild or encouraged populations. Maygrass was likely a welcome food source, since the seeds are highly nutritious and mature in the late spring when stored food reserves might be running low (Cowan 1978; Crites and Terry 1987).

The chenopod seeds from these samples do not exhibit the seed coat reduction or truncate margins diagnostic of the North American cultigen, *C. berlandieri* ssp. *jonesianum* (Smith 1984, 1985a, 1985b; Fritz and Smith 1988; Smith and Funk 1985). Variation in shape and seed coat texture indicates that more than one wild or weedy species is represented here, but all seed coats are thick. Native chenopods were probably harvested by prehistoric Caddo people for the leafy greens, but we cannot assume that all seeds entering the archeobotanical record came from economic plants. By the Woodland period, and probably much earlier, human activity in Northeast Texas would have resulted in open, disturbed habitats colonized by ruderal species such as many of the native chenopods. Some seeds from these prolific seed producers could have become carbonized as part of accidental "seed rain."

A third member of the Midcontinental pre-maize crop complex, little barley, is represented by only two seeds. Like maygrass, little barley is native to Northeast Texas and might have been harvested from spontaneous populations in the early summer. Purslane, amaranth, spurge, and bedstraw are ruderal plants that have edible parts, but may have entered these samples as weeds harvested with maize or other cultigens, or incidentally as seed rain.

The vetch-type seed, likely either *Lathyrus* sp. or *Vicia* sp., has been recovered from several other sites in East Texas (Crane 1988, 1990; Fritz 1987) and Oklahoma (Fritz 1989). These might represent plant parts harvested for seeds or for the sweet, green pods. Grapes (*Vitis* sp.) were, of course, regularly consumed by Southeastern Indians (Swanton 1979).

An unusually high proportion of the seeds (a total of 21) remains unidentified. Some of these may have come from economically useful plants brought to the sites, but since they occur in assemblages reflecting relatively little use of native seeds, I tend to suspect that most are incidental inclusions. One type of unidentified seed occurred in both samples from Feature 405 at the Roitsch site, with a total of five specimens. These slightly reniform seeds range from 1.4 mm to 1.5 mm in length and 1.2 mm to 1.3 mm in width. A relatively thick, smooth, outer coat is slightly split in a few of the specimens, revealing an inner kernel or endosperm. A second, very small, unidentified seed type was found in three separate samples from two sites, Roitsch and Fasken, with a single seed of this type in each sample. Lengths range from 0.7 to 1.0 mm; widths from 0.5 to 0.7 mm. These seeds are oval and flattish, with one end more constricted than the other from top to bottom, resembling some seeds of the Mint family (Lamiaceae). A long-term paleoethnobotanical effort in this area would, of course, include the building of modern reference collections from Red River County and searches through local herbaria in an attempt to identify unknown seed types such as these.

Sixty-five seed fragments are considered unidentifiable. The heavy fractions of these samples were generally filled with small rocks that would be highly damaging to fragile archeobotanical remains. In retrospect, given the poor light fraction recovery rate and the abundance of gravels in the soil matrix, an IDOT system is probably not the best flotation recovery method for use on Red River Caddo sites. A SMAP-type machine (Pearsall 1989; Watson 1976), with water pressure from below aiding light fraction recovery, would be preferable.

DISCUSSION OF SUBSISTENCE INDICATORS

Given a total assemblage of only 20 samples distributed across five sites, it is impossible to present conclusions concerning subsistence trends through time or to define elements of a Caddo subsistence system at any point in time on the basis of the meager information available. For our knowledge of prehistoric Caddo plant use to rise above its present level, archeologists must begin investing heavily in flotation equipment oriented specifically to the soils and other particular conditions of this region. Research strategies must include systematic flotation sampling procedures allowing statistically valid comparisons within and between sites to be made. Paleoethnobotanists must be incorporated into the research process at the highest decision-making levels as full-time team members in the field and laboratory, as well as at the publication stage. In the meantime, rudimentary observations can be made.

Possible Woodland Period or Formative Caddo Period: The Ray Site

The possibility of obtaining a pre-Caddo subsistence assemblage from the Ray site is exciting. As noted above, the maize concentration from Feature 2 (Lot 124) was thought to represent some of the earliest corn grown in northeastern Texas, although it has now been established that it dates after the 11th century A.D. If an adequate set of firmly dated samples from this site (thought by Bruseth et al. [2001] to mainly date between A.D. 800-1000) and contemporaneous components verifies the high visibility of maize and low proportion or absence of native seed crops before A.D. 900, we can begin modeling an agricultural trajectory with maize adopted by previously non-gardening populations during the later centuries of the 1st millennium A.D. Maize intensification may then either precede or be directly correlated with the formation of recognizable Caddo sociopolitical units. If future investigations support the high ubiquity and/or frequency of maize on the Red River of Northeast Texas before A.D. 900, the situation here will seem different from that currently visible in the Ozarks and Arkansas River valley (Fritz 1986b, 1989, 1990), where corn is poorly represented before ca. A.D. 1100 and where native seed crops appear to have been widely produced before maize was intensified.

Early to Middle Caddo Period

Four samples from the Roitsch site and two from Fasken were most likely deposited during the Early to Middle Caddo periods. Unfortunately, the Middle Caddo samples from Roitsch are all from Feature 601, which was severely disturbed by a pothunter's trench and can be judged generally contaminated by the non-indigenous plant remains. However, the maize fragments, maygrass seeds, chenopod seeds, acorn, and hickory nutshell fragments from Feature 601 reflect part of what might be predicted for Early to Middle Caddo plant utilization. The sample from Feature 2 at the Fasken site (Lot 292) contained few carbonized plant remains, but did include maize, hickory nutshell, acorn shell, and a few seeds (one amaranth, one purslane, one spurge, and three unidentified).

Late Caddo Period

Seven samples come from proveniences thought to reflect Late Caddo plant use. Feature 1 (Lot 37) at the Pine Cone sites dates to the earlier part of the McCurtain phase, ca. A.D. 1300-1500. Maize fragments and a few seeds (one maygrass, one chenopod, one purslane, and two pine) were included with the carbonized pine cone parts that dominated this sample.

The four Saltwell Slough samples also belong to the earlier part of the McCurtain phase. All but one of these contains maize, two have thick hickory nutshell, two have pecan, and one includes acorn shell. Eight chenopod seeds, one little barley, one vetch-type, and one grape family seed may also reflect subsistence-related activities at this site.

Feature 405 at the Roitsch site (Lots 1017 and 1018), a hearth that contained Late Caddo ceramics, was rich in maize, hickory, walnut, and acorn shell and included one fragment of Cucurbita rind. Maygrass, chenopod, and purslane seeds were also recovered from this feature. Feature 402 (Lot 1020) included two Cucurbita rind fragments, along with maize, hickory, pecan, and acorn shells.

Either Early or Late Caddo

Samples from Feature 101 (Lot 1015) and the fill of Burial 1 in the East Mound (Lot 1025) are not readily assignable to either the Early or Late Caddo periods based on their archeological contexts. The sample from Feature 101 was virtually devoid of archeobotanical remains, but the other yielded maize, hickory, pecan, and acorn shell fragments along with a typically low count of seeds.

ISSUES FOR FUTURE INVESTIGATION

The archeobotanical remains recovered by flotation from five sites excavated by the Texas Archeological Society field school participants offer an enigmatic glimpse of prehistoric plant use, but larger-scale recovery and more systematic sampling are needed before meaningful interpretations can be offered. Several issues discussed by Story (1990a) and Burnett (1990) will hopefully be addressed by future subsistence-oriented research projects in this area.

First, what is the best way to model the interrelatedness of maize agriculture and the formation of hierarchically ranked Caddo polities? Second, what differences in amounts of maize consumption, and presumably in intensity of farming, might have existed among groups living in different ecological sub-regions of the greater Red River Caddo area? If validated by further bioarcheological and archeobotanical evidence, why did these sub-regional variations exist? Third, did farming in this area develop with a primary focus on maize, without significant production of the pre-maize native annual seed crops important for Woodland and Emergent Mississippian period societies of the Midwest, the Ozarks, and Arkansas River valley? Fourth, what types of *Cucurbita pepo* squashes, gourds, and pumpkins were grown here? Do the rind fragments from Cooper Lake sites (Crane 1988) and now from the Roitsch site as well, represent "tropical" cultigens domesticated in Mexico; do they belong to an indigenous, domesticated *ovifera* subspecies with a wild Texas gourd-like ancestor, or did they come from free-living populations rather than cultivated or domesticated ones? Fifth, are cultivated beans (*Phaseolus vulgaris*) as late as indicated by the incomplete archeobotanical record currently available? Were they grown only when and where the most intense agriculture was practiced and, if so, how does this vary through time and across space?

Caddoan-speaking women observed by early Europeans were serious farmers who also harvested quantities of nuts, wild fruits, and underground plant parts to feed their families and fulfill social and ritual obligations. The 20 samples of archeological plant remains reported here may not furnish a great deal of information about the prehistoric development of Caddo food ways, but they do reflect the general pattern documented ethnohistorically, and make some progress in the direction of understanding the late prehistoric subsistence in this region.

MORE MACROBOTANICAL MATERIALS FROM THREE SITES ALONG THE RED RIVER, NORTHEAST TEXAS: RAY (41LR135), FASKEN (41RR14), AND ROITSCH (41RR16)

S. Eileen Goldborer

Thirty flotation samples from the 1992 Texas Archeological Society Field School were submitted for macrobotanical analysis. Seventeen samples came from the Ray site (41LR135), five from Fasken (41RR14), and eight from Roitsch (41RR16). Two samples from the Ray site were labeled: Light Fraction "1 of 2" and "2 of 2"; two others were labeled: Heavy Fraction "l of 2" and "2 of 2." The companion bags for this light and heavy fraction were combined to facilitate reporting. The resulting 28 samples are summarized in Table 38. Those 28 samples represent 17 proveniences within 11 features. All light and heavy fractions having the same lot number (i.e., identical provenience) have been grouped together in the summary tabulation. Table 39 reviews the total number of samples and features analyzed from Ray, Fasken, and Roitsch for the combined 1991 and 1992 field seasons.

Both charred and uncharred materials were sorted from the soil matrix. Carbonized macrobotanical remains identified during the analysis include wood charcoal, thick hickory nutshell (*Carya* sp.), walnut shell (*Juglans nigra*), seeds, and maize (*Zea mays* ssp. *mays*) (Table 40). Uncarbonized branchlet fragments of juniper (*Juniperus* sp.) were present in all but a few samples. On the other hand, uncharred rootlets that commonly appear in flotation samples occurred in only one fraction. Fresh seeds were present in a number of samples from Ray and a few from Roitsch. Non-botanical items sorted from the soil matrix included bone, lithics, pottery sherd fragments, shell, and snails. Only three lots from the Fasken site did not contain one or more of these material types. Many of the samples contained bone or microlithic artifacts (smaller than 7 mm), many of which had been exposed to fire.

The selection and flotation of soil samples for the 1992 season were made by the same methods used for the 1991 TAS Field School. After selection in the field by site supervisors, soil samples were again processed at a field laboratory in Idabel, Oklahoma, across the Red River from

Table 38. Summary of Flotation Samples by Site.

Site No.	Site Name	Lot	Fraction Type	Feature No.	Level
41LR135	Ray	481	Light	Fea. 1	L. 2
41LR135	Ray	481	Heavy	Fea. 1	L. 2
41LR135	Ray	482	Light	Fea. 1	L. 3
41LR135	Ray	482	Heavy	Fea. 1	L. 3
41LR135	Ray	483	Light	Fea. 1	L. 4
41LR135	Ray	483	Heavy	Fea. 1	L. 4
41LR135	Ray	484	Light	Fea. 1	L. 5
41LR135	Ray	484	Heavy	Fea. 1	L. 5
41LR135	Ray	485	Light	Fea. 1	L. 5
41LR135	Ray	485	Light (Bag 2)*	Fea. 1	L. 5
41LR135	Ray	485	Heavy	Fea. 1	L. 5
41LR135	Ray	485	Heavy (Bag 2)*	Fea. 1	L. 5
41LR135	Ray	486	Light	Fea. 40	-
41LR135	Ray	486	Heavy	Fea. 40	-
41LR135	Ray	487	Heavy (only)	Fea. 60	-
41LR135	Ray	488	Light	Fea. 37	-
41LR135	Ray	488	Heavy	Fea. 37	-
41RR14	Fasken	551	Light	Fea. 23	L. 7
41RR14	Fasken	552	Heavy (only)	Fea. 22	L. 7
41RR14	Fasken	553	Light	Fea. 21	L. 6
41RR14	Fasken	553	Heavy	Fea. 21	L. 6
41RR14	Fasken	554	Heavy	Fea. 24	L. 7
41RR16	Roitsch	1308	Heavy (only)	Fea. 104	L. 7
41RR16	Roitsch	130g	Light	Fea. 104	a*
41RR16	Roitsch	1309	Heavy	Fea. 104	b*
41RR16	Roitsch	1310	Light	Fea. 208	-
41RR16	Roitsch	1310	Heavy	Fea. 208	-
41RR16	Roitsch	1311	Heavy (only)	Fea. 208	L. 9
41RR16	Roitsch	1312	Light	Fea. 310	-
41RR16	Roitsch	1312	Heavy	Fea. 310	-

* "Bag 1 of 2" and "Bag 2 of 2" for each fraction of Lot 485 were combined during analysis
a* level not designated on bag
b* level designated as 55-70 cm

the excavations. The same "IDOT" box flotation method (Pearsall 1989) was used to process the 1991 and 1992 samples. The 1991 flotation process has been fully described by Fritz (1992:1, 2, see also Fritz, this article). As was done with the 1991 data, light and heavy fractions were also analyzed and tabulated separately.

METHODOLOGY

After flotation, samples were delivered to the author for sorting and analysis. All light and heavy fractions were weighed before sorting. To facilitate sorting, each sample was passed through geological sieves (4.0, 2.0, and 1.0. mm). All

Table 39. Sample and Feature totals for Ray, Fasken, and Roitsch Sites: 1991 and 1992 Field Seasons.

Site	Features	Total Samples	Total
Ray			
	1991	5*a	4
	1992	15*b	4
	Combined	20	7*c
Fasken	1991	1	1
	1992	5	4
	Combined	6	5
Roitsch			
	1991	9	5
	1992	8	3
	Combined	17	8

a*: Two bags from same fraction were combined into one sample for analysis (Fritz 1992:1)
*b: Two bags for each of two fractions were combined into one sample for each fraction (see Table 38)
*c: One of the features represented in 1992 was also represented in 1991, so that a total of only seven features are actually represented over both seasons

Table 40. Carbonized Plant Remains from the 1992 TAS Field School.

Fea.	Lot No./ Type	Initial Sample Wt. (g)	Wood Ct.	Wood Wt. (g)	Hickory Ct.	Hickory Wt. (g)	Walnut Ct.	Walnut Wt. (g)
41LR135, Ray								
F. 1	481/Light	10.0	0	0.0	1	0.1	0	0.0
F. 1	481/Heavy	87.0	4	0.3	2	0.1	0	0.0
F. 1	482/Light	11.0	0	0.0	0	0.0	0	0.0
F. 1	482/Heavy	76.0	3	0.2	3	0.1	0	0.0
F. 1	483/Light	15.0	0	0.0	0	0.0	0	0.0
F. 1	483/Heavy	101.0	6	0.4	300+	5.0	0	0.0
F. 1	484/Light	9.0	0	0.0	7	0.3	0	0.0
F. 1	484/Heavy	102.0	300+	4.0	300+	7.0	0	0.0
F. 1	485/Light*	20.0	16	1.4	1	0.2	0	0.0
F. 1	485/Heavy*	103.0	15	1.0	300+	17.5	6	0.5
F. 40	486/Light	4.0	0	0.0	0	0.0	0	0.0
F. 40	486/Heavy	26.0	0	0.0	0	0.0	0	0.0
F. 60	487/Heavy	22.0	300+	9.0	0	0.0	0	0.0
F. 37	488/Light	6.0	5	0.3	6	0.5	0	0.0

Table 40. *(Continued)*

Fea.	Lot No/ Type	Initial Sample Wt. (g)	Wood Ct.	Wood Wt. (g)	Hickory Ct.	Hickory Wt. (g)	Walnut Ct.	Walnut Wt. (g)
F. 37	488/Heavy	44.0	300+	3.0	300+	7.0	0	0.0
Subtotal		636.0	949+	19.6	1220+	37.8	6	0.5
41RR14, Fasken								
F. 23	551/Light	5.0	0	0.0	0	0.0	0	0.0
F. 22	552/Heavy	14.0	0	0.0	0	0.0	0	0.0
F. 21	553/Light	0.5	0	0.0	0	0.0	0	0.0
F. 21	553/Heavy	1.0	0	0.0	0	0.0	0	0.0
F. 24	554/Heavy	19.0	0	0.0	0	0.0	0	0.0
Subtotal		39.5	0	0.0	0	0.0	0	0.0
41RR16, Roitsch								
F. 104	1308/Heavy	196.0	18	1.6	6	0.5	0	0.0
F. 104	1309/Light	21.0	6	0.3	5	0.3	0	0.0
F. 104	1309/Heavy	126.0	3	0.3	0	0.3	0	0.0
F. 208	1310/Light	2.0	5	0.3	2*a	0.02	0	0.0
F. 208	1310/Heavy	6.0	1	0.1	0	0.0	0	0.0
F. 208	1311/Heavy	5.0	39	1.8	24	2.0	0	0.0
F. 310	1312/Light	5.0	0	0.0	0	0.0	0	0.0
F. 310	1312/Heavy	176.0	2	0.2	5	0.3	0	0.0
Subtotal		537.0	74	4.6	42	3.42	0	0.0
Totals		1212.5	1023+	24.2	1262+	41.22	6	0.5

*Two bags of this fraction combined for analysis
*a under 2 mm, each assigned wt. of 0.01 g

fractions were fully sorted except for charcoal and nutshell below 2 mm in size, and snails below 1 mm in size. The number of snails below 1 mm in length was estimated, but they were not collected. In the one sample where charcoal or nutshell fragments were present only in a sample below 2 mm in size, a weight of 0.01 g was recorded for each fragment. All charred seeds and maize fragments, regardless of size, were removed from the flotation samples.

Size-segregated fractions were sorted under a Meiji binocular microscope (7X to 45X). A comparative collection, and standard identification manuals (Delorit 1970; Martin and Barkley 1973; Montgomery 1977) were used to identify seeds. An attempt was also made to identify wood sources of charcoal. However, charcoal was generally very fragile, often breaking into minuscule fragments when snapped. For fragments not breaking up, standard references (Core et al. 1979; Dimbleby 1967) and a comparative collection were used for identification purposes.

Table 40. *(Continued)*

Fea.	Lot No. Type	Maize Cupules Whole	Maize Cupules Frags.	Maize Other Ct.	Maize Wt. (g)	Seeds Whole	Seeds Frags.	Unknown Count
41LR135, Ray								
F. 1	481/Light	0	0	0	0	5	2	0
F. 1	481/Heavy	0	0	0	0	0	0	0
F. 1	482/Light	0	0	0	0	0	0	0
F. 1	482/Heavy	0	0	0	0	0	0	0
F. 1	483/Light	0	0	0	0	0	0	0
F. 1	483/Heavy	0	0	0	0	0	0	0
F. 1	484/Light	0	0	0	0	0	0	0
F. 1	484/Heavy	0	0	0	0	0	0	0
F. 1	485/Light*	0	0	0	0	0	0	0
F. 1	485/Heavy*	0	0	0	0	0	0	0
F. 40	486/Light	0	0	0	0	0	0	0
F. 40	486/Heavy	0	0	0	0	0	0	0
F. 60	487/Heavy	0	0	0	0	0	0	0
F. 37	488/Light	1	0	0	0.1	0	0	0
F. 37	488/Heavy	2	0	0	0.1	0	0	0
Subtotal		3	0	0	0.2	5	2	0
41RR14, Fasken								
F. 23	551/Light	0	0	0	0	0	0	0
F. 22	552/Heavy	0	0	0	0	0	0	0
F. 21	553/Light	0	0	0	0	0	0	0
F. 21	553/Heavy	0	0	0	0	0	0	0
F. 24	554/Heavy	0	0	0	0	0	0	0
Subtotal		0	0	0	0	0	0	0
41RR16, Roitsch								
F. 104	1308/Heavy	0	1	0	0.1	0	0	0
F. 104	1309/Light	0	1	0	0.1	0	0	0
F. 104	1309/Heavy	1	1	0	0.1	1	1	0
F. 208	1310/Light	0	0	0	0	0	0	0
F. 208	1310/Heavy	0	0	0	0	0	0	0
F. 208	1311/Heavy	3	13	2*a	0.5	0	0	1*b
F. 310	1312/Light	0	0	0	0	0	0	0
F. 310	1312/Heavy	0	0	0	0	0	0	0
Subtotal		4	16	2*a	0.8	1	1	1*b
Totals		7	16	2*a	1.0	6	3	1*b

* Two bags of this fraction combined for analysis
*a Two sets of two spikelets attached at base, each with glumes intact
*b may be endosperm from a kernel

RESULTS

Wood Charcoal

Only 16 (57 percent) of the 28 flotation samples had wood charcoal larger than 2 mm in length for a total weight of 24.2 g. The total charcoal weight per site for Ray (Features 1, 37, and 60) and Roitsch (Features 104, 208, and 310) are 19.6 g and 4.6 g, respectively. No charcoal was present in samples from Feature 40 at the Ray site. Similarly, none of the four post holes represented by the five samples from Fasken had any charcoal. Individual sample weights are recorded in Table 40. When both field seasons samples were combined (see Fritz 1992, and this article), 85.7 percent of the features at Ray and all of those at Roitsch had charcoal.

Examination of the wood charcoal was made at magnifications up to 100X. The size and fragile condition of the small amounts of charcoal present in both the Ray and Roitsch samples generally precluded identification of wood taxon. However, several pieces from both light and heavy fractions at the Ray site (Unit S61W41, East half, Feature 1, level 5) were ring-porous with general characteristics consistent with oak (*Quercus* sp.). Several pieces from the heavy fraction of that provenience were identified as being in the white oak group, which includes such local natives as post oak (*Q. stellata*) and bur oak (*Q. macrocarpa*) (Simpson 1988:280, 297).

The largest amount of charcoal extracted from any one sample was 9 g from Feature 60 at the Ray site. All fragments were under 5 mm in length and most were very distorted. While the wood family was not identified, four pieces had the same semi-ring porous structure combined with unevenly spaced, narrow rays. Such a structure at least eliminates oak, which was present in Feature 1 at the Ray site, and native gymnosperms such as Loblolly pine (*Pinus taeda*) and Eastern red cedar (*Juniperus virginiana*) (Simpson 1988:188, 228). Pine cone fragments from an unidentified species were present in Feature 1 (Fritz 1992:3). Uncharred juniper branchlet fragments occurred in numerous 1992 Ray samples.

Nutshell

Only black walnut (0.5 g) and thick hickory (41.22 g) nutshell were present in the 1992 TAS Field School samples. All of the nutshell came from either the Ray or Roitsch site; none came from Fasken. Although 15 (53.6 percent) of the total samples had some nutshell, both ubiquity and abundance were greatest in the Ray samples.

Among the 15 Ray site samples, 10 (66.7 percent) had hickory nutshell. However, walnut was retrieved from only one Ray sample (Feature 1, level 5). Level 5 also provided the largest amount of hickory nutshell. While only four (26.7 percent) of the 1992 Ray samples came from level 5 of Feature 1, they account for 66.1 percent of the total hickory nutshell by weight and 82.5 percent from all Feature 1 levels. A noticeable increase in nutshell is apparent in level 4 from that obtained in higher level (levels 2 and 3) samples.

When combined, the six samples from levels 4 and 5 include 60 percent of the 10 Ray samples with hickory nutshell, and 75 percent of such samples (n=8) from Feature 1. They account for 79.4 percent of the total hickory nutshell by weight within all 1992 Ray samples, and 99 percent of it from all Feature 1 levels. On the other hand, no nutshell was present in samples from Ray Feature 40 or Feature 60. Six (75.0 percent) of the eight Roitsch fractions also had hickory nutshell. When the data for both field seasons are combined, the ubiquity of nutshell within all features sampled at Ray and Roitsch is 57.1 percent and 87.5 percent, respectively.

Maize

Six (21.4 percent) of the 28 samples contained whole or partial maize cupules. Cupule measurements are presented in Table 41. While maize was present in fractions from the Roitsch and Ray sites, it was not found in any of the five flotation samples from Fasken.

Half of the eight Roitsch samples from the 1992 field season contained corn. Since four samples from the 1991 season also contained maize (see Table 36), ubiquity remains about the same (47 percent) when the 17 Roitsch samples from both field seasons are combined. All of the 1992 Roitsch fractions with maize came from either Feature 104 (hearth) or Feature 208 (Burial 21). The corn from Feature 104 includes one whole cupule and three cupule fragments. One cupule fragment measures 3 mm in width and is about 60 percent complete. This suggests a complete charred width of 5 mm, identical with the width of the whole cupule.

Table 41. Maize Whole Cupule Measurements.

Site	Feature	Whole Cupules (Ct.)	Cupule Width (mm)	Mean Width (mm)	Internode Length (mm)	Mean Internode Length (mm)
Ray						
	F. 37	3	4.8-5.1	4.97	2.0-3.0	2.33
Roitsch						
	F. 104	1	5.0	5.0	2.0	2.0
	F. 208	3	4.5-5.4	5.07	1.5-1.9	1.77

The three whole cupules from Feature 208 are 4.5 mm, 5.3 mm, and 5.4 mm wide. The whole cupule widths from Feature 104 and Feature 208 fit within the range (3.5-6.2 mm) of 11 others that Fritz (see Table 36) retrieved from four Roitsch samples excavated during the 1991 TAS Field School. Of the 13 cupule fragments from Feature 208, three had more than half of the cupules preserved. This allows an estimation of the original charred widths as being 5.0 mm, 5.1 mm, and 6.0 mm. These projected widths also fall within the range for the 1991 samples. The mean whole cupule widths for samples from Features 104 and 208 (Burial 21) are 5.0 mm and 5.07 mm, respectively.

If the projected complete cupule widths for the three fragments in Feature 208 are combined with whole cupule widths, the mean for that feature would rise slightly to 5.21 mm. All of these means are consistent with those for the four 1991 samples of 4.73 mm, 5.1 mm, 5.1 mm, and 5.45 mm (see Table 36) from Roitsch Features 402, 405, and Burial 20. Mean internode lengths of cupules from Feature 104 and Feature 208 are 2.0 mm and 1.77 mm, respectively. Those measurements are within the range and means that Fritz (see Table 36) found for single cupules from Roitsch.

In addition to cupules, two sets of two spikelets still attached at their bases were also recovered from Feature 208 at Roitsch. Both of the lower glumes as well as the two upper glumes were still attached to spikelet tissue. The glumes are narrow, forming radial widths for the individual ranks of 5.3 mm and 5.4 mm, respectively. The radial width of two adjacent lower glumes within one rank should approximate the charred cupule width, so that the previous measurements are consistent with the widths of the cupules from Feature 208. Spikelet thickness as defined by Bird (1990:12) is approximately 1 mm for each set of spikelets. Feature 208 also had one charred and distorted fragment recorded as an unknown, but which may be endosperm from a kernel.

Two (13.3 percent) of the 15 1992 TAS samples from the Ray site contained maize. Since only one 1991 Ray flotation sample had corn, ubiquity remains low (15 percent) even when the 20 Ray samples from both seasons are combined. Twelve (60 percent) of the combined 1991 and 1992 Ray samples came from Feature 1, which had no remains of maize.

During the 1992 field season, flotation samples were taken from four features (Features 1, 37, 40, and 60), but both of the fractions with maize came from only one feature (Feature 37). Ray samples from the 1991 season also came from four features (Feature 1, 2, Hearth [N328E425], and Hearth-Top [S61W41]), but maize was only present in Feature 2 (see Tables 35 and 36). The only maize remains in Feature 37 were three complete cupules. Those cupules' widths (4.8 mm, 5.0 mm, and 5.1 mm) have a mean of 4.97 mm. These widths and mean fall within the width range of the 109 whole cupules recovered from Feature 2 during the 1991 season (see Table 36). However, the Feature 37 mean is somewhat smaller than the 5.6 mm mean (see Table 36) from Feature 2.

Internode lengths for the three single cupules in Feature 37 (see Table 41) had a smaller range and mean than those measured from Feature 2 by Fritz (1992:7 and Table 3). However, Fritz (1992:7) notes that the Feature 2 internode lengths were measured on specimens with two or three adjoining cupules.

A larger and truer measurement can be expected for those internode lengths than on single cupules where the edge of the internode may not be as clearly defined. The width/internode (w/i) ratio of the means from Feature 2 cupules, from which the internode measurements are probably the most reliable, is greater than one (i.e., w/i=1.75). A width/internode ratio over one is indicative of Maiz de Ocho or eight-rowed corn (Galinat 1985:261-263). All of the means for single whole cupules retrieved during the combined field seasons have a width/internode ratio of more than 2.0 (Table 42). Even if the larger, and probably more realistic, 3.19 internode mean from Feature 2 at Ray were used to adjust "w/i" mean ratios for cupules from each feature sampled during the 1991 and 1992 field seasons, the resulting "w/i" mean ratios would have a value of 1.4 or more (see Table 42).

Charred Seeds

Despite an attempt to recover all charred seed remains regardless of size, only two (7.1 percent) flotation samples from the 1992 excavations yielded any. One fraction came from the Ray site and one from the Roitsch site. When samples from both the 199l and 1992 field seasons are considered, two (10 percent) of the 20 Ray fractions and nine (52.9 percent) of the 17 Roitsch fractions contained charred seeds. Of the features sampled during both field seasons, two (28.6 percent) of the seven at Ray and six (75 percent) of the eight samples at Roitsch also contained charred seeds.

Five whole and two fragments of charred seeds were present in one sample from Feature 1 (Lot 481) at the Ray site. These seeds are all bedstraw

Table 42. Integration of 1991 and 1992 Field Season Maize Cupule Means and Width/Internode Ratios for Features at Five Red River Sites by Descending Mean Width.

1991*a Site/Fea.	1992 Site/Fea.	Mean Cupule Width (mm)	Mean Internode Length (mm)	W/I Ratio*	W/I Ratio* Based on Largest I. L. Mean of 3.19*b
41RR236/F. 1		5.78	2.34	2.47	1.81
41LR135/F. 2		5.60	3.19*b	1.75	1.75
41RR16/B. 20		5.10	2.30	2.22	1.60
41RR16/F. 402		5.10	1.75	2.91	1.60
41RR16/F. 405		5.09*c	2.33*c	2.18	1.59
	41RR16/ F. 208	5.07	1.77	2.86	1.59
	41RR16/ F. 104	5.00	2.00	2.50	1.57
	41LR135/ F. 37	4.97*c	2.33*c	2.13	1.56
41RR204/lot 98		4.60*d	2.13	2.16	1.44

*width/internode ratio over 1.0 is considered indicative of Maiz de Ocho or eight-rowed corn (Galinat 1985:261-263)
*a based on Fritz (1992:Table 3) (see also Table 36, this article)
*b this mean is considered most accurate, because it is based on internode lengths taken between adjoining attached cupules, rather than on single cupules
*c mean based on average of means for all samples from this feature
*d slightly larger than the 4.4 mm mean cupule width recorded for cupules from the Copple Mound at the Spiro site, Oklahoma (Fritz 1989:74)

or cleavers (*Galium* sp.). Twelve (60 percent) of the combined 1991 and 1992 samples came from Feature 1. However, Feature 1 provided only one of the two fractions with charred seeds from Ray.

A Roitsch sample from Feature 104 contained one nearly whole seed and one seed fragment. The almost complete seed is native violet (*Viola* sp.). This seed closely resembles Plate 197 in Martin and Barkley (1961:33) of *V. palmata*. *V. palmata* is not listed in the *Manual of the Vascular Plants of Texas* (Correll and Johnston 1979). However, Steyermark (1963:1082) states that variants of *V. triloba*, a bottomland wood violet native to East Texas, are often misidentified as *V. palmata*. If there is a close relationship between the two species, the seeds may also look very similar, but a comparative specimen was not available. The seed fragment from Feature 104 preserves about half the seed with identifying characteristics. The fragment is a gromwell or puccoon (*Lithospermum* cf. *carolinense*).

Charred seeds may occur in the archeological record as "seed rain" or from direct or indirect use (Minnis 1981:145). Prehistoric seeds used for food, medicine, or other purposes, as well as seeds attached to plants processed for different parts, have a higher likelihood of being exposed to fires in a cultural context and, therefore, of becoming charred. The native violet and gromwell at Roitsch occur together with maize in a hearth (Feature 104).

The leaves of native violets can be eaten and are extremely high in vitamins C and A (Zennie and Ogzewalla 1977:76-79). Various parts of indigenous violets were used by Native Americans to make medicines, especially for urinary tract problems (Erichsen-Brown 1979:329-332; Vogel 1970:387). Gromwell (puccoon) seeds were also used to treat urinary problems by the early European settlers (Erichsen-Brown 1979:458). With the wide knowledge Indians had of native plants, they may also have been familiar with similar healing properties in native gromwells.

Since neither native violet or gromwell commonly appear in the archeological record and since both are historically known for treating similar ailments, a medicinal as well as a food use could account for the appearance of *Viola* and *Lithospermum* together in Feature 104. *Lithospermum*, however, does have several other documented uses among Native Americans, so that it might have been collected for one purpose, but also used for a secondary reason. The primary use was of the root of yellow puccoon (*L. caroliniense*) and other species as a dye for decorating the body, baskets, or other objects (Erichsen-Brown 1979:318, 458-459). Puccoon seems to be an Algonquian term applied to several roots including *Lithospermum* sp. and *Sanguinaria canadensis* (bloodroot) that yield a red or yellow dye (Gove 1976:237, 1836). Since cane stem and bedstraw/cleaver are also present at Roitsch (Fritz 1992:4, 9; see Tables 35 and 36, this article), the potential use of puccoon/gromwell as a cane dye should be noted.

Some species of cleaver were also used among native peoples to produce a red dye as well as medicine (Erichsen-Brown 1979:267-268, 336, 338). *Galium* and *Lithospermum* are occasionally reported at Caddo sites. For instance, *Lithospermum* sp. seed beads were placed around the neck of one of the Early Caddo burials in Feature 134 at the George C. Davis site (41CE19) on the Neches River (Story 1997:22). Galium was also present at the Ray site. Cleaver and cane were present in numerous flotation samples from the Copple Mound at the Spiro site in eastern Oklahoma (Fritz 1989:66-69, 79). *Lithospermum* has also been reported at the Hays Mound (3CL6) in Arkansas, which dates to approximately A.D. 1100-1300 (Cutler and Blake 1973:11).

Uncharred Seeds

As uncharred seeds have a poor chance of long-term preservation, they are generally considered modern contaminants (Minnis 1981:143-150). However, modern seeds may indicate changes in vegetation from that which surrounded the prehistoric site. Eighty-seven fresh seeds were present in 13 (86.7 percent) of the 15 Ray samples from the 1992 field season. One uncharred seed was present in one (12.5 percent) sample from the Roitsch site. None occurred in the Fasken samples. These uncharred seeds' taxa are listed in Table 43. In addition to fresh seeds, uncharred branchlet fragments of juniper (*Juniperus* sp.) occurred in 23 (82.1 percent) of the 28 1992 flotation samples. The uncharred juniper fragments are also considered modern contaminants that were probably blown in during excavation of the units.

Chenopodium occurred in both charred and uncharred forms within the combined 1991 and 1992 Ray and Roitsch samples. However, all of the *Chenopodium* from the Ray samples are fresh and considered modern intrusions. On the

Table 43. Uncharred Seeds.

Family	Genus/Species	Common Name	Ray Fea.	Ray Ct.	Roitsch Fea.	Roitsch Ct.	Fasken Fea.	Fasken Ct.
Caryophyllaceae	*Stellaria media*	Common Chickweed	1	4	-	-	-	-
Chenopodiaceae	*Chenopodium* sp.	Goosefoot	1 37 40	5 1 3	-	-	-	-
Cupressaceae	*Juniperus* sp.	Juniper	1 37 40	* * *	104 208 310	* * *	21 22 23 24	* * * *
Cyperaceae	*Carex* sp.	Sedge	1	5	-	-	-	-
Euphorbiaceae	*Croton* cf. *capitalus*	Doveweed (spurge)	1 37 40	40 4 6	-	-	-	-
Gramineae	*Paspalum* sp.	Grass	1 60	2 2	-	-	-	-
Oleaceae	*Fraxinus* sp.	Ash	1	1	104	1	-	-
Polygonaceae	*Rumex* sp.	Dock	1	1	-	-	-	-
Ranunculaceae	*Ranunculus* sp.	Buttercup	1 37	12 1	-	-	-	-

* Uncounted branchlet fragments

other hand, the goosefoot seeds from Roitsch are charred and occur with other common prehistoric seed types (Fritz 1992:Table 4). The one charred spurge (*Euphorbia* cf. *maculata*) removed from a Fasken sample (Fritz 1992:Table 4; see Table 37, this article) is not matched by any of the 50 uncharred spurge seeds (*Euphorbia* cf. *capitalus*) that are considered to be modern contaminants in three features at Ray.

DISCUSSION

As the archeobotanical data base grows, archeologists expect to achieve a broader understanding of man and plant interactions within the Red River Caddo subsistence system. Although the flotation samples from the 1992 field season have not provided the depth of information about local or regional plant use that was sought, they have furnished some supplemental data on the Ray and Roitsch sites. Unfortunately, the five samples from post holes within Fasken did not provide any charred plant materials. The new data from Ray and Roitsch, however, do bear on observations and issues raised by Fritz (1992, see also this article) after she analyzed charred archeobotanical remains from the 1991 field season.

During the 1991 field season, maize was excavated from a pit (Feature 2) at the Ray site (see Table 36). Artifacts from the site and a uncorrected radiocarbon date of A.D. 740 $\pm$ 90 from a pit (Feature 2) suggested to Bruseth and Banks (1992) that the maize was associated with a Woodland period occupation (Fritz 1992:7). This situation is significant, because it suggested that the maize in

Feature 2 may be some of the earliest grown in the region. However, Fritz (1992:7, 8, 12) presented a case against making such an assumption without the direct dating of the Feature 2 corn. Her concern involved the observation that no maize was present in any of the other three features (a pit and two hearths) at Ray represented by the 1991 flotation samples. In addition, the cupule width range and mean for Feature 2 are comparable with those for later Caddo contexts (see Fritz, this article). Therefore, gathering additional information about the ubiquity, abundance, morphology, and age of the maize at the Ray site was a priority in selecting the 1992 field season's flotation samples In fact, as Bruseth et al. (2001: Table 11) indicate, directly dated maize from Feature 2 now has calibrated 1-sigma date ranges of AD 1000-1040 and AD 1035-1205.

When the data from both field seasons are combined, the ubiquity of charcoal, nutshell, charred seeds, and maize for features at the Ray and Roitsch sites remains essentially unchanged from those of the 1991 samples alone. However, maize from one additional feature (Feature 37) within the Ray site was found in two 1992 field season flotation samples. The maize from this feature is contemporaneous with the Feature 2 maize (Bruseth et al. 2001: Table 11). The ubiquity of maize within total samples from Ray is only 15 percent for the combined field seasons. However, as 60 percent of the combined fractions came from Feature 1, which had yielded no maize remains, a more accurate picture may be formed by looking at the presence of corn within the total number of features sampled by flotation. Maize was present in 28.6 percent of the total combined features sampled at Ray. Maize and charred seeds of wild plants were present in an equal number (n=2) of features at Ray, and thus they are equally ubiquitous among the features. However, maize and wild seeds were not present in the same features. Maize, because of its durability, was less likely to be underrepresented in the features than the seeds of wild plants.

When one combines both field seasons' flotation data, one finds that Roitsch has a substantially higher maize ubiquity than Ray. While Ray values are only 15 percent for total samples and 28.6 percent for features, those values for Roitsch are 58.8 percent and 75 percent, respectively. The presence of maize in six (75 percent) of the eight features sampled at the Roitsch site approaches that of Spoonbill (41WD109). Spoonbill, an Early to Middle Caddo period site located about 150 km southwest of Roitsch, provides one of the better documented botanical assemblages for a Caddo site in Northeast Texas. Maize was present in five (83.3 percent) of the six features (pits) flotation-sampled at Spoonbill (Perttula et al. 1982:91, 93).

The percentages of sampled features with maize at Roitsch and Spoonbill compare closely to the range (70.8-92.4 percent) for three Emergent Mississippian (A.D. 800-1000) floodplain sites extensively examined in the archeological study of the American Bottom in Illinois (Bareis and Porter 1984; Johannessen 1984:197-214). In the American Bottom, maize first becomes common during the Emergent Mississippian period (Johannessen 1984:203). For that study, "common" is defined as occurring in 50 percent or more of the features analyzed for that component (Johannessen 1984:203). From this perspective, maize is common at Roitsch and Spoonbill, but not at the Ray site. In the American Bottom study, two floodplain sites for the Late Woodland (A.D. 300-A.D. 800, the cultural period just prior to the Emergent Mississippian), have less than 6.5 percent of the features containing maize (Johannessen 1984:204 and Table 12). The 6.5 percent value actually represents only one cupule with attached glumes from one feature (Johannessen 1984:203). None of the seven upland sites in the American Bottom studied from the Late Woodland period have any maize at all (Johannessen 1984:204 and Table 12).

Another site with well-documented botanical recovery is the Bohannon site (34HU61) in Hughes County, Oklahoma. Bohannon is approximately 120 km north of the Red River sites under discussion herein. The artifact assemblage and radiocarbon dates indicate that Bohannon has Caddo affiliations and dates roughly between A.D. 1000 and A.D. 1300 (Charles Wallis, 1986 personal communication). Bohannon appears to be a base camp with either a long-term or recurrent occupation (Goldborer 1991:173) contemporary with the earlier component (i.e., before the substantial McCurtain phase occupation dating after A.D. 1300) at Roitsch and much of the Spoonbill occupation. Despite the relatively good preservation of organic matter at Bohannon and the intensive effort to recover it, only two (3.2 percent) of the 62 features investigated were associated with maize (Goldborer 1988:1,18-19). Such a low presence of maize within the site features implies that its use was low (cf. Pearsall 1989:212).

The Bohannon inhabitants could have represented hinterland Caddo populations not fully integrated with groups living along the Red River possessing the more elaborate Caddo cultural characteristics (Goldborer 1991:175). One explanation for the low usage of corn at Bohannon when reliance was growing in other areas is discussed elsewhere (Goldborer 1991:171-183). The important point here is that, if the presence of maize in 3.2 percent or 6.5 percent of a site's features represents little use and levels at Roitsch (75 percent) and Spoonbill (83.3 percent) represent "common" use, then the level of maize ubiquity at Ray (28.6 percent) would seem to indicate something beyond incipient use, yet not a level of "common" usage.

From this perspective, the ubiquity of maize within features supports the idea that Ray represents a lower level of acceptance of corn horticulture into the prehistoric Caddo subsistence system than does either the Roitsch and Spoonbill flotation data. If the corn from Ray and Roitsch does represent plant remains from sequent occupations, then a regional trend towards maize farming had begun to emerge earlier than has been previously accepted. In the less likely event that the maize at Ray should prove to be contemporary with the Caddo period sites, then Ray, like the Bohannon site, may represent circumstances that were either different or marginal to those occurring at regional sites where corn appears to have been "common."

Fritz (1992:7, see also Fritz, this article) found that the Feature 2 corn from Ray was comparable with that from later Caddo contexts. Finding maize in additional features at Ray could provide additional data on its morphology and ubiquity. Another opportunity for confirming the early presence of maize at Ray would also be available. Three whole cupules were preserved in the samples from Feature 37. While not abundant, this maize does offer an additional opportunity to compare the size of cupules from Ray with that of other regional sites believed to date to a later time period; the maize from Feature 37 has a 1-sigma calibrated age range of AD 1045-1220, see Bruseth et al. 2001: Table 11). Table 42 places the maize that was recovered from all sites excavated during both field seasons in order by mean cupule width per feature. The mean widths of cupules from Ray clearly fall into the range of means from the other regional Red River Field School samples, all of which are considered later occupations. Therefore, the 1992 paleobotanical data further support Fritz's (this article) finding that there is a similar morphology of corn at Ray, that may belong to an earlier cultural period, and maize from the other sites that were sampled.

In addition, the mean width/internode ratios (see Table 42) indicate the presence of an eight-rowed corn at all five of the Red River sites excavated during the 1991 and 1992 field seasons. The maize cupules from the Red River sites, like those from the Davis site (41CE19) (Jones 1949) and Spiro (34LF46) (Fritz 1989), tend to have smaller widths than those from other eastern regions where eight-rowed corn is present (Adair 1990:1-12 and Table 2; Blake and Cutler 1979:54; Cutler and Blake 1973). Galinat (1985:267) has suggested that the smaller eight-rowed ear bearing small kernels present in the prehistoric southeastern United States may not have developed from the large kerneled Maiz de Ocho of the Southwest, but rather from a more primitive Mexican ancestor. In the last several decades, researchers have made continuous progress toward understanding the evolution of maize, and unraveling the relationship of maize races (Benz 1986; Benz and Itlis 1992; Sanchez-G and Goodman 1992; Staller et al. 2006; Zeder et al. 2006). Such research may ultimately lead to determining the biological origin of the earliest prehistoric maize in Texas. In order to understand the geographical and cultural pathways through which the smaller eight-rowed corn spread across the Caddo region, measurements should be reported for existing maize assemblages such as those documented for Spoonbill and Steck (41WD529) (Perttula et al 1982:93, 95) as well as for new collections.

SUMMARY

A relatively small amount of charred botanical remains were recovered from the 1992 TAS flotation samples. Nevertheless, these materials provide supplemental data to those gathered from the 1991 field season samples, as earlier discussed by Fritz. They help to build a regional Caddo subsistence data base. The new data reflects the use of oak wood, nutshell (i.e. hickory and walnut), and maize. In addition, three types of charred seeds that might be the result of human use were recovered. Two of the three seeds could represent food or possible medicinal use. However, the presence of cleaver at both Ray (see Table 40) and Roitsch (see Table 37) as well as cleaver's association with cane (see Tables 35 and 37) and gromwell (see Table 40) at Roitsch suggests its possible use as dye for decoration.

When the data on maize for both field seasons are combined, they indicate a similar small eight-rowed corn at both Ray and Roitsch. However, the feature ubiquity of maize indicates a different level of use between the two sites. The level of use at Ray appears to be beyond an incipient stage, without having attained a level of "common" usage. On the other hand, maize use at Roitsch seems to have been "common." This similarity of maize types at both sites, contrasting with different levels of use, serves to reemphasize the need to resolve the date for maize at the Ray site. In an attempt to confirm whether or not the maize at Ray is associated with a Woodland period occupation, charred maize from Feature 2 and Feature 37 were submitted for radiocarbon dating (James Bruseth, 1995 personal communication; see Bruseth et al. 2001). The results indicate that the maize from the Ray site dates to the Formative and Middle Caddo periods.

Confirmation for the age of maize at Ray should help to elucidate the diachronic pattern of regional subsistence. However, even without such clarification the botanical remains from the Red River sites have improved the regional subsistence data base. These data make an important contribution to our knowledge of the geographical distribution of a small eight-rowed corn variety that has been documented for the Davis site and Spiro, and that may have a different origin than Maiz de Ocho.

OBSERVATIONS ON THE FAUNAL REMAINS FROM THE 1991 FIELD SCHOOL ON THE RED RIVER IN RED RIVER COUNTY, TEXAS

Bonnie C. Yates

INTRODUCTION

More than 10,000 fragments of animal bone were recovered by excavators from five sites during the 1991 Texas Archeological Society (TAS) Field School in Lamar and Red River counties, Texas. In addition, approximately 65 fragments were collected during surveys associated with the Field School. This section will document the initial analysis of these faunal remains by providing an inventory of recorded specimens (Appendix VII and VIII, this article) from the Roitsch (41RR16) and Ray (41LR135) sites, commentary on the ecological and economic aspects that are suggested by the identified taxa, and descriptions of butchering patterns and modified bone.

Eighty-two percent of the recorded faunal remains were recovered from the Roitsch site (41RR16), mainly from the cemetery area and Blocks III and IV in the McCurtain phase village (Table 44). The Ray site (41LR135) generated the next largest assemblage primarily as a result of excellent preservation, given the small extent of excavations conducted at the site in 1991 (see Bruseth et al. 2001). Unfortunately, poor preservation of bone was the culprit responsible for paltry quantities of faunal remains from Fasken Mounds (41RR14), and surface exposure accounted for low recoveries from the survey sites and Jonesborough (41RR15), as well. Salt Well Slough (41RR204), however, has the potential of yielding well preserved faunal remains due to the clayey matrix there. Considering how difficult excavation was at that site, the quantity of bone that was recovered is high, and the overall condition of the bone is good. Analysis of the Salt Well Slough material has been hampered however, by the time-consuming and labor-intensive need to re-wash the bones in order to remove the inevitable clay "slip" that was left on the bones after initial treatment in the field lab. Therefore, the remainder of this section will focus on the faunal remains from the Roitsch and Ray sites.

METHODS

Standard zooarcheological methods have been used. The animal bone was washed and sorted in the TAS field lab and submitted for identification and quantification. Provenience was rigorously maintained. Unidentified fragments were divided into unburned and burned categories and counted. Attributes of identified elements were recorded as taxon, body part, side of body, element portion, age, condition (burning), modification, and taphonomic appearance.

Quantification of the faunal assemblages have been summarized as minimum number of identified specimens per taxon (NISP) and a minimum number of individuals (MNI) for identified elements. MNI estimates were calculated according to the most frequent element, based on symmetry and element portion (Munzel 1986) and then determined by adapting Grayson's (1978) minimum distinction

Table 44. Number of Bones for Each Site Collection 1991 TAS Field School.

Site	Area	No. of Bones
Roitsch (41RR16)	Block I	695
	Block II	448
	Block III	3,322
	Block IV	1,012
	Cemetery	1,715
	Trench I	64
	Special Test Units	578
	Youth Area	140
	General Collection	522
	Roitsch Site Total	8,496
Ray (41LR135)	Ray Site Total	1,477
Fasken Mounds (41RR14)	Trench I	11
	Trench II	24
	Mound C	12
	Area D	5
	Test Units	16
	Fasken Site Total	68
Salt Well Slough (41RR204)	Salt Well Slough Site Total	578
Jonesborough (41RR15) Prehistoric only	Total	27
Survey Sites Prehistoric only	Total	65
Total BONES		10,711

method. Other considerations in determining MNI include age (based on dental eruption/occlusal wear) and/or epiphyseal fusion, and also on the relative sizes of otherwise analogous specimens in the comparative collection.

Species identifications were made in the field lab in the fairgrounds of Idabel, Oklahoma, by the author, Mr. Bill McClure, Mr. Brian Shaffer, and Ms. LeeAnna Schniebs. Further identifications were made by the author and others in the Zooarchaeology Laboratory at the University of North Texas, with occasional recourse to standard osteological keys such as Olsen (1960, 1964, 1968), Gilbert et al. (1981), Hillson (1986), and Sisson and Grossman (1953). Only positive identifications resulted in assigning elements to genus or species.

The attributes of each specimen were coded for computerization. Data manipulation was enhanced by using FACS, a vertebrate faunal analysis coding system developed by Shaffer and Baker (1992). Although this flexible, dBase-based, system had been involved in several analyses during its development, the TAS Field School was the first time it had been used in the field. And because there were computers present at the Field School, the data were input daily, and various types of summary information could then be made available to the site directors during the ongoing excavations.

Elements of non-diagnostic skeletal value (e.g., ribs and long bone shafts; see Olsen 1961) have been coded by the estimated size of the most likely taxon. For example, in what is called a "indeterminate large mammal" category, these specimens are considered to be in the size range of pigs, cattle, or horses. Recording these bones in a size category allows as fine a level of observation as the specimen permits: otherwise, the specimen would be considered unidentifiable (i.e., Vertebrata). In small samples, noting size categories of non-diagnostic elements broadens the utility of the bone assemblage. The "medium/large mammal" category accommodates skeletal elements that are the size equable to deer, but which are damaged or too incomplete to be assigned firmly to order (Artiodactyla), genus (*Odocoileus*), or species (*O. virginianus*).

Study Area

Red River and Lamar counties of Northeast Texas are located at the western edge of Blair's (1950) Austroriparian biotic province within the drainage basin of the Red River upstream of that river's Great Bend. Historically, this area is characterized as a pine and hardwood forest dotted with prairie remnants and oxbow ponds and sloughs. According to Blair (1950:99), the Austroriparian biotic province of Texas contains at least 47 mammals, 29 species of snakes, 10 species of lizards, two terrestrial turtles, and 35 amphibians. While Blair infers that bird life in the biotic provinces of Texas in beyond the scope of his study, the estimate must be between 280 and 450 species of birds, because of the area's diverse habitat and its location along the Central Flyway.

The Woodland to Late Caddo hunters seemingly then would have had a plethora of wildlife to exploit. But what the numbers fail to indicate is how difficult it would have been to procure the vast majority of these resources. At least half of the mammalian class represented in Blair's account are tiny bats, mice, or insectivores. Likely the same is true for the reptiles and amphibians. Thus, the hunters are left to take those resources that provide ample return for their expended energy.

Carnivores, such as bear, panther, bobcat, wolf, coyote, otter and other weasels, are generally under-represented in archeological assemblages, perhaps due to an ideological proscription against these hunting competitors. Such cunning, adversarial animals were often totemic to Native American groups and would be killed or consumed in restrictive ceremonial contexts. Swanton (1942:134-135) mentions pre-hunt rituals involving the staple meat source of deer and ceremonial consumption of domestic or hybrid dogs, the "jubines," but he gathered no data on any ritualism regarding bear. In fact, bear fat and bear hunting are consistently mentioned as routine subsistence activities in the 17th and 18th centuries among the Caddo (see Swanton 1942), although bear bones are rarely found in archeological sites.

A review of the literature of Formative to Late Caddo period sites in Northeast Texas indicates 10 taxa that are consistently represented in faunal remains recovered in archeological contexts: white-tailed deer, tree squirrels (Sciuridae), rabbits (Lagomorpha), beaver (*Castor canadensis*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), turkey (*Meleagris gallopavo*), turtles (Emydidae), freshwater drum (*Aplodinotus grunniens*), and catfishes (Ictaluridae) (Butler 1974, 1975; Henderson 1978a, 1978b, 1982; Parmalee and Bogan 1981; Parmalee and Opperman 1983; Yates 1988a, 1988b, 1999). The taxa lists from these reports contain additional animals that undoubtedly provided meat and fur resources to peoples inhabiting the Austroriparian province; some of the more important species (from an ethnological or ecological point of view) will also be discussed herein.

White-tailed Deer

By virtue of their diverse adaptability and reproductive success, deer has been an important food resource for human through the ages. They also provided raw material for clothing, shelter, and tools. Although deer are available year round, individuals or small parties of Omaha hunted deer usually in the winter when the deer were in good condition (Fletcher and La Flesche 1911:270-271). Other mid-continental natives employed various tactics to bring down this prey item. The Chippewa had several techniques for hunting deer, such as the use of pitch torches and deer calls. Deer were attracted to the light of a pitch torch and to the sound of an instrument producing a sound similar to that emitted by a fawn (Densmore 1929:128-129). Swanton (1942:136) cites two diarists who depict a ritual used before a deer hunt by the Caddo that involved placing a preserved head of a deer on a post of the hunter's door and reciting prayers for a successful hunt, painting their bodies, and. using deer antlers as decoys during the hunt.

Tree Squirrels

This taxa consists of the fox squirrel and the gray squirrel, both of which inhabit the Austroriparian province. The gray squirrel is restricted to heavily wooded streams, and the fox squirrel prefers the upland forests. However, within their ranges both species can occur together (Bee et al. 1981:96-101; W. B. Davis 1974:158-162; Jones et al. 1985:163, 166). Ethnographic data indicates that tree squirrels are listed as a food resource of the Omaha (Fletcher and La Flesche 1911:104). The tail of the black (fox) squirrel was used to decorate the moccasins of young Osage men, and small Osage boys hunted squirrels with blunted dogwood arrows (Mathews 1961:20, 448). No specific mention regarding the historic Caddo use of squirrel was found. The bones found in archeological contexts of Caddo sites, however, are often burned and found to exhibit consistent breakage patterns in the long bones. Other squirrel remains may be incidental, having been preyed upon by the domestic dogs kept by the Caddo.

Rabbits

There are three sizes of rabbits that would have been available to Caddo hunters: jackrabbit, swamp rabbit, and cottontail. The swamp rabbit (*Sylvilagus aquaticus*) probably goes unrecognized in some archeological assemblages because its intermediate size might appear to overlap the upper and lower registers of the other Lagomorphs. It does, however, have some specific diagnostic characteristics on several individual elements that aid in distinguishing it from the other two (e.g., malar bone configuration and protuberances on the innominate, etc.). All three appear to be present in most of these Caddo sites.

Ethnographic accounts of rabbit hunting are pandemic. The Omaha used headless arrows with sharpened shafts for hunting rabbits (Fletcher and La Flesche 1911:451).The Chippewa caught rabbits in snares and prepared the carcasses two ways: (a) the meat was removed from the bones, roasted and pounded. The bones were then pounded with what meat remained on them. The pounded bones were boiled in a small kettle and the grease skimmed off and eaten with the pounded meat; and (b) the meat was cut in pieces and dried, the bones being dried also. The bones were pounded to a powder and mixed with the dry meat and any available grease. This was eaten dry, and not boiled at the time of using (Densmore 1929:44).

Caddo women used rabbit skins dyed red for tying their hair behind their heads (Espinosa 1927:177). Newcomb (1961:139) notes that the Tonkawa, dreaded enemy of the historic Caddo, ate rabbits along with rodents, skunks, and land tortoises.

Beaver

America's largest rodent, it inhabits permanent bodies of water, which it either creates by damming streams and living in bough dens, or in creeks and rivers where it burrows into soft banks. Beavers are abundant along watercourses on the Plains, where their preferred foods—cottonwoods and willows—are plentiful (Davis 1974:188-190; Hall and Kelson 1959:547, Jones et al. 1985:194; Schwartz and Schwartz 1981:174-181).

Historical accounts do not reveal how the Caddo traditionally hunted or used the beaver. Other groups of mid-continental Indians participated in the trapping of beaver for the fur trade for almost 300 years (ca. A.D. l550-1840). Their traditional uses of this valuable fur-bearers may shed insight into how the Caddo might have dealt with beaver. For example, Tonkawa men occasionally tied their hair with beaver fur (Newcomb 1961:138). The Chippewa trapped beaver for its tail, which was considered a great delicacy because of its high fat content (Densmore 1929:44). The Osage hunted beaver for meat and pelts (La Flesche 1932:221; Mathews 1961:447). Prior to the appearance of Euro-Americans, the Cheyenne used dogs to hunt beaver for food and clothing (Grinnell 1923:295-296).

Opossum

A nocturnal animal, the opossum could be easily killed if encountered at night or trapped in a snare. They occupy a wide range of wooded habitats, upland or bottomland, and provide about one kg of edible meat. Opossums were probably hunted by the prehistoric Caddos for food and pelts, as was done by historic groups, such as the

Osage (La Flesche 1932:30) and Omaha (Fletcher and La Flesche 1911:104).

Raccoon

Raccoon are omnivores and therefore can be found in a variety of habitats usually exploited in seasonal rounds (Smith 1975:42). Henderson (1982:143) notes that in winter and spring they can be found in wooded floodplains where they avail themselves of acorns and crayfish; in summer and fall, they would be found dispersed in the uplands where they eat plums, berries, and insects. At nearly any time they could be encountered at pond shores or near creeks eating mussels. Like the opossum, the raccoon is primarily nocturnal, but might be encountered at dawn and dusk. Ethnographic accounts exist of the use of this valuable fur-bearer by other historic Plains peoples, such as the Omaha (Fletcher and La Flesche 1911:104), Pawnee (Weltfish 1977:155, 376), and Osage (La Flesche 1932:91) strongly suggest similar predation by the Caddo.

Turkey

According to Smith (1975:77-78), turkeys are known to use a variety of habitats during seasonal feeding rounds. Meanley (1956) studied flocks along Mississippi River tributaries in southeastern Arkansas and found them congregated in winter and spring along terrace ridges feeding on mast; in summer and fall, they can be found in the vegetated areas around oxbow lakes and sandbars. The formation of large flocks in the fall is controlled to a degree by the availability of acorn and other mast (Bull and Farrand 1977:631-632; Johnsgard 1979:125; Martin et al. 1951:107-108).

Schorger (1966) includes details of Indian and pioneer hunting techniques ranging from shooting into roosting flock to the use of snares and traps. Most of Schorger's accounts deal with fall-winter hunts. The Caddo employed turkey head decoys when hunting these birds (Swanton 1942:135-136). Some other Southeastern groups used fire or dogs when hunting turkeys. The birds were either roasted or boiled when prepared by the Caddo (Swanton 1946:329-330, 369).

Turtles

Turtle shell fragment. often seem ubiquitous, almost background "noise," in zooarcheological assemblages. While it is true that one should expect large quantities of shell fragments because of their propensity of breaking into ever-smaller, though recognizable, fragments, the astounding fact remains that in some assemblages there are multiple genera present, not just one or two crushed individuals, but sometimes as many as five or six. Then it appears that actually there is not enough shell to accommodate the number of individuals represented. This has been the case in several prehistoric Caddo sites examined by the author. The point, therefore, is that prehistoric peoples of East Texas actively hunted (or gathered) turtles, including them in their diets not as a passive food resource, but deliberately, and it would seem enthusiastically.

Box turtles seem to be the most abundant of the turtles used by the Caddo, perhaps because of the ease of capturing these slow-moving terrestrial reptiles. The population density for box turtles may be one per km^2 (Henderson 1982:143) in Texas. The presence of burned shell fragments suggests box turtles were cooked in their shells and consumed as food resources. In addition, their shells may have been a source of raw material for tools and ornaments (e.g., carapace bowls, shell rattles, etc.). Although box turtles may have been easy to obtain by simply picking them up when observed, special techniques were probably necessary to procure the aquatic species. However, some may have been caught when they ventured onto land to nest. Soft-shell turtles are difficult to catch because they can swim and walk fast and their shells are slippery, making them hard to hold. Currently, though, soft-shell and slider turtles are captured with a hook and line (Hudson 1942:101) and a similar technique may have been used prehistorically. The Cheyenne used a variety of methods for obtaining aquatic turtles by hand (Grinnell 1923, Vol. I:307-308). Some were caught as they came to the surface to breathe: "sometimes when turtles were abundant, and only one or two men or boys were together, they tied grass and willows about their heads, and very slowly approaching a turtle at the surface, put the hands under it and caught it" (Grinnell 1923, Vol. I:308). The underwater locations of turtles were discerned by long lines of people wading in the water and feeling for the submerged turtles with their feet. The turtles were grasped by hand as they tried to escape or as they were held in place by the hunter's feet.

Freshwater Drum

These fish can attain lengths of 80 cm, thus providing up to 60 pounds of edible flesh. It inhabits soft, muddy bottoms of rivers, creeks, and lakes where it feeds almost entirely on mollusks (Smith 1975:54). Its flat-topped grinding pharyngeal teeth and large otoliths are diagnostic and preserve well in most archeological contexts. Because they are bottom-feeders, they are difficult to catch with a hook and line, but they can become easily stranded in backwater areas when floodwaters subside (Henderson 1982:144). The flesh of this species is firm but the taste is good (Kemp 1971:19). Prehistoric peoples procured drum by using nets and/or spears. The Caddo preserved fish by smoking the flesh (Newcomb 1961:294).

Catfishes

This is a large family of fishes with species ranging in size from a few inches to five feet in length. The medium-size species, notably channel catfish (*Ictalurus punctatus*), seem to be the most representative of this family in archeological sites. Being taxonomically primitive, this group has robust skeletal features that are noticeable and easily avoided when eating the flesh. Prehistorically, young catfish of the medium and large species (e.g., *Ictalurus natalis* and *Pylodictis olivacis)* would have been easy to trap in nets and/or to spear while in shallow water. They may also have been caught on hooks.

During spawning, large fish congregate in shallow water near the shore. At these times, it was probably feasible to spear the fish (Parmalee et al. 1976). The Cheyenne caught fish in willow nets. They also trapped fish in pounds or pens made of willow saplings (Grinnell 1923, Vol. I: 309-310). It was also possible to obtain fish when water levels lowered in rivers and streams. During these periods, fish became concentrated in smaller, shallower areas and were probably caught by hand. Large, bottom feeders were stranded in deep holes and became easy prey. The Pawnee took fish in this way. They preferred catfish, often fishing with a decorticated willow stick mat (Weltfish 1977:231). The Omaha sometimes shot or speared fish. They also used a movable weir of willows to drive fish into shallow water where the fish could then be shot, speared, or caught by hand (Fletcher and La Flesche 1911:312). In addition to these methods, various Southeastern groups also used poison, trot lines, hooks and lines, and drags (Swanton 1946:332-344). The "Creeks sometimes dragged brush about in a pool of water until it became so muddy that the fish came to the surface for air, when they were shot with arrows or speared" (Swanton 1946:343). It is probable that a variety of fishing techniques were employed by the Caddo inhabitants of the middle Red River area.

The above accounts concern just a few of the many faunal resources procured by Native American groups. Many other fishes and birds, reptiles, and mammals constitute taxa lists of recovered animal remains in good archeological contexts and are presumed to represent food resources for these people. The Roitsch and Ray sites provide additional data toward the reconstruction of the dietary habits of prehistoric Native Americans who lived in Northeast Texas.

RESULTS OF THE FAUNAL ANALYSES

Roitsch Site (41RR16)

Formerly called the Sam Kaufman site, a sample of faunal remains from this site was examined by the author at Southern Methodist University (SMU) prior to the 1991 TAS Field School. This was done to determine the degree of preservation of animal bone from the site; consequently, some estimate was obtained regarding the recovery potential of faunal remains and the kinds of animals that could be expected from the TAS excavations.

The recovery of these specimens currently in curation at SMU occurred in 1968 (Skinner et al. 1969). Animal remains constitute two paragraphs in this report, one on mollusks and one on deer bone (Skinner et al. 1969:105). Artifacts made from shell and bone were reported from burial goods, and consist of numerous beads made from freshwater mussel, shell gorgets, zoomorphic pendants and inlays from conch columella, and two drilled bear tooth pendants from Burial 11. Skinner et al. (1969:104) note the association of these artifacts with the late manifestations of the Southern Cult or Southeastern Ceremonial Complex that had also been found at the Belcher, Foster, and Friday sites on the Red River in southwestern Arkansas and northwestern Louisiana, citing Webb (1959) and Waring and Holder (1945) as authorities on those sites and similar artifacts.

My examination of the faunal remains from the SMU excavations also noted the preponderance of deer bone, but many other species were present. Squirrel and rabbit were particularly abundant, and a few bovid-size bones were present. Unfortunately, the exact provenience and circumstances of the bovid bones leaves the question of bison hunting unanswered; these remains compared favorably with modern cattle and may be incidental to the archeological components. Some isolated canid remains could represent additional dog burials (although none was recognized in the SMU work), or even dogs as ceremonial food refuse. Throughout the boxes containing animal bone were isolated human remains, indicating probable mixture of sediments and burial disturbance (or possibly cannibalism, although no human bones showed cut marks).

The most striking contrast between this early collection and the present study is the degree of fragmentation. In the SMU collection, the bones are extremely well preserved and, while most are broken, they are in the main large, spirally fractured fragments. In some cases, whole and nearly whole leg bones from nine individual deer were recovered from a single provenience (somewhere in the midden at the East mound). Fragmentation is extremely high in the 1991 TAS assemblage, by contrast.

Only 158 specimens of the 1991 TAS sample were complete, and these consist primarily of singular teeth, toes, or podials, which are all very durable and resilient to destruction. Of the 8,496 elements analyzed from the 1991 TAS Field School, 4,569 were capable of being spirally fractured. Of the 4,569, only 453 (10 percent) were actually spirally fractured. The majority of the sample was lightly weathered (6,627 or 78 percent), although 3,490 (41 percent) of the sample was burned. Tables 45 and 46 provide data on breakage and burning patterns for the different taxa: these data show which taxa exhibit spirally fractured remains and different degrees of burning. At least 451 specimens (5 percent) of the analyzed sample has been rodent gnawed, and 23 specimens exhibit cut marks. A total of 1,035 (12 percent) specimens were identifiable to the level of Order or below.

Table 47 lists the animals represented in the Roitsch faunal sample from the 1991 Field School. These taxa indicate exploitation by the site's inhabitants of a variety of ecological niches: aquatic (e.g., fishes, water turtles); woodland (opossum, squirrel, woodrat, bear), woodland edge (deer, rabbits, striped skunk, raccoon, box turtle, etc.); and grassland species (jackrabbits, spotted skunks, coyotes, gophers, and cotton rats). Surprisingly absent are traces of the exploitation of large fishes and large aquatic turtles, water fowl, and common riparian mammals such as beaver, muskrat, otter, and mink.

Woodland animals and edge habitat dwellers constitute the dominant faunal resources represented in the bone samples from Roitsch. Deer, bear, raccoon, and turkey provided the majority of meat protein apparent in these samples (Table 48). Even though bear bones are present in the assemblage, it would appear that these large animals were not brought back to the site for initial processing. Although pig is listed in Table 47, its provenience (from a surface collection in the terrace area) indicates that it is intrusive from historic times; likewise, the bovid bones are ambiguous and may also be from domestic cattle. This is not to deny bison a role in the subsistence of the Roitsch inhabitants; however, if bison meat was procured, it was performed in such a way that few bison bones were returned to the site. Pronghorn antelope are known from other Caddo assemblages in the general region (see Henderson 1978a, 1978b), but here again, no definitive pronghorn remains were identified in the Roitsch sample. These observations, therefore, support the importance of the woodland habitat to the Caddo hunters and inhabitants of this site.

By virtue of MNI and NISP, it is deer that supported the meat portion of the inhabitants' diets. Table 49 indicates that teeth, metapodials, and phalanges dominate the recovered deer elements, which is to be expected given the durability of those skeletal parts. They are also considered butchering waste because there is not much meat around them; therefore, they are rarely processed for grease and got tossed out as refuse and most likely covered with dirt to discourage unwanted scavengers or insects, thus additionally enhancing their preservation.

Dogs were important to the site's inhabitants as hunting companions, sentries, and garbage disposers. They may be the principal agent responsible for the destruction of meaty element butchering waste. Five dogs were recovered from four dog burials during the Field School excavations. Three of the burials were located adjacent (west) to the human cemetery area investigated during the 1991 Field School (see discussion of Terrace Area excavations, this article). The first dog burial from the cemetery was damaged by plowing activities, which rendered

Table 45. Roitsch Site: Bone Breakage Patterns by Taxon.

Taxon	Breakage	Total
Vertebrata	Unbroken	21
Vertebrata	Angular fracture	2970
Vertebrata	Spiral fracture	53
Vertebrata	Spiral and Angular	4
Osteichthyes (Medium)	Unbroken	2
Osteichthyes (Medium)	Angular fracture	14
Osteichthyes (Large)	Angular fracture	2
Osteichthyes	Unbroken	1
Osteichthyes	Angular fracture	6
Lepisosteidae	Unbroken	4
Lepisosteidae	Angular fracture	11
Amildae	Angular fracture	4
Ictaluridae	Angular fracture	1
Sciaenidae	Unbroken	1
Alligator mississippiensis	Angular fracture	1
Testudinata	Angular fracture	237
Kinosternidae	Angular fracture	6
Kinosternon subrubrum	Angular fracture	3
Emydidae	Unbroken	1
Emydidae	Angular fracture	10
Chrysemys sensu lato	Unbroken	1
Chrysemys sensu lato	Angular fracture	6
cf. *Chrysemys* sensu lato	Angular fracture	1
Terrapene sp.	Unbroken	1
Terrapene sp.	Angular fracture	11
Terrapene carolina	Unbroken	1
Terrapene carolina	Angular fracture	5
cf. *Terrapene carolina*	Angular fracture	1
Trionyx sp.	Unbroken	1
Trionyx sp.	Angular fracture	5
cf. *Trionyx* sp.	Angular fracture	1
Colubridae	Angular fracture	1
Elaphe sp.	Unbroken	1
Elaphe sp.	Angular fracture	5
Masticophis sp.	Angular fracture	1
Crotalus sp.	Angular fracture	1
Aves (Small/medium)	Angular fracture	1
Aves (Medium)	Angular fracture	3
Aves (Medium/large)	Angular fracture	11
Aves (Large)	Angular fracture	17
Meleagris gallapavo	Unbroken	1
Meleagris gallapavo	Angular fracture	1
cf. *Meleagris gallopavo*	Angular fracture	1
Mammalia (Micro)	Angular fracture	2
Mammalia (Micro/small)	Angular fracture	1
Mammalia (Small)	Angular fracture	16
Mammalia (Small)	Spiral fracture	1
Mammalia (Small)	Spiral and Angular	1
Mammalia (Small/medium)	Unbroken	1
Mammalia (Small/medium)	Angular fracture	36
Mammalia (Small/medium)	Spiral fracture	6
Mammalia (Small/medium)	Spiral and Angular	2
Mammalia (Medium)	Angular fracture	35
Mammalia (Medium)	Spiral fracture	2
Mammalia (Medium/large)	Unbroken	3
Mammalia (Medium/large)	Angular fracture	2691
Mammalia (Medium/large)	Spiral fracture	101
Mammalia (Medium/large)	Spiral and Angular	25
Mammalia (Large)	Unbroken	1
Mammalia (Large)	Angular fracture	112
Mammalia (Large)	Spiral fracture	33
Mammalia (Large)	Spiral and Angular	19
Mammalia	Angular fracture	73
Mammalia	Spiral fracture	3
Didelphis virginiana	Unbroken	1
Didelphis virginiana	Angular fracture	1
Scalopus aquaticus	Angular fracture	1
Dasypus novemcinctus	Unbroken	1
Dasypus novemcinctus	Angular fracture	35
Leporidae	Angular fracture	1
Lepus sp.	Unbroken	2
Lepus sp.	Angular fracture	3
Sylvilagus sp.	Unbroken	4
Sylvilagus sp.	Angular fracture	12
Sylvilagus sp.	Spiral fracture	3
Sylvilagus aquaticus	Unbroken	1

Table 45. *(Continued)*

Taxon	Breakage	Total
Sylvilagus aquaticus	Angular fracture	5
cf. *Sylvilagus aquaticus*	Unbroken	3
cf. *Sylvilagus aquaticus*	Angular fracture	6
Sylvilagus floridanus	Unbroken	4
Sylvilagus floridanus	Angular Fracture	9
Sylvilagus floridanus	Spiral fracture	1
cf. *Sylvilagus floridanus*	Angular fracture	2
Rodentia	Angular fracture	3
Sciuridae	Unbroken	1
Sciuridae	Angular fracture	1
Sciurus sp.	Angular fracture	2
Sciurus niger	Unbroken	1
Sciurus niger	Angular fracture	3
Geomys sp.	Unbroken	9
Geomys sp.	Angular fracture	18
Geomys breviceps	Unbroken	2
Geomys breviceps	Angular fracture	10
Sigmodon hispidus	Unbroken	3
Sigmodon hispldus	Angular fracture	5
Neotoma sp.	Angular fracture	1
Carnivora	Angular fracture	3
Ursus sp.	Unbroken	1
Ursus americanus	Unbroken	1
Procyon rotor	Unbroken	6
Procyon rotor	Angular fracture	10
cf. *Procyon rotor*	Angular fracture	1
Spilogale sp.	Angular fracture	1
cf. *Mephitis mephitis*	Angular fracture	3
Canidae	Angular fracture	4
Canis sp.	Unbroken	2
Canis sp.	Angular fracture	4
cf. *Canis* sp.	Unbroken	1
cf. *Canis* sp.	Angular fracture	2
Canis familiaris	Unbroken	2
Canis latrans	Unbroken	1
cf. *Canis latrans*	Unbroken	2
cf. *Canis latrans*	Angular fracture	6
Artiodactyla	Unbroken	2
Artiodactyla	Angular fracture	21
Artiodactyla	Spiral fracture	3
Artiodactyla	Spiral and Angular	5
cf. Artiodactyla	Angular fracture	1
Sus scrofa	Unbroken	1
Cervidae	Angular fracture	2
Odocoileus sp.	Unbroken	13
Odocoileus sp.	Angular fracture	63
Odocoileus sp.	Spiral fracture	7
cf. *Odocoileus* sp.	Angular fracture	1
Odocoileus virginianus	Unbroken	17
Odocoileus virginianus	Angular fracture	64
Odocoileus virginianus	Spiral fracture	4
Odocoileus virginianus	Spiral and Angular	12
cf. *Odocoileus virginianus*	Unbroken	8
cf. *Odocoileus virginianus*	Angular fracture	94
cf. *Odocoileus virginianus*	Spiral fracture	9
cf. *Odocoileus virginianus*	Spiral and Angular	5
Antilocapra/ Odocoileus	Angular fracture	20
Antilocapra/ Odocoileus	Spiral fracture	6
Antilocapra/ Odocoileus	Spiral and Angular	2
Bovidae	Angular fracture	1
cf. Bovidae	Angular fracture	1
	Total	7149

Table 46. Roitsch Site: Stages of Burning by Taxon.

Taxon	Status of Burning	No.
Vertebrata	Unburned	1486
Vertebrata	Burned	966
Vertebrata	Charred	118
Vertebrata	Calcined	478
Osteichthyes (Medium)	Unburned	15
Osteichthyes (Medium)	Calcined	1
Osteichthyes (Large)	Unburned	2
Osteichthyes	Unburned	7
Lepisosteidae	Unburned	13
Lepisosteidae	Burned	2
Amiidae	Unburned	4
Ictaluridae	Unburned	1
Sciaenidae	Unburned	1
Alligator mississippiensis	Unburned	1
Testudinata	Unburned	152
Testudinata	Burned	51
Testudinata	Charred	4
Testudinata	Calcined	30
Kinosternidae	Unburned	4
Kinosternidae	Calcined	1
Kinosternon subrubrum	Unburned	3
Emydidae	Unburned	1
Emydidae	Burned	2
Emydidae	Calcined	2
Chrysemys sensu lato	Unburned	7
cf. *Chrysemys sensu lato*	Unburned	1
Terrapene sp.	Unburned	9
Terrapene sp.	Charred	1
Terrapene sp.	Calcined	2
Terrapene carolina	Unburned	6
cf. *Terrapene carolina*	Calcined	1
Trionyx sp.	Unburned	4
Trionyx sp.	Burned	1
Trionyx sp.	Calcined	1
cf. *Trionyx* sp.	Unburned	1
Colubridae	Unburned	1
Elaphe sp.	Unburned	6
Masticophis sp.	Unburned	1
Crotalus sp.	Unburned	1
Aves (Smal1/medium)	Unburned	1
Aves (Medium)	Unburned	2
Aves (Medium)	Calcined	1
Aves (Medium/large)	Unburned	8
Aves (Medium/large)	Burned	5
Aves (Large)	Unburned	17
Meleagris gallapavo	Unburned	2
cf. *Meleagris gallopavo*	Unburned	1
Mammalia (Micro)	Unburned	2
Mammalia (Micro/small)	Burned	1
Mammalia (Small)	Unburned	12
Mammalia (Small)	Burned	4
Mammalia (Small)	Calcined	2
Mammalia (Small/medium)	Unburned	32
Mammalia (Small/medium)	Burned	3
Mammalia (Small/medium)	Charred	2
Mammalia (Small/medium)	Calcined	8
Mammalia (Medium)	Unburned	20
Mammalia (Medium)	Burned	14
Mammalia (Medium)	Charred	1
Mammalia (Medium)	Calcined	2
Mammalia (Medium/large)	Unburned	1653
Mammalia (Medium/large)	Burned	555
Mammalia (Medium/large)	Charred	219
Mammalia (Medium/large)	Calcined	393
Mammalia (Large)	Unburned	126
Mammalia (Large)	Burned	27
Mammalia (Large)	Charred	4
Mammalia (Large)	Calcined	9
Mammalia	Unburned	46
Mammalia	Burned	14
Mammalia	Calcined	16
Didelphis virginiana	Unburned	1
Didelphis virginiana	Burned	1
Scalopus aquaticus	Unburned	1
Dasypus novemcinctus	Unburned	36

Table 46. *(Continued)*

Taxon	Status of Burning	No.	Taxon	Status of Burning	No.
Leporidae	Unburned	1	*Geomys* sp.	Unburned	27
Lepus sp.	Unburned	5	*Geomys breviceps*	Unburned	11
Sylvilagus sp.	Unburned	16	*Geomys breviceps*	Burned	1
Sylvilagus sp.	Calcined	3	*Sigmodon hispidus*	Unburned	8
Sylvilagus aquaticus	Unburned	6	*Neotoma* sp.	Calcined	1
cf. *Sylvilagus aquaticus*	Unburned	9	Carnivora	Unburned	2
Sylvilagus floridanus	Unburned	12	Carnivora	Calcined	1
Sylvilagus floridanus	Calcined	2	*Ursus* sp.	Unburned	1
cf. *Sylvilagus floridanus*	Unburned	2	*Ursus americanus*	Unburned	1
Rodentia	Unburned	3	*Procyon lotor*	Unburned	13
Sciuridae	Unburned	2	*Procyon lotor*	Burned	3
Sciurus sp.	Unburned	2	cf. *Procyon lotor*	Unburned	1
Sciurus niger	Unburned	4	*Spilogale* sp.	Unburned	1

Table 47. Roitsch Site Taxa List.

Taxon	Common Name	NISP	MNI
Vertebrata	Vertebrates	3145	
Osteichthyes (Medium)	Medium bony fish	19	
Osteichthyes (Large)	Large bony fish	3	
Osteichthyes	Bony fish	7	
Lepisosteidae	Gars	22	1
Amiidae	Bowfins	4	1
Ictaluridae	Catfish	1	1
Sciaenidae	Drums, croakers, etc.	1	1
Anura	Toads and frogs	1	1
Alligator mississippiensis	Alligator	1	1
Testudinata	Turtles	271	
Kinosternidae	Mud and musk turtles	8	1
Emydidae	Water and box turtles	11	
Chrysemys sensu lato	Painted turtles/cooters/ sliders	8	1
cf. *Chrysemys sensu lato*	Painted turtles/cooters/ sliders	1	
Terrapene sp.	Box turtles	19	1
cf. *Terrapene carolina*	Eastern box turtle	1	
Trionyx sp.	Softshell turtle	7	1
cf. *Trionyx* sp.	Softshell turtle	1	
Colubridae	Colubrid snakes	3	

Table 47. *(Continued)*

Taxon	Common Name	NISP	MNI
Elaphe sp.	Corn and rat snakes	6	1
Masticophis sp.	Whip snakes	1	1
Crotalus sp.	Rattlesnakes	1	1
Aves (Small/medium)	Small/medium birds	1	
Aves (Medium)	Medium birds	3	
Aves (Medium/large)	Medium/large birds	12	
Aves (Large)	Large birds	17	
Meleagris gallapavo	Turkey	3	1
cf. *Meleagris gallapavo*	Turkey	1	
Mammalia (Micro)	Micro-mammals	2	
Mammalia (Micro/small)	Micro/small mammals	3	
Mammalia (Small)	Small mammals	18	
Mammalia (Small/medium)	Small/medium mammals	54	
Mammalia (Medium)	Medium mammals	38	
Mammalia (Medium/Large)	Medium/large mammals	3882	
Mammalia (Large)	Large mammals	165	
Mammalia (Large/very large)	Large/very large mammals	5	
Mammalia	Mammals	87	
Didelphis virginiana	Virginia opossum	3	1
Scalopus aquaticus	Eastern mole	1	1
Dasypus novemcinctus	Nine-banded armadillo	36	1
Leporidae	Rabbits and hares	1	
Lepus sp.	Jackrabbits	11	2
Sylvilagus sp.	Cottontail rabbits	47	2
Sylvilagus aquaticus	Swamp rabbit	9	1
cf. *Sylvilagus aquaticus*	Swamp rabbit	9	
Rodentia	Rodents	3	
Rodentia (Small)	Small rodents	2	
Rodentia (Medium)	Medium rodents	1	
Sciuridae	Squirrels and chipmunks	3	
Sciurus sp.	Squirrels	6	1*
Geomys sp.	Pocket gophers	39	3
Sigmodon hispidus	Hispid cotton rat	8	2
Neotoma sp.	Wood rats	1	1
Carnivora	Carnivores	5	
Ursus sp.	Bears	3	1
Procyon lotor	Raccoon	17	2
cf. *Procyon lotor*	Raccoon	1	
Spilogale sp.	Spotted skunks	1	1
cf. *Mephitis mephitis*	Striped skunk	3	1
Canidae	Dogs and relatives	5	
Canis sp.	Dogs	6	
cf. *Canis* sp.	Dogs	3	

Table 47. *(Continued)*

Taxon	Common Name	NISP	MNI
Canis familiaris	Domestic dog	2	1
Canis latrans	Coyote	1	1
cf. *Canis latrans*	Coyote	8	
cf. Artiodactyla	Even-toed ungulates	1	
Sus scrofa	Pig	1	1
Odocoileus sp.	Deer	326	4*
cf. *Odocoileus* sp.	Deer	1	
Antilocapra/Odocoileus	Pronghorn/deer	98	
Bovidae	Cattle and relatives	1	1
cf. Bovidae	Cattle and relatives	1	
	Totals	8496	42

NISP=Number of Identifiable Specimens; MNI=Minimum Number of Individuals
*MNI for *Sciurus* also includes Sciuridae; MNI for *Odocoileus* includes cf. *Odocoileus* and *Antilocarpa/ Odocoileus*.

Table 48. Edible Meat Weights and Yields.

		Roitsch			Ray		
Taxon	Edible kg	MNI	Yield (in kg)	% Total	MNI	Yield (in kg)	% Total
Bear	100.4	1	100.4	37.8	-	-	-
Deer	36.3	4	145.2	54.7	3	108.9	90.5
Raccoon	3.9	2	7.8	2.9	1	3.9	3.2
Turkey	3.8	1	3.8	1.4	1	3.8	3.2
Opossum	1.5	1	1.5	0.6	-	-	-
Jackrabbit	0.98	2	1.96	0.7	-	-	-
Swamp rabbit	0.84	1	0.84	0.3	-	-	-
Skunk	0.98	1	0.98	0.4	-	-	-
Cottontail	0.68	2	1.36	0.5	2	1.36	1.1
Squirrel	0.68	1	0.68	0.3	2	1.36	1.1
Box turtle	0.22	1	0.22	0.1	2	0.44	0.4
Wood rat	0.18	1	0.18	0.1	-	-	-
Gopher	0.17	3	0.51	0.2	1	0.17	0.1
Summary		21	265.43		12	119.93	

Table 49. Roitsch Site Deer/Artiodactyl Elements Recovered.

Element	Portion of Element	Side	Total
Cranium	Petrosal		1
Cranium	Petrosal	Left	4
Cranium	Petrosal	Right	3
Mandible	Horizontal ramus portion		1
Mandible	Horizontal ramus portion	Left	2
Mandible	Horizontal ramus portion	Right	1
Mandible	Horizontal ramus diastema	Left	1
Permanent tooth	Tooth fragment		7
Permanent tooth	Enamel fragment		2
Permanent tooth	Root fragment		2
Permanent tooth	Molar		1
Permanent tooth	Cheek tooth		1
Permanent tooth	Upper PM2	Right	1
Permanent tooth	Upper M		1
Permanent tooth	Upper M	Right	1
Permanent tooth	Upper M2	Right	1
Permanent tooth	Upper M1 or 2	Right	1
Permanent tooth	Lower I2	Left	1
Permanent tooth	Lower PM2	Left	1
Permanent tooth	Lower PM3	Left	2
Permanent tooth	Lower PM3	Right	1
Permanent tooth	Lower PM4	Left	2
Permanent tooth	Lower PM4	Right	1
Permanent tooth	Lower M		2
Permanent tooth	Lower M	Left	1
Permanent tooth	Lower M	Right	1
Permanent tooth	Lower M1	Left	2
Permanent tooth	Lower M2	Left	1
Permanent tooth	Lower M3	Left	2
Permanent tooth	Lower M3	Right	2
Deciduous tooth	Cheek tooth		1
Deciduous tooth	Upper PM2	Left	1
Deciduous tooth	Upper PM4	Right	1
Tooth, perm./decid. inc.	Tooth fragment		10
Tooth, perm./decid. inc.	Enamel fragment		32
Tooth, perm./decid. inc.	Root fragment		6
Tooth, perm./decid. inc.	Molar		3
Tooth, perm./decid. inc.	Lower cheek tooth		1
Tooth, perm./decid. inc.	Cheek tooth		25
Tooth, perm./decid. inc.	Cheek tooth	Left	1
Vertebra	Centrum epiphysis	Axial	2
Vertebra	Articular facet	Axial	2
Cervical vertebra	Complete or nearly complete	Axial	1
Cervical vertebra	Gentrum and neural area	Axial	1
Thoracic vertebra	Complete minus spinous process	Axial	2

Table 49. Roitsch Site Deer/Artiodactyl Elements Recovered.

Element	Portion of Element	Side	Total
Lumbar vertebra	Spinous process	Axial	1
Rib	Vertebral end		2
Rib	Shaft fragment		3
Scapula	Glenoid fossa & incomplete blade	Right	1
Scapula	Blade portion	Right	1
Humerus	Prox. ant. lat. part of shaft	Right	1
Humerus	Prox. post. med. part of shaft	Right	1
Humerus	Medial portion of shaft	Right	2
Humerus	Distal portion of shaft	Left	1
Humerus	Distal portion of shaft	Right	1
Humerus	Distal ant. lat. part of shaft	Right	1
Humerus	Distal posterior part of shaft	Right	I
Humerus	Distal end	Right	1
Radius	Proximal end	Left	1
Radius	Proximal end	Right	2
Radius	Proximal anterior end	Left	1
Radius	Proximal anterior medial end	Left	1
Radius	Proximal posterior end	Left	1
Radius	Proximal posterior lateral end		1
Radius	Proximal medial end		1
Radius	Proximal medial end	Right	1
Radius	Prox. epiph., ant. med. aspect		1
Radius	Prox. post. lat. part of shaft	Left	1
Radius	Lateral portion of shaft	Right	1
Radius	Distal portion of shaft	Right	1
Radius	Distal medial end	Left	1
Radius	Complete distal epiphysis	Left	1
Ulua	Prox. anterior part of shaft	Left	1
Ulna	Prox. anterior part of shaft	Right	1
Pelvis	Acetabulum w/ilium and ischium	Left	1
Pelvis	Acetabular end of ilium	Left	1
Pelvis	Ischium fragment	Right	1
Femur	Prox. epiphysis, medial aspect		2
Femur	Distal medial part of shaft		1
Femur	Distal posterior medial end	Left	1
Femur	Diaphyseal fragment		1
Femur	Diaphyseal fragment	Right	1
Patella	Complete or nearly complete		1
Tibia	Proximal end		1
Tibia	Prox. anterior part of shaft	Left	1
Tibia	Prox. ant. med. part of shaft	Right	1
Tibia	Posterior portion of shaft	Right	1
Tibia	Distal portion of shaft	Left	1

Table 49. *(Continued)*

Element	Portion of Element	Side	Total
Tibia	Distal portion of shaft	Right	1
Tibia	Dist. post. med. part of shaft	Right	1
Tibia	Distal end	Left	2
Tibia	Distal anterior medial end	Left	1
Tibia	Distal posterior medial end	Right	1
Tibia	Distal medial end	Right	2
Tibia	Distal epiphysis, med. aspect	Left	1
Metapodial	Posterior portion of shaft		1
Metapodial	Distal anterior lateral end	Left	1
Metapodial	Distal epiph., ant. lat. aspect		1
Metapodial	Distal articular condyle		3
Metapodial	Diaphyseal fragment		1
Fused 3rd & 4th metacarpal	Proximal end	Right	1
Fused 3rd & 4th metacarpal	Proximal anterior end	Left	1
Fused 3rd & 4th metacarpal	Proximal anterior medial end	Left	I
Fused 3rd & 4th metacarpal	Proximal anterior medial end	Right	1
Fused 3rd & 4th metacarpal	Proximal lateral end		1
Fused 3rd & 4th metacarpal	Proximal lateral end	Left	1
Fused 3rd & 4th metacarpal	Anterior portion of shaft		1
Fused 3rd & 4th metacarpal	Distal end		1
Fused 3rd & 4th metacarpal	Distal articular condyle	Left	1
Metatarsal	Anterior portion of shaft		1
Fused 3rd & 4th metatarsal	Proximal end	Left	1
Fused 3rd & 4th metatarsal	Proximal anterior end	Right	2
Fused 3rd & 4th metatarsal	Proximal medial end	Right	1
Fused 3rd & 4th metatarsal	Anterior portion of shaft		3
Fused 3rd & 4th metatarsal	Diaphyseal fragment		2
Phalange	Proximal end		3
Phalange	Distal portion of shaft		2
Phalange	Distal end		1
Phalange	Distal anterior end		1
Proximal phalange	Complete or nearly complete		6
Proximal phalange	Complete or nearly complete	Left	1
Proximal phalange	Proximal end		1
Proximal phalange	Complete proximal epiphysis		1
Proximal phalange	Medial portion of shaft		1
Proximal phalange	Distal end		2
Proximal phalange	Distal articular condyle		1
Prox. phalange of paradigit	Complete or nearly complete		2
Middle phalange	Complete or nearly complete		1
Middle phalange	Complete proximal epiphysis		1
Mid. phalange of paradigit	Complete or nearly complete		1
Distal phalange	Complete or nearly complete		1
Distal phalange	Complete or nearly complete	Right	1

Table 49. *(Continued)*

Element	Portion of Element	Side	Total
Distal phalange	Proximal end		1
Distal phalange	Distal end		1
Dist. phalange of paradigit	Complete or nearly complete		1
Fused second & third carpal	Complete or nearly complete	Left	1
Fused second & third carpal	Medial aspect		1
Fused second & third tarsal	Complete or nearly complete		1
Astragalus	Complete or nearly complete	Left	1
Astragalus	Complete or nearly complete	Right	1
Astragalus	Complete minus prox. epiphy	Right	1
Astragalus	Distal lateral aspect		1
Calcaneus	Complete or nearly complete	Left	1
Calcaneus	Complete or nearly complete	Left	2
Calcaneus	Complete or nearly complete	Right	1
Calcaneus	Complete minus prox. epiph.	Right	1
Calcaneus	Proximal aspect		1
Calcaneus	Proximal medial aspect	Left	1
Calcaneus	Distal aspect	Right	3
Fused central/fourth tarsal	Complete or nearly complete	Left	1
Fused central/fourth tarsal	Complete or nearly complete	Right	1
Fused central/fourth tarsal	Fragment	Right	1
Proximal abaxial sesamoid	Complete or nearly complete		1
Long bone Diaphyseal fragment			5
Long bone Fragment			11
Antler Fragment			10
Totals			315

the skeleton too fragile to be removed except in a block. It lay curled up on its left side facing southwest. No pit outline was observed.

The second dog burial was that of a puppy tightly curled up on its right side, again facing southerly. Its exact age has not been determined because of its delicate condition, but it conforms in skeletal development to a 6-week-old pup. Additional tooth buds were found in the surrounding matrix, suggesting more than one puppy in the burial. At this writing, the block in which the puppy was found is still intact pending X-ray analysis; the analysts are loath to immerse the block in water, thereby losing the details of the burial pose.

The third dog burial turned out to be a superimposed double burial. The outstretched leg of the later interment indicates a difference in disposal ritual due either to temporal or ritualistic changes toward those domiciliary companions. Severa1 large shell-tempered sherds were found mixed in with the dog bones.

Another dog was found buried in the Block IV excavations. It was in excellent condition, and its skull was adequately intact for cranial measurements. It was also found on its left side, tightly flexed, with its face toward the south. A small ceramic sherd was found near its right eye.

Only the dog from Block IV and the first dog burial from the cemetery (Feature 701) were intact enough for metric analysis. A comparison was made of cranial measurements from other Caddo dog burials, and this indicated that the Caddo dogs cluster very closely morphologically. Contrasts with coyote (open triangles in Figure 79) show that while coyotes overlap within the range of *Canis familiaris* metrics, they seem to have slightly longer snouts and smaller braincases. Swanton (1942:137) cites Morfi as commenting:

> With all of this, they do not forget the chase, for which they raise a certain kind of dog they call *Jubine*, with long, sharp-pointed snout, and as cunning as its master (Morfi 1932:44).

And Swanton (1942:134) also mentions Fray de Solis' observation about dogs in the Caddo camp: "they have...some dogs also which they call *jubines* because they are a mixture of dog and coyote or wolf. These dogs are very intelligent and cunning as well as great thieves; they have thin pointed snouts" (Solis 1931:61).

Two canid teeth were found with drilled holes. One was from Burial 27, which also produced a drilled bison tooth, probably on the same necklace or garment. These decorative items are just a few of the modified animal bones from the Roitsch assemblage. Twenty fragments exhibited either cut marks from butchering or meal preparation or they showed striations and/or smoothing from tool manufacture. All of these fragment are from deer-sized animals.

Ray Site (41LR135)

Located in Lamar County, some 20 km south of the Red River, the Ray site contained the remains of two, or possibly three, overlapping houses from an occupation thought to have occurred between ca. A.D. 800-1000 (Bruseth et al. 2001:212), although there were earlier as well as later occupations at the site. Nineteen percent of the faunal assemblage has been identified to the level of Order or below. Thirty-three specimens were complete. Of the 1,477 specimens recovered during the 1991 TAS Field School, 1,214 were capable of being spirally fractured. Of the 1,214, 197 (16 percent)

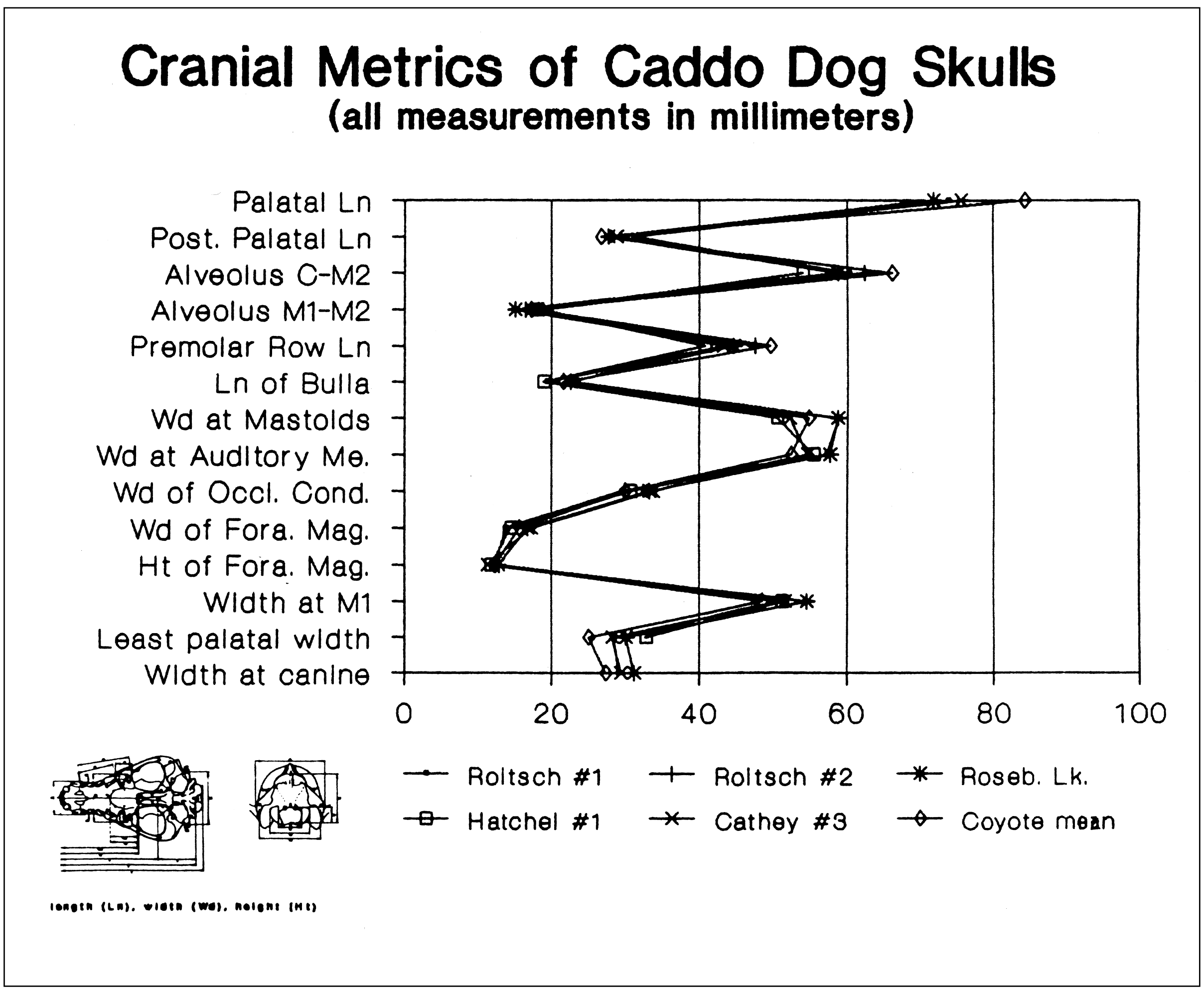


Figure 79. Cranial Metrics of Caddo Dogs.

were spirally fractured. Degradation of the specimens included 827 (56 percent) recorded as light, and 650 (44 percent) that were heavily degraded (weathering damage, gnawing, root etching, etc.). This sample was notably burned with 1,002 (68 percent) of the specimens recorded as burned. Only four specimens exhibited gnawing, and three specimens had cut marks.

The taxa list (Table 50) is almost one-third the size of the Roitsch site faunal assemblage. But considering the small amount of excavation that was undertaken, it is remarkably diverse. Five of the important taxa are present, and for two of them, the Ray site had more individuals represented (i.e., *Terrapene* sp. and *Sciurus* sp.). For the number of identified specimens for *Odocoileus* (n=41, or 12.5 percent that of the Roitsch sample of deer), the MNI for deer in the Ray assemblage is only one less than the Roitsch assemblage.

As at the Roitsch site, deer provided the majority of the edible meat (see Table 48). The inventory for the Ray site faunal remains lists all of the deer or deer-sized elements recovered from the site (Appendix VIII, this article).

Modified bone from the Ray site includes three deer-size elements with cut marks: a radius, a calcaneus, and a long bone fragment. In addition, there are two awls and a highly polished split astragalus, all probably from deer. One of the awls is complete, 11.5 cm in length, and appears to have been made from a deer metapodial. This type of pointed bone tool is also sometimes referred to as a hair pin. The cross section of this specimen is sub-triangular near the basal end and tapers to a flat cross section at the tip. A series of transverse parallel scoring marks occur at the base, and wavy longitudinal scratches cover the shaft. It was recovered from level 5 of Area A. This specimen closely resembles the hairpin from Feature 1 at the Bentsen-Clark site (Banks and Winters 1975:21).

A second awl/hairpin tip was also recovered from level 5 of Area A. Like the other, it is flat in cross section, tapering to a pointed tip, with wavy longitudinal striations.

CONCLUSIONS

Given the Roitsch site's location so close to the Red River in modern times and the assumption that it was situated in proximity to the river or an oxbow lake in prehistoric times, more aquatic fauna would be expected in the faunal assemblage from the Caddo occupation. Only 366 elements can be attributed to aquatic faunas, and these are primarily non-diagnostic turtle shell fragments (n=271) generously considered aquatic for this discussion. Perhaps more fine screening and flotation of the sediments would have facilitated recovery of more small fish and amphibian remains; however, it is apparent that exploitation of large riverine fishes (such as alligator gar) and large reptiles (snapping turtles and alligators) was not practiced extensively by the Caddo inhabitants or that these large aquatic resources were not available in close proximity. Bones from these creatures are large and durable enough to be recovered by troweling or coarse screening through 1/4-inch mesh hardware cloth. Earlier Caddo components near river courses have yielded quantities of large fishes, alligators, aquatic turtles, water fowl, and aquatic mammals. Examples of these faunas include alligator gar (*Atractosteus spatula*), sturgeon and paddlefish (Acipenseriformes), even large individuals of flathead catfish (*Pylodictis olivaris*), freshwater drum (*Aplodinotus grunniens*), snapping turtles (Chelydridae), red-eared sliders (*Trachemys scripta*), geese (*Branta* spp. and *Chen* spp.) and swan (*Cygnus* spp.), beaver (*Castor canadensis*), and muskrat (*Ondatra zibethicus*). Caddo sites located in the eastern part of the Caddo cultural area likewise reveal a diminished reliance on these larger aquatic faunas in Late Caddo components. These eastern sites include sites such as Cedar Grove (Styles and Purdue 1984), Werner, Belcher (Webb 1959), and Hanna (Byrd 1980).

When compared to the Caddo sites at Cooper Lake (Butler 1975; Henderson 1978a, 1978b; Yates 1988a, 1988b, 1999), and Bob Williams (Parmalee and Opperman 1983), the Roitsch and Ray sites are more similar to these neighboring sites than they are to sites of similar age farther east. However, our overall observations are in accordance with Pertula's (1990) findings, in that there is less emphasis on fish, waterfowl, and migratory birds and more reliance on deer, rabbit, turkey, and turtles during this period of Caddo prehistory.

ACKNOWLEDGEMENTS

Gratitude is expressed to Marie E. Brown for her assistance in researching the ethnozoological references and to Brian S. Shaffer for producing

Table 50. Ray Site Faunal Summary.

Taxon	Common Name	NISP	MNI
Vertebrata	Vertebrates	86	
Testudinata	Turtles	75	
Emydidae	Water and box turtles	2	
Chrysemys sensu lato	Painted turtles/ cooters/sliders	2	1
Terrapene sp.	Box turtles	10	2
cf. *Terrapene* sp.	Box turtles	3	
Aves (Medium)	Medium birds	1	
Aves (Large)	Large birds	3	
Meleagris gallapavo	Turkey	2	1
Mammalia (Small)	Small mammals	1	
Mammalia (Small/medium)	Small/medium mammals	3	
Mammalia (Medium/large)	Medium/large mammals	1059	
Mammalia (Large)	Large mammals	3	
Mammalia	Mammals	41	
Sylvilagus sp.	Cottontail rabbits	8	2
Rodentia (Medium)	Medium rodent	3	
Sciuridae	Squirrels and chipmunks	2	
Sciurus sp.	Squirrels	3	2*
Geomys sp.	Plains pocket gopher	5	1
Carnivora	Carnivores	2	
Procyon lotor	Raccoon	19	1
Mustelidae	Weasels and relatives	3	1
cf. Canidae	Dogs and relatives	1	1
Artiodactyla (Medium)	Medium even-toed ungulates	99	
Odocoileus sp.	Deer	41	3*
Total		1477	15

NISP=number of identified specimens; MNI=minimum number of individuals
* *Sciurus* and Sciuridae combined for MNI as were *Odocoileus* and Artiodactyla.

the FACS-generated tables and inventories. In addition, all of the members of the zooarcheological team during the 1991 TAS Field School are thanked for their unflagging devotion to getting the job done in our "bone lab away from bone lab." Recognition is made to team members Bill McClure, LeeAnna Schniebs, and Brian Shaffer; to Barry Baker for his valuable commentary and his help with the dog burials; and to Reeda Peel for her excellent sketches of the dog burials. Lastly, I wish to thank the TAS Field School Committee and Dr. Timothy K. Perttula and Dr. James E. Bruseth for their recognition of the importance of faunal analysis in broadening our understanding of the life ways of past cultures, and for giving me the opportunity to participate in the Red River Field School.

SUMMARY AND CONCLUSIONS

Timothy K. Perttula and William A. Martin

In this article have been discussed the results of two very successful Texas Archeological Society (TAS) Field Schools held in Northeast Texas in 1991 and 1992 at the Arnold Roitsch site (41RR16) in Red River County, Texas. During the field schools, considerable new and important information was obtained on the prehistoric Caddo settlement and history of the middle reaches of the Red River with the aid of more than 600 Field School participants in 1991, and 500 more TAS members in 1992. About 50 percent of the participants worked at the Roitsch site during those two years.

The archeological work conducted by the TAS at the Arnold Roitsch (41RR16) site, as well as at the Salt Well Slough (41RR204) (Kenmotsu 2006), Fasken (41RR14) (Prikryl, this volume), and Ray (41LR135) (Bruseth et al. 2001) sites, constituted the first substantial prehistoric archeological research conducted in both Red River and Lamar counties, Texas, since the late 1960s and early 1970s, and the Caddo archeological record in these two counties was relatively poorly known at the time of the 1991 and 1992 TAS Field Schools. Also during the Field School, our search for the early 19th century town of Jonesborough during the 1991 Field School discovered and documented the mid-1840s burial crypt of Jane Chandler Gill, the wife of an early resident and large landowner in the Jonesborough area (see Reese 2001). Several other 19th century farmsteads and a cemetery were recorded during the extensive archeological survey of the Roitsch, Tarrant, and Wright lands in the Mound Prairie area (see Perttula, this volume), and a mid-19th century component was also identified on the top of Mound B at the Fasken site (Prikryl, this volume). Prior to the TAS Field Schools, the 19th and early 20th century archeology of Red River County, Texas, was virtually unknown and unstudied.

With the able participation of the many TAS members during the two Field Schools, the native history of the Caddo peoples that lived along the middle reaches of the Red River has come into better focus, particularly with regard to their material culture, their use of cultivated plants such as maize and squash, their production of salt, the construction and use of their houses and extramural features, and their health and diet. This is especially the case at the Roitsch site, where extensive excavations recovered new information on the settlement of this important prehistoric and early historic Caddo village. The Mound Prairie area of the middle Red River had been the scene of permanent settlement by the Caddo peoples and their ancestors for at least one or two millennia, and the 1991 and 1992 TAS Field Schools has provided us with an unparalleled research opportunity to study the nature and character of prehistoric and historic Caddo lifeways in this part of northeastern Texas. It is hoped that this article on the 1991 and 1992 TAS Field School excavations at the Arnold Roitsch site (41RR16) along the Red River will inspire and encourage others to undertake further studies of the rich prehistoric and historic heritage of this stretch of the Red River valley.

Research Problems

At the outset of this article, research problems developed prior to undertaking the fieldwork were discussed by Bruseth and Perttula. Information pertinent to all of these research problems was collected to some extent during the 1991 and 1992 Texas Archeological Society field schools, but certain problems are of a sufficiently broad nature—and also depend upon regionally-based archeological information—that it is not possible to address them adequately on the basis of two short field seasons at a handful of sites. Substantive archeological data were gathered which could address the more narrowly focused research problems. This section summarizes what was learned about each of the research problems set out at the beginning of the TAS Field School investigations.

Improving the Regional Chronology

This is a broad research problem that cannot be adequately addressed without excavation data from many sites. However, work at the Roitsch site resulted in the collection of several radiocarbon assays (see Appendix X, this article) along with numerous decorated sherds from the dated features that did provide chronological estimations for the different Caddo occupations at the site. This work provided chronological data primarily relating to the Late Caddo period and the McCurtain phase, which is already better known than the earlier and later periods, but data were also collected from a Woodland and prehistoric Mound Prairie phase Caddo occupation at the southern end of the site. This work, then, provided chronological data that will be useful when it can be compared with data from other sites (particularly well-controlled series of radiocarbon and thermoluminescence dates on charred plant materials and decorated Caddo pottery sherds) that may be excavated in the future in this vicinity.

Understanding the Village Structure of Prehistoric and Early Historic Caddo Groups on Mound Prairie

Our archeological survey investigations, along with the known locations of previously recorded sites, indicates that prehistoric archeological sites of various ages are thickly distributed along Big Pine Creek and Salt Well Slough (Figure 80), primarily in immediate proximity to the Caddo-era Roitsch village. Most are situated on sandy loam soils on the edge of alluvial terraces, or are located on natural rises on such landforms. A few of the sites, almost exclusively Late Caddo McCurtain phase in age (such as the salt-making sites discussed below), occur on a band of dense clays that parallels Salt Well Slough and Big Pine Creek below its confluence with Salt Well Slough.

Of the 109 sites that were recorded or re-recorded during the two years of archeological survey on the Roitsch Farm and other nearby farms (see Perttula, this volume), 89 percent had evidence of at least one prehistoric occupation. The recovery of diagnostic

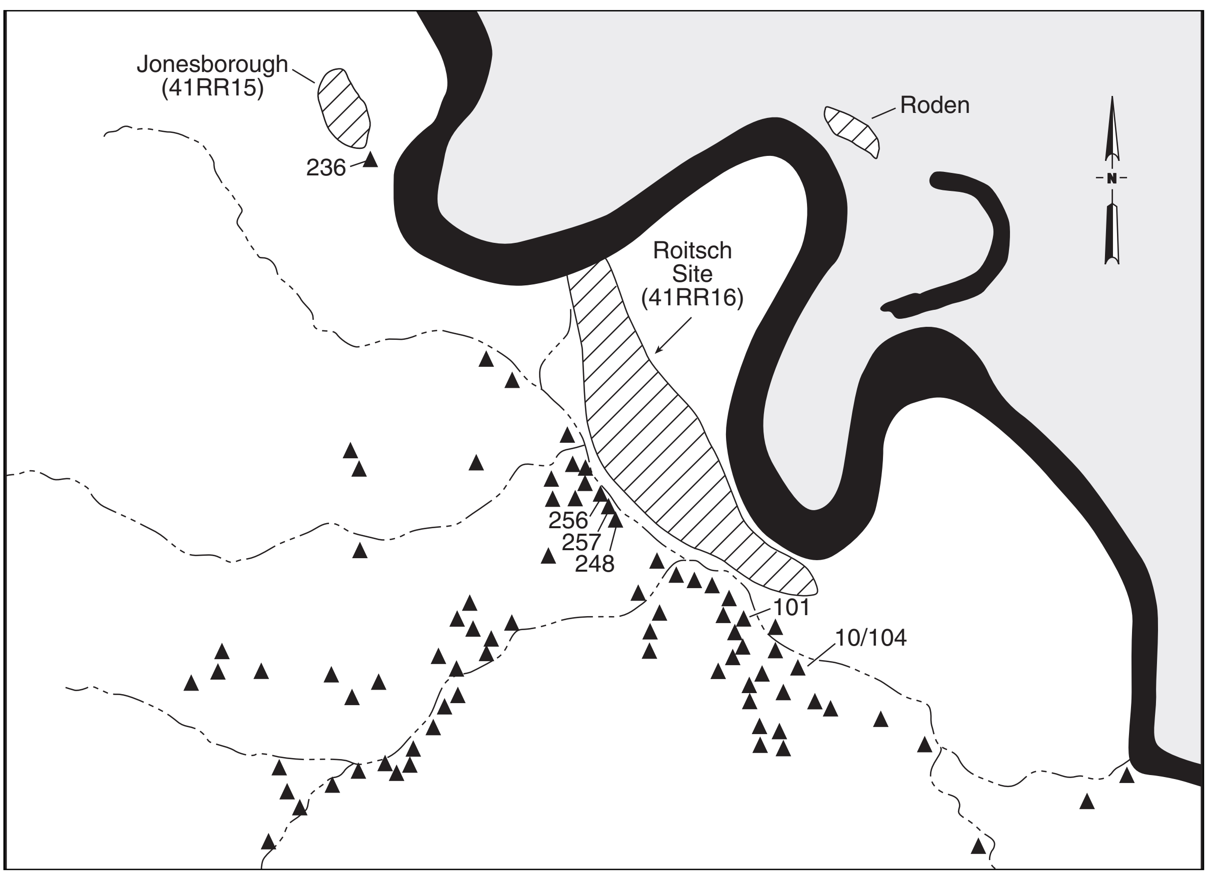


Figure 80. Distribution of prehistoric sites on the Roitsch Farm, and in the vicinity of the A. E. Roitsch site (41RR16).

projectile points and ceramics (especially decorated sherds) from surface collections, shovel tests, and a few 1 x 1 m units, suggests that there were two peaks in periods of settlement: (a) from the Late Archaic (ca. 2000 B.C. to 500 B.C.) through the Woodland (500 B.C.-A.D. 900) periods, and (b) then again during the Late Caddo period (ca. A.D. 1300-1700). However, finds from the sites in the TAS survey area and the Roitsch site indicate that the area was utilized to some extent by Native Americans from Paleoindian times to about A.D. 1700 or slightly later.

Many of the Late Archaic and Woodland period sites probably represent small, seasonally occupied forager camps, although at least a few of the Woodland period sites (such as 41RR101) have middens and dense occupational refuse. These types of sites are believed to be very similar to the Ray site (see Bruseth et al. 2001) and the Stallings Ranch site (the location of the 2005 and 2006 Texas Archeological Society field schools in Lamar County, Texas), and thus may be small homesteads occupied on a multi-seasonal or year-round basis; structures and cooking/storage features are probably preserved in the archeological deposits from these sites.

Only four (4.5 percent) of the prehistoric sites have identifiable Formative to Middle Caddo period occupations. One such habitation site near Fasken, site 41RR206, has a clear midden deposit and an abundance of ceramics and stone tools. It probably represents one small part of the dispersed and localized Caddo community around this civic-ceremonial center. The Formative to Middle Caddo period component at the Holdeman site (41RR11), on a broad and low alluvial terrace of the Red River, is represented by at least one earthen mound that covered a circular house and a small Formative Caddo Albion phase cemetery (Perino 1995; Perttula 1995), as well as extensive village remains from a large settlement.

The Late Caddo, McCurtain phase, settlement of the Big Pine Creek and Salt Well Slough areas was extensive. The habitation sites are characterized by shell-tempered ceramics, small triangular arrow points, and some quantities of daub or burned clay. The sites are presumed to represent dispersed farmsteads, or compounds of farmsteads, that are associated with the larger village community at the Roitsch site. The habitation sites other than Roitsch are typically small in size, may or may not contain middens, and generally are not characterized by large quantities of material culture remains; this suggests short (perhaps a few years) occupations by Late Caddo farmers. Some of these sites contain family cemeteries, as at 41RR10/104 (cf. Hampton and Moore 1936). Other Late Caddo McCurtain phase components include several salt-making sites on Salt Well Slough (see Kenmotsu 2001, 2006; Perttula, this volume), as well as a few components that simply contain a few triangular arrow points from either hunting and refurbishing camps and/or from hunting losses.

A much larger Late Caddo occupation was defined at the Holdeman site during our 1992 TAS investigations (Perttula, this volume). Holdeman appears to have been a substantial village during Late Caddo times, comparable to the Roitsch site in settlement character, as it contains abundant artifacts and features, as well as numerous cemeteries, marking clusters of Caddo houses of this age spread across a large alluvial terrace of the Red River. During deep plowing of one portion of the site in 1992, the landowner exposed considerable Late Caddo habitation debris across a spring branch from the Formative Caddo Albion phase mound mentioned above, and Perino (1995) excavated some 30 burials from this area in the early 1980s before land-leveling activities. Other cemeteries and structures were disturbed by pipeline construction before that in several other locales within the boundaries of the site (see Briscoe 1995). In most particulars, the archeological deposits at the Holdeman site during the Late Caddo period occupation are thought to be quite comparable to the village areas at Roitsch (Blocks III-IV), Bob Williams (Perino 1983), and Rowland Clark (41RR77), another contemporaneous Late Caddo village a few km downstream from Holdeman on the Red River (Perino 1994).

Based upon the 1691 Domingo Teran de los Rios map of a Red River Nasoni Caddo community, and ethnographic descriptions of the dispersed nature of Caddo settlement in East and Northeast Texas, it was expected that in addition to the larger Late Caddo communities with mounds (as at Roitsch) the settlement system would also be comprised of individual farmsteads, hamlets, and small villages (see Bruseth et al. 1992:10, 22). It was uncertain whether such a model of settlement would also be applicable to Formative-Middle Caddo period communities.

The archeological survey data from the Roitsch Farm, along with the archeological data recovered from the Roitsch site excavations, does suggest that there are clusters of contemporaneous Late Caddo farmsteads and ancillary sites located immediately to the south and west of the Roitsch site along old channels of the Red River (now used as channels by Big Pine Creek and Salt Well Slough). No evidence was recovered in the survey to indicate that larger Late Caddo hamlets or villages occur away from the river itself, as all the non-salt-making sites along Big Pine Creek and Salt Well Slough seem to have been about the size to contain individual houses, small trash middens, and a household cemetery. The dispersion of Late Caddo remains at the Holdeman site village suggests that a number of household compounds are present there, but the village lacked a mound at that time.

The low number of Formative-Middle Caddo period sites in the survey areas, and at the Roitsch site itself, argues against the same type of dispersed settlement system as characterized the Late Caddo period in the Mound Prairie area. The few sites of this period that were identified during the TAS Field School occur only in immediate proximity to Roitsch, Fasken, and Holdeman, the large civic-ceremonial villages with mounds. This suggests that populations during Formative-Middle Caddo period times were mainly concentrated in a few optimal locales, but became more dispersed in Late Caddo times around the few mound centers.

The Historic Tribal Affiliation of the Early Historic Archeological Deposits at the Roitsch Site

Unfortunately, no progress was made toward solving this research problem during the course of the TAS field school investigations. An area in the western portion of the Roitsch site was believed to contain Caddo archeological deposits dating to the Historic period due to its proximity to a burial that contained glass beads that was recovered many years ago. However, the field school excavations in this area (Block V) contained only evidence of short-term, low density Early Caddo and Late Caddo occupations. No definitive evidence of a Historic period occupation by Caddo peoples was found there, although one small sherd could have come from a Keno Trailed vessel that may have been made and used during that period. Near the East Mound, several sherds from Keno Trailed, Hudson Engraved, and Simms Engraved vessels were recovered, and these could have been used during the historic period by Caddo peoples. In general, however, this research problem simply could not be addressed due to a lack of data, both archeological and historical.

Understanding the Internal Characteristics of the Mound at the Roitsch Site

The primary impetus for conducting the 1991 and 1992 TAS Field Schools in Red River and Lamar counties was the urgent need to study the East Mound at the Roitsch site before it could be washed away by another flood. The entire West Mound had been washed away in the 1990 flood, leaving the limited excavations conducted by SMU in 1968 as the only record of mound construction and content. Although significant discoveries were made at the East Mound during those excavations, the Principal Investigator believed that there was no clear evidence for intentional construction and thought that the mound was formed by the gradual accumulation of midden (Skinner et al. 1969). In 1991 and 1992, tremendous effort was devoted to excavation in the mound to complete its documentation and definitively determine whether or not it was an artificial mound.

The strata described in the 1969 report (Skinner et al. 1969) included a sterile red clay layer overlain by 55 cm-thick black sandy clay, overlain by a tan and brown 80 cm-thick sandy loam midden and a plow zone. The authors noted that the initial occupation had occurred in the upper portion of the black sandy clay layer and they believed that the midden accumulated gradually on top of it. The black layer, which was redefined as a dark reddish brown sandy loam in the 1991 work, and the sterile red clay represent the natural soil profile. Resting on top of this soil in the center of the mound was a roughly 10 cm-thick layer of red clay which formed the floor of a ceremonial structure through which the shaft grave was dug at a later point in time. It is clear from the wide sloping area of the "mottled zone" in the profile over the shaft grave that a large area was excavated to uncover the original structure that had been buried. From the prepared clay floor down to the base of the grave shaft, the grave walls were vertical.

The most spectacular features within the mound are the human burials, especially the large shaft grave in the center of the mound (Burial 15). However, the mound was not originally constructed to serve as a burial mound. The only human burials uncovered within the mound fill or beneath the mound were clearly intrusive and postdate the mound's construction. The ceramics from the intrusive interments include shell-tempered ceramics associated with the latter portion of the Late Caddo McCurtain phase (e.g., Avery Engraved, Nash Neck Banded, and Simms Engraved). The mound appears to have been built to cap the early McCurtain phase rectangular ceremonial structure with a prepared clay floor built on the natural ground surface near the center of the mound. Unlike the West Mound, which included multiple layers of burned structures, the East Mound contained this single structure.

The clearest evidence that the mound was deliberately constructed and not a gradually accumulating midden comes from the ceramics identified in the mound fill. Very few shell-tempered sherds were present in the mound fill, which suggests that midden from the Early and Middle Caddo occupations was scooped up elsewhere and placed intentionally to construct the mound. Given the radiocarbon dates associated with the use of the mound, most ceramics in the mound fill would have been shell-tempered if it had formed through the gradual accumulation of midden.

Feature 101, a large bathtub-shaped pit containing evidence of intense burning, provided dates for the initial episode of mound construction. By chance, a small portion of this large pit extended outside of Block I, leaving a clear profile along the eastern wall of the block that proved to be very illuminating. Beneath the layers of mixed sandy loam mound fill was a relatively uniform, thin (ca. 2-5 cm thick) waterlain layer of laminated sand. Similar waterlain layers were observed in our units and trenches after torrential rainfall washed backdirt into the excavations, so it is clear that this layer was deposited rapidly after a similar rainfall event. However, this waterlain layer had been penetrated by Feature 101 before mound fill was added over the top of the feature. Apparently, some basket loads of sandy loam had been deposited in the vicinity of Feature 101 as the mound construction began, and the feature was then used for a short-term event that included burning and immediate backfilling before the rest of the mound fill was deposited. The date on charcoal recovered from Feature 101 places the initial construction of the mound between cal. A.D. 1275 and 1383, during the early portion of the McCurtain phase.

To summarize our conclusions about construction of the mound and its internal characteristics, examination of all the data from the 1968, 1991, and 1992 excavations has allowed us to establish the entire sequence of mound use with a reasonable degree of certainty. Through a combination of hard work and good luck, enough information was gathered in 1991 and 1992 to demonstrate that the East Mound was deliberately constructed by Caddo peoples and we were fortunate enough to obtain an initial date of construction at around A.D. 1275-1383. At that time, a rectangular structure with a prepared clay floor was ceremonially burned and covered with sandy loam mound fill containing artifacts discarded during earlier Early and Middle Caddo period occupation of the site. Later, single and multiple burials were interred in the mound, with the large shaft grave (Burial 15) dug down through the center of the mound, and through the structure that was buried by the mound fill, down through the natural soil into the sterile red clay. Late McCurtain phase ceramics recovered from these graves in 1968, along with radiocarbon samples obtained in 1991 and 1992, place the late period of use of the mound for interment at cal. AD 1412-1511 for Burial 15 and cal. A.D. 1431-1513 for Burial 17. While no radiocarbon dates from the historic period were obtained, the quantity of ceramics that have been found elsewhere in association with historic materials (e.g., Keno Trailed, Hudson Engraved, and Sims Engraved) could reflect continued use into the historic period.

Subsistence Pursuits by the Caddo peoples that lived at the Roitsch Site

A combination of archeological and bioarcheological evidence was recovered from the Roitsch site—and from several other contemporaneous Caddo sites where stable carbon isotope analyses were conducted—during the course of the 1991 and 1992 TAS Field School that has proved quite informative about prehistoric Caddo subsistence pursuits in the middle reaches of the Red River. These different sources of information have convincingly established that by A.D. 1300, the prehistoric Caddo living at the Roitsch site and other associated communities had a diet based on an intensive use of cultivated foods, particularly maize. These Caddo communities had developed a successful maize-based economy that was sustained in this part of northeastern Texas until at least the early 18th century, despite several major droughty periods (Perttula 2005: Table 2-3) that would have led to crop losses from poor or failed harvests.

Paleobotanical analyses by Fritz and Goldborer identified maize, cucurbita, various seeds from wild plants (maygrass, chenopod, and purslane), as well as thick hickory, acorn, walnut, and pecan nuts. Hardwood mast was apparently also an important constituent of the Caddo diet at Roitsch. The ubiquity of maize in feature flotation samples indicate that maize was in common use: i.e., maize was an important crop and dietary food item. There is no evidence that the Caddo peoples living at Roitsch grew or gathered native oily or starchy seed crops, not like their contemporaries living in the Midwest, the Ozarks, and the Arkansas River basin (Gremillion 2006). Maize, which diffused from Mexico into the Southeastern United States sometime after 2000 years ago (Fritz 2006:439-440), became an important crop for the Caddo on the Red River sometime after ca. A.D. 1000. Maize was directly dated to the 11th century A.D. at the Ray site (Bruseth et al. 2001: Table 11), an earlier Caddo site also investigated during the 1991-1992 TAS Red River Field School.

Stable carbon isotope analyses of Caddo human skeletal remains from Red River Caddo village populations—including Roitsch (see Appendix X, this article)—indicate that McCurtain phase Caddo peoples had a maize-rich diet. Pre-A.D. 1250 Caddo had a diet based more on wild plants and animal foods, supplemented by tropical cultigens. Schoeninger et al. (2000:69) note that a stable carbon isotope value of -14.0 ‰ on human skeletal remains means that the diet of such an individual would have consisted of 50 percent C4 species, which include maize, amaranth, other grasses, as well as bison. Caddo burials dated from A.D. 1280-1480 from Red River Caddo sites have mean stable carbon isotope values of -14.26 ± 1.25 ‰ (see Appendix X, this article), while slightly later burials (dating from ca. A.D. 1450-1680) from the same set of sites have comparable mean isotope values of -14.58 ± 1.18 ‰. Very similar isotope values from other Late Caddo sites along the Red River indicate that Caddo agricultural populations were also living in southwestern Arkansas and northwestern Louisiana from the 14th century A.D. on (Perttula 2005:399 and Figure 11-20).

Although the Caddo peoples living at the Roitsch site were agricultural, other contemporaneous Native American groups had very high maize diets, perhaps 15-50 percent higher than did the McCurtain phase Caddo groups living along the Red River. For instance, in the Ohio River valley, populations there had stable isotope values that were enriched (-12 ‰ to -9 ‰), as did Cahokia and other American Bottom populations (-14 ‰ to -11 ‰) along the Mississippi River. It is interesting that most high status individuals living at Cahokia ate less maize—and probably ate more meat—than did commoners (Schoeninger 2006:643). No such status variation can be identified among the Roitsch site Caddo population. At Moundville, in Alabama, after ca. A.D. 1000, the Native American populations were firmly agricultural (mean -10 ‰ stable carbon isotope values) (Schoeninger 2006:644).

Bioarcheological analyses of burials at the Roitsch site (see Derrick et al., this article) also indicate that McCurtain phase Caddo populations living at the site were part of an extended agricultural community. In addition to the previously mentioned stable carbon isotope analyses, these Caddo had very high caries rates in their teeth. Such rates are consistent with an increasing dependence on corn agriculture and the extensive consumption of sticky carbohydrate-rich foodstuffs.

These Red River Caddo also have evidence of porotic hyperostosis in their skeletal remains: 3-33 percent of the studied burials among Caddo populations at the Roitsch, Roden, Holdeman, Rowland Clark, and Bob Williams sites have this pathological condition. Porotic hyperostosis is a paleopathological condition that is considered a likely result of iron deficiency anemia caused by nutritional deficiencies. The rate of porotic hyperostosis in the Roitsch burials is only 5 percent, suggesting that these Caddo had a nutritionally adequate diet not significantly affected by nutritional stress, disease, anemia, or malnutrition.

The Caddo living at the Roitsch site supplemented their diet with a wide and diverse complement of wild animal foods, including fish, toads and frogs, alligator, turtles, snakes, birds, and many different mammals (see Yates, this article). The latter comprised such species as rabbits, rodents (surely pests that got into stored foodstuffs) and squirrels, bear, raccoon, and white-tailed deer. These animal remains are consistent with a Late Caddo diet for these Mound Prairie Caddo people that relied on large game animals for meat and protein, supplemented by turkey, rabbit, fish, turtles, and various small mammals. Edible mean weights from the Roitsch site (see Table 48) indicate that white-tailed deer accounted for almost 55 percent of the available meat weight; much of the bone in the archeological deposits here is the product of the processing and consumption of white-tailed deer. At the earlier Ray site, by comparison, white-tailed deer comprised 90 percent of the edible meat weight.

Caddo Salt Processing: Were the Caddo Processing Salt near the Roitsch Site?

In addition to the salt processing site at Salt Well Slough (41RR204, see Kenmotsu 2001, 2006), three other Late Caddo salt making sites (41RR248, 41RR256, and 41RR257) have been identified immediately south of the Salt Well Slough site along Salt Well Slough below its confluence with Pond Creek (see Figure 80, see also Perttula, this volume). Known salt-making sites, on intractable clay soils, extend for at least 800 m along high ground immediately adjacent to the slough.

These sites contain abundant surface and buried deposits of large, shell-tempered Nash Neck Banded and Emory Punctated-Incised jar sherds, substantial quantities of burned clay (and daub), and evidence from shovel testing of burned and oxidized soils; few chipped or ground stone tools or pieces of lithic debris have been found at these sites (Perttula, this volume). Our inference that these are post-A.D. 1300 Late Caddo salt-making sites hinges on the fact that Salt Well Slough is fed by a salt spring, on the findings of features and burned areas from the Salt Well Slough site (see Kenmotsu 2001), and comparisons with other salt-making sites in southwestern Arkansas (cf. Early 1993; Kenmotsu 2001, 2006) and northwestern Louisiana (Girard 2006). Agricultural Caddo folk, as with the McCurtain phase Caddo living at the Roitsch site and surrounding domiciles, had strong nutritional requirements for salt.

Anglo-American Settlement and Trade

The recorded historic archeological sites on the Roitsch farm and adjoining lands are the remnants of homesteads and tenant farms occupied principally between 1860 and 1950. Of the 56 archeological sites that have historic archeological components, only 12.5 percent have occupations that predate 1900, while another 23 percent may have had 19th century occupations but the archeological material remains recovered are equivocal in chronological matters. One late 19th century cemetery (41RR235) was recorded on the upper reaches of Salt Well Slough (Figure 81).

Early to mid-19th century artifacts (English transfer-printed and hand-painted ceramics, dark green bottle glass, square nails and metal implements, etc.) have been found in some quantity at Jonesborough (see also Reese 1998, 2001), in several sites in the Tarrant Survey (Perttula, this volume), on Mound B at the Fasken site (see Prikryl 2001, this volume; Perttula and Reese 2001:232), and similar material remains have been documented in the R. K. Harris collection (at the Smithsonian Institution) from the Wright Plantation site (41RR7); this site is located on the Red River between the Roitsch and Fasken sites. However, clear Antebellum Anglo-American or early 19th century Native American sites were not identified in the TAS Field School survey or in the various 1991 and 1992 site excavations.

The historic sites are widely dispersed across the Roitsch Farm, but they are especially common on high ground between Big Pine Creek and Pond Creek, but off of the Late Holocene alluvial terraces where the Roitsch site is situated. The few historic sites that were occupied only in the 19th century seem to have preferred settling along the tributaries of Red River, particularly Big Pine Creek (for example, site 41RR266, see Figure 81), rather than on the river itself.

These farmsteads cluster around the old and abandoned community of Blakeney (Hazlewood 1996:580), along the roads that ran from the late 19th-mid-20th century towns of Manchester and Davenport (near Jonesborough), and immediately north of Pond Creek where an unnamed community of tenant farmers lived. This community was reported to have had as many as 15 separate farmsteads and a blacksmith shop, and a general store was thought to have been in the area as well. The TAS survey of that area recorded six ca. 1900-1930 farmsteads (41RR215, 41RR222-41RR225, and 41RR227), and through systematic surface collections recovered a large sample of domestic artifacts associated with each of the farms.

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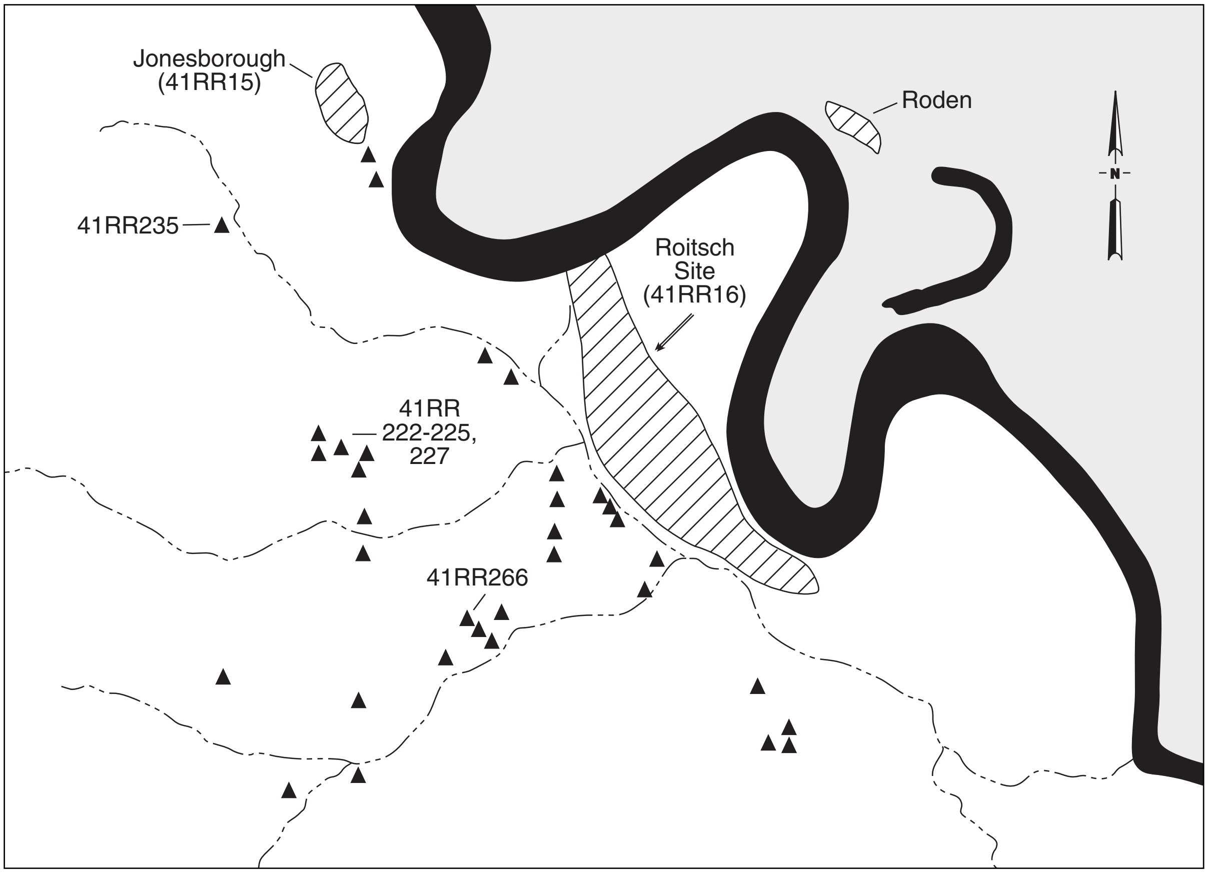

Figure 81. Distribution of 19th and 20th century archeological sites on the Roitsch farm, and in the vicinity of the Jonesborough site (41RR15).

them all, more than 600 in number. While we cannot recognize each and every member of the 1991 and 1992 TAS Field Schools, we do want to specifically thank the following: Mike Davis, Tom Middlebrook, Norman Flaigg, Jimmie Smith, E. Mott Davis, Pam Wheat, and Sallie Taylor (Block Directors at Roitsch); Karen Gardner and Jeanine McDonald (Lab Directors, 1991 Field Season); Bonnie Yates (Bone Laboratory); and Bryan Jameson. We also thank the TAS Board of Directors for their financial support of the Field School.

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REFERENCES CITED

Adair, M. J.
1990 Corn and Culture History in the Central Plains. Paper presented at the Conference on Corn and Culture in the Prehistoric New World, Minneapolis.

Ambrose, S. H. and L. Norr
1992 On Stable Isotopic Data and Prehistoric Subsistence in the Soconusco Region. *Current Anthropology* 33(4):401-404.

Arbingast, S. A., L. G. Kennamer, R. H. Ryan, A. Lo, D. L. Karney, C. P. Zlatkovich, M. E. Bonine, and R. G. Steele
1973 *Atlas of Texas*. The University of Texas Press, Austin.

Banks, L. D.
1990 *From Mountain Peaks to Alligator Stomachs: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest*. Memoir #4. Oklahoma Anthropological Society, Norman.
1996 Kiomatia Mounds. In *The New Handbook of Texas, Vol. 3*, edited by R. Tyler, p. 1120. Texas State Historical Association, Austin.

Banks, L. D. and N. T. Banks
2002 *Last Twentieth Century Archaeological Investigations at the Arnold Roitsch Site (41RR16), Red River County, Texas*. Report on file, Archeology Division, Texas Historical Commission, Austin.

Banks, L. D. and J. Winters
1975 *The Bentsen-Clark Site, Red River County, Texas: A Preliminary Report*. Special Publication No. 2. Texas Archeological Society, San Antonio.

Bareis, C. J. and J. W. Porter (editors)
1984 *American Bottom Archaeology*. University of Illinois Press, Urbana.

Beattie, O. B.
1980 An Analysis of Prehistoric Human Skeletal Material from the Gulf of Georgia Region of British Columbia. Ph.D. Dissertation, Department of Anthropology, Simon Fraser University, Vancouver, British Columbia.

Bee, J. W., G. E. Glass, R. S. Hoffmann, and R. R. Patterson
1981 *Mammals in Kansas*. Public Education Series No. 7. Museum of Natural History, University of Kansas, Lawrence.

Bell, R. E. and D. A. Baerreis
1951 A Survey of Oklahoma Archeology. *Bulletin of the Texas Archeological and Paleontological Society* 22:7-100.

Bennett, K. A.
1961 Artificial Cranial Deformation among the Caddo Indians. *The Texas Journal of Science* 13(4):377-390.

Benz, B. F.
1986 Taxonomy and Evolution of Mexican Maize. Ph.D. dissertation, University of Wisconsin, Madison.

Benz, B. F. and H. H. Iltis
1992 Evolution of Female Sexuality in the Maize Ear (*Zea mays* L. subsp. *mays*- Gramineae). *Economic Botany* 46(2):212-222.

Berger, R., A. G. Homey, and W. F. Libby
1964 Radiocarbon Dating of Bone and Shell from their Organic Components. *Science* 144:999-1001.

Bergman, L. E. and T. Hansson
1979 Hard Tissue Changes of the Temporomandibular joint in Archeo-osteological Material from the 11th century. *Swedish Dental Journal* 3:149-155.

Bird, R. M.
1990 Manual for the Measurement of Maize Cobs. Paper presented at the Conference on Corn and Culture in the Prehistoric New World, Minneapolis.

Blair, W. F.
1950 The Biotic Provinces of Texas. *Texas Journal of Science* 2(1):93-117.

Blake, L. W. and H. C. Cutler
1979 Plant Remains from the Upper Nodena Site (3MS4). *Bulletin of the Arkansas Archeological Society* 20:53-58.

Boutton, T. W. and P. D. Klein
1984 Stable carbon isotope ratios as indicators of prehistoric human diet. In *Stable Isotopes in Nutrition*, edited by J. R. Turnlund and P. E. Johnson, pp. 191-204. American Chemical Society, Washington, D.C.

Brain, J. P.
1979 *Tunica Treasure*. Papers of the Peabody Museum of Archaeology and Ethnology, Volume 71. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.

Briscoe, J.
1995 *Archeological Investigations on the OkTex Pipeline Company Proposed Abandonment of OK-7, Red River County, Texas*. Briscoe Consulting Services, Norman, Oklahoma.

Brown, D. E., F. Reichenbacher, and S. E. Franson
1998 *A Classification of North American Biotic Communities*. University of Utah Press, Salt Lake City.

Brown, I. W.

1980 *Salt and the Eastern North American Indian, An Archaeological Study*. Lower Mississippi Survey, Bulletin No. 6. Peabody Museum, Harvard University.

Brown, J. A.

1971 *Spiro Studies: Volume 3, Pottery Vessels*. Stovall Museum of Science and History, The University of Oklahoma Research Institute, Norman.

1996 *The Spiro Ceremonial Center: The Archaeology of Arkansas Valley Caddoan Culture in Eastern Oklahoma*. 2 Vols. Memoirs No. 29. Museum of Anthropology, University of Michigan, Ann Arbor.

Bruseth, J. E.

1998 The Development of Caddoan Polities along the Middle Red River Valley of Eastern Texas and Oklahoma. In *The Native History of the Caddo: Their Place in Southeastern Archeology and Ethnohistory*, edited by T. K. Perttula and J. E. Bruseth, pp. 47-68. Studies in Archeology 30. Texas Archeological Research Laboratory, The University of Texas at Austin.

Bruseth, J. E. and L. Banks

1992 Ray Site (41LR135). In *Field Guide for the 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas*, by J. Bruseth, T. Perttula, B. Martin, and D. Prikryl, pp. 51-59. Department of Antiquities Protection, Texas Historical Commission, Austin.

Bruseth, J. E. and W. A. Martin

1987 *The Bird Point Island and Adams Ranch Sites: Methodological and Theoretical Contributions to North Central Texas Archaeology.* Richland Creek Technical Series, Volume II. Archaeology Research Program, 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.* Research Report 87. Archaeology Research Program, Southern Methodist University, Dallas.

Bruseth, J. E., L. Banks, and J. Smith

2001 The Ray Site (41LR135). *Bulletin of the Texas Archeological Society* 72:197-213.

Bruseth, J., T. Perttula, and B. Martin

1991 *Field Guide for the 1991 Texas Archeological Society Field School in Red River County, Texas*. Department of Antiquities Protection, Texas Historical Commission, Austin.

Bruseth, J., T. Perttula, B. Martin, and D. Prikryl

1992 *Field Guide for the 1992 Texas Archeological Society Field School in Red River County, Texas*. Department of Antiquities Protection, Texas Historical Commission, Austin.

Buikstra, J. and D. Fowler

1975 An osteological study of the human skeletal materials from the Bentsen-Clark site. In *The Bentsen-Clark Site, Red River County, Texas: a Preliminary Report*, by L. D. Banks and J. Winters, pp. 79-97. Special Publication No. 2. Texas Archeological Society, San Antonio.

Bull, J. and J. Farrand, Jr.

1977 *The Audubon Society Field Guide to North American Birds: Eastern Region*. Alfred A. Knopf, New York.

Burnett, B. A.

1988 Standridge bioarcheology and the Middle Ouachita Caddo. In *Standridge: Caddoan Settlement in a Mountain Environment*, by A. M. Early, pp. 143-152. Research Series No. 29. Arkansas Archeological Survey, Fayetteville.

1989 A Bioarcheological Synthesis of the Ozark and Ouachita Mountains and the Arkansas River Valley, 1350-1100 B.P. to 300 B.P. Masters Thesis, Department of Anthropology, University of Arkansas, Fayetteville.

1990 The Bioarcheological Synthesis of the Eastern Portion of the Gulf Coastal Plain. In *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by D. A. Story, J. A. Guy, B. A. Burnett, M. D. Freeman, J. C. Rose, D. G. Steele, B. W. Olive, and K. J. Reinhard, pp. 385-418. Research Series No. 38. 2 Vols. Arkansas Archeological Survey, Fayetteville.

1993 Adaptive Efficiency of Arkansas Populations. In *Caddoan Saltmakers in the Ouachita Valley: The Hardman Site*, edited by A. M. Early, pp. 187-223. Research Series No. 43. Arkansas Archeological Survey, Fayetteville.

Burton, S. S.

1970 *The Hugo Dam Site, Ch-112, Choctaw County, Southeast Oklahoma*. Oklahoma River Basin Survey, Archaeological Site Report No. 16. University of Oklahoma, Norman.

Butler, B. H.

1969 Analysis of the human skeletal remains. In *Archaeological Investigations at the Sam Kaufman Site, Red River County, Texas*, edited by S. A. Skinner, R. K. Harris, and K. M. Anderson, pp. 115-136. Contributions in Anthropology No. 5. Southern Methodist University, Dallas.

1974 Faunal Analysis. In *Archaeological Research at Cooper Lake, 1970-1972*, by R. D. Hyatt, B. H. Butler, and H. P. Mosca III, pp. 53-56, 69, and 86-87. Contributions in Anthropology No. 12. Department of Anthropology, Southern Methodist University, Dallas.

1975 Faunal Remains. *In Archeological Research at Cooper Lake, Northeast Texas, 1973*, by R. D. Hyatt and K. Doehner, pp. 60-70. Contributions in Anthropology No. 15. Department of Anthropology, Southern Methodist University, Dallas.

Butler, B. H. and T. K. Perttula
1981 Subsistence Analysis. In *Prehistoric Settlement Patterns at Lake Fork Reservoir*, by J. E. Bruseth and T. K. Perttula, pp. 117-124. Texas Antiquities Permit Series Report No. 2. Texas Antiquities Committee and Southern Methodist University, Austin and Dallas.

Byrd, K. M.
1980 Zooarchaeological Analysis of the Hanna Site: An Alto Focus Occupation in Louisiana. *Louisiana Archaeology* 5:235-265.

Chafe, W.
1993 Caddo Names in the de Soto Documents. In *The Expedition of Hernando de Soto West of the Mississippi, 1541-1543, Proceedings of the De Soto Symposia 1988 and 1990*, edited by G. A. Young and M. P. Hoffman, pp 222-226. University of Arkansas Press, Fayetteville.

Chevrud, J. M. and J. E. Midkiff
1992 Effects of fronto-occipital cranial reshaping on mandibular form. *American Journal of Physical Anthropology* 87(2):167-172.

Chisholm, B. S.
1989 Variation in diet reconstructions based on stable carbon isotopic evidence. In *The Chemistry of Prehistoric Human Bone*, edited by T. D. Price, pp. 10-37. Cambridge University Press, Cambridge.

Cogswell, J. W., H. Neff, and M. D. Glascock
1998a Analysis of Shell-Tempered Pottery Replicates: Implications for Provenance Studies. *American Antiquity* 63(1):63-72.
1998b Complementary Analysis of Prehistoric Pottery: Explaining Behavioral Processes. Paper presented at the 63rd annual Society for American Archaeology meetings, Seattle.

Colby, G. R.
1995 Analysis of Dental Abscess Formation in a Texas Hunter-Gatherer and a Texas Agricultural Population. Paper presented at the 1995 Caddo Conference, Austin.
1997 Analysis of Dental Abscess Formation in a Texas Hunter-Gatherer and a Texas Agricultural Population. *Bulletin of the Texas Archeological Society* 68:179-189.
n.d. Dental health and TMJ disorders in hunting and gathering and agricultural populations from Texas: implication on paleodiet reconstruction. Manuscript in preparation, on file, Department of Anthropology, Texas A&M University, College Station.

Colby, G. R., M. H. Hines, and D. G. Steele
1992 Analysis of human remains. In *Exploratory Investigations at 41GV53 on Clear Creek, Galveston County, Texas*, by M. H. Hines, pp. 59-79. Reports of Investigations No. 89. Prewitt and Associates, Inc., Austin.

Colby, G. R., B. W. Baker, D. L. Carlson, H. Danzeiser Dockall, P. M. Landau, S. K. McCormick, B. W. Olive, J. F. Powell, B. S. Shaffer, and D. G. Steele
n.d. Texas A&M University, Physical Anthropology Laboratory Data Form. Texas A&M University, College Station.

Core, H. A., W. A. Cote, and A. C. Day
1979 *Wood Structure and Identification*. Syracuse University Press, Syracuse, New York.

Correll, D. S. and M. C. Johnston
1979 *Manual of the Vascular Plants of Texas*. University of Texas at Dallas.

Cowan, C. W.
1978 The Prehistoric Use and Distribution of Maygrass in Eastern North America: Cultural and Phytogeographical Implications. In *The Nature and Status of Ethnobotany*, edited by R. I. Ford, pp. 263-288. Anthropological Papers 67. Museum of Anthropology, University of Michigan, Ann Arbor.

Crane, C. J.
1988 The Cooper Lake Archaeobotanical Remains: Results from the First Season. Report submitted to the Archaeology Research Program, Southern Methodist University, Dallas.

Crites, G. D. and R. D. Terry
1987 Nutritive Value of Maygrass (*Phalaris caroliniana* Walt.). *Economic Botany* 38:114-120.

Cutler, H. C. and L. W. Blake
1973 *Plants from Archaeological Sites East of the Rockies*. Missouri Botanical Garden, St. Louis.

Cybulski, J. S.
1980 Skeletal remains from Lillooet, British Columbia, with observations for a possible diagnosis of skull trephination. *Syesis* 13:53-59.

Davis, D. D.
1984 Comparative Aspects of Late Prehistoric Faunal Ecology at the Sims Site. *Louisiana Archaeology* 11:111-138.

Davis, W. B.
1974 *The Mammals of Texas*. Bulletin No. 41. Texas Parks and Wildlife Department, Austin.

Decker, D. S.
1988 Origin(s), Evolution, and Systematics of *Cucurbita pepo* (Cucurbitaceae). *Economic Botany* 42:3-15.

Delorit, R. J.
1970 *An Illustrated Taxonomy Manual of Weed Seeds*. Agronomy Publications, River Falls, Wisconsin.

Delorit, R. J. and C. Gunn
1986 *Seeds of Continental United States Legumes (Fabaceae)*. Agronomy Publications, River Falls, Wisconsin.

Densmore, F.

1929 *Chippewa Customs*. Bureau of American Ethnology Bulletin 86. Smithsonian Institution, Washington, D.C.

Derrick, S. M.

n.d. Suggested Etiology of Supra-Inion Depressions in Artificially Modified Caddoan Crania. Manuscript on file, Department of Anthropology, Texas A&M University, College Station.

Derrick, S. M. and D. G. Steele

1993 Analysis of Human Remains from 41DT6 and 41DT16. In *Excavations at the Tick, Spike, Johns Creek, and Peerless Bottoms Sites, Cooper Lake Project, Delta and Hopkins Counties, Texas*, by R. C. Fields, E. F. Gadus, L. W. Klement, C. B. Bousman, and J. B. McLerran, pp. 272-286. Reports of Investigations No. 91. Prewitt and Associates, Inc., Austin.

Derrick, S. M. and D. Wilson

1997 Cranial Modeling as an Ethnic Marker among the Prehistoric Caddo. *Bulletin of the Texas Archeological Society* 68:139-146.

Derrick S. M., D. Wilson, and C. Lee

1995 Cranial Modeling As An Ethnic Marker Among the Prehistoric Caddo. Paper presented at the 1995 Caddo Conference, Austin.

Diamond, D. D., D. H. Riskind, and S. L. Orzell

1987 A Framework for Plant Community Classification and Conservation in Texas. *The Texas Journal of Science* 39:203-221.

Dickinson, S. D.

1936 Ceramic Relationships of the Pre-Caddo Pottery from the Crenshaw Site. *Bulletin of the Texas Archeological and Paleontological Society* 8:56-69.

Dimbleby, G. W.

1967 *Plants and Archaeology*. Baker, London.

Doehner, K. and R. E. Larson

1978 *Archaeological Research at Proposed Cooper Lake, Northeast Texas, 1974-1975*. Archaeology Research Program, Southern Methodist University, Dallas, Texas.

Durham, J. H. and M. K. Davis

1975 Report on the Burials Found at Crenshaw, Mound C, Miller County, Arkansas. *Bulletin of the Oklahoma Anthropological Society* 23:1-90.

Early, A. M. (editor)

1993 *Caddoan Saltmakers in the Ouachita Valley: The Hardman Site*. Research Series No. 43. Arkansas Archeological Survey, Fayetteville.

Erichsen-Brown, C.

1979 *Medicinal and Other Uses of North American Plants*. Dover Publications, New York.

Ericson J. E., M. West, C. H. Sullivan, and H. W. Krueger

1989 The development of maize agriculture in the Viru Valley, Peru. In *The Chemistry of Prehistoric Human Bone*, edited by T. D. Price, pp. 68-104. Cambridge University Press, Cambridge.

Espinosa, Fr. I. F. de

1927 Descriptions of the Tejas or Asinai Indians, l691-1722, Part IV: Fray Isidro Felis de Espinosa on the Asinai and Their Allies. Translated by M. A. Hatcher. *Southwestern Historical Quarterly* 31(2):150-180.

Everett, D.

1990 *The Texas Cherokees: A People between Two Fires 1819-1840*. University of Oklahoma Press, Norman.

Fazekas, I. G. and F. Kosa

1978 *Forensic Fetal Osteology*. Akademiai Kiado, Budapest.

Fenneman, N. M.

1938 *Physiography of Eastern United States*. McGraw-Hill Book Company, Inc., New York.

Fields, R. C. and S. A. Tomka

1993 Hunter-Gatherer Mobility in Northeast Texas. In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by N. A. Kenmotsu and T. K. Perttula, pp. 69-95. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Fletcher, A. C. and F. La Flesche

1911 *The Omaha Tribe*. Annual Report 27. Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.

Flynn, P.

1976 A Study of Red-Filmed Pottery from the Clement Site (Mc-8), McCurtain County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society* 25:127-134.

Ford, J. A.

1936 *Analysis of Indian Village Collections from Louisiana and Mississippi*. Department of Conservation, Louisiana Geological Survey, Anthropological Study No. 2. New Orleans.

Fritz, G. J.

1986a Maize. In *French-Indian Interaction at an 18th Century Frontier Post: The Roseborough Lake Site, Bowie County, Texas*, by K. Gilmore, pp. 131-134. Contributions in Archaeology 3. North Texas State University, Institute of Applied Sciences, Denton.

1986b Prehistoric Ozark Agriculture: The University of Arkansas Rockshelter Collections. Ph.D. dissertation, Department of Anthropology, University of North Carolina at Chapel Hill.

1987 Analysis of Carbonized Macrobotanical Remains. In *The Bird Point Island and Adams Ranch Sites*, edited by J. E. Bruseth and W. A. Martin, pp. 129-136. Richland Creek Technical Series, Vol. II. Archaeology Research Program, Institute for the Study of Earth and Man, Southern Methodist University, Dallas.

1989 Evidence of Plant Use from Copple Mound at the Spiro Site. In *Contributions to Spiro Archaeology: Mound Excavations and Regional Perspectives*, edited by J. D. Rogers, D. G. Wyckoff, and D. A. Peterson, pp. 65-87. Studies in Oklahoma's Past No. 16. Oklahoma Archeological Survey, Norman.

1990 Multiple Pathways to Farming in Precontact Eastern North America. *Journal of World Prehistory* 4:387-435.

1992 Archaeobotanical Remains from Five Sites on the Red River, Northeast Texas. Report submitted to the Department of Antiquities Protection, Texas Historical Commission, Austin.

2006 Introduction and Diffusion of Crops from Mexico. In *Environment, Origins, and Population*, edited by D. H. Ubelaker, pp. 437-446. Handbook of North American Indians, Volume 3. Smithsonian Institution, Washington, D.C.

Fritz, G. J. and B. D. Smith
1988 Old Collections and New Technology: Documenting the Domestication of Chenopodium in Eastern North America. *Midcontinental Journal of Archaeology* 13:3-27.

Galinat, W. C.
1985 Domestication and Diffusion of Maize. In *Prehistoric Food Production in North America*, edited by R. I. Ford, pp. 245-278. Papers No. 75. Museum of Anthropology, University of Michigan, Ann Arbor.

Galm, J. R. and P. Flynn
1978 *The Cultural Sequences at the Scott (34LF-11) and Wann (34LF-27) Sites and Prehistory of the Wister Valley*. Archaeological Research and Management Center Research Series No. 3. University of Oklahoma, Norman.

Genoves, S. C.
1967 Proportionality of long bones and their relation to stature among Mesoamericans. *American Journal of Physical Anthropology* 26:67-78.

Gerschman, J. A. and P. C. Reade
1988 Disorders of the temporomandibular joint and related structures. *Australian Family Physician* 17:239-244.

Gilbert, B. M.
1980 *Mammalian Osteology*. B. Miles Gilbert, Publisher, Laramie, Wyoming.

Gilbert, B. M., L. D. Martin, and H. G. Savage
1981 *Avian Osteology*. B. Miles Gilbert, Publisher, Laramie, Wyoming.

Gilmore, K.
1986 *French-Indian Interaction at an 18th Century Frontier Post: The Roseborough Lake Site, Bowie County, Texas*. Contributions to Archaeology No. 3. Institute of Applied Sciences, North Texas State University, Denton.

Gilmore, K. and O. F. McCormick
1982 *Red River Archaeological Project, Phases I and II*. Contributions in Archaeology No. 2. Institute of Applied Sciences, North Texas State University, Denton.

Girard, J. S.
2006 *Regional Archaeology Program, Management Unit 1, Seventeenth Annual Report 2006*. Northwestern State University of Louisiana, Natchitoches.

Glascock, M. D.
1992 Characterization of Archaeological Ceramics at MURR by Neutron Activation Analysis and Multivariate Statistics. In *Chemical Characterization of Ceramic Pastes in Archaeology*, edited by H. Neff, pp. 11-26. Prehistory Press, Madison, Wisconsin.

Goldborer, S. E.
1988 Botanical Materials from the Bohannon (34Hu61) and Ashland (34Hu62) Sites. Report submitted to the Oklahoma Conservation Commission, Norman.

1991 Maize and Prehistoric Subsistence in the Oklahoma Cross Timbers: A Model for Post-Woodland Warm Season Precipitation Decline. Master's thesis, Department of Anthropology, University of Oklahoma, Norman.

1995 More Macrobotanical Materials from Three Sites along the Red River, Northeast Texas: Ray (41LR135), Fasken (41RR14), and Roitsch (41RR16). Report submitted to the Department of Antiquities Protection, Texas Historical Commission, Austin.

Goldstein, M. S.
1957 Skeletal pathology of early Indians in Texas. *American Journal of Physical Anthropology* 15:299-307.

Gonzalez, B.
2005 Caddo Tribal Religious Burial Ceremonies beyond Archeology. In *A Rediscovering of Caddo Heritage: The W. T. Scott Collection at the American Museum of Natural History and Other Caddo Collections from Arkansas and Louisiana*, by B. Gonzalez, R. Cast, T. K. Perttula, and B. Nelson, pp. 55-59. Historic Preservation Program, Caddo Nation of Oklahoma, Binger.

Gove, P. B. (editor)
1976 *Webster's Third New International Dictionary*. G. & C. Merriam Co., Springfield, Massachusetts.

Grayson, D. K.
1978 Reconstructing Mammalian Communities: A Discussion of Shotwell's Method of Paleoecological Analysis. *Paleobiology* 4:77-81.
1979 On the Quantification of Vertebrate Archaeofaunas. In *Advances in Archaeological Method and Theory, Vol. 2*, edited by M. B. Schiffer, pp. 199-237. Academic Press, New York.

Gregory, H. F.
1973 Eighteenth Century Caddoan Archaeology: A Study in Models and Interpretation. Ph.D. dissertation, Department of Anthropology, Southern Methodist University, Dallas.
1991 Coles Creek in the Caddo Area. Paper presented at the 33rd Annual Caddo Conference, Nacogdoches, Texas.

Gremillion, K. J.
2006 Southeast Plants. In *Environment, Origins, and Population*, edited by D. H. Ubelaker, pp. 388-395. Handbook of North American Indians, Volume 3. Smithsonian Institution, Washington, D.C.

Grinnell, G. B.
1923 *The Cheyenne Indians*. 2 Vols. Yale University Press, New Haven.

Haag, W. G.
1971 *Louisiana in North American Prehistory*. Museum of Geoscience, Melanges No. 1. Louisiana State University, Baton Rouge.

Hall, E. R. and K. R. Kelson
1959 *The Mammals of North America*. 2 Vols. Ronald Press, New York.

Hampton, H. and G. Moore
1936 A Burial Site in Northeastern Red River County. *Bulletin of the Central Texas Archeological Society* 2:64-69.

Harmon, A. M. and J. C. Rose
1989 Bioarcheology of the Louisiana and Arkansas study area. In *Archeology and Bioarcheology of the Lower Mississippi Valley and Trans-Mississippi South in Arkansas and Louisiana*, by M. D. Jeter, J. C. Rose, G. I. Williams, and A. M. Harmon, pp. 323-354. Research Series No. 37. Arkansas Archeological Survey, Fayetteville.

Harris, R. K.
1951 An Unusual Stone Pipe from the Sam Kaufman Site. *The Record*, Volume 10, No. 2, p. 6. Newsletter of the Dallas Archeological Society.
1953 The Sam Kaufman Site, Red River County, Texas. *Bulletin of the Texas Archeological Society* 24:43-68.

Harris, R. K. and Mr. and Mrs. J. Perkins
1954 Burials 12, 13, 14, & 15, The Sam Kaufman Site, Site 19B3-2. *The Record*, Volume 13, No. 1, pp. 2-8. Newsletter of the Dallas Archeological Society.

Harris, R. K. and L. Wilson
1956 Burial 17, The Sam Kaufman Site, 19B3-2. *The Record*, Volume 14, No. 4, pp. 17-22. Newsletter of the Dallas Archeological Society.

Hauser, G. and G. F. De Stephano
1989 *Epigenetic Variants of the Human Skull*. E. Schweizervartsche Verlagsbuchandlung, Stuttgart.

Hazlewood, C.
1996 Blakeney, Texas. In *The New Handbook of Texas, Vol. 1*, edited by R. Tyler, p. 580. Texas State Historical Association, Austin.

Heiser, C. B., Jr.
1989 Domestication of Cucurbitaceae: *Cucurbita* and *Lagenaria*. In *Foraging and Farming: The Evolution of Plant Exploitation*, edited by D. R. Harris and G. C. Hillman, pp. 471-480. Unwin Hyman, London.

Henderson, J.
1978a Faunal Analysis. In *Archaeological Research at Proposed Cooper Lake, Northeast Texas, 1974-1975*, by K. Doehner and R. E. Larson, p. 52, pp. 99-114, and pp. 187-190. Research Report 108. Archaeology Research Program, Southern Methodist University, Dallas.
1978b Faunal Analyses. In *Evaluation of the Archaeology at the Proposed Cooper Lake*, by K. Doehner, D. Peter, and S. A. Skinner, pp. 77-86, pp. 108-115, and pp. 200-207. Research Report 114. Archaeology Research Program, Southern Methodist University, Dallas.
1982 Faunal Analysis. In *The Deshazo Site, Nacogdoches County, Texas*, edited by D. A. Story, pp. 131-158. Texas Antiquities Committee Permit Series No. 7. Texas Antiquities Committee, Austin.

Herring, S. W.
1993 Epigenetic and functional influences on skull growth. In *The Skull*, by J. Hanken and B. K. Hall, pp. 153-206. University of Chicago Press, Chicago.

Hillson, S.
1986 *Teeth*. Cambridge University Press, Cambridge.

Hoffman, M. P.
1967 Ceramic Pipe Chronology along the Red River Drainage in Southwestern Arkansas. *Arkansas Archeologist* 8(1):4-14.

1970 Archaeological and Historical Assessment of the Red River Basin in Arkansas. In *Archeological and Historical Resources of the Red River Basin: Louisiana, Texas, Oklahoma, Arkansas*, edited by H. A. Davis, pp. 135-194. Arkansas Archeological Survey, Research Series No. 1. Fayetteville.

Holliday, D. Y.
1993 Cradleboards. Occipital lesions: a possible cost of cradleboards. *American Journal of Physical Anthropology* 90(3):283-290.

Hrdlicka, A.
1908 *Physiological and Medical Observations Among the Indians of Southwestern United States and Northern Mexico*. Bulletin 34. Bureau of American Ethnology, Government Printing Office, Washington, D.C.

1909 Report on additional collection of skeletal remains from Arkansas and Louisiana. In Antiquities of the Ouachita Valley, by C. B. Moore. *Journal of the Academy of Natural Science of Philadelphia* 14:171-249.

Huckell, L. W. and C. S. Vanpool
2006 *Toloatzin* and Shamanic Journeys: Exploring the Ritual Role of Sacred Datura in the Prehistoric Southwest. In *Religion in the Prehispanic Southwest*, edited by C. S. Vanpool, T. L. Vanpool, and D. A. Phillips, Jr., pp. 147-163. AltaMira Press, Lanham, Maryland.

Hudson, G. E.
1942 *The Amphibians and Reptiles of Nebraska*. Nebraska Conservation Bulletin No. 24. Conservation and Survey Division, University of Nebraska, Lincoln.

Huebner, J. A. and A. G. Comuzzie
1992 *The Archeology and Bioarcheology of Blue Bayou: A Late Archaic and Late Prehistoric Mortuary Locality in Victoria County, Texas*. Studies in Archeology 9. Texas Archeological Research Laboratory, The University of Texas at Austin.

Hughes, J. T.
1968 Prehistory of the Caddoan-Speaking Tribes. Ph.D. dissertation, Department of Anthropology, Columbia University, New York.

Hyatt, R. D. and H. P. Mosca III
1972 *Survey of Cultural Resources of the Proposed Big Pine Lake, Texas*. Southern Methodist University, Archaeology Research Program, Research Report 15. Dallas.

Jacquier, J. A.
1991 Jonesborough. *Texas Archeology* (Newsletter of the Texas Archeological Society) 35(3):9-10.

Johannessen, S.
1984 Paleoethnobotany. In *American Bottom Archaeology*, edited by C. J. Bareis and J. W. Porter, pp. 197-214. University of Illinois Press, Urbana.

Johnsgard, P. A.
1979 *Birds of the Great Plains*. University of Nebraska Press, Lincoln.

Jones, J. K., Jr., D. M. Armattong, and J. R. Choate
1985 *Guide to Mammals of the Plains States*. University of Nebraska Press, Lincoln.

Jones, V. H.
1949 Maize from the Davis Site: Its Nature and Interpretation. In *The George C. Davis Site, Cherokee County, Texas*, by H. P. Newell and A. D. Krieger, pp. 241-249. Memoirs No. 5. Society for American Archaeology, Kenosha, Wisconsin.

Jordan, T. G.
1981 *Trails to Texas: Southern Roots of Western Cattle Ranching*. University of Nebraska Press, Lincoln.

Kelley, D. B. (editor)
1994 *The McLelland and Joe Clark Sites, Bossier Parish, Louisiana*. Coastal Environments, Inc., Baton Rouge.

Kelley, M. A.
1979 Sex determination with fragmented skeletal remains. *Journal of Forensic Sciences* 24:154-58.

Kemp, R. J., Jr.
1971 *Freshwater Fishes of Texas*. Bulletin 5-A. Texas Parks and Wildlife Department, Austin.

Kenmotsu, N. A.
2001 Salt Well Slough. *Bulletin of the Texas Archeological Society* 72:213-222.

2006 *Investigations at the Salt Well Slough Site (41RR204), a Salt Making Site in Red River County, Texas*. Archaeological Reports Series, No. 4. Texas Historical Commission, Austin.

Kenmotsu, N. A. and T. K. Perttula (editors)
1993 *Archeology in the Eastern Planning Region, Texas: A Planning Document*. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Kennedy, K. A. R.
1989 Skeletal markers of occupational stress. In *Reconstruction of Life From the Skeleton*, edited by M. Y. Iscan and K. A. R. Kennedy, pp. 129-160. Alan R. Liss, New York.

Kidd, K. E. and M. A. Kidd
1970 A Classification System for Glass Beads for the Use of Field Archaeologists. *Canadian Historic Sites, Occasional Papers in Archaeology and History*, No. 1:45-89. National Historic Sites Service, National

and Historic Parks Branch, Department of Indian Affairs and Northern Development, Ottawa, Ontario, Canada.

Kidder, T. R.
1998 Mississippi Period Mound Groups and Communities in the Lower Mississippi Valley. In *Mississippian Towns and Sacred Spaces: Searching for an Architectural Grammar*, edited by R. B. Lewis and C. Stout, pp. 123-150. University of Alabama Press, Tuscaloosa.

Konigsberg, L.W., L. A. P. Kohn, and J. M. Chevrud
1993 Cranial deformation and nonmetric trait variation. *American Journal of Physical Anthropology* 9:35-48.

Krieger, A. D.
1946 *Culture Complexes and Chronology in Northern Texas with Extension of Puebloan Datings to the Mississippi Valley*. University of Texas Bulletin No. 4640. Austin.

2000 The Pottery of the Sanders Farm, Lamar County, Texas. In *The 1931 Excavations at the Sanders Site, Lamar County, Texas: Notes on the Fieldwork, Human Osteology, and Ceramics*, by A. T. Jackson, M. S. Goldstein, and A. D. Krieger, pp. 131-144. Archival Series 2. Texas Archeological Research Laboratory, The University of Texas at Austin.

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

La Flesche, F.
1932 *A Dictionary of the Osage Language*. Bureau of American Ethnology Bulletin 109. Smithsonian Institution, Washington, D.C.

Lorrain, D.
1967 The Glass Site. In *A Pilot Study of Wichita Indian Archaeology and Ethnohistory*, assembled by R. E. Bell, E. B. Jelks, and W. W. Newcomb, pp. 24-44. A Final report to the National Science Foundation, Grant GS-964. University of Oklahoma, Norman and Southern Methodist University, Dallas.

Lovejoy, C. O., R. S. Meindl, T. R. Pryzbeck, and R. P. Mensforth
1985 Chronological metamorphosis of the auricular surface of the ilium: A new method for determination of adult skeletal age at death. *American Journal of Physical Anthropology* 68:15-28.

Loveland, C. J.
1980 The Skeletal Biology of the Caddo Indians of the Kaufman-Williams Site, Red River County, Texas. Ph.D. Dissertation, Department of Anthropology, University of Tennessee, Knoxville.

1987 Human Skeletal Remains from the Clark and Holdeman sites, Red River County, Texas. *Bulletin of the Texas Archeological Society* 57:165-182.

1994a Vertebral anomalies and degenerative lesions in the Caddoan skeletal population, Kaufman-Williams site, Red River County, Texas. *Bulletin of the Texas Archeological Society* 65:161-181.

1994b Rowland Clark and Dan Holdeman Site Human Skeletal Remains. *Journal of Northeast Texas Archaeology* 4:50-60.

Loveland, C. J. and W. M. Bass
1983 Cranial Studies of the Caddo Indians from the Kaufman-Williams Site. In *Southeastern Natives and Their Pasts*, edited by D. G. Wyckoff and J. L. Hofman, pp. 241-257. Studies in Oklahoma's Past No. 11 and Cross Timbers Heritage Association Contribution No. 2. Oklahoma Archeological Survey, Norman.

Macon, J. W., chief cartographer
1979 *Mineral Resources of Texas*. Map prepared by the Bureau of Economic Geology, The University of Texas at Austin.

Mallouf, R. J.
1976 *Archeological Investigations at Proposed Big Pine Lake, 1974-1975: Lamar and Red River Counties, Texas*. Archeological Survey Report No. 18. Office of the State Archeologist, Texas Historical Commission, Austin.

Martin, A. C. and W. D. Barkley
1961 *Seed Identification Manual*. University of California Press, Berkeley.

Martin, A. C., H. S. Zim, and A. L. Nelson
1951 *American Wildlife and Plants: A Guide to Wildlife Food Habits*. McGraw-Hill. New York.

Mathews, J. J.
1961 *The Osages*. University of Oklahoma Press, Norman.

McGregor, D. E.
1987 Lithic Raw Material Utilization. In *Hunter-Gatherer Adaptations Along the Prairie Margin: Site Excavations and Synthesis of Prehistoric Archaeology*, edited by D. E. McGregor and J. E. Bruseth, pp. 185-195. Richland Creek Technical Series, Volume III. Archaeology Research Program, Southern Methodist University. Dallas.

McKern, T. W. and T. D. Stewart
1957 *Skeletal Age Changes in Young American Males: Analyses from the Standpoint of Age Identification*. Technical Report EP-45. Environmental Protection Research Division, Quartermaster Research and Development Center, U.S. Army, Natick, Massachusetts.

Meanley, B.
1956 Foods of the wild turkey in the White River bottomlands of southeastern Arkansas. *Wilson Bulletin* 68:305-311.

Minnis, P. E.
1981 Seeds in Archaeological Sites: Sources and Some Interpretive Problems. *American Antiquity* 46(1):143-152.

Molnar, S.
1971 Human tooth wear, tooth function and cultural variability. *American Journal of Physical Anthropology* 34:175-189.

Montgomery, F. H.
1977 *Seeds and Fruits of Plants of Eastern Canada and Northeastern United States*. University of Toronto Press, Toronto.

Morfi, Fr. J. A.
1932 *Excerpts from the Memorias for the history of the Province of Texas, being a translation of those parts of the Memorias which particularly concern the various Indians of the Province of Texas; their tribal divisions, characteristics, customs, traditions, superstitions, and all else of interest concerning them*. Privately printed by F. M. Chabot.

Moss-Salentijn, L. and H. Hendricks-Klyvert
1985 *Dental and Oral Tissues: An Introduction*. Lea and Febiger, Philadelphia.

Munzel, S.
1986 Quantitative Analysis and the Reconstruction of Site Patterning. Paper presented at the Vth International Conference of the International Council for Archaeo-Zoology, August 25-30, Bordeaux, France.

Neff, H.
1998 April 1, 1998 Letter report submitted to Robert Rogers, PBS&J, Inc., Austin, Texas.

Neff, H., R. L. Bishop, and E. V. Sayre
1988 A Simulation Approach to the Problem of Tempering in Compositional Studies of Archaeological Ceramics. *Journal of Archaeological Science* 15:159-172.
1989 More Observations on the Problem of Tempering in Compositional Studies of Archaeological Ceramics. *Journal of Archaeological Science* 16:57-69.

Neff, H., J. W. Cogswell, and M. D. Glascock
1996 Compositional Analysis of Caddoan Ceramics from Northeast Texas. Research report on file, University of Missouri Research Reactor, Columbia.
1998a Compositional Analysis of Caddoan Ceramics from the Mockingbird Site (41TT550) in Northeast Texas. In *Analysis of the Titus Phase Mortuary Assemblage at the Mockingbird or "Kahbakayammaahin" Site (41tT550)*, by T. K. Perttula, M. Tate, H. Neff, J. W. Cogswell, M. D. Glascock, E. Skokan, S. Mulholland, R. Rogers, and B. Nelson, pp. 255-272. Document No. 970849. Espey, Huston & Associates, Inc., Austin.
1999 Compositional Analysis of Caddoan Ceramics from Northeast Texas. In *The Hurricane Hill Site (41HP106): The Archaeology of a Late Archaic/Early Ceramic and Early-Middle Caddoan Settlement in Northeast Texas*, edited by T. K. Perttula, pp. 301-319. 2 Vols. Special Publication No. 4. Friends of Northeast Texas Archaeology, Pittsburg and Austin.

Neff, H., J. W. Cogswell, and L. M. Ross, Jr.
1998b Microanalysis as a Supplement to Bulk Chemistry in Archaeological Ceramic Investigations. Paper presented at the Patterns and Process Symposium, Smithsonian Center for Materials Research and Education, Washington, D.C.

Neumann, G. K.
1942 Types of artificial cranial deformation in the eastern United States. *American Antiquity* 7:306-310.

Newcomb, W.W., Jr.
1961 *The Indians of Texas*. University of Texas Press, Austin.

Nixon, E. S.
1985 *Trees, Shrubs, and Woody Vines of East Texas*. Bruce Lyndon Cunningham Productions, Nacogdoches.

Olsen, S. J.
1960 Post-cranial Skeletal Characters of *Bison* and *Bos*. *Papers of the Peabody Museum of Archaeology and Ethnology* 35(4):1-64. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.
1961 The Relative Value of Fragmentary Mammalian Remains. *American Antiquity* 26:538-540.
1964 *Mammal Remains from Archaeological Sites, Part I: Southeastern and Southwestern U.S.* Papers of the Peabody Museum of Archaeology and Ethnology 56(1):1-162. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.
1968 *Fish, Amphibian and Reptile Remains from Archeological Sites. Part I: Southeastern and Southwestern United States.* Papers of the Peabody Museum of Archaeology and Ethnology 56(2). Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.

Ossenberg, N.
1976 Within and between race distances in population studies based on discrete traits of the human skull. *American Journal of Physical Anthropology* 45:701-716.
1977 Congruence of distance matrices based on cranial discrete traits, cranial measurements, and linguistic-geographic criteria in five Alaskan populations. *American Journal of Physical Anthropology* 47:93-98.

1986 Isolate conservatism and hybridization in the population history of Japan: the evidence of nonmetric cranial traits. In *Prehistoric Hunter-Gatherers in Japan*, by T. Akazawa and C. Aikens, pp. 199-215. Bulletin No. 27. University of Tokyo Press, Tokyo, Japan.

Parmalee, P. W. and A. Bogan
1981 Animal Remains from the Roden Site (Mc-215), McCurtain County, Oklahoma. In *Archeological Investigations at the Roden Site, McCurtain County, Oklahoma*, by G. Perino, pp. 87-94. Museum of the Red River, Idabel, Oklahoma.

Parmalee, P.W. and A. F. Opperman
1983 Animal Remains from the Bob Williams Site, Red River County, Texas. In *Archaeological Research at the Bob Williams Site (41RR16), Red River County, Texas*, by G. Perino, pp. 79-84. Potsherd Press, Idabel, Oklahoma.

Parmalee, P. W., R. B. McMillan, and F. B. King
1976 Changing subsistence patterns at Rodgers Shelter. In *Prehistoric Man and his Environments: A Case Study in the Ozark Highland*, edited by W. R. Wood and R. B. McMillan, pp. 141-161. Academic Press, New York.

Pearsall, D. M.
1989 *Paleoethnobotany: A Handbook of Procedures*. Academic Press, New York.

Perino, G.
1981 *Archaeological Investigations at the Roden Site, McCurtain County, Oklahoma*. Potsherd Press Publication 1. Museum of the Red River, Idabel, Oklahoma.

1983 *The Bob Williams Site, Red River County, Texas*. Museum of the Red River, Idabel, Oklahoma.

1994 Archaeological Research at the Dan Holdeman Site (41RR11), Red River County, Texas. *Journal of Northeast Texas Archaeology* 4:3-42.

1995 The Holdeman Site (41RR11), Red River County, Texas. *Journal of Northeast Texas Archaeology* 6:3-62.

Perttula, T. K.
1989 Contact and Interaction between Caddoan and European Peoples: The Historic Archaeological and Ethnohistorical Perspective. Ph.D. dissertation, Department of Anthropology, University of Washington.

1990 Changes in Animal Exploitation in the Caddoan Area of the Trans-Mississippi South: The Evolution of Agricultural Societies. Abstracts to the Sixth International Conference of ICAZ, Washington, D.C.

1992 *"The Caddo Nation": Archaeological and Ethnohistoric Perspectives*. University of Texas Press, Austin.

1993 Effects of European Contact on Native and Immigrant Indians in Northeast Texas, ca. A.D. 1540-1859. In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by N. A. Kenmotsu and T. K. Perttula, pp. 147-189. Cultural Resource Management Report No. 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

1995 A Reconsideration of the Chronological and Cultural Placement of the Mortuary Remains and Grave Goods from the Dan Holdeman Site. *Journal of Northeast Texas Archaeology* 6:67-85.

1996 Caddoan Area Archaeology Since 1990. *Journal of Archaeological Research* 4(4):295-348.

1997a The Archaeology of the Middle Caddoan Period in the Middle Red River Valley of Northeast Texas. *Journal of Northeast Texas Archaeology* 10:47-51.

1997b Middle Caddoan Period Archaeology in the Upper Sulphur River Basin. *Journal of Northeast Texas Archaeology* 10:41-46.

1998 A Compendium of Radiocarbon and Oxidizable Carbon Ratio Dates from Archaeological Sites in East Texas, with a Discussion of the Age and Dating of Select Components and Phases. *Radiocarbon* 39(3):305-341.

2001 Archeological Survey of the Roitsch Farm and Adjoining Lands. *Bulletin of the Texas Archeological Society* 72:239-244.

2002 Archaeological Evidence for the Long-Distance Exchange of Caddo Indian Ceramics in the Southern Plains, Midwest, and Southeastern United States. In *Geochemical Evidence for Long-Distance Exchange*, edited by M. D. Glascock, pp. 89-107. Bergin and Garvey, Westport, Connecticut.

2004 The Prehistoric and Caddoan Archeology of the Northeast Texas Pineywoods. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 370-407. Texas A&M University Press, College Station.

2005 1938-1939 WPA Excavations at the Hatchel Site (41BW3) on the Red River in Bowie County, Texas. *Southeastern Archaeology* 24(2):180-198.

2006 *A Study of the Buddy Calvin Jones Collection from Northeast Texas Caddo Sites*. Special Publication No. 6. Friends of Northeast Texas Archaeology, Austin and Pittsburg.

2008 Caddo Agriculture on the Western Frontier of the Eastern Woodlands. *Plains Anthropologist*, in press.

Perttula, T. K. (editor)
1999 *The Hurricane Hill Site (41HP106): The Archaeology of a Late Archaic/Early Ceramic and Early-Middle Caddoan Settlement in Northeast Texas*. 2 Vols. Special Publication No. 4. Friends of Northeast Texas Archaeology, Pittsburg and Austin.

2005 *Archeological Investigations at the Pilgrim's Pride Site (41CP304), a Titus Phase Community in the Big*

Cypress Creek Basin, Camp County, Texas. 2 Vols. Report of Investigations No. 30. Archeological & Environmental Consultants, LLC, Austin.

Perttula, T. K. and S. I. Iruegas
2001 1991 Youth Area Investigations at the Roitsch Site. *Bulletin of the Texas Archeological Society* 72:192-197.

Perttula, T. K. and N. G. Reese
2001 Historic Artifacts from the Fasken Site. *Bulletin of the Texas Archeological Society* 72:232.

Perttula, T. K., C. J. Crane, and J. E. Bruseth
1982 A Consideration of Caddoan Subsistence. *Southeastern Archaeology* 1(2):89-102.

Perttula, T. K., R. C. Fields, J. E. Corbin, and N. A. Kenmotsu
1993 The Emergence of Sedentism in Northeast Texas, ca. 500 B.C. to A.D. 1000. In *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by N. A. Kenmotsu and T. K. Perttula, pp. 97-120. Cultural Resource Management Report 3. Department of Antiquities Protection, Texas Historical Commission, Austin.

Perttula, T. K., M. R. Miller, R. A. Ricklis, D. J. Prikryl, and C. Lintz
1995 Prehistoric and Historic Aboriginal Ceramics in Texas. *Bulletin of the Texas Archeological Society* 66:175-235.

Perttula, T. K., J. E. Bruseth, N. A. Kenmotsu, D. J. Prikryl, W. A Martin, L. Banks, J. Smith, N. G. Reese, and S. A. Iruegas
2001 Archeological Investigations on the Red River and Tributaries: Summary of the Findings of the 1991 and 1992 Texas Archeological Society Field School in Red River and Lamar Counties, Texas. *Bulletin of the Texas Archeological Society* 72:165-250.

Perttula, T. K. and J. E. Bruseth (editors)
1998 *The Native History of the Caddo: Their Place in Southeastern Archeology and Ethnohistory*. Studies in Archeology 30. Texas Archeological Research Laboratory, The University of Texas at Austin.

Phillips, P.
1970 *Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949-1955*. Papers of the Peabody Museum of Archaeology and Ethnology No. 60. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.

Powell, M. L.
1997 Foreword for Special Papers on Caddoan Bioarcheological Research. *Bulletin of the Texas Archeological Society* 68:135-138.

Powell, M. L. and J. D. Rogers
1980 *Bioarchaeology of the McCutchan-McLaughlin Site (34Lt-11): Biophysical and Mortuary Variability in Eastern Oklahoma*. Studies in Oklahoma's Past No. 5. Oklahoma Archeological Survey, Norman.

Prikryl, D. J.
2001 The Fasken Mounds Site (41RR14). *Bulletin of the Texas Archeological Society* 72:222-233.

Reese, N. G.
1999 Archeological and Archival Investigations at the Jonesborough Site, Texas, 41RR15. Master's thesis, Department of Anthropology, New Mexico State University, Las Cruces.
2001 *Archeological and Archival Investigations of the Jonesborough Site (41RR15), Red River County, Texas*. Archeological Reports Series, No. 2. Texas Historical Commission, Austin.

Reinhard, K. J., L. Tieszen, K. L. Sandness, M. Beiningen, E. Niller, A. M. Ghazi, C. E. Miewald, and S. V. Barnum
1994 Trade, contact, and female health in northeast Nebraska. In *In the Wake of Contact: Biological Responses to Conquest*, edited by C. S. Larsen and G. R. Milner, pp. 63-74. Wiley-Liss, New York.

Rice, P. M.
1996 Recent Ceramic Analysis: 1. Function, Style, and Origins. *Journal of Archaeological Research* 4(2):133-163.

Rogers, R. M. and T. K. Perttula
2004 *The Oak Hill Village Site (41RK214), Rusk County, Texas*. Document No. 030083. PBS&J, Austin.

Rogers, R., M. B. Cliff, T. K. Perttula, G. Rutenberg, S. Victor, P. Dering, and M. Malainey
2003 *Excavations at the Alex Justiss Site, 41TT13, Titus County, Texas*. Archeological Studies Program Report No. 36. Texas Department of Transportation, Austin.

Rogers, S. L.
1975 *Artificial Deformation of the Head: New World Examples of Ethnic Mutilation and Notes on its Consequences*. San Diego Museum Papers No. 8. San Diego Museum of Man, San Diego.

Rohrbaugh, C. L.
1973 *Hugo Reservoir #3*. Archeological Site Report No. 24. Oklahoma River Basin Survey, Norman.
1982 An Hypothesis for the Origin of the Kichai. In *Pathways to Plains Prehistory*, edited by D. G. Wyckoff and J. L. Hofman, pp. 51-63. Oklahoma Anthropological Society, Memoir 3, Norman.

Rose, J. C.
1984 Bioarcheology 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, pp. 227-256. Research Series No. 23. Arkansas Archeological Survey, Fayetteville.

Rose, J. C. and B. A. Burnett
1990 Bioarcheology of the eastern portion of the Gulf coastal plain. In *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by D. A. Story, J. A. Guy, B. A. Burnett, M. D. Freeman, J. C. Rose, D. G. Steele, B. W. Olive, and K. J. Reinhard, pp. 132-148. 2 Vols. Research Series No. 38. Arkansas Archeological Survey, Fayetteville.

Rose, J. C. and M. Marks
1985 Bioarcheology of the Alexander site. In *The Alexander Site*, by E. T. Hemmings and J. H. House, pp. 75-98. Research Series No. 24. Arkansas Archeological Survey, Fayetteville.

Rose, J. C., P. M. Clancy, and P. H. Moore-Jansen
1981 Bioarcheology of the Roden site. In *Archeological Investigations at the Roden Site (MC- 215), McCurtain County, Oklahoma*, by G. Perino, pp. 99-129. Potsherd Press Publication No. 1, Museum of the Red River, Idabel, Oklahoma.

Rose, J. C., M. P. Hoffman, B. A. Burnett, A. M. Harmon, and J. E. Barnes
1998 Skeletal Biology of the Prehistoric Caddo. In *The Native History of the Caddo: Their Place in Southeastern Archeology and Ethnohistory*, edited by T. K. Perttula and J. E. Bruseth, pp. 113-126. Studies in Archeology 30. Texas Archeological Research Laboratory, The University of Texas at Austin.

Rostlund, E.
1952 *Freshwater Fish and Fishing in Native North America*. University of California Publications in Geography, Vol. 9. University of California Press, Berkeley.

Sanchez-G., J. J. and M. M. Goodman
1992 Relationships Among the Mexican Races of Maize. *Economic Botany* 46(1):72-85.

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, pp. 132-197. Research Series No. 15. Arkansas Archeological Survey, Fayetteville.

1983 The Archeology of the Great Bend region in Arkansas. In *Contributions to the Archeology of the Great Bend Region*, edited by F. F. Schambach and F. Rackerby, pp. 1-11. Research Series No. 22. Arkansas Archeological Survey, Fayetteville.

1995 A Probable Spiroan Entrepot in the Red River Valley in Northeast Texas. *Caddoan Archeology Newsletter* 6(1):9-25.

1998 *Pre-Columbian Cultures in the Trans-Mississippi South: A Beginning Sequence*. Research Series No. 53. Arkansas Archeological Survey, Fayetteville.

1999 Spiro and the Tunica: A New Interpretation of the Role of the Tunica in the Culture History of the Southeast and the Southern Plains, A.D. 1100-1750. In *Arkansas Archaeology: Essays in Honor of Dan and Phyllis Morse*, edited by R. C. Mainfort, Jr. and M. D. Jeter, pp. 169-224. University of Arkansas Press, Fayetteville.

2001 Fourche Maline and Its Neighbors: Observations on an Important Woodland Period Culture of the Trans-Mississippi South. *The Arkansas Archeologist* 40:21-50.

2002 Fourche Maline: A Woodland Period Culture of the Trans-Mississippi South. In *The Woodland Southeast*, edited by D. G. Anderson and R. C. Mainfort, Jr., pp., 91-112. University of Alabama Press, Tuscaloosa.

Schambach, F. F. and J. E. Miller
1984 A Description and Analysis of the Ceramics. In *Cedar Grove: An Interdisciplinary Investigation of a Late Caddo Farmstead in the Red River Valley*, edited by N. L. Trubowitz, pp. 109-170. Research Series No. 23. Arkansas Archeological Survey, Fayetteville.

Schambach, F. F., N. L. Trubowitz, F. Rackerby, E. T. Hemmings, W. F. Limp, and J. E. Miller, III
1983 Test Excavations at the Cedar Grove Site (3LA97): A Late Caddo Farmstead in the Great Bend Region. In *Contributions to the Archeology of the Great Bend Region*, edited by F. F. Schambach and F. Rackerby, pp. 90-129. Research Series No. 22. Arkansas Archeological Survey, Fayetteville.

Schiffer, M. B., J. M. Skibo, T. C. Boelke, M. A. Neupert, and M. Aronson
1994 New Perspectives on Experimental Archaeology: Surface Treatments and Thermal Response of the Clay Cooking Pot. *American Antiquity* 59(2):197-217.

Schoeninger, M. J.
2006 Population Inferences from Bone Chemistry. In *Environment, Origins, and Population*, edited by D. H. Ubelaker, pp. 640-644. Handbook of North American Indians, Volume 3. Smithsonian Institution, Washington, D.C.

Schoeninger, M. J. and M. J. DeNiro
1982 Carbon isotope ratios of apatite from fossil bone cannot be used to reconstruct diets of animals. *Nature* 297:577-578.

Schoeninger, M. J., L. Sattenspiel, and M. R. Schurr
2000 Transitions at Moundville: A Question of Collapse. In *Biological Studies of Life in the Age of Agriculture: A View from the Southeast*, edited by P. M. Lambert, pp. 63-77. University of Alabama Press, Tuscaloosa.

Schorger, A. W.
1966 *The Wild Turkey, its History and Domestication*. Oklahoma State University Press, Stillwater.

Scott, E. C.
1979 Dental Wear Scoring Technique. *American Journal of Physical Anthropology* 51:213- 218.

Schurr, M. R.
1992 Isotopic and Mortuary Variability in a Middle Mississippian Population. *American Antiquity* 57(2):300-320.

Schwartz, C. W. and E. R. Schwartz
1981 *The Wild Mammals of Missouri*. University of Missouri Press and Missouri Department of Conservation, Columbia.

Shaller, J., R. Tykot, and B. Benz (editors)
2006 *Histories of Maize: Multidisciplinary Approaches to the Prehistory, Linguistics, Biogeography, Domestication, and Evolution of Maize*. Academic Press, Burlington, Massachusetts.

Shaffer, B. S. and B. W. Baker
1992 *A Vertebrate Faunal Analysis Coding System with North American Taxonomy and dBase Support Programs and Procedures (Version 3.3)*. Museum of Anthropology Technical Report 23. University of Michigan, Ann Arbor.

Sheridan, S.G., D. M. Mittler, D. P. Van Gerven, and H. H. Covert
1991 Biomechanical Association of Dental and Temporomandibular Pathology in a Medieval Nubian Population. *American Journal of Physical Anthropology* 85:201-205.

Simpson, B. J.
1988 *A Field Guide to Texas Trees*. Texas Monthly Press, Austin.

Sisson, S. and J. D. Grossman
1953 *The Anatomy of the Domestic Animals*. 4th Edition. W. B. Saunders Co., Philadelphia and London.

Skinner, S. A., R. K. Harris, and K. M. Anderson (editors)
1969 *Archeological Investigations at the Sam Kaufman Site, Red River County, Texas*. Contributions in Anthropology, No. 5. Southern Methodist University, Department of Anthropology, Dallas.

Smith, B.
1984 Patterns of Molar Wear in Hunter-gatherers and Agriculturalists. *American Journal of Physical Anthropology* 63(1):39-56.

Smith, B. D.
1975 *Middle Mississippian Exploitation of Animal Populations*. Anthropological Papers No. 57. Museum of Anthropology, University of Michigan, Ann Arbor.

1984 *Chenopodium* as a Prehistoric Domesticate in Eastern North America: Evidence from Russell Cave, Alabama. *Science* 226:165-167.

1985a The Role of *Chenopodium* as a Domesticate in Pre-maize Garden Systems of the Eastern United States. *Southeastern Archaeology* 4:51-72.

1985b *Chenopodium berlandieri* ssp. *jonesianum*: Evidence for a Hopewellian Domesticate from Ash Cave, Ohio. *Southeastern Archaeology* 4:107-133.

1987 The Independent Domestication of Indigenous Seed-bearing Plants in Eastern North America. In *Emergent Horticultural Economies of the Eastern Woodlands*, edited by W. F. Keegan, pp. 3-47. Occasional Papers No. 7. Center for Archaeological Investigations, Southern Illinois University-Carbondale.

1989 Origins of Agriculture in Eastern North America. *Science* 246:15661571.

Smith, B. D. and V. A. Funk
1985 A Newly Described Subfossil Cultivar of *Chenopodium* (Chenopodiaceae). *Phytologia* 57:445-448.

Smith, F. T.
1998 The Political History of the Caddo Indians, 1686-1874. In *The Native History of the Caddo: Their Place in Southeastern Archeology and Ethnohistory*, edited by T. K. Perttula and J. E. Bruseth, pp. 175-181. Studies in Archeology 30. Texas Archeological Research Laboratory, The University of Texas at Austin.

2005 *From Dominance to Disappearance: The Indians of Texas and the Near Southwest, 1786-1859*. University of Nebraska Press, Lincoln.

Snyder, W. S. C.
1981 Infracranial Nonmetric Variation: An Assessment of its Value for Biological Distance Analysis. Ph.D. Dissertation, Indiana University, Bloomington.

Solis, Fr. G. J. de
1931 Diary of a Visit of Inspection of the Texas Missions Made by Fray Gaspar Jose de Solis in the Year 1767-1768. Translated by M. K. Kress, with introductory note by M. A. Hatcher. *Southwestern Historical Quarterly* 35(1):28-76.

Steele, D. G.
1970 Estimation of Stature from Fragments of Long Limb Bones. In *Personal Identification in Mass Disasters*, by T. D. Stewart, pp. 85-97. National Museum of Natural History, Washington, D.C.

Steele, D. G. and C. A. Bramblett
1988 *The Anatomy and Biology of the Human Skeleton*. Texas A&M University Press, College Station.

Steely, S.
n.d. Unpublished manuscript on Jonesboro (Jonesborough). MS on file with the authors, Texas Historical Commission, Department of Archeological Planning and Review, Austin.

Stein, C. M.
2006 Kansas Lithic Resources. In *Kansas Archaeology*, edited by R. J. Hoard and W. E. Banks, pp. 264-282. University Press of Kansas, Lawrence.

Steponaitis, V. P. and M. J. Blackman
1981 Chemical Characterization of Mississippian Pottery. Paper presented at the 38th annual meeting of the Southeastern Archaeological Conference, Asheville.

Steponaitis, V. P., M. J. Blackman, and H. Neff
1996 Large-Scale Patterns in the Chemical Composition of Mississippian Pottery. *American Antiquity* 61(4):555-572.

Stewart, T. D.
1971 Pseudo-trephination. *American Journal of Physical Anthropology* 35:296-297.
1976 Are Supra-inion Depressions Evidence of Prophylactic Trephination? *Bulletin of the History of Medicine* 50:414-434.
1979 *Essentials of Forensic Anthropology Especially as Developed in the United States*. Charles C. Thomas, Springfield, Illinois.

Steyermark, J. A.
1963 *Flora of Missouri*. Iowa State University Press, Ames, Iowa.

Stone, G. W. (editor)
1937 *Geologic Map of Texas*. U.S. Geological Survey, Department of the Interior, Washington, D.C.

Story, D. A.
1985 Adaptive Strategies of Archaic Cultures of the Western Gulf Coastal Plain. In *Prehistoric Food Production in North America*, edited by R. I. Ford, pp. 19-56. Museum of Anthropology, Anthropological Papers, Volume 75. University of Michigan, Ann Arbor.
1990a Cultural History of the Native Americans. In *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by D. A. Story, J. A. Guy, B. A. Burnett, M. D. Freeman, J. C. Rose, D. G. Steele, B. W. Olive, and K. J. Reinhard, pp. 163-366. 2 Vols. Research Series No. 38. Arkansas Archeological Survey, Fayetteville.
1990b Excavated Caddoan Sites with Coles Creek Style Ceramics. In *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by D. A. Story, J. A. Guy, B. A. Burnett, M. D. Freeman, J. C. Rose, D. G. Steele, B. W. Olive, and K. J. Reinhard, pp. 736-748. 2 Vols. Research Series No. 38. Arkansas Archeological Survey, Fayetteville.
1997 1968-1970 Archeological Investigations at the George C. Davis Site, Cherokee County, Texas. *Bulletin of the Texas Archeological Society* 68:1-113.

Story, D. A. (editor)
1995 *The Deshazo Site, Nacogdoches County, Texas, Vol. 2: Artifacts of Native Manufacture*. Studies in Archeology 21. Texas Archeological Research Laboratory, The University of Texas at Austin.

Styles, B. W. and J. R. Purdue
1984 Faunal Exploitation at 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, pp. 211-226. Research Series No. 23. Arkansas Archeological Survey, Fayetteville.

Suchey, J., S. Brooks, and D. Katz
1988a *Instructions for Use of the Suchey-Brooks System for Age Determination of the Female Os Pubis*. Instructional materials accompanying female pubic symphyseal models of the Suchey-Brooks system. Distributed by France Casting, Diane France, Ft. Collins, Colorado.
1988b *Instructions for Use of the Suchey-Brooks System for Age Determination of the Male Os Pubis*. Instructional materials accompanying male pubic symphyseal models of the Suchey-Brooks system. Distributed by France Casting, Diane France, Ft. Collins, Colorado.

Suhm, D. A., A. D. Krieger, and E. B. Jelks
1954 An Introductory Handbook of Texas Archeology. *Bulletin of the Texas Archeological Society* 25:1-562.

Suhm, D. A. and E, B. Jelks (editors)
1962 *Handbook of Texas Archeology: Type Descriptions*. Texas Archeological Society, Special Publication No. 1, and the Texas Memorial Museum, Bulletin No. 4, Austin.

Swanton, J. R.
1942 *Source Material on the History and Ethnology of the Caddo Indians*. Bulletin 132. Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.
1946 *The Indians of the Southeastern United States*. Bureau of American Ethnology Bulletin 137. Smithsonian Institution, Washington, D.C.
1979 *The Indians of the Southeastern United States*. Reprinted by Smithsonian Institution Press, Washington, D.C.

Texas A&M University
1975 *Texas Plants: A Checklist and Ecological Summary*. The Texas Agricultural Experiment Station, College Station.

Texas Archeological Research Laboratory, The University of Texas at Austin
n. d. Red River County File.

Texas Game, Fish and Oyster Commission
1945 *Principal Game Birds and Mammals of Texas*. Von Boeckmann-Jones, Austin.

Thomas, J. R.
1977 *Soil Survey of Red River County, Texas*. United States Department of Agriculture, Soil Conservation Service, in cooperation with Texas Agricultural Experiment Station, Washington, D.C.

Thurmond, J. P.
1990 *Archeology of the Cypress Creek Drainage Basin: Northeastern Texas and Northwestern Louisiana*. Studies in Archeology 5. Texas Archeological Research Laboratory, The University of Texas at Austin.

Tieszen, L. L.
1994 Stable Isotopes on the Plains: Vegetation Analyses and Diet Determinations. In *Skeletal Biology in the Great Plains*, edited by D. W. Owsley and R. L. Jantz, pp. 262-282. Smithsonian Institution Press, Washington, D.C..

Tiller, J.
2007 The Shreveport Caddo, 1835-1838. *Journal of Northeast Texas Archaeology* 26:159-167.

Tine, A. and L. Tieszen
1994 Bioarchaeology. In *The McLelland and Joe Clark Sites: Protohistoric-Historic Caddoan Farmsteads in Southern Bossier Parish, Louisiana*, edited by D. B. Kelley, pp. 213-237. Coastal Environments, Inc., Baton Rouge.

Trotter, M. and G. C. Gleser
1952 Estimation of Stature from Long Bones of American Whites and Negroes. *American Journal of Physical Anthropology* 10:463-514.

Trubowitz, N. L. (editor)
1984 *Cedar Grove: An Interdisciplinary Investigation of a Late Caddo Farmstead in the Red River Valley*. Research Series No. 23. Arkansas Archeological Survey, Fayetteville.

Turner, E. S. and T. R. Hester
1999 *A Field Guide to Stone Artifacts of Texas Indians*. 2nd Edition, Gulf Publishing, Houston.

Ubelaker, D. H.
1978 *Human Skeletal Remains: Excavation, Analysis, Interpretation*. Taraxacum, Washington, D.C..

1994 The Biological Impact of European Contact in Ecuador. In *In the Wake of Contact: Biological Responses to Conquest*, edited by C. S. Larsen and G. R. Milner, pp. 147-160. Wiley-Liss, New York.

Vogel, V. J.
1970 *American Indian Medicine*. University of Oklahoma Press, Norman.

Waring, A. J., Jr. and P. Holder
1945 A Prehistoric Ceremonial Complex in the Southeastern United States. *American Anthropologist* 47(1):1-34.

Watson, P. J.
1976 In Pursuit of Prehistoric Subsistence: A Comparative Account of Some Contemporary Flotation Techniques. *Midcontinental Journal of Archaeology* 1:77-100.

Webb, C. H.
1959 *The Belcher Mound: A Stratified Caddoan Site in Caddo Parish, Louisiana*. Memoirs No. 16. Society for American Archaeology, Salt Lake City.

1984 The Bellevue Focus: A Marksville-Troyville Manifestation in Northwestern Louisiana. *Louisiana Archaeology* 9:251-274.

Webb, C. H. and M. Dodd, Jr.
1939 Further Excavations of the Gahagan Mound: Connections with a Florida Culture. *Bulletin of the Texas Archeological and Paleontological Society* 11:92-126.

Webb, W. P. (editor)
1952 *Handbook of Texas*. 2 Vols. Texas State Historical Association, Austin.

Wedel, M. M.
1978 *La Harpe's 1719 Post on Red River and Nearby Caddo Settlements*. Texas Memorial Museum, Bulletin 30. Austin.

Weiss, P.
1958 *Osteologia Cultural, Practicas Cefalicas*. Lima, Peru.

1967 Ensayo de Osteologia Cultural en Guatemala. *Antropologica e Historia de Guatemala* 19(1):14-26.

Weltfish, G.
1977 *The Lost Universe*. University of Nebraska Press, Lincoln.

Westbury, M. S.
1978 Osteological Analysis. In *Archaeological Research at the Proposed Cooper Lake, Northeast Texas 1974-1975*, by K. Doehner and R. E. Larson, pp. 159-196. Research Report 108. Archeology Research Program, Southern Methodist University, Dallas.

Willey, G. R. and P. Phillips
1958 *Method and Theory in American Archaeology*. The University of Chicago Press, Chicago.

Williams, S.
1964 The Aboriginal Location of the Kadohadacho and related Tribes. In *Explorations in Cultural Anthropology*, edited by W. H. Goodenough, pp. 545-570. Yale University Press, New Haven.

Wilson, D. E.
1994 Division of Labor and Stress Loads at the Sanders Site (41LR2), Lamar County, Texas. *Bulletin of the Texas Archeological Society* 65:129-160.

Winchell, F.
1990 An Assessment of the Fourche Maline Culture and its Place in the Prehistory of Northeast Texas. *Caddoan Archeology* I (No. 4):7-19.

Wright, G.
1938 Manuscript papers on file, Texas Archeological Research Laboratory, The University of Texas at Austin.

Wyckoff, D. G
1967 Woods Mound Group: A Prehistoric Mound Complex in McCurtain County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society* 15:1-76.

Yates, B. C.
1988a Vertebrate Fauna from Hurricane Hill. In The Hurricane Hill Site, Hopkins County, Texas, assembled by T. K. Perttula. Draft MS on file, Institute of Applied Sciences, University of North Texas, Denton.

1988b Observations on the Vertebrate Faunal Remains from the 1987 Archaeological Season at Cooper Lake and Bone Tool Evaluation. Reports submitted to Archaeology Research Program, Southern Methodist University, Dallas.

1999 Vertebrate Fauna from Hurricane Hill. In *The Hurricane Hill Site (41HP106): The Archaeology of a Late Archaic/Early Ceramic and Early-Middle Caddoan Settlement in Northeast Texas, Vol. I*, edited by T. K. Perttula, pp. 345-353. Special Publication No. 4. Friends of Northeast Texas Archaeology, Austin and Pittsburg.

Yates, B. C. and B. McClure
1992 Faunal Remains from the 1992 TAS Field School. MS on file, Department of Antiquities Protection, Texas Historical Commission, Austin.

Zeder, M. A., D. G. Bradley, E. Emshwiller, and B. D. Smith (editors)
2006 *Documenting Domestication: New Genetic and Archaeological Paradigms*. University of California Press, Berkeley.

Zennie, T. M. and C. D. Ogzewella
1977 Ascorbic Acid and Vitamin A Content of Edible Wild Plants of Ohio and Kentucky. *Economic Botany* 31(1):76-79.

APPENDIX I,
Chemical Elemental Concentration Values for the Neutron Activation Analysis of Red River Ceramics

TKP041, 41RR204, N116/E90, Nash Neck Banded

AS	4.7254	LA	20.0901	LU	0.2232	ND	19.2176
SM	3.8748	U	2.0396	YB	1.478	CE	42.154
CO	7.0903	CR	50.1347	CS	3.8645	EU	0.7416
FE	21528.4	HF	2.4137	NI	0	RB	73.1562
SB	0.2676	SC	7.2	SR	591.3	TA	0.5446
TB	0.3164	TH	6.7432	ZN	36.2471	ZR	80.4985
AL	44430	BA	916.306	CA	221762.5	DY	2.5388
K	9683.61	MN	497.74	NA	1909.63	TI	2454.8232
V	68.7855						

TKP042, 41RR204, Fea. 11, Nash Neck Banded

AS	6.0593	LA	21.7499	LU	0.2199	ND	21.3646
SM	4.1747	U	2.023	VB	1.2794	CE	45.7505
CO	6.9814	CR	47.9834	CS	4.1073	EU	0.7877
FE	21708.6	HF	2.1963	NI	0	RB	66.723
SB	0.2073	SC	6.8795	SR	639.7	TA	0.6066
TB	0.7117	TH	6.7163	ZN	42.0091	ZR	56.049
AL	41540.2	BA	684.233	CA	253792.1	DY	2.433
K	10161.66	MN	603.64	NA	1316.29	TI	1648.8514
V	69.0251						

TKP043, 41RR204, N105/E100, Avery Engraved

AS	6.2746	LA	21.8845	LU	0.2253	ND	22.7076
SM	4.2836	U	2.2769	VB	1.4658	CE	47.7176
CO	7.0316	CR	47.6266	CS	3.5974	EU	0.8588
FE	21917.6	HF	2.5656	NI	0	RB	62.7691
SB	0.232	SC	7.285	SR	611.7	TA	0.577
TB	0.8179	TH	7.137	ZN	46.1014	ZR	85.4728
AL	43932.2	BA	930.795	CA	229177.6	DY	2.6285
K	12443.5	MN	761.36	NA	1535.5	TI	1595.0486
V	72.5412						

TKP044, 41RR204, N116/E90, Nash Neck Banded

AS	6.3009	LA	26.0675	LU	0.2701	ND	25.0863
SM	4.8443	U	2.128	VB	1.9843	CE	56.9464
CO	9.9287	CR	53.117	CS	4.6551	EU	0.9562
FE	24907.2	HF	3.1412	NI	0	RB	77.099
SB	0.3686	SC	8.499	SR	490.3	TA	0.7613
TB	0.7034	TH	8.2302	ZN	43.7246	ZR	85.9209
AL	57626	BA	866.637	CA	196095.7	DY	3.2681
K	9359.36	MN	1033.52	NA	2150.77	TI	2750.345
V	92.0152						

TKP045, 41RR204, N116/E90, Avery Engraved

AS	3.7293	LA	21.6309	LU	0.2254	ND	21.2862
SM	4.3046	U	1.7777	VB	1.8322	CE	46.3768
CO	6.8748	CR	48.8367	CS	3.6639	EU	0.8087
FE	22427	HF	2.8553	NI	0	RB	62.9771
SB	0.251	SC	7.4082	SR	556.6	TA	0.6243
TB	0.756	TH	7.1847	ZN	46.4224	ZR	102.1464
AL	44008.6	BA	881.15	CA	214458.9	DY	3.0476
K	9914.61	MN	664.34	NA	1519.85	TI	1957.3169
V	64.442						

TKP046, 41RR204, Fea. 5, Nash Neck Banded

AS	5.9255	LA	24.9613	LU	0.2492	ND	26.4007
SM	4.7499	U	2.3472	VB	1.831	CE	54.0743
CO	8.6902	CR	51.4348	CS	4.311	EU	0.94
FE	24178.5	HF	2.5725	NI	0	RB	72.3615
SB	0.361	SC	8.0438	SR	567.3	TA	0.6548
TB	0.6494	TH	7.7433	ZN	44.0339	ZR	107.7254
AL	47085.2	BA	1002.378	CA	212208.2	DY	3.1437
K	11253.6	MN	622.87	NA	2894.96	TI	2252.6484
V	70.3697						

TKP047, 41RR204, Fea. 9, Nash Neck Banded

AS	6.6142	LA	24.2805	LU	0.2425	ND	23.9999
SM	4.6776	U	2.261	VB	1.8844	CE	51.2361
CO	7.2919	CR	47.9897	CS	4.0169	EU	0.8717
FE	21495.2	HF	2.7878	NI	0	RB	69.7215
SB	0.2583	SC	7.4531	SR	640.3	TA	0.5715
TB	0.531	TH	7.1004	ZN	43.7465	ZR	103.5354
AL	41731.5	BA	974.147	CA	229243	DY	2.6444
K	10352.66	MN	1072.67	NA	5773.6	TI	2061.0598
V	76.3199						

TKP048, 41RR204, N116/E90, Avery Engraved

AS	4.0416	LA	21.5525	LU	0.2206	ND	19.2233
SM	4.2943	U	1.8853	VB	1.4678	CE	48.1611
CO	6.9054	CR	49.5941	CS	3.7775	EU	0.8422
FE	22750.4	HF	2.673	NI	0	RB	64.8914
SB	0.2664	SC	7.4441	SR	536.1	TA	0.6245
TB	0.3118	TH	7.3864	ZN	50.5601	ZR	90.712
AL	43448.2	BA	782.214	CA	216693	DY	2.6449
K	9828.91	MN	656.49	NA	1513.92	TI	2401.5051
V	64.7264						

TKP049, 41RR204, N116/E90, Nash Neck Banded

AS	6.4377	LA	25.4741	LU	0.2707	ND	24.4674
SM	4.9402	U	2.7435	VB	1.9605	CE	56.8748

CO	8.885	CR	55.096	CS	4.5954	EU	1.0007
FE	25512.6	HF	3.4051	NI	0	RB	85.3353
SB	0.3327	SC	8.4688	SR	560.5	TA	0.719
TB	0.4252	TH	8.2814	ZN	49.7079	ZR	94.6311
AL	48650.2	BA	971.671	CA	198963.4	DY	3.4438
K	12327.44	MN	671.69	NA	1865.2	TI	2066.8589
V	74.2625						

TKP050, 41RR204, Fea. 11, Nash Neck Banded

AS	6.4187	LA	21.6336	LU	0.2007	ND	23.0972
SM	4.0494	U	1.586	VB	1.5575	CE	43.8723
CO	6.6427	CR	44.9084	CS	3.5788	EU	0.7666
FE	21705.6	HF	2.4335	NI	0	RB	58.0325
SB	0.2646	SC	7.0463	SR	514.5	TA	0.548
TB	0.302	TH	6.5103	ZN	39.9444	ZR	76.0852
AL	43117.3	BA	771.634	CA	233489.8	DY	2.5622
K	9723.4	MN	610.25	NA	1877.98	TI	1738.4711
V	61.8181						

TKP051, 41RR11, Lot 20 (Perino's Area A), Sanders Engraved

AS	9.6553	LA	55.3349	LU	0.5338	ND	48.3552
SM	9.1896	U	3.5405	VB	4.0427	CE	104.698
CO	15.4524	CR	96.6598	CS	6.6029	EU	1.9416
FE	47101.7	HF	6.8284	NI	31.4	RB	110.6388
SB	0.7269	SC	17.0663	SR	108	TA	1.721
TB	1.8271	TH	15.2333	ZN	99.6431	ZR	197.633
AL	93313.8	BA	1787.227	CA	7269	DY	7.1541
K	22648.91	MN	495.14	NA	2772.66	TI	5252.169
V	143.2253						

TKP052, 41RR11, Lot 20 (Perino's Area A), Sanders Plain

AS	10.434	LA	87.8355	LU	0.682	ND	86.2723
SM	15.7211	U	3.6899	VB	5.2134	CE	175.0307
CO	21.9269	CR	86.9137	CS	4.7656	EU	3.1493
FE	36781.1	HF	9.8361	NI	56.5	RB	75.9694
SB	0.5695	SC	13.0949	SR	71.8	TA	2.6676
TB	1.6251	TH	13.1385	ZN	103.9421	ZR	285.3646
AL	81934.4	BA	2482.558	CA	12173.7	DY	10.1688
K	10838.46	MN	337.46	NA	2271.38	TI	4921.3765
V	124.7962						

TKP053, 41RR16, Block IVA, Nash Neck Banded

AS	3.9026	LA	23.7194	LU	0.2487	ND	22.9902
SM	4.4396	U	2.1897	VB	1.7908	CE	49.2945
CO	8.366	CR	53.9519	CS	4.8451	EU	0.856
FE	24159	HF	3.0892	NI	0	RB	71.3236
SB	0.5323	SC	7.8266	SR	451.2	TA	0.6755
TB	0.3632	TH	7.2998	ZN	61.6815	ZR	101.3065

AL	44534.6	BA	703.561	CA	193665.6	DY	2.7918
K	8934.03	MN	563.44	NA	2027.55	TI	2400.8457
V	73.4892						

TKP054, 41RR16, Block VI, Pennington Punctated-Incised

AS	6.47	LA	38.0815	LU	0.4189	ND	35.9655
SM	6.6331	U	2.8693	VB	2.7992	CE	84.0456
CO	13.598	CR	85.6071	CS	6.6682	EU	1.32
FE	42465.9	HF	8.3144	NI	43.3	RB	99.7795
SB	0.7116	SC	13.6301	SR	0	TA	1.5657
TB	0.8619	TH	10.8776	ZN	80.7137	ZR	228.9652
AL	85812	BA	1381.216	CA	12941.4	DY	4.8064
K	9799.05	MN	247.54	NA	2145.07	TI	4328.564
V	106.4082						

TKP055, 41RR16, Terrace, Avery Engraved

AS	14.0439	LA	29.8759	LU	0.3143	ND	28.2056
SM	5.4232	U	2.1593	VB	2.2125	CE	58.5018
CO	10.2161	CR	71.1033	CS	3.8841	EU	0.9887
FE	23848	HF	4.5747	NI	28.6	RB	78.3423
SB	0.3084	SC	10.7703	SR	485.4	TA	0.8874
TB	0.7023	TH	10.7723	ZN	49.7285	ZR	111.885
AL	62500.9	BA	1353.003	CA	145543	DY	3.6809
K	13925.7	MN	256.01	NA	865.53	TI	3225.0518
V	100.6842						

TKP056, 41RR16, Terrace, Nash Neck Banded

AS	7.3856	LA	28.001	LU	0.3066	ND	28.3936
SM	5.2892	U	2.4154	VB	2.1854	CE	60.722
CO	8.0589	CR	62.7084	CS	4.6299	EU	1.0605
FE	25532.5	HF	4.3272	NI	0	RB	75.5439
SB	0.2497	SC	8.9098	SR	407.6	TA	0.7719
TB	0.4595	TH	8.6143	ZN	50.5854	ZR	136.544
AL	54658.1	BA	817.559	CA	154175.3	DY	3.1469
K	12838.76	MN	503.16	NA	2445.15	TI	3093.6404
V	77.3069						

TKP057, 41RR16, Terrace, Nash Neck Banded or McKinney Plain

AS	9.4403	LA	18.8751	LU	0.2137	ND	18.0955
SM	3.2781	U	1.8972	VB	1.4447	CE	34.7572
CO	6.2892	CR	45.899	CS	7.5247	EU	0.661
FE	25637	HF	2.4134	NI	0	RB	45.3922
SB	0.7526	SC	6.6916	SR	108.3	TA	0.5131
TB	0.2687	TH	6.4561	ZN	48.6251	ZR	97.9224
AL	44385	BA	873.699	CA	36680.9	DY	2.0565
K	6428.03	MN	258.84	NA	621.97	TI	1582.3917
V	87.6238						

TKP058, 41RR16, Block I/II, Nash Neck Banded

AS	8.2022	LA	30.1103	LU	0.2897	ND	31.895
SM	6.1272	U	2.1617	VB	1.9829	CE	65.4192
CO	11.776	CR	75.7156	CS	6.862	EU	1.1285
FE	38637.8	HF	3.2505	NI	0	RB	93.1597
SB	0.4137	SC	11.1062	SR	449.5	TA	0.7732
TB	0.4104	TH	9.9795	ZN	48.6587	ZR	104.9612
AL	65387.1	BA	1015.003	CA	130879.8	DY	2.9228
K	12076.21	MN	957.85	NA	1413.17	TI	2575.5356
V	102.2109						

TKP059, 41RR16, Block I/II, Avery Engraved

AS	9.6633	LA	22.6637	LU	0.2297	ND	22.9992
SM	4.5185	U	1.6462	VB	1.8976	CE	49.3173
CO	10.5407	CR	60.5493	CS	5.9573	EU	0.8317
FE	31475	HF	2.5115	NI	0	RB	94.5193
SB	0.2046	SC	8.9589	SR	545.6	TA	0.6041
TB	0.3704	TH	7.8681	ZN	48.0751	ZR	87.3287
AL	56456.1	BA	535.796	CA	199949.2	DY	2.4987
K	13331.43	MN	990.42	NA	1940.54	TI	1831.3545
V	83.8107						

TKP060, 41RR16, Block I/II, Clement Redware

AS	12.4714	LA	40.1336	LU	0.4335	ND	37.1077
SM	7.4988	U	3.0843	VB	3.0961	CE	87.1522
CO	15.3626	CR	89.2459	CS	6.8312	EU	1.5162
FE	44473.3	HF	6.7827	NI	0	RB	110.1663
SB	0.3839	SC	14.5079	SR	155.6	TA	1.1202
TB	0.8781	TH	12.7964	ZN	89.8104	ZR	196.7842
AL	85028.1	BA	2039.166	CA	11819.8	DY	5.3473
K	17275.09	MN	830.58	NA	4043.82	TI	3986.9705
V	118.6249						

TKP061, 41RR16, lot 26 (N470E480, 20-30 cm), Emory Punctated-Incised

AS	6.2747	LA	26.1673	LU	0.2931	ND	24.8757
SM	4.9043	U	1.9169	VB	2.0035	CE	54.3051
CO	10.154	CR	57.6273	CS	4.7091	EU	0.9531
FE	30897.4	HF	3.5068	NI	0	RB	76.2703
SB	0.3488	SC	9.0973	SR	515.2	TA	0.7779
TB	0.4356	TH	8.2455	ZN	58.2188	ZR	111.9396
AL	52106.8	BA	816.658	CA	158065.2	DY	3.0166
K	13908.88	MN	427.72	NA	2112.47	TI	2493.6455
V	74.877						

TKP062, 41RR16, lot 83 (Village area surface collection), Simms Engraved

AS	5.6972	LA	24.5049	LU	0.2597	ND	25.1622
SM	4.8197	U	2.2934	VB	2.0078	CE	52.7026

CO	6.6403	CR	52.6418	CS	3.8378	EU	0.9264
FE	22574.8	HF	3.7962	NI	0	RB	67.2007
SB	0.2598	SC	7.6627	SR	466.1	TA	0.7052
TB	0.4521	TH	7.7523	ZN	46.3249	ZR	92.801
AL	49300.2	BA	681.739	CA	176591.8	DY	3.0598
K	13040.35	MN	403.88	NA	2576	TI	2875.4941
V	84.0259						

TKP063, 41RR16, lot 1014 (River bank surface collection), Hudson Engraved

AS	10.6083	LA	23.1458	LU	0.2418	ND	21.031
SM	4.1128	U	2.3521	VB	1.7129	CE	48.8488
CO	9.2247	CR	66.4248	CS	4.5893	EU	0.7917
FE	30853.7	HF	3.4737	NI	53.4	RB	58.3331
SB	0.4915	SC	9.7001	SR	124.1	TA	0.7226
TB	0.3672	TH	8.6604	ZN	57.763	ZR	100.0589
AL	63501.2	BA	967.006	CA	24332.4	DY	2.7823
K	8826.06	MN	502.89	NA	2097.67	TI	2832.7136
V	109.5581						

TKP064, 41RR16, lot 61 (N300E520, 20-40 cm), Sanders Plain with thickened lip

AS	9.8797	LA	65.2507	LU	0.5145	ND	66.606
SM	10.5449	U	3.7723	VB	4.0772	CE	133.4984
CO	16.3207	CR	90.1428	CS	5.9892	EU	2.1448
FE	41097.6	HF	6.9503	NI	0	RB	98.6841
SB	0.5672	SC	14.7804	SR	93.8	TA	2.6005
TB	1.673	TH	15.4477	ZN	97.1429	ZR	206.0421
AL	85145.2	BA	1772.732	CA	11403.4	DY	7.0144
K	16654.04	MN	508.95	NA	2458.19	TI	5169.6065
V	128.9213						

TKP065, 41RR16, Block III/IV, Nash Neck Banded

AS	6.3379	LA	25.2436	LU	0.2637	ND	24.3116
SM	4.8807	U	2.451	VB	2.0119	CE	52.1366
CO	7.8348	CR	55.6424	CS	4.1075	EU	0.9057
FE	23404.9	HF	3.1602	NI	0	RB	66.1585
SB	0.2841	SC	8.4461	SR	445.5	TA	0.6176
TB	0.7804	TH	7.734	ZN	48.8654	ZR	106.3772
AL	46617.6	BA	653.167	CA	183968.8	DY	3.0259
K	11961.25	MN	485.5	NA	1924.14	TI	2034.7191
V	65.8423						

TKP066, 41RR16, Block III/IV, Nash Neck Banded

AS	4.6333	LA	21.9797	LU	0.2083	ND	21.8232
SM	4.1341	U	1.7912	VB	1.4594	CE	45.257
CO	7.0747	CR	46.2769	CS	3.8869	EU	0.7964
FE	21646.5	HF	2.4748	NI	0	RB	50.6189
SB	0.205	SC	7.1437	SR	449.9	TA	0.5636
TB	0.8714	TH	6.4224	ZN	46.8584	ZR	86.1225

AL	42283.7	BA	740.361	CA	222337.4	DY	2.5669
K	8950.7	MN	685.02	NA	1350.1	TI	1873.3488
V	59.6893						

TKP067, 41RR16, Block III/IV, Keno Trailed

AS	8.6216	LA	50.2031	LU	0.4866	ND	42.1398
SM	8.7559	U	3.2474	VB	3.7217	CE	104.2301
CO	18.0907	CR	96.0854	CS	8.7331	EU	1.7963
FE	51468	HF	5.7369	NI	44.2	RB	148.2307
SB	0.8243	SC	17.7927	SR	106.7	TA	1.4833
TB	1.8964	TH	15.6566	ZN	109.6831	ZR	152.5415
AL	99192.6	BA	808.356	CA	10607	DY	6.2687
K	29649.37	MN	793.68	NA	4053.23	TI	5074.7105
V	146.1609						

TKP068, 41RR16, Block III/IV, McKinney Plain

AS	5.7687	LA	28.1137	LU	0.3171	ND	29.2622
SM	5.3088	U	2.2931	VB	2.4366	CE	58.5941
CO	8.4156	CR	60.3593	CS	4.6384	EU	1.0266
FE	27180.5	HF	4.309	NI	0	RB	85.5189
SB	0.4186	SC	9.8083	SR	369	TA	0.7986
TB	0.8117	TH	8.9182	ZN	54.5399	ZR	130.6717
AL	56071	BA	864.672	CA	144291.6	DY	3.9466
K	16232.8	MN	321.17	NA	3294.77	TI	2943.1882
V	74.316						

TKP069, 41RR16, Block III/IV, Avery Engraved

AS	5.8914	LA	22.09	LU	0.195	ND	21.8714
SM	4.0884	U	2.0864	VB	1.4677	CE	44.847
CO	7.4219	CR	50.3821	CS	3.8641	EU	0.7727
FE	22958	HF	2.0551	NI	0	RB	51.7018
SB	0.1994	SC	7.4452	SR	391.7	TA	0.5433
TB	0.3302	TH	6.593	ZN	42.7844	ZR	74.1684
AL	42998.3	BA	834.007	CA	230893.1	DY	2.7774
K	7412.01	MN	523.3	NA	918.52	TI	1798.162
V	63.4692						

TKP070, 41RR16, Block III/IV, Emory Punctated-Incised

AS	3.5599	LA	26.9627	LU	0.2652	ND	30.9877
SM	5.0716	U	2.6	VB	1.8612	CE	55.4546
CO	8.7634	CR	61.3456	CS	5.2333	EU	0.9722
FE	24472.1	HF	3.299	NI	45.2	RB	83.0263
SB	0.3362	SC	9.3052	SR	416.6	TA	0.7569
TB	0.4035	TH	8.6529	ZN	49.967	ZR	93.2276
AL	52571.3	BA	663.507	CA	165573.1	DY	3.2106
K	14326.39	MN	490.39	NA	2124.08	TI	2697.8438
V	82.2821						

TKP071, 41RR16, Block III/IV, Hudson Engraved

AS	7.958	LA	31.665	LU	0.3387	ND	30.7496
SM	6.2169	U	3.4079	VB	2.2133	CE	66.2405
CO	9.1601	CR	67.9993	CS	5.1661	EU	1.1863
FE	29463.5	HF	4.3949	NI	0	RB	92.21
SB	0.3662	SC	10.0849	SR	393.8	TA	0.8571
TB	1.1573	TH	9.75	ZN	52.1739	ZR	181.1498
AL	57561.7	BA	1161.25	CA	136973.1	DY	4.1939
K	15864.41	MN	626.91	NA	3426.74	TI	3196.2444
V	77.6147						

TKP072, 41RR16, Block III/IV, Nash Neck Banded

AS	4.9397	LA	26.4204	LU	0.2669	ND	25.8931
SM	5.066	U	2.09	VB	1.8131	CE	54.4003
CO	8.3922	CR	58.8452	CS	5.4533	EU	0.9569
FE	26244.1	HF	2.9849	NI	0	RB	79.7165
SB	0.3297	SC	9.0823	SR	485.6	TA	0.6729
TB	0.4029	TH	8.2674	ZN	47.1814	ZR	102.214
AL	51091.2	BA	602.717	CA	200829.2	DY	3.4171
K	12590.18	MN	528.75	NA	2605.03	TI	2194.0691
V	69.4115						

TKP073, 41RR16, Block III/IV, Sanders Plain with scalloped rim

AS	7.1216	LA	39.1846	LU	0.4439	ND	32.0909
SM	6.5344	U	2.9002	VB	3.2922	CE	76.8522
CO	10.3505	CR	68.1975	CS	3.9674	EU	1.3896
FE	32163.1	HF	8.527	NI	0	RB	71.9193
SB	0.5251	SC	11.0138	SR	162.4	TA	1.1218
TB	1.3786	TH	10.5784	ZN	62.3935	ZR	219.4861
AL	67476.2	BA	1786.701	CA	40255.6	DY	5.1329
K	12268.85	MN	141.85	NA	3229.58	TI	3490.9824
V	78.4313						

TKP074, 41RR14, Area A, Sanders Plain

AS	7.2933	LA	36.5821	LU	0.4337	ND	34.6128
SM	6.4644	U	2.5014	VB	3.303	CE	74.7231
CO	8.5995	CR	72.2548	CS	3.6745	EU	1.3299
FE	32227.1	HF	8.0741	NI	27.5	RB	79.2643
SB	0.4841	SC	11.0734	SR	0	TA	1.0926
TB	1.3762	TH	11.1405	ZN	49.8576	ZR	225.8666
AL	70972	BA	863.967	CA	3187	DY	5.454
K	18189.61	MN	314.89	NA	5385.09	TI	3881.3894
V	89.421						

TKP075, 41RR14, Area A, Holly/Hickory Engraved

AS	7.1537	LA	45.3064	LU	0.505	ND	41.6322
SM	8.244	U	4.2321	VB	3.8421	CE	93.9983

CO	7.9792	CR	92.606	CS	6.6908	EU	1.533
FE	31353.5	HF	7.1884	NI	34.4	RB	101.4017
SB	0.647	SC	15.1334	SR	0	TA	1.453
TB	1.9215	TH	14.7829	ZN	88.6455	ZR	219.2269
AL	90952.6	BA	927.248	CA	2609	DY	5.9318
K	14098.16	MN	92.18	NA	2006.16	TI	5363.7051
V	130.8056						

TKP076, 41RR11, Area B, Vessel 5, Unidentified horizontal engraved and red-slipped, shell-tempered

AS	7.7089	LA	29.0658	LU	0.2595	ND	28.8531
SM	5.3191	U	2.345	VB	1.8086	CE	60.6193
CO	10.4447	CR	69.5819	CS	5.5679	EU	1.0035
FE	35357.2	HF	3.2015	NI	0	RB	80.8748
SB	0.2502	SC	10.2106	SR	374.5	TA	0.7703
TB	0.3837	TH	9.1714	ZN	52.0144	ZR	103.8021
AL	61689.2	BA	1325.109	CA	172869	DY	2.5468
K	9136.03	MN	692.26	NA	849.61	TI	2682.6262
V	86.7012						

Elements: AL=Aluminum; AS=Arsenic; BA=Barium; CA=Calcium; CE=Cerium; CO=Cobalt; CR=Chromium; CS=Cesium; DY=Dysprosium; EU=Europium; FE=Iron; HF=Hafnium; K=Potassium; LA=Lutetium; LU=Lutetium; MN=Manganese; NA=Sodium; ND=Neodynium; NI=Nickel; RB=Rubidium; SB=Antimony; SC=Scandium; SM=Samarium; SR=Strontium; TA=Tantalum; TB=Terbium; TH=Thorium; TI=Titanium; U=Uranium; V=Vanadium; YB=Ytterbium; ZN=Zinc; ZR=Zirconium

APPENDIX II, Roitsch Site Burial Descriptions

Sharon M. Derrick, Gail R. Colby, and D. Gentry Steele

Burial 24, Adult Male, 30-35 Years

The extremely fragmentary remains of this individual were found eroding from the side of a shallow gully. The narrow sciatic angle (not measurable) of the right ilium, measurements of the right talus, and the right femoral head measurement of 45 mm indicate that this individual is a male (see Table 24 and Appendix IV, this article). Stature estimation was not possible due to the absence of measurable long bones. The age at death of 30-34 years was based on an auricular surface morphology assessment (Lovejoy et al. 1985), and the presence of a moderate amount of 3rd molar wear (see Appendix V, this article). No pathological lesions were observed on the postcranial skeleton.

The cranium was modeled. There is a large supra-inion depression measuring 27 x 20 mm in diameter present on the occipital bone (see Table 33).

Extreme crowding of the anterior mandibular dentition occurred, with possible antemortem loss of some of the incisors. There is an abscess of the two distal roots of the right first maxillary molar, and the crown of this tooth is almost completely decayed. The crown of the right fourth maxillary premolar is also quite decayed. Calculus deposition is evident on most surfaces of all of the other teeth. There is a total of 20 caries, excluding the completely decayed crowns of the right fourth maxillary premolar and the right first maxillary molar.

Burial 25, Adult of Indeterminate Sex, 40-55 Years

This adult individual of indeterminate sex was disturbed by erosion and pothunting activity, resulting in poor preservation of the skeletal material. The right humerus was used (assuming a possible female sex assessment) to estimate a stature of approximately 161 cm (see Table 24). Age assessment is tentative, but the presence of arthritic changes indicates an older individual, possibly in his/her 40s or 50s. The bones of this individual are gracile with rough, although not overly robust, muscle attachment areas.

Few pathological lesions were observed in this individual with the exception of arthritic changes. There is evidence of degenerative joint disease at the fifth lumbar/sacral articulation, with obvious slippage at the articular surface that caused a wear facet and severe osteophytic ripping. Osteophytic changes are present on the articular surfaces of the fragmented ribs and the right patella exhibits marked lipping on the lateral edge of the articular facet. One proximal phalanx of the foot displays a remodeled proximal end, indicating a possible healed injury.

Three loose mandibular teeth are present, the second left incisor, third left molar, and right canine. All teeth exhibit moderate wear (see Appendix V, this article). There is calculus deposition on the left incisor. One caries is present on the occlusal surface of the molar, as well as discoloration on the lingual surface.

Burial 26A, Subadult, 18 ± 6 Months

The skeletal material from Burial 26 contains a single, healthy deciduous tooth, the second maxillary right incisor (see Appendix V, this article). The incisor was occluded, and there is evidence of very slight wear, but the root is not completely formed. This condition conforms to a tentative age estimate of 18 ± 6 months (Ubelaker 1978).

Burial 26B, Adult Female

These remains were also disturbed by erosion and previous human activity. The os coxae are fragmented and the sciatic notch width is not measurable at the traditional landmarks. Upon visual examination, the sciatic angle appears quite large, and there is a well-defined preauricular sulcus present on both iliae. The femoral head diameters measure 39.0 mm (right) and 40.0 mm (left). The femur head diameter for females is typically less than 45 mm (Stewart 1979). Based upon these characteristics, the individual was assessed as a female. Her stature was estimated at approximately 160 cm (see Table 24).

The auricular surface of the ilium appears older than the evidence from dentition and other joint surfaces warrant. There is a general lack of degenerative arthritic changes in the post-cranial skeleton, lack of fusion of the coronal suture of the calvarium, and an overall youthful quality to the bone material. Based on this evidence, the individual was identified as an adult but was not assigned an age in years.

The muscle markings on this individual are well-defined, with large supinator crests on the ulnae and a robust linea aspera of the femur. The phalanges of the hand exhibit small osteophytes that were probably caused by strenuous use of the hands. The only disorders noted were dental caries and a slight pitting on the right frontal bone at the coronal suture.

The dentition of Burial 26b is represented by the first mandibular right incisor, the mandibular left canine, and the second mandibular right molar (see Appendix V, this article). An erosional taphonomic process of some type appears to have affected all three teeth present. No dental hypoplasias are evident, but the molar exhibits discoloration on both the mesial and buccal surfaces. Two caries are present, one on the occlusal surface of the molar and one on the distal side of the canine. Tooth wear is moderate (see Appendix V, this article).

Burial 27A, 8ubadult, 12 ± 2.5 Years

Burial 27 contains the commingled remains of two individuals, Burial 27a and 27b. Burial 27a is a subadult represented by 15 permanent teeth and the proximal epiphysis of a humerus (see Appendix III, this article). The second molars were occluded, with roots that are mostly formed but not complete. The crowns of the third molars are complete, but the roots are not formed. The occluded teeth exhibit minimal wear (see Appendix V, this article). Four caries are present, as well as several lines of hypoplasia.

There is a moderate amount of calculus deposition, especially on the first and second molars. The first maxillary left incisor was probably injured antemortem, as discoloration of the labial surface of the tooth suggests that it was dead before the death of the child. The incisors exhibit marked shoveling.

Buria1 27B, Young Adult Female

The Burial 27 adult was distinguished from the subadult on the basis of tooth eruption, fused epiphyses, and fused sutural lines present on cranial fragments. Estimation of sex is tentative. The size and shape of the left eye orbit, the size and shape of the mandible, a lack of flaring at the gonial angles, as well as the gracile morphology of the long bones with smooth muscle attachment areas, suggest that the individual is a female (see Table 24). A stature estimation of approximately 153 cm (see Table 24) was calculated from a segment of the left humerus (Steele and Bramblett 1988). Age could not be determined beyond classification of the individual as a young adult.

There is a virtual lack of postcranial pathology on this individual. The only pathological condition noted is on the proximal articular surface of the tibia. This area exhibits some osteophytic build-up that may have been caused by local trauma.

Although the mandible is present, no teeth are in place. A portion of the maxilla contains five teeth and there are eight loose teeth (see Appendix V, this article). A very destructive caries is present on the right maxillary fourth premolar that destroyed most of the tooth and caused an apical abscess at the root. This abscess extends into the root of the third right maxillary premolar. The distal margin of the right third premolar exhibits a large caries. There is a small caries present on the mesial margin of the right maxillary incisor. The alveolar margin of the maxilla is porous, exhibiting resorption at the margin of all five teeth. The maxillary teeth are discolored in a brown banding pattern, but no hypoplasias were observed. The palate appears slightly roughened and the incisal foremen is quite large.

Burial 28, Commingled

Burial 28 consists of a minimum of four individuals; two adult females, one adult male, and one subadult. This burial was treated as an ossuary sample because it was not possible to ascertain with certainty which elements belonged to which individual (with the exception of the subadult clavicle).

Items of note include one case of fused laminae from two unidentified vertebrae, one piece of ossified costal cartilage, one mandible with extensive infection and periodontal disease, one supra-inion depression, and one maxilla with a roughened palate and evidence of infection on the alveolar margin.

Burial 29, Subadult, Birth ± 2 Months

Most of the elements representing this infant are fragmentary. Age was estimated by examination of dental eruption pattern (Ubelaker 1978), and measurement of the first metacarpal and the malleus of the ear (Fazekas 1978). There are no identifiable pathological conditions noted for this individual.

Burial 30, Male, 17-23 Years

Burial 30 is a male based on the narrow sciatic notch, large mastoid processes, and flat articulation of the sacroiliac joint (see Table 24). The discriminant function analysis of the talus and calcaneus and the 44 mm femoral diameter garnered for sex determination are inconclusive, possibly due to the young age of the individual (see Table 25). Stature was estimated at approximately 166 cm (see Table 24).

A maximum age of 23 years is indicated by the incomplete fusion of the acromion processes to the scapulae as well as a lack of fusion at the medial clavicular epiphysis (McKern and Stewart 1957). A minimum age of 17 years is indicated by auricular surface changes (Lovejoy et al. 1985) and the root development of the mandibular third molar (Steele and Bramblett 1988).

A number of pathological conditions were noted for this individual. The surfaces of the frontal, parietals, and occipital are generally porous in appearance and the occipital bone exhibits a supra-inion depression measuring 27 x 22 mm in diameter (see Table 33). There is incomplete fusion of the palatine suture and the palate is roughened, with the presence of small spicules of bone. The nasal aperture is slightly eroded. The axis (second cervical vertebra) displays a small sequestrum of ossified articular cartilage in a depression of the left superior articular facet, an example of osteochondritis dissecans. The left superior articular facet of the first cervical vertebra, the atlas, is markedly larger than the right facet, a condition that may have been caused by the pathological condition of the axis. The laminae and spines of the third and fourth thoracic vertebrae exhibit osteophytosis of the inferior surfaces. In addition to the above conditions, the auricular surfaces of the os coxae appear too smooth, lacking the normal billowing or roughened morphology.

There is a slight to marked alveolar porosity in both the maxilla and the mandible. Numerous caries and fenestrae are present, as well as some calculus build-up. The crown of the left first lower molar is completely decayed. Both mandibular third molars are impacted. Various teeth are chipped. This young male must have experienced severe pain from the condition of his teeth.

Burial 31, Female, Early to Late 30s

Burial 31 was identified as a female based on several avenues of evidence. The sciatic angle of this individual is large. There is a large shallow preauricular sulcus, the medial aspect of the ischiopubic ramus is sharp, and there is a ventral arc present on the pubis. The femur head diameter is 42.5 mm, within the range characteristic of females. Talus and calcaneus measurements also indicate that the individual is a female (see Table 25). Stature was estimated at approximately 159 cm (see Table 24).

Auricular surface morphology indicates an age of 30-39 years (Lovejoy et al. 1985). Pubic symphysis changes are consistent with an age of 30.7-38.2 (Suchey et al. 1988a). The basosphenoid suture is completely fused, indicating that the individual is over 17 years of age. The coronal and sagittal sutures were becoming obliterated, but the facial sutures are still well-defined. Tooth wear is moderate, although several teeth were lost and the alveolus had healed over the sockets. Slight degenerative joint disease is present in the lumbar vertebrae and there is some osteophytic action on the articular surfaces of the ribs and the articular surfaces of vertebrae articulating with ribs. These mild osteophytic changes are normally seen in individuals in their 30s. The long bones exhibit dense, smooth, cortical bone and the femoral heads have the smooth rounded margins characteristic of a younger adult.

Pathological conditions of the postcranial remains are limited to osteoarthritis and osteophytosis. The left radius displays an enthesophyte, a ridge-like build-up of bone, along the lateral border of the radial tuberosity. This osteophytic action at the attachment for the biceps muscle may be stress-related. The biceps muscle attachment area of the right radius is less well developed than that of the left and there is no enthesophyte present, although there is some osteophytic activity on the distal articular end. Therefore, this individual may have been left-handed.

Evidence of degenerative joint disease was observed on the lumbar vertebrae and in the pelvic region. The lumbar vertebrae exhibit well-developed osteophytes and degeneration of the articular surfaces. The acetabulae of the os coxae are shallow, smooth, and burnished, and the head of the right femur is smooth at the margins with a burnished cap, indicating malfunction of the hip joint.

The cranium of this individual was modeled (see Table 24). The overall shape of the cranium is long and flat, with a forehead that slopes quickly toward the parietal region. The occipital region is broad and bulbous. There is some surface porosity of the calvarial bones but no apparent thinning of the tables or expansion of the diploe. The most distinct porosity occurs on the parietal bones in the vicinity of the sagittal suture. A well-healed supra-inion depression is present on the occipital bone, but the lack of definite borders precludes an accurate measurement of the diameter. There is an antemortem crease present on the left parietal just above the temporo-parietal suture that may have been the result of a healed trauma to the head.

Dental pathology was a serious health problem for this woman, with the maxilla as the site of the most severe infection. The right alveolar border of the maxilla is extremely porous and unhealthy. The second right incisor is discolored on the interproximal margins. The right canine and adjacent premolar are decayed, leaving only dead roots. Alveolar abscesses occurred around these roots and around the right fourth premolar. The root tip of that tooth was dying antemortem. The right first and third molars were lost antemortem, and healing of the alvealar surface has occurred. The dentition on the left side of the maxilla is also infected. The left second incisor, left canine, and left premolars were dead antemortem, having decayed to the roots. There is an alveolar abscess above the left canine and adjacent premolar. A large caries is present on the distal cervical margin of the left first molar. The left second and third molars were also lost antemortem and some healing has occurred around those molar sockets.

Although the left incisors and canine of the mandible are healthy teeth, a small caries is present on the left mesial premolar. The left distal premolar and left first and second molars had been lost antemortem, with almost complete healing of the alveolar region. The left third molar is discolored on all sides as well as the occlusal surface. The alveolar surface around this tooth is slightly porous, indicating incipient infection. Lines of hypoplasia occur on the buccal surfaces of the left canine and mesial premolar. Two lines of hypoplasia are evident above the cervical margin of the right mandibular canine. The right mesial premolar has a large caries on the distal interproximal surface. The right first and third molars were lost antemortem and the alveolar surface had healed before death. The right second molar is badly discolored.

Burial 32, Female, 45-59 Years

The remains of Burial 32 are extremely fragmentary, with the exception of the femora. Sex was assessed as female based on the width of the sciatic notch from both the os coxae and a large left preauricular sulcus. Due to lack of corroborating evidence this assessment is tentative. Stature is estimated at 157 cm from measurement of the right femur (see Table 24). The auricular surfaces of the iliac conform to an age category range of 45-59 years (Lovejoy et al. 1985).

Postcranial disorders include a possible case of local trauma and degenerative joint disease. The glenoid fossa of the right scapula is roughened and pitted, and the head of the right humerus in contact with this fossa exhibits a fine porosity and some pitting, indicating possible trauma to the shoulder joint. However, there is no evidence of deterioration of the joint.

All of the thoracic vertebrae present exhibit degeneration of the centrum surface. Lesions occur on the superior and inferior centra surfaces, with the largest lesion measuring 8 mm in diameter. The centra appear eroded, although the laminae and articular facets are healthy.

Various other signs of skeletal deterioration due to aging are present in the postcranial remains. The surface of the femoral head is burnished and almost polished in appearance. There is osteophytic action on the metacarpals and phalanges of both hands, indicating that the hands had been used for many years for a variety of tasks.

Only two identifiable teeth are present, the left maxillary central incisor and the left maxillary mesial premolar. One unidentified dead root is also present. Both of the complete teeth have large caries and hypoplastic lines.

Burial 33, Male, 30-40 Years

The head and shoulder areas of this young adult male were disturbed by pothunting activity, but most of the postcranial remains are well-preserved. A male sex assessment was made based on the following criteria: small sciatic angle, narrow and shallow preauricular sulcus, discriminant functions for the talus and calcaneus in the male range, a femoral head measurement of 45.5 mm, rounded upper orbital margins, everted gonial angles, and robust attachment areas for the masseter muscle. Living stature for this individual was estimated at 160 cm (see Table 24). Based on the auricular surface morphology (Lovejoy et al. 1985), as well as the presence of fused epiphyses, no signs of arthritis, dense cortical bone, and open cranial sutures, except for the coronal suture, this individual was 30-40 years old at death.

Developmental anomalies were observed in the vertebral column and the left foot. The fifth and sixth thoracic vertebrae are misshapen and slightly skewed to the left, and the fifth lumbar vertebra has misshapen lamina that produce a skewed arch. This condition probably was not severe enough to produce noticeable scoliosis in the living individual. One proximal phalanx of the left foot is malformed at the proximal articular surface. Evidence of nutritional stress during development is present in the form of distinct horizontal lines of hypoplasia on several of the maxillary and mandibular teeth.

Two fractures and damage to the left patella are evidence of traumatic injuries. Two left ribs had been broken; one was a complete fracture and the other was a compression fracture. Both fractures had completely healed. The left patella exhibits a small (2 mm) lytic lesion on the medial facet, an indication of possible localized trauma. Other anomalies include the presence of infectious bone on one indeterminate rib at the vertebral articular facet, the presence of enthesophytes on the lateral borders of the left and right radius diaphyses (a sign that this individual participated in strenuous activity), and evidence of mechanical stress on the hands in the form of osteophytic growth on the metacarpals and phalanges.

The health of this individual must have been compromised by the presence of severe tooth decay. There are a large number of caries and pursuant periodontal disease, with little or no healing before death. The alveolar margin is severely infected in several places, most notably around the right maxillary distal premolar and the right maxillary first, second, and third molars. Three abscesses are present. Actual wear on the dentition is moderate (see Appendix V, this article).

Burial 34A, Male, Late 40s to Mid-50s

The burial that contained this individual was the most disturbed of all the Caddo burials excavated at the 1991 TAS Field School (Jimmy Smith, 1991 personal communication). However, many of the individual elements are well-preserved and provide a quantity of bioarcheological information. Sex determination for this individual was based on several substantial criteria. The sciatic notch/acetabular index indicates the individual is a male (Kelley 1979), the pubic symphysis is wide in length by width, and the preauricular sulcus is very small. Diameter of the femoral head is 45.4 mm. The mandible is broad, with slightly everted gonial angles and a receding chin, and the muscle attachments on the occipital are quite robust. This individual is taller than most individuals in the sample at an estimated 166 cm (see Table 24).

Age assessment was also based on substantial criteria. The auricular surface morphology is indicative of an age of 40-44 years (Lovejoy et al. 1985). Pubic symphysis changes indicate an age of 37-62 years (Suchey et al. 1988b). The cranial sutures are beginning to fuse; the sagittal suture is almost obliterated, the coronal suture is faint, and the lambdoidal suture is moderately fused. Additional evidence of middle age includes slight arthritic growth on the occipital and mastoid processes, and alveolar resorption of the maxilla and mandible.

Osteoarthritis was observed in varying degrees throughout the skeleton of this individual. The thoracic and lumbar vertebrae of this individual display evidence of degenerative disk disease. The intervertebral disks appear to have degenerated, causing the end plates of the vertebral bodies to become extremely porous and rough. Schmorl's nodes are present on the articular faces of the centra. The inferior and superior surfaces of these end plates have eroded, with subsequent deposition of osteophytic bone. There is no marked osteoarthritic change in the borders of the centra or on the zygopophyses.

Mild osteophytic action was observed on the vertebral facets of the ribs. Slight marginal osteophytes are present on the acetabulae of the right and left os coxae. The left acetabulum exhibits a rectangular deposition of light colored porous bone on the dorsal margin. This patch of bone measures 13.4 x 4.0 mm. Wrinkled depressions are present on the superior margins of both acetabulae. The proximal right humerus, metacarpals and phalanges, and distal left femur display osteophytes. In addition, the lateral border of the radial tuberosity of the right radius exhibits an age and stress-related enthesophyte.

Evidence of infection was observed in the cranium and in fragments of unidentified ribs. The cranium displays two round depressed centers of bone activity on the right parietal. One of those centers is highly porous. Four ribs exhibit mild periostitis near the articular facets. The shaft of one of these ribs is slightly remodeled.

The dentition of this individual is characterized by heavy tooth wear, periodontal disease, tooth loss, and subsequent alveolar resorption. Extensive chipping and discoloration are present on the lingual occlusal margin of the left third mandibular molar. The left lateral mandibular incisor is also severely chipped, as is the left distal maxillary premolar. The crown of the maxillary right mesial incisor is completely decayed and nine additional caries are present in the dentition.

Burial 34B, 8ubadult, 6 ± 3 Months

The remains of this infant are quite fragmentary and composed of few elements. Age determination was based on dental eruption (see Table 24). The occipital bone appears to have been the site of a massive infection, with perforation into the brain cavity. This may be another case of supra-inion infection but, due to the fragmentary nature of the cranial elements, a concrete diagnosis could not be made.

Burial 34C, Adult of Indeterminate Sex and Age

This individual is represented by one parietal fragment and one clavicle fragment.

Burial 35, Female, 30-35 Years

Sex determination was made for this individual from cranial, pelvic, and metric evidence. The rounded chin, very slight gonial eversion of the mandible, small mastoid processes, light muscle markings, round orbits, small to no supraorbital torus, and large parietal bossing are all female traits. The os coxae display a wide sciatic notch, a wide and definite preauricular sulcus, a large subpubic angle, a ventral arc, dorsal pitting on both pubic bones, and narrow pubis width. Femoral head diameter is 42.5 mm. Calcaneus and talus discriminant function calculations also indicate that the individual is a female. Stature was estimated at 161 cm.

Age estimation was performed using the following evidence. Auricular surface morphology indicates an age of 30-34 years (Lovejoy et al. 1985). Evaluation of the pubic symphysis was consistent with an age estimation of 30-38 years (Suchey et al. 1988a). Dental wear assessment indicated an age range of 30-40 years.

Medical disorders affecting Burial 20 are present in the form of vertebral osteophytosis and degenerative joint disease of the cervical, thoracic, and lumbar regions, slight osteoarthroses of the pelvis, arms, and legs, infection in the form of a suprainion depression and mild periodontal disease, enamel hypoplasias, and dental caries. Tooth wear is moderate (see Appendix V, this article).

Burial 36, Subadult, 9 ± 3 Months

The remains of this infant are extremely friable and delicate. The cranium is held together by soil. Care was taken to clean the exterior surfaces of the cranium and leave the cranial bones in articulation. Therefore, measurements of the cranial bones were not taken. The fragmentary nature of the postcranial remains precludes most measurement as well. Age estimation was completed using dental evidence and measurement of the auditory ossicles (Steele and Bramblett 1988; Fazekas 1978) (see Tables 26 and 33).

The most notable feature of this infant is the presence of a large perforating lesion of the occipital supra-inion region of the modeled cranium.

Surface Collection

The element inventory for the surface collection is included in Appendix III, identified by lot numbers. Some of the surface collection remains can only be assigned to Block II (East Mound) or Block III (Village area) but some of the material is associated with Burials 24, 25, 27, and 28 on the Terrace. Items of note include a right maxilla with a roughened palate and a peg-like incisor, and several cases of enamel hypoplasias, hypercementosis, caries, and osteophytosis.

APPENDIX III, Skeletal Inventory By Burial

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Skeletal Remains from the Surface

Quantity	Element	Side	Age	Sex
1	Neural area only Axis	Axial	Older Subadult/Adult Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Left	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Left	Subadult (0-24 years)	Indeterminate
2	Frag. Cranial fragment IND	Indeterminate	Indeterminate	Indeterminate
6	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
3	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
1	Frag. Cranial fragment indet.	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Dist. end of long bone Femur	Left	Adult (25-50+ years)	Indeterminate
1	Dist. epiphysis, complete Femur	Indeterminate	Indeterminate	Indeterminate
1	Long bone frag. indet. Femur	Indeterminate	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Femur	Right	Older Subadult/Adult indet.	Indeterminate
2	Prox. portion of shaft Femur	Indeterminate	Indeterminate	Indeterminate
3	Complete or nearly complete Foot distal phalanx	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Foot distal phalanx	Indeterminate	Indeterminate	Indeterminate
2	Complete or nearly complete Foot distal phalanx	Indeterminate	Indeterminate	Indeterminate
2	Complete or nearly complete Foot middle phalanx	Indeterminate	Older Subadult/Adult indet.	Indeterminate
4	Complete or nearly complete Foot middle phalanx	Indeterminate	Older Subadult/Adult indet.	Indeterminate
2	Complete or nearly complete Foot proximal phalanx	Indeterminate	Adult (25-50+ years)	Indeterminate
3	Complete or nearly complete Foot proximal phalanx	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Foot proximal phalanx	Left	Older Subadult/Adult indet.	Indeterminate

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Hamate	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Hand middle phalanx	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Hand proximal phalanx l	Indeterminate	Indeterminate	Indeterminate
1	Diaphyseal frag. Humerus	Left	Older Subadult/Adult indet.	Indeterminate
1	Prox. portion of shaft Humerus	Right	Indeterminate	Indeterminate
1	Nearly complete Hyoid	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Intermediate cuneiform	Left	OlderSubadult/Adult indet.	Indeterminate
1	Complete or nearly complete Intermediate cuneiform	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Lateral cuneiform	Left	Older Subadult/Adult indet.	Indeterminate
4	Diaphyseal frag. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
	Diaphyseal frag. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
3	Diaphyseal frag. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
	Diaphyseal frag. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
1	Centrum Lumbar vertebra indet.	Axial	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Lunate	Left	Older Subadult/Adult indet.	Indeterminate
1	Horiz. ramus portion Mandible	Left	Subadult (0-24 years)	Indeterminate
1	Horiz. ramus portion Mandible	Right	Subadult (0-24 years)	Indeterminate
1	Medial aspect Maxilla	Right	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Metacarpal 3	Left	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Metacarpal 3	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metapodial indet.	Indeterminate	Indeterminate	Indeterminate
1	Fragment Metapodial indet.	Indeterminate	Indeterminate	Indeterminate
1	Fragment Metapodial indet.	Indeterminate	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Fragment Metapodial indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Metatarsal 2	Left	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 3	Right	Older Subadult/Adult indet.	Indeterminate
2	Long bone frag. indet. Metatarsal 3	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 5	Left	Older Subadult/Adult indet.	Indeterminate
	Long bone frag. indet. Metatarsal indet.	Indeterminate	Older Subadult/Adult indet.	Indeterminate
2	Long bone frag. indet. Metatarsal indet.	Indeterminate	Indeterminate	Indeterminate
1	Fragment Navicular	Indeterminate	Indeterminate	Indeterminate
1	Frag. Occipital	Axial	Indeterminate	Indeterminate
1	Posterior aspect Occipital	Axial	Indeterminate	Indeterminate
1	Superior aspect Occipital	Axial	Old Adult (50+ years)	Indeterminate
1	Acetabular frag. indet. Os Coxa	Indeterminate	Indeterminate	Indeterminate
1	Ilium frag. Os Coxa	Indeterminate	Indeterminate	Indeterminate
1	Ilium frag. Os Coxa	Left	Indeterminate	Female
1	Ilium frag. Os Coxa	Indeterminate	Infant (0-2 years)	Indeterminate
1	Ischium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Indeterminate	Infant (0-2 years)	Indeterminate
1	Ischium frag. Os Coxa	Left	Older Subadult/Adult indet.	Indeterminate
1	Ischium frag. Os Coxa	Right	Older Subadult/Adult indet.	Indeterminate
1	Nearly complete Palatine	Left	Older Subadult/Adult indet.	Indeterminate
1	Nearly complete Palatine	Right	Older Subadult/Adult indet.	Indeterminate
1	Frag. Parietal	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Lateral aspect Parietal	Left	Older Subadult/Adult indet.	Indeterminate
	Post. aspect Parietal	Left	Old Adult (50+ years)	Indeterminate
1	Post. aspect Parietal	Right	Old Adult (50+ years)	Indeterminate
1	Fragment Patella	Indeterminate	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Right	Subadult (0-24 years)	Indeterminate
1	Lower C Permanent tooth	Left	Subadult (0-24 years)	Indeterminate
1	Lower I indet. Permanent tooth	Indeterminate	Adult (25-50+ years)	Indeterminate

Quantity	Element	Side	Age	Sex
1	Lower M indet. Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Lower M2 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Lower M2 or 3 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Lower PM3 Permanent tooth	Right	Subadult (0-24 years)	Indeterminate
1	Lower PM3 Permanent tooth	Left	Subadult (0-24 years)	Indeterminate
1	Lower PM4 Permanent tooth	Right	Subadult (0-24 years)	Indeterminate
1	Lower PM4 Permanent tooth	Left	Subadult (0-24 years)	Indeterminate
1	Tooth indet. Permanent tooth	Indeterminate	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper Il Permanent tooth	Right	Older Subadult/Adult indet.	Indeterminate
1	Upper Il Permanent tooth	Left	Older Subadult/Adult indet.	Indeterminate
1	Upper Il Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper Il Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper I2 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper M indet. Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper Ml Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Phalanx indet.	Indeterminate	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Phalanx indet.	Indeterminate	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Radius	Indeterminate	Adult (25-50+ years)	Indeterminate
1	Shaft frag. Rib indet.	Indeterminate	Older Subadult/Adult indet.	Indeterminate
7	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate

Burial 24

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Axis	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Right	Indeterminate	Indeterminate
2	Complete or nearly complete Carpal indet.	Right	Indeterminate	Indeterminate
5	Neural area only Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Vertebra frag. indet. Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Indeterminate Clavicle	Right	Indeterminate	Indeterminate
1	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Femur	Right	Indeterminate	Indeterminate
1	Prox. end of long bone Femur	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Femur	Right	Indeterminate	Indeterminate
1	Prox. portion of shaft Femur	Left	Indeterminate	Indeterminate
1	Prox. portion of shaft Femur	Right	Indeterminate	Indeterminate
1	Complete shaft Fibula	Right	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Fibula	Left	Indeterminate	Indeterminate
1	Dist. portion of shaft Fibula	Left	Indeterminate	Indeterminate
4	Complete or nearly complete Foot distal phalanx	Indeterminate	Indeterminate	Indeterminate
9	Complete or nearly complete Foot phalanx indet.	Left	Indeterminate	Indeterminate
4	Complete or nearly complete Foot phalanx indet.	Right	Indeterminate	Indeterminate
1	Frag. Frontal	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Hand distal phalanx	Indeterminate	Indeterminate	Indeterminate
1	Complete shaft Humerus	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Prox. epiphysis, complete Humerus	Right	Indeterminate	Indeterminate
98	Indeterminate Indeterminate	Indeterminate	Indeterminate	Indeterminate
10	Fragment Long bone indet.	Indeterminate	Indeterminate	Indeterminate
3	Long bone frag. indet. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
1	Transverse process Lumbar vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lunate	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Mandible	Axial	Indeterminate	Indeterminate
1	Frag. Maxilla	Left	Indeterminate	Indeterminate
1	Frag. Maxilla	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Medial cuneiforme	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal indet.	Right	Indeterminate	Indeterminate
2	Complete or nearly complete Metacarpal indet.	Indeterminate	Indeterminate	Indeterminate
1	Long bone frag. indet. Metacarpal indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Metatarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Occipital	Axial	Indeterminate	Indeterminate
1	Acetabular end of ilium Os Coxa	Right	Indeterminate	Indeterminate
1	Auricular surface only Os Coxa	Right	Indeterminate	Indeterminate
1	Auricular surface only Os Coxa	Indeterminate	Indeterminate	Indeterminate
1	Ilium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Frag. Palatine	Left	Indeterminate	Indeterminate
1	Frag. Palatine	Right	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Nearly complete Parieta1	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Left	Indeterminate	Indeterminate
1	Lower Ml Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower Ml Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM9 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Long bone frag. indet.			
	Phalanx indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Pisiform	Indeterminate	Indeterminate	Indeterminate
1	Complete shaft Radius	Right	Indeterminate	Indeterminate
3	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Vertebral end Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Scaphoid	Right	Indeterminate	Indeterminate
1	Blade portion Scapula	Left	Indeterminate	Indeterminate
1	Glenoid fossa only Scapula	Left	Indeterminate	Indeterminate
1	Frag. Sphenoid	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Talus	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Tarsal indet.	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
4	Complete or nearly complete Tarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Right	Indeterminate	Indeterminate
5	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
6	Transverse process Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
3	Transverse process Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Right	Indeterminate	Indeterminate
1	Prox. end of long bone Tibia	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezoid	Right	Indeterminate	Indeterminate
1	Fragment Trapezoid	Indeterminate	Indeterminate	Indeterminate
1	Prox. end of long bone Ulna	Right	Indeterminate	Indeterminate
1	Prox. portion of shaft Ulna	Right	Indeterminate	Indeterminate
1	Articular facet Vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete Zygomatic	Right	Indeterminate	Indeterminate

Burial 25

Quantity	Element	Side	Age	Sex
1	Fragment Calcaneus	Right	Indeterminate	Indeterminate
1	Complete shaft Eibula	Right	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Fibula	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Foot distal phalanx	Indeterminate	Indeterminate	Indeterminate
2	Complete or nearly complete Foot middle phalanx	Indeterminate	Indeterminate	Indeterminate
4	Complete or nearly complete Foot proximal phalanx	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Hand distal phalanx	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Hand distal phalanx	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Hand middle phalanx	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Hand middle phalanx	Indeterminate	Indeterminate	Indeterminate
1	Long bone frag. indet. Hand proximal phalanx 1	Indeterminate	Indeterminate	Indeterminate
1	Dist. end of long bone Humerus	Right	Indeterminate	Indeterminate
3	Prox. end of long bone Humerus	Right	Indeterminate	Indeterminate
1	Eragment Lateral cuneiform	Right	Indeterminate	Indeterminate
2	Centrum Lumbar vertebra indet.	Axial	Indeterminate	Indeterminate
2	Long bone frag. indet. Metacarpal indet.	Indeterminate	Indeterminate	Indeterminate
6	Long bone frag. indet. Metatarsal indet.	Indeterminate	Indeterminate	Indeterminate
1	Fragment Navicular	Right	Indeterminate	Indeterminate
1	Frag. Occipital	Axial	Indeterminate	Indeterminate
2	Ilium frag. Os Coxa	Indeterminate	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Indeterminate ossified thyroid cartilage	Indeterminate	Indeterminate	
	Indeterminate			
1	Complete or nearly complete Patella	Right	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete shaft Radius	Right	Indeterminate	Indeterminate
1	Complete shaft Radius	Indeterminate	Indeterminate	Indeterminate
1	Prox. end of long bone Radius	Right	Indeterminate	Indeterminate
19	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
3	Vertebral end Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Vertebral end Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Glenoid fossa only Scapula	Left	Indeterminate	Indeterminate
2	Indeterminate Sesamoid indet.	Indeterminate	Indeterminate	Indeterminate
1	Sternal body Sternum	Axial	Indeterminate	Indeterminate
4	Diaphyseal frag. T	Indeterminate	Indeterminate	Indeterminate
11	Fragment Tarsal indet.	Indeterminate	Indeterminate	Indeterminate
4	Centrum Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
6	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete shaft Tibia	Left	Indeterminate	Indeterminate
1	Diaphyseal frag. Tibia	Indeterminate	Indeterminate	Indeterminate
3	Prox. epiphysis, complete Tibia	Indeterminate	Indeterminate	
	Indeterminate			
1	Complete shaft Ulna	Left	Indeterminate	Indeterminate
1	Complete shaft Ulna	Indeterminate	Indeterminate	Indeterminate
17	Centrum and neural area Vertebra indet.	Axial	Indeterminate	Indeterminate

Burial 26, Individual 1

Quantity	Element	Side	Age	Sex
1	Upper I2 Permanent tooth	Right	Infant (0-2 years)	Indeterminate

Burial 26, Individual 2

Quantity	Element	Side	Age	Sex
4	Centrum and neural area Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Left	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Right	Indeterminate	Indeterminate
1	Coccyx complete Coccygeal vertebra	Axial	Indeterminate	Indeterminate
1	Complete minus distal end Femur	Left	Indeterminate	Indeterminate
1	Complete shaft Femur	Right	Indeterminate	Indeterminate
32	Diaphyseal frag. Femur	Right	Indeterminate	Indeterminate
14	Diaphyseal frag. Femur	Left	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Femur	Right	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Femur	Left	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Femur	Right	Indeterminate	Indeterminate
5	Diaphyseal frag. Fibula	Right	Indeterminate	Indeterminate
12	Diaphyseal frag. Fibula	Left	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Fibula	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Fibula	Left	Indeterminate	Indeterminate
3	Complete or nearly complete Foot proximal phalanx	Right	Indeterminate	Indeterminate
1	Lateral aspect Frontal	Left	Indeterminate	Indeterminate
4	Complete or nearly complete Hand distal phalanx	Right	Indeterminate	Indeterminate
2	Complete or nearly complete Hand middle phalanx	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
3	Complete or nearly complete Hand middle phalanx	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Hand proximal phalanx 1	Right	Indeterminate	Indeterminate
3	Complete or nearly complete Hand proximal phalanx 1	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Left	Indeterminate	Indeterminate
5	Neural area only Lumbar vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 1	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 4	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 5	Left	Indeterminate	Indeterminate
1	Long bone frag. indet. Metacarpal indet.	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metatarsal 1	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Metatarsal 3	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Metatarsal 4	Right	Indeterminate	Indeterminate
1	Long bone frag. indet. Metatarsal 5	Right	Indeterminate	Indeterminate
1	Long bone frag. indet. Metatarsal indet.	Indeterminate	Indeterminate	Indeterminate
5	Long bone frag. indet. Metatarsal indet.	Indeterminate	Indeterminate	Indeterminate
1	Sup. aspect Occipital	Axial	Indeterminate	Indeterminate
1	Acetabular frag. indet. Os Coxa	Right	Indeterminate	Indeterminate
12	Ilium frag. Os Coxa	Right	Indeterminate	Indeterminate
13	Ilium frag. Os Coxa	Left	Indeterminate	Indeterminate
3	Ischium frag. Os Coxa	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
4	Ischium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Pisiform	Right	Indeterminate	Indeterminate
1	Complete shaft Radius	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Radius	Left	Indeterminate	Indeterminate
11	Shaft frag. Rib indet.	Right	Indeterminate	Indeterminate
27	Shaft frag. Rib indet.	Left	Indeterminate	Indeterminate
2	Vertebral end Rib indet.	Right	Indeterminate	Indeterminate
5	Vertebral end Rib indet.	Left	Indeterminate	Indeterminate
18	Sacrum frag. indet. Sacrum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Scapula	Left	Indeterminate	Indeterminate
1	Glenoid fossa only Scapula	Right	Indeterminate	Indeterminate
1	Scapula frag. indet. Scapula	Right	Indeterminate	Indeterminate
1	Frag. Temporal	Indeterminate	Indeterminate	Indeterminate
3	Centrum Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
2	Centrum and neural area Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
14	Diaphyseal frag. Tibia	Right	Indeterminate	Indeterminate
32	Diaphyseal frag. Tibia	Left	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Tibia	Right	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Tibia	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezium	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezoid	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Triquetral	Left	Indeterminate	Indeterminate
1	Complete minus distal end Ulna	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Ulna	Right	Indeterminate	Indeterminate
8	Centrum Vertebra indet.	Axial	Indeterminate	Indeterminate
2	Centrum and neural area Vertebra indet.	Axial	Indeterminate	Indeterminate
47	Neural area only Vertebra indet.	Axial	Indeterminate	Indeterminate

Burial 27, Individual 1

Quantity	Element	Side	Age	Sex
1	Coccygeal element 1 Coccygeal vertebra	Axial	Indeterminate	Indeterminate
1	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
1	Indeterminate Indeterminate	Indeterminate	Indeterminate	Indeterminate
1	Long bone frag. indet. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
1	Tooth indet. Permanent tooth	Indeterminate	Indeterminate	Indeterminate
1	Sternal body segment Sternum	Axial	Older Subadult/Adult indet.	Indeterminate
1	Xiphoid process Sternum	Axial	Older Subadult/Adult indet.	Indeterminate
1	Articular facet Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Horiz. ramus portion Alveolar ridge fragment	Right	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Humerus	Indeterminate	Late Child (6-12 years)	Indeterminate
1	Lower I1 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Lower M1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Right	Late Child (6-12 years)	Indeterminate
1	Lower M2 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Lower M3 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Lower M3 Permanent tooth	Right	Late Child (6-12 years)	Indeterminate
1	Upper I1 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Upper I2 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Upper I2 Permanent tooth	Right	Late Child (6-12 years)	Indeterminate
1	Upper M1 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Upper M2 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Upper M3 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Upper PM3 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate
1	Upper PM4 Permanent tooth	Left	Late Child (6-12 years)	Indeterminate

Burial 27, Individual 2

Quantity	Element	Side	Age	Sex
2	Shaft frag. Clavicle	Left	Indeterminate	Indeterminate
2	Shaft frag. Clavicle	Right	Indeterminate	Indeterminate
12	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
1	Vertebral end First rib	Left	Indeterminate	Indeterminate
1	Long bone frag. indet. Foot distal phalanx indet.	Indeterminate	Indeterminate	Indeterminate
1	Long bone frag. indet. Foot phalanx indet.	Indeterminate	Indeterminate	Indeterminate
2	Frag. Frontal	Axial	Indeterminate	Indeterminate
1	Frag. Frontal	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Hand middle phalanx	Indeterminate	Indeterminate	Indeterminate
2	Complete or nearly complete Hand proximal phalanx 1	Indeterminate	Indeterminate	Indeterminate
4	Long bone frag. indet. Hand proximal phalanx 1	Indeterminate	Indeterminate	Indeterminate
1	Complete minus proximal end Humerus	Left	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Humerus	Right	Indeterminate	Indeterminate
1	Long bone frag. indet. Humerus	Indeterminate	Indeterminate	Indeterminate
1	Prox. portion of shaft Humerus	Right	Indeterminate	Indeterminate
1	Complete Incus	Left	Indeterminate	Indeterminate
3	Centrum Lumbar vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete Malleus	Left	Indeterminate	Indeterminate
1	Complete minus right condyle Mandible	Axial	Indeterminate	Indeterminate
1	Frag. Maxilla	Indeterminate	Indeterminate	Indeterminate
1	Lateral aspect Maxilla	Right	Indeterminate	Indeterminate
1	Long bone frag. indet. Metacarpal indet.	Indeterminate	Indeterminate	Indeterminate
2	Frag. Occipital	Axial	Indeterminate	Indeterminate
1	Inf. aspect Occipital	Axial	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
5	Frag. Parietal	Indeterminate	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Lower I1 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Lower I1 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Lower I2 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Lower PM4 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
2	Tooth indet. Permanent tooth	Indeterminate	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Left .	Adult (25-50+ years)	Indeterminate
1	Upper C Permanent tooth	Right	Adult t25-50+ years)	Indeterminate
1	Upper I1 Permanent tooth	Right	Adult (25-50+ years;	Indeterminate
l	Upper I2 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper M1 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper FM3 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Right	Indeterminate	Indeterminate
41	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
8	Vertebral end Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacral element indet. Sacrum	Axial	Indeterminate	Indeterminate
1	Glenoid fossa only Scapula	Left	Indeterminate	Indeterminate
1	Glenoid fossa only Scapula	Right	Indeterminate	Indeterminate
2	Scapula frag. indet. Scapula	Left	Indeterminate	Indeterminate
2	Frag. Temporal	Right	Indeterminate	Indeterminate
1	Inf. aspect Temporal	Right	Indeterminate	Indeterminate
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Centrum Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Centrum and neural area Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
2	Long bone frag. indet. Tibia	Indeterminate	Indeterminate	Indeterminate
2	Diaphyseal frag. Ulua	Left	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Ulna	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Uloa	Left	Indeterminate	Indeterminate
3	Centrum Vertebra indet.	Axial	Indeterminate	Indeterminate
8	Neural area only Vertebra indet.	Axial	Indeterminate	Indeterminate

Burial 28

Quantity	Element	Side	Age	Sex
1	Neural area onIy Axis	Axial	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Calcaneus	Right	Adult (25-50+ years)	Male
1	Complete or nearly complete Calcaneus	Left	Older Subadult/Adult indet.	Male
5	Centrum Cervical vertebra indet. Indeterminate	Axial	Older Subadult/Adult indet.	
1	Shaft frag. Clavicle	Right	Older Subadult/Adult indet.	Indeterminate
1	Shaft frag. Clavicle	Left	Adolescent/Juvenile	Indeterminate
1	Shaft frag. Clavicle	Left	Older Subadult/Adult indet.	Indeterminate
1	Shaft frag. Clavicle Indeterminate	Indeterminate	Indeterminate	
1	Indeterminate Costal cartilage	Indeterminate	Indeterminate	Indeterminate
9	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Cuboid	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Cuboid	Left	Older Subadult/Adult indet.	Indeterminate
1	Complete minus proximal end Femur	Right	Adult (25-50+ years)	Indeterminate
1	Diaphyseal frag. Femur	Left	Indeterminate	Indeterminate
1	Dist, end of long bone Femur	Left	Adult (25-50+ years)	Indeterminate
1	Dist. end of long bone Femur	Left	Adult (25-50+ years)	Indeterminate
1	Dist. end of long bone Femur	Right	Indeterminate	Indeterminate
1	Prox. end of long bone Femur	Left	Adult (25-50+ years)	Female
1	Complete minus distal end Fibula	Right	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Fibula	Left	Adult (25-50+ years)	Indetermlnate
1	Diaphyseal frag. Fibula	Left	Indeterminate	Indeterminate
2	Shaft frag. First rib	Indeterminate	Indeterminate	Indeterminate
2	Fragment Flat bone indet.	Indeterminate	Indeterminate	Indeterminate
2	Complete or nearly complete Foot distal phalanx	Left	Older Subadult/Adult indet.	Indeterminate
3	Long bone frag. indet. Foot phalanx indet.	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
3	Long bone frag. indet. Foot phalanx indet.	Indeterminate	Indeterminate	Indeterminate
5	Complete or nearly complete Foot proximal phalanx	Left	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Foot proximal phalanx indet.	Right	Older Subadult/Adult indet.	Indeterminate
1	Lateral aspect Frontal	Right	Adult (25-50+ years)	Female
1	Medial aspect Frontal	Left	Young Adult (25-49 years)	Indeterminate
1	Complete or nearly complete Hamate	Right	Older Subadult/Adult indet.	Indeterminate
3	Complete or nearly complete Hand middle phalanx	Right	Older Subadult/Adult indet.	Indeterminate
2	Complete or nearly complete Hand proximal phalanx l	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete minus distal end Humerus	Left	Adult (25-50+ years)	Indeterminate
1	Nearly complete Hyoid	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Intermediate cuneiform	Right	Older Subadult/Adult indet.	Indeterminate
1	Fragment Intermediate cuneiform	Left	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Lateral cuneiform	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Lateral cuneiform	Left	Older Subadult/Adult indet.	Indeterminate
12	Long bone frag. indet. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Lunate	Right	Older Subadult/Adult indet.	Indeterminate
1	Horiz. and ascending ramus Mandible	Right	Adult (25-50+ years)	Female
1	Lateral aspect Maxilla	Left	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Medial cuneiforme	Right	Older Subadult/Adult indet.	Indeterminate

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Medial cuneiforme	Left	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metacarpal 1	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metacarpal 3	Right	Older Subadult/Adult indet.	Indeterminate
3	Fragment Metapodial indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Metatarsal 1	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 1	Left	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 2	Left	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Metatarsal 2	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 3	Left	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Metatarsal 3	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 4	Left	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 5	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Metatarsal 5	Left	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Metatarsal indet.	Right	Older Subadult/Adult indet.	Indeterminate
1	Long bone frag. indet. Metatarsal indet.	Right	Indeterminate	Indeterminate
3	Fragment Navicular	Right	Older Subadult/Adult indet.	Indeterminate
1	Fragment Navicular	Left	Older Subadult/Adult indet.	Indeterminate
1	Frag. Occipital	Axial	Indeterminate	Indeterminate
1	Post. aspect Occipital	Axial	Indeterminate	Indeterminate
1	Post. aspect Occipital	Axial	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Right	Old Adult (50+ years)	Female
1	Ilium complete Os Coxa	Right	Indeterminate	Female
1	Ilium frag. Os Coxa	Left	Adult (25-50+ years)	Male
1	Ischium complete Os Coxa	Left	Adult (25-50+ years)	Indeterminate

Quantity	Element	Side	Age	Sex
1	Ischium complete Os Coxa	Right	Adult (25-50+ years)	Indeterminate
3	Os coxa frag. indet. Os Coxa	Indeterminate	Indeterminate	Indeterminate
6	Frag. Parietal	Indeterminate	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	O1d Adult (50+ years)	Indeterminate
1	Nearly complete Parietal	Left	Older Subadult/Adult indet.	Indeterminate
1	Sup. aspect Parietal	Right	Old Adult (50+ years)	Indeterminate
1	Sup. aspect Parietal	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Patella	Left	Adult (25-50+ years)	Indeterminate
1	Lower C Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Lower I1 Permanent tooth	Right	Older Subadult/Adult indet.	Indeterminate
1	Lower PM indet. Permanent tooth	Indeterminate	Adult (25-50+ years)	Indeterminate
1	Lower PM3 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Lower PM4 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper C Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper C Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper I indet. Permanent tooth	Indeterminate	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper I2 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper M indet. Permanent tooth	Indeterminate	Indeterminate	Indeterminate
1	Upper M1 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper M1 Permanent tooth	Right	Older Subadult/Adult indet.	Indeterminate
1	Upper M1 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Upper PM indet. Permanent tooth	Left	Older Subadult/Adult indet.	Indeterminate
1	Upper PM3 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper PM4 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Pisiform	Right	Older Subadult/Adult indet.	Indeterminate
1	Dist. portion of shaft Radius	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Radius	Left	Adult (25-50+ years)	Indeterminate
35	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
25	Vertebral end Rib indet.	Indeterminate	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Sacral element indet. Sacrum	Axial	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Scapula	Right	Adult (25-50+ years)	Indeterminate
1	Glenoid fossa only Scapula	Right	Adult (25-50+ years)	Indeterminate
1	Scapula frag. indet. Scapula	Right	Indeterminate	Indeterminate
7	Scapula frag. indet. Scapula	Indeterminate	Indeterminate	Indeterminate
1	Scapula frag. indet. Scapula	Left	Adult (25-50+ years)	Indeterminate
3	Complete or nearly complete Sesamoid indet.	Right	Indeterminate	Indeterminate
3	Complete or nearly complete Sesamoid indet.	Indeterminate	Indeterminate	Indeterminate
2	Sternal body Sternum	Axial	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Talus	Right	Older Subadult/Adult indet.	Male
1	Complete or nearly complete Talus	Left	Older Subadult/Adult indet.	Male
3	Fragment Tarsal indet.	Indeterminate	Indeterminate	Indeterminate
1	Frag. Temporal	Indeterminate	Indeterminate	Indeterminate
1	Inf. aspect Temporal	Indeterminate	Indeterminate	Indeterminate
1	Lateral aspect Temporal	Left	Older Subadult/Adult indet.	Indeterminate
10	Centrum Thoracic vertebra indet.	Axial	Older Subadult/Adult indet.	Indeterminate
1	Complete or nearly complete Tibia	Left	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Tibia	Left	Adult (25-50+ years)	Indeterminate
1	Diaphyseal frag. Tibia	Right	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Tibia	Right	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Tibia	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezium	Right	Older Subadult/Adult indet.	Indeterminate
1	Complete shaft Ulna	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Ulna	Right	Adult (25-50+ years)	Indeterminate
1	Prox. portion of shaft Ulna	Left	Indeterminate	Indeterminate
1	Centrum Vertebra indet.	Axial	Older Subadult/Adult indet.	Indeterminate
1	Neural area & trans. proc. Vertebra indet.	Axial	Indeterminate	Indeterminate
42	Neural area only Vertebra indet.	Axial	Older Subadult/Adult indet.	Indeterminate
1	T Vertebra indet.	Axial	Indeterminate	Indeterminate

Burial 29

Quantity	Element	Side	Age	Sex
1	Shaft frag. Clavicle	Left	Infant (0-2 years)	Indeterminate
27	Frag. Cranial fragment indet.	Indeterminate	Infant (0-2 years)	Indeterminate
1	Lower I1 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Lower I2 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
3	Tooth indet. Deciduous tooth	Indeterminate	Infant (0-2 years)	Indeterminate
1	Upper I1 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper I1 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Complete shaft Femur	Left	Infant (0-2 years)	Indeterminate
1	Prox. end of long bone Femur	Left	Infant (0-2 years)	Indeterminate
9	Long bone frag. indet. Long bone indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Malleus	Indeterminate	Fetus/neonate	Indeterminate
1	Horiz. and ascending ramus Mandible	Left	Infant (0-2 years)	Indeterminate
1	Horiz. and ascending ramus Mandible	Right	Infant (0-2 years)	Indeterminate
20	Complete or nearly complete Metapodial indet.	Indeterminate	Indeterminate	Indeterminate
3	Inf. aspect Occipital	Axial	Infant (0-2 years)	Indeterminate
1	Ilium complete Os Coxa	Left	Infant (0-2 years)	Indeterminate
1	Ilium complete Os Coxa	Right	Infant (0-2 years)	Indeterminate
1	Ischium complete Os Coxa	Left	Infant (0-2 years)	Indeterminate
3	Os coxa frag. indet. Os Coxa	Indeterminate	Indeterminate	Indeterminate
23	Shaft frag. Rib indet.	Indeterminate	Infant (0-2 years)	Indeterminate
1	Glenoid fossa only Scapula	Left	Infant (0-2 years)	Indeterminate
1	Lateral aspect Temporal	Left	Infant (0-2 years)	Indeterminate
1	Complete shaft Tibia	Right	Infant (0-2 years)	Indeterminate
1	Complete shaft Uloa	Left	Infant (0-2 years)	Indeterminate
1	Prox. end of long bone Ulna	Left	Infant (0-2 years)	Indeterminate
13	Centrum Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate
47	Neural area only Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate
1	Nearly complete Zygomatic	Left	Infant (0-2 years)	Indeterminate

Burial 30

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Atlas	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Axis	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Right	Indeterminate	Indeterminate
8	Complete or nearly complete Carpal indet.	Left	Indeterminate	Indeterminate
8	Complete or nearly complete Carpal indet.	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Cervical vertebra 7	Axial	Indeterminate	Indeterminate
4	Complete or nearly complete Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Indeterminate Clavicle	Left	Indeterminate	Indeterminate
1	Indeterminate Clavicle	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Right	Indeterminate	Indeterminate
1	Complete minus distal end Fibula	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Fibula	Left	Indeterminate	Indeterminate
11	Complete or nearly complete phalanx indet.	Left	Indeterminate	Indeterminate
2	Complete or nearly complete Foot phalanx indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Frontal	Axial	Indeterminate	Indeterminate
8	Complete or nearly complete Hand phalanx indet.	Left	Indeterminate	Indeterminate
11	Complete or nearly complete Hand phalanx indet.	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
3	Complete or nearly complete Hand phalanx indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Right	Indeterminate	Indeterminate
1	Frag. Hyoid	Axial	Indeterminate	Indeterminate
37	Indeterminate Indeterminate	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 1	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 2	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 3	Axial	Indeterminate	Indeterminate
11	Complete or nearly complete Lumbar vertebra 4	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 5	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Mandible	Axial	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Left	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Right	Indeterminate	Indeterminate
4	Complete or nearly complete Metacarpal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metacarpal indet.	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Occipital	Axial	Indeterminate	Indeterminate
1	Acetab. with ilium & ischium Os Coxa	Left	Indeterminate	Indeterminate
1	Acetab. with ilium & ischium Os Coxa	Right	Indeterminate	Indeterminate
1	Auricular surface only Os Coxa	Left	Indeterminate	Indeterminate
1	Auricular surface only Os Coxa	Right	Indeterminate	Indeterminate
1	Nearly complete Palatine	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Nearly complete Palatine	Right	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	Indeterminate	Indeterminate
1	Nearly complete Parietal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Right	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower Il Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower Ml Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Supernumerary lower tooth Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper C Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M3 Permanent tooth	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Upper M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Right	Indeterminate	Indeterminate
7	Complete or nearly complete Rib indet.	Left	Indeterminate	Indeterminate
8	Complete or nearly complete Rib indet.	Right	Indeterminate	Indeterminate
11	Shaft frag. Rib indet.	Left	Indeterminate	Indeterminate
11	Shaft frag. Rib indet.	Right	Indeterminate	Indeterminate
2	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacrum frag. indet. Sacrum	Axial	Indeterminate	Indeterminate
1	Glenoid fossa and incomp. blade Scapula	Right	Indeterminate	Indeterminate
1	Glenoid fossa and incomp. blade Scapula	Right	Indeterminate	Indeterminate
2	Complete or nearly complete Sesamoid indet.	Left	Indeterminate	Indeterminate
3	Complete or nearly complete Sesamoid indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Sphenoid	Axial	Indeterminate	Indeterminate
1	Manubrium Sternum	Axial	Indeterminate	Indeterminate
1	Sternal body Sternum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Talus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Talus	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Tarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Tarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 10	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 11	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 12	Axial	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
8	Complete or nearly complete Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Uloa	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Ulna	Right	Indeterminate	Indeterminate
1	Nearly complete Zygomatic	Left	Indeterminate	Indeterminate
1	Nearly complete Zygomatic	Right	Indeterminate	Indeterminate

Burial 31

Quantity	Element	Side	Age	Sex
1	Neural area only Atlas	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Left	Indeterminate	Indeterminate
2	Complete or nearly complete Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Indeterminate Clavicle	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Eleventh rib	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Fibula	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Fibula	Right	Indeterminate	Indeterminate
1	Complete or nearly complete First rib	Left	Indeterminate	Indeterminate
1	Complete or nearly complete First rib	Right	Indeterminate	Indeterminate
6	Complete or nearly complete Foot phalanx indet.	Left	Indeterminate	Indeterminate
1	Nearly complete Frontal	Axial	Indeterminate	Indeterminate
2	Complete or nearly complete Hand phalanx indet.	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 2	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 3	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 4	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 5	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Mandible	Axial	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Nearly complete Maxilla	Right	Indeterminate	Indeterminate
4	Complete or nearly complete Metatarsal indet.	Left	Indeterminate	Indeterminate
1	Nearly complete Occipital	Axial	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Left	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Right	Indeterminate	Indeterminate
1	Ischium complete Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium complete Os Coxa	Right	Indeterminate	Indeterminate
1	Pubis frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Pubis frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Nearly complete Palatine	Left	Indeterminate	Indeterminate
1	Nearly complete Palatine	Right	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	Indeterminate	Indeterminate
1	Nearly complete Parietal	Right	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower Il Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower Il Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Left	Indeterminate	Indeterminate
11	Lower I2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Left	Indeterminate	Indeterminate
	Upper Il Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Upper PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Left	Indeterminate	Indeterminate
	Complete or nearly complete Radius	Right	Indeterminate	Indeterminate
8	Complete or nearly complete Rib indet.	Left	Indeterminate	Indeterminate
2	Complete or nearly complete Rib indet.	Right	Indeterminate	Indeterminate
2	Shaft frag. Rib indet.	Left	Indeterminate	Indeterminate
1	Shaft frag. Rib indet.	Right	Indeterminate	Indeterminate
4	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacral body Sacrum	Axial	Indeterminate	Indeterminate
1	Glenoid fossa & incomp. blade Scapula	Left	Indeterminate	Indeterminate
1	Glenoid fossa and incomp. blade Scapula	Right	Indeterminate	Indeterminate
1	Nearly complete Sphenoid	Axial	Indeterminate	Indeterminate
1	Sternal body segment Sternum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Talus	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Right	Indeterminate	Indeterminate
8	Complete or nearly complete Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Twelfth rib	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Ulna	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Ulna	Right	Indeterminate	Indeterminate
1	Nearly complete Zygomatic	Left	Indeterminate	Indeterminate
1	Nearly complete Zygomatic	Right	Indeterminate	Indeterminate

Burial 32

Quantity	Element	Side	Age	Sex
1	Centrum and neural area Atlas	Axial	Indeterminate	Indeterminate
	Complete or nearly complete Capitate	Left	Indeterminate	Indeterminate
3	Centrum Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
4	Neural area only Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Left	Indeterminate	Indeterminate
1	Complete minus distal end Femur	Left	Indeterminate	Indeterminate
1	Complete minus proximal end Femur	Right	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Femur	Left	Indeterminate	Indeterminate
1	Ant. aspect Frontal	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Hamate	Right	Indeterminate	Indeterminate
3	Complete or nearly complete Hand distal phalanx	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Hand distal phalanx	Right	Indeterminate	Indeterminate
3	Complete or nearly complete Hand middle phalanx	Left	Indeterminate	Indeterminate
4	Complete or nearly complete Hand proximal phalanx l	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Hand proximal phalanx 1	Left	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Humerus	Right	Indeterminate	Indeterminate
1	Prox. epiphysis, complete Humerus	Right	Indeterminate	Indeterminate
1	Prox. portion of shaft Humerus	Right	Indeterminate	Indeterminate
2	Centrum Lumbar vertebra indet.	Axial	Indeterminate	Indeterminate
2	Neural area only Lumbar vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lunate	Left	Indeterminate	Indeterminate
1	Horiz. ramus portion Mandible	Left	Indeterminate	Indeterminate
1	Lateral aspect Maxilla	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 1	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 1	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Metacarpal 2	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 2	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 3	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 4	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 5	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Metacarpal 5	Left	Indeterminate	Indeterminate
1	Post. aspect Occipital	Axial	Indeterminate	Indeterminate
1	Ilium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Ilium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Pubis frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Frag. Parietal	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Left	Indeterminate	Indeterminate
1	Tooth indet. Permanent tooth	Indeterminate	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Pisiform	Left	Indeterminate	Indeterminate
20	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
4	Vertebral end Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacrum frag. indet. Sacrum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Scaphoid	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Scaphoid	Left	Indeterminate	Indeterminate
1	Scapula frag. indet. Scapula	Left	Indeterminate	Indeterminate
1	Scapula frag. indet. Scapula	Right	Indeterminate	Indeterminate
1	Lateral aspect Temporal	Left	Indeterminate	Indeterminate
1	Lateral aspect Temporal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 10	Axial	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
6	Centrum Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
7	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezium	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezium	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Trapezoid	Right	Indeterminate	Indeterminate
1	Prox. portion of shaft Ulna	Right	Indeterminate	Indeterminate
1	Sternal end and portion of shaft Vertebrosternal rib	Indeterminate	Indeterminate	Indeterminate
1	Complete Zygomatic	Left	Indeterminate	Indeterminate

Burial 33

Quantity	Element	Side	Age	Sex
1	Neural area only Atlas	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Axis	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Right	Indeterminate	Indeterminate
8	Complete or nearly complete Carpal indet.	Left	Indeterminate	Indeterminate
6	Complete or nearly complete Carpal indet.	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Cervical vertebra 7	Axial	Indeterminate	Indeterminate
5	Centrum Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
3	Neural area only Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Left	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Right	Indeterminate	Indeterminate
1	Shaft frag. Eleventh rib	Indeterminate	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Right	Indeterminate	Indeterminate
1	Complete minus proximal end Fibula	Left	Indeterminate	Indeterminate
1	Complete minus proximal end Fibula	Right	Indeterminate	Indeterminate
1	Shaft frag. First rib	Indeterminate	Indeterminate	Indeterminate
9	Complete or nearly complete Foot phalanx indet.	Left	Indeterminate	Indeterminate
8	Complete or nearly complete Foot phalanx indet.	Right	Indeterminate	Indeterminate
2	Complete shaft Foot phalanx indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Frontal	Axial	Indeterminate	Indeterminate
12	Complete or nearly complete Hand phalanx indet.	Left	Indeterminate	Indeterminate
10	Complete or nearly complete Hand phalanx indet.	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra l	Axial	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Lumbar vertebra 2	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 3	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 4	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 5	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Mandible	Axial	Indeterminate	Indeterminate
1	Frag. Maxilla	Right	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metacarpal indet.	Left	Indeterminate	Indeterminate
4	Complete or nearly complete Metacarpal indet.	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Occipital	Axial	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Left	Indeterminate	Indeterminate
1	Ilium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Right	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Lower M3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Right	Indeterminate	Indeterminate
11	Shaft frag. Rib indet.	Left	Indeterminate	Indeterminate
6	Shaft frag. Rib indet.	Right	Indeterminate	Indeterminate
44	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacral body Sacrum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Scapula	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Scapula	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Second rib	Left	Indeterminate	Indeterminate
1	Frag. Sphenoid	Axial	Indeterminate	Indeterminate
1	Manubrium Sternum	Axial	Indeterminate	Indeterminate
1	Sternal body Sternum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Talus Left	Indeterminate	Indeterminate	
1	Complete or nearly complete Talus Right	Indeterminate	Indeterminate	
5	Complete or nearly complete Tarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Tarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 10	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 11	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 12	Axial	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
9	Centrum Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
10	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Right	Indeterminate	Indeterminate
1	Shaft frag. Twelfth rib	Indeterminate	Indeterminate	Indeterminate
	Complete or nearly complete Ulna	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Ulna	Right	Indeterminate	Indeterminate
1	Complete Zygomatic	Right	Indeterminate	Indeterminate
1	Nearly complete Zygomatic	Left	Indeterminate	Indeterminate

Burial 34, Individual 1

Quantity	Element	Side	Age	Sex
1	Nearly complete Parietal	Right	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Left	Adult (25-50+ years)	Indeterminate
1	Upper M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete minus distal end Radius	Right	Indeterminate	Indeterminate
1	Complete minus proximal end Radius	Left	Indeterminate	Indeterminate
2	Shaft frag. Rib indet.	Left	Indeterminate	Indeterminate
7	Shaft frag. Rib indet.	Right	Indeterminate	Indeterminate
40	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacral body Sacrum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Scapula	Left	Indeterminate	Indeterminate
1	Frag. Sphenoid	Axial	Indeterminate	Indeterminate
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 10	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 11	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 12	Axial	Indeterminate	Indeterminate
6	Centrum Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
6	Neural area only Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Twelfth rib	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Twelfth rib	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Complete minus proximal end Ulna	Left	Indeterminate	Indeterminate
1	Complete shaft Ulna	Right	Indeterminate	Indeterminate
1	Nearly complete Zygomatic	Left	Indeterminate	Indeterminate
1	Neural area only Atlas	Axial	Indeterminate	Indeterminate
4	Complete or nearly complete Carpal indet.	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Carpal indet.	Right	Indeterminate	Indeterminate
3	Centrum Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
3	Neural area only Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Left	Indeterminate	Indeterminate
1	Shaft frag. Clavicle	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Eleventh rib	Left	Indeterminate	Indeterminate
1	Complete minus proximal end Femur	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Right	Indeterminate	Indeterminate
1	Complete or nearly complete First rib	Left	Indeterminate	Indeterminate
1	Complete or nearly complete First rib	Right	Indeterminate	Indeterminate
1	Nearly complete Frontal	Axial	Indeterminate	Indeterminate
5	Complete or nearly complete Hand phalanx indet.	Left	Indeterminate	Indeterminate
4	Complete or nearly complete Hand phalanx indet.	Right	Indeterminate	Indeterminate
1	Complete shaft Humerus	Left	Indeterminate	Indeterminate
1	Complete shaft Humerus	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 3	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 4	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 5	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Mandible	Axial	Indeterminate	Indeterminate
1	Frag. Maxilla	Right	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Left	Indeterminate	Indeterminate
3	Complete or nearly complete Metacarpal indet.	Left	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
2	Complete or nearly complete Metacarpal indet.	Right	Indeterminate	Indeterminate
1	Frag. Occipital	Axial	Indeterminate	Indeterminate
1	Aur. sur. and sciatic notch only Os Coxa	Right	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Pubis complete Os Coxa	Left	Indeterminate	Indeterminate
1	Pubis complete Os Coxa	Right	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	Indeterminate	Indeterminate

Burial 34, Individual 2

Quantity	Element	Side	Age	Sex
1	Complete Clavicle	Right	Infant (0-2 years)	Indeterminate
45	Frag. Cranial fragment indet.	Indeterminate	Infant (0-2 years)	Indeterminate
1	Lower I1 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Lower I1 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Lower PM3 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper C Deciduous tooth	Indeterminate	Infant (0-2 years)	Indeterminate
	Upper I1 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper I2 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper PM4 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Complete or nearly complete Incus	Indeterminate	Indeterminate	Indeterminate
1	Diaphyseal frag. Long bone indet.	Indeterminate	Infant (0-2 years)	Indeterminate
1	Neural area only Lumbar vertebra indet.	Axial	Adult (25-50+ years)	Indeterminate
1	Complete or nearly complete Malleus	Indeterminate	Indeterminate	Indeterminate
1	Horiz. ramus portion Mandible	Left	Infant (0-2 years)	Indeterminate
1	Horiz. ramus portion Mandible	Right	Infant (0-2 years)	Indeterminate
1	Frag. Occipital	Axial	Infant (0-2 years)	Indeterminate
1	Inf. aspect Occipital	Axial	Infant (0-2 years)	Indeterminate
2	Medial aspect Occipital	Axial	Infant (0-2 years)	Indeterminate
2	Frag. Parietal	Indeterminate	Infant (0-2 years)	Indeterminate
1	Sup. aspect Parietal	Indeterminate	Infant (0-2 years)	Indeterminate
1	Lateral aspect Temporal	Right	Infant (0-2 years)	Indeterminate
1	Centrum Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate
1	Neural area only Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate
1	Neural area only Vertebra indet.	Axial	Older Subadult/Adult indet.	Indeterminate
10	Neural area only Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate

Burial 34, Individual 3

Quantity	Element	Side	Age	Sex
1	Shaft frag. Clavicle	Right	Adult (25-50+ years)	Indeterminate
1	Frag. Parietal	Right	Adult (25-50+ years)	Indeterminate

Burial 35

Quantity	Element	Side	Age	Sex
1	Neural area only Atlas	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Axis	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Calcaneus	Right	Indeterminate	Indeterminate
6	Complete or nearly complete Carpal indet.	Left	Indeterminate	Indeterminate
7	Complete or nearly complete Carpal indet.	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Cervical vertebra 7	Axial	Indeterminate	Indeterminate
5	Complete or nearly complete Cervical vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Clavicle	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Clavicle	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Femur	Right	Indeterminate	Indeterminate
1	Dist. epiphysis, complete Femur	Left	Indeterminate	Indeterminate
1	Prox. end of long bone Femur	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Fibula	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Fibula	Right	Indeterminate	Indeterminate
4	Complete or nearly complete Foot phalanx indet.	Left	Indeterminate	Indeterminate
6	Complete or nearly complete Foot phalanx indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Frontal	Axial	Indeterminate	Indeterminate
8	Complete or nearly complete Hand phalanx indet.	Left	Indeterminate	Indeterminate
9	Complete or nearly complete Hand phalanx indet.	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Humerus	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 1	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 2	Axial	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Complete or nearly complete Lumbar vertebra 3	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 4	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Lumbar vertebra 5	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Mandible	Axial	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Left	Indeterminate	Indeterminate
1	Nearly complete Maxilla	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Metacarpal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metacarpal indet.	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Metatarsal indet.	Right	Indeterminate	Indeterminate
1	Nearly complete Occipital	Axial	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Left	Indeterminate	Indeterminate
1	Ilium complete Os Coxa	Right	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Left	Indeterminate	Indeterminate
1	Ischium frag. Os Coxa	Right	Indeterminate	Indeterminate
1	Pubis complete Os Coxa	Left	Indeterminate	Indeterminate
1	Pubis complete Os Coxa	Right	Indeterminate	Indeterminate
1	Nearly complete Palatine	Left	Indeterminate	Indeterminate
1	Nearly complete Palatine	Right	Indeterminate	Indeterminate
1	Nearly complete Parietal	Left	Indeterminate	Indeterminate
1	Nearly complete Parietal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Patella	Right	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower C Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I1 Permanent tooth	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Lower I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower I2 Permanent tooth	Right	Adult (25-50+ years)	Indeterminate
1	Lower M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower M3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Lower PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper C Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper I1 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper I2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M2 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper M2 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper M3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM3 Permanent tooth	Left	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Right	Indeterminate	Indeterminate
1	Upper PM4 Permanent tooth	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Radius	Right	Indeterminate	Indeterminate
2	Shaft frag. Rib indet.	Indeterminate	Indeterminate	Indeterminate
1	Sacral body Sacrum	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Scapula	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Scapula	Right	Indeterminate	Indeterminate
1	Nearly complete Sphenoid	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Talus	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Talus	Right	Indeterminate	Indeterminate
5	Complete or nearly complete Tarsal indet.	Left	Indeterminate	Indeterminate
5	Complete or nearly complete Tarsal indet.	Right	Indeterminate	Indeterminate

Quantity	Element	Side	Age	Sex
1	Nearly complete Temporal	Left	Indeterminate	Indeterminate
1	Nearly complete Temporal	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 10	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 11	Axial	Indeterminate	Indeterminate
1	Complete or nearly complete Thoracic vertebra 12	Axial	Indeterminate	Indeterminate
9	Complete or nearly complete Thoracic vertebra indet.	Axial	Indeterminate	Indeterminate
1	Complete minus dist. epiphysis Tibia	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Tibia	Right	Indeterminate	Indeterminate
1	Complete or nearly complete Ulna	Left	Indeterminate	Indeterminate
1	Complete or nearly complete Ulna	Right	Indeterminate	Indeterminate
1	Complete Zygomatic	Left	Indeterminate	Indeterminate
1	Complete Zygomatic	Right	Indeterminate	Indeterminate

Burial 36

Quantity	Element	Side	Age	Sex
20	Frag. Cranial fragment indet.	Indeterminate	Indeterminate	Indeterminate
1	Lower C Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Lower C Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Lower I1 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Lower I2 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Lower PM3 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Lower PM3 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Lower PM4 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Lower PM4 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper C Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper C Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Upper I1 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper I1 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Upper I2 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Upper PM3 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
1	Upper PM3 Deciduous tooth	Left	Infant (0-2 years)	Indeterminate
1	Upper PM4 Deciduous tooth	Right	Infant (0-2 years)	Indeterminate
2	Diaphyseal frag. Femur	Indeterminate	Infant (0-2 years)	Indeterminate
2	Diaphyseal frag. Humerus	Indeterminate	Infant (0-2 years)	Indeterminate
1	Complete or nearly complete Incus	Left	Infant (0-2 years)	Indeterminate
2	Diaphyseal frag. Long bone indet.	Indeterminate	Infant (0-2 years)	Indeterminate
1	Complete or nearly complete Malleus	Left	Infant (0-2 years)	Indeterminate
1	Horiz. ramus portion Mandible	Right	Infant (0-2 years)	Indeterminate
1	Horiz. ramus portion Mandible	Axial	Indeterminate	Indeterminate
1	Post. aspect Occipital	Indeterminate	Infant (0-2 years)	Indeterminate
1	Nearly complete Parietal	Left	Infant (0-2 years)	Indeterminate
1	Nearly complete Parietal	Right	Infant (0-2 years)	Indeterminate
2	Shaft frag. Rib indet.	Indeterminate	Infant (0-2 years)	Indeterminate
1	Lateral aspect Temporal	Left	Infant (0-2 years)	Indeterminate
3	Diaphyseal frag. Tibia	Indeterminate	Infant (0-2 years)	Indeterminate
4	Centrum Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate
7	Neural area only Vertebra indet.	Axial	Infant (0-2 years)	Indeterminate

APPENDIX IV,
Measurements by Individual (in millimeters)

Sharon M. Derrick, Gail R. Colby, and D. Gentry Steele

Burial 24, Male, 30-35

Right Femur	
Max. Diam. Head	45.0

Burial 25, Indeterminate, 40-55

Right Patella	
Length	39.0
Breadth	43.0
Left Fibula	
Midshaft Diam.	17.0
Max. Circum.	46.0

Burial 26b, Female, 20-24

Left Humerus	
Max. Length	294.0
Max. Diam. Head	42.0
Min. Circum. Diaph.	57.0
Min. Diam. Diaph.	15.5
Left Ulna	
Min. Circum. Diaph.	30.0
Min. Diam. Diaph.	10.0
Mid. Circum. Diaph.	48.0
Left Femur	
Midshaft Circum.	82.0
Max. Diam. Head	40.0
M-L Subtroch. Diam.	30.0
A-P Subtroch. Diam.	24.0
A-P Diam. Distal	27.0
Right Femur	
Midshaft Circum.	83.0
Max. Diam. Head	40.0
M-L Diam. Distal	26.0
A-P Diam. Distal	27.0

Burial 27b, Female, Young Adult

Mandible	
Body Height	28.0
Body Thickness	11.0
Go-Go	90.0
Lt. Min. Ramus Brdth.	30.0
Rt. Min. Ramus Brdth.	30.0
Lt. Max. Ramus Brdth.	31.0
Rt. Max. Ramus Brdth.	31.0
Max. Ramus Height	54.5
Mandibular Length	75.0
Lt. Gonial Angle	130 degrees
Rt. Gonial Angle	130 degrees
Left Humerus	
Max. Diam. Diaph.	19.0
Min. Diam. Diaph.	15.5
Min. Circum. Diaph.	55.0

Burial 28, Commingled (elements could be from different individuals)

Mandible	
Body Height	27.0
Body Thickness	12.5
Sternum	
Max. Breadth	19.0
Left Humerus	
Max. Diam. Head	41.0
Left Patella	
Length	42.0
Breadth	42.5
Left Femur	
Max. Diam. Head	43.0
Vert. Min. Diam. Neck	42.0
A-P Diam. Neck	25.0
M-L Subtroch. Diam.	32.0
A-P Subtroch. Diam.	22.0

Right Femur	
M-L Subtroch. Diam.	31.0
A-P Subtroch. Diam.	22.0
A-P Diam. Distal	32.0
M-L Diam. Midshaft	23.0
A-P Diam. Midshaft	26.0
Midshaft Circum.	84.0
Left Tibia	
Max. Length	364.0
M-L Diam.	20.0
A-P Diam.	33.0
Prox. Epiph. Max. B	69.0
Circum. Nutr. Foramen	90.0
Right Tibia	
M-L Diam.	20.0
A-P Diam.	33.0
Circum. Nutr. Foramen	90.0
Left Fibula	
Midshaft Diam.	15.0
Right Fibula	
Midshaft Diam.	15.0
Left Calcaneus	
Max. Length	73.5
Min. Width	26.0
Body Height	42.0
Load Arm Length	47.0
Load Arm Width	40.0
Right Calcaneus	
Max. Length	72.5
Min. Width	25.5
Body Height	41.0
Load Arm Length	46.0
Load Arm Width	40.0
Left Talus	
Max. Length	57.0
Width	43.0
Body Height	30.0
Max. Length Troch.	40.0
Max. Width Troch.	32.0
Right Talus	
Max. Length	53.0
Width	43.0
Body Height	27.0
Max. Length Troch.	40.0
Max. Width Troch.	31.0

Burial 29, Subadult, Birth ± 2 Months

Metacarpal 1	10.0
Malleus	7.6

Burial 30, Male, 17-23

Cranium	
Eu-Eu	136.0
Zy-Zy	136.0
Ba-Br	136.0
Ecm-Ecm	65.0
Mandible	
Gn-Id	38.0
Go-Go	93.5
Max. Ramus Height Lt.	59.5
Rt. Gonial Angle	112 degrees
Left Clavicle	
Max. Length	140.0
Acrom. Max. Breadth	25.0
Stern. Max. Breadth	18.0
Midshaft Circum.	32.0
Midshaft Breadth	10.0
Right Clavicle	
Max. Length	138.0
Acrom. Max. Breadth	22.5
Stern. Max. Breadth	18.0
Midshaft Circum.	34.0
Midshaft Breadth	11.0
Right Scapula	
Breadth	96.5
Spine Length	125.5
Left Humerus	
Max. Length	305.5
Vert. Min. Diam. Head	35.0
Max. Diam. Head	42.0
Max. Diam. Diaphysis	18.0
Min. Diam. Diaphysis	15.0
Min. Circum. Diaph.	55.0

Mid. Circum. Diaph.	55.0
Right Humerus	
Max. Length	302.0
Vert. Min. Diam. Head	34.0
Max. Diam. Head	41.5
Max. Diam. Diaphysis	17.5
Min. Diam. Diaphysis	15.0
Min. Circum. Diaph.	53.0
Mid. Circum. Diaph.	53.0
Left Radius	
Max. Length	239.0
Max. Diam. Diaphysis	11.5
Min. Diam. Diaphysis	9.0
Min. Circum. Diaph.	35.0
Mid. Circum Diaph.	36.0
Right Radius	
Max. Length	238.5
Max. Diam. Diaphysis	12.0
Min. Diam. Diaphysis	10.0
Min. Circum. Diaph.	34.0
Mid. Circum. Diaph.	34.0
Left Ulna	
Max. Length	257.0
Max. Diam. Diaphysis	13.0
Min. Diam. Dipahysis	11.0
Min. Circum. Diaph.	38.0
Mid. Circum. Diaph.	39.0
Right Ulna	
Max. Length	257.0
Max. Diam. Diaphysis	13.0
Min. Diam. Diaphysis	11.0
Min. Circum. Diaph.	39.0
Mid. Circum. Diaph.	40.0
Left Femur	
Max. Length	439.5
Oblique Length	433.0
Max. Diam. Head	44.0
A-P Subtroch. Diam.	22.0
M-L Subtroch. Diam.	26.5
A-P Diam. Midshaft	24.0
M-L Diam. Midshaft	23.0
Epicondylar Width	76.0
Midshaft Circum.	78.0
Right Femur	
Max. Length	438.0
Oblique Length	434.0
Max. Diam. Head	45.0
A-P Subtroch. Diam.	23.0
M-L Subtroch. Diam.	27.0
A-P Diam. Midshaft	24.5
M-L Diam. Midshaft	24.0
Midshaft Circum.	82.0
Left Tibia	
Max. Length	363.0
A-P Diam.	35.0
M-L Diam.	21.0
Circum. Nutr. Foramen	89.0
Right Tibia	
Max. Length	359.0
A-P Diam.	34.0
M-L Diam.	21.0
Circum. Nutr. Foramen	91.0
Left Fibula	
Midshaft Diam.	14.5
Max. Circum.	40.0
Right Fibula	
Max. Length	345.0
Midshaft Diam.	14.5
Max. Circum.	38.0
Left Calcaneus	
Max. Length	75.0
Min. Width	27.5
Body Height	47.0
Load Arm Height	47.0
Load Arm Width	39.0
Right Calcaneus	
Max. Length	75.0
Min. Width	26.5
Body Height	49.0
Load Arm Length	47.5
Load Arm Width	38.0
Left Talus	
Max. Length	51.0
Width	39.5
Body Height	32.0

Max. Length Troch.	37.0
Max. Width Troch.	31.0

Burial 31, Female, Early to Late 30s

Cranium

Gl-Op	165.0
Eu-Eu	145.0
Zy-Zy	126.0
Ba-Br	131.0
Ba-N	110.0
Ba-Pr	110.0
Ecm-Ecm	64.0
Pr-Alv	57.0
Enm-Enm	43.0
Stn-Ol	46.0
Biauricular Breadth	100.0
N-Pr	64.0
Ft-Ft	93.0
N-Ns	48.0
Al-Al	26.0
Left Orbiral Brdth.	42.0
Right Orbital Brdth.	42.0
Left Orbital Ht.	40.0
Right Orbital Ht.	39.0
Ec-Ec	140.0
Mf-Mf	24.0
N-B	120.0
Ba-O	40.0
Foram. Magnum Brdth.	32.0
Lt. Mastoid Length	29.0
Rt. Mastoid Length	28.0
N-Gn	106.0
Po-N	111.0
Po-Br	128.0
Po-L	123.0

Mandible

Gn-Id	34.0
Body Height	29.5
Body Thickness	13.5
Bimental Foram. Chrd.	49.0
Go-Go	88.0
Cdl-Cdl	126.0
Lt. Min. Ramus Brdth.	36.0
Rt. Min. Ramus Brdth.	36.0
Lt. Max. Ramus Brdth.	39.5
Rt. Max. Ramus Brdth.	40.5
Max. Ramus Height	56.5
Mandibular Length	84.0
Lt. Gonial Angle	114 degrees
Rt. Gonial Angle	114 degrees

Right Clavicle

Max. Length	144.0
Max. Diam.	17.0
Acrom. Max. Breadth	19.0
Stern. Max. Breadth	22.5

Left Scapula

Glenoid Breadth	23.0
Glenoid Length	34.0

Right Scapula

Glenoid Breadth	22.0
Glenoid Length	36.0

Left Humerus

Max. Length	306.0
Epicondylar Brdth.	52.0
Max. Circum. Diaph.	64.0
Min. Circum. Diaph.	60.0
Olecranon Fossa Wth.	24.0
Min. Diam. Diaph.	17.0

Right Humerus

Max. Length	313.0
Epicondylar Brdth.	52.5
Max. Diam. Head	44.0
Max. Circum. Diaph.	63.0
Min. Circum. Diaph.	60.0
Olecranon Fossa Wth.	22.5
Min. Diam. Diaph.	17.0

Left Radius

Max. Length	236.0
Max. Circum. Diaph.	43.0
Max. Diam. Head	21.0
Max. Distal Breadth	29.5

Right Radius

Max. Circum. Diaph.	46.0
Max. Diam. Head	20.5
Max. Distal Breadth	32.0

Left Ulna

Max. Length	261.0 (excluding styloid)
Min. Diam. Diaph.	11.0

Min. Circum. Diaph.	38.0
Mid. Circum. Diaph.	47.0
Coronoid Height	20.0

Right Ulna

Max. Length	268.0 (including styloid)
Max. Length	264.0 (excluding styloid)
Min. Diam. Diaph.	10.0
Min. Circum. Diaph.	37.0
Mid. Circum Diaph.	46.0
Coronoid Height	19.0

Sacrum

Anterior Length	97.0
Ant. Surface Brdth.	119.5

Left Os Coxa

Iliac Breadth	129.0
Iliac Height	131.0
ischium Length	64.0
Sciatic Notch Width	65.0
Acetabular Height	50.0

Right Os Coxa

Iliac Breadth	128.5
Iliac Height	128.0
Ischium Length	64.5
Sciatic Notch Width	68.0
Acetabular Height	53.5

Left Femur

Max. Diam. Head	42.5
Min. Diam. Neck	27.5
A-P Diam. Neck	26.0
Midshaft Circum.	86.0
M-L Subtroch. Diam.	30.5
A-P Subtroch Diam.	24.0
M-L Diam. Midshaft	26.5
A-P Diam. Midshaft	27.0
Prox. End Width	82.0

Right Femur

Max. Length	423.0
Max. Diam. Head	42.0
Min. Diam. Neck	27.0
A-P Diam. Neck	23.0
Midshaft Circum.	85.0
M-L Subtroch. Diam.	29.5
A-P Subtroch. Diam.	25.0
M-L Diam. Midshaft	24.0
A-P Diam. Midshaft	26.5
Prox. End Width	81.0

Left Tibia

Max. Length	373.0
M-L Diam.	23.0
A-P Diam.	32.0
Dist. Epiph. A-P Diam.	37.0
Dist. Epiph. Max. Brd.	51.0
Circum. Nutr. Foramen	91.0

Right Tibia

Max. Length	374.0
M-L Diam.	22.5
A-P Diam.	31.0
Dist. Epiph. A-P Diam.	36.0
Dist. Epiph. Max. Brd.	49.5
Circum. Nutr. Foramen	88.0

Left Fibula

Max. Length	354.0

Right Fibula

Max. Length	357.0
Midshaft Diam.	13.5

Left Calcaneus

Max. Length	72.0
Min. Width	27.0
Body Height	40.0
Load Arm Length	43.5
Load Arm Width	39.5

Left Talus

Max. Length	52.0
Width	38.5
Body Height	29.5
Max. Length Troch.	33.0
Max. Width Troch.	32.0

Burial 32, Female, 45-49

Left Patella

Length	38.0
Breadth	38.0

Left Femur

M-L Subtroch. Diam.	28.0
A-P Subtroch. Diam.	24.5
M-L Diam. Midshaft	26.0
A-P Diam. Midshaft	28.0
Midshaft Circum.	84.0

Right Femur

Max. Length	413.0
Oblique Length	408.0
M-L Subtroch. Diam.	29.0
A-P Subtroch. Diam.	25.0
M-L Diam. Midshaft	24.0
A-P Diam. Midshaft	27.5
Midshaft Circum.	82.0
Bicondylar Width	69.0
Intercondylar Notch	17.0

Burial 33, Male, 25-35

Cranium

Gl-Op	174.0
Eu-Eu	139.0
Ecm-Ecm	61.0
Enm-Enm	47.0
Ft-Ft	110.0
Al-Al	27.0
Parietal Chord	115.5
Left Mastoid Length	43.0
Po-Br	134.0
Po-L	120.0

Mandible

Body Height	37.5
Body Thickness	18.5
Max. Ramus Height	53.0
Mandibular Length	97.0
Rt. Gonial Angle	121 degrees

Left Scapula

Glenoid Breadth	29.0
Glenoid Length	39.0
Spine Length	14.0

Left Humerus

Max. Length	299.0
Max. Diam. Head	41.0
Max. Diam. Diaph.	22.0
Min. Diam. Diaph.	21.0
Min. Circum. Diaph.	66.0
Mid. Circum Diaph.	69.0

Right Humerus

Max. Length	308.2 $\pm$ 12.3 (estimated)
Max. Diam. Diaph.	22.0
Min. Diam. Diaph.	20.5
Min. Circum. Diaph.	67.0
Mid. Circum. Diaph.	68.0

Left Radius

Max. Length	238.0
Min. Circum.	44.0
Mid. Circum.	44.5
Min. Diam. Diaph.	11.0

Right Radius

Max. Length	245.0
Min. Circum.	45.0
Mid. Circum.	47.0
Min. Diam. Diaph.	11.0

Left Ulna

Max. Length	255.0 (excluding styloid)
Min. Circum. Diaph.	36.0
Mid. Circum. Diaph.	50.0
Min. Diam. Diaph.	12.0

Right Ulna

Max. Length	257.0 (excluding styloid)
Min. Circum. Diaph.	37.0
Mid. Circum. Diaph.	52.0
Min. Diam. Diaph.	11.5

Sacrum

Max. S-l Breadth	57.0

Left Os Coxa

Iliac Breadth	154.0
Iliac Height	137.0
Ischium Length	71.0
Sciatic Notch Width	67.0

Right Os Coxa

Iliac Height	136.0
Ischium Length	73.0
Sciatic Notch Width	66.5

Left Patella	
Length	41.0
Breadth	44.0
Right Patella	
Length	39.0
Breadth	42.0
Left Femur	
Max. Length	414.0
Oblique Length	402.5
Max. Diam. Head	45.5
M-L Subtroch. Diam.	32.5
A-P Subtroch. Diam.	24.0
Epicondylar Width	78.5
M-L Midshaft Diam.	27.5
A-P Midshaft Diam.	28.0
Midshaft Circum.	87.0
Right Femur	
Max. Length	415.0
Oblique Length	405.0
Max. Diam. Head	45.5
M-L Subtroch. Diam.	31.0
A-P Subtroch. Diam.	24.5
M-L Midshaft Diam.	27.0
Midshaft Circum.	85.0
Left Tibia	
Max. Length	350.0
M-L Diam.	23.0
A-P Diam.	34.5
Prox. Epiph. A-P Diam.	51.0
Prox. Epiph. Max. Brd.	76.0
Dist. Epiph. A-P Diam.	40.0
Circum. Nutr. Foramen	93.0
Right Tibia	
Max. Length	352.0
M-L Diam.	25.0
A-P Diam.	34.5
Prox. Epiph. A-P Diam.	53.0
Prox. Epiph. Max. Brd.	74.0
Dist. Epiph. A-P Diam.	40.0
Dist. Epiph. Max. Brd.	46.5
Circum. Nutr. Foramen	93.0
Left Fibula	
Max. Circum.	45.0
Right Fibula	
Max. Circum.	45.0
Left Calcaneus	
Max. Length	77.0
Min. Width	30.0
Body Height	43.5
Load Arm Length	53.0
Load Arm Width	42.0
Right Calcaneus	
Max. Length	76.5
Min. Width	30.0
Height	43.5
Load Arm Length	52.5
Load Arm Width	39.5

Burial 34A, Male, Late 40s to Mid-50s

Cranium	
Gl-Op	175.0
Eu-Eu	132.0
Mandible	
Cdl-Cdl	134.0 (damaged)
Body Height	26.5
Max. Ramus Height	61.9
Mandibular Length	105.0
Left Humerus	
Min. Diam. Diaph.	21.1
Min. Circum. Diaph.	65.0
Right Humerus	
Max. Length	312.0
Max. Diam. Head	41.4
Min. Diam. Diaph.	21.4
Min. Circum. Diaph.	65.0
Left Radius	
Max. Circum. Diaph.	42.0
Min. Diam. Diaphysis	10.5
Right Radius	
Max. Circum. Diaph.	45.0
Min. Diam. Diaphysis	11.0

Left Ulna

Min. Diam. Diaph.	11.6
Max. Circum. Diaph.	47.0

Right Ulna

Min. Diam. Diaph.	11.2
Max. Circum. Diaph.	48.0

Right Os Coxa

Ischium Length	76.1
Sciatic Notch Width	35.6
Acetabular Height	51.5

Left Femur

M-L Subtroch. Diam.	24.9
A-P Subtroch. Diam.	23.8
M-L Diam. Midshaft	25.0
A-P Diam. Midshaft	29.4
Midshaft Circum.	89.0

Right Femur

Max. Length	440.0
Oblique Length	420.0
Bicondylar Width	76.8
Max. Diam. Head	45.4
M-L Subtroch. Diam.	23.1
A-P Subtroch. Diam.	23.0
M-L Diam. Midshaft	24.3
A-P Diam. Midshaft	28.8
Midshaft Circum.	86.5

Burial 35, Female, 30-35

Cranium (warping of skull is present)

Gl-Op	172.0
Eu-Eu	131.0
Ft-Ft	84.0
Ba-B	137.0
Ba-N	93.5
Zy-Zy	129.0
Ba-Ids	100.0
Ids-N	73.0
Orbit Ht. Lt.	37.0
Orbit Ht. Rt.	37.0
Mf-Ec Lt.	39.0
Mf-Ec Rt.	38.5
N-Ns	52.5
Al-Al	32.5
Pr-Alv	51.5
Ecm-Ecm	66.5
Enm-Enm	41.0
Mf-Mf	23.0
Lt. Mastoid Length	27.5
Rt. Mastoid length	mastoid incomplete

Mandible

Gn-Id	33.0
Body Height	22.0
Go-Cdl	55.0
Go-Gn	75.0
Go-Go	95.0
Cdl-Cdl	123.5
Body Brdth. Lt.	17.5
Body Brdth. Rt.	17.5
Ramus Brdth. Lt.	34.0
Ramus Brdth. Rt.	35.0
Ec-Ec	99.0
N-B	115.5 (chord)
Lt. Gonial Angle	118 degrees

Left Clavicle

Max. Length	138.0
Midsagit. Diam.	10.0
Mid. Vert. Diam.	7.0
Midshaft Circum.	28.0
Acrom. Max. Breadth	24.3
Stern. Max. Breadth	20.5

Right Clavicle

Max. Length	136.5
Midsagit. Diam.	9.0
Mid. Vert. Diam.	7.5
Midshaft Circum.	28.5
Acrom. Max. Breadth	21.5
Stern. Max. Breadth	24.0

Manubrium

Max. Length	42.5

Sternum

Max. Length	123.5
Max. Width	40.5

Left Humerus

Max. Length	304.0
Vert. Min. Diam. Head	32.5
Max. Diam. Head	41.0
Min. Circum. Diaph.	58.0
Mid. Circum. Diaph.	59.0

Mid. Min. Diam. Diaph.	15.0
Mid. Max. Diam. Diaph.	21.0
Right Humerus	
Max. Length	312.5
Vert. Min. Diam. Head	33.0
Max. Diam. Head	41.5
Min. Circum. Diaph.	57.5
Mid. Circum. Diaph.	58.0
Mid. Min. Diam. Diaph.	15.0
Mid. Max. Diam. Diaph.	21.0
Epicondylar Brdth.	56.5
Articular Brdth.	37.0
Left Radius	
Max. Length	235.5
Min. Circum.	39.0
Mid. Circum.	43.0
Mid. Min. Diam.	11.0
Mid. Max. Diam.	15.5
Right Radius	
Max. Length	235.0
Min. Circum.	39.0
Mid. Circum.	41.5
Mid. Min. Diam.	11.0
Mid. Max. Diam.	15.0
Left Ulna	
Max. Length	256.0
Phys. Length	227.0
Min. Circum. Diaph.	33.0
Mid. Circum. Diaph.	42.0
Mid. Min. Diam. Diaph.	10.0
Mid. Max. Diam. Diaph.	14.5
Right Ulna	
Max. Length	257.0
Phys. Length	225.0
Min. Circum. Diaph.	45.0
Mid. Min. Diam. Diaph.	11.5
Mid. Max. Diam. Diaph.	16.5
Sacrum	
Max. Breadth	123.0
Left Os Coxa	
Max. Height	208.5
Iliac Height	123.7
Ischium Length	86.0
Pubis Length	88.6
Acetabular Height	52.0
Right Os Coxa	
Max. Height	209.0
Max. Breadth	142.0
Iliac Breadth	142.0
Iliac Height	124.0
ischium Length	90.5
Pubis Length	90.2
Sciatic Notch Width	50.0
Acetabular Height	51.0
Left Femur	
Max. Diam. Head	42.0
Epicond. Width	73.0
Right Femur	
Max. Length	429.0
Oblique Length	426.0
Max. Diam. Head	42.0
M-L Subtroch. Diam.	31.0
A-P Subtroch. Diam.	23.0
Midshaft Circum.	82.0
M-L Diam. Midshaft	26.0
A-P Diam. Midshaft	26.5
Left Tibia	
Dist. Epiph. Max. Brd.	40.0
M-L Diam.	22.0
A-P Diam.	32.5
Circum.	91.0
Right Tibia	
Max. Length	370.5
Circum.	90.0
M-L Diam.	23.0
A-P Diam.	33.0
Bicondylar Breadth	67.0
Dist. Epiph. Max. Brd.	43.0
Left Fibula	
Max. Length	353.0
Max. Circum.	41.0
Midshaft Diam.	15.0
Right Fibula	
Max. Length	357.5
Max. Circum.	41.0
Midshaft Diam.	15.0

Left Calcaneus	
Max. Length	76.0
Min. Width	27.0
Body Height	45.0
Load Arm Length	41.0
Load Arm Width	40.0
Right Calcaneus	
Max. Length	75.0
Min. Width	27.0
Body Height	45.0
Load Arm Length	41.0
Load Arm Width	41.0
Left Talus	
Max. Length	48.0
Width	41.5
Body Height	35.2
Max. Length Troch.	31.0
Max. Width Troch.	30.0
Right Talus	
Max. Length	48.0
Width	42.0
Body Height	38.0
Max. Length Troch.	31.0
Max. Width Troch.	30.5

Burial 36, Subadult, 9 ± 3 Months

Left Malleus	
Max. Length	6.0
Left Incus	
Max. Length	6.0
Max. Width	5.0

APPENDIX V,
Dental Measurements and Wear Scores

Sharon M. Derrick, Gail R. Colby, and D. Gentry Steele

Burial Number	Maxillary	Mandibular	Mesio-Distal	Bucco-Lingual	Height	Wear Score*
24	LM-2		10.30	12.88	5.78	2
24	LM-3		10.00	12.32	5.70	2
24	RP-4		**	**	**	**
24	RM-1		**	**	**	**
24	RM-2		10.75	12.95	6.25	2
24	RM-3		9.65	12.05	6.55	2
24		LP-4	7.10	8.52	6.12	3
24		LM-1	11.60	11.02	5.67	22
24		LM-2	10.75	10.53	5.15	20
24		LM-3	12.05	11.40	6.75	15
24		RP-3	7.10	8.82	6.15	4
24		RP-4	7.40	8.61	6.33	3
24		RM-1	11.75	11.18	6.18	18
24		RM-2	10.26	11.40	5.53	17
24		RM-3	11.30	11.00	5.93	16
25		Ll-2	5.33	6.62	5.80	5
25		LM-3	9.10	10.33	5.07	16
25		RC	7.34	8.33	7.60	5
26A	Rl-2		5.50	5.50	10.00	1
26B		LC	7.00	8.00	5.0	5
26B		Rl-1	3.50	5.50	2.50	6
26B		RM-2	11.00	11.00	7.00	17
27A	Ll 1		7.70	6.63	9.93	1
27A	Ll-2		6.63	6.42	9.68	2
27A	LP-3		7.40	9.40	8.43	2
27A	LP-4		7.95	9.07	7.58	1
27A	LM-1		11.20	11.93	7.58	11
27A	LM-2		10.15	10.88	7.60	9
27A	LM-3		8.42	9.95	7.02	4
27A	Rl-2		6.93	6.48	9.97	2
27A		Ll-1	5.62	5.80	9.23	2
27A		LM-1	11.87	11.18	6.40	**
27A		LM-2	11.35	10.28	6.53	9
27A		LM-3	10.37	9.40	7.18	4
27A		RM-1	12.10	10.92	6.80	**
27A		RM-2	11.45	9.98	7.28	8
27A		RM 3	10.30	9.12	7.33	4
27B	LC		8.02	8.55	8.25	4

Burial Number	Maxillary	Mandibular	Mesio-Distal	Bucco-Lingual	Height	Wear Score*
27B	LP-4		**	**	7.33	**
27B	LM-1		9.72	11.05	6.07	19
27B	Rl-1		8.56	7.17	7.80	4
27B	Rl 2		7.37	6.87	7.18	4
27B	RC		7.70	8.28	7.40	4
27B	RP 3		6.77	9.35	7.10	4
27B	RP-4		**	**	**	**
27B		Ll-1	5.35	5.78	7.97	4
27B		LC	8 18	8.60	7.48	4
27B		LP-4	6.58	7.98	6.65	2
27B		Rl-1	5.02	5.53	6.37	5
27B		Rl-2	6.12	6.15	6.60	5
28	Ll-2		5.28	4.97	6.50	5
28	LC		8.07	8.95	7.10	5
28	LP-3		7.22	10.00	6.65	3
28	LP-4		6.63	9.42	6.25	4
28	LM-1		10.42	7.00	6.32	22
28		LP-3	**	8.38	5.97	2
28		Rl-1	5.55	5.60	9.17	2
28		RC	7.55	8.15	9.63	4
28		RP-4	6.52	7.92	7.22	3
28		RM-1	11.18	11.97	7.55	8
28		P-?	6.67	7.68	4.28	6
28 LOOSE	LP-?		7.75	9.12	8.23	1
28 LOOSE	RM-1		10.15	10.83	7.32	16
28 LOOSE	Rl-2		5.85	6.50	6.83	4
28 LOOSE	RC		6.87	7.60	8.27	5
30	RP-3		6.65	9.40	7.61	4
30	RP-4		6.40	9.35	7.40	3
30	Ll-1		8.80	7.90	10.85	3
30	Ll-2		7.10	6.60	10.20	2
30	LC		7.79	9.19	9.40	2
30	LP-3		6.55	9.20	7.90	2
30	LP-4		7.25	9.45	8.50	3
30	LM-1		10.15	11.15	8.05	19
30	LM-2		9.50	11.80	8.60	12
30	LM-3		8.80	10.55	5.85	9
30	Rl-1		8.55	7.25	10.05	4
30	Rl-2		7.10	6.90	8.95	4
30	RC		7.90	9.20	9.55	4
30	RP-3		6.65	9.40	7.60	4
30	RP-4		6.40	9.35	7.40	3
30	RM-1		10.70	11.15	7.35	21
30	RM-2		10.90	11.75	8.35	13
30	RM-3		10.20	11.65	6.65	6

Burial Number	Maxillary	Mandibular	Mesio-Distal	Bucco-Lingual	Height	Wear Score*
30		Ll-1	5.35	6.10	7.65	4
30		Ll-2	6.25	6.55	9.00	4
30		LC	7.05	8.25	10.60	3
30		LP-3	7.50	7.40	8.60	3
30		LP-4	7.25	8.25	7.80	2
30		LM-1	**	**	**	**
30		LM-2	11.30	10.50	7.40	14
30		LM-3	10.55	11.65	7.10	6
30		L-SUPERNUM	3.20	4.80	3.80	0
30		Rl-1	5.30	6.15	7.35	4
30		Rl-2	5.90	6.60	7.50	4
30		RC	7.00	8.10	9.25	4
30		RP-3	7.00	7.20	7.00	4
30		RP-4	7.00	8.25	6.15	3
30		RM-1	10.95	10.55	5.85	18
30		RM-2	11.55	10.45	6.60	17
30		RM-3	11.35	10.00	6.90	7
31	Ll-1		8.10	6.77	7.72	4
31	Ll-2		**	**	**	**
31	LC		**	**	**	**
31	LP-3		**	**	**	**
31	LP-4		6.18	8.98	6.23	2
31	LM-1		10.23	11.03	6.80	14
31	Rl-2		6.78	6.08	6.18	4
31	RC		**	**	**	**
31	RP-3		**	**	**	**
31	RP-4		6.43	8.95	5.98	4
31		Ll-1	4.62	5.68	5.70	5
31		Ll-2	6.25	6.33	6.52	4
31		LC	6.98	7.21	9.12	4
31		LP-3	6.55	7.65	5.68	4
31		LM-3	10.93	10.75	6.55	17
31		Rl-1	4.60	5.63	4.57	5
31		Rl-2	5.97	6.00	4.77	5
31		RC	6.27	7.52	7.27	5
31		RP-3	6.48	8.38	5.90	4
31		RP-4	6.47	7.97	5.20	3
31		RM-2	11.38	10.07	6.23	13
32	Ll-1		6.08	6.45	7.42	4
32	LP-3		6.13	10.03	6.48	6
			7.03	8.95	6.00	6
33	Ll-1		7.60	6.77	6.67	6
33	LC		7.12	8.02	9.30	4

Burial Number	Maxillary	Mandibular	Mesio-Distal	Bucco-Lingual	Height	Wear Score*
33	RC		7.03	8.95	6.00	6
33		Ll-2	4.87	6.58	6.46	5
33		LC	7.37	9.00	8.63	4
33		LP-3	6.85	7.52	6.58	4
33		LP-4	6.58	7.63	5.80	3
33		LM-2	10.82	10.55	5.97	18
33		LM-3	10.40	10.15	5.60	16
33		R1-1	4.15	5.67	4.28	5
33		Rl-2	5.17	6.50	5.62	5
33		RC	6.95	7.92	8.33	5
33		RP-3	6.68	7.15	7.20	3
33		RP-4	**	**	**	**
33		RM-3	10.73	10.22	5.57	17
34A	Ll-1		**	**	**	**
34A	LP-4		5.98	7.73	5.33	4
34A	LM-3		7.82	10.13	4.90	25
34A	Rl-1		**	**	**	**
34A	RP-4		5.88	7.24	4.43	6
34A		Ll-1	3.85	4.70	2.65	6
34A		Ll-2	4.33	5.55	3.90	6
34A		LM-1	11.30	10.55	6.40	14
34A		LM-3	9.75	10.28	4.88	21
34A		RC	6.21	7.25	4.38	5
35	Ll-1		8.40	7.10	7.05	5
35	Ll-2		7.05	6.95	6.45	5
35	LC		8.35	8.80	6.45	5
35	LP-3		7.40	10.20	6.35	5
35	LP-4		7.00	10.00	7.15	4
35	LM-2		10.75	12.15	6.40	19
35	LM-3		6.25	8.90	3.80	14
35	Rl-1		9.00	7.00	7.70	5
35	Rl-2		7.25	6.75	7.20	5
35	RC		7.55	8.80	6.75	5
35	RP-3		7.25	10.35	6.00	5
35	RP-4		**	**	**	**
35	RM-1		**	**	**	**
35	RM-2		10.75	11.80	5.10	20
35		Ll-1	4.45	5.20	4.50	5
35		Ll-2	5.25	6.20	4.25	5
35		LC	6.75	7.75	5.70	5
35		LP-3	6.45	8.25	4.75	6
35		LP-4	7.15	8.75	5.15	4
35		LM-2	**	**	**	**
35		LM-3	9.85	10.55	4.70	14
35		Rl-1	4.45	5.60	4.55	5

Burial Number	Maxillary	Mandibular	Mesio-Distal	Bucco-Lingual	Height	Wear Score*
35		Rl-2	5.20	6.10	5.30	5
35		RC	6.85	7.75	7.20	5
35		RP-3	6.75	7.85	6.05	5
35		RP-4	7.15	8.60	4.95	2
35		RM-3	10.50	10.40	5.35	17

*Molar tooth wear is scored after Scott (1979). All other teeth are scored after Smith (1984)
**= Not Measureable

APPENDIX VI,
Non-Metric Trait Summary

Sharon M. Derrick, Gail R. Colby, and D. Gentry Steele

Trait	B24 Male	B26b Female	B27b Female	B28 Commingled	B30 Male	B31 Female
Inca Bone	O Unsided	O Unsided	9 Unsided	O Unsided	O Unsided	O Unsided
Suprameatal Pit	OL, OR	9L, 9R	OL, 9R	OL, 9R	OL, OR	OL, OR
Auditory Exostosis	OL, 1R	9L, 9R	OL, 9R	OL, 9R	OL, OR	OL, OR
Tympanic Dehiscence	OL, OR	9L, 9R	OL, 9R	1L, 9R	OL, OR	OL, OR
Mandibular Torus	2L, 2R	9L, 9R	2L, 1R	9L, 2R	1L, 1R	2L, 2R
Mental Foramen	1L, 1R	9L, 9R	9L, 1R	9L, 1R	1L, 1R	1L, 1R
Mylohyoid Bridge	OL, OR	9L, 9R	OL, OR	9L, 1R	OL, OR	OL, OR
Genial Tubercles	2, Type 3	9 Unsided	2, Type 3	2, Type 4	2, Type 3	2, Type 3
Subclavian Facet	9L, 1R	1L, 1R	9L, 9R	9L, 9R	9L, 1R	9L, 1R
Glenoid Fossa Extension	OL, OR	OL, 9R	OL, 9R	OL, OR	1L, 1R	1L, 1R
Septal Aperture	9L, 9R	1L, 9R	OL, 9R	9L, 9R	OL, OR	2L, OR
Pect./Teres Major Impression	9L, 9R	OL, 9R	1L, 9R	9L, OR	OL, 1R	9L, OR
Trochlear Notch Form	9L, 2R	1L, 2R	3L, 9R	3L, 9R	1L, 1R	3L, 2R
Third Trochanter	OL, OR	OL, 9R	9L, 9R	1L, 1R	OL, OR	OL, OR
Femoral Neck Depression	9L, OR	9L, 9R	9L, 9R	OL, 9R	OL, OR	OL, OR
Poirer's Facet	9L, OR	OL, OR	9L, 9R	OL, 9R	OL, OR	OL, OR
Hyp. Trochanteric Fossa	OL, OR	OL, 9R	9L, 9R	lL, 1R	OL, OR	OL, OR
Trochlear Fossa Spicules	1L, 2R	2L, 9R	9L, 9R	1L, 9R	OL, OR	OL, OR
Bipartite Patella	OL, 9R	9L, 9R	9L, 9R	OL, 9R	OL, OR	9L, 9R
Vastus Notch	OL, 9R	9L, 9R	9L, 9R	OL, 9R	OL, OR	9L, 9R
Vastus Fossa	OL, 9R	9L, 9R	9L, 9R	OL, 9R	OL, OR	9L, 9R
Preauricular Sulcus	OL, 1R	lL, 1R	9L, 9R	1L, lR; 1L, 1R	1L, 1R	OL, OR
Acetabular Crease	9L, 9R	OL, 9R	9L, 9R	9L, 9R	OL, OR	OL, OR

L=Left, R=Right, O=Absent, 1=Present, 2=Multiple or Marked Expression, 9=Non-Observable
Types: 3=Small Spine, 4=Large Spine
Trochlear Notch Form: 1=Continuous, 2=Partial, 3=Separate

APPENDIX VI,
Non-Metric Trait Summary, Cont.

TRAIT	B32 Female	B33 Male	B34a Male	B35 Female
Inca Bone	9 Unsided	O Unsided	O Unsided	O Unsided
Suprameatal Pit	OL, 9R	1L, 1R	OL, OR	OL, OR
Auditory Exostosis	OL, 9R	OL, OR	OL, OR	OL, OR
Tympanic Dehiscence	OL, 9R	OL, OR	OL, OR	OL, OR
Mandibular Torus	9L, 9R	1L, 1R	9L, 1R	1L, 1R
Mental Foramen	9L, 9R	1L, 1R	1L, 1R	1L, 1R
Mylohyoid Bridge	9L, 9R	OL, OR	OL, 1R	OL, OR
Genial Tubercles	9 Unsided	2, Type 4	2, Type 4	1, Type 2
Subclavian Facet	9L, 9R	OL, 1R	1L, 1R	1L, 1R
Glenoid Fossa Extension	9L, 9R	1L, 1R	9L, 9R	1L, 1R
Septal Aperture	9L, 9R	1L, OR	9L, OR	OL, 1R
Pect./Teres Major Impression	OL, 9R	OL, 9R	OL, 9R	1L, 1R
Trocwlear Notch Form	9L, 9R	3L, 3R	9L, 9R	1L, 2R
Third Trochanter	9L, 9R	OL, OR	OL? OR	OL, OR
Femoral Neck Depression	OL, 9R	1L, 1R	9L, OR	OL, OR
Poirer's Facet	9L, 9R	OL, OR	9L, 1R	1L, 9R
Hyp. Trochanteric Fossa	9L, 9R	OL, OR	9L, OR	OL, OR
Trochlear Fossa Spicules	9L, 2R	2L, 2R	9L, 1R	1L, 1R
Bipartite Patella	OL, 9R	OL, OR	9L, 9R	OL, OR
Vastus Notch	OL, 9R	OL, OR	9L, 9R	OL, OR
Vastus Fossa	OL, 9R	OL, OR	9L, 9R	1L, OR
Preauricular Sulcus	1 L, 1 R	1L, 1R	1L, 1 R	1L, 1 R
Acetabular Crease	OL, OR	OL, OR	OL, OR	OL, OR

L-Left, R=Right, O=Absent, 1=Present, 2=Multiple or Marked Expression, 9=Non-Observable
Types: 3=Small Spine, 4=Large Spine
Trochlear Notch Form: 1=Continuous, 2=Partial, 3=Separate

APPENDIX VI,
Non-Metric Trait Comparison, cont.

Trait	Roitsch Female/ Male	Williams Female/ Male	Sam Kaufman Female/Male	Roitsch Left/ Right	Williams Left/ Right	Sam Kaufman Left/Right
Inca Bone	0/5; 0/4	5/27; 7/24	0/11; 0/9	Unsided	Unsided	Unsided
Suprameatal Pit	0/10; 2/8	NR	0/11; 0/9	1/1	NR	0/0
Auditory Exostosis	0/10; 1/8	2/54; 4/52	NR	0/1	3/3	NR
Tympanic Dehiscence	1 NSX	7/54; 2/52	NR	1/0	4/5	NR
Mandibular Torus	6/10; 7/8; 1 NSX	3/58; 2/52	0/11; 0/9	6/8	5/5	0/0
Mental Foramen	5/10; 8/8; 1 NSX	N/C	N/C	6/8	N/C	N/C
Mylohyoid Bridge	0/10; 1/8; 1 NSX	2/56; 2/52	NR	0/2	2/2	NR
Genial Tubercles	Variation	NR	NR	Unsided	NR	NR
Subclavian Facet	5/10; 5/8	NR	NR	3/7	NR	NR
Glenoid Fossa Extension	4/10; 4/8	NR	NR	4/4	NR	NR
Septal Aperture	3/10; 1/8	NR	N/C	3/1	NR	N/C
Pect./Teres Major Impression	3/10; 1/8	NR	NR	2/2	NR	NR
Trochlear Notch Form	Variation	NR	NR	Variation	NR	NR
Third Trochanter	0/10; 0/8; 2 NSX	NR	0/11; 0/9	1/1	NR	0/0
Femoral Neck Depression	0/10; 2/8	NR	NR	1/1	NR	NR
Poirer's Facet	1/10; 1/8	NR	1 NSX	1/1	NR	1/0
Hyp. Trochanteric Fossa	0/10; 0/8; 2 NSX	NR	NR	1/1	NR	NR
Trochlear Fossa Spicules	3/10; 5/8; 1 NSX	NR	NR	5/4	NR	NR
Bipartite Patella	0/10; 0/8	NR	NR	0/0	NR	NR
Vastus Notch	0/10; 0/8	NR	2/11; 0/9	0/0	NR	1/1
Vastus Fossa	1/10; 0/8	NR	NR	1/0	NR	NR
Preauricular Sulcus	4/10; 7/8; 4 NSX	NR	NR	7/8	NR	NR
Acetabular Crease	0/10; 0/8	NR	NR	0/0	NR	NR

Sam Kaufman site data is taken from Butler (1969); Williams site data is taken from Loveland (1980)
NR=Not Reported; NSX=Not Sexed; N/C=Not Comparable

APPENDIX VI,
Additional Cranial Non-Metric Trait Summary for Well-Preserved Skulls

Additional Cranial Traits	B30 Male	B31 Female	B33 Male	B34a Male	B35 Female
Metopic Suture	9 Unsided	O Unsided	9 Unsided	O Unsided	O Unsided
Bregmatic Bone	O Unsided	O Unsided	9 Unsided	O Unsided	O Unsided
Coronal OssicleS	OL, 2R	OL, OR	OL, OR	OL, 1R	OL, OR
Lambdoid Ossicles	2L, 2R	OL, OR	OL, 1R	L1, R1	OL, 9R
Apical Bqne	O Unsided	O Unsided	O Unsided	O Unsided	O Unsided
Sagittal Ossicles	2 Unsided	O Unsided	O Unsided	O Unsided	O Unsided
Parietal Notch Bone	OL, OR	OL, OR	9L, 9R	OL, OR	OL, 9R
Parietal Foramen	1L, OR	1L, OR	1L, 1R	OL, OR	1L, OR
Epiteric Bone	9L, 9R	OL, OR	9L, 9R	9L, 9R	9L, 9R
Asterionic Bone	OL, OR	OL, OR	9L, 9R	9L, OR	1L, 9R
Supraorbital Foramen	9L, 9R	2L, 2R	9L, 1R	OL, 9R	1L, 2R
Supraorbital Notch	9L, 9R	OL, OR	9L, OR	1 L, 9R	1 L, OR
Infraorbital Foramina	OL, OR	OL, OR	OL, OR	9L, 9R	OL, 2R
Zygomatic Foramen	1L, OR	OL, aR	6L, 6R	6L, 9R	1L, 1R
Mastoid Foramen Locus	1L, 1R	2L, 2R	9L, 9R	1L, 1R	2L, 9R
Mastoid Foramen Number	1L, 1R	2L, 2R	9L, 9R	1L, 1R	1L, 9R
Occip-Mast Ossicle	OL, OR	OL, OR	9L, 9R	9L, 9R	OL, 9R
Palatine Torus	1 Unsided	O Unsided	1 Unsided	1 Unsided	O Unsided
Trans. Palatine Suture	2 Unsided	1 Unsided	9 Unsided	9 Unsided	1 Unsided
Lesser Palatine Foramen	9L, 1R	OL, OR	OL, 9R	1L, 9R	OL, OR
Precondylar Tubercle	1 Unsided	O Unsided	9 Unsided	9 Unsided	1 Unsided
Postcondylar Foramen	1L, 1R	1L, 1R	1L, 9R	9L, 9R	1L, 1R
Bif. Hypogloss. Canal	OL, OR	OL, 0R	9L, 9R	9L, 9R	4L, 4R

L=Left, R=Right, O=Absent, 1=Present, 2=Multiple or Marked Expression, 9=Non-Observable
Zygomatic Foramen: 6=Multiple Small, Mastoid Foramen Locus: 1=Temporal, 2=Sutural Trans. Palatine
Suture: 1=Straight, 2=Irregular, Bif. Hypogloss. Canal, 4=Complete Bifurcation

APPENDIX VI,
Cranial Non-Metric Trait Comparison for Well-Preserved Skulls

Additional Cranial Traits	Roitsch Female/ Male	Williams Female/ Male	Sam Kaufman Female/ Male	Roitsch Left/ Right	Williams Left/ Right	Sam Kaufman Left/ Right
Metopic Suture	0/2; 0/3	NR	NR	Unsided	NR	NR
Bregmatic Bone	0/2; 0/3	NR	NR	Unsided	NR	NR
Coronal Ossicles	0/4; 2/6	0; 2/42	NR	0/2	1/1	NR
Lambdoid Ossicles	0/4; 5/6	21/52; 22/48	N/C	2/3	22/21	N/C
Apical Bone	0/2; 0/3	NR	NR	Unsided	NR	NR
Sagittal Ossicles	0/2; 1/3	2/22; 3/20	NR	Unsided	Unsided	NR
Parietal Notch Bone	0/4; 0/6	8/52; 6/44	NR	0/0	8/6	NR
Parietal Foramen	2/4; 3/6	20/54; 24/52	N/C	4/1	20/24	5/12; 5/11
Epiteric Bone	0/4; 0/6	NR	NR	0/0	NR	NR
Asterionic Bone	1/4; 0/6	8/54; 15/46	NR	1/0	8/15	NR
Supraorbital Foramen	4/4; 1/6	53/55; 46/47	N/C	2/3	49/50	N/C
Supraorbital Notch	1/4; 1/6	See Foramen	N/C	2/0	See Foramen	N/C
Infraorbital Foramina	1/4; 0/6	NR	NR	0/1	NR	NR
Zygomatic Foramen	3/4; 4/6	NR	NR	4/3	NR	NR
Mastoid Foramen Locus	Variation	NR	Variation	Variation	NR	Variation
Mastoid Foramen Number	Variation	NR	Variation	Variation	NR	Variation
Occip Mast Ossicle	0/4; 0/6	NR	NR	0/o	NR	NR
Palatine Torus	0/2; 3/3	2/24; 1/25	0/11 NSX	Unsided	Unsided	0/0
Trans. Palatine Suture	Variation	NR	NR	Unsided	Unsided	NR
Lesser Palatine Foramen	0/4; 2/6	NR	NR	L/1	NR	NR
Precondylar Tubercle	1/2; 1/3	NR	0/11; 0/9	Unsided	NR	0/0
Postcondylar Foramen	4/4; 3/6	NR	6/7 NSX	4/3	NR	NR
Bif. Hypogloss. Canal	2/4; 0/6	NR	NR	1/1	NR	NR

Sam Kaufman Site data taken from Butler (1969); Williams site data taken from Loveland (1980)
NR = Not Recorded; NSX = Not Sexed; N/C = Not Comparable

APPENDIX VII,
Roitsch Site Taxa List by Lot Number, 1991 TAS Field School

Bonnie C. Yates

Lot*	Common Name	Total	Provenience
4	Medium/large mammals	5	
	Deer	1	
6	Small/medium mammals	1	
	Eastern cottontail rabbit	1	
7	Medium/large mammals	2	
9	Medium/large mammals	4	Block IV
14	Deer	1	Between Blocks III and IV
15	Vertebrates	8	Between Blocks III and IV
	Medium/large mammals	1	
16	Vertebrates	12	Between Blocks III and IV
	Turtles	1	
	Medium/large mammals	30	
	Mammals	3	
17	Vertebrates	4	Between Blocks III and IV
	Medium/large mammals	1	
	Deer	1	
18	Vertebrates	7	Block III
	Gar	1	
	Medium/large mammals	34	
	Deer	1	
19	Vertebrates	10	Block III
	Medium bony fish	1	
	Deer	1	
20	Gar	1	Block III
	Turtles	1	
	Medium/large mammals	11	
	Deer	1	
21	Vertebrates	3	Block III
	Bony fish	1	
	Turtles	1	
	Medium/large mammals	7	
	Rabbits and hares	1	
	Eastern cottontail rabbit	1	
22	Vertebrates	7	Block III
	Deer	2	
24	Medium/large mammal	1	South of Block IV
	Mammals	1	
25	Mammals	2	Block III
26	Vertebrates	1	Block III
	Turtles	1	
	Medium/large mammals	5	
27	Medium/large fish	1	Block III
	Turtles	2	

Lot*	Common Name	Total	Provenience
27	Medium/large mammals	25	
	Deer	1	
28	Medium/large mammals	27	Block III
31	Vertebrates	1	Near Youth Area
33	Vertebrates	3	Between Blocks III and IV
34	Small mammals	1	Between Blocks III and IV
	Eastern cottontail rabbit	1	
35	Vertebrates	9	Between Blocks III and IV
	Turtles	1	
37	Vertebrates	1	Between Blocks III and IV
	Medium/large mammals	1	
39	Mammals	2	Block VI
40	Medium/large mammal	5	Block VI
41	Vertebrates	1	Between Blocks III and IV
	Box turtles	1	
	Medium/large mammals	1	
	Mammals	2	
	Cottontail rabbits	1	
42	Medium/large mammals	3	Between Blocks III and IV
	Pronghorn/deer	1	
43	Deer	2	Block IV
44	Vertebrates	6	50 x 50 cm unit
	Medium/large mammals	1	
	Deer	7	
45	Medium/large mammals	1	Block VI
47	Medium/large mammals	1	Block VI
	Mammals	2	
48	Vertebrates	1	Block VI
	Turtles	1	
	Micro-mammals	2	
	Medium/large mammals	6	
49	Vertebrates	1	Block VI
	Medium/large mammals	1	
50	Medium/large mammals	4	Block VI
51	Vertebrates	3	50 x 50 cm unit
	Medium/large mammals	4	
52	Bowfins	1	Block III
	Softshell turtle	1	
	Medium/large mammal	43	
	Swamp rabbit	1	
	Deer	2	
53	Vertebrates	4	Block IV
	Medium/large mammals	9	
	Deer	1	
55	Turtles	2	50 x 50 cm unit
56	Medium/large mammals	1	50 x 50 cm unit
58	Turtles	1	Block VI
	Medium/large mammals	3	

Lot*	Common Name	Total	Provenience
59	Squirrels and chipmunks	1	
60	Medium/large mammals	1	Youth Area
62	Vertebrates	3	Block VI
63	Vertebrates	6	Block III
	Gars	1	
	Deer	1	
64	Vertebrates	11	50 x 50 cm unit
	Turtles	1	
	Swamp rabbit	1	
	Deer	1	
65	Medium/large mammals	4	50 x 50 cm unit
	Large mammals	1	
66	Vertebrates	23	Block III
	Water and box turtles	2	
	Turkey	1	
	Deer	2	
67	Turtles	7	Block III
	Small/medium mammals	3	
	Medium/large mammals	27	
	Deer	3	
70	Vertebrates	5	50 x 50 cm unit
	Medium/large mammals	19	
73	Vertebrates	10	Block III
	Turtles	10	
	Box turtles	1	
	Medium/large mammals	36	
	Deer	2	
75	Medium/large mammals	6	50 x 50 cm unit
	Swamp rabbit	3	
76	Medium/large mammals	1	Block VI
77	Turtles	1	Block VI
	Medium/large mammals	1	
78	Vertebrates	25	Block III
79	Vertebrates	13	Block III
	Deer	1	
94	Dogs	1	Terrace, east slope
96	Vertebrates	4	Terrace, east slope
	Dogs	2	
	Deer	1	
	Pronghorn/deer	1	
97	Medium/large mammals	4	Block IV
	Pronghorn/deer	1	
99	Medium/large mammals	1	Block IV
100	Medium/large mammals	2	Block IV
101	Vertebrates	7	Block IV
102	Vertebrates	10	Block IV
103	Vertebrates	57	Block III
	Medium bony fish	1	

Lot*	Common Name	Total	Provenience
103	Gars	1	
	Water and box turtles	3	
	Deer	2	
104	Vertebrates	21	Block III
	Softshell turtle	1	
	Medium mammals	1	
	Deer	1	
105	Water and box turtles	1	Block I/II
	Eastern box turtle	1	
106	Vertebrates	1	Block I/II
	Medium/large mammals	2	
	Mammals	1	
107	Medium/large mammals	2	Block I/II
112	Medium/large mammals	2	Block I
113	Medium/large mammals	3	Block I
114	Vertebrates	2	Block I/II
115	Vertebrates	9	Block I/II
120	Vertebrates	1	Youth Area
121	Medium/large mammals	2	Youth Area
123	Small/medium mammals	2	Block I/II
	Medium/large mammals	1	
124	Vertebrates	1	Block I/II
	Turtles	1	
	Small/medium mammals	2	
	Medium/large mammals	2	
	Eastern cottontail rabbit	1	
126	Medium/large mammals	8	Block I/II
128	Vertebrates	2	Block I/II
	Medium/large mammals	1	
129	Corn and rat snakes	1	Block I/II
	Medium/large mammals	4	
	Deer	4	
130	Medium/large mammals	3	Block I/II
132	Medium/large mammals	1	Block I/II
133	Vertebrates	20	Block I/II
134	Vertebrates	26	Block III
	Medium bony fish	1	
	Gars	1	
	Medium/large mammals	1	
	Raccoon	1	
	Deer	3	
135	Medium/large mammals	8	Trench I
136	Vertebrates	1	Trench I
137	Medium/large mammals	2	Trench I
138	Vertebrates	32	Block IV
	Turtles	2	
	Softshell turtle	1	
	Medium/large mammals	2	

Lot*	Common Name	Total	Provenience
139	Vertebrates	2	Block IV
141	Vertebrates	11	Block IV
	Medium/large mammals	5	
	Cottontail rabbits	1	
142	Vertebrates	2	Block IV
	Turtles	1	
	Small/medium mammals	1	
	Medium/large mammals	4	
143	Medium/large mammals	2	Block IV
144	Turtles	1	Block IV
	Medium/large mammals	3	
145	Medium/large mammals	5	Block IV
146	Vertebrates	1	Block IV
	Medium/large mammals	2	
147	Medium/large mammals	22	Block III
	Raccoon	5	
	Deer	2	
148	Vertebrates	17	Block III
	Turtles	3	
	Raccoon	1	
	Deer	1	
149	Vertebrates	68	Block III
	Turtles	4	
	Large mammals	1	
150	Vertebrates	19	Block III
	Turtles	5	
	Medium/large mammals	33	
	Large mammals	2	
	Mammals	6	
	Deer	1	
151	Vertebrates	65	Block III
	Turtles	2	
	Large mammals	6	
	Deer	4	
152	Vertebrates	43	Block III
	Turtles	1	
	Deer	1	
155	Vertebrates	3	Block I/II
	Turtles	3	
	Medium/large mammals	5	
156	Small/medium mammals	1	Block I/II
158	Medium/large mammals	1	Block I/II
	Deer	1	
161	Vertebrates	2	Block I/II
163	Box turtles	1	Block I/II
	Medium/large mammals	2	
	Deer	1	
164	Mud and musk turtles	1	Block I/II

Lot*	Common Name	Total	Provenience
167	Small/medium mammals	1	
	Medium/large mammals	1	
168	Turtles	1	Block I/II
169	Medium/large mammals	2	Block I/II
170	Turtles	1	Youth Area
171	Medium/large mammals	1	Youth Area
	Deer	2	
174	Medium/large mammals	1	Youth Area
177	Water and box turtles	1	Block III
	Small mammals	1	
	Medium/large mammals	34	
	Deer	3	
	Pronghorn/deer	1	
178	Vertebrates	1	Block I/II
	Turtles	2	
	Box turtles	1	
179	Vertebrates	6	Block I/II
180	Vertebrates	8	Block IV
	Deer	1	
182	Vertebrates	4	Block IV
183	Medium/large mammals	2	Block IV
	Deer	1	
184	Vertebrates	21	Block IV
	Medium/large mammals	10	
185	Turtles	2	Block I/II
186	Medium/large mammals	1	Block I/II
	Deer	1	
187	Vertebrates	64	Block III
	Medium bony fish	1	
	Turtles	2	
	Mud turtle	1	
	Deer	1	
188	Vertebrates	4	Block III
	Turtles	2	
	Water and box turtles	1	
	Medium/large mammals	25	
	Mammals	2	
	Pocket gopher	3	
	Deer	8	
189	Turtles	1	Block III
	Medium/large mammals	55	
	Deer	3	
190	Vertebrates	5	Block IV
	Bowfins	1	
	Medium/large mammals	5	
	Mammals	2	
	Squirrels	1	
	Deer	2	

Lot*	Common Name	Total	Provenience
191	Vertebrates	54	Block III
	Gars	1	
	Turtles	2	
	Eastern box turtle	1	
	Small mammals	1	
	Large mammals	3	
	Deer	2	
192	Vertebrates	5	Block IV
	Turtles	1	
	Medium/large mammals	5	
	Mammals	1	
193	Box turtles	1	Block III
	Turkey	1	
	Medium/large mammals	28	
	Deer	3	
194	Vertebrates	8	Block III
	Turtles	2	
	Water and box turtles	1	
	Large birds	3	
	Medium/large mammals	12	
	Mammals	12	
	Pocket gophers	12	
195	Vertebrates	60	Block III
	Turtles	5	
	Large mammals	1	
	Deer	1	
196	Vertebrates	15	Block III
	Turtles	2	
	Medium/large mammals	37	
	Mammals	1	
	Deer	2	
	Pronghorn/deer	3	
197	Vertebrates	66	Block III
	Turtles	5	
	Medium birds	1	
	Deer	2	
198	Vertebrates	1	Block IV
	Medium/large mammals	1	
199	Vertebrates	7	Block III
200	Vertebrates	32	Block III
	Small/medium birds	1	
	Medium mammals	1	
	Medium/large mammals	13	
	Deer	4	
201	Vertebrates	5	Block III
	Mud and musk turtles	1	
	Large mammals	1	
	Deer	1	

Lot*	Common Name	Total	Provenience
203	Vertebrates	3	Block IV
204	Medium/large mammals	5	Block IV
205	Medium/large mammals	7	Block IV
206	Vertebrates	3	Block IV
208	Vertebrates	3	Block I/II
	Corn and rat snakes	1	
209	Vertebrates	6	Block IV
	Turtles	1	
	Medium/large mammals	1	
	Deer	1	
211	Vertebrates	7	Block IV
212	Vertebrates	1	Block I/II
213	Mammals	1	Block I/II
216	Medium/large mammals	3	Youth Area
218	Vertebrates	3	Youth Area
219	Vertebrates	1	Youth Area
220	Medium mammals	1	Trench I
	Medium/large mammals	1	
	Deer	1	
222	Vertebrates	2	Youth Area
	Medium/large mammals	1	
223	Vertebrates	9	Block I/II
224	Vertebrates	4	Block I/II
225	Vertebrates	11	Block III
	Bony fish	1	
	Turtles	1	
	Medium/large mammals	37	
	Bears	1	
	Raccoon	1	
	Deer	3	
	Pronghorn/deer	1	
228	Vertebrates	2	Block I/II
	Deer	1	
229	Vertebrates	14	Block III
	Large mammals	5	
	Hispid cotton rat	5	
	Carnivores	1	
	Raccoon	2	
230	Vertebrates	27	Block III
	Eastern box turtle	1	
	Medium/large birds	1	
	Medium/large mammals	9	
233	Corn and rat snakes	2	Block I/II
	Medium mammals	5	
	Medium/large mammals	3	
234	Vertebrates	5	Block I/II
235	Vertebrates	1	Block I/II
	Large mammals	2	

Lot*	Common Name	Total	Provenience
236	Vertebrates	1	Block I/II
	Coyote	1	
238	Vertebrates	4	Block I/II
239	Vertebrates	40	Block III
	Turtles	4	
	Large mammals	2	
	Raccoon	1	
241	Vertebrates	2	Block I/II
242	Vertebrates	54	Block III
	Medium bony fish	1	
	Turtles	3	
	Softshell turtle	1	
	Small/medium mammals	1	
	Medium mammals	2	
	Large mammals	6	
	Deer	1	
243	Medium/large mammals	1	Block IV
244	Vertebrates	1	Block III
	Medium/large mammals	4	
245	Vertebrates	1	Block IV
246	Vertebrates	44	Block IV
	Large mammals	1	
	Coyote	2	
249	Vertebrates	1	Trench I
250	Vertebrates	84	Block III
	Turtles	2	
	Medium mammals	1	
	Large mammals	2	
	Black bear	1	
	Deer	3	
251	Vertebrates	51	Block III
	Medium bony fish	2	
	Turtle	2	
	Eastern box turtle	1	
	Small mammals	1	
	Medium/large mammals	5	
	Louisiana pocket gopher	2	
	Deer	1	
252	Vertebrates	54	Block III
	Nine-banded armadillo	34	
	Swamp rabbit	4	
	Deer	1	
253	Vertebrates	20	Block IV
	Turtles	3	
	Large mammals	1	
254	Vertebrates	2	Trench I
255	Medium-large mammals	6	Block III
256	Vertebrates	2	Block I/II

Lot*	Common Name	Total	Provenience
257	Vertebrates	1	Trench I
258	Vertebrates	2	Block I/II
259	Medium/large mammals	1	Block I/II
260	Vertebrates	4	Block III
	Large birds	1	
	Medium/large mammals	26	
	Large mammals	2	
	Deer	8	
	Pronghorn/deer	1	
261	Vertebrates	10	Block I/II
	Corn and rat snakes	1	
	Large mammals	4	
	Dogs	1	
262	Vertebrates	6	Block I/II
	Turtles	1	
	Corn and rat snakes	1	
266	Turtles	1	Block IV
	Medium/large mammals	13	
	Deer	1	
267	Vertebrates	3	Block I/II
	Deer	1	
269	Vertebrates	5	Block I/II
270	Vertebrates	2	Block I/II
272	Vertebrates	2	Trench I
274	Vertebrates	18	Block III
	Medium/large mammals	5	
	Large mammals	2	
	Hispid cotton rat	3	
275	Vertebrates	9	Block IV
	Medium/large birds	1	
	Large mammals	1	
276	Vertebrates	1	Block I/II
277	Vertebrates	2	Block I/II
282	Vertebrates	17	Block I/II
	Medium/large mammals	19	
285	Vertebrates	9	Block I/II
286	Vertebrates	2	Block I/II
287	Vertebrates	3	Block I/II
288	Vertebrates	1	Block I/II
	Deer	1	
289	Vertebrates	2	Block I/II
290	Vertebrates	1	Block I/II
	Turtles	1	
292	Vertebrates	11	Block I/II
	Large mammals	2	
293	Vertebrates	1	Block I/II
295	Vertebrates	38	Block III
	Large mammals	1	

Lot*	Common Name	Total	Provenience
296	Vertebrates	17	Block III
	Large bony fish	1	
	Turtles	3	
	Mud and musk turtles	1	
	Box turtles	1	
	Medium/large mammals	72	
	Large mammals	6	
	Raccoon	1	
	Deer	3	
	Pronghorn/deer	1	
297	Vertebrates	1	Block III
	Large mammals	1	
	Louisiana pocket gopher	1	
	Deer	2	
298	Vertebrates	4	Block III
	Large mammals	2	
299	Vertebrates	1	Block I/II
	Fox squirrel	1	
	Deer	1	
300	Medium/large mammals	5	Block I/II
301	Turtles	1	Block I/II
303	Vertebrates	2	Block I/II
307	Vertebrates	7	Block III
	Turtles	2	
	Medium/large mammals	16	
	Deer	1	
	Pronghorn/deer	1	
308	Vertebrates	5	Block I/II
309	Medium/large mammals	3	Block IV
310	Vertebrates	10	Block IV
311	Large mammals	3	Block I/II
	Dogs	1	
312	Vertebrates	10	Block IV
313	Medium/large mammals	7	Block IV
314	Vertebrates	18	Block IV
	Deer	1	
316	Vertebrates	4	Block IV
317	Vertebrates	4	Block III
	Gars	1	
	Turtles	3	
	Medium birds	1	
	Medium/large mammals	42	
	Mammals	14	
	Nine-banded armadillo	1	
	Raccoon	1	
	Deer	1	
	Pronghorn/deer	1	
319	Vertebrates	2	Block I/II

Lot*	Common Name	Total	Provenience
320	Turtles	1	
	Large mammals	2	
	Louisiana pocket gopher	1	
321	Vertebrates	11	Block IV
	Large mammals	1	
	Deer	1	
322	Vertebrates	1	Block IV
	Large mammals	1	
323	Vertebrates	1	Block IV
324	Vertebrates	20	Block III
	Turtles	1	
	Painted turtles/cooters/sliders	1	
	Large birds	1	
	Medium/large mammals	27	
	Deer	2	
325	Vertebrates	10	Block IV
326	Vertebrates	2	Block I/II
327	Vertebrates	3	Block IV
328	Medium/large mammals	1	Trench I
329	Turtles	1	Block IV
	Medium/large mammals	19	
331	Vertebrates	3	Block I/II
	Deer	1	
333	Turtles	1	Block IV
	Medium/large mammals	1	
334	Medium/large mammals	7	Block IV
335	Turtles	2	Block III
	Medium/large mammals	41	
	Deer	1	
336	Vertebrates	4	Block III
	Medium/large mammals	61	
	Large mammals	1	
337	Vertebrates	31	Block III
	Turtles	1	
	Large mammals	2	
	Deer	1	
338	Vertebrates	63	Block III
	Large birds	1	
	Small mammals	2	
	Large mammals	7	
	Deer	5	
339	Bony fish	2	Block III
	Turtles	6	
	Medium/large mammals	73	
	Deer	4	
	Pronghorn/deer	1	
400	Vertebrates	20	Block III
	Turtles	5	

Lot*	Common Name	Total	Provenience
400	Eastern box turtle	1	
	Softshell turtle	1	
	Small/medium mammals	1	
	Large mammals	4	
	Deer	7	
401	Turtles	3	Block III
	Vertebrates	14	
	Large mammals	5	
	Swamp rabbit	1	
	Deer	2	
402	Turtle	1	Block III
	Medium/large mammals	47	
	Mammals	9	
	Carnivores	2	
	Deer	2	
403	Vertebrates	4	Block III
	Medium/large mammals	4	
404	Vertebrates	14	Block III
	Large mammals	8	
	Dogs	1	
	Deer	1	
407	Vertebrates	5	Block I/II
408	Vertebrates	2	Block I/II
410	Vertebrates	1	Block I/II
	Medium/large mammals	4	
411	Vertebrates	1	Block I/II
	Box turtles	1	
414	Turtles	1	Block I/II
415	Vertebrates	3	Block I/II
416	Vertebrates	1	Block I/II
	Large mammals	1	
417	Vertebrates	4	Block I/II
418	Vertebrates	2	Block I/II
419	Gars	1	Block I/II
	Medium/large mammals	6	
421	Vertebrates	2	Block I/II
	Medium bony fish	1	
	Large mammals	2	
422	Medium/large mammals	2	Block I/II
423	Vertebrates	22	Block IV
	Deer	1	
424	Vertebrates	1	Trench I
425	Vertebrates	3	Block I/II
426	Vertebrates	2	Block I/II
	Turtles	1	
	Eastern cottontail rabbit	1	
427	Vertebrates	1	Block I/II
	Fox squirrel	1	

Lot*	Common Name	Total	Provenience
428	Vertebrates	2	Block I/II
	Large mammals	1	
429	Vertebrates	1	Block IV
	Medium/large mammals	9	
430	Vertebrates	13	Block IV
	Large mammals	1	
431	Vertebrates	4	Block I/II
	Deer	1	
432	Medium/large mammals	1	Trench I
433	Vertebrates	3	Block IV
434	Vertebrates	5	Block IV
	Turtles	7	
	Painted turtles/cooters/sliders	1	
444	Vertebrates	2	Block IV
	Medium/large mammals	2	
	Deer	1	
445	Vertebrates	5	Block I/II
	Large mammals	2	
446	Vertebrates	4	Block I/II
447	Vertebrates	1	Block I/II
	Turtles	1	
448	Medium/large mammals	14	Trench I
449	Vertebrates	1	Trench I
450	Vertebrates	2	Trench I
	Turtles	1	
452	Vertebrates	2	Trench I
454	Vertebrates	1	Block I/II
455	Medium/large mammals	3	Block I/II
456	Vertebrates	1	Block I/II
	Medium/large mammals	4	
457	Medium/large mammals	2	Block I/II
461	Vertebrates	3	Block I/II
	Large mammals	1	
463	Mammals	1	Block I/II
465	Medium/large mammals	1	Block I/II
	Deer	2	
466	Vertebrates	10	Block IV
	Large mammals	1	
467	Medium/large mammals	7	Block IV
	Deer	1	
468	Vertebrates	1	Block IV
469	Vertebrates	9	Block IV
470	Turtles	3	Block IV
	Medium/large mammals	6	
471	Cattle and relatives	1	Trench I area
476	Vertebrates	2	Trench I area
478	Vertebrates	1	Trench I area
479	Vertebrates	5	Block I/II

Lot*	Common Name	Total	Provenience
480	Vertebrates	27	Block III
	Turtles	4	
	Painted turtles/cooters/sliders	1	
	Large birds	1	
	Medium/large mammals	83	
	Mammals	10	
	Deer	3	
	Pronghorn/deer	1	
481	Vertebrates	15	Block III
	Turtles	2	
	Medium/large mammals	43	
	Mammals	1	
	Deer	2	
482	Turtle	1	Block IV
	Medium/large birds	5	
	Medium/large mammals	42	
	Deer	2	
483	Drum, croaker, etc.	1	Block IV
	Turtles	1	
	Medium/large mammals	13	
	Deer	4	
484	Vertebrates	2	Block IV
485	Water and box turtle	1	Block IV
	Softshell turtle	1	
	Medium/large mammals	23	
	Dogs	1	
	Pronghorn/deer	1	
486	Vertebrates	1	Block III
	Turtles	2	
	Medium/large mammals	56	
	Cottontail rabbits	1	
	Deer	21	
487	Vertebrates	4	Block IV
	Alligator	1	
488	Vertebrates	27	Block IV
	Softshell turtle	1	
	Deer	2	
489	Vertebrates	13	Block III
	Gars	1	
	Turtles	1	
	Small mammals	1	
	Large mammals	2	
	Deer	6	
490	Vertebrates	7	Block IV
491	Small/medium mammals	1	Block IV
	Medium/large mammals	7	
	Deer	1	
492	Raccoon	1	Block III

Lot*	Common Name	Total	Provenience
493	Vertebrates	49	Block III
	Gars	1	
	Turtles	1	
	Large birds	1	
	Large mammals	4	
	Eastern cottontail rabbit	1	
	Coyote	1	
	Deer	2	
494	Vertebrates	12	Block III
	Medium/large mammals	11	
	Deer	4	
495	Vertebrates	14	Block III
	Eastern mole	1	
496	Vertebrates	3	Block IV
	Bony fish	1	
	Medium/large mammals	6	
497	Medium/large mammals	73	Block III
498	Vertebrates	3	Block III
	Medium/large mammals	16	
	Pronghorn/deer	1	
499	Vertebrates	1	Block IV
500	Vertebrates	163	Block III
	Turtles	4	
	Large mammals	1	
	Deer	1	
501	Vertebrates	35	Block III
	Turtles	4	
	Small/medium mammals	2	
	Medium/large mammals	120	
	Deer	3	
	Pronghorn/deer	1	
503	Vertebrates	4	Block III
504	Vertebrates	53	Block III
	Medium bony fish	1	
	Turtles	1	
	Large mammals	3	
	Deer	3	
506	Vertebrates	16	Block I/II
	Small/medium mammals	1	
	Medium/large mammals	5	
	Pronghorn/deer	1	
507	Small mammals	1	Block I/II
	Medium/large mammals	5	
508	Medium/large mammals	6	Block I/II
509	Vertebrates	1	Block I/II
	Turtles	1	
	Louisiana pocket gopher	1	
510	Vertebrates	11	Block I/II

Lot*	Common Name	Total	Provenience
510	Turtles	2	
	Large mammals	2	
	Coyote	3	
	Deer	1	
511	Medium/large mammals	1	Block I/II
	Large mammals	4	
512	Medium/large mammals	3	Block I/II
513	Turtles	6	Terrace
	Painted turtles/cooters/sliders	1	
	Large birds	3	
	Medium mammals	1	
	Medium/large mammals	174	
	Large mammals	2	
	Jackrabbits	5	
	Cottontail rabbits	1	
	Rodents	2	
	Pocket gophers	9	
	Dogs and relatives	3	
	Pig	1	
	Deer	19	
	Pronghorn/deer	9	
514	Vertebrates	13	Terrace
	Medium/large birds	1	
	Medium/large mammals	1	
515	Turtles	2	Terrace
	Medium/large mammals	5	
	Pronghorn/deer	1	
516	Medium bony fish	1	Terrace
	Small/medium mammals	3	
	Pronghorn/deer	5	
517	Medium/large mammals	2	Terrace
518	Vertebrates	1	Terrace
	Large mammals	1	
519	Medium/large mammals	8	Terrace
	Cottontail rabbits	1	
	Pronghorn/deer	1	
520	Vertebrates	21	Terrace
	Small/medium mammals	1	
	Medium/large mammals	115	
	Dogs and relatives	1	
	Pronghorn/deer	1	
	Cattle and relatives	1	
521	Small mammals	1	Terrace
	Medium/large mammals	19	
	Large mammals	1	
	Pronghorn/deer	1	
522	Vertebrates	5	Terrace
	Gars	1	

Lot*	Common Name	Total	Provenience
522	Turtles	1	
	Water and box turtles	1	
	Medium/large mammals	14	
	Virginia opossum	1	
523	Medium bony fish	1	Terrace
	Box turtles	1	
	Whip snakes	1	
	Small/medium mammals	3	
	Medium mammals	13	
	Medium/large mammals	2	
	Cottontail rabbits	2	
	Deer	1	
	Pronghorn/deer	3	
524	Vertebrates	5	Terrace
	Small mammals	1	
	Medium mammals	1	
	Louisiana pocket gopher	5	
525	Medium/large mammals	12	Terrace
	Deer	1	
526	Vertebrates	6	Terrace
	Medium birds	1	
	Medium/large mammals	18	
	Deer	1	
527	Medium/large mammals	10	Terrace
	Deer	2	
	Pronghorn/deer	1	
529	Vertebrates	2	Terrace
	Medium/large mammals	18	
	Virginia opossum	1	
	Deer	1	
530	Medium/large mammals	8	Terrace
	Pronghorn/deer	1	
531	Medium/large mammals	1	Block I/II
532	Medium/large mammals	3	Block I/II
534	Painted turtles/cooters/sliders	2	Block I/II
535	Box turtles	1	Block I/II
	Medium mammals	1	
	Large mammals	1	
536	Pronghorn/deer	1	Block I/II
538	Vertebrates	5	Block I/II
	Turtles	1	
541	Vertebrates	3	Block I/II
	Medium/large mammals	4	
544	Vertebrates	3	Block I/II
	Medium/large mammals	1	
545	Vertebrates	1	Block I/II
547	Vertebrates	1	Block I/II
550	Medium/large mammals	5	Block I/II

Lot*	Common Name	Total	Provenience
552	Medium/large mammals	2	Block I/II
553	Medium/large mammals	2	Block I/II
554	Vertebrates	4	Block I/II
	Medium/large mammals	6	
555	Medium bony fish	1	Block I/II
	Medium/large mammals	1	
557	Medium/large mammals	1	Block I/II
558	Vertebrates	3	Block I/II
560	Vertebrates	2	Block I/II
562	Medium mammals	1	Block I/II
564	Vertebrates	2	Block I/II
565	Medium/large mammals	2	Block I/II
567	Vertebrates	2	Block I/II
	Medium/large mammals	11	
	Wood rats	1	
568	Vertebrates	1	Block I/II
570	Vertebrates	2	Block I/II
	Medium/large mammals	14	
572	Medium/large mammals	2	Block I/II
573	Medium/large mammals	1	Block I/II
575	Medium/large mammals	2	Block I/II
	Squirrels	1	
576	Turtles	1	Block I/II
	Medium/large mammals	6	
	Spotted skunks	1	
577	Small mammals	3	Block I/II
578	Vertebrates	3	Block I/II
579	Large mammals	1	Block III
581	Medium/large mammals	2	Trench I
583	Vertebrates	7	Block III
	Turtles	1	
	Swamp rabbit	3	
584	Vertebrates	3	Trench I
585	Vertebrates	2	Block I/II
	Colubrid snakes	1	
	Medium/large mammals	4	
586	Medium/large mammals	4	Block I/II
587	Vertebrates	5	Block I/II
	Large bony fish	1	
	Turtles	1	
	Painted turtles/cooters/sliders	1	
	Large mammals	1	
588	Vertebrates	4	Block I/II
	Medium/large mammals	3	
589	Vertebrates	7	Youth Area
590	Turtles	1	Block IV
	Medium/large mammals	5	
	Deer	3	

Lot*	Common Name	Total	Provenience
591	Small/medium mammals	1	Block I/II
	Medium/large mammals	15	
	Cottontail rabbits	1	
	Pocket gophers	1	
593	Turtles	1	Youth Area
	Small/medium mammals	2	
	Deer	1	
594	Turtles	2	Block I/II
	Medium/large mammals	1	
595	Medium/large mammals	3	Block I/II
596	Medium mammals	1	Block I/II
	Medium/large mammals	5	
597	Medium/large mammals	4	Block I/II
598	Small mammals	1	Block I/II
	Medium/large mammals	2	
599	Vertebrates	2	Block I/II
	Turtles	1	
600	Box turtles	1	Block I/II
	Medium/large mammals	4	
602	Medium/large mammals	1	Block I/II
603	Vertebrates	2	Block I/II
608	Vertebrates	6	Block I/II
	Large mammals	1	
	Deer	1	
609	Medium/large mammals	6	Block I/II
	Pronghorn/deer	1	
611	Vertebrates	9	Block I/II
613	Vertebrates	9	Block I/II
	Mud and musk turtles	1	
	Large mammals	1	
	Deer	1	
614	Vertebrates	5	Block I/II
	Large mammals	4	
618	Vertebrates	2	Trench I
620	Vertebrates	10	Block III
	Turtles	2	
	Medium/large mammals	48	
	Large/very large mammal	1	
	Deer	1	
621	Deer	1	Block I/II
622	Vertebrates	2	Block I/II
623	Vertebrates	2	Block I/II
	Turtles	1	
624	Painted turtles/cooters/sliders	1	
	Medium/large mammals	1	
625	Gars	2	Block III
	Bowfins	1	
	Small mammals	1	

Lot*	Common Name	Total	Provenience
625	Medium/large mammals	9	
	Mammals	3	
	Swamp rabbit	1	
626	Vertebrates	4	Block I/II
627	Vertebrates	44	Block III
	Turtles	12	
	Large mammals	9	
	Louisiana pocket gopher	1	
	Raccoon	1	
	Deer	3	
628	Vertebrates	36	Block III
	Medium bony fish	1	
	Turtles	2	
	Eastern box turtle	1	
	Large mammals	5	
	Deer	2	
629	Vertebrates	43	Block III
	Medium bony fish	1	
	Turtles	4	
	Medium mammals	2	
	Large mammals	6	
	Striped skunk	3	
	Deer	3	
630	Vertebrates	31	Block III
	Micro/small mammals	1	
	Small mammals	1	
	Large mammals	5	
	Deer	4	
631	Vertebrates	28	Block IV
	Small/medium mammals	1	
	Deer	1	
632	Vertebrates	16	Block IV
	Turtles	4	
633	Vertebrates	31	Block III
	Deer	1	
634	Vertebrates	4	Block I/II
	Mud turtle	1	
	Small/medium mammal	1	
	Eastern cottontail rabbit	1	
636	Deer	1	Block I/II
638	Vertebrates	3	Block I/II
	Medium/large mammals	1	
639	Vertebrates	1	Block I/II
	Cottontail rabbits	3	
642	Vertebrates	11	Block I/II
644	Turtles	4	Block IV
	Medium/large mammals	9	
646	Deer	2	Block IV

Lot*	Common Name	Total	Provenience
647	Medium/large mammals	1	Block IV
648	Vertebrates	5	Block IV
	Turtles	1	
649	Vertebrates	6	Block IV
	Deer	2	
651	Medium/large mammals	9	Block IV
652	Vertebrates	9	Block IV
	Turkey	1	
	Dogs	1	
653	Vertebrates	1	Block IV
654	Vertebrates	5	Block IV
	Large mammals	3	
	Domestic dog	2	
656	Vertebrates	8	Block I/II
	Medium bony fish	2	
657	Vertebrates	12	Block I/II
	Turtles	1	
	Mud turtle	1	
	Coyote	1	
658	Medium/large mammals	7	Block I/II
659	Medium/large mammals	3	Block I/II
	Squirrels and chipmunks	1	
660	Vertebrates	6	Block I/II
662	Vertebrates	5	Block I/II
	Eastern box turtle	1	
663	Vertebrates	1	Block I/II
664	Vertebrates	6	Block I/II
	Turtles	1	
	Eastern cottontail rabbit	1	
	Deer	1	
668	Vertebrates	4	Block I/II
	Eastern cottontail rabbit	5	
	Deer	1	
669	Turtles	1	Block I/II
670	Vertebrates	4	Block I/II
	Eastern cottontail rabbit	1	
671	Vertebrates	1	Youth Area
	Medium/large mammals	4	
	Deer	1	
673	Vertebrates	2	Block IV
674	Vertebrates	2	Block IV
	Medium/large mammals	8	
675	Medium/large mammals	4	Block IV
	Pronghorn/deer	1	
676	Vertebrates	7	Block IV
	Bowfins	1	
	Medium/large mammals	4	
677	Vertebrates	5	Block IV

Lot*	Common Name	Total	Provenience
677	Turtles	5	
	Deer	1	
678	Vertebrates	5	Block IV
680	Pronghorn/deer	1	Block IV
682	Medium bony fish	1	Block IV
	Medium/large mammals	7	
	Pronghorn/deer	1	
683	Vertebrates	5	Block IV
687	Medium mammals	1	Block I/II
	Medium/large mammals	1	
688	Dogs	1	Block I/II
689	Medium/large mammals	3	Block I/II
690	Mammals	1	Block I/II
691	Turtles	1	Block I/II
	Deer	2	
	Pronghorn/deer	1	
692	Gars	2	Block I/II
	Cottontail rabbits	1	
693	Medium/large mammals	2	Block I/II
696	Mud turtle	1	Youth Area
	Small/medium mammals	1	
	Medium/large mammals	2	
698	Medium/large mammals	5	Block II
699	Medium/large mammals	6	Terrace
700	Catfish	1	Terrace
	Turtles	1	
	Box turtles	1	
	Rattlesnakes	1	
	Medium/large birds	1	
	Medium mammals	1	
	Medium/large mammals	49	
	Cottontail rabbits	2	
	Rodents	1	
	Pocket gophers	2	
	Raccoon	1	
	Deer	2	
	Pronghorn/deer	2	
701	Vertebrates	4	Terrace
	Medium/large mammals	60	
	Nine-banded armadillo	1	
	Coyote	1	
	Pronghorn/deer	1	
702	Vertebrates	1	Terrace
	Large birds	2	
	Large mammals	5	
	Eastern cottontail rabbit	2	
	Fox squirrel	2	
	Louisiana pocket gopher	1	

Lot*	Common Name	Total	Provenience
703	Deer	1	
704	Vertebrates	5	Terrace
	Turtles	2	
	Medium/large birds	2	
	Cottontail rabbits	1	
705	Medium/large mammals	70	Terrace
	Carnivores	1	
	Deer	2	
706	Turtles	1	Terrace
708	Small mammals	1	Terrace
717	Vertebrates	1	Terrace
	Medium/large mammals	4	
718	Mammals	1	Block I/II
720	Turtles	2	Block I/II
	Medium/large mammals	4	
	Mammals	1	
	Pronghorn/deer	1	
721	Vertebrates	1	Block I/II
	Medium/large mammals	2	
722	Turtles	1	Block I/II
	Small/medium mammals	1	
	Medium/large mammals	1	
	Pronghorn/deer	1	
723	Vertebrates	3	Block I/II
	Mud and musk turtles	1	
724	Medium/large mammals	3	Block I/II
	Pronghorn/deer	1	
726	Gars	1	Block I/II
727	Turtles	1	Youth Area
	Small/medium mammals	1	
730	Vertebrates	8	Youth Area
731	Turtles	1	Youth Area
	Small mammals	1	
734	Medium/large mammals	2	Youth Area
	Deer	1	
735	Vertebrates	2	Block III
	Gars	1	
	Medium/large mammals	9	
	Squirrels and chipmunks	1	
736	Cottontail rabbits	1	Youth Area
737	Vertebrates	4	Youth Area
738	Small/medium mammals	1	Youth Area
741	Medium/large mammal	1	Youth Area
744	Large bird	3	Block III
	Small/medium mammals	4	
	Medium/large mammals	26	
	Cottontail rabbits	1	
	Raccoon	1	

Lot*	Common Name	Total	Provenience
744	Deer	6	
745	Medium bony fish	1	Block III
	Turtle	7	
	Medium/large mammals	143	
	Large/very large mammal	1	
	Raccoon	1	
	Deer	2	
	Pronghorn/deer	2	
746	Turtles	1	Block III
	Box turtles	1	
	Medium mammals	3	
	Medium/large mammals	51	
	Pronghorn/deer	1	
747	Vertebrates	1	Block III
	Medium/large mammals	77	
	Cottontail rabbits	1	
	Deer	2	
748	Vertebrates	9	Block III
	Turtles	1	
	Medium/large mammals	96	
749	Medium/large mammals	30	Block III
	Pronghorn/deer	1	
750	Bony fish	2	Block III
	Turtles	2	
	Small/medium mammals	9	
	Medium/large mammals	68	
	Cottontail rabbits	2	
	Deer	6	
752	Medium/large mammals	2	Block IV
753	Medium mammals	1	Block IV
	Medium/large mammals	1	
754	Medium/large mammals	1	Block I/II
755	Small/medium mammals	1	Block I/II
	Pronghorn/deer	6	
756	Deer	1	Block I/II
757	Vertebrates	6	Block I/II
	Turtles	2	
	Box turtles	1	
	Medium mammals	1	
	Medium/large mammals	35	
	Large/very large mammal	2	
	Bears	1	
	Pronghorn/deer	10	
758	Vertebrates	8	Block I/II
	Large mammals	1	
	Swamp rabbit	1	
760	Medium/large mammals	1	Block I/II
761	Medium/large mammals	1	Block I/II

Lot*	Common Name	Total	Provenience
763	Vertebrates	18	Block III
	Turtles	7	
	Medium/large mammals	164	
	Cottontail rabbits	1	
	Deer	4	
	Pronghorn/deer	1	
765	Large mammals	1	Block II
768	Even-toed ungulates	1	Block IV
769	Vertebrates	1	Block II
	Turtles	2	
	Medium/large mammals	2	
770	Medium/large mammals	3	Block II
	Deer	1	
772	Vertebrates	7	Block II
	Gars	1	
	Medium/large mammals	4	
773	Vertebrates	4	Block IV
	Medium/large mammals	1	
	Deer	2	
	Pronghorn/deer	1	
774	Pronghorn/deer	1	Block IV
775	Medium/large mammals	2	Block IV
776	Medium/large mammals	2	Block IV
777	Gars	1	Block IV
	Turtles	1	
778	Medium/large mammals	2	Block IV
779	Small/medium mammals	4	Block IV
	Medium/large mammals	2	
	Deer	1	
780	Medium/large mammals	11	Block IV
781	Vertebrates	1	Block VI
	Medium/large mammals	4	
	Jackrabbits	1	
	Carnivores	1	
	Deer	1	
	Pronghorn/deer	1	
782	Vertebrates	1	Block VI
	Large birds	1	
	Medium/large mammals	7	
	Pronghorn/deer	1	
783	Turtles	1	Block VI
	Painted turtles/cooters/sliders	1	
	Medium/large mammals	28	
	Deer	2	
	Pronghorn/deer	1	
785	Vertebrates	3	Block VI
	Medium/large mammals	22	
786	Vertebrates	2	Block IV

Lot*	Common Name	Total	Provenience
786	Medium/large mammals	9	
	Pronghorn/deer	1	
787	Vertebrates	5	Block IV
	Medium/large mammals	5	
788	Deer	1	Youth Area
789	Vertebrates	1	Block IV
	Turtles	1	
	Medium/large mammals	16	
	Pronghorn/deer	1	
790	Medium/large mammals	13	Block IV
791	Medium/large mammals	2	Block IV
	Deer	1	
792	Vertebrates	5	Block IV
	Turtles	1	
793	Vertebrates	2	Block VI
	Medium/large mammals	5	
795	Vertebrates	2	Block IV
797	Vertebrates	9	Block I/II
	Turtles	1	
	Large mammals	3	
	Deer	1	
799	Vertebrates	1	Block IV
800	Turtles	3	Block III
	Medium/large mammals	26	
801	Vertebrates	8	Block VI
	Medium/large mammals	10	
	Deer	1	
802	Vertebrates	21	Block III
	Medium/large mammals	11	
804	Micro/small mammals	1	Block I/II
	Medium/large mammals	6	
805	Small/medium mammals	2	Block I/II
	Medium/large mammals	8	
	Pronghorn/deer	2	
806	Small/medium mammals	1	Block I/II
	Medium/large mammals	2	
807	Vertebrates	3	Block I/II
	Medium/large mammals	3	
808	Vertebrates	1	Block I/II
809	Vertebrates	2	Block I/II
	Medium/large mammals	8	
	Medium rodent	1	
	Deer	1	
811	Medium/large mammals	1	Block I/II
816	Vertebrates	1	Youth Area
	Medium/large mammals	1	
827	Medium/large mammals	7	Block I/II
	Cottontail rabbits	1	

Lot*	Common Name	Total	Provenience
828	Deer	1	
829	Vertebrates	1	Block I/II
	Gars	1	
	Medium/large mammals	1	
	Cottontail rabbit	1	
	Pronghorn/deer	1	
831	Medium/large mammals	5	Block I/II
	Deer	3	
832	Vertebrates	2	Block I/II
	Softshell turtle	1	
	Medium/large mammals	2	
833	Vertebrates	2	Block I/II
	Large bony fish	1	
	Medium/large mammals	1	
	Deer	1	
837	Vertebrates	1	Youth Area
	Medium/large mammals	1	
842	Medium/large birds	1	Block VI
	Medium/large mammals	36	
	Jackrabbits	1	
843	Medium/large mammals	1	Block VI
845	Medium/large mammals	8	Block VI
	Pronghorn/deer	1	
848	Medium/large mammals	8	Block VI
849	Medium/large mammals	12	Block VI
	Pronghorn/deer	1	
852	Vertebrates	1	Block VI
	Turtles	1	
	Medium/large mammals	12	
853	Medium/large mammals	5	Block I/II
856	Vertebrates	2	Block I/II
861	Medium/large mammals	23	Block IV
	Dogs and relatives	1	
	Deer	2	
	Pronghorn/deer	2	
868	Medium/large mammals	3	Block I/II
	pronghorn/deer	1	
870	Medium/large mammals	6	Block IV
872	Medium/large mammals	1	Block I/II
873	Vertebrates	1	Block I/II
	Colubrid snakes	2	
	Medium/large mammals	6	
876	Vertebrates	2	Block I/II
878	Gars	1	Block I/II
	Turtles	2	
	Medium/large mammals	8	
879	Medium/large mammals	4	Block I/II
	Swamp rabbit	3	

Lot*	Common Name	Total	Provenience
880	Gars	1	Block I/II
	Toads and frogs	1	
	Micro/small mammals	1	
	Medium/large mammals	5	
	Deer	1	
	Pronghorn/deer	1	
882	Medium/large mammals	2	Block I/II
	Pronghorn/deer	2	
884	Turtles	3	Block III
	Turkey	1	
	Medium/large mammals	23	
	Virginia opossum	1	
	Cottontail rabbits	5	
	Deer	11	
	Pronghorn/deer	3	
891	Medium/large mammals	12	Block IV
	Large/very large mammals	1	
894	Medium/large mammals	6	Youth Area
906	Medium/large mammals	23	Block III
	Jackrabbits	4	
	Deer	1	
	Pronghorn/deer	2	
916	Vertebrates	8	Block IV
	Medium/large mammals	19	
	Mammals	8	
984	Vertebrates	2	Terrace
	Medium/large mammals	14	
	Cottontail rabbits	1	
	Small rodent	2	
	Pronghorn/deer	1	
	Totals	8496	

*lot provenience information is on file at the Texas Archeological Research Laboratory, The University of Texas at Austin

APPENDIX VIII, Ray Site Faunal Inventory, 1991 TAS Field School

Bonnie C. Yates

Lot*	Common Name	Total
1	Vertebrates	1
	Turtles	1
	Medium/large mammal	3
	Medium even-toed ungulate	2
2	Small mammals	1
	Medium/large mammals	3
	Mammals	1
	Medium even-toed ungulate	1
12	Medium/large mammals	4
15	Medium/large mammals	15
	Medium/even-toed ungulate	1
22	Vertebrates	8
	Turtles	3
	Large birds	1
	Medium/large mammals	84
	Cottontail rabbits	1
	Raccoon	1
	Medium even-toed ungulates	15
	Deer	1
23	Medium/large mammals	1
25	Medium/large mammals	69
	Carnivores	2
	Deer	12
29	Medium/large mammals	34
	Medium even-toed ungulates	4
	Deer	2
30	Medium/large mammals	2
	Medium even-toed ungulates	1
	Deer	1
32	Plains pocket gopher	5
36	Turtles	1
37	Medium/large mammals	1
38	Turtles	4
	Box turtles	2
	Turkey	1
	Medium/large mammals	58
	Mammals	16
	Medium even-toed ungulates	7
	Deer	2
40	Medium/large mammals	3
41	Medium/large mammals	8
42	Medium/large mammals	1

Lot*	Common Name	Total
44	Vertebrates	7
	Turtles	3
	Medium birds	1
	Medium/large mammals	16
	Medium rodent	1
	Deer	1
45	Vertebrates	2
	Medium/large mammals	3
	Medium even-toed ungulate	1
	Deer	1
46	Turtles	11
	Painted turtles/cooters/sliders	2
	Large birds	1
	Small/medium mammals	2
	Medium/large mammals	133
	Cottontail rabbits	1
	Medium rodent	2
	Raccoon	1
	Dogs and relatives	1
	Medium even-toed ungulates	8
	Deer	4
47	Vertebrates	4
	Box turtles	1
	Medium/large mammals	34
	Cottontail rabbits	1
	Squirrels and chipmunks	1
	Medium even-toed ungulates	4
48	Deer	2
49	Turtles	1
	Medium/large mammals	4
	Mammals	3
	Medium even-toed ungulates	1
51	Medium/large mammals	1
52	Vertebrates	6
	Turtles	3
	Medium/large mammals	51
	Medium even-toed ungulates	2
	Deer	2
54	Medium/large mammals	2
56	Medium/large mammals	14
	Medium even-toed ungulates	4
57	Medium/large mammals	4
	Medium even-toed ungulates	1
59	Vertebrates	2
	Medium/large mammals	1
	Medium even-toed ungulates	1
60	Vertebrates	4
	Medium/large mammals	2

Lot*	Common Name	Total
60	Medium even-toed ungulates	3
61	Medium/large mammals	12
	Deer	3
62	Medium/large mammals	6
	Medium even-toed ungulates	2
65	Medium/large mammals	1
66	Mammals	1
73	Vertebrates	5
	Medium/large mammals	4
	Medium even-toed ungulates	1
75	Medium/large mammals	5
	Deer	1
80	Medium/large mammals	1
	Deer	1
82	Vertebrates	11
	Turtles	5
	Large birds	1
	Medium/large mammals	53
	Cottontail rabbits	1
	Medium even-toed ungulates	7
	Deer	1
83	Medium/large mammals	6
	Large mammals	2
	Medium even-toed ungulates	1
84	Turtles	8
	Water and box turtles	1
	Medium/large mammals	37
	Mammals	8
	Squirrels and chipmunks	1
	Medium even-toed ungulates	10
	Deer	1
85	Medium/large mammals	2
86	Medium/large mammals	10
	Medium even-toed ungulates	2
87	Medium even-toed ungulates	1
89	Medium/large mammals	3
	Medium even-toed ungulates	2
90	Small/medium mammals	1
	Medium/large mammals	10
91	Vertebrates	3
	Turtles	2
	Medium/large mammals	25
	Raccoon	13
	Medium even-toed ungulates	2
93	Medium/large mammals	1
95	Vertebrates	2
	Medium/large mammals	1
	Mammals	2

Lot*	Common Name	Total
98	Turtles	10
	Medium/large mammals	8
	Deer	1
99	Turtles	1
	Medium/large mammals	2
100	Vertebrates	1
	Medium/large mammals	3
103	Medium/large mammals	5
104	Vertebrates	3
	Turtles	1
	Medium/large mammals	73
	Large mammals	1
	Medium even-toed ungulates	2
105	Medium/large mammals	2
	Mammals	4
	Medium even-toed ungulates	1
106	Vertebrates	10
	Turtles	2
	Box turtles	1
	Medium/large mammals	47
	Raccoon	4
	Weasel and relatives	3
	Medium even-toed ungulates	2
	Deer	2
108	Vertebrates	15
	Medium/large mammals	33
	Mammals	6
	Cottontail rabbits	2
	Squirrels	2
	Medium even-toed ungulates	3
112	Medium/large mammals	2
113	Turtles	4
	Water and box turtles	1
	Box turtles	2
	Medium/large mammals	80
	Squirrels	1
	Medium even-toed ungulates	3
114	Medium/large mammals	5
115	Medium/large mammals	6
116	Vertebrates	1
	Turtles	14
	Box turtles	5
	Medium/large mammals	39
	Cottontail rabbits	2
	Medium even-toed ungulates	2
	Deer	1
117	Medium/large mammals	3
118	Vertebrates	1

Lot*	Common Name	Total
118	Medium even-toed ungulates	1
119	Medium/large mammals	3
	Deer	2
120	Medium/large mammals	5
121	Medium/large mammals	2
123	Turtles	1
	Box turtles	2
	Turkey	1
	Medium/large mammals	8
	Medium even-toed ungulates	1
135	Medium/large mammals	5
	TOTALS	1477

*lot provenience information is on file at the Texas Archeological Research Laboratory, The University of Texas at Austin

APPENDIX IX, Chipped Stone and Ground Stone Tools from the Roitsch Site (41RR16), Red River County, Texas

Timothy K. Perttula

Chipped Stone Tools

Arrow Points

Provenience	Lot No.	Category	Raw Material	L*	W*	TH*	SW*	Comments
Block I	186	VI	brown chert	24.2	18.9	3.8	4.1	serrated
Block I	262	VI	brown chert		24.6	3.9	6.1	
Block I	511	I	gray novaculite	28.0	12.9	1.8		serrated and unifacial
Block I	970	XIII	brown jasper	18.5	11.2	2.4	4.9	
Block I	1062	tip	gray novaculite			2.8		
Block II	533	blade	gray novaculite		11.1	2.9		UID stemmed and notched form
Block II	1098	tip	Big Fork chert			3.1		
Block II	1139	III (?)	gray novaculite			2.5	4.2	
Block II	1208	VII	claystone-siltstone		14.1	3.4		serrated
Block II	1219	XI	brown chert	15.5	11.1	2.9	7.5	
Block II	1238	tip	gray chert			1.8		
Block II	1281	tip	brown novaculite			2.3		
East Md.	554	tip	grayish-brown chert			2.9		unifacial
East Md.	856	VIII	quartzite			2.9		
East Md.	928	blade	gray novaculite			3.1		UID stemmed and notched form
East Md.	928	VII	dark brown novaculite		17.2	4.2	7.2	
East Md.	949	tip	quartzite			2.5		
East Md.	1034	II	gray novaculite	13.5	9.3	2.3		resharpened blade
East Md. B35	277	VIII	quartzite	20.9	13.0	4.1	4.9	
East Md. B35	454	V	dark brown chert	20.6	10.5	2.8	7.4	
East Md. B35	464	tip	Big Fork chert			2.5		
Block III	147	preform	gray novaculite	10.0	3.2			
Block III	147	preform	Big Fork chert	17.1	12.0	2.6		
Block III	150	II	brown novaculite	20.5	9.4	2.0		

Provenience	Lot No.	Category	Raw Material	L*	W*	TH*	SW*	Comments
Block III	151	I	quartzite		11.9	2.9		serrated
Block III	152	II	quartzite	15.4	12.0	3.2		resharpened blade
Block III	187	II	Big Fork chert		9.2	2.6		serrated
Block III	189	blade	Big Fork chert			2.5		possible Category II
Block III	197	III	quartzite	11.8	2.8	6.7		serrated
Block III	240	II	Big Fork chert		8.4	3.6		
Block III	317	VIII	gray novaculite	18.2	9.5	2.8	3.4	
Block III	335	XII	dark gray chert		10.2	2.4	2.9	
Block III	338	preform	gray novaculite		17.2	2.8		unifacial
Block III	402	blade	Big Fork chert		12.3	2.0		possible Category II
Block III	406	II	dark gray novaculite		12.5	2.2		serrated
Block III	480	II	Big Fork chert	16.0	8.8	2.3		serrated
Block III	480	VIII	dark brown chert		10.4	3.1	3.3	
Block III	486	II	gray chert		10.9	2.9		
Block III	629	V	claystone-siltstone		8.7	2.5	5.1	
Block III	745	X	white novaculite	14.3	9.9	2.8	4.5	serrated
Block III	745	tip	dark brown chert			2.0		
Block III	747	II	Big Fork chert	15.4	10.2	3.0		serrated
Block III	747	tip	Big Fork chert			1.4		
Block III	747	tip	dark gray chert			2.0		
Block III	763	II	dark gray novaculite	16.5	15.0	2.5		unifacial
Block III	1042	II	dark brown chert		13.2	2.9		
Block III	1083	tip	gray novaculite			2.6		serrated blade
Block III	1084	XI	gray novaculite			3.1		
Block III	1085	preform	pink novaculite	22.3	15.0	3.2		
Block III	1085	preform	dark gray novaculite	22.2	17.9	4.1		
Block III	1088	II	Big Fork chert		13.9	2.6		
Block III	1124	preform	reddish-brown chert	18.3	11.2	4.1		
Block III	1180	II	gray novaculite	17.3	11.0	1.5		unifacial
Block III	1181	XII	Big Fork chert	15.0	10.0	2.3	4.1	
Block III	1182	XIII	brown chert	2.3	6.3			
Block III	1185	IX	chalcedony	8.7	2.0	4.1		
Block III	1189	II	light gray chert	11.3	1.9			
Block III	1277	tip	Big Fork chert	1.8				serrated
Block III	1277	II	claystone-siltstone	20.4	13.6	3.8		unifacial
Block III	1277	preform	red novaculite	14.3	3.0			

Provenience	Lot No.	Category	Raw Material	L*	W*	TH*	SW*	Comments
Block III	1277	preform	brown chert		16.7	2.6		
Near Block III	28	II	gray novaculite	15.2	10.3	2.0		
Near Block III	36	II	gray novaculite		11.7	1.7		
Near Block III	1026	preform	Big Fork chert		14.7	2.5		
Block IV	143	II	light gray novaculite	16.0	8.0	2.3		unifacial
Block IV	144	XIII	grayish-brown chert		11.5	2.1	4.9	unifacial
Block IV	182	II	Big Fork chert		9.8	3.3		
Block IV	314	blade	yellow chert		14.0	2.3	3.8	UID stemmed and notched form; serrated and unifacial
Block IV	334	blade/tip	brown chert		9.1	3.0	2.8	UID stemmed and notched form
Block IV	467	blade	red novaculite			4.1		UID stemmed form
Block IV	490	II	dark gray novaculite	15.0	10.5	1.6		
Block IV	787	VI	white novaculite	25.4	4.6	5.4		
Block IV	790	blade	Big Fork chert		9.2	2.2		
Near Block IV	34	XIII	gray novaculite	18.8	12.0	4.6	5.3	
Near Block IV	51	IV	claystone-siltstone	21.0	16.0	3.1	6.4	
Block V	272	II	gray novaculite		10.9	2.6		serrated
Block V	815	II	Big Fork chert		10.7	3.6		resharpened tip
Block V	1250	VII	red jasper		13.5	3.9	3.6	serrated
Block V	1253	tip	Big Fork chert			1.8		
Block VI	77	IV	claystone-siltstone	29.2	13.7	3.4	5.5	
Block VI	793	VI	claystone-siltstone		22.1	3.7	4.9	serrated
Block VI	847	II	Big Fork chert	15.4	7.9	3.1		
Block IX	1121	VIII	brown chert	14.4	8.9	1.7	2.9	unifacial
Block IX	1223	II	gray novaculite	21.0	9.9	2.5		
Terrace	82	V	white chert	18.7	8.3	3.9	3.7	

Provenience	Lot No.	Category	Raw Material	L*	W*	TH*	SW*	Comments
Terrace	514	I	dark brown novaculite	33.2	13.5	2.3		serrated
Terrace, B24	700	preform	quartzite	27.3	13.1	3.3		
Terrace, B30	983	I	brown novaculite		14.3	2.8		serrated
Terrace, B30	999	I	black novaculite	32.9	13.0	2.1		serrated
Terrace, B30	999	I	gray novaculite	31.2	13.2	2.3		serrated
Terrace, B32	980	X	white novaculite	14.6	11.2	2.6	5.3	
Terrace, B33	988	I	gray novaculite	35.5	13.0	2.8		serrated
Terrace, B33	988	II	brown novaculite	24.2	13.0	2.2		serrated
Terrace, B33	988	II	gray novaculite	20.8	13.2	2.3		serrated
Terrace, B33	988	II	gray novaculite	22.0	11.9	2.8		serrated
Terrace, B33	988	XII	gray novaculite	24.1	14.5	2.8	5.0	serrated
Terrace, B33	988	XII	dark brown chert	25.3	15.3	2.1	5.5	serrated
Terrace, B33	988	XII	brown novaculite	21.4	15.5	3.2	5.3	serrated
Terrace, B33	988	XII	gray novaculite	17.4	13.0	2.0	3.7	serrated
General Surface	405	II	gray novaculite	11.0	2.1			
Road Collection	83	II	gray novaculite	17.9	10.2	2.0		serrated

*in mm; UID=unidentified; L=length in mm; W=width in mm; TH=thickness in mm; SW=stem width in mm

Flake Tools

Provenience	Lot No. (mm)	Description	Raw Material	Thickness	Comments
Block I	828	unilateral flake tool	Big Fork chert	5.0	–
Block I	893	bilateral flake tool	claystone-siltstone	8.4	cortex, bipolar flake
Block II	417	side scraper	red jasper	8.2	cortex
Block II	417	side scraper	dark brown novaculite	6.8	cortex
Block II	1145	end scraper	Big Fork chert, green variety	2.5	cortex
Block II	1145	bilateral flake tool	brown chert	7.8	–
E. Md.	131	unilateral flake tool	quartzite	11.5	cortex
E. Md., B35	978	unilateral flake tool	brownish-gray chert	4.6	–
Block III	134	end scraper	gray chert	5.6	–

Provenience	Lot No. (mm)	Description	Raw Material	Thickness	Comments
Block III	489	thumbnail end scraper	dark gray-black chert	6.1	–
Block III	493	end and side scraper	brownish-gray chert	5.0	–
Block III	504	thumbnail end scraper	gray chert	4.6	–
Block III	745	end and side scraper	dark brown chert	6.5	cortex
Block III	747	side scraper, bilateral	gray novaculite	4.1	–
Block III	1039	unilateral flake tool	gray novaculite	4.4	–
Block III	1042	unilateral flake tool	gray chert	4.6	–
Block III	1042	side scraper	grayish-brown chert	3.5	cortex
Block III	1089	unilateral flake tool	black chert	4.5	cortex
Block III	1090	side scraper	dark brown chert	4.7	–
Block III	1182	end scraper	gray chert	6.1	cortex
Block III	1187	side scraper	Big Fork chert	6.9	–
Block III	1271	unilateral flake tool	claystone-siltstone	3.8	cortex
Block III	1277	thumbnail end scraper	gray novaculite	7.2	–
Block IV	9	end scraper	gray novaculite	6.3	–
Block IV	204	unilateral flake tool	grayish-brown chert	5.6	–
Block IV	631	unilateral flake tool	brown chert	2.9	cortex
Between Blocks III and IV	35	bilateral flake tool	claystone-siltstone	2.5	cortex
Block VI	929	bilateral and alternate flake tool	brownish-gray chert	5.1	–
Block IX	1121	side scraper, bilateral	gray novaculite	5.3	–
Block IX	1161	thumbnail end scraper	dark gray chert	5.3	–
Block IX	1259	bilateral flake tool	light gray chert	3.8	–
Surface	94	side scraper and unilateral flake tool	dark gray chert	8.7	–
Surface	153	side scraper and perforator bit	gray novaculite	6.0	cortex

Drills and Perforators

Provenience	Lot No.	Description	Raw Material	Thickness	Working Length (mm)
Block II	418	unifacial perforator	red jasper	3.3	-
Block II	418	bifacial drill	dark gray chert	3.3	-
Block II	1237	perforator with alternate retouch	brownish-red jasper	2.3	10.2
Block III	497	bifacial mid-section	Big Fork chert	2.8	–
Block III	630	bifacial drill	white novaculite	5.7	22.0+
Block III	888	bifacial mid-section	brown novaculite	2.1	–
Block III	1188	bifacial drill	gray novaculite	5.6	19.0
Block IV	794	perforator with alternate retouch	Big Fork chert	6.4	–
Block IX	1166	bifacial drill tip	dark gray chert	2.8	–
Block IX	1297	bifacial drill	grayish-black chert	3.4	–

Dart Points

Provenience	Lot No. (in mm)	Type (in mm)	Raw Material	L x W x Th	SW	Resharpened
Block I	1028	Gary	Big Fork chert	45.1 x 15.4 x 6.4	?	+
East Md.	463	Gary	dark gray chert	34 x 22.2 x 7.7	15.2	+
Block III	338	Kent	dark gray chert	- x 24.5 x 7.2	13.1	+
Block VI	45	Gary	quartzite	49.1 x 26.0 x 6.7	19.8	+

+=present; L=length; W=width; Th=thickness; SW-stem width

Bifaces

Provenience	Lot No.	Category	Raw Material	Thickness	Comments
Burial 35 fill	538	bifacial frag,	brown chert	8.9	cortex
Block I	156	bifacial frag.	brown chert	4.1	–
Block I	234	bifacial frag.	claystone/ siltstone	6.3	–
Block I	807	bifacial tool frag.	brown chert	3.6	–

Provenience	Lot No.	Category	Raw Material	Thickness	Comments
Block II	270	bifacial tool frag.	Big Fork chert	3.7	arrow point preform?
Block II	1055	bifacial tool frag.	claystone/ siltstone	6.1	–
Block II	1150	bifacial preform	brown chert	6.0	cortex
Block III	195	bifacial frag.	pink novaculite	5.2	–
Block III	338	bifacial preform	Big Fork chert	8.4	hard hammer flaking
Block III	763	bifacial tool tip	dark gray chert	6.0	–
Block III	890	biface frag.	brown chert	5.6	–
Block III	1044	bifacial tool frag.	dark gray chert	4.9	cortex
Block III	1088	bifacial fragment	Big Fork chert	4.4	–
Block III	1126	bifacial tool frag.	dark gray chert	6.9	–
Near Block III	66	bifacial preform	quartzite	12.0	cortex
Near Block III	73	bifacial tool frag.	gray novaculite	3.3	–
Block IX	1296	beveled knive	Florence A chert	13.8	hard hammer flaking

Cores

Provenience	Lot No.	Raw material	Description	Measurements (L x W x Th)
East Md.	459	gray chert	opposed platform	45 x 27 x 23
Block I	871	quartzite	single platform fragment	
Block III	579	brownish-red chert	single platform	34 x 13 x 14
Block III	818	brownish-red chert	tested cobble fragment	
Block IV	677	grayish-brown chert	single platform fragment	
Block IV	911	red chert	multiple platform-opposed, fragment	
Surface Coll.	473	red novaculite	bipolar core	31 x 29 x 11
Terrace, B. 25	529	red jasper	multiple platform	42 x 21 x 12
Terrace, B. 27	520	brownish-gray chert	single platform fragment	
Terrace	519	Big Fork chert	single platform	36 x 35 x 24

L=length; W=width; Th=thickness

Ground stone Tools

Provenience	Tool Type	Raw Material	L x W x TH (in mm)
Block I			
Lot 186	Mano	Quartzite	123 x 76 x 67
Lot 829	Mano fragment	Sandstone	
Block II			
Lot 166	Mano fragment	Sandstone	
Lot 168	Mano fragment	Quartzite	
Lot 532	Mano fragment	Sandstone	
Lot 540	Grinding slab fragment	Sandstone	
East Md.			
Lot 115	Grinding slab fragment	Sandstone	
Lot 279	Celt flake fragment	Greenstone or green (Ouachita Mountains) siliceous shale	
Block III			
Lot 230	Mano fragment	Sandstone	
Lot 493	Celt fragment	Greenstone (Ouachita Mountains)	
Lot 1269	Celt fragment	Greenstone (Ouachita Mountains)	
Lot 1275 (Fea. 310)	Celt fragment	Greenstone (Ouachita Mountains)	
Between Blocks III and IV			
Lot 33	Mano fragment	Quartzite	
Lot 35	Mano fragment	Sandstone	
Block IV			
Lot 102	Hammerstone fragment	Quartzite	
Lot 180	Hammerstone	Quartzite	72 x 55 x 46
Lot 211	Metate fragment	Sandstone	
Lot 266	Hammerstone	Quartzite	80 x 44
Lot 496	Mano fragment	Quartzite	
Lot 790	Grinding slab fragment (n=2)	Sandstone	
Block V			
Lot 925 (F. 502)	Mano	Quartzite	83 x 66 x 50 mm

Provenience	Tool Type	Raw Material	L x W x TH (in mm)
Block VI			
Lot 937	Celt fragment	Greenstone (Ouachita Mountains)	
Terrace			
Lot 81	Celt fragment	Greenstone (Ouachita Mountains)	
Lot 82	Celt fragment	Greenstone (Ouachita Mountains)	
Lot 473	Celt fragment	Greenstone (Ouachita Mountains)	
Lot 514	Celt flake fragment	Greenstone (Ouachita Mountains)	
Lot 703 (B. 24)	Grinding slab	Sandstone	104 x 57 x 15
Lot 991 (B. 34)	Hammerstone fragment	Quartzite	
Road Surface Collection			
Lot 83	Celt fragment	Greenstone (Ouachita Mountains)	
General Surface Collection			
Lot 153	Celt fragment	Quartzite	

APPENDIX X,

Radiocarbon and OCR Dates

Radiocarbon Dates

Site	Sample No.	Context/ Burial #	C13/C12 value	age range (1 sigma)
Roden (34MC215)				
	Beta-79443	20	-13.7 ‰*	AD 1280-1455**
	Beta-79445	35	-13.6 ‰*	AD 1440-1665**
	Beta-79444	28	-14.7 ‰*	AD 1450-1660**
	Beta-75065	29	-15.6 ‰*	AD 1640-1950**
Holdeman (41RR11)				
	Beta-75061	23	-20.2 ‰*	AD 1052-1245
	Beta-79446	21	-15.5 ‰*	AD 1319-1469
	Beta-750670	14	-14.5 ‰*	AD 1402-1478
	Beta-75059	11	-16.9 ‰*	AD 1415-1478
Fasken (41RR14)				
	Beta-91235	Md. B	-21.5 ‰	AD 1043-1188
	Beta-91234	Md. B	-24.0 ‰	AD 1055-1242
Roitsch (41RR16)				
	Tx-883	House 3	–	AD 982-1160
	Tx-884	House 3	–	AD 1040-1200
	Tx-885	House 3	–	AD 1044-1216
	Tx-882	House 3	–	AD 1048-1250
	Beta-46957	Fea. 601	-26.8 ‰	AD 1048-1296
	Beta-46267	Fea. 101	–	AD 1275-1383
	Tx-8077	35	-8.0 ‰+	AD 1231-1678
	Tx-8076	24	-8.2 ‰+	AD 1280-1396
	Tx-8074	15 (shaft tomb)	-8.0 ‰+	AD 1412-1616
	Tx-8075	17	-8.2 ‰+	AD 1431-1619
Rowland Clark (41RR77)				
	Beta-79447	7	-14.5 ‰*	AD 1309-1418
	Beta-79449	33	-11.5 ‰*	AD 1317-1440
	Beta-75053	2	-17.0 ‰*	AD 1502-1673
	Beta-79448	21	-14.0 ‰*	AD 1515-1680

*=collagen value; **2 sigma age ranges; + = apatite values. Due to fractionation, apatite values tend to be about –5 ‰ enriched compared to collagen values. The estimated C13/C12 values on collagen would be approximately –13.0 ‰ for the Roitsch burials.

OCR Dates

Site	Provenience	Zone	BP	A.D.
Fasken (41RR14)				
	Trench 2	Fea. 3	784-832	1118-1166
	Trench 2	Zone 5	1140-1210	740-810
	Trench 2	Zone 6	981-1041	909-969