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Foreword

Taking on the responsibilities as editor of the *Bulletin of the Texas Archeological Society* after the ten-year tenure of Tim Perttula is a somewhat daunting enterprise. Tim's high editorial standards and his constant efforts to expand the horizons of the *BTAS*—including the numerous topical volumes produced under his guidance—have established a standard that will be difficult to emulate by myself and future editors. It is my opinion, as well as that of many in the Texas archeological community, that through Tim's efforts the *BTAS* has attained a stature as one of the more outstanding and professional archeological periodicals produced among the many avocational societies across the United States.

Volume 73 is, in essence, a topical volume. The current volume contains three articles that report the results of past Texas Archeological Society Field Schools. One of the articles describes the results of the 1967 TAS Field School at the Harold Williams Site and thus brings to light the results of this important Caddoan excavation conducted 34 years ago. Credit is due to the many authors and TAS members—both professional and avocational—who have worked diligently to produce these reports. Credit is also due to Ron Ralph and members of the Reports and Curation Committee of the TAS for their ongoing program to ensure that the backlog of TAS Field School reports continues to reach publication.

The TAS gratefully acknowledges the Houston Endowment and its financial contribution that partially funded the production of Volume 73.

Myles Miller
April 2003

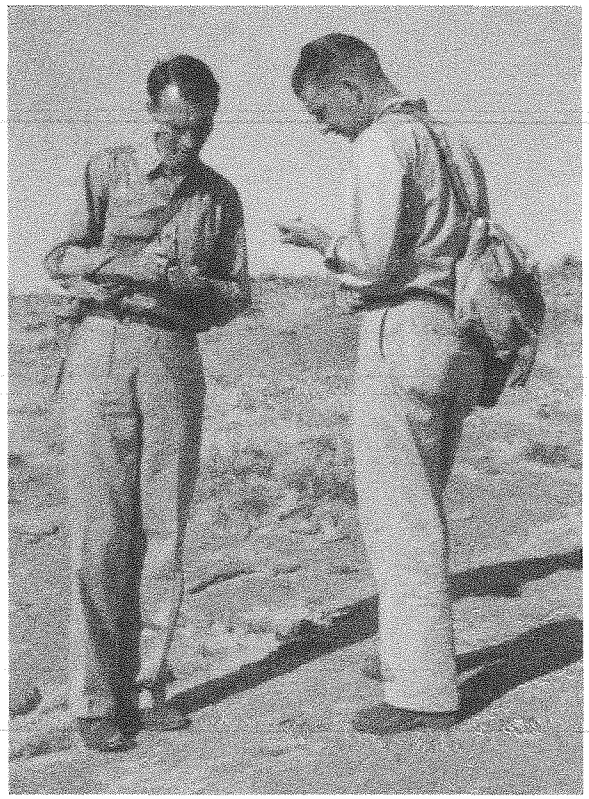
Memorial

JACK THOMAS HUGHES (1921-2001)

At the inaugural Floyd V. Studer Banquet of the Panhandle Archaeological Society in 1977, Curtis Tunnell described Jack Thomas Hughes as "an adept archeologist and a fine philosopher. He is a connoisseur of tamales, tequila, and chicken-fried steaks. He is a picker of guitars and a singer of songs, and he can tell gravelly-voiced stories around a campfire that make your hair stand on end. He is the only person I know who would just as soon dig a Pliocene turtle as a Caddoan pot." In more recent years, Jack was known to share his wit and wisdom with a broader audience using list servers for archaeology, allowing still younger generations of archaeologists to gain some insight into the thoughts of the "Dean of Panhandle Archaeology."

Born October 16,1921, Jack spent his youth traveling with his parents to the many Texas highway construction and other building projects his father supervised. He spent his spare time walking the fields and woods of North and East Texas, falling in love with the outdoors and the mysteries of the natural world. At the age of eight, he became one of the earliest members of the Texas Archeological and Paleontological Society. He received his B.S. degree in geology and anthropology from the University of Texas at Austin. He received his M.A. in archeology from the University of Texas as an exchange student with the National University of Mexico. In 1943 he interrupted his studies to enlist in the U.S. Navy.

After 1945 he participated in archaeological investigations across the Great Plains on the Smithsonian Institution River Basin Surveys. That work led him to Columbia University in New York where he eventually earned a Doctor of Philosophy in Anthropology for his analysis of the prehistory of the Caddoan speaking tribes. In 1952 he became curator of the Panhandle-Plains Historical Museum and an associate professor of Geology at West Texas State College, which later expanded to include the fields of archaeology and anthropology.



Jack Hughes (left) with Ed Moorman during the 1953 investigations at the Midland Site (41MD1), Midland County. Photograph taken by Gort Rushmer, WTSU Photographer.

Jack's enthusiasm for archeology was contagious, and professional and avocational archeologists alike found encouragement and support in his mentorship. Although West Texas State never offered a degree in anthropology, Jack's presence there attracted some of the most significant scholars in the field. Jack received numerous awards for his life-long efforts to preserve and understand the past. Some of the more notable awards came

from the Society for American Archaeology, the Texas Archeological Society, and the Texas Historical Commission.

Jack was a member of the Texas Archeological Society for over 50 years, serving as President in 1963 and in a number of other capacities. He directed the TAS Field School at Lake Meredith in 1969, and was named a TAS Fellow in 1980. Jack Thomas Hughes, Ph.D., Professor Emeritus, West Texas A&M University, Canyon, died May 11, 2001. His legacy lives on in his many contributions to Texas archeology and Texas archeologists, and this volume is dedicated as a memorial to him.

This memorial was adapted and modified from an obituary published in the Summer 2001 issue of *Texas Archaeology*.

The Harold Williams Site (41CP10) and the Texas Archeological Society Field School of 1967

Robert L. Turner Jr. and James E. Smith II, with contributions by Timothy K. Perttula, Bo Nelson, Mark Walters, and Bobby Gonzalez

ABSTRACT

The Harold Williams site has yielded artifacts dating from the Archaic through the Titus phase occupation of the site, the last Caddoan group to occupy this particular region of Northeast Texas. House and burial features are present in the Middle Caddoan occupation, with a large cemetery characterizing the Titus phase component. This article describes the 1967 Texas Archeological Society excavations, as well as the work done prior to 1967, and the latest data from the 2000 investigations.

INTRODUCTION AND BACKGROUND

The Williams site (41CP10)[1] is located 6.6 km east of Pittsburg in Camp County, Texas, on the north side of Dry Creek (Figure 1). It is 2 km downstream of the Tuck Carpenter site (41CP5) (Turner 1978), and 2.2 km upstream of its confluence with Cypress Creek. Camp County is part of the Pineywoods of East Texas with low rolling hills covered with sandy soil and a mixed hardwood and pine forest, except where cleared for agriculture.

In the early 1940s, most likely in 1943, an extremely heavy and prolonged rain came to Camp County and the surrounding area. Cypress Creek completely left its banks, covering the nearby Highway 11 bridge between Pittsburg and Daingerfield. Dry Creek was also swollen and rose 15 or more feet above its bed. Area B of the site (Figure 2), on the first terrace above the floodplain, was partially covered by the waters. When the water receded, Mr. Albert Hilton, who farmed the property at that time, found clusters of pottery vessels and skeletal remains that had been exposed by the flood. He collected the vessels.

This was an event of considerable local interest and many visitors came to visit the site. Among those was one, who with permission, excavated in excess of 60 graves at the site (see Perttula and Nelson 1998: Table 22).

In late 1948, when the senior author moved to Pittsburg, Mr. Hilton no longer owned or knew where any of the vessels were. However, eventually eight were located and acquired (Figure 3). These are all typical Late Caddoan Titus phase vessels.

From 1948 until 1959 the site was surface collected by the senior author. In 1959, 19 Titus phase graves were excavated by the senior author, Ralph Nicholas of Daingerfield, and Ed German of Lone Star (see below). After this the site was undisturbed until the 1967 Texas Archeological Society (TAS) Field School.

In the spring of 1967, Mr. Harold Williams, who had purchased the farm, leveled an area of the property which was designated as Area A during the Field School. A heavy rain caused a gully to form, and exposed a grave. There was no skeletal material, but a cluster of three pottery vessels remained, including two bowls and one bottle with an engraved rattlesnake motif. Also with these artifacts was a stone earspool of unusual design. These artifacts were found by the Williams' teen age children Belinda and Rickey.

The senior author was notified of this find by the Williams family and visited the site with them. At this time the TAS was looking for a location for the Field School, and when the Williams family gave permission, the Harold Williams site was chosen. The selection committee was composed of Kathleen Gilmore, C. A. Smith, and J. Ned Woodall.

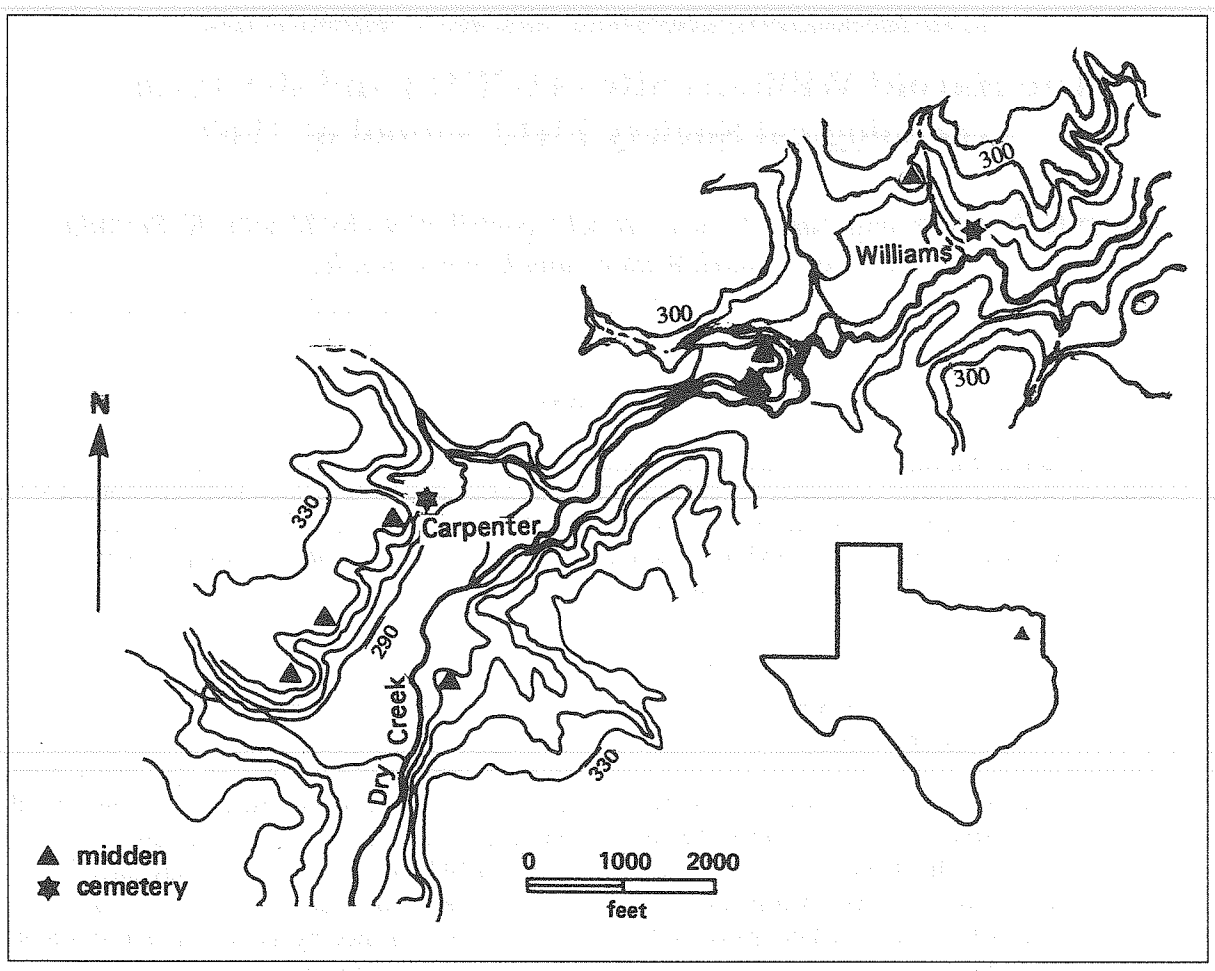


Figure 1. Dry Creek area, showing the location of the Harold Williams and Tuck Carpenter sites, and several Titus phase middens.

The sixth TAS Field School was held June 17-25, 1967. J. Ned Woodall, then a Doctoral candidate at Southern Methodist University (SMU), was the Archeologist in charge. Local arrangements were made by the senior author, the camp boss was Charlie Bollich, and Mrs. Martha Davis, of Pittsburg, was the camp cook. Figures 4 and 5 are photographs of several of the Field School participants at work, along with views of the site during the excavations.

In 1968 Woodall received his Doctorate and soon thereafter acquired a position at Wake Forest University. As a result he was unable to write the Field School report, although he did write a short article (Woodall 1967). All artifacts were stored at SMU awaiting analysis.

In 1968 the senior author left Pittsburg and moved to Fort Worth where both authors of this article became members of the Tarrant County Archeological Society (TCAS). In January 1975, the TCAS undertook the task of completing the washing, sorting, identifying, labeling, and bagging of the Harold Williams site artifacts. Turner and Smith then started a more detailed analysis of the artifacts for publication purposes, and a spread sheet was devised so that artifacts from each level were counted, and if ceramics were present, they were classified by decorative technique. Lithics were also separated into groups and counted as cortex flakes, biface thinning flakes, flakes, chips, and cores. Stone tools were also enumerated for each level as were bone fragments, daub, charcoal, ear ornaments, and pipe fragments. The projectile points were sorted as darts or arrows, and classified to type where this was possible.

This is where the project stalled. Jimmy Smith had a change in employment and moved to Cleburne, while the senior author remained in Fort

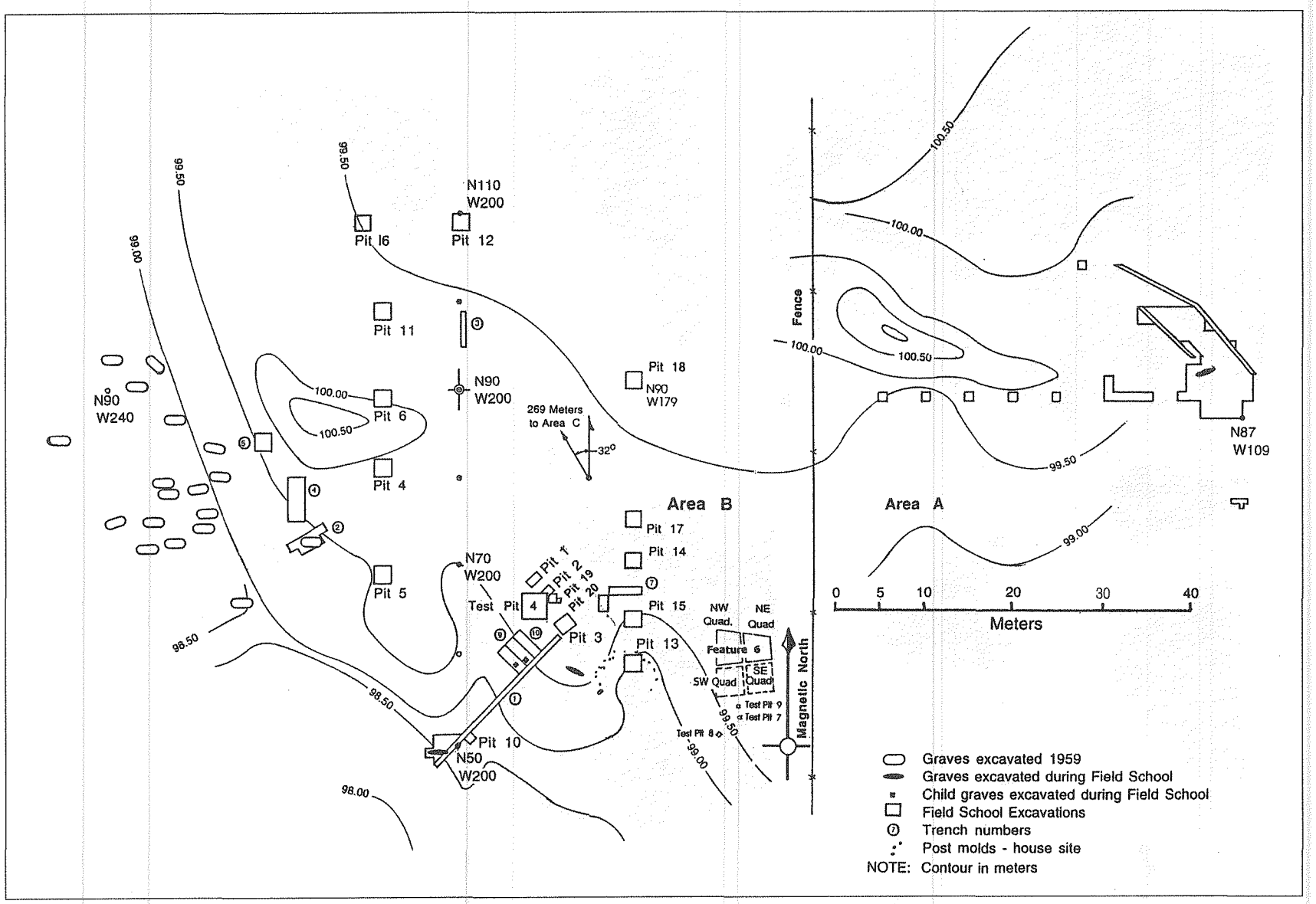


Figure 2. Excavations in Areas A and B.

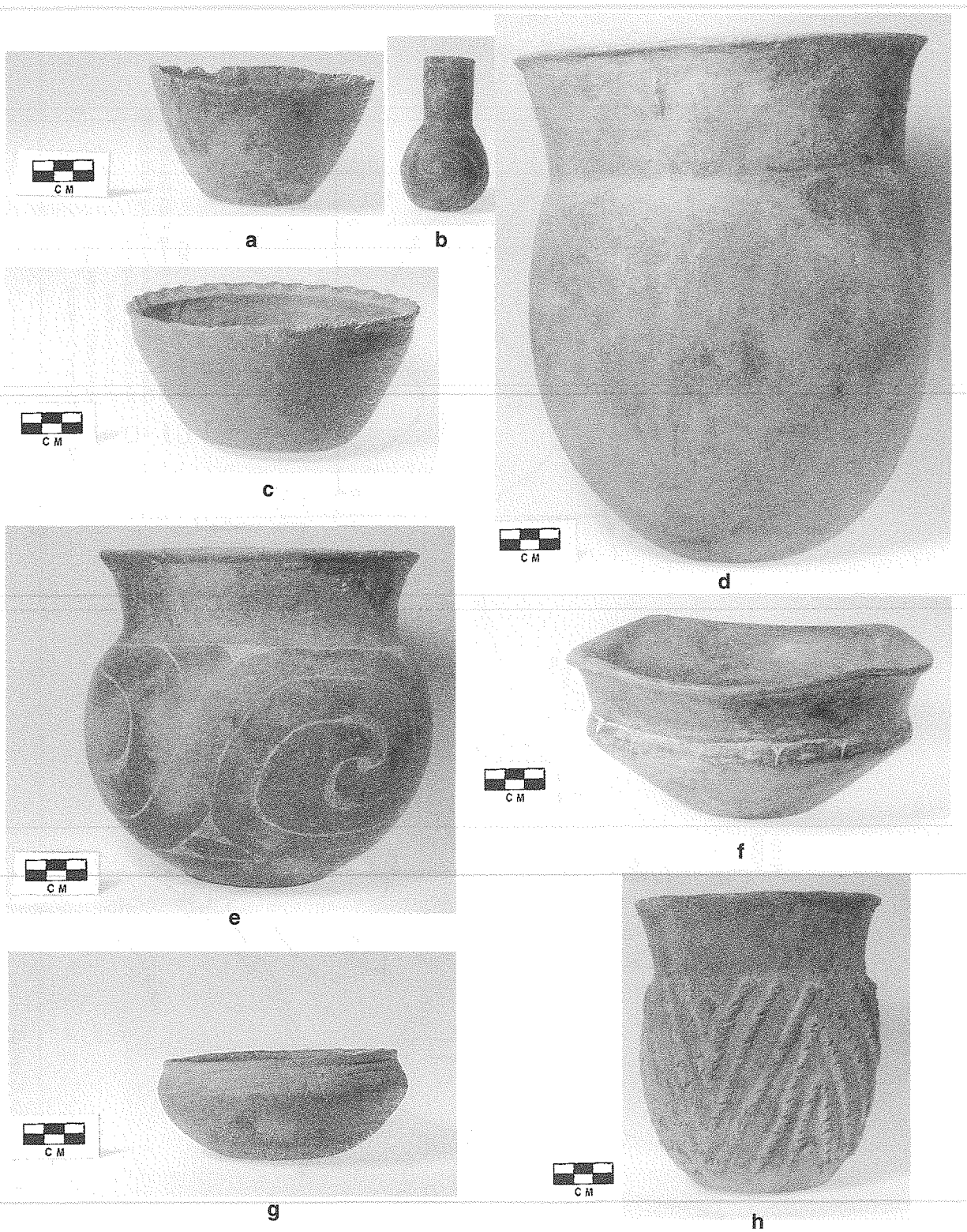


Figure 3. Titus phase vessels collected after the 1943 flood at the Williams Site: a, undecorated bowl; b, Wilder Engraved miniature bottle; c, red slipped bowl with engraving inside everted lip, probable trade piece; d, undecorated jar; e, Wilder Engraved jar; f, Ripley Engraved compound bowl; g, Ripley Engraved carinated bowl; h, Harleton Applique jar.

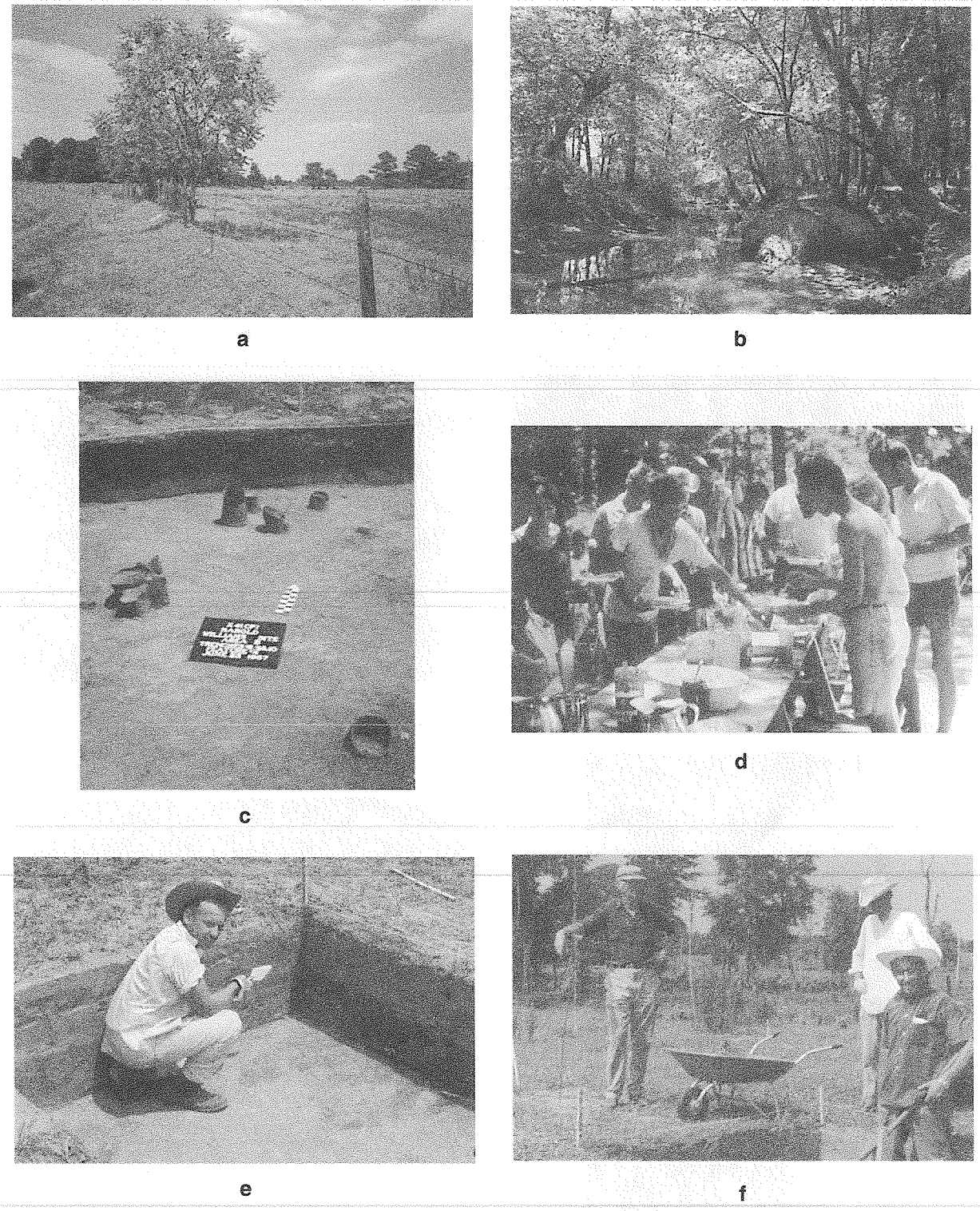


Figure 4. Views of the Williams site and the Field School: a, looking north, with Area A to the right of fence, and Area B to the left; b, Dry Creek by site; c, trenches 8-10; d, breakfast; e, Bob Adams; f, E. Mott Davis, Paul Koeppe, and Ned Woodall.

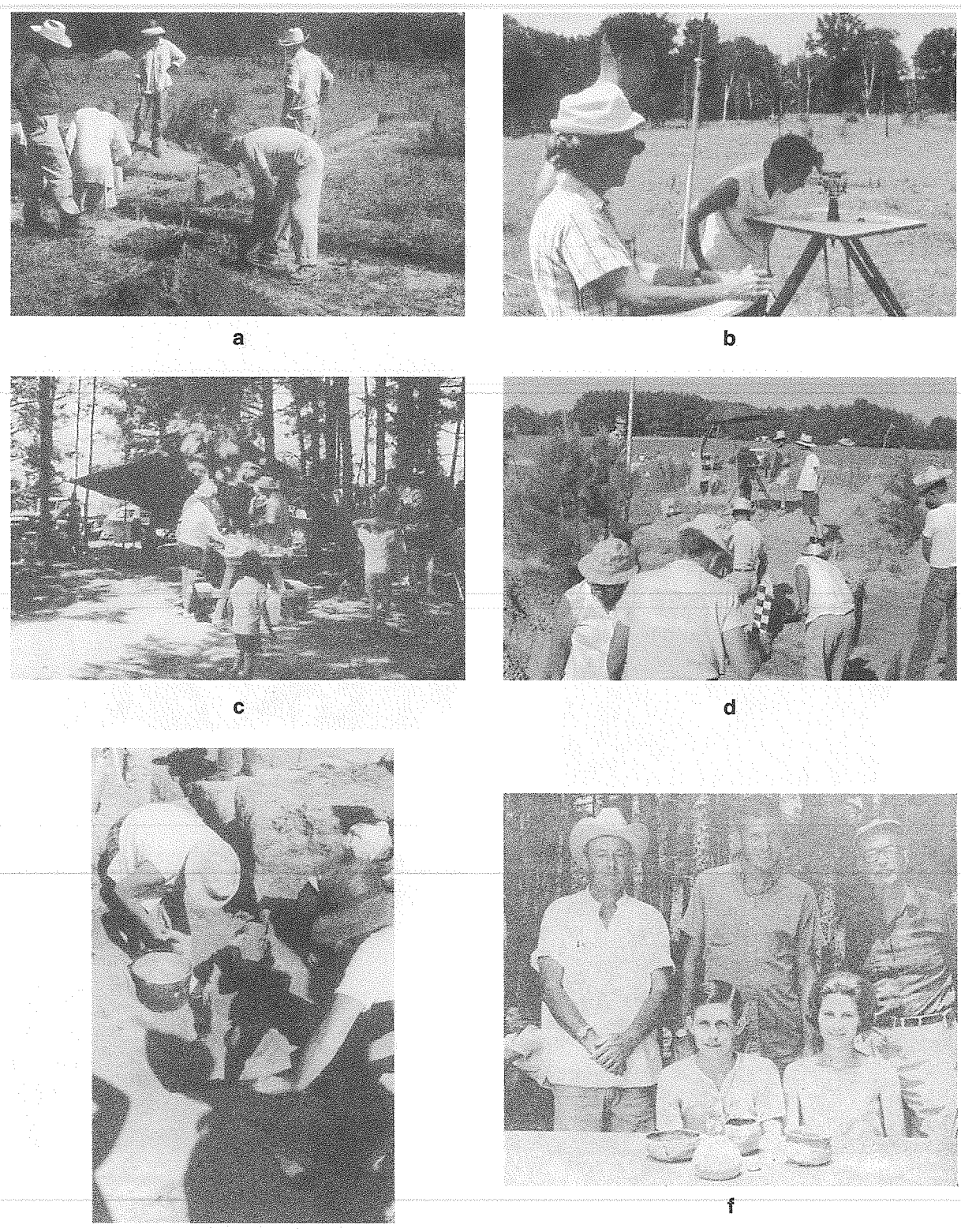


Figure 5. Field School at the Harold Williams site: a, Area C, with C. A. Smith, Charles Bandy, unidentified woman, Charlie Bollich, and Lou Fullen; b, Norma Hoffrichter with alidade, Dessamae Lorrain, and unidentified helper; c, lunch; d, everyone is busy; e, Margaret Drew; f, Bob Turner, J. Ned Woodall, E. Mott Davis, Rickey Williams, and Belinda Williams. This photo is reproduced from *Pittsburg Gazette*, June 22, 1967.

Worth. For this, among other reasons, the article was not completed at that time. This is not to say it was forgotten, for it was not, either by the authors or by TAS, who in the person of Bill Richmond reminded us several times each year that this needed to be completed. If you are reading this, he was successful.

This article not only includes the work of the TAS Field School but also the information from the senior author's surface collection, the available information from the 19 Titus Phase graves excavated in 1959, as well as archeological data from Pits 19 and 20, excavated in the Spring and Summer of 2000 by Perttula, Nelson, Walters, and Gonzalez. It is our objective to use all available information to give an account of the people who have occupied this piece of ground over the millennia.

THE TAS PLAN OF ATTACK

Dr. E. Mott Davis and Lou Fullen supervised the Area A excavations. Area B was supervised by Cecil Calhoun and Bob Burleson, and Charles Bandy supervised the Area C work. Area C was located 269 m northwest of Area B (see below).

The metric system was used during the Field School, and most excavated units were 1 x 1 m in size, or multiples thereof. Levels were usually excavated in 15 cm increments, but 10 or 20 cm levels, or other thicknesses, were used as necessary. In Areas A and C, the excavated units were identified only by their north and east designation at the unit's southeast corner. In Area B, in addition to the southeast corner designation, units were identified by Pit, Trench, or Feature, and an identifying number.

The surface of Area A and B had been row cropped for many years, and there was no contextual integrity within the plow zone. During the excavations, the sediments were screened through 1/4-inch hardware cloth, but in cases where speed was essential, 1/2-inch screens were used.

THE AREA A EXCAVATIONS

Dr. E. Mott Davis directed the large eastern area dig where the Williams children found the exposed vessels (Davis 1967; see also Turner [1997]). Lou Fullen and the youth group excavated the western part of Area A, which was between Davis and the fence dividing Areas A and B (Figure 6).

The location of the vessels and earspool found by Rickey and Belinda Williams, the platform pipe (with a ceramic hand holding the bowl), and the location of the grave found during excavation, are also shown on Figure 6. The units north of N94, and the trenches (Figure 7), were excavated by shovel shaving and spot screening through a disturbed zone, about 20 cm in thickness, looking for additional features. None were found, but many artifacts were collected in this zone.

A trench was placed across the gully between W108-W117/N89 (see Figure 6). Profiles were recorded on the north wall to depict the maximum extent of the disturbed areas along the sides of the gully. In the course of these excavations, a discernible midden was not identified, and most of the artifacts were recovered between 0-20 cm bs.

Figure 8 shows the distribution of selected artifacts in Area A. The artifacts include earspools (Figure 9), a platform pipe and fragments (Figure 10b-10d), and several arrow and dart points (Figure 11n-w).

The three pottery vessels discovered by the Williams include two bowls and a bottle. One bowl has a slightly compound shape with a nearly rounded base (Figure 12a). The four continuous lines around the rim are engraved. The body decorative technique is completely different. The pattern is composed of punctates with no zoning or guide lines. The curvilinear pattern, repeated three times around the vessel, was placed when the clay was plastic and then smoothed before firing. The small simple bowl (Figure 12c) is undecorated.

The most interesting of this group of vessels is the bottle with the rattlesnake design motif (see Figure 12b). The vessel is a light chocolate brown color, and has been well-fired; no temper is apparent. The design incorporates four engraved snakes in two pairs, with each pair of rattles connected at a circle (Figure 12d-e); the engraved lines have a red hematite pigment smeared in them. The broken top of the bottle appears to be a recent break probably caused by plowing. There are also four rocker-stamping lines on the neck. A close examination of the engraved rattlesnakes shows that three have the same rattle design and one is slightly different. The same is true for the forked tongues, as three are alike and one is different (see Figure 12e). These vessels belong to the Middle Caddo period occupation at the Harold Williams site.

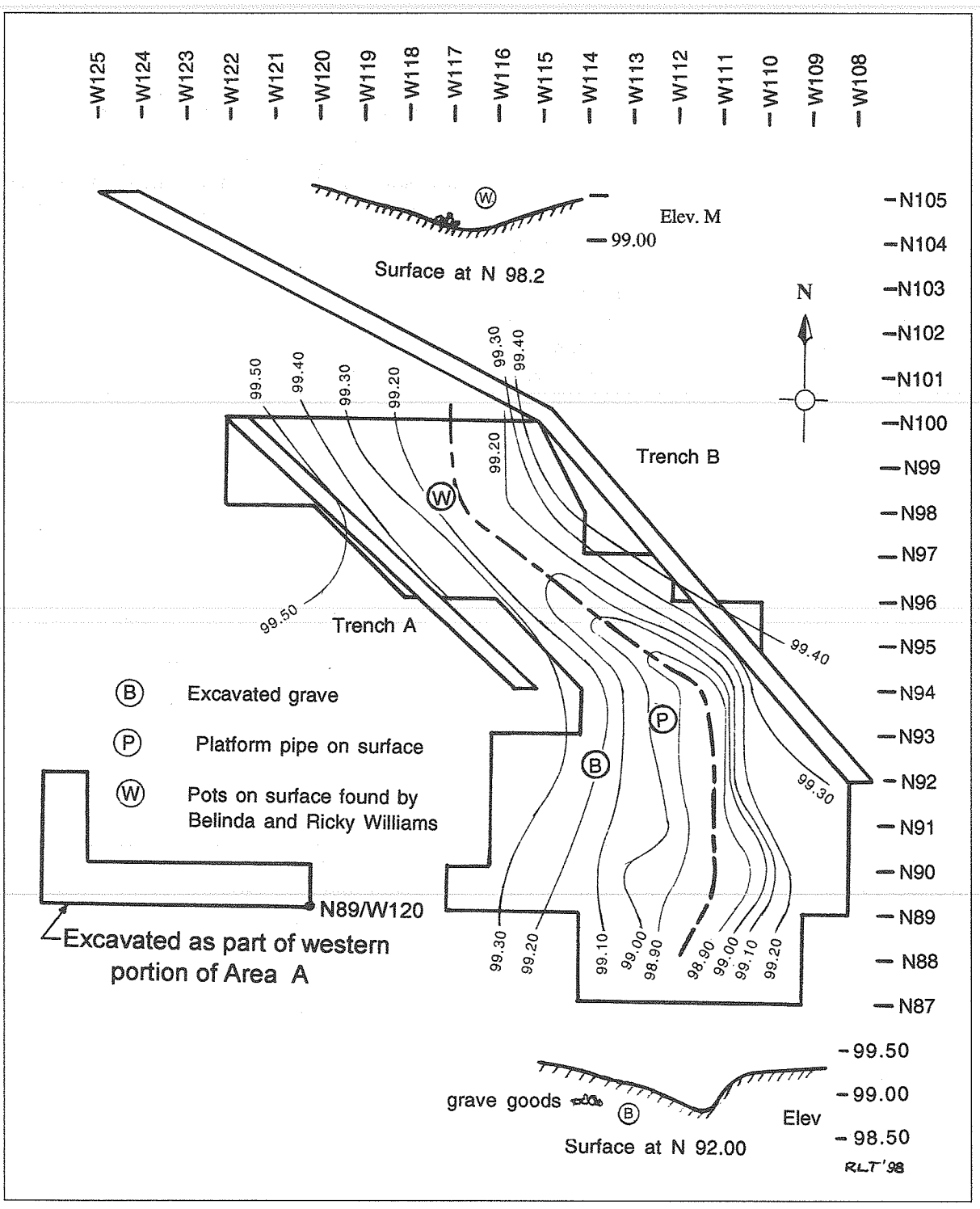


Figure 6. Area A East, contours and area excavated.

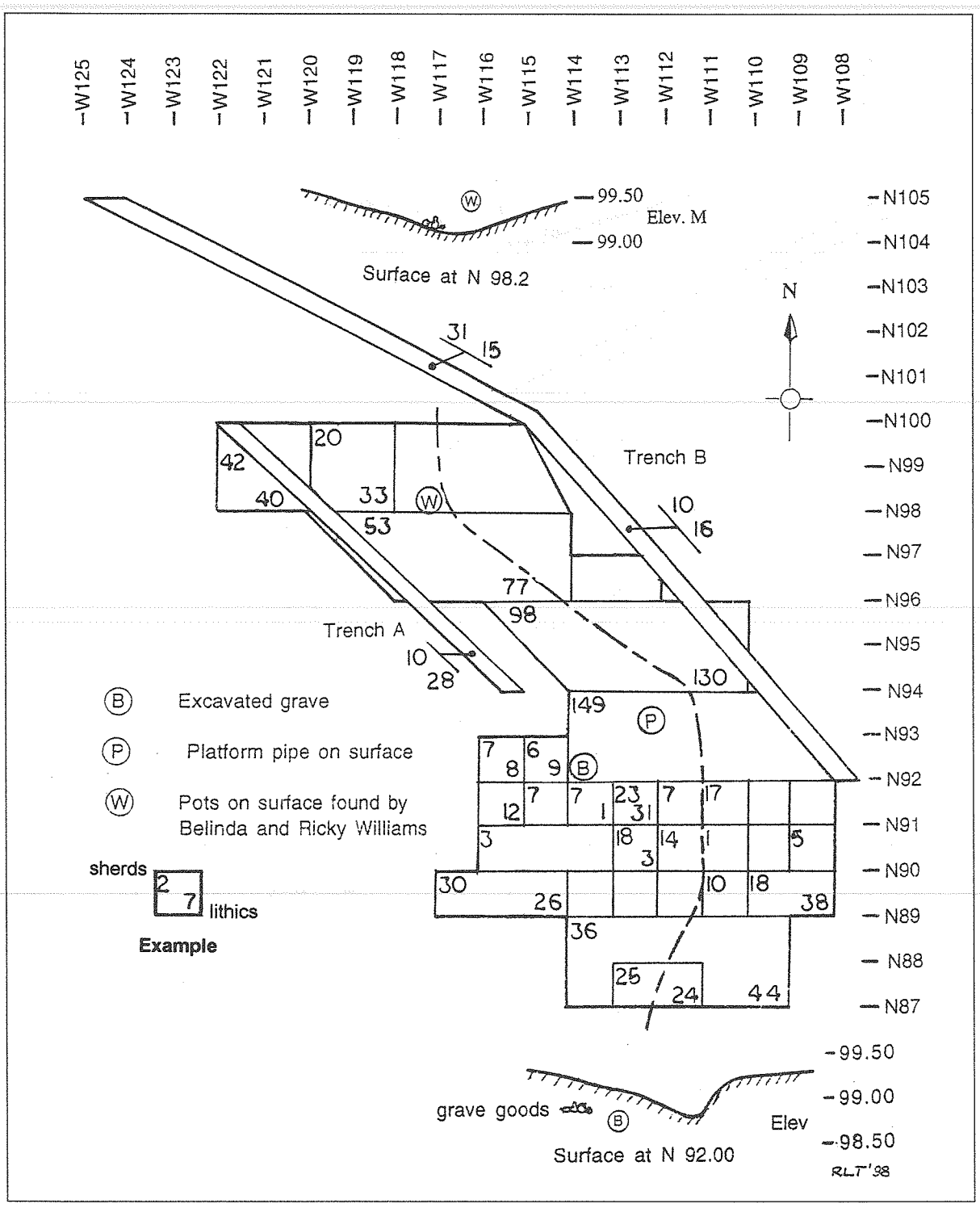


Figure 7. Distribution of sherds and lithic debris in various excavated units in Area A East.

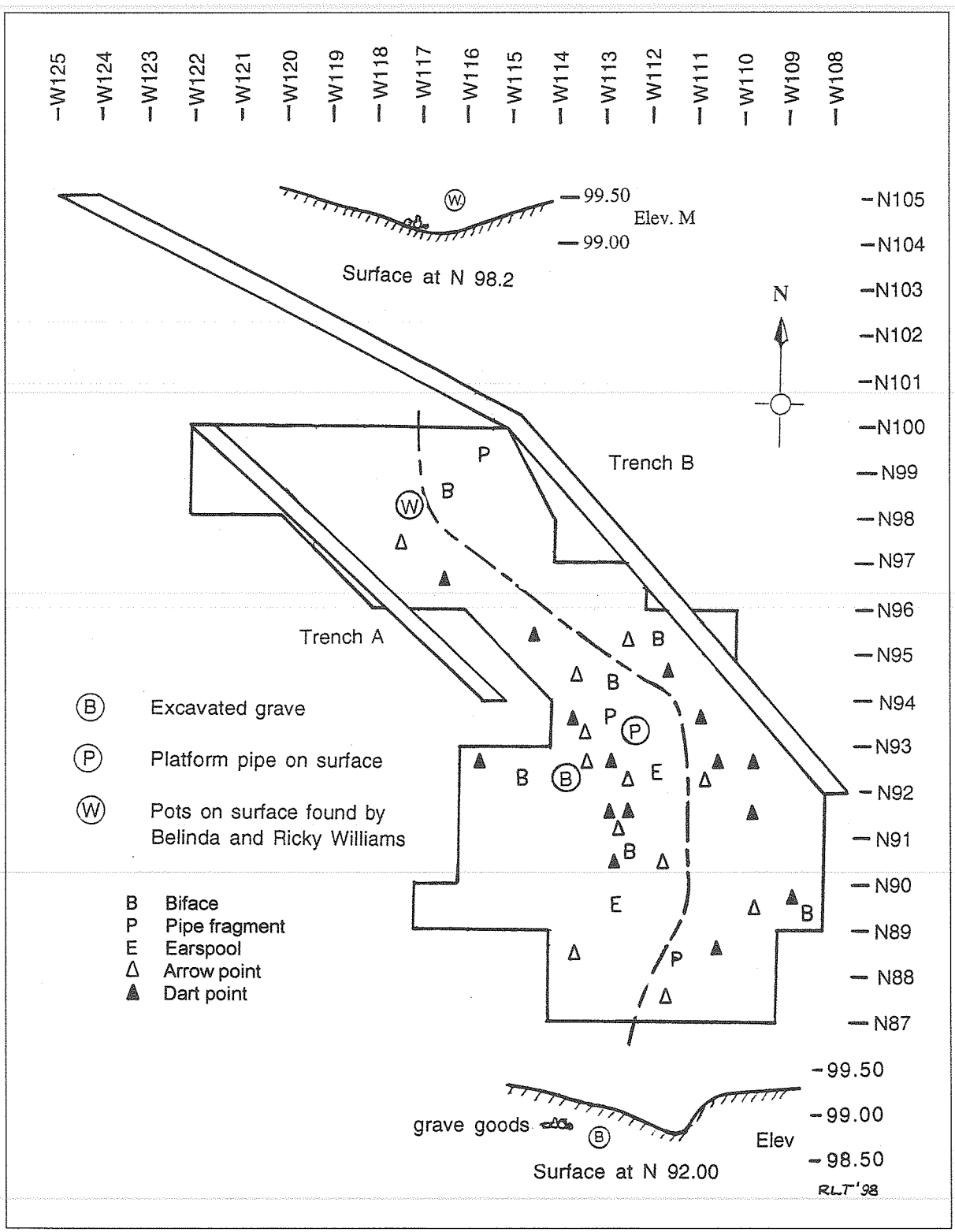


Figure 8. Distribution of selected artifacts in Area A East.

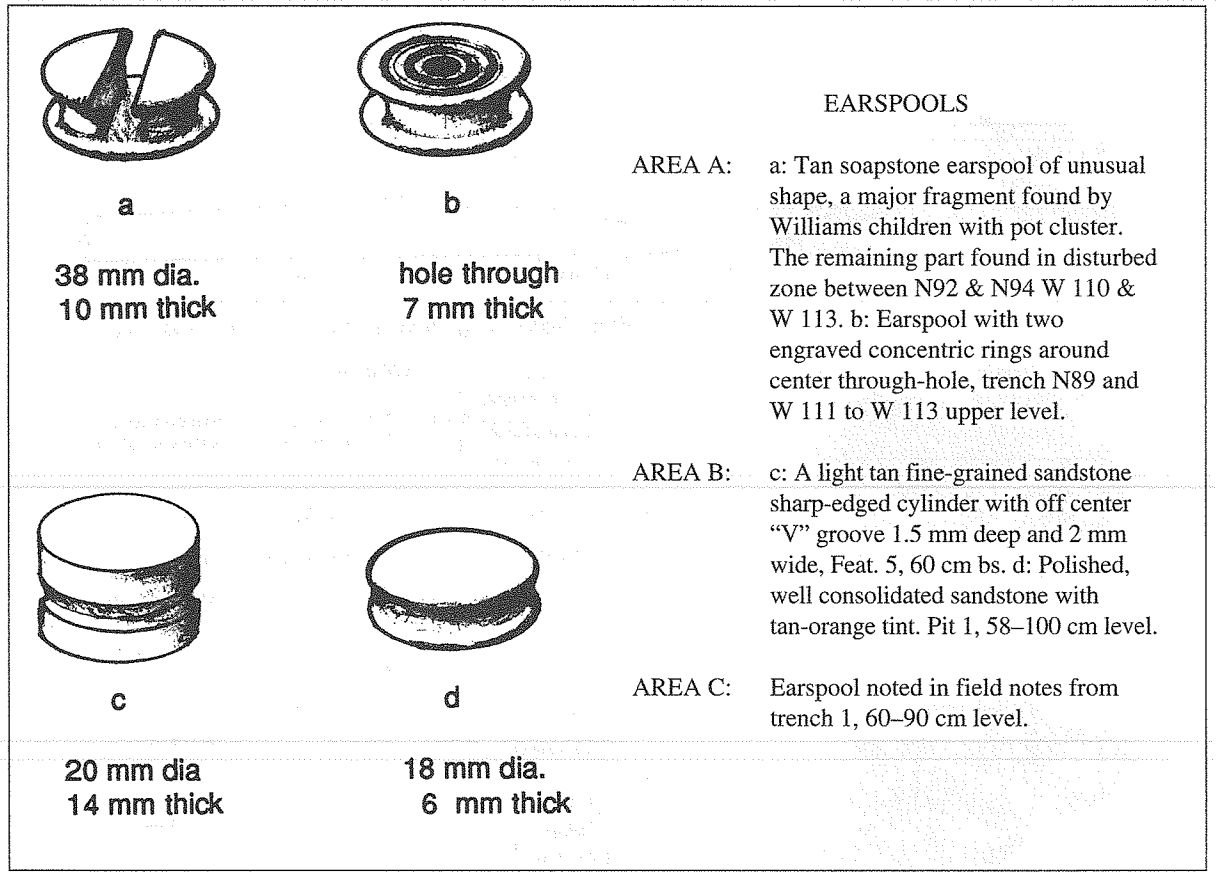


Figure 9. Earspools from Area A and B excavations.

During the course of the exploratory trenching along the gully, a grave was found at N92/W113 (Figure 13a-b). Including a vessel found in the adjacent unit directly to the south, there were six vessels with the grave (Figure 13c-d). Additionally, a Homan arrow point was found near vessel a (Figure 13e). A single arrow point, even though found in a grave, may not be an intentional placement but it was in the grave fill. There was no skeletal material associated with this vessel cluster, and the attempt to find a grave outline was unsuccessful.

One vessel is a small Pease Brushed-Incised cooking jar with four vertical appliqued ridges that quadrate the body (see vessel a in Figure 13c); the latter is roughly smoothed, but not polished. The rim is horizontally brushed, with three rows of punctates encircling it. The broken bottle neck had been squared and resmoothed for continued use (see Figure 13d). The design on the body was lightly engraved and somewhat carelessly done. One plain jar (see Figure 13d) had fire clouds on the exterior that ranged from near black to chocolate brown to reddish-tan in color. The other three vessels are plain bowls and jars (see Figure 13c-d). Based on the overall assemblage, vessel size, bottle decoration, proximity to the other vessel grouping, and total lack of skeletal remains, this grave is also assigned to the Middle Caddo period occupation at the Harold Williams site.

Area A, the Western Excavation

This area was excavated by the youth group under the supervision of Lou Fullen. The top of Figure 14 is a plan view of the excavation units, with profiles below (north wall, except for the east wall at View B-B). The excavations were carried out in 15 cm levels. Numbers to the left and right depict the quantity of sherds and lithics, respectively, found in each level of the various units. Projectile points are sketched and shown at the level at which they were found. Units N89/W120 and N89/W130-N89/W150 appear to be undisturbed below the plow zone, while the L-shaped excavation

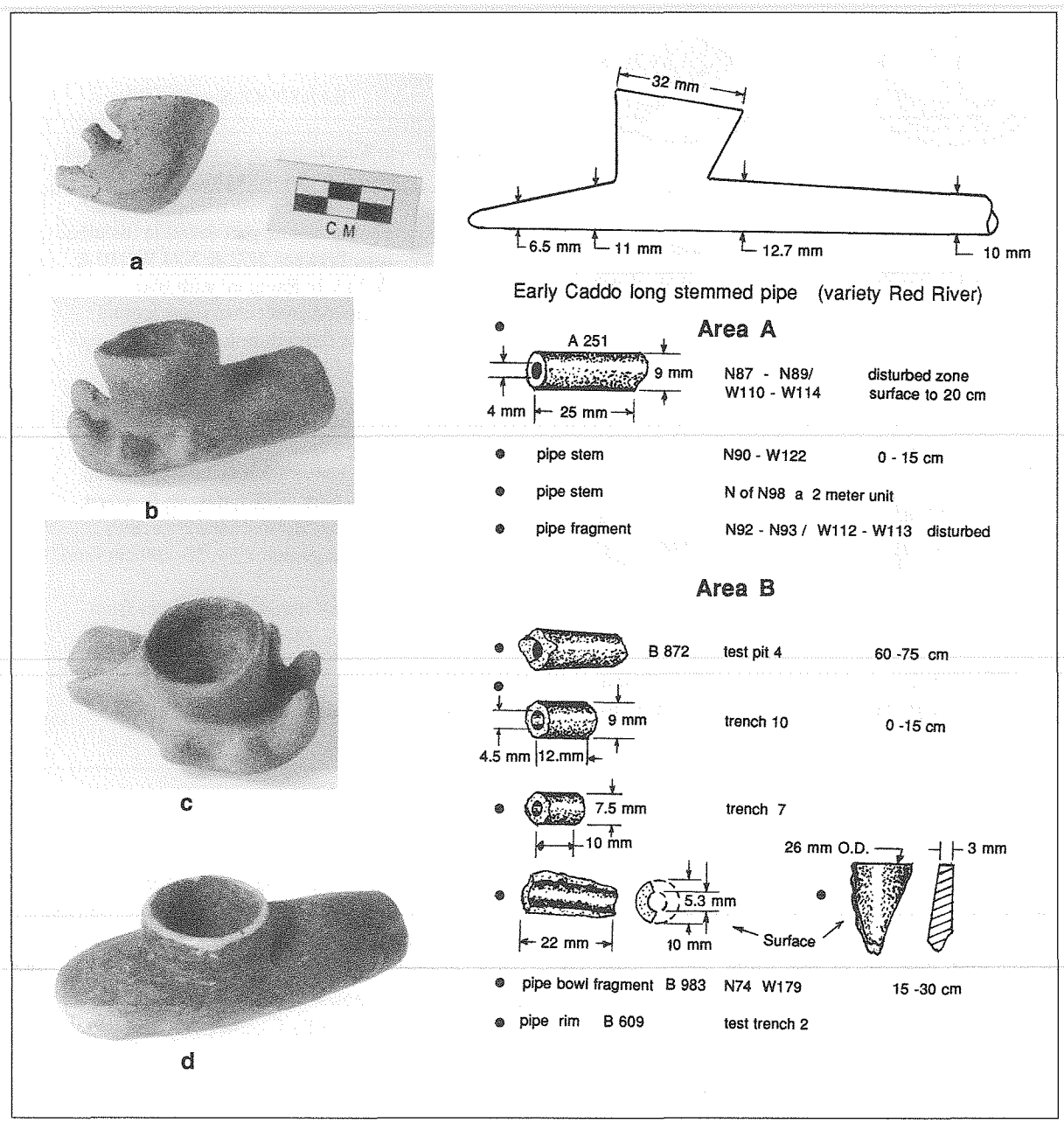


Figure 10. Pipes and pipe fragments from both Areas A and B: a, elbow pipe from Titus phase grave N; b-c, platform pipe from gully surface in Area A east; d, platform pipe from Area A south of youth excavations, a surface find; e, pipe stems and bowl fragments.

was primarily in disturbed sediments. Both views A-A and B-B show relatively recent organic accumulations, including small limbs and sticks, and a large deflated deposit of local ferruginous sandstone rock and gravels that appeared to be the remnant of a wash.

Found in these gravels were an Edgewood dart point, two Homan arrow points, a modern ceramic sherd, a glass bottle neck fragment, and a rim sherd of Ripley Engraved with a pendant triangle motif. These units were certainly disturbed, and agricultural activity had covered the rocky gully bed and artifacts with 60 cm of recent overburden containing unrotted twigs and limbs.

In three of the undisturbed units, lithic debris was found in the 15 cm level below the first

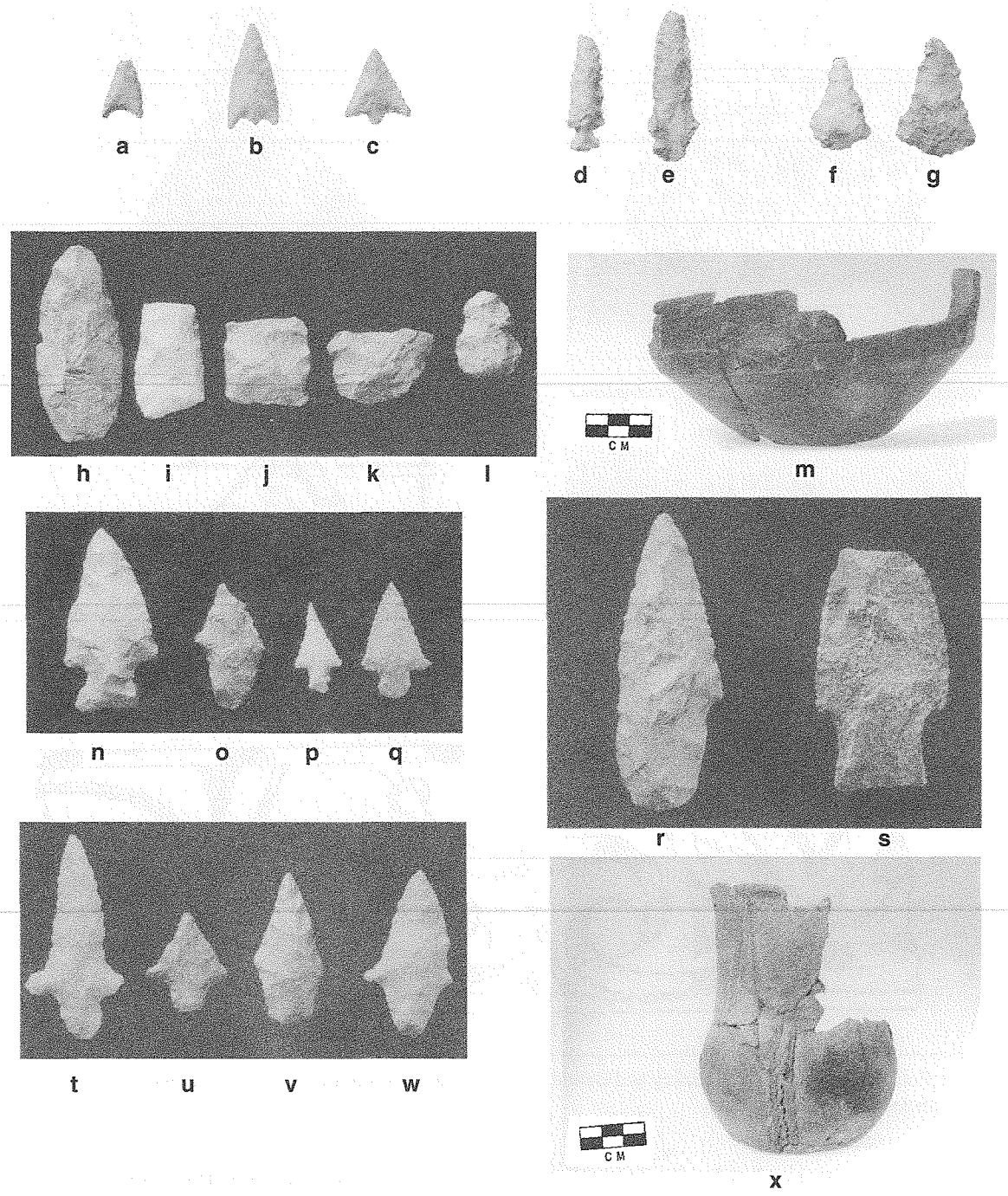


Figure 11. Lithic and Ceramic Artifacts from Areas A and B. Area B artifacts are: a, Talco point from spring-deposited sand by the house, Feature 7; b-c, Bassett points from Titus phase graves K and N; Surface collection: d-e, unclassified arrow points, f-g, Clifton arrow points; h-l, surface collection: bifaces and biface fragments; m, Ripley Engraved carinated bowl from late Titus phase, with pendant triangle decorative technique, Pit 14. Area A artifacts: n, Edgewood dart point, N89/W108; o, Gary *var. hobson*, N92/W114; p, Bonham-like arrow point, N90/W111; q, Homan point from excavated grave, N92/W113; r, Morrill dart point, N78/W109; s, Yarbrough dart point, N78/W109; t, Homan arrow point, N90/W125; u, Homan arrow point, N90/W125; v, Gary *var. hobson*, N90/W125; w, Gary *var. kemp*, N89/W140; x, Pease Brushed-Incised jar from wash, N78/W109.

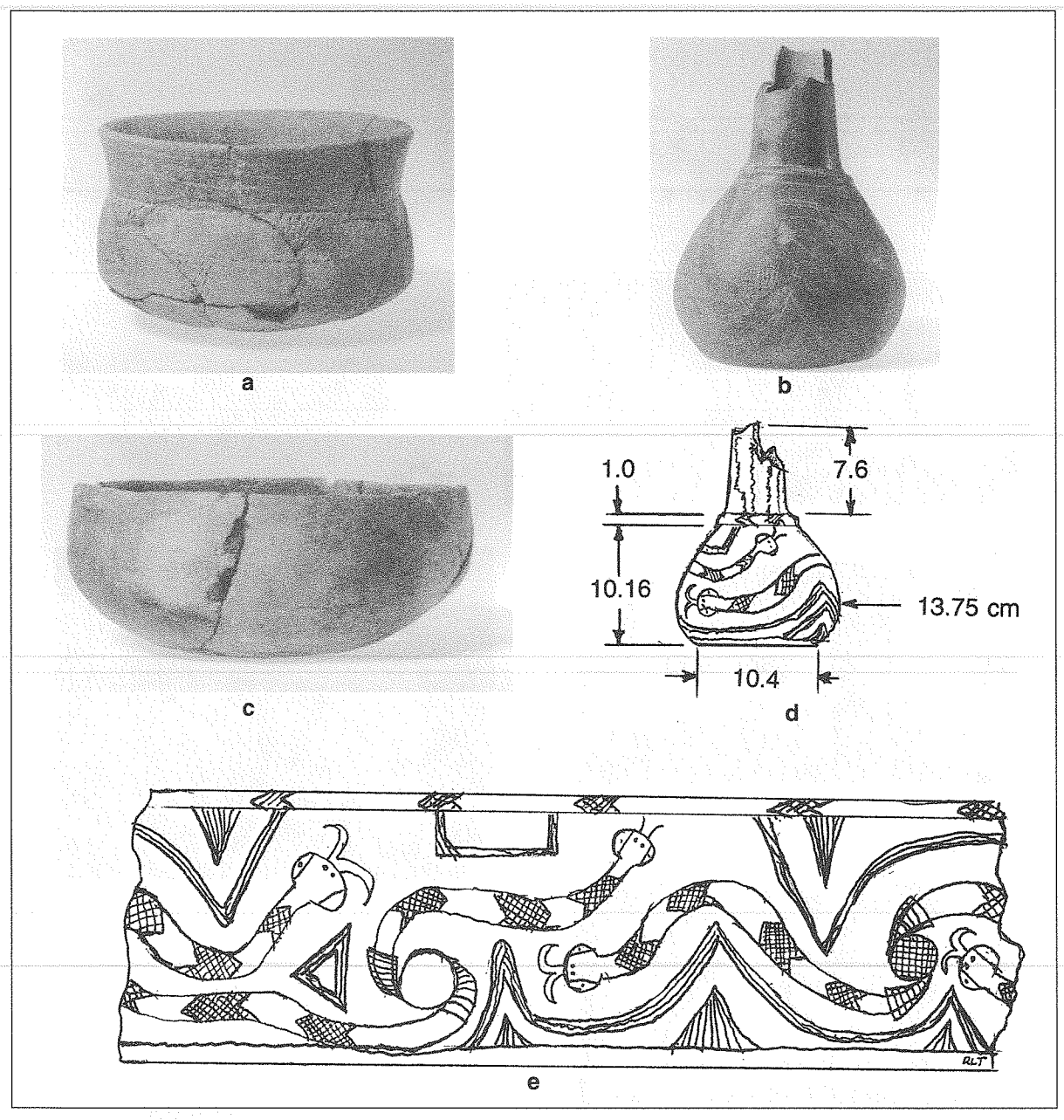


Figure 12. Pottery vessels found by Rickey and Belinda Williams in Area A (east): a, engraved bowl; b, d, e, bottle with engraved rattlesnakes; c, plain bowl.

appearance of pottery sherds. In four of the undisturbed units Gary dart points are found at depths of 90-105 cm, 45-60 cm, and 60-75 cm, with a Homan arrow point and an unidentified arrow point in the plow zone (see Figure 11t-w). Figure 15 illustrates the density per m^3 of the ceramic sherds and lithic debris for each 15 cm level in the undisturbed squares. Table 1 shows the percent of the sherd decorative techniques at each level.

Area A Projectile Points

There are 30 projectile points from Area A, including 11 arrow points and 19 dart points (see Figures 11 and 14). More than 80 percent of the arrow points are of the Homan type (Table 2), and these have a rounded to somewhat bulbous stem, whereas Alba and Bonham arrow points have rectangular stems that are usually straight across the

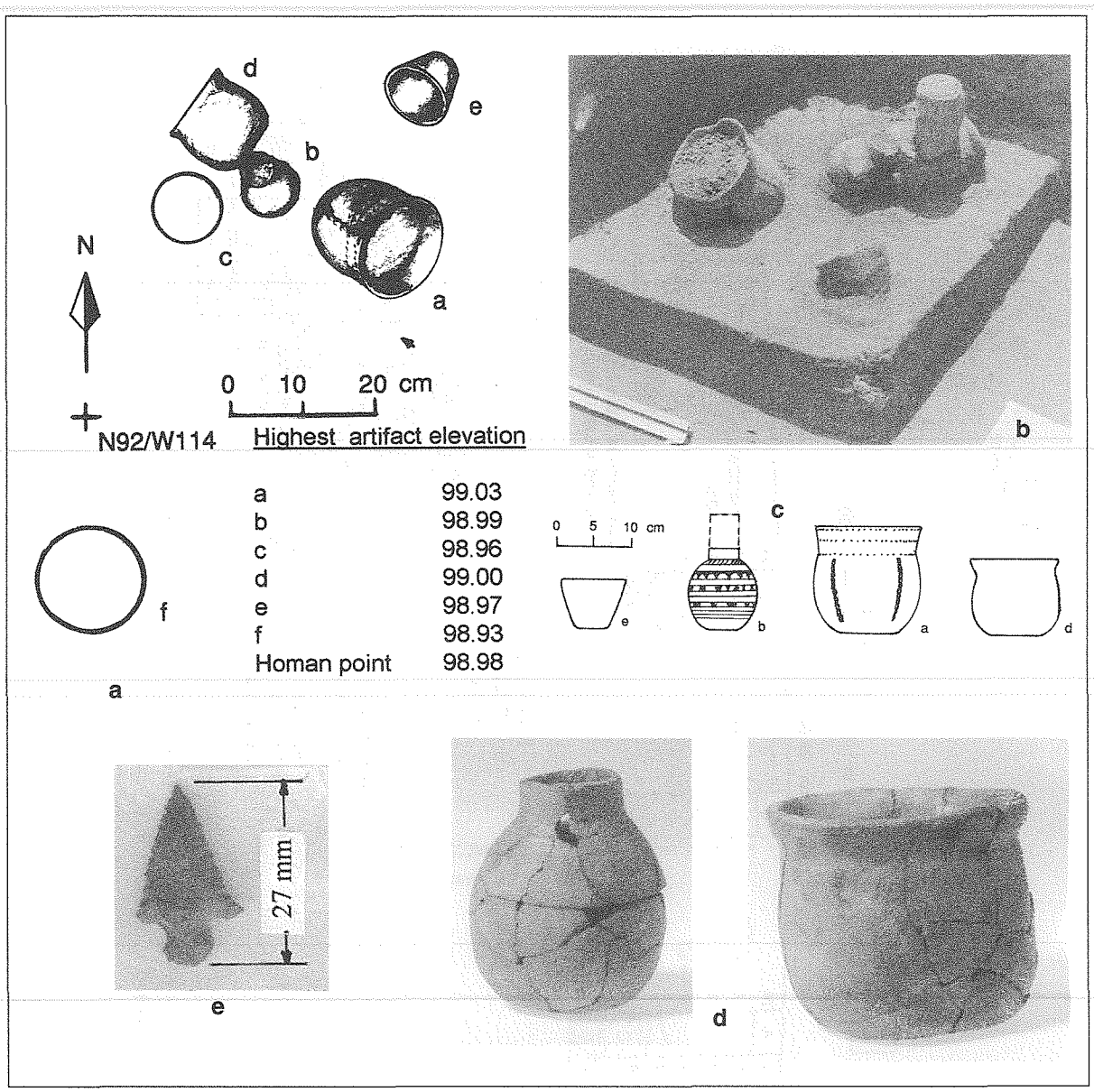


Figure 13. Excavated grave in Area A, east: a, plan view of vessels and arrow point; b, view of grave looking southwest; c, sketches of vessels with scale; d, photographs of bottle and jar; e, Homan arrow point.

base (Suhm et al.1954; Suhm and Jelks 1962; Shafer 1973; Turner and Hester 1993). The dart points are dominated by Gary points (68 percent of the dart points in Area A), including both large and small specimens (see Table 2).

In Area A, east, only a few of the units were excavated very deeply by level. In four of the units, projectile points were found below the disturbed zone: a large Gary, 20-30 cm bs, a small Gary, 50 cm bs, and an Edgewood dart point and Homan arrow point from 20-40 cm bs (see Figure 14).

Area B Excavations

Cecil Calhoun directed one crew of excavators in Area B, Bob Burleson directed the other. The main purpose of these excavations (see Figure 2) was to locate house structures or other features within the village area, as well as to recover associated artifacts in the midden.

Some of the excavations were designated as pits, usually 2 x 2 m in size, but some were 1 x 2 m. The pits were placed to determine the limits of the

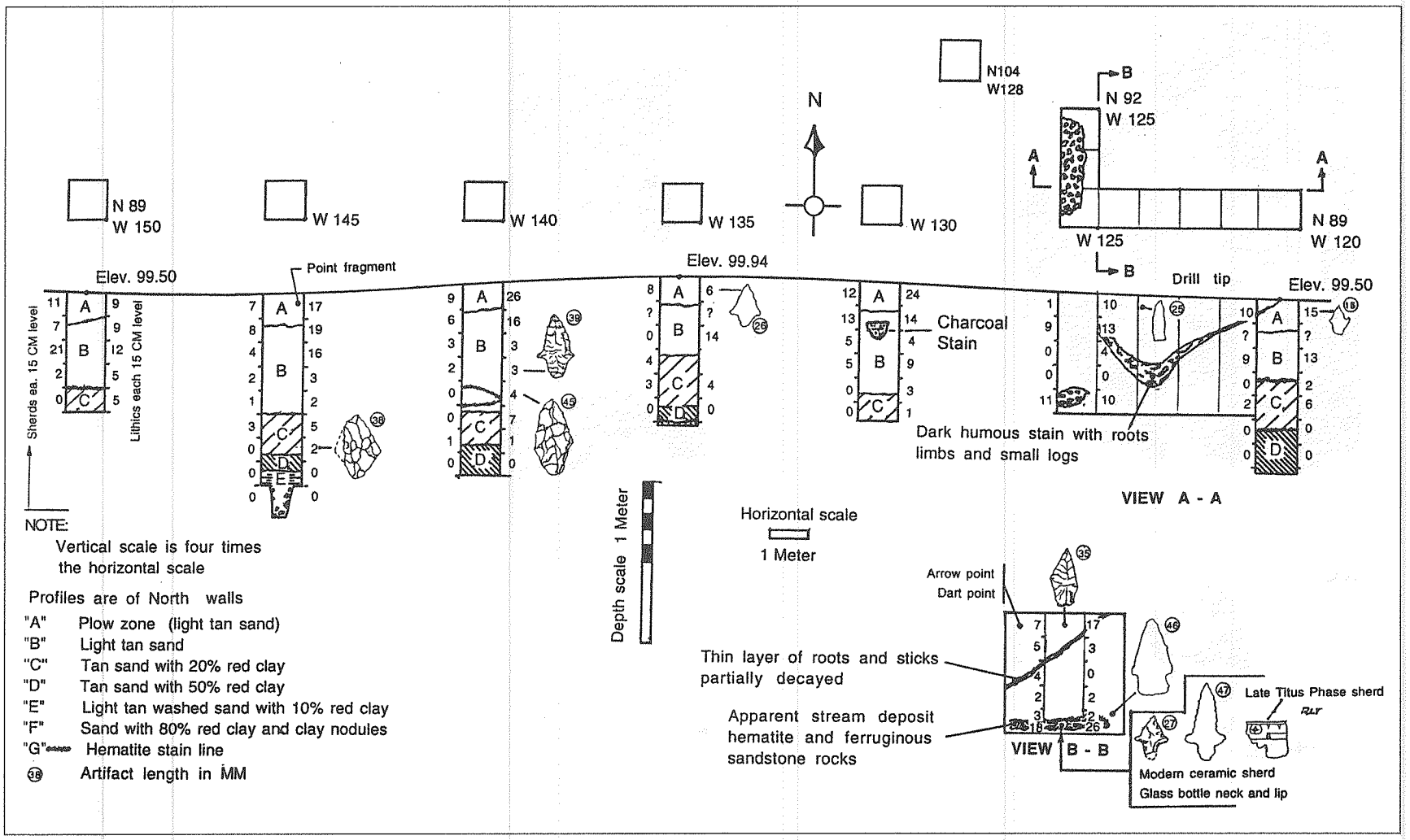


Figure 14. Plan and profile of Area A, western portion, units and selected artifacts.

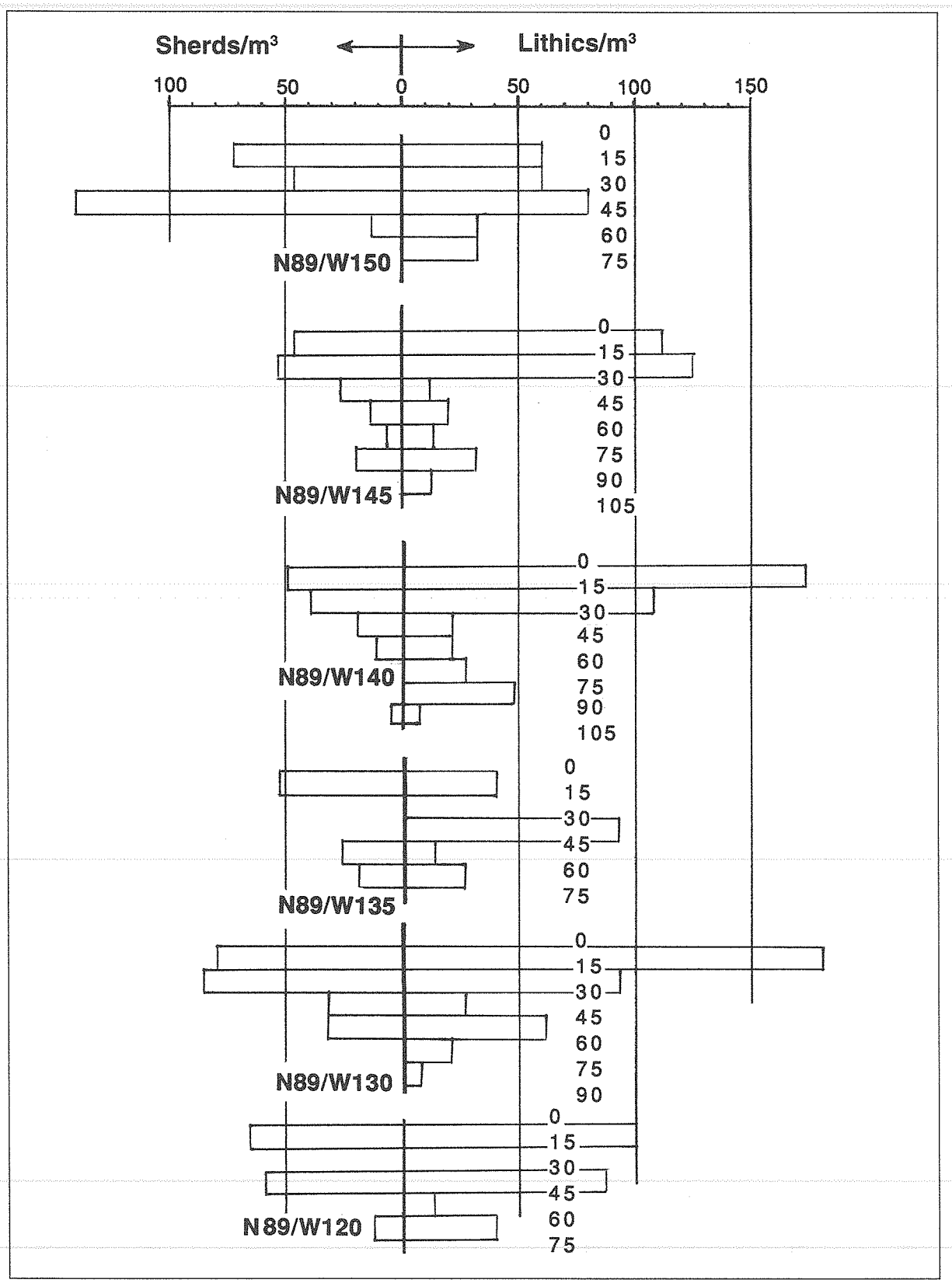


Figure 15. Density of sherds and lithic debris in Area A.

Table 1. Percentage of sherd decorative techniques in Area A by level.

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	N
N89W120								
15	80*	20	–	–	–	–	–	10
30	Data Not Available							
45	100	–	–	–	–	–	–	9
60	–	–	–	–	–	–	–	0
75	50	–	–	50	–	–	–	2
N89W130								
15	67	8	–	25	–	–	–	12
30	92	–	–	–	8	–	–	13
45	40	20	–	20	20	–	–	5
60	60	40	–	–	–	–	–	5
N89W135								
15	88	–	–	12	–	–	–	8
30	Data Not Available							
45	–	–	–	–	–	–	–	0
60	100	–	–	–	–	–	–	4
75	100	–	–	–	–	–	–	3
N89W140								
15	78	–	–	22	–	–	–	9
30	67	–	–	17	17	–	–	6
45	67	–	33	–	–	–	–	3
60	100	–	–	–	–	–	–	2
75	–	–	–	–	–	–	–	0
90	–	–	–	–	–	–	–	0
105	100	–	–	–	–	–	–	1
N89W145								
15	86	–	14	–	–	–	–	7
30	63	–	12	25	–	–	–	8
45	100	–	–	–	–	–	–	4
60	100	–	–	–	–	–	–	2
75	100	–	–	–	–	–	–	1
90	100	–	–	–	–	–	–	3
N89W150								
15	55	9	–	–	36	–	–	11
30	71	14	–	14	–	–	–	7
45	71	–	9	9	5	–	5	21
60	50	–	–	–	50	–	–	2

*percentage

Table 2. Total Projectile Points from Area A, both East and West.

Arrow Points	
Homan	9
Perdiz	2
Dart Points	
Gary points,	
large	2
small	4
untyped	7
Yarbrough	2
Edgewood	1
Morrell	1
Kent	1
Untyped	1

habitation area and the locations with the highest potential to contain structures, features, and midden deposits. Trenches designated those excavations more elongated in shape and selected to cover a greater surface area (see Figure 2). A few areas were mapped as features and so designated on the site map. In Area B, features were numbered from 1-3 and 5-8; Feature 4 was not assigned.

During the excavations, most of the levels were in 15 cm increments, although 10 or 20 cm thick levels were also employed. In some units where there was no stratigraphic control, the artifacts were bagged as if they were from a single level.

The initial excavations were in Pits 1-3 and Trench 1. Pit 1 was placed by an old test hole dug by the senior author from which several pounds of daub had been recovered. Because of the large quantity of daub, it was hoped that the remains of a Caddo house would be found nearby. Trench 1 was a 50 cm x 20 m unit with a maximum depth of 1 m bs. The trench was oriented northeast-southwest, in order to examine the midden deposit along its slope. Feature 2 was encountered in the trench (at the location of Pit 10, see Figure 2). It was a basin-shaped trash pit (80 x 35 cm in size) that had considerable charcoal, bone fragments, and a few pottery sherds. Feature 2 extended from 35-70 cm bs, and was first noted immediately below the midden.

All excavations had daub, sherds, lithic debris, and other midden refuse. Because of the quantity of artifacts found, a large 3 x 3 m square, Test Pit 4, was opened adjacent to Pits 1, 2, and 3 in an attempt to find post molds from a house or other structure. Although artifacts were abundant, no post molds were found here. Figure 16 indicates the ceramic sherds/m^3, the lithic debris/m^3, as well as the weight (in grams) of daub in each level if it was collected.

For Test Pit 4, Table 3 provides the analysis of the pottery sherd decorative technique for all sherds in each level by percent as well as the total sherds in the level. Also listed are the other artifacts from that level. Figures 16-20 and Tables 4-7 provide the same information for all pits and trenches for which data were recorded in Area B.

Pits 19 and 20

by Timothy K. Perttula, Bo Nelson, Mark Walters, and Bobby Gonzalez

Additional archeological investigations were conducted at the Harold Williams site by Bo Nelson, Mark Walters, Bobby Gonzalez (of the Caddo Tribe of Oklahoma) and Timothy K. Perttula in May and August 2000. The purpose of this work, part of a broader and ongoing study of the Caddoan archeology of the Big Cypress Creek basin, was to locate and examine an area of intact Caddoan archeological deposits at the site to obtain samples for radiocarbon and Oxidizable Carbon Ratio (OCR) dates as well as recover preserved plant and animal remains.

One such area of Caddoan archeological deposits was located in Area B. Excavations first included 11 positive shovel tests and six positive auger tests (Table 8). Next a 1x 1 m unit (Pit 19), and a 50 x 50 cm unit (Pit 20) were excavated; Pit 20 adjoined the southeastern corner of Pit 19 (see Figure 2). These units were placed immediately adjacent to shovel tests that had quantities of daub.

This work identified a 20-30 cm thick Caddoan midden deposit containing a dense concentration of daub, probably from a burned Caddoan house, along with ceramics, lithic debris, arrowpoints, animal bone, and charred plant remains (nutshells and corn). The midden was overlain by a modern plow zone, and underneath the midden were undisturbed E-horizon sandy deposits with a low density of archeological materials. Table 9 summarizes the

Table 3. Percentage of sherd decorative techniques in Area B by level, and other artifacts, Pits 4, 12–15, and 18.

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Pit 18									
15	74.1*	4.5	5.9	5.6	5.6	11.1	–	89	—
30	64.1	6.4	6.4	10.2	9.0	3.8	–	78	2 Talco, 1 dart point
45	Data Not Available								
60	78.7	1.3	1.3	1.3	14.7	4.0	–	75	—
Pit 14									
15	71.6	4.9	9.9	6.2	6.2	1.2	–	81	1 Talco, 1 Maud
30	65.7	4.5	11.9	10.4	1.5	3.0	3.0	67	1 Friley, 1 arrow point fragment
45	78.2	2.2	2.2	23.9	4.3	–	–	46	1 Catahoula
60	77.1	1.4	1.4	15.7	4.3	–	–	70	1 Gary, *var. Emory*, 1 untyped point
Pit 13									
15	82.6	8.7	–	4.3	4.3	–	–	23	1 Bassett
30	58.8	11.8	14.7	5.9	2.9	5.9	–	34	1 point fragment; 1 mano fragment
45	82.2	2.2	11.1	2.2	2.2	–	–	45	small bone fragments
Test Pit 4									
10	67.9	8.0	8.9	9.4	4.7	0.1	0.1	212	2 Talco, 1 Bassett, 1 1 Homan, 1 Perdiz, 1 untyped point, 3 triangular points, 1 arrow point fragment, 3 worked flakes, 1 point fragment

Table 3. *(Continued)*

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
20	86.9	3.3	6.6	3.3	–	–	–	61	—
30	Data Not Available								
40	80.7	1.8	3.5	7.0	7.0	–	–	57	1 point fragment, 2 biface, 1 worked flake
50	64.1	–	25.6	10.2	–	–	–	38	1 large Gary point
60	70.2	4.3	2.1	14.9	6.4	–	–	47	—
70	100	–	–	–	–	–	–	8	1 pipe stem
90	100	–	–	–	–	–	–	4	1 scraper
Pit 12									
15	–	–	–	–	–	–	–	0	—
30	–	–	–	–	–	–	–	0	—
45	–	–	–	–	–	–	–	0	1 shotgun shell brass
Pit 15									
15	–	–	–	–	–	–	–	0	1 Bassett, 1 Homan
30	?	?	?	?	?	?	?	79	1 Talco, 1 arrow point fragment, 1 dart point fragment

*percentage

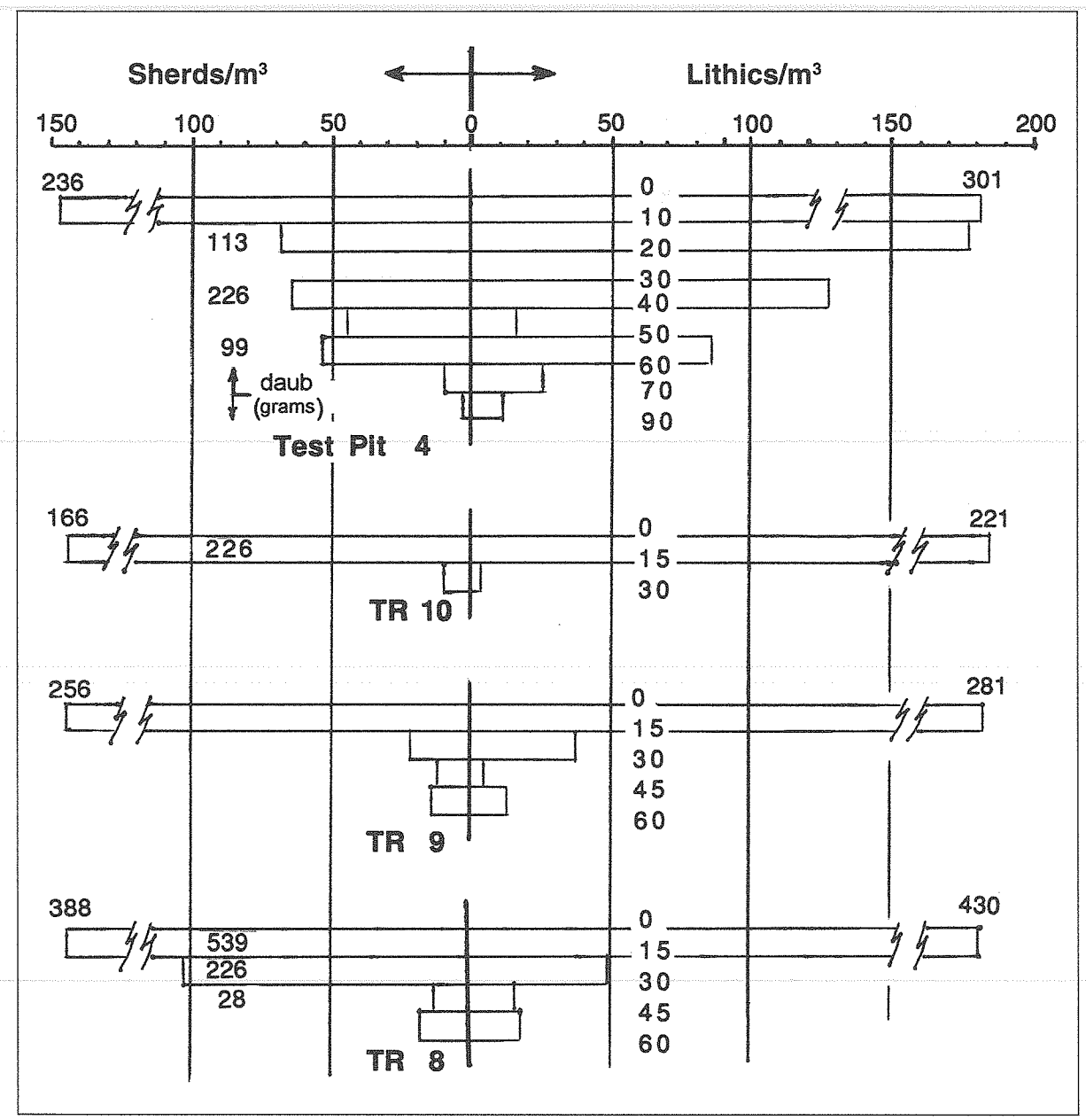


Figure 16. Density of sherds, lithic debris, and daub in Area B, Pit 4, Trench 8-10, by level.

different types of artifacts found in the combined Pit 19 and 20 excavations.

Daub occurs at a density of more than 5000 grams per m^3 of excavated deposits in the two pits, compared with 75 plain and decorated sherds per m^3 and 285 pieces of lithic debris per m^3. The highest densities of Caddoan artifacts are in the midden deposits, followed by the plow zone (see Table 9 and Figure 21).

Ten OCR samples and two radiocarbon dates were obtained from Pits 19 and 20 (Table 10). The results strongly suggest that the Caddoan midden deposits date primarily to the Middle Caddoan period, ca. A.D. 1200-1400, with limited use in the early part of the Late Caddoan Titus phase. The one Late Caddoan triangular arrow point was found in the plow zone (see Figure 21).

The culturally relevant OCR dates, based in part on context, sediment textural changes, and differences in pH in the Pit 19 and 20 columns (Douglas Frink, 2000 personal communication), range from 578-759 B.P., or ca. A.D. 1191-1372. A

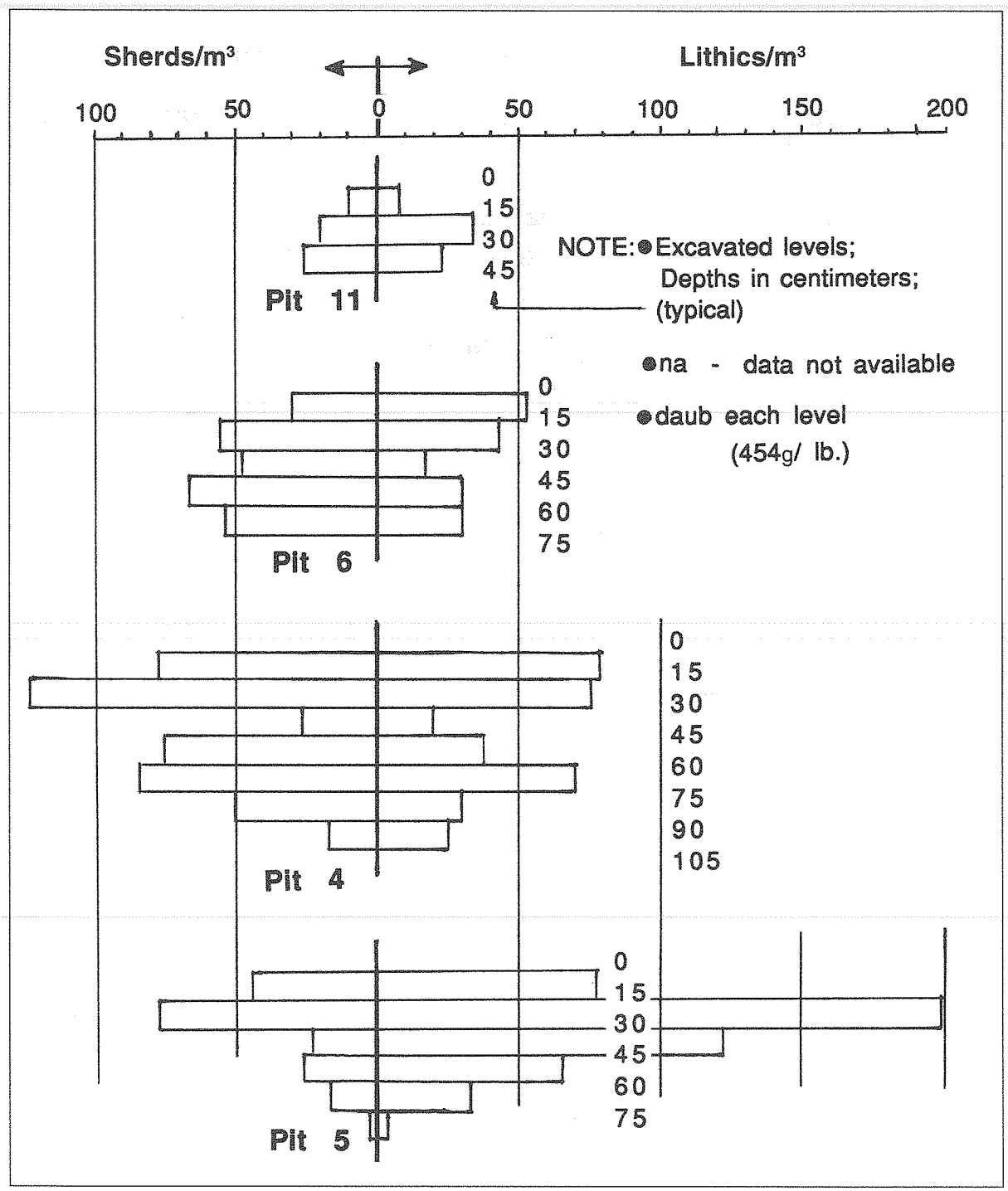


Figure 17. Density of sherds and lithic debris in Area B, Pits 4-6, and 11, by level.

distinct spike in the frequency of coarse particles at 30 cm bs suggests the Middle Caddoan occupation here may date closer to ca. A.D. 1251-1289. The sub-midden OCR dates range from 2572-4734 B.P., but they do not relate to the archeological deposits in Pits 19 and 20. It is more likely that they represent the age of pedogenic development in the sandy loam sediments on the landform.

Two radiocarbon dates on charred hickory nutshells were obtained from Pits 19 and 20. The

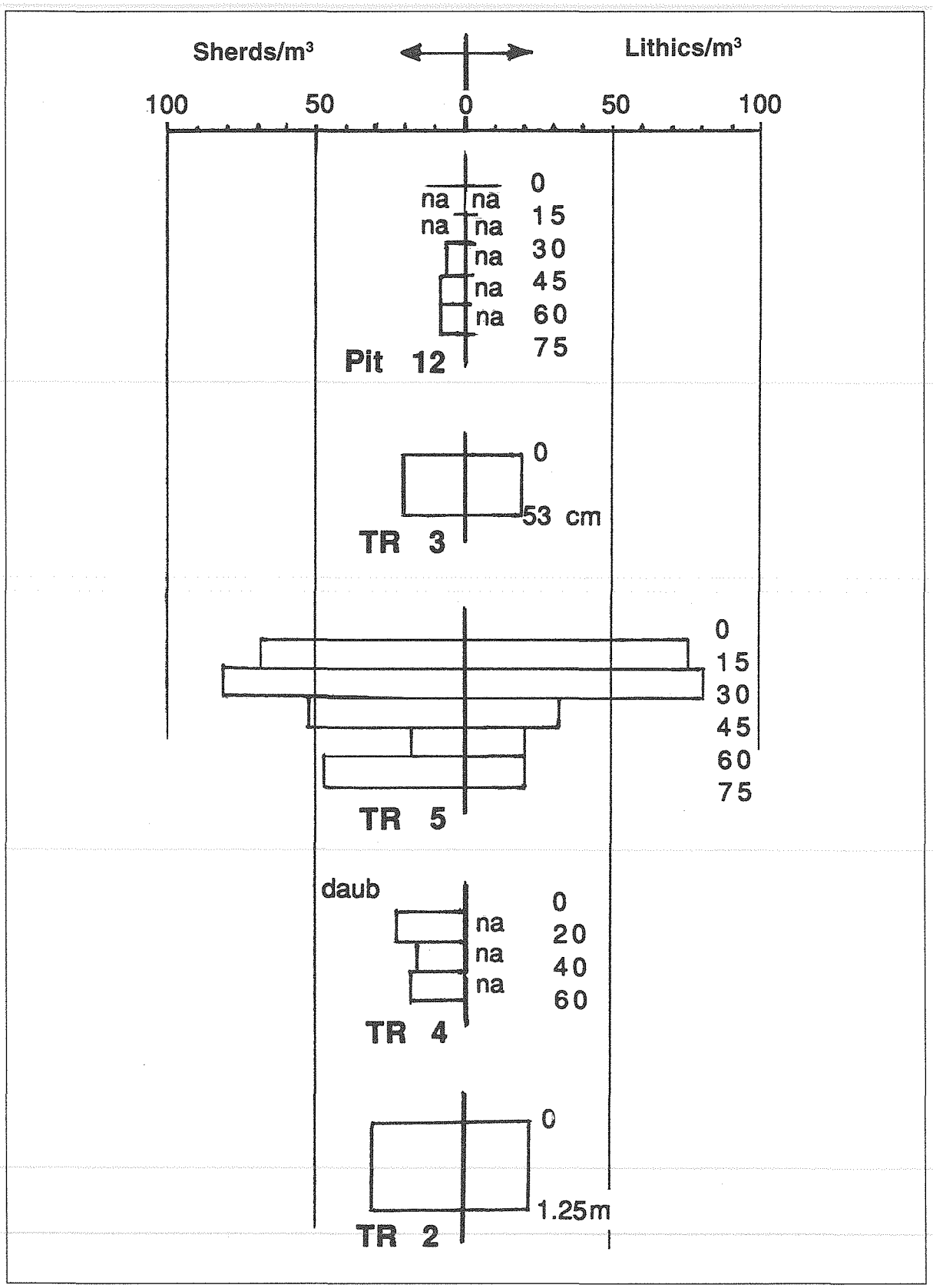


Figure 18. Density of sherds, lithic debris, and daub in Area B, Pit 12, and Trench 2-5, by level.

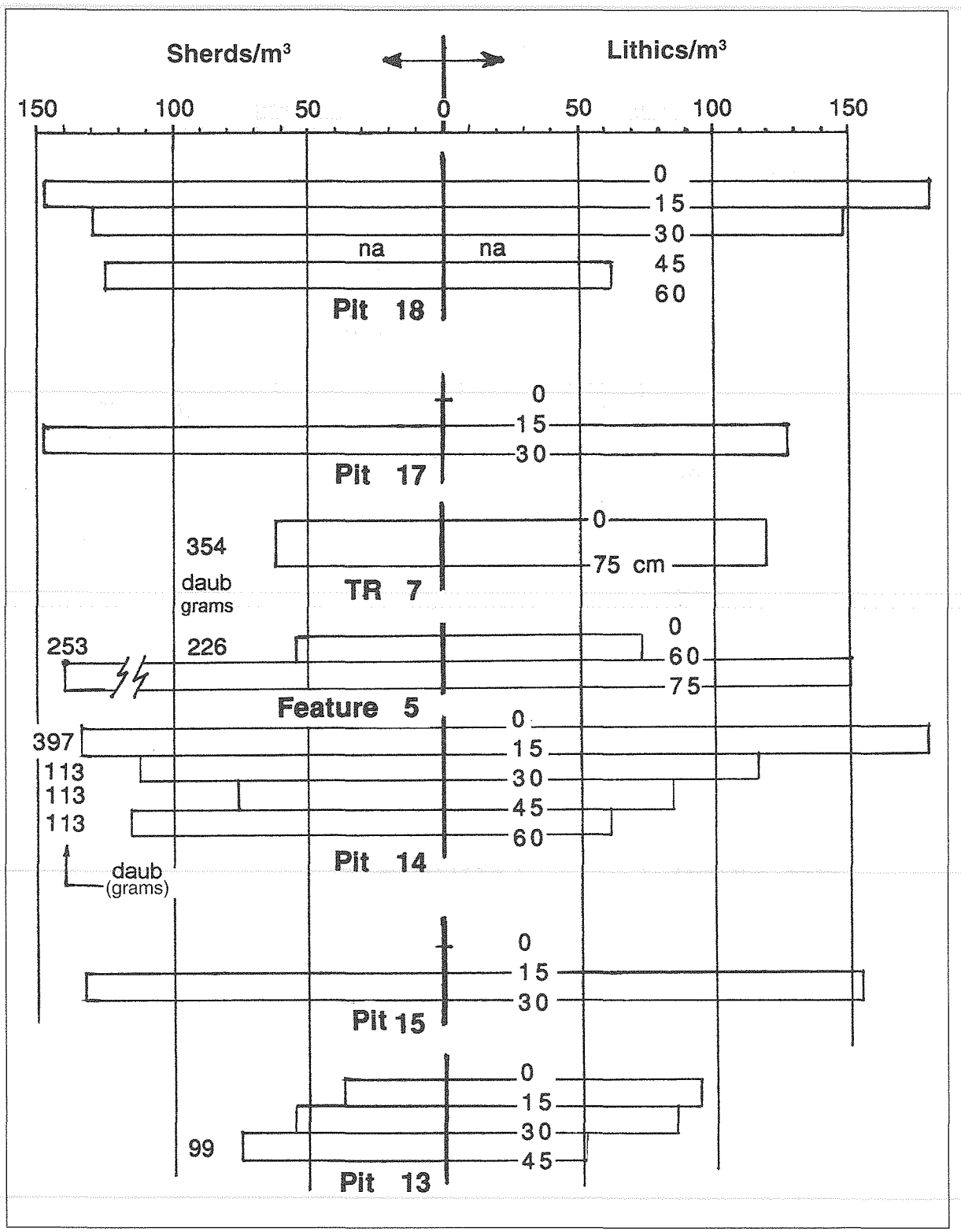


Figure 19. Density of sherds, lithic debris, and daub in Area B, Pits 13-15, 17, and 18, Feature 5, and Trench 7, by level.

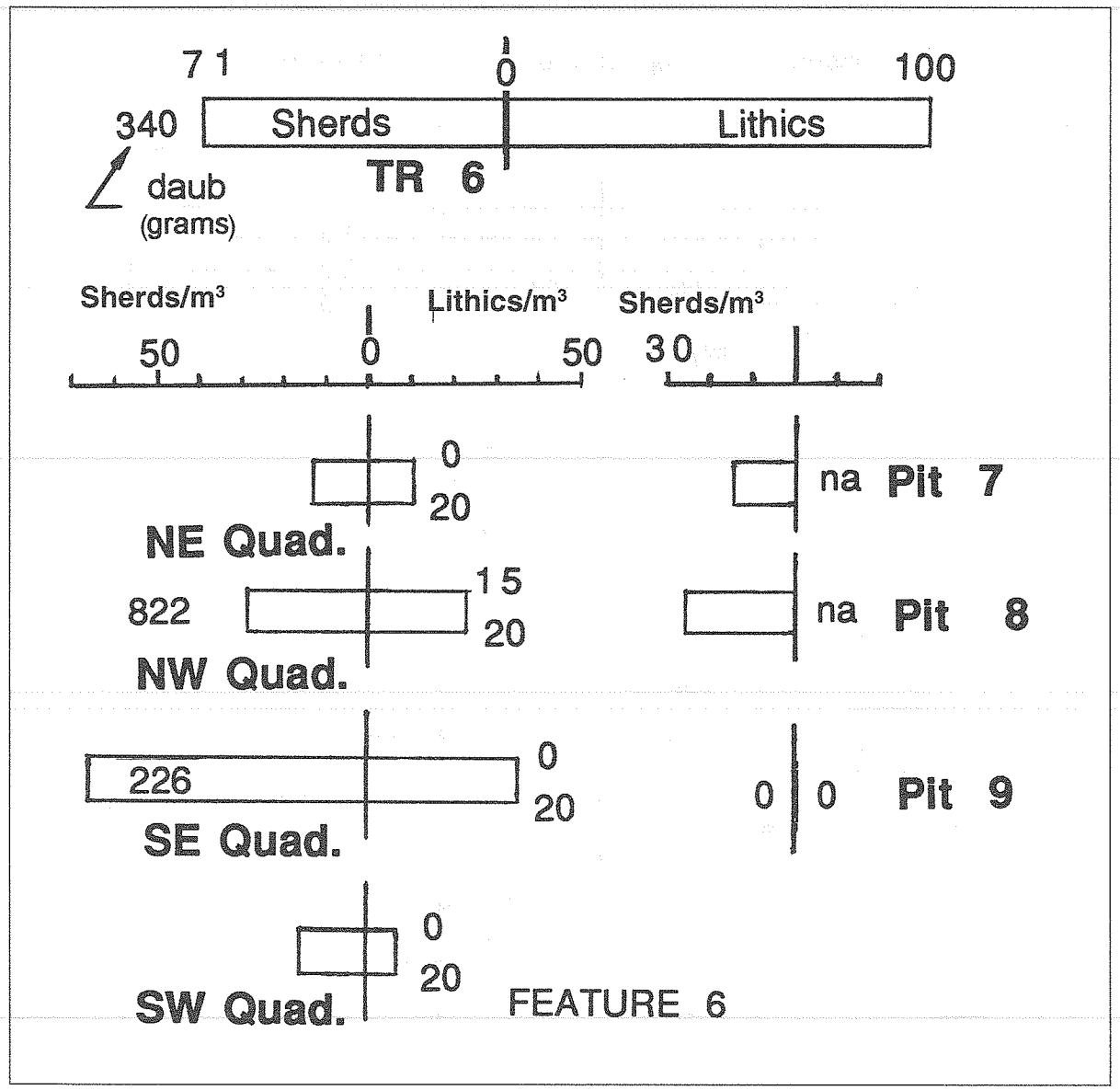


Figure 20. Density of sherds, lithic debris, and daub in Area B, Pits 7-9, Feature 6, and Trench 6, by level

younger calibrated intercept date of cal A.D. 1420 (Beta-146787) is from 20-30 cm bs at the top of the midden deposit. At 2 sigma (95 percent), the calibrated age ranges for this sample are cal A.D. 1320-1340 and cal A.D. 1390-1460. The older date from 30-40 cm bs has a calibrated intercept date of cal A.D. 1180 (Beta-146788). At 2 sigma, there is a 95 percent chance that the radiocarbon age falls between cal A.D. 1000-1280.The two calibrated radiocarbon dates bracket the date range of the OCR dates from the midden deposits in Pits 19 and 20 (see Table 10).

Schniebs (2000) analyzed the 75 faunal remains from these excavations. They weigh in total 18.7 grams, and they were recovered mostly from the midden in Pits 19 and 20, with a few from the shovel and auger tests. Approximately 80 percent of the fragments had been burned. Three deer teeth were identified as well as 34 fragments from large mammals, probably also deer, five fragments from turtle shell, eight from unidentified mammal, and 25 from unidentified animals. According to Turner, this small and broken assemblage of faunal remains is typical of the debris mix of bone, sherds, lithics, and nutshells found as trash in prehistoric Caddoan middens in Northeast Texas.

Table 4. Percentage of sherd decorative techniques in Area B by level, and other artifacts, Pit 17 and Trenches 8-10.

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Pit 17									
15–30	?	?	?	?	?	?	?	89	1 pipe bowl sherd, 1 untyped arrowpoint, 1 arrow point fragment
Trench 10									
15	73.6*	9.2	4.6	4.6	4.6	3.4	–	87	1 pipe stem, 1 mano
30	60	40	–	–	–	–	–	5	—
Trench 9									
15	67.6	5.9	11.0	7.4	6.6	0.7	–	136	1 Ellis point, 1 dart point fragment, 1 Talco, 3 point fragments, 1 small grinding stone
30	54.5	–	–	27.3	18.2	–	–	71	1 groundstone fragment
45	33.3	–	50	16.7	–	–	–	6	—
60	85.7	–	–	14.3	–	–	–	7	—
Trench 8									
15	79.7	5.9	3.9	5.9	4.2	0.3	–	306	1 Gary, *var. Emory*, 1 Homan, 2 untyped arrow points, 6 arrow point fragments, 1 quartz fragment, 1 groundstone fragment, 1 biface, 1 worked flake
30	58.8	2.5	8.8	10.0	3.8	1.3	2.5	80	1 groundstone fragment
45	90.0	-	-	10.0	-	-	-	10	1 Gary, *var. Emory*
60	78.6	-	-	7.1	14.3	-	-	14	1 biface

*percentage

Table 5. Percentage of sherd decorative techniques in Area B by level, and other artifacts, Pits 1 and 3 and Trenches 1 and 6.

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Trench 1									
0–30	?	?	?	?	?	?	?	103	1 Catahoula, 1 biface
30–100	–	–	–	–	–	–	–	0	1 Gary, *var. Kaufman*, 1 dart point fragment, 2 bifaces, 1 mano
Trench 6									
0–?	81.7*	4.2	5.6	4.2	4.2	–	–	71	1 Catahoula, 1 Homan, 1 biface, 1 celt fragment
NE Quad									
0–20	63.6	–	–	36.4	–	–	–	11	—
NW Quad									
15–20	75.4	1.8	1.8	10.5	5.3	5.2	–	57	1 Talco, 1 Bassett, 1 corner–notched
SE Quad									
0–20	74.4	2.4	9.8	7.3	2.4	3.7	–	62	2 points
SW Quad									
0–20	50.0	15.0	10.0	5.0	20.0	–	–	20	—
Pit 1									
0–58	?	?	?	?	?	?	?	20	1 biface
58–100	?	?	?	?	?	?	?	16	1 earspool, 1 biface
Pit 3									
0–64	?	?	?	?	?	?	?	41	daub and bone

*percentage

Table 6. Percentage of sherd decorative techniques in Area B by level, and other artifacts, Feature 5 and Trenches 2–5 and 7.

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Trench 3									
0–53	69.0*	9.5	–	11.9	4.8	4.8	–	42	1 arrow point fragment, 1 biface
Trench 5									
20	69.1	–	–	25.4	5.5	–	–	55	—
35	85.7	–	–	8.2	6.1	–	–	49	1 biface
50	75.0	–	3.1	9.4	12.5	–	–	32	1 Gary, *var. Panna Maria*
65	63.6	–	–	18.2	18.2	–	–	11	—
80	51.7	–	6.9	10.3	31.0	–	–	29	—
Trench 4									
20	71.4	9.1	5.2	10.4	3.9	–	–	77	1 Scallorn–like, 2 untyped points, 1 arrow point fragment, 3 bifaces
40	?	?	?	?	?	?	?	33	1 Gary, v*ar. Kaufman*, 1 drill fragment
60	?	?	?	?	?	?	?	35	—
Trench 2									
0–125	74.1	1.5	10.2	10.9	3.3	–	–	274	1 pipe rim sherd, 1 Homan 1 point base, 2 Gary, *var. Runge* and *Kennedy*

Table 6. *(Continued)*

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Trench 7									
0–75	75.1	6.7	1.3	11.4	3.8	1.7	–	237	2 Gary, 1 Gary, *var. Hobson*, 1 Scallorn–like, 2 Bassett, 2 untyped arrow points, 1 Paleo–indian dart base, 1 celt fragment, 1 pipe fragment
Feature 5									
0–60	79.6	4.1	10.2	4.1	2.1	–	–	49	1 Talco, 1 worked flake
60–75	63.2	12.2	7.0	8.8	5.3	1.8	1.7	57	1 Gary, *var. Kemp.* 1 earspool, 3 bifaces

*percentage

Table 7. Percentage of sherd decorative techniques in Area B by level, and other artifacts, Pits 4–6 and 11.

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Pit 6									
15	83.3*	–	–	11.1	–	5.5	–	18	1 untyped arrow point
30	63.6	3.0	9.1	18.2	6.1	–	–	33	1 untyped arrow point, 1 biface
45	79.3	–	–	13.8	6.9	–	–	29	1 biface
60	65.0	–	2.5	25.0	7.5	–	–	40	—
75	75.0	6.3	12.5	6.3	–	–	–	32	—
Pit 4									
15	76.1	2.2	10.9	2.2	6.5	–	2.2	46	1 untyped arrow point
30	82.2	1.4	6.8	2.7	5.5	–	1.4	73	1 worked flake
45	81.3	–	6.6	6.3	6.3	–	–	16	—
60	71.1	–	11.1	15.6	2.2	–	–	45	1 Gary, small
75	86.0	–	6.0	2.0	6.0	–	–	50	—
90	63.3	6.7	10.0	10.0	10.0	–	–	30	—
105	80.0	–	–	–	20.0	–	–	5	—
Pit 11									
20	87.5	–	–	12.5	–	–	–	8	—
35	83.3	–	8.3	–	8.3	–	–	12	1 biface fragment
50	81.3	6.3	6.2	–	6.2	–	–	16	—

Table 7. *(Continued)*

Depth (cm)	Plain	Brushed	Incised	Engraved	Punctated	Appliqued	Other	Total Sherds	Other Artifacts
Pit 5									
15	65.4	–	34.6	–	–	–	–	26	1 worked flake
30	84.8	–	6.5	4.3	4.3	–	–	46	1 Homan, 1 untyped arrow point, 1 worked flake
45	78.6	–	7.1	14.2	–	–	–	14	1 Gary, small, 1 Homan, 1 untyped arrow point
60	86.7	–	–	6.7	6.7	–	–	15	1 hammerstone
75	70.0	–	–	30.0	–	–	–	10	1 Gary, *var. Kaufman*
90	100.0	–	–	–	–	–	–	1	—

*percentage

Table 8. Artifacts from Shovel and Auger Tests, 2000 Investigations at the Harold Williams site.

Unit	Daub #	Daub g	Bone	PS	DS	LD	C	AP	OT	FCR	CPR
ST 1	8	3.8	–	3	1	8	–	–	–	–	–
ST 2	14	12.8	3	1	1	11	–	–	–	–	1
ST 3	9	5.8	1	–	4	7	–	–	–	–	1
ST 4	157	140.8	1	2	1	4	–	–	1+	–	2
ST 5	1	8.2	5	2	–	9	–	–	–	–	–
ST 10	49	46.9	–	1	–	8	–	–	–	–	–
ST 11	111	89.5	–	1	–	7	–	–	–	–	2
ST 12	142	155.3	1	7	3	13	–	–	–	–	–
ST 13	75	44.3	2	2	2	10	–	–	–	–	2
ST 14	89	90.5	2	3	3	15	–	–	–	–	–
ST 16	110	88.8	2	5	1	13	–	–	–	1	4
AT 4	–	–	–	2	1	1	–	–	–	–	4
AT 5	3	8.7	–	–	–	3	–	–	–	–	–
AT 6	2	1.0	–	–	–	–	–	–	–	–	4
AT 7	4	1.5	1	–	–	2	–	–	–	–	–
AT 8	7	9.1	–	2	–	2	–	–	–	–	–
AT 16	6	5.2	–	1	–	4	–	–	–	–	–
Total	787	710.2	18	32	18	117	0	0	1	1	20

PS=plain sherd; DS=decorated sherds and rims; LD=lithic debris; C=cores; AP=arrowpoint; OT=other tools, including dart point; FCR=fire–cracked rock; CPR=charred plant remains
+=dart point
ST=shovel test; AT=auger test

Area B Features

Trench 2, in the area of the Titus phase graves, encountered the outline of a grave pit (see Figure 2). This was designated Feature 1. The pit was completely excavated and the grave bottom was reached at 1.15 m bs. This grave had been previously dug, and skull fragments, other bone fragments, and numerous sherds were in the fill. This was probably Titus phase Grave A (see below).

Trench 4 (2 x 5 m) had sherds and both arrow and dart points, but no features. There were old potholes in the northwest and southeast corners of the trench, but they were not associated with previously dug graves.

Trench 5, north of trenches 2 and 4, yielded lithic and ceramic artifacts as well as a Gary point and biface. In addition, the outline of another grave was encountered in level 2, and traced through level 5. Apparently this was also the remains of a previously dug grave. It was not assigned a feature number, however.

Feature 3 (Figure 22) was located at the southwest end of Trench 1. It is the grave of an adult buried on the back with legs extended, arms by the side, and with the head at the east and the feet to the west The small bones had disintegrated, leaving only the skull, the major arm and leg bones, and a fragment of the pelvic region. The skeleton was oriented like other Titus phase burials (see Turner 1978, 1992), but there were no grave offerings. The balk profile across the skeleton's chest area appears to be intact (i.e., undisturbed by previous digging to remove vessels), Feature 3 appears to be a person buried without grave offerings.

Table 9. Artifacts from Pit 19 and Pit 20.

Level	Daub (g)	Bone	PS	DS	LD	C	AP	OT	FCR	Context
1	189.9	1	5	2	20	0	0	0	0	
2	606.9	8	10	4	34	0	1	1	0	Plow Zone
3	2061.0	25	13	6	62	0	1	1	0	
4	957.4	10	3	6	55	0	0	1	0	Midden
5	325.5	13	4	0	40	0	1	2	0	
6	160.5	5	7	2	14	1	0	1	0	
7	55.8	1	2	0	18	2	0	0	0	Sub-midden E-horizon
Total	4357.0	63	44	20	243	3	3	6	0	

PS=plain sherds; DS=decorated sherds; LD=lithic debris; C=cores; AP=arrowpoints; OT=other tools; FCR=fire-cracked rock

Table 10. OCR Dates by Depth and Context.

Depth	Pit 19	Pit 20	Context
10 cm		448 ± 13 BP	Plow Zone
20 cm		699 ± 20 BP	Plow Zone
25 cm	680 ± 20 BP		Midden
28 cm		608 ± 18 BP	Midden
30 cm		661 ± 19 BP	Midden
35 cm		759 ± 22 BP	Midden
42 cm	578 ± 17 BP		Midden
45 cm		2651 ± 79 BP	Sub-midden
55 cm		4597 ± 137 BP	Sub-midden
64 cm	3584 ± 107BP		Sub-midden

Feature 5 is the designation for the 1 x 3 m unit attached to the western end of Trench 7 (see Figure 2). This was designated a feature because it was thought to be in the area of a grave. It proved not to be, but yielded an earspool as well as projectile points, sherds, and lithics.

Feature 6 covered a rather large area (see Figure 2). The area had an extremely hard-packed sand layer at 20-30 cm bs. At this depth were numerous daub fragments, charcoal flecks, and sherds. Although this appeared to be promising as a house floor, it proved difficult to trace an outline. A complicated arrangement of short trenches and holes (Trench 6) were then excavated to try to determine the extent of the hard-packed area. Fortunately, a thunderstorm occurred during the pre-dawn hours of Thursday, June 22, which softened the upper soil above the hard-packed floor. This made it possible

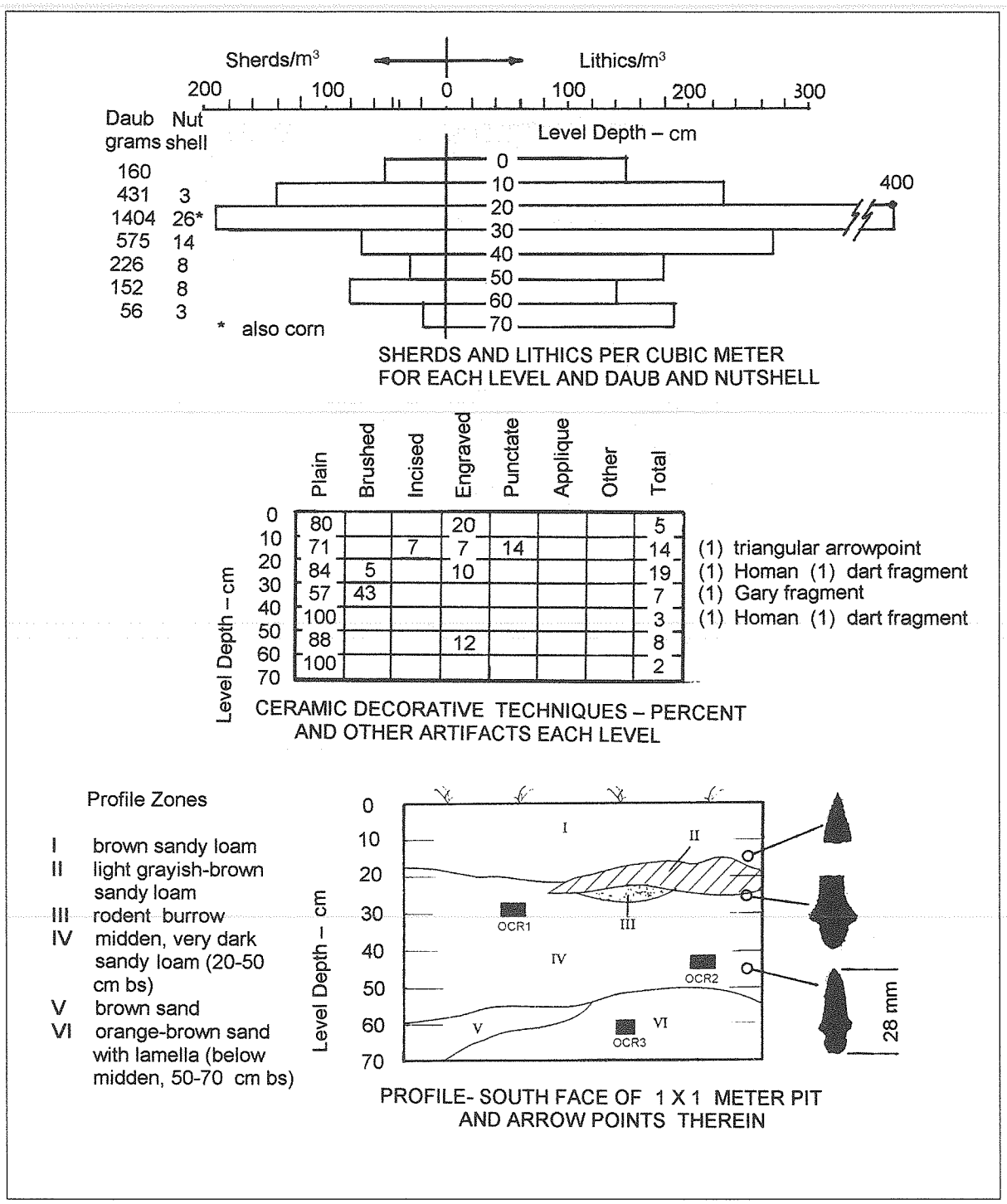


Figure 21. Analysis of artifacts from Pit 19 and soil profile.

to define a 4 x 7 m area (oriented roughly north-south) with this distinctive hard pan. The northwest quadrant was staked, shovel-shaved to 20 cm bs, and partially screened. No post molds were found. During the scraping of the quadrant, several artifacts were recovered (see Figure 20 and Table 5). Other quadrants were laid out and excavated in the same manner as the northwest quadrant, but no post molds or hearths were found. Two parallel hard-packed sand areas extended south from Feature 6, and Woodall concluded that it was the path of an old road bed.

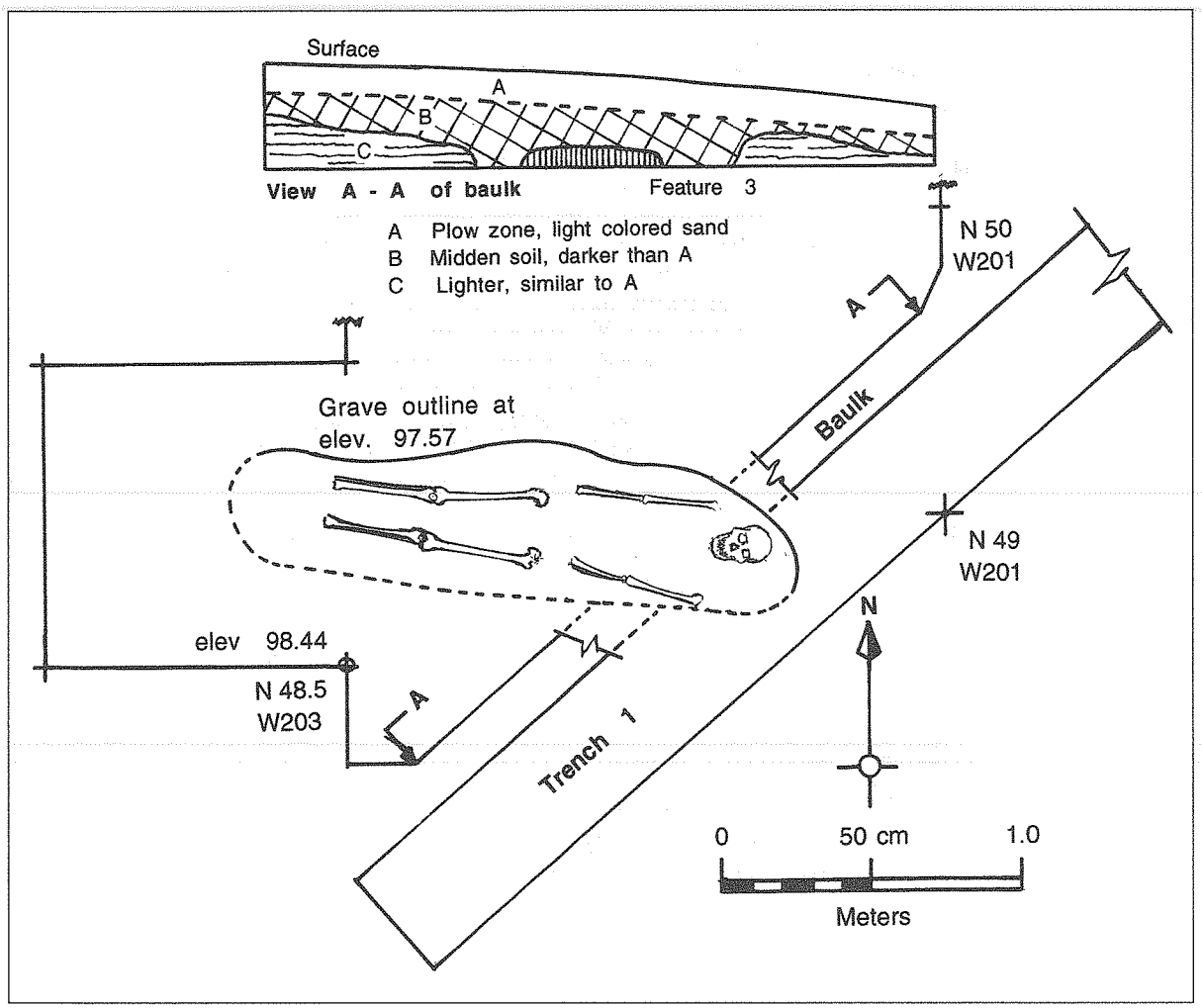


Figure 22. Feature 3 and profile across feature.

Pit 13 (Figures 23 and 24) was placed on a narrow promontory between two converging gullies. Three post molds were found at 40 cm bs. Subsequent excavations west and south of Pit 13 exposed other round post mold stains that formed an approximate circle (Feature 7). The post molds were first noted at elevations of approximately 99.19 m, except molds 8, 9, and 10, found at about 98.72 m. They extended from 4 to 39 cm below the elevation where first identified. These molds were probably well below the original house floor, which had been eroded away. Post molds to the south had been washed away by the water flowing through the gullies. The post molds have an elliptical shape with an east-west axis of 6.5 m and a north-south axis of 5 m.

Feature 8 was discovered while excavations were in progress on Feature 7. Like Feature 3, it was a single individual, supine, but unlike the burial of Feature 3 the head was to the west and the feet were to the east. This arrangement is unknown in Titus phase graves (see Turner 1978, 1992; Thurmond 1990). Feature 8 also had no grave offerings. The general record form indicated the individual's length as 1.64 m, with a 28 cm shoulder breadth, and a width at the pelvis of 36 cm. The top of the skull was 20.5 cm bs.

Turner is aware of another grave similar to Features 3 and 8 in this part of the Harold Williams site. It also contained no grave offerings. Orientation was roughly north-south, with the head to the north and the body in the supine position. This grave was found in the early 1950s.

Who were these three graves with various compass alignments, and no artifacts? Their alignment and lack of grave offerings rules out a Titus phase age, except the grave of Feature 3, which is

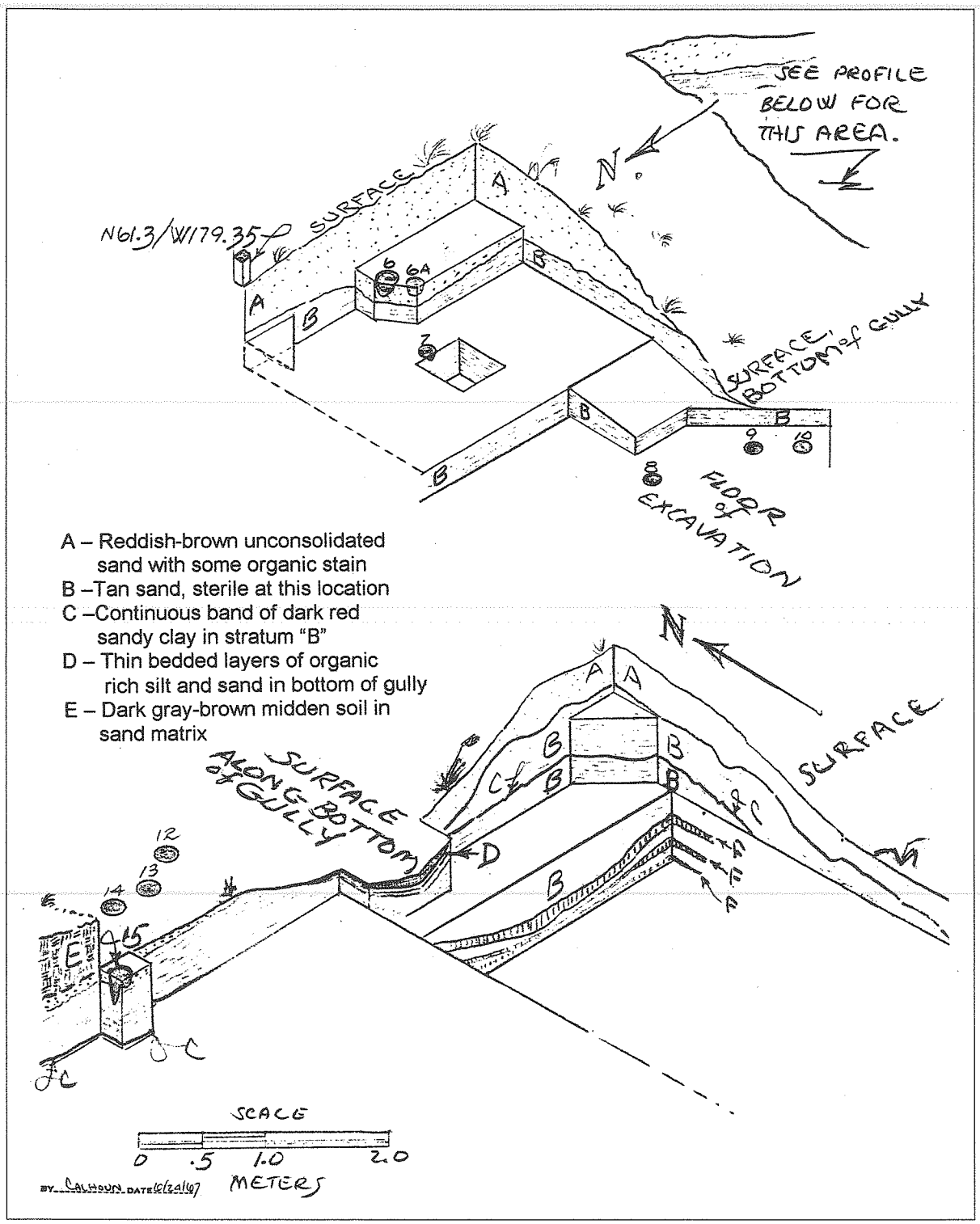


Figure 23. Soil profiles and post molds in Pit 13, and additional excavation and post molds south of Pit 13.

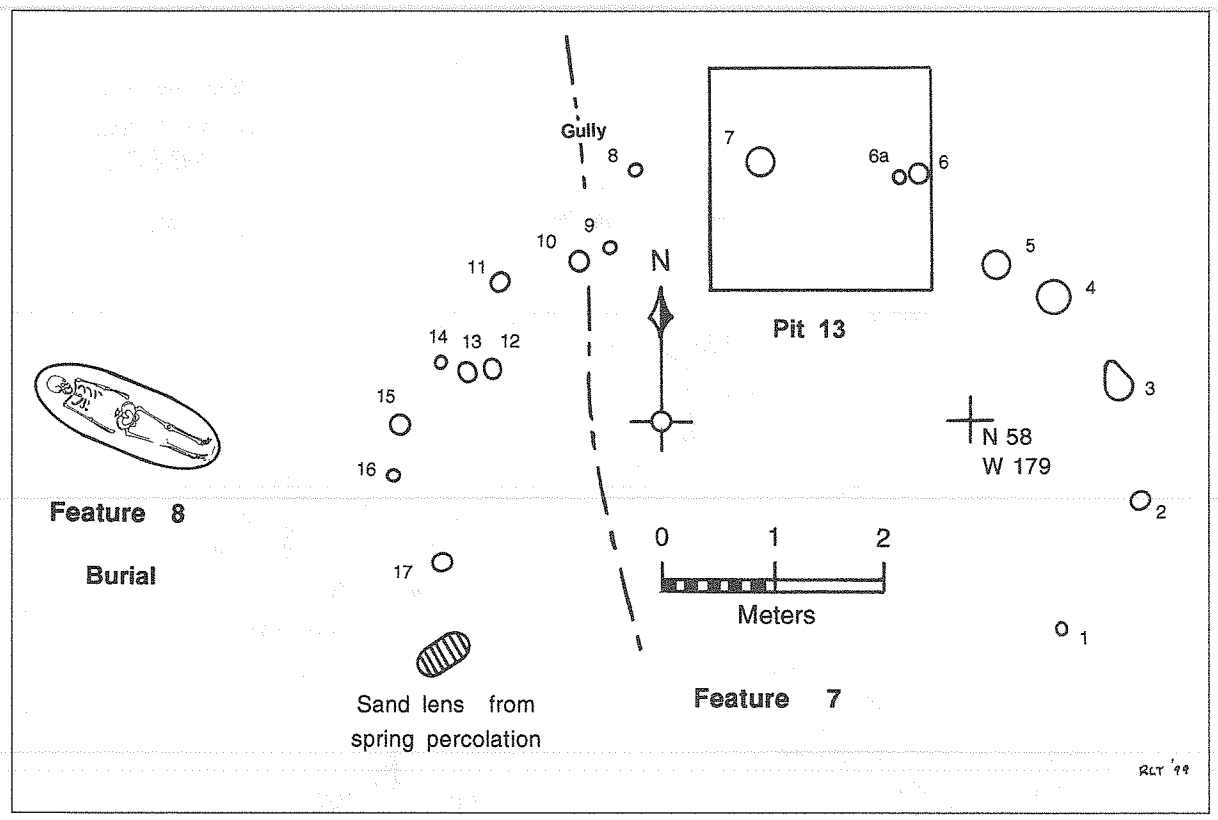


Figure 24. House pattern (Feature 7) and burial (Feature 8).

properly oriented for it to be Titus phase affiliation. The Middle Caddo period peoples provided grave offerings as well, as shown by the graves in Area A, and at other Middle Caddoan sites in the vicinity (see Turner 1997). Did these graves originally contain burial offerings that were uncovered and collected after the flood of 1943, leaving the skeletal material untouched, or were they graves of individuals of low social status who were buried without offerings? Additional research is required to unravel this problem.

When trenches 8, 9, and 10, adjacent to Trench 1 and near Test Pit 4, were opened, a number of pottery vessels were uncovered (Figures 25 and 26). In addition to the vessels, fragmentary skeletal remains of two infants were discovered. As shown in Figure 25, infant burial 1 is adjacent to pot cluster 1, undoubtedly a burial offering. Infant burial 2 is somewhat apart from the pot clusters and may have had no offerings. Pot clusters 2 and 3 may have accompanied infant graves whose remains have decayed. These infant graves may have been within or directly adjacent to a house, as this was a common prehistoric Caddoan practice to bury infants below house floors (see Figure 4c for a view of the excavations in this area).

In the Area B excavations, the pits were arranged in north-south rows in order to determine the extent of the midden area. Figures 16-20 and Tables 3-7 depict the distribution of artifacts from each pit and their relative productivity.

There were 31 artifacts from units not excavated by level, primarily arrow points (n=13), Gary dart points (n=6), point fragments, pipe fragments, and celt fragments (Table 11). Table 12 tabulates dart points, pipe fragments, ear spools, and other lithic artifacts by level. It is interesting to note that both the large and small Gary dart points appear to be equally present at all levels (see Table 12), as are bifaces, while worked flakes are found only from 0-35 cm bs. Two of the three pipe sherds were recovered between 10-25 cm bs (see Table 12). The Titus phase arrow points—Talco, Maud, Bassett, and triangular—in Area B mainly occur in the plow zone (0-20 cm bs) and directly beneath it (Table 13). The earlier Catahoula, Homan, and Friley points are found deeper in the deposits, and in fact the vertical distribution of the earlier arrow points overlaps with a

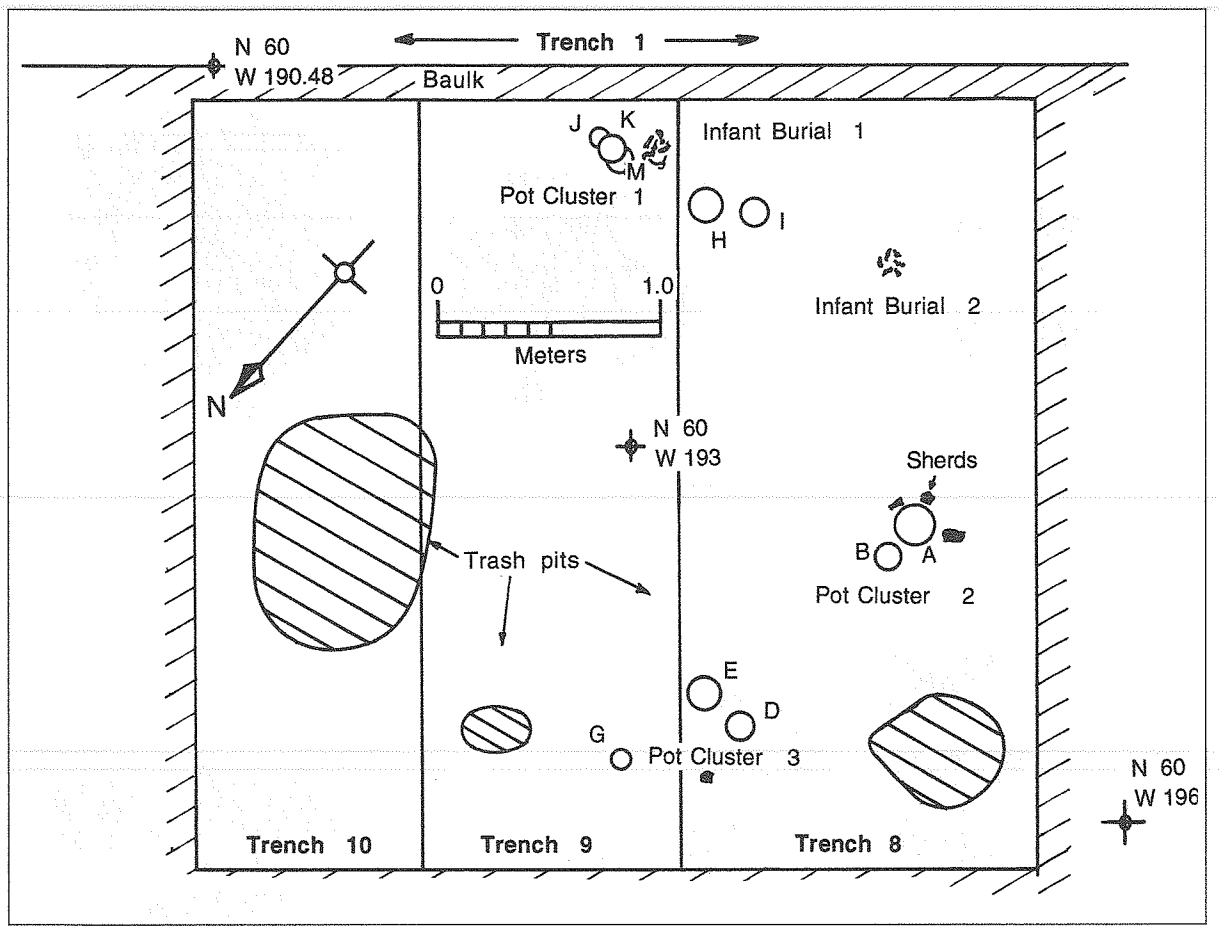


Figure 25. Trenches 8-10, infant burials, and associated vessel clusters.

number of the Gary dart points (see Tables 12 and 13). A sample of projectile points from the Area B excavations are shown in Figures 11a-c and 27.

THE TITUS PHASE GRAVES

Background

After the flood of 1943, when this cemetery was found, an individual from the Gladewater area excavated more than 60 graves at the Harold Williams site. However, no information is available on these burials other than anecdotal data that indicates they date from the Titus phase.

In the spring of 1959, Ralph Nicholas of Daingerfield, Ed German of Lone Star, and the senior author excavated 19 burials at the Williams site. Of these 19 graves (Figure 28), at least three had been previously dug. All burials, where any skeletal material was observed, were extended and supine: lying on the back with the face upward, and with the head to the east.

It has been proposed (Turner 1978) that the Titus phase people buried their dead with the feet toward the setting sun. Archeological evidence consistently shows an east-west orientation. Ethnographic studies also support this east-west burial behavior.

At the geographic location of the Williams site (33° N latitude), the sun sets at 28.3° north of the equator on the first day of summer and 28.3° south of the equator on the first day of winter. At the spring and fall equinox the sun sets due west. These Titus phase graves, except Grave O, for which the direction is suspect, are aligned between these ± 28° sunset directions. The grave directions provided in the following listing of grave contents are true directions, not magnetic compass readings. This Titus phase cemetery, originally with 70 or 80 graves, would certainly suggest it was a community cemetery (see Perttula and Nelson 1998) rather than a family plot of 10 graves or less.

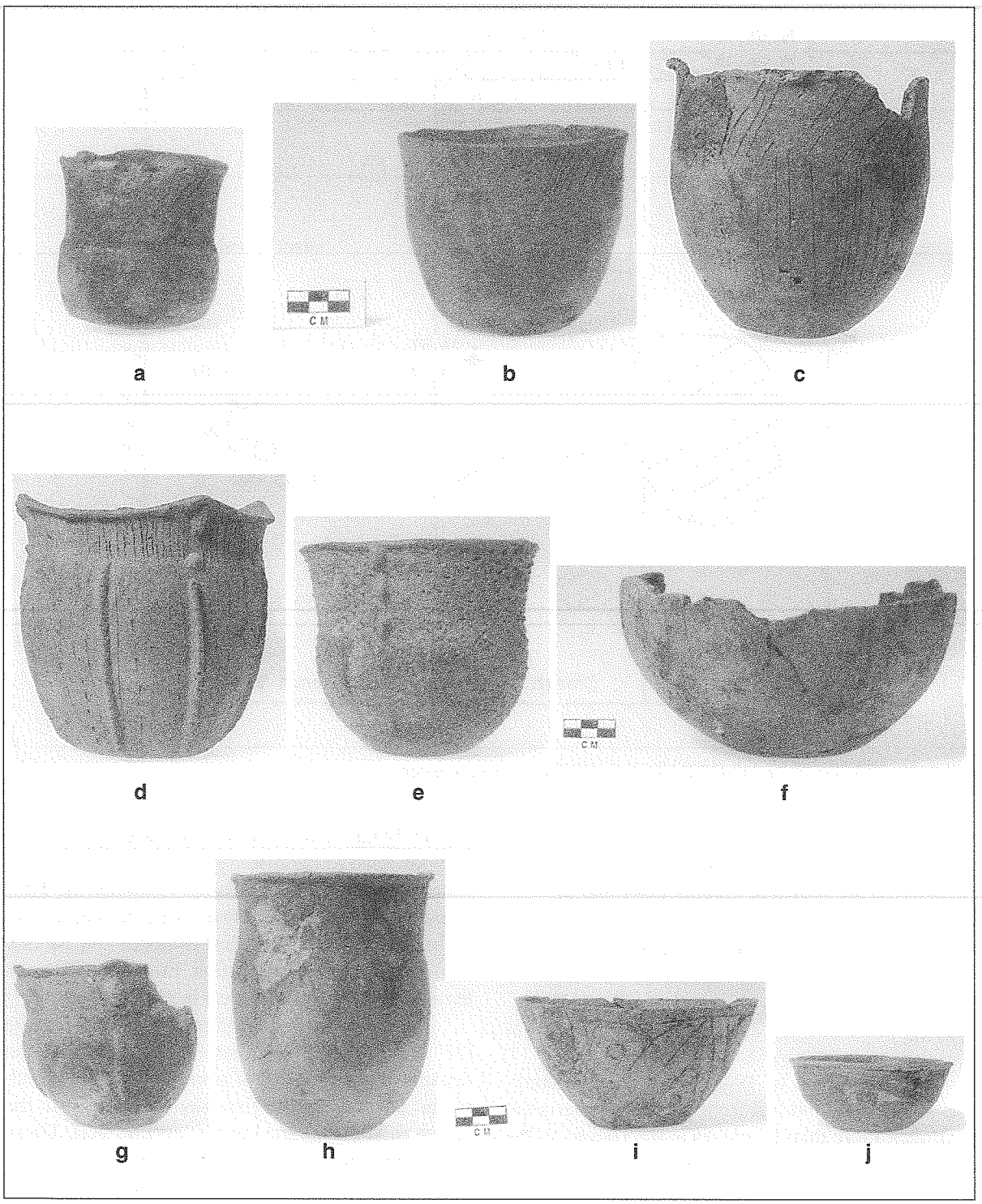


Figure 26. Vessels from children's graves excavated during the Field School: a, Vessel J, Pot Cluster 1; b, Vessel K, Pot Cluster 1; c, Vessel M, Pot Cluster 1; d, Vessel H; e, Vessel I, Pot Cluster 1; f, Vessel A, Pot Cluster 2; g, Vessel B, Pot Cluster 2; h, Vessel D, Pot Cluster 3; i, Vessel E, Pot Cluster 3; j, Vessel G, Pot Cluster 3.

Table 11. Artifacts from units in Area B not excavated by level.

Provenience	Homan	Catahoula	Corner–notched	Talco	Bassett	Untyped	Gary	Dart or arrow fragment	Pipe frags.	Celt fragment	Mano fragment	N
Trench 1	–	–	–	–	–	–	–	1	–	–	1	2
Trench 2	1	–	–	–	–	–	2	1	1	–	–	5
Trench 3	–	–	–	–	–	–	–	1	–	–	–	1
Trench 6	1	1	–	–	–	–	–	–	–	1	–	3
Trench 7	–	–	2	–	1	1	3	1	1	1	–	10
Feature 3	–	–	–	–	–	–	–	3	–	–	–	3
Feature 5	–	–	–	1	–	–	–	–	–	–	–	1
Feature 7	1	–	–	–	–	–	1	–	–	–	–	2
Pit 2	1	1	–	–	–	–	–	–	–	–	–	2
SE Quad	–	–	–	–	–	2	–	–	–	–	–	2
Total	4	2	2	1	1	3	6	7	2	2	1	31

Table 12. Dart points and other artifacts in Area B by level.

Depth (cm)	small Gary	large Gary	Other Dart Points or fragments	Dart or Arrow fragments	Biface	Worked flakes	Pipe fragments	Earspool	Other
5	–	–	–	–	–	3	–	–	–
10	1	–	2	1	5	3	1	–	M,* GS
15	–	–	1	1	1	–	–	–	SM, Q
20	–	–	–	–	–	–	–	–	–
25	–	–	2	1	1	2	1	–	M, GS
30	–	1	–	–	2	–	–	–	D
35	–	–	–	1	2	1	–	–	–
40	2	–	–	1	1	–	–	–	–
45	–	1	–	–	–	–	–	–	–
50	–	1	–	–	–	–	–	–	–
55	1	1	–	1	1	–	–	–	H
60	–	–	–	–	–	–	–	2	–
65	–	–	–	–	1	–	–	–	–
70	1	2	–	–	3	–	1	–	–
Total	5	6	5	6	17	9	3	2	8

*M=small mano; H=hammerstone; GS=ground stone fragment; D=drill; SM=small metate; Q=quartz fragment

Table 13. Arrow point types by level, Area B.

Depth (cm)	Broken, Untyped	Unbroken, untyped	Homan	Catahoula	Friley	Perdiz	Triangular	Talco	Maud	Bassett	Corner-notched	N
10	8	4	3	–	–	1	3	4	1	3	1	28
20	3	3	–	1	–	–	–	2	–	1	1	11
30	2	1	1	1	1	–	–	2	–	–	–	8
40	1	–	1	1	–	–	–	–	–	–	–	3
Total	14	8	5	3	1	1	3	8	1	4	2	50

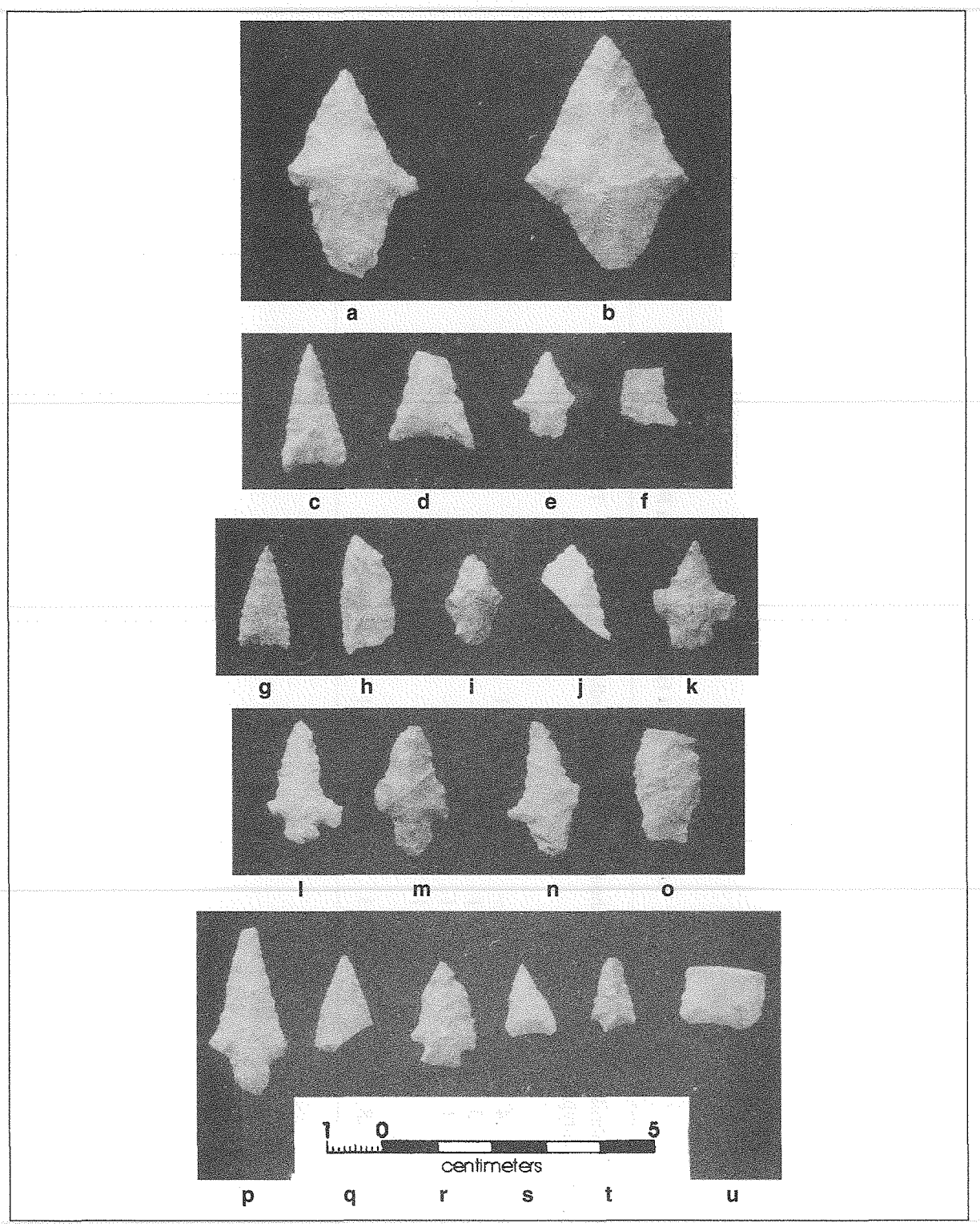


Figure 27. Projectile points from Area B excavations: a, Gary, *var. Kaufman* (TR 4, 20-40 cm); b, Gary, *var. Kaufman* (Pit 5, 60-75 cm); c, Talco (Pit 14, 0-15 cm; d, Maud (Pit 14, 0-15 cm); e, Friley (Pit 14, 15-30 cm); f, fragment (Pit 14, 15-30 cm); g, Talco (Pit 4, 0-10 cm); h, Talco fragment (Pit 4, 0-10 cm); i, Homan (Pit 4, 0-10 cm); j, fragment (Pit 4, 0-10 cm); k, Catahoula (Feature 3 grave fill); l, Catahoula (Pit 2); m, Homan (Pit 2); n, Homan (Pit 5); o, untyped (Pit 5); p, Homan (TR 8, 0-20 cm); q, untyped (TR 8, 0-20 cm); r, corner-notched (Feature 6 NE Quad); s, Talco (Feature 6 NE Quad); t, Bassett (Feature 6 NE Quad); u, dart point stem (Feature 3 grave fill).

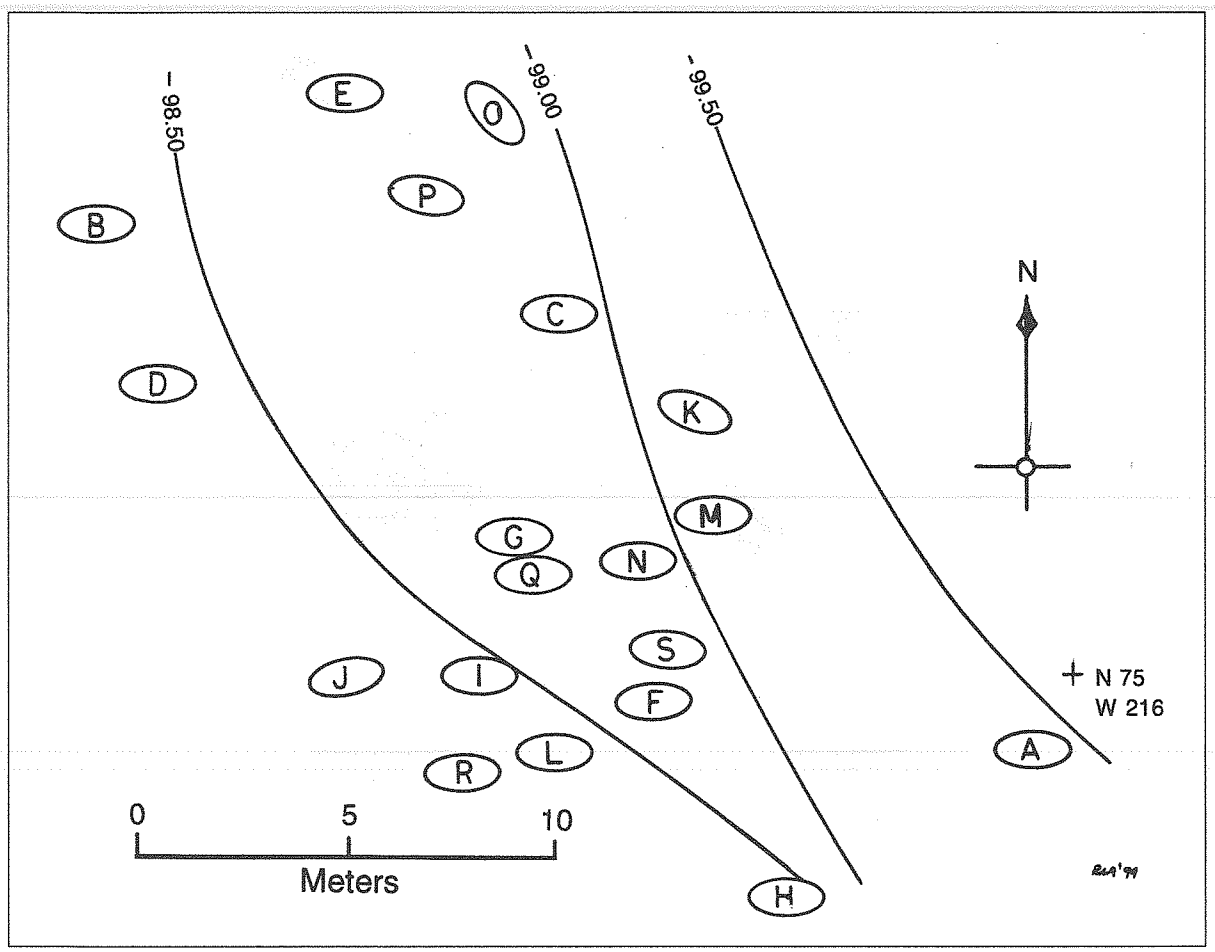


Figure 28. Titus phase graves excavated in 1959 at the Harold Williams site (41CP10).

Contents of the Graves

Figures 29 and 30 depict the spatial arrangement of the grave offerings and the skeletal remains, if any were present. We also describe the various artifacts found with the graves (Table 14), along with other information, such as their depth and direction, and remarks are included below. Ceramic vessels were the most common grave offerings (Figures 31 and 32).

Grave A

Excavated by Ralph Nicholas. No other information available.

Grave B

Excavated by Ralph Nicholas on March 28, 1959. Unknown depth, grave direction is east-west. Associated artifacts include: 1, plain bowl with sawtooth-shaped rim; 2, noded bowl; 3, 4, and 6, no information; 5, small cup-shaped vessel.

Grave C

Excavated by Ralph Nicholas on March 29, 1959. Skeletal remains were 1.45 m bs, and the grave direction is east-west. Associated artifacts include: 1, large jar; 2, 9, small plain bowls; 3, 4, Ripley Engraved carinated bowls; 5, Simms Engraved bowl; 6, very small bottle; 7, bird effigy bowl; 8, noded bowl; 10, Harleton Appliqued jar; 11, abrading stone.

Graves D and E

Excavated by Ralph Nicholas. No other information available.

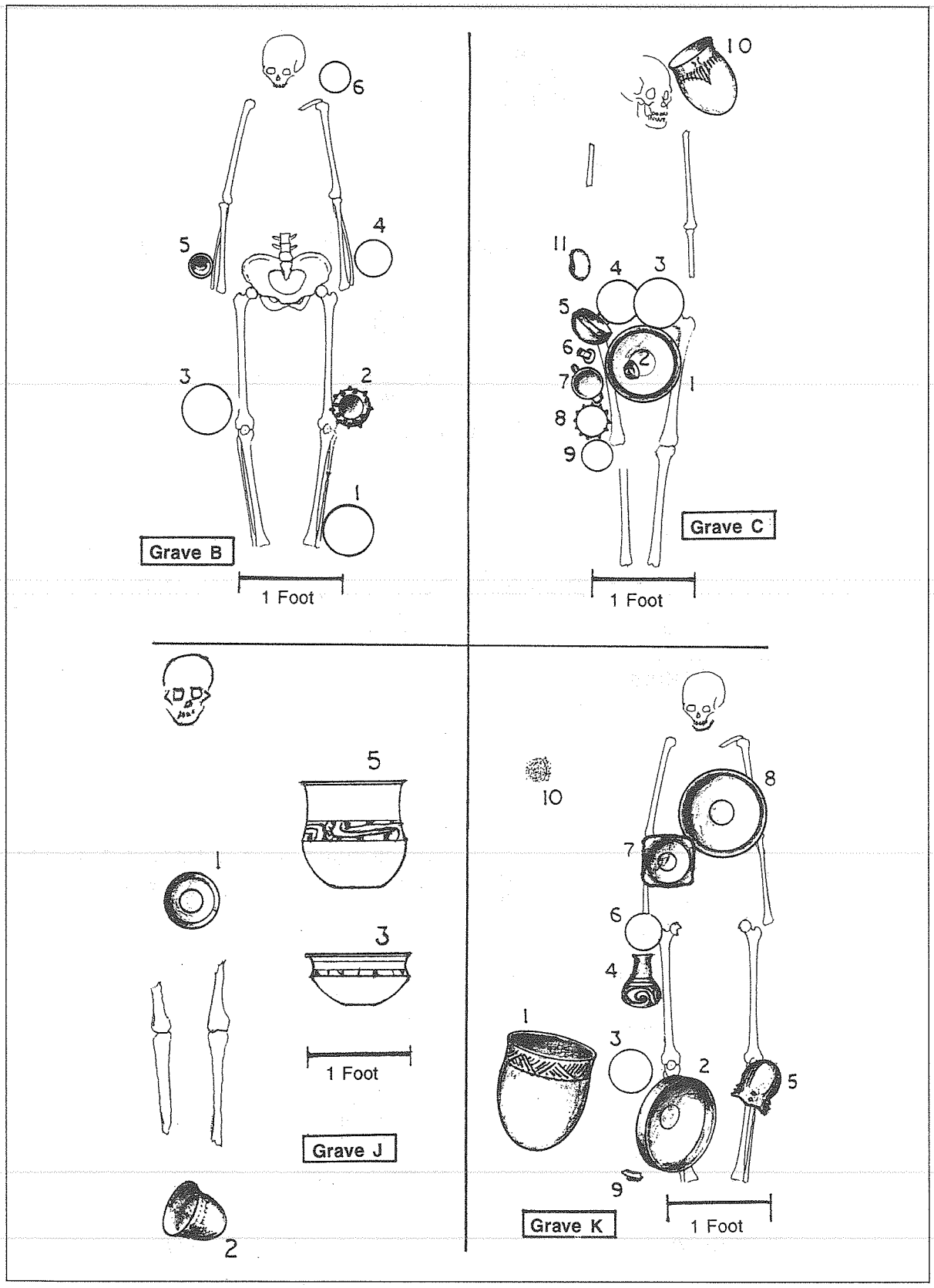


Figure 29. Titus phase graves B, C, J, and K, and their offerings.

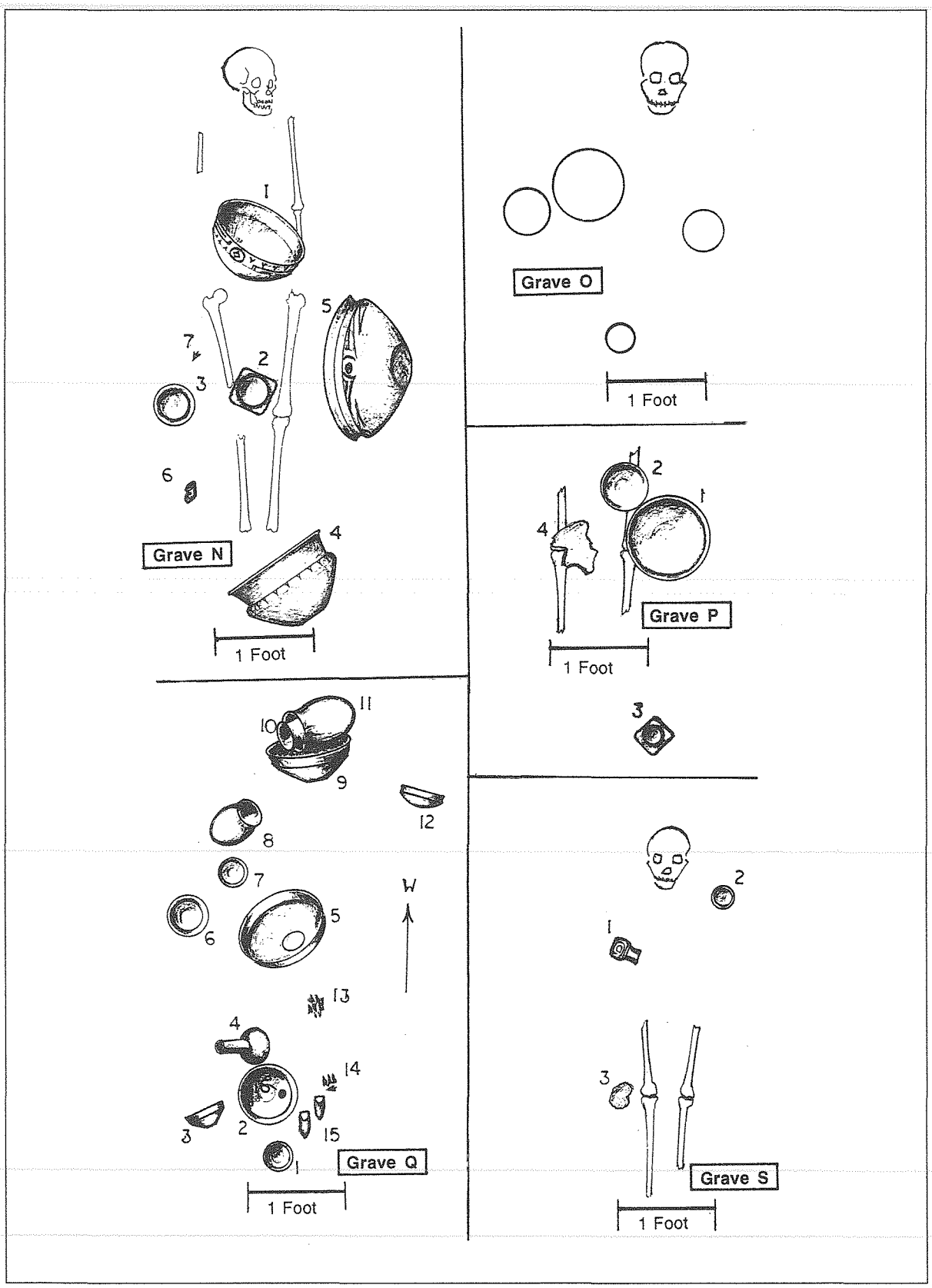


Figure 30. Titus phase graves N-Q and S and their offerings.

Table 14. Ceramic vessel types in the Titus phase graves.

Grave	No Info.	Previously Dug	Ripley Engraved, CB*	Ripley Engraved, LCPB	Ripley Engraved, SCPB	Maydelle Incised	Cooking vessel, large	Cooking vessel, small	Harleton Appliqued	Simms Engraved
A	X									
B										
C			2				1		1	1
D	X									
E	X									
F										
G	X									
H	X									
I	X									
J		X	1	1	1			1		
K			2		1	1		1		
L	X									
M		X								
N			1	2	1			1		
O										
P		X	1		1					
Q			7							
R		X								
S										
Totals			14	3	4	1	1	3	1	1

Table 14, *(Continued)*

Grave	Effigy Bowl	Noded Bowl	Bottle	Jar	Plain Bowl	Unidentified Type	Total Vessels	Other Artifacts in the Graves
A								
B		1			2	3	6	
C	1	1	1		2		10	abrading stone
D								
E								
F								crushed grog tempering material
G								
H								
I								
J						1	5	
K			1			2	8	crushed grog tempering material; 1 Bassett point; 1 deer mandible
L								
M								1 celt
N							5	1 Bassett point; 1 ceramic elbow pipe
O						4	4	
P						1		
Q			1	3		1	12	14 Talco points; 1 Bassett point; 2 celts; 1 pulley-shaped ceramic earspool
R								
S			1			1	2	kaolin clay
Total	1	2	4	3	4	13	55	

*CB=carinated bowl; LCPB=large compound bowl; SCPB=small compound bowl

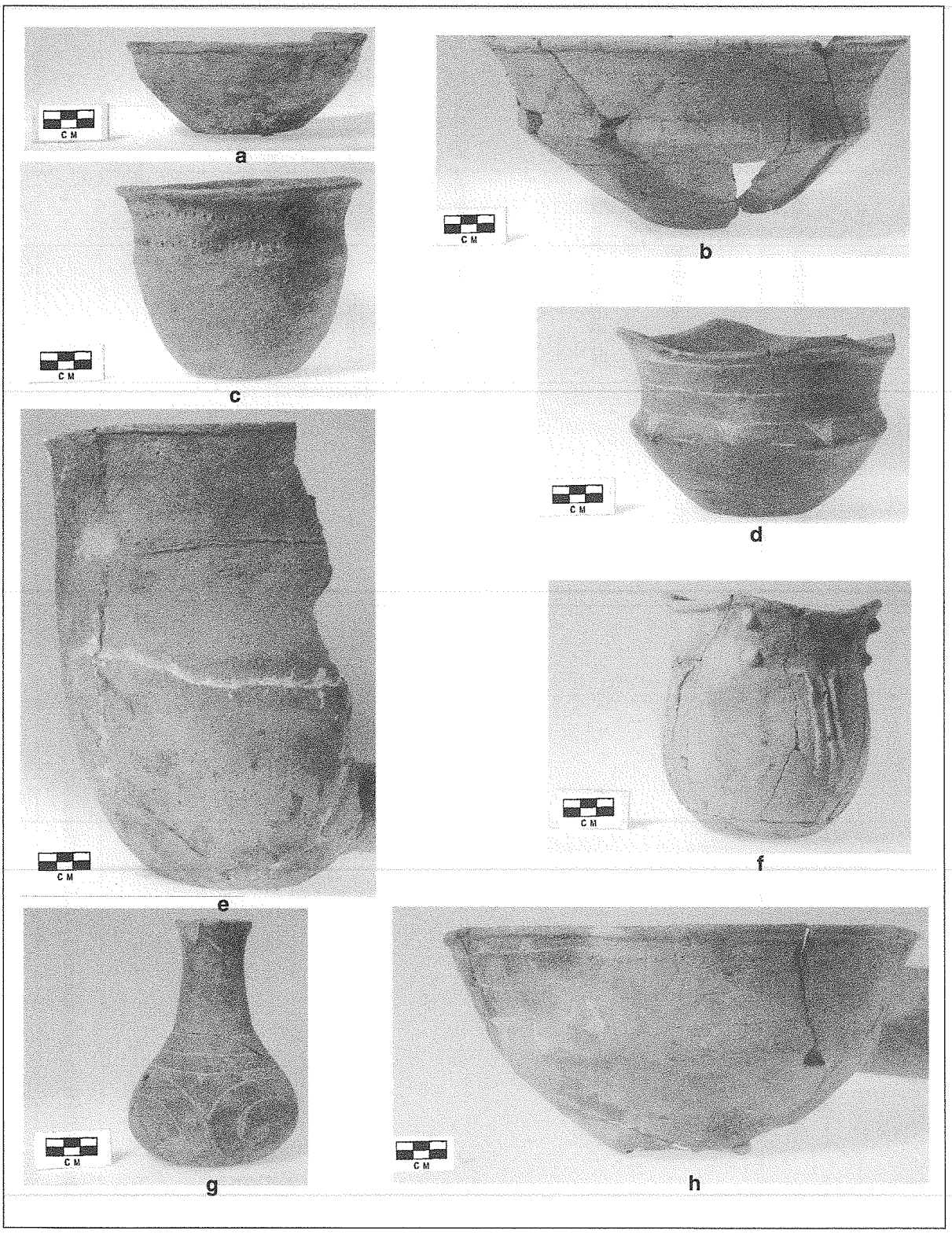


Figure 31. Vessels from Titus Phase graves J and K: a, Grave J, #1; b, Grave J, #3; c, Grave J, #2; d, Grave K, #7; e, Grave K, #1; f, Grave K, #5; g, Grave K, #4; h, Grave K, #8.

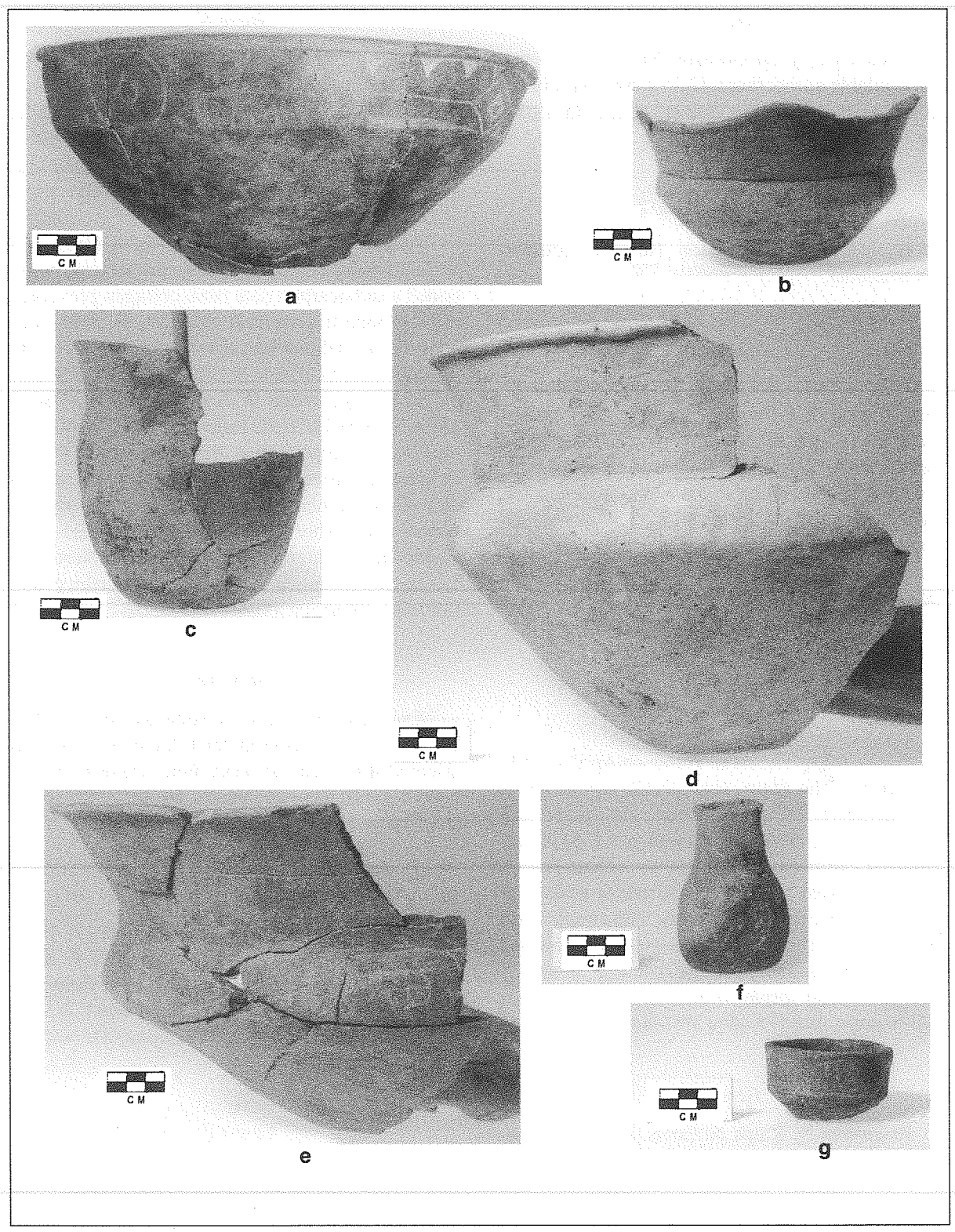


Figure 32. Vessels from Titus Phase graves N and S: a, Grave N, #1; b, Grave N, #2; c, Grave N, #3; d, Grave N, #4; e, Grave N, #5; f, Grave S, #1; g, Grave S, #2.

Grave F

Excavated by Ed German. No other information available except that a 42.75 g concentration of ground-up pottery sherds (used as temper in pottery clay) was collected.

Graves G, H, and I

Excavated by Ed German. No other information available.

Grave J

Excavated by Robert L. Turner on March 29, 1959. The depth of the grave was 84 cm bs, and the grave direction was 11° south of west. Associated artifacts include: 1, Ripley Engraved carinated bowl (the style of decoration is the same as item 5); 2, small cooking jar; 3, 5, Ripley Engraved compound bowls; 4, no information. This grave had been previously dug. Vessels 1 and 2 were probably missed because of their depth, while vessels 3-5 were broken and thrown back in the grave before it was refilled; their original location is unknown.

Grave K

Excavated by Robert L. Turner on April 4, 1959. The depth of the grave was 102-122 cm bs, and it was oriented at 19° north of west. Associated artifacts include: 1, Maydelle Incised jar; 2, 8, Ripley Engraved carinated bowls; 3, 6, no information; 4, Wilder Engraved bottle; 5, four-eared or peaked jar with nodes under each peak, along with an appliqued design; 7, Ripley Engraved four-peaked compound bowl; 9, deer mandible; 10; small concentration (14.1 g) of ground-up sherds to be used for temper; 11; Bassett point, exact location not noted.

Grave L

Excavated by Ralph Nicholas. No other information available.

Grave M

Excavated by Robert L. Turner. A small 9 cm long petaloid celt was found in this previously dug grave.

Grave N

Excavated by Robert L. Turner, and the floor of the grave was 91-117 cm bs. It was oriented at 1° south of west. Associated artifacts include: 1, Ripley Engraved carinated bowl; 2, four-eared compound bowl; 3, small jar; 4, 5, Ripley Engraved compound bowls; 6, ceramic elbow pipe; 7, Bassett point.

As part of the most recent study of the Harold Williams site, Perttula and associates recently obtained a radiocarbon date from collagen preserved in long bone fragments from Grave N. The intercept of the radiocarbon age of the remains with the calibration curve is A.D. 1500, with a 2 sigma calibrated age range of A.D. 1440–1640 (Beta-152353). The 13C/12C ratio is -14.0 ‰. This isotope value suggests that the Titus phase Caddo individual buried in Grave N had a maize-rich diet. Comparable isotope values have been obtained from other Late Caddoan and post-1650 Caddo burials along the Red River in Northeast Texas, southwestern Arkansas, and northwestern Louisiana (Perttula 1996:321).

Grave O

Excavated by Ralph Nicholas on May 2, 1959. The grave was between 89-105 cm bs, and was oriented 49° north of west. Four vessels (of unknown kind) were apparently found in the grave (see Figure 30).

Grave P

Excavated by Ralph Nicholas on May 2, 1959. The grave was 76-81 cm bs, and oriented 9° north of west. It had been previously dug, but overlooked were: 1, Ripley Engraved carinated bowl; 2, unidentified vessel; 3, four-eared compound bowl; and 4, a large sherd.

Grave Q

Excavated by Ralph Nicholas on May 3, 1959. The grave was 150-173 cm in depth, and was oriented east-west. Associated artifacts include: 1, small bowl; 2, 3, 5-7, 9, 12, carinated bowls; 4, bottle; 8, 10-11, jars; 13, eleven Talco points; 14, three Talco points and one Bassett point; 15, two celts; 16, one ceramic pulley-shaped earspool. The

drawn plan of the burial did not show the location of any skeletal remains relative to the funerary objects (see Figure 30). The carinated bowls were likely Ripley Engraved. Based on the number of offerings, this was the grave of an important person (probably a male). Large quantities of arrow points are usually associated with Titus phase male burials (see discussion in Turner 1978, 1992; Perttula 1992).

Grave R

No information available.

Grave S

Excavated by Robert L. Turner. The burial was 91-96 cm in depth bs, 1.17 m in length, and was oriented 4° north of west. Associated artifacts include: 1, small engraved bottle; 2, small carinated bowl with child-like non-repetitive design; and 3, a concentration of kaolin clay. It is the burial of a child, possibly a young girl. The potter's clay and the child-like engraving on the two small vessels (see Figure 32f-g) may indicate these were her work.

THE THURMOND HYPOTHESIS

Thurmond (1985, 1990) has proposed that within the Big Cypress Creek drainage, which is the epicenter of the Titus phase sphere of influence, there is not one homogenous culture but four groups (or subclusters) that can be separated by geography and their archeological remains. From west to east these subclusters are named the Three Basins, Tankersley Creek, Swauano Creek, and Big Cypress Creek. These subclusters extend for 80 km across the Cypress Creek drainage basin.

Turner (1978) had earlier proposed that vessel differences in types and decorative style, as well as arrow point types, within this region during the Titus phase, were a result of changes through time, and not because of different cultural groupings. Looking at the evidence in both Turner (1978) and Thurmond (1985, 1990), Perttula (1995) suggested that changes in decorative motifs will occur with time within a given subcluster as well as from regular interaction between peoples living in these subcluster areas. Thus, within a particular cluster not all artifact assemblages would be alike, depending upon their age.

In Thurmond's analysis of ceramic and arrow point types within his four subclusters, each share several identical ceramic decorative styles on Ripley Engraved carinated bowls; these are the scroll, scroll and circle, and the continuous scroll (Thurmond 1990:Figure 6). In addition, they contain the Wilder Engraved bottle design, Maydelle Incised and Harleton Appliqued cooking vessels, and Talco and Maud arrow points. The two subclusters to the west (the Three Basins and Tankersley Creek) contained McKinney Plain jars, while the Big Cypress subcluster, the farthest east, has Karnack Brushed-Incised and Belcher Ridged cooking vessels. The Belcher site, where Belcher Ridged pottery was first defined, contains many of both pottery types (Webb (1959).

The Belcher Ridged and Karnack Brushed-Incised vessels in the Titus phase subclusters appear to have been traded or brought into the subclusters from Late Caddoan groups to the east, along the Red River. The two easternmost subclusters also contain Bailey Engraved bottles, another Red River import, and they are more numerous in Big Cypress subcluster sites. Bassett points occur in the three eastern subclusters but not in the Three Basins. Thurmond (1985, 1990) also indicates that there is very little Bullard Brushed ware in the Three Basins subcluster, but with more in the Tankersley Creek subcluster, and it represents 40-50 percent of the cooking ware in Swauano Creek and Big Cypress Creek subcluster graves.

The pendant triangle decorative technique used on Ripley Engraved carinated bowls is the predominant decorative technique in the Big Cypress subcluster, and is also a major style on the bowls of the Swauano Creek subcluster. Perdiz points are more prevalent in the Three Basins and Tankersley Creek subclusters. Based on these regional differences, Thurmond (1985) has suggested that these subclusters may represent tribal groupings similar to those described by the early European visitors to the Hasinai tribal groups about 150 km to the south and the Kadohadacho groups on the Red River to the north and northeast. Perttula (1995) has argued that as more radiocarbon dates become available from Titus phase settlements and cemeteries in each of the subclusters, a clearer picture

will emerge of the sequence of cultural events in the Titus phase heartland.

THE WILLIAMS TITUS PHASE GRAVES

The Titus phase graves from the Harold Williams site best fit the pattern of Thurmond's (1985, 1990) Swauano Creek subcluster. The site is within the spatial boundaries of the subcluster and the artifacts mostly match his criteria. The only exception to this seems to be the small quantity of Bullard Brushed utility ware from the site.

Perttula (1995:350) and Bruseth (1992:91) believe that the large community cemeteries like Harold Williams were a short term event that generally dates from about A.D. 1550 to the early 1600s. This period follows the de Soto expedition into Texas in 1542-1543 as it passed through this region from north to south and then returned the same way. They believe these cemeteries occur after the contact between the de Soto army and the Titus phase people (probably the group called the Lacane by the army, see Hudson [1997]). Increased mortality of the people probably occurred because of diseases introduced by the army. The Titus phase graves at the Williams site probably date to this period, i.e., from A.D. 1550 to the early 1600s.

Comparison with Carpenter Site Graves

The nearby Carpenter Site (Turner 1978, 1992) contained 44 graves. Nine of these contained Talco arrow points as well as Ripley Engraved carinated bowls with the pendant triangle decorative style. Turner believed these nine graves, which were on the periphery of the cemetery, belonged to the last burial episode at the site. A calibrated radiocarbon date for one of these graves (Tx-666) has a 2 sigma age range of A.D. 1473-1635, with the most likely range between A.D. 1536-1635 (see Perttula 1998:Table 1). Pendant triangle decorative motifs on Harold Williams pottery vessels, as well as the Talco arrow points, would probably make these neighboring cemeteries contemporaneous. The 2 sigma age range of Grave N at Harold Williams (see above) overlaps between cal A.D. 1440-1635 with the Tuck Carpenter calibrated date. These together are another indication of the ca. A.D. 1550 to early 1600s time frame for these interments.

THE SURFACE COLLECTION PROJECTILE POINTS

The surface collection was made by the senior author between 1948 and 1959. The artifacts were collected in Area B and in Area A south of the youth group excavations. The platform pipe (see Figure 10d) and a stone axe (see below) also came from this part of Area A.

There are 131 projectile points and point fragments from the surface collection. Of this, 58 were arrow points and 73 were dart points (Figures 33-35).

Arrow points are classified as follows: Bassett (n=2); Maud (n=2); Homan (n=8); Catahoula (n=9); Friley (n=4); Scallorn-like (n=2); Clifton (n=2); crude stemmed (n=4); small corner-notched (n=5); thick triangular with basal notch (n=2); unclassified (n=11); and fragments (n=7). The material used for all arrow point manufacture, except for two, was from locally available sources. Forty-three points were of a gray to maroon quartzite. Twelve points were of light yellow-tan jasper and dark red jasper. Two unclassified points (see Figure 33) are a white chert from non-local sources.

The dart points from the collection include: Gary, small (n=21); Gary, large (n=8); Kent (n=1); Yarbrough (n=8); Morrill (n=3); Marcos (n=1); Bulverde (n=2); San Patrice? (n=1); and broken-unclassified (n=28). One Bulverde points is made of a non-local tan chert with black mottling (see Figure 35s). This same material is present in several large dart points from other Camp County locations. The second and larger Bulverde is made of novaculite. The possible San Patrice point, with both ears broken off (see Figure 35j), is a greenish-brown jasper. The Marcos point is made from a large thinning flake with the flat surface unworked as it came off the core and the other surface retains a rather large area of almost polished maroon cortex. The material is a tan flint resembling that found in Central Texas.

Of the remaining dart points 69 percent are of the locally available gray-maroon quartzite, three were tan jasper (7 percent), and 11 (24 percent) were various non-local cherts. Most of the latter are small Gary points.

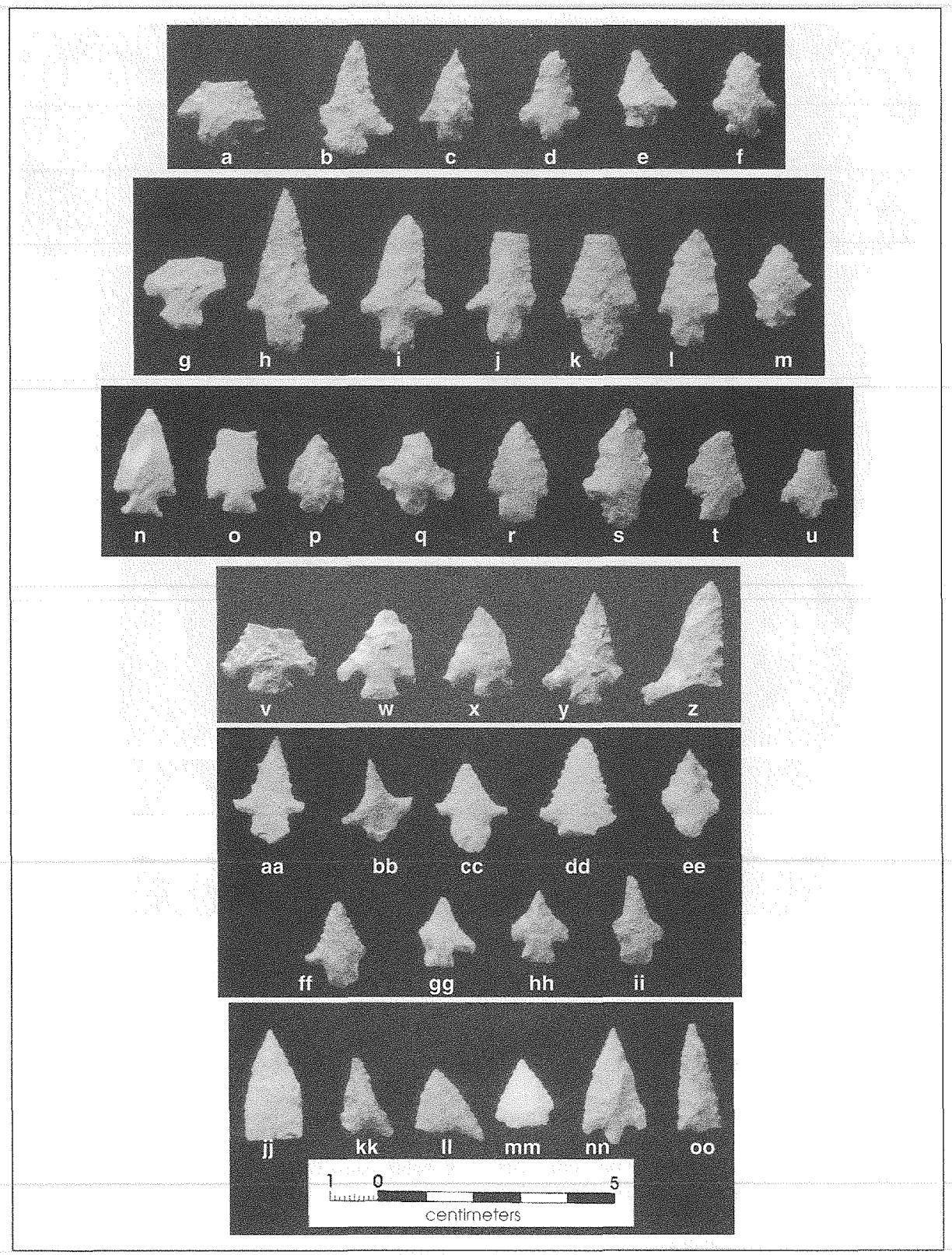


Figure 33. Arrow points from surface collections: a, b, g, q, v-z, Catahoula; c, e-f, gg-hh, small corner-notched; d, p, s-u, crude stemmed; h-m, r, cc, ee, Homan; n-o, Scallorn-like; aa-bb, dd, ff, Friley; ii-jj, mm, unclassified; kk-ll, Maud; nn-oo, Bassett.

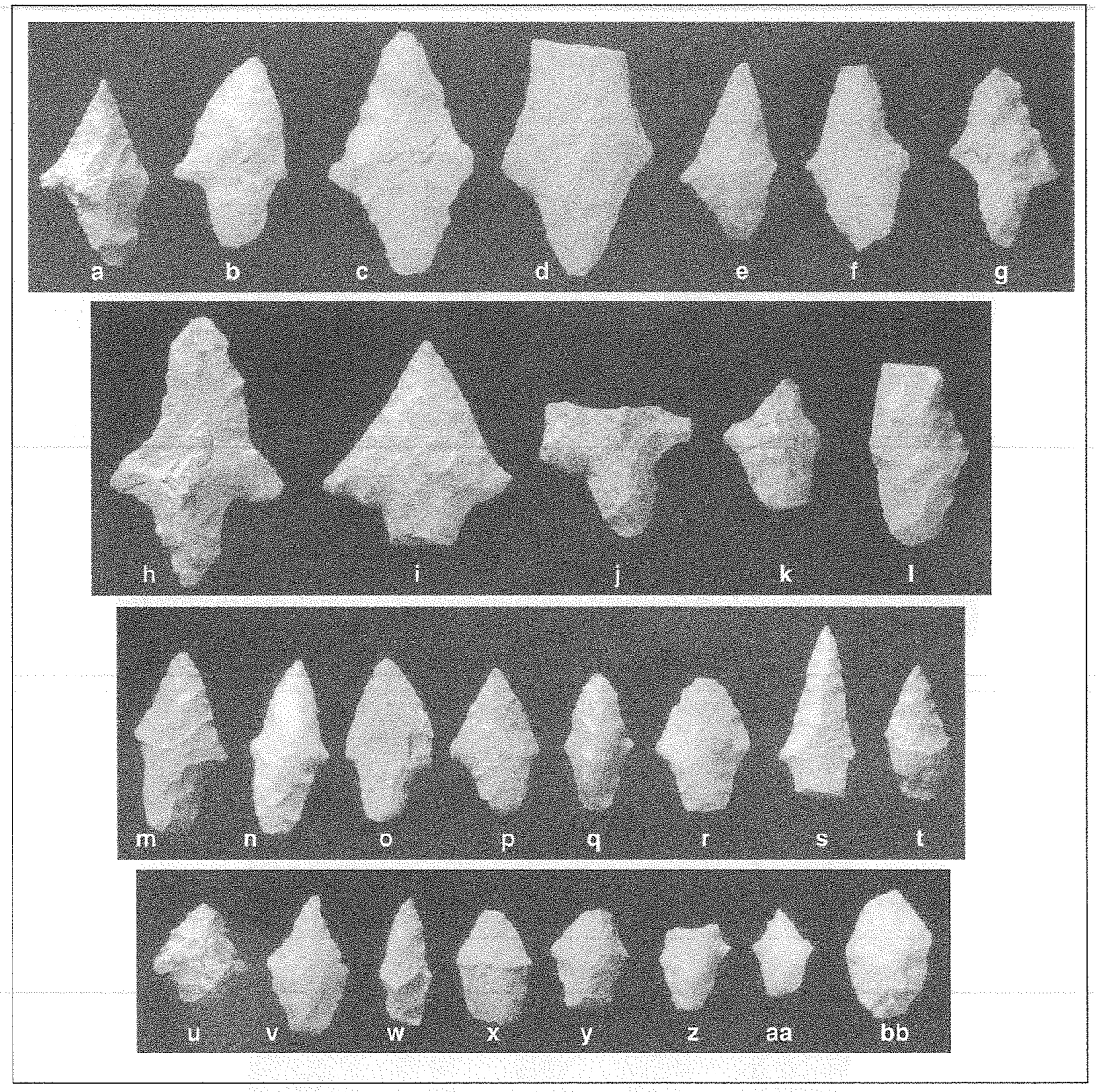


Figure 34. Gary points from Area B surface collections: a, f-g, *var. Kemp*; b, h-j, *var. Kaufman*; c-d, *var. Alsa*; e, m-q, t, v-bb, *var. Hobson*; k, r-s, *var. Emory*; l, u, miscellaneous.

Other Artifacts

The abrading stone (Figure 36a) is an extremely coarse-grained slab of ferruginous sandstone 4 to 5 cm thick. It is similarly grooved on both sides and would have provided an excellent surface and texture for sharpening bone tools.

The perforated ceramic disc is from the base of a large jar (see Figure 36b). It is approximately 11 cm in diameter and varies from 1 cm thick at the edge to 1.8 cm at the perforation. The minimum diameter of the perforation is 11 mm, increasing to 17-20 mm at the outer surfaces. The hole is perfectly smooth throughout its length. The disc break appears to be relatively recent in time and was probably caused by agricultural activity. The outside edge of the disc has been purposely smoothed. Based on the size of the jar from which the disc came, it is probably associated with the Titus phase occupation, since the Middle Caddo peoples in the Big Cypress Creek basin are not known to have had large cooking vessels.

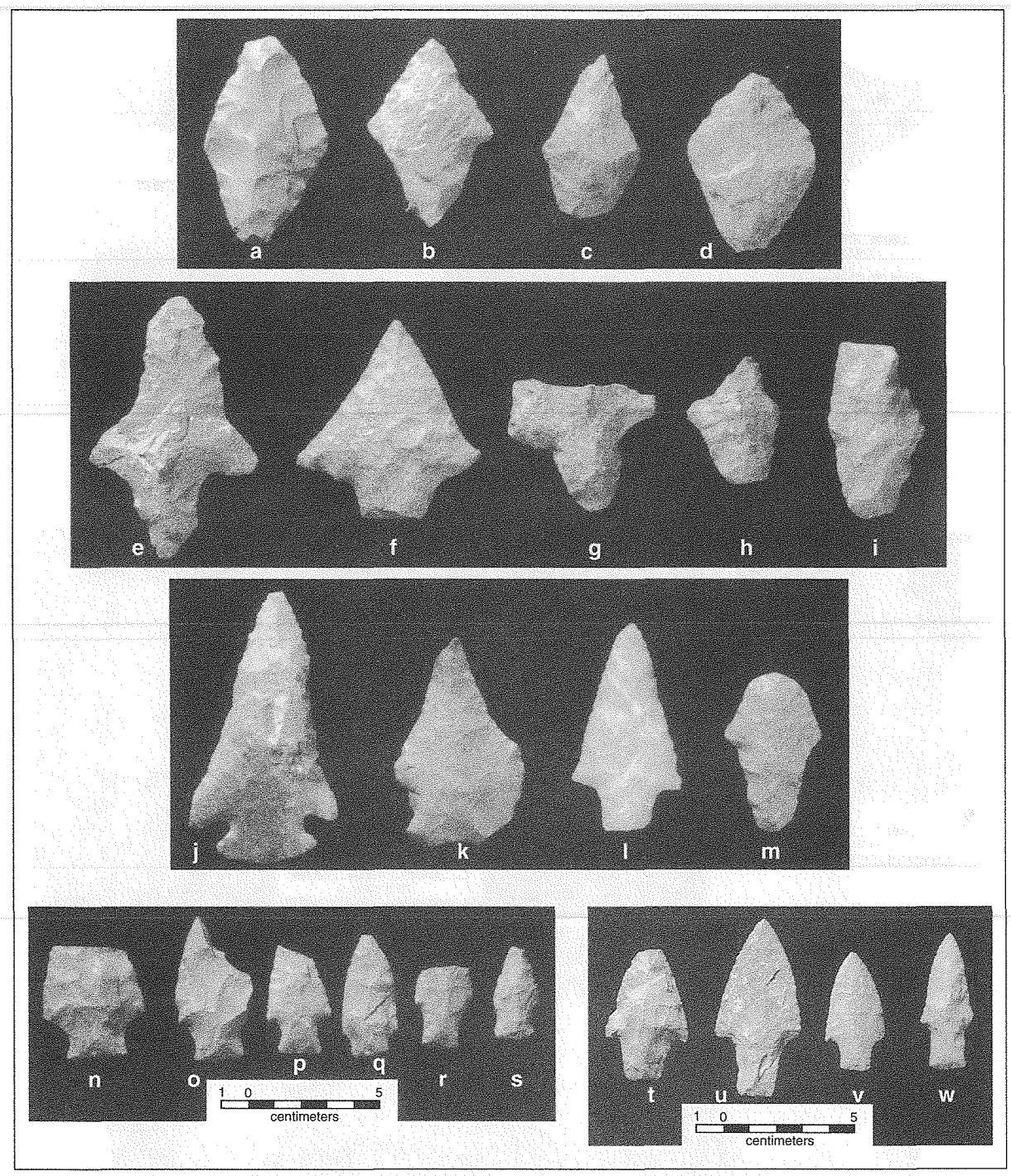


Figure 35. Dart points from Area B surface collections: a-b, d, Gary, *var. Alsa*; c, Gary, *var. Hobson*; e-g, Morrill; h, k, r, unclassified; i, Marcos; j, San Patrice (?); m, point with rounded and ground tip; l, n-q, u-w, Yarbrough; s-t, Bulverde.

The small celt (see Figure 36c) is pecked and ground and petaloid-shaped. The material, common for Titus phase celts, is a greenstone that probably originated in the Ouachita Mountains of southeastern Oklahoma or southwestern Arkansas. This specimen is complete, but slightly shorter (7.5 cm versus 8. 8 cm) than the celt in Titus phase grave M. The bit edge of this small specimen is rounded at an approximate radius of 1 mm, presumably from wear. This small tool is large enough to be hafted in the

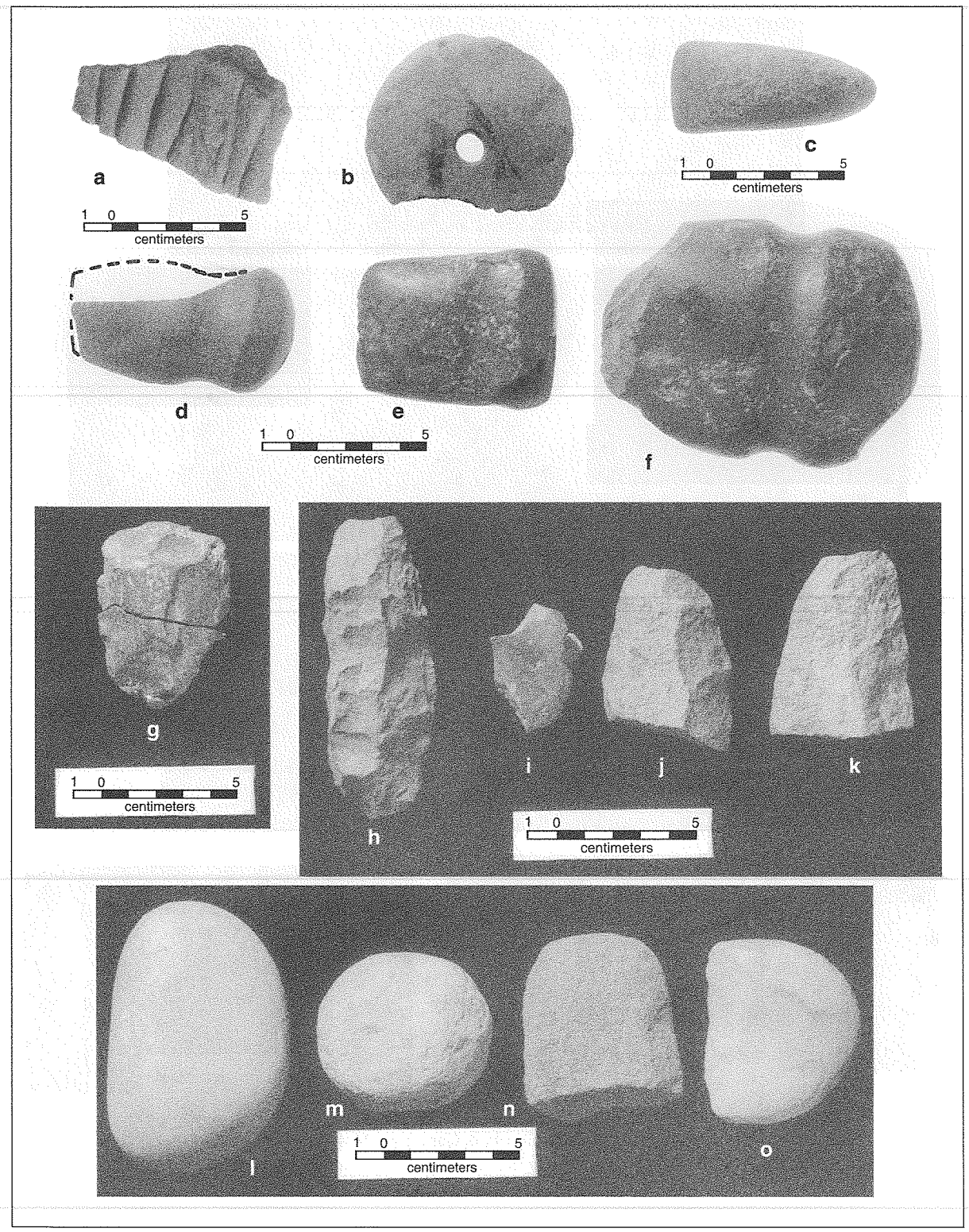


Figure 36. Surface collection from Area B and Area A, south of youth excavations: a, ferruginous sandstone abrading stone; b, perforated ceramic vessel base; c, celt; d-f, hematite axes; g, hematite gouge; h, ovoid percussion-flaked ferruginous sandstone tool; i, polished hematite fragment; j-k, ferruginous sandstone bifaces; l-m, hammerstones; n, ferruginous sandstone tool fragment; o, sandstone nutting stone.

conventional manner but it is too small and light for wood chopping. It would have been perfect, if hafted, as a toy for a child or perhaps the dulled edge resulted from a scraping action.

There are polished hematite axes (see Figure 36d-f) in the collection. Two were broken in antiquity as the broken surfaces have had time to metamorphose from a homogeneous ferruginous sandstone to the same color and texture as the outer surface. Each axe is full grooved, and they have marks from modern agricultural activity. Grooved hematite axes were a tool of the Archaic people of Northeast Texas and continued in use into the Early Ceramic period. The grooved axes were eventually replaced in form and material by ungrooved axes or celts during Caddo times.

The ferruginous sandstone gouge (see Figure 36g) is the shape of the classic Clear Fork tool (see Turner and Hester 1993). Its outer surface has weathered to the same dark reddish-brown color and texture as the axes.

There are three other ferruginous sandstone tools in the surface collections. This material frequently occurs in tabular form and from 1 cm or more in thickness. It is also a principal material for Archaic tools in this area of the state. Percussion flaking was used almost exclusively in forming tools from this material, other than grinding for axes. In tool manufacture from the sandstone, a lighter-colored cortex may remain on one or both faces. One tool utilized the flat cortex on the bottom (see Figure 36h), and the surface shows polish; this was evidently the working surface. The edges are not smoothed and the upper surface lacks wear or polish. The second tool (see Figure 36j) is broken, but has some edge smoothing. No wear or polish is apparent on either of the faces, which are roughly convex in cross-section. This tool was probably broken while in use and was discarded early in its life cycle. The third ferruginous sandstone tool is also broken (see Figure 36k), and there are no scars or shatter from a blow at the broken face; the tool may have snapped from a prying action. It also has a light wear-polish on high spots of both surfaces, but the major wear is on the edges, which are smooth to the touch. Similar complete tools of this type and material, and with long elliptical shapes, were apparently used as saws.

One tool (see Figure 36i) is a fragment of highly polished hematite that was apparently part of a grinding surface. Two others are hammerstones (see Figure 36l-m), and one was only slightly used whereas the other (see Figure 36m) was used into a nearly spherical shape. There is a well-shaped mano of ferruginous sandstone (see Figure 36n), as well as a tool with a slight depression on one surface. The material is a tan sandstone that has been smoothed around the edges. It may have been used as a small grinding stone or a nutting stone.

Five bifaces were collected from the surface, four of local quartzite and the other of a non-local whitish chert. Rounding out the stone tools are seven worked flakes.

Early Caddo period sherds were also found in the surface collection. This includes Crockett Curvilinear Incised (Figure 37a-b), Coles Creek Incised (Figure 37c), Dunkin Incised (Figure 37d), and Canton Incised (Figure 37e-f).

AREA C EXCAVATIONS

Area C excavations were located 269 m northwest of Area B on a sandy knoll (Figure 38). The elevations and corner designations are part of the same grid system as Areas A and B. Charles Bandy directed the work at this location.

Test 1 was a 1 x 2 m unit excavated in three 30 cm levels. The first level had one Homan arrow point and a hammer stone, and there was an earspool fragment from 60-90 cm bs. Lithic debris and sherds were present in these deposits, but not in abundance.

In Test 2, another 1 x 2 m unit, sherds occurred at a density of approximately 100 per m^3 through the upper 60 cm, and about 50 percent lower in density between 60-90 cm bs. Lithics were present to 120 cm, as were a few sherds. Charcoal and charred bone were found at 47 cm bs.

The purpose of the Area C excavation was to locate features for detailed study. In an attempt to cover a larger search area, Test 3, a 30 m x 60 cm trench, was placed across the knoll (see Figure 38). This trench was dug to 75 cm bs in two 30 cm levels and a third 15 cm thick level. Sherd densities were 77 per m^3 and 44 per m^3 in the two upper levels and lithic concentrations were 27 and 6 per m^3, respectively. Charcoal fragments were present in the top two levels as well as daub (n=39) in the top level. Five arrow points were found between 0-30 cm bs, two of which were broken.

Test 4 had 105 sherds and 36 lithics, while Test 5 had 104 sherds and eight lithics. The only feature, a fire pit, was found at N319/W349, at 39 cm bs. The

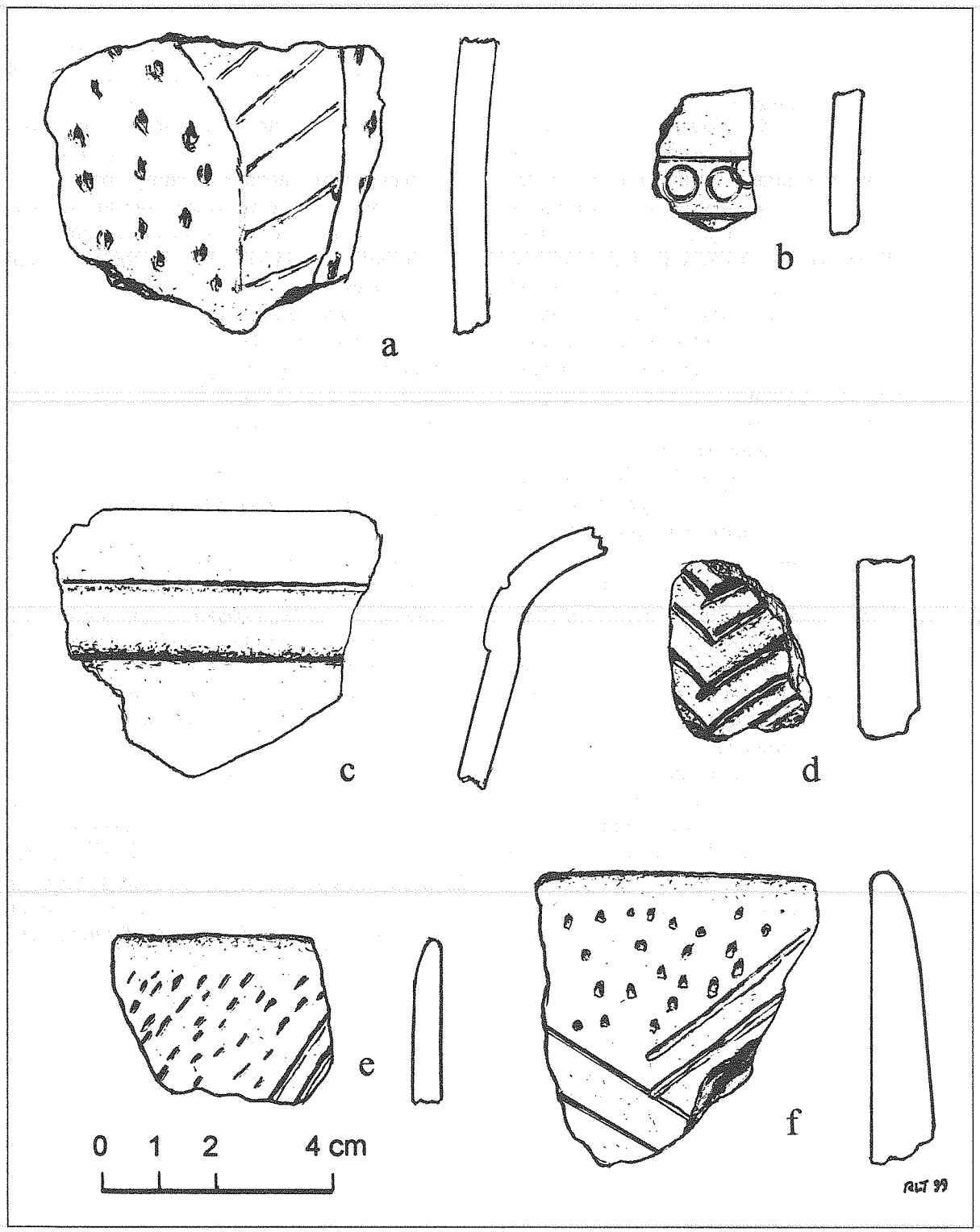


Figure 37. Early Caddo sherds, surface collection: a-b, Crockett Curvilinear Incised; c, Coles Creek Incised; d, Dunkin Incised; e-f, Canton Incised.

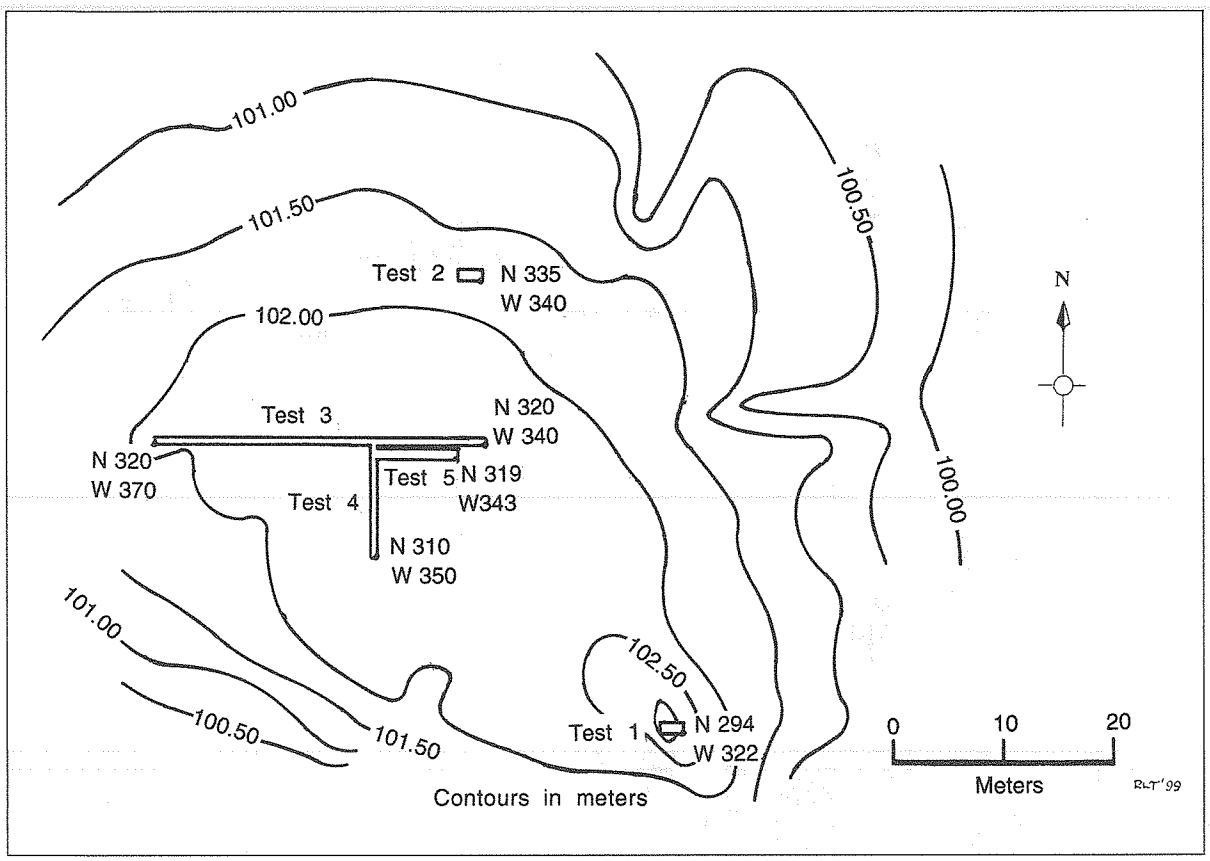


Figure 38. Area C, at the Harold Williams site (41CP10).

pit had burned soil, but no rocks were present, and it was approximately 75 cm in diameter. The feature contained 26 sherds, charcoal, 22 bone fragments, and several shell fragments, probably mussel.

The six arrow points were found between 0-30 cm bs in Area C. They include two Homan, two Perdiz, one Fresno, and one that was unidentified.

The quantity of artifacts found indicates a light human occupation of this particular part of the Williams site. The arrow point styles suggest the occupation took place during the Middle Caddo period.

A SUMMATION

People inhabited the Harold Williams site, intermittently or seasonally during the Archaic and Early Ceramic periods, and then on a more permanent basis after the advent of agriculture during the Caddoan occupation of the site (Figure 39). The oldest artifact, if identified correctly, is a single San Patrice dart point (see Figure 35j). San Patrice dart points are found in Camp County and in Northeast Texas, but generally in very small numbers. They are associated with the Late Paleoindian period, ca. 8000-7500 B.C. (see Webb et al. 1971; Johnson 1989; Story 1990).

Following this in time are two well formed and readily identified Bulverde dart points (see Figure 35s-t), and several Morrill dart points. These points date from the Middle Archaic in Northeast Texas, between ca. 4000-1500 B.C. According to Thurmond (1990), the Late Archaic period (1500-200 B.C.) is represented by the dart point types Gary, Kent, and Ensor. Story (1990) has added Edgewood and Ellis to this Late Archaic dart point assemblage.

Following the Late Archaic in Northeast Texas is the Early Ceramic period (Story 1981) presently dated from 200 B.C. to A.D. 800. During this time ceramics were present, and the bow and arrow was introduced during the latter part of the period. Dart point styles introduced in the Late Archaic, particularly Gary points, continued to be made and used in the Early Ceramic.

Johnson (1962) in his analysis of the artifacts from the Yarbrough site in Van Zandt County, 85 km

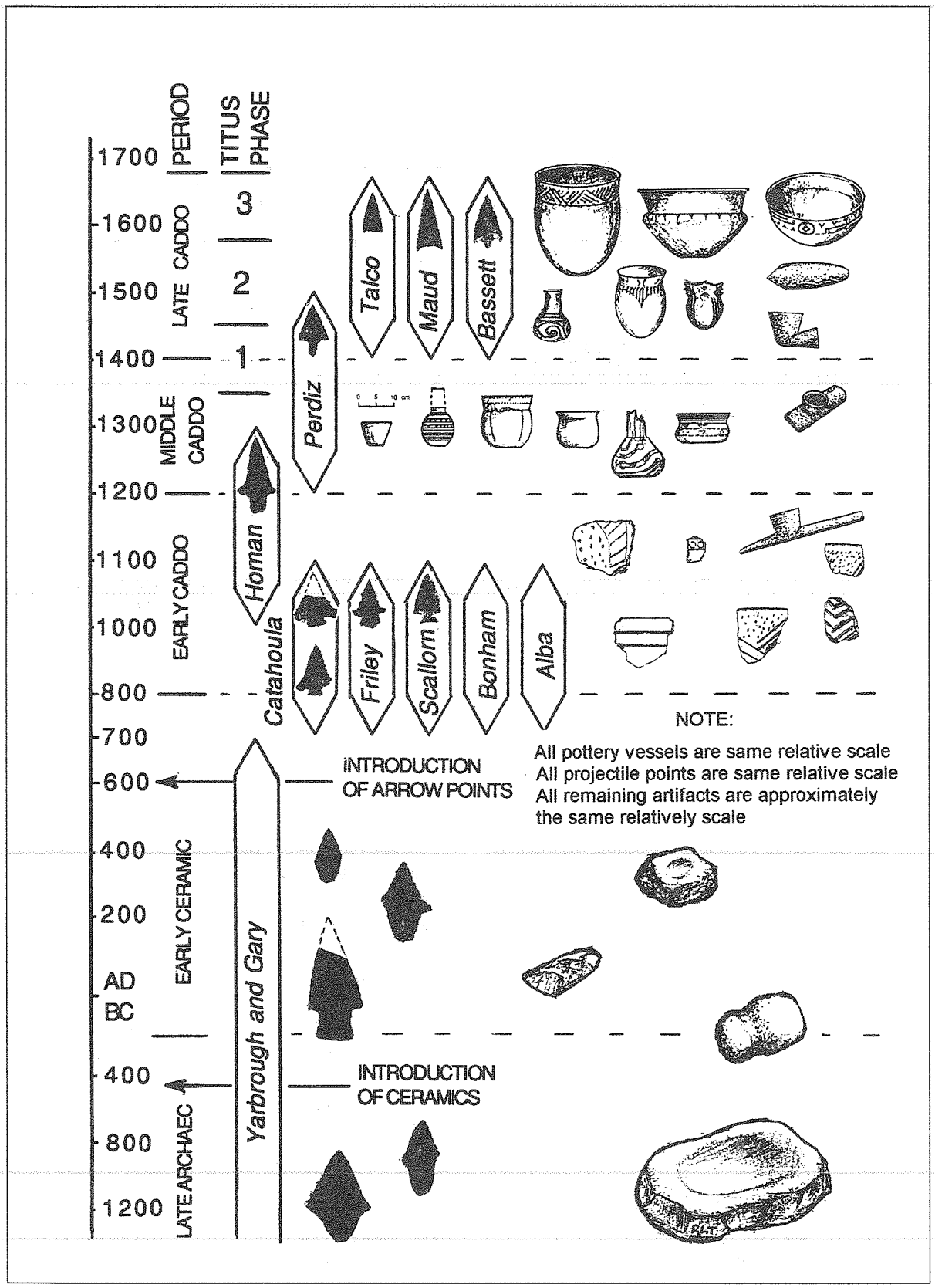


Figure 39. Harold Williams site cultural sequence and associated artifacts.

southwest of the Harold Williams site, and from the Manton Miller site in Delta County, provides a major source of information on the Archaic period in Northeast Texas. He demonstrated that changes in dart point types occurred through time, with expanding stem dart points (the Yarbrough type) occurring early in time and before the contracting stem points (the Gary type). As time passed, the Gary points increased in numbers compared to the Yarbrough points, although they were present in small quantities during the period when the Gary type was most popular. At the top of the stratigraphic column at Yarbrough were a few pottery sherds and arrow points. The Gary point is a major type in both the Late Archaic and the following Early Ceramic period.

The same stratigraphic sequence occurred at the Tankersley Creek site (Young 1981), 19 km northwest of Harold Williams. Here, Yarbrough points preceded the use of the Gary point. Overall, the site's dart point assemblage closely matches that at the Harold Williams site; that is, the total Gary point assemblage is about 50 percent, and the proportions of Yarbrough points are nearly the same. The Tankersley Creek site had the same stone tool groups as at Williams: nutting stones, manos, grinding slabs, hammerstones, gouges, and polished stone fragments. It also had Williams Plain pottery, three Catahoula arrow points, one corner-notched point, one Alba-like point, and one that was unidentified. The Early Caddo sherds were also similar, with Crockett Curvilinear Incised, Coles Creek Incised, and Pennington Punctated Incised-like specimens.

Cliff (1998:105) stated that:

> It is probable that the Early Ceramic period in Northeast Texas was fully Archaic in lifestyle and tradition, and represents a period of change and modification to the Archaic tradition under the combined pressures of increasing within-group populations, and increasing between-group packing.

The Gary point tradition carried into the Early Ceramic period and flourished. Young (1981), as well as Johnson (1962), for example, has demonstrated that the large Gary points preceded the small Gary points in time. Young (1981:75) proposes that:

> occupations without Gary points probably predate B.C. 2000 and that sites with a predominance of large Gary's range around B.C. 800 or later. Small Gary points (less than 36 mm) are proposed to become the dominant projectile point type around the advent of pottery and to continue as the dominant type into the earliest portion of the Caddo sequence.

The selected Archaic sites in Table 15 overlap in time. The Analysis Units 1 and 2 at the Yarbrough site are a good baseline for temporal comparisons of other East Texas Archaic sites. These sites have archeological deposits with artifacts dating from as early as the Paleoindian period, as well as Archaic and Early Ceramic periods, and also Early Caddoan in age (Table 16).

The Miller site, with a predominantly Gary dart point assemblage and only one Yarbrough point, but with both large and small Gary points, dates to the Late Archaic and the Early Ceramic period. Williams Plain pottery was present at the site as well as early arrow point styles. A third component at the site is Early Caddoan in age, with the appropriate ceramic and arrow point assemblage.

The Jake Martin site (Davis and Davis 1960), located 32 km southeast of the Williams site, is also an Archaic site, and with a Paleoindian component (see Table 16). The expanding stem Yarbrough points are the most common dart point variety, while the later Gary points are only a minor part of the assemblage.

The Williams site excavations did not find Yarbrough points in the excavations, but rather only in the surface collection. At Tankersley Creek, the Yarbrough points were found deeper than the Gary type in the excavated columns, but the distributions of Yarbrough and the large Gary points overlapped; a similar distribution was noted for the large and small Gary points, with the latter also postdating the larger Gary points. This same sequence was noted at the Yarbrough site.

The Bolton collection (see Tables 15 and 16) was assembled over many years, primarily in the 1930s and early 1940s. Mr. Oliver Bolton of Pittsburg, Camp County, was associated with the dry goods business in downtown Pittsburg. During this era, East Texas was cotton country and most arable land was row cropped, primarily in cotton. This exposed artifacts after each plowing and rain. Nearly every farm boy collected artifacts, usually from the family place. A custom of the time was the Saturday visit to town to buy, or perhaps trade

Table 15. A comparison of selected dart point percentages between several Archaic sites and one Camp County collection.

Type	Yarbrough, AU 1 and 2	Manton Miller	Jake Martin	Tankersley Creek	Bolton Coll.	Williams
small Gary	22.8	30.2	1.7	25.7	21.4	28.2
large Gary	16.4	24.8	3.9	25.7	26.4	14.5
broken Gary	0.0	37.2	0.0	0.0	0.0	8.2
total Gary	39.2	92.2	5.6	51.4	47.8	50.9
Edgewood	7.5	0.0	0.0	0.0	5.0	0.9
Yarbrough	24.1	0.8	26.2	10.1	14.4	9.1
Other	29.2	7.0	68.2	38.5	32.8	29.1
Total Dart Points	373	129	229	148	1336	110

Table 16. Other artifacts and traits shared by the selected prehistoric sites.

Artifact Class	Yarbrough AU 1 and 2	Manton Miller	Jake Martin	Tankersley Creek	Bolton Coll.	Williams
Pottery	Williams Plain Sanders Plain Canton	Williams Plain Crockett Pennington Coles Creek	None	Williams Plain Crockett Pennington Holly Marksville	None	Crockett Canton Dunkin Coles Creek
Early Arrow Points	Catahoula	Alba Scallorn	None	Catahoula Alba side-notched	Unknown	Catahoula Friley
Paleoindian	Clovis Plainview Meserve Sandy Creek San Patrice	None	Meserve San Patrice	San Patrice	Clovis Plainview Eden Meserve Scottsbluff San Patrice	San Patrice
Flexed Burials	Yes	Yes	No	Yes	Unknown	No

produce, for next week's groceries, visit with friends, and if you were a kid, go to the movie. To help finance this excursion, young people would bring dart points and other artifacts to Mr. Bolton to purchase.

Based on this method of acquisition, and the size of the collection, it provides an excellent baseline for the kinds of Archaic dart points found in Camp County. If one thinks of Camp County as a single site, this collection can be compared to assemblages from individual sites to assess local and site-specific trends in prehistoric use. For example, by percentage, the total Gary assemblage for Camp County and the Williams site are similar (see Table 15), but at Harold Williams, the small Gary points are a larger percent of the overall assemblage, and the large Gary and Yarbrough points are a smaller percent. One may conclude that the Williams site was more heavily populated during the latter part of the Late Archaic and the Early Ceramic period than was the county as a whole.

The artifacts, archeological deposits, and their stratigraphy at the Harold Williams site indicate that it was used during the Late Archaic (possibly somewhat earlier), as well as during the Early Ceramic period. This period is marked by the first use of the early Catahoula, Friley, and corner-notched Scallorn-like arrow points (see Figure 39). The major stone tool assemblages of the Archaic and Early Ceramic periods are also present. Although Williams Plain sherds were not recognized in the 1976 analysis, they likely were present were the sherds to be reanalyzed. Perttula et al. (1993) discuss the character of the Early Ceramic period in East Texas in more detail.

Habitation of the Harold Williams site during the Early Caddoan period is marked by Catahoula, Friley, Scallorn-like, Bonham, and Homan arrow points. There are also Crockett Curvilinear Incised, Coles Creek Incised, Dunkin Incised, Canton Incised, and Pennington Punctated Incised sherds, and pipe fragments of the long stemmed Red River variety. Webb et al. (1969), in their article on the Resch site (41HS16) in nearby Harrison County, Texas, describe a similar assemblage of artifacts that date from the Late Archaic to the Early Caddoan period.

The Middle Caddoan and Late Caddoan Titus phase occupations of the Harold Williams site are characterized by large quantities of ceramic sherds, arrow points, as well as houses and their graves. In Middle Caddoan contexts, excavations recovered charred nutshells in abundance, as well as corn. Deer and turtle bone were also identified, along with other bone, and these remains were found in association with large quantities of daub. The Pit 19 and 20 radiocarbon and OCR dates suggest these materials date from ca. A.D. 1200-1400.

The former presence of Middle Caddoan houses is inferred from the large quantity of daub at various locations within the site, including Pit 1, as well as nearby Pits 19 and 20. In trenches 8-10 where the infant interments and offerings were found (see Figures 4c, 25, and 26), the supposition is that these burials of children were within or immediately adjacent to a house, which is a Caddoan burial custom. If this is correct, the house in the trench 8-10 area dates to the Titus phase, as all 10 vessels found as offerings belong to this Late Caddoan phase. Feature 7 (see Figures 23 and 24) is the post mold pattern from a prehistoric Caddo house. Excavations there recovered single examples of Bassett, Talco, and Homan arrow points, and sherds of all decorative styles, including a higher percentage of brushed sherds than other pits and trenches. Based on the artifacts from within and adjacent to the structure, the Feature 7 house probably was built and used by Titus phase peoples.

In summary, then, the Middle Caddoan period is represented by the graves in Area A, platform pipes, the Homan and Perdiz-like arrow points, and the rattlesnake motif on the bottle of one of the Area A graves. Much of the archeological deposits in Area B and C are also from a Middle Caddoan occupation. There are twice as many Homan arrow points at Harold Williams than there are Late Caddoan arrow points, and it appears that the Middle Caddoan people lived on the site in greater numbers than the later Titus phase. The Caddoan settlement of the Harold Williams site during this period must have been permanent, as indicated by the evidence of structures, a substantial midden, and the small number of burials. In addition to the stone and ceramic artifacts, the OCR and radiocarbon dates from sediments and charred nutshells in Pits 19 and 20 confirm this Middle Caddoan occupation and provide excellent dating for the Homan arrow points in Pit 19.

The last inhabitants of this site were the people of the Titus phase. This occupation is marked by a large community cemetery, houses, and the discard of Bassett, Maud, and Talco arrow points and Titus

phase ceramics from a small settlement. In addition to the large community cemeteries at Williams and the nearby Tuck Carpenter site (see Figure 1), a small Titus phase family cemetery with seven burials has been reported at the nearby Guest site (Turner 1978). This cemetery is ca. 450 m north of the Harold Williams site.

There are numerous Caddoan middens along Dry Creek (see Figure 1) in the vicinity of the Harold Williams site, and downstream near its confluence with Big Cypress Creek. Each midden probably represents the debris from a Caddo farmstead. The Harold Williams site is located on a terrace above the floodplain, and in the midst of a sandy field well suited for corn and garden agriculture. The other middens are in similar settings. Thus, in Late Caddoan times there were apparently enough local inhabitants to support a major community cemetery at the Harold Williams site.

NOTE

1. The Williams site, during the Field School, was identified as X41CP1. All field notes, level reports, and paper work generated during the excavations, as well as the artifacts, are identified with this site number. This identification has subsequently been changed to 41CP10, the Texas Archeological Research Laboratory and Texas Historical Commission site designation.

ACKNOWLEDGMENTS

The kindness of the Harold Williams family in allowing the Field School to be held on their farm is appreciated by the Texas Archeological Society, as was the brush-hogging and preparation of the camp site by Mr. Williams. This was a fine location for the 1967 Field School.

The Tarrant County Archeological Society completed the final cleaning and cataloging of the artifacts from the Field School. This project was a learning experience for many of the members, and its accomplishment was a worthwhile endeavor.

Kerza Pickworth Prewitt, Bob Adams, and Charles Bollich, who were all attendees at the Field School, provided personal photographs for inclusion in this article. These were used in interpreting events, visualizing selected artifacts, and in "getting the feel" again of a long past event.

All artifact photographs in this article were taken by Milton Bell, who came to Pittsburg to do the photography. In addition he made all prints to the scale requested by the BTAS editor. Without his interest and expertise, this article would be lacking.

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APPENDIX I, THE FIELD SCHOOL ATTENDEES

The names of participants at the 1967 Texas Archeological Society field school, approximately 100 in number, were taken from crew chief daily journals, rosters, and particularly from the level reports. The names are generally under each person's primary work area. Towards the week's end, people were reassigned to other areas. The following listing contains 84 names which were on field school documents.

J. Ned Woodall	Archeologist in charge
E. Mott Davis	Crew Chief Area A
Lou Fullen	Crew Chief Area A
Cecil Calhoun	Crew Chief Area B
Bob Burleson	Crew Chief Area B
Charles Bandy	Crew Chief Area C
Charles Bollich	Camp Boss
Kathleen Gilmore	Lab Director
Julie Woodall	Lab Director
J. Sharp	Photographer
Gloria Turner	Local Arrangements
Bob Turner	Local Arrangements
Ed Jelks	Consultant
Martha Davis	Camp Cook

Area A	**Area B**
Frank Brezik	R. G. Adams
Janet Barlow	Herb Akers
Jo Ann Calhoun	Freda Blackwell
Marvin Clark	Richard Bowen
Hugh Davis	Randy Brown

Area A	**Area B**
Jonathon Davis	Mickey Burleson
Dawn East	Ann Childers
Danny Fox	Tom Cobb
Marge Fullen	Joe Cochran
Glen Garner	Toppy Cochran
Sally Garner	Margaret Drew
Barbara Jo Hickman	Mr. Espey
Jack Klatt	Bransford Eubank
Mary Lou Klatt	W. Griffith
Jan Omara	Arlan Hackler
Kerza Pickworth	Dawn Hoffrichter
Ms. Schmidt	Norma Hoffrichter
Kerry Thedford	Nancy Jircik
Sam Valastro	Paul Koeppe
Mike Williams	Dessamae Lorrain
Jim Word	Paul Lorrain
J. A. (Turkey) Zoeller	Percy Miller
Pauline Zoeller	Alonzo Morrisey

Youth Group	
Leah Calhoun	F. L. Safforrans
Wayne Calhoun	Stephen Sharp
D. J. Smelley	C. A. Smith
Lauren Childers	R. C. Stapp
Darrell Creel	C. W. Urwin
Gerald Creel	Barbee Zoeller
Nancy Flavin	
Jean Fullen	
John Fullen	
Nina Garner	
Dan Jircik	
Mark Jircik	
Stanley Jiecik	
Pete McKaugahn	
Roy Padgett	
Karen Patrick	
T. Powell	

Late Holocene Investigations at the Lubbock Lake Landmark with the 1993 Texas Archeological Society Field School

Eileen Johnson, Briggs Buchanan, Matthew Gill, Patrick J. Lewis, Corrine L. MacEwen, Stuart M. Selwood, Susan E. Baxevanis, Karen Hicks, and Karen L. O'Brien

ABSTRACT

During the 1993 summer field season, the Museum of Texas Tech University hosted the Texas Archeological Society Field School at the Lubbock Lake Landmark. Field investigations included a 100% pedestrian survey of the entire landmark preserve and test excavations at four locations. Test excavations at two of these locations were continued through the end of the summer field season. Activity areas uncovered at these locations dated to the late Holocene period based on the geologic context and temporal identification of artifacts recovered. During the survey, artifacts were recovered from 14 areas within the Lubbock Lake site (41LU1) in Yellowhouse Draw and from nine upland rim sites. A new occupation area within the valley was designated and two new upland rim sites were recorded. Test excavations at Area 10 revealed a complex and extensive veneer of hearth material covering an underlying pit. Continued work in Area 13B helped explore the boundaries and microstratigraphy of the cultural deposits in Stratum 5 and provided information on the number and extent of bison processing events at this location. Test excavations in Area 72 focused on mid-twentieth century trash dumps in order to gain insight into discard and consumer activity as reflected by Lubbock's post-World War II population growth. Testing at Site 41LU31 was conducted to determine the age and extent of a disturbed hearth. The results of the surveys and excavations underscored the extensive and repeated use of the Landmark area for various purposes.

INTRODUCTION

The Lubbock Lake Landmark (41LU1) is a designated National Historic Landmark and Texas State Archeological Landmark located on the northern outskirts of the city of Lubbock, in the Texas Panhandle of the Southern High Plains (Figure 1). The landmark encompasses 300 acres along the axis and margins of Yellowhouse Draw. The landmark is both an archaeological and biological preserve within the urban setting of Lubbock. The site was discovered in 1936 during dredging operations to rejuvenate springs in the meander channel associated with the historical location of Long Lake (Holden 1974; Johnson and Holliday 1987). The excavators did not realize that the water table was dropping rather than the springs were silting in, and thus several thousand cubic meters of sediment were removed along the valley axis until the water table was breached. The dredging operations resulted in the formation of a city reservoir and also exposed the extensive late Quaternary stratigraphy along the valley terraces. The archeological deposits were discovered when prehistoric artifacts were brought to the West Texas Museum (now the Museum of Texas Tech University) for identification.

For 65 years the Museum of Texas Tech University has been involved with the research, preservation, and governance of the Lubbock Lake Landmark (Johnson 1993, 1995a, 2002; Johnson and Holliday 1987). Although the boundaries of the Lubbock Lake Landmark archeological site (41LU1) and the Lubbock Lake Landmark Preserve overlap, they are not identical. The boundaries of the preserve encompass 105 acres of the rims and terraces overlooking the valley and 202 acres of archeological site 41LU1 within Yellowhouse Draw (Figure 2). The 98-acre portion of 41LU1 located outside of the preserve is governed by the city of Lubbock but is covered by permit to the Museum for research purposes.

During the 1993 summer field season, the Museum of Texas Tech University hosted the Texas Archeological Society (TAS) Field School at three

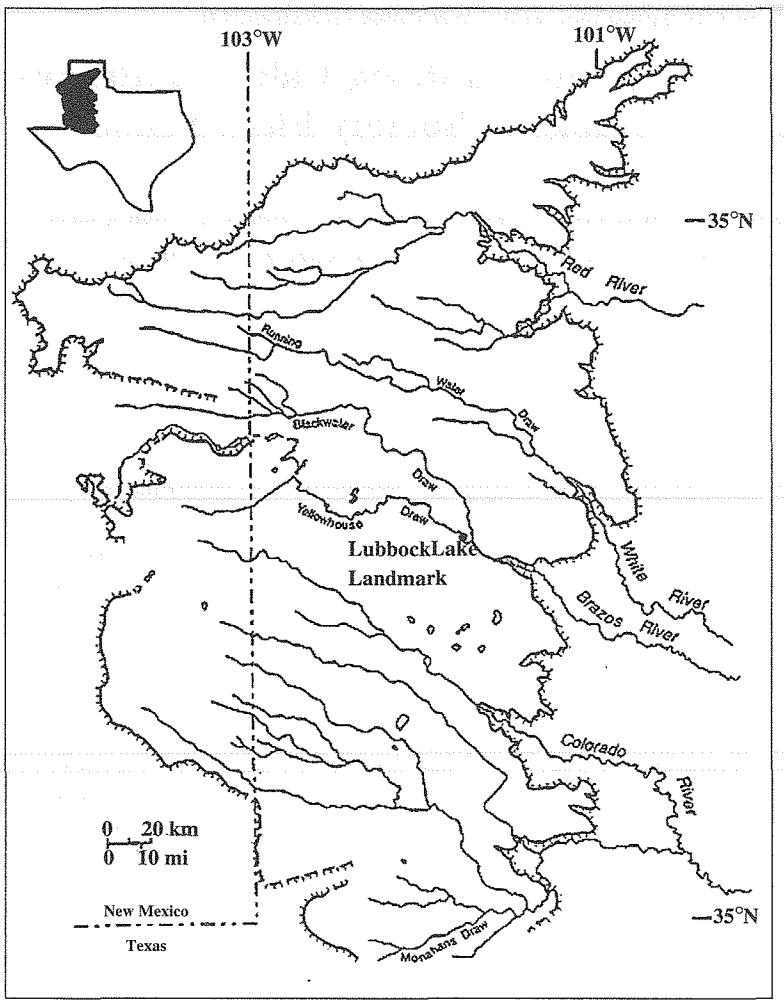

Figure 1. Location of the Lubbock Lake Landmark in the physiographic setting of the Southern High Plains.

different locations in the southern Panhandle Plains region (Baxevanis et al. 1997; Litwinionek et al. 1997), including the Lubbock Lake Landmark. The TAS Field School efforts within the landmark focused on a pedestrian survey of the 307-acre preserve and test excavations at four locations. The landmark's research crew continued the test excavations at two locations through the end of the summer field season.

GEOLOGIC BACKGROUND

The Southern High Plains (southern portion of the High Plains section of the Great Plains province) is a flat, expansive plateau in western Texas and eastern New Mexico that covers an area of 130,000 square kilometers. The region is defined by escarpments along the west, north, and east sides and merges with the Edwards Plateau along the southern edge without an obvious break. On the west and southwest sides are the Pecos Valley and Mescalero (Querecho) Plains. To the north is the Canadian River Valley. Bordering the eastern side is the southern portion of the Osage Plains section of the Central Lowland province, in Texas known locally as the Rolling Plains. These areas comprise most of the Southern Plains, a general, informal term covering the southern portions of the Great Plains and Central Lowland provinces (Fenneman 1931; Hunt 1974). This extensive tract of land has consisted of vast grasslands since at least the late Pleistocene (Ferring 1995; Holliday 1987; Johnson 1989).

The flat, almost featureless surface of the Southern High Plains has been modified by several geomorphic processes. The northwest-southeast-trending now-dry valleys (locally known as draws) are tributaries of the Red, Brazos, and Colorado rivers that flow through the Rolling Plains and into the Gulf of Mexico. Around 25,000 small lake basins (locally known as playas) and 40 saline depressions (salinas) cover the landscape, occurring primarily on the high plains surface. Lastly, several dune fields occur along the western side (Hawley et al. 1976; Holliday 1995a; Holliday et al. 1996; Reeves 1972, 1976; Sabin 1992; Sabin and Holliday 1995). Prior to the 1930s, numerous springs, active since at least the late Pleistocene (Holliday 1985a, 1995a, 1995b), flowed in various reaches of the draws, with both ponds and free-flowing water available (Brune 1981). Today, the playas and salinas contain the only naturally impounded water for the region.

The Ogallala Formation of Miocene-Pliocene age is the regional bedrock and is generally overlain by the Pleistocene-aged Blackwater Draw Formation. Locally, the Blanco Formation (Pliocene) may overly the Ogallala Formation. The Ogallala

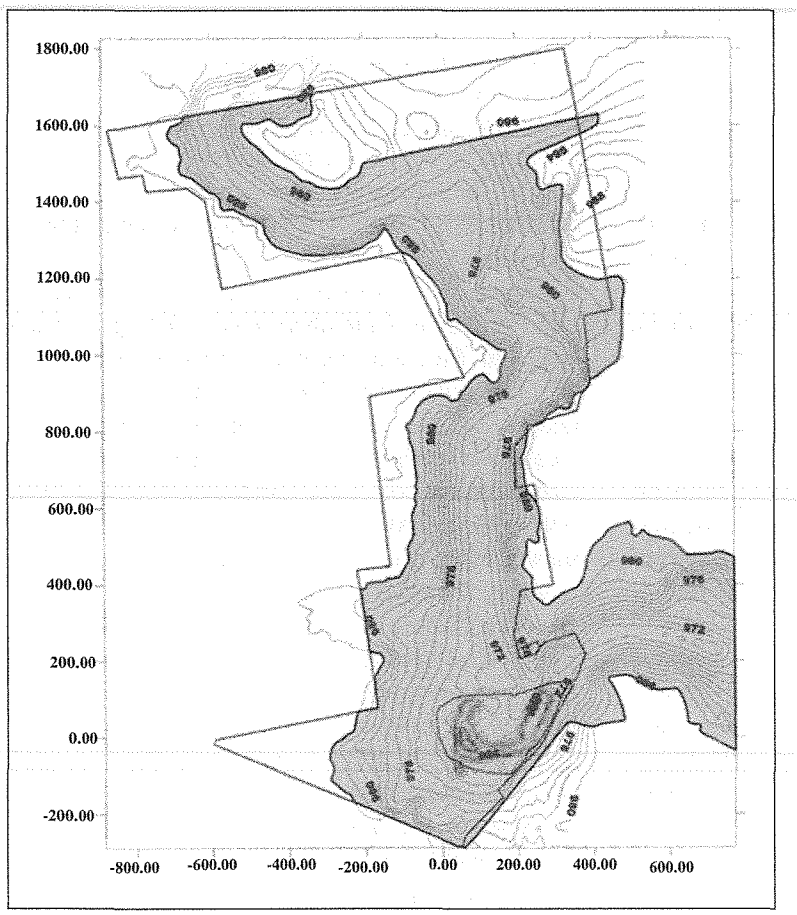

Figure 2. Outline of the Lubbock Lake Landmark preserve with the 41LU1 site boundary delineated by shading.

Formation, composed of aeolian and alluvial sediments, has several members that contain cobbles of various quartzites and cherts suitable for flaking and tool use (Holliday and Welty 1981). These materials are known either by the generic name of Ogallala quartzite or chert or a member name such as Potter quartzite or chert. The Ogallala Formation contains the Ogallala aquifer from which the springs flowed (Gutentag et al. 1984). The upper Ogallala Formation has a very resistant, thick, ledge-forming calcrete known locally as the Caprock caliche (Holliday 1995a). The Blanco Formation is an extensive lacustrine deposit within large basins cut into the Ogallala Formation (Evans and Meade 1945; Holliday 1988). The source for silicified caliche suitable for tool use (Holliday and Welty 1981) is the calcrete formed at the top of this formation that also is the probable source for caliche used as hearthstones (Ladkin and Miller 1993). The Blackwater Draw Formation, formed by deposition of thick, widespread aeolian sediments, drapes the region and is the formation responsible for its flat surface. The Blanco and Blackwater Draw Formations are present along the lower elevations and upland terraces of the Lubbock Lake Landmark.

During the late Quaternary, climatic regimes shifted a number of times across the Southern Plains. However, by 4,500 B.P., the climate ameliorated and the modern continental regime was established. The late Holocene climate was marked by a cooler, moister trend that peaked around 2,000 B.P. and was then followed by minor departures toward aridity. Episodic droughts and aeolian deposition followed by periods of landscape stability resulted in the semiarid conditions of the present time (Holliday 1995a, 1995b; Johnson 1987). Playa basins held seasonal to year-round water and springs flowed in the draws. The Southern High Plains region was an extensive mixed-grass grassland (Hall 1982; Johnson 1987), although hackberry, native walnut, and cottonwood trees grew in the draws (Thompson 1987).

The Southern High Plains today has a strongly continental climate, with marked seasonality and a large annual temperature range. Rainfall maxima occur in the spring and fall while winter precipitation is minimal. Summer thunderstorms occur locally. Summer droughts and extended periods of below freezing temperatures in winter are common (Bomar 1995; Haragan 1983). Humidity levels are low with mean annual temperature around 50 degrees (15 degrees Celsius) and average, yearly rainfall varying from 47 to 38 cm (Bomar 1995; Haragan 1983). Playa basins will fill with water during seasonal rainstorms. A continental climate with seasonal variations in temperature and available moisture, a spring-fall rainfall pattern, episodic droughts, available surface water, and mixed-grass grassland with scattered trees in the draws form the setting for the late Holocene peoples on the Southern High Plains.

Lubbock Lake is located in Yellowhouse Draw that begins in New Mexico and joins Blackwater Draw in the city of Lubbock, thus becoming Yellowhouse Canyon that forms the Double Mountain Fork of the Brazos River. The draw is incised below the high plains surface, cutting through the Blackwater Draw Formation and into the Blanco Formation. Prior to about 11,000 B.P., the draw began aggrading and filled with a variety of sediments throughout the late Quaternary that compose five major geologic strata in which five principal soils formed (Holliday 1985a, 1985b, 1985c). Almost 200 radiocarbon dates from these well-stratified deposits now are available (Haas et al. 1986; Holliday et al. 1983, 1985; Johnson 1989, 1993, 1995a, 2002). This well-documented stratigraphic record reflects a more detailed version of the regional scheme (Table 1; Holliday 1995a, 1995b).

Considerably less well-known is the late Quaternary stratigraphic record for the high plains surface. Current research has focused on dune formation, playa stratigraphy, and lunettes (Holliday 1995a, 1995b, 1997; Holliday et al. 1996; Sabin 1992; Sabin and Holliday 1995). Away from these features, little is known about the sediments overlying the Blackwater Draw Formation on the high plains surface. Recent geologic work involving these sediments has been undertaken at the Lubbock Lake Landmark Preserve and has investigated sediments associated with the upland rims overlooking the draw (Holliday 1989, 1993, 1995b; Johnson 1995a; Johnson and Hartwell 1989). These sediments range from a few centimeters to well over a meter in depth but are aeolian in nature and are geologically unstratified. The deeper deposits exhibit soil formation. These upland sediments appear to be late Holocene in age and, therefore, related primarily to valley-fill Stratum 5. Correlation of upland stratigraphic designations (e.g., stratum K) to substrata or facies within valley-fill Stratum 5 has not been made.

FIELD METHODS

Surface surveys using point-proveniencing of artifacts have been conducted at the Lubbock Lake Landmark preserve on an annual basis since 1987. These surveys are conducted for several reasons: (1) to provide spatial data over a period of years; (2) to determine archaeological site boundaries; (3) to help determine the placement of test excavation units; (4) to monitor erosion across the surface of the landmark; and (5) to serve as a preventative measure prior to scheduled prescription burns. The results of these surveys have demonstrated that the landmark was occupied repeatedly over several thousand years.

The survey conducted in 1993 with the help of TAS Field School members was a 100% pedestrian survey of the entire preserve. The preserve boundaries encompass the valley axis, valley margin, and adjacent upland rim areas (Figure 2). Survey and excavation methods followed standard procedures used at the Lubbock Lake Landmark (Johnson 1987, 1993, 1995a, 2002). Pedestrian survey was accomplished using three-meter transects. All materials, including isolated artifacts not associated with an area or site, were pin-flagged and point-provenienced using a total station placed at known datum points (brass caps or rebar) referenced to Benchmark Datum 1 of the Lubbock Lake Landmark. Elevations above mean sea level (amsl) were also recorded using this benchmark. Diagnostic artifacts were photographed in the field prior to collection. All artifacts were collected for cleaning and processing.

Surface expressions of prehistoric and historic activity within Site 41LU1 are assigned unique provenience numbers. However, sites found on the upland rim areas are given distinct site numbers separate from 41LU1. After each year's pedestrian survey, maps are generated illustrating the spatial distribution of collected materials. These maps are used to help determine area and site boundaries or to identify previously unrecorded areas or sites.

The 1993 survey covered the 307-acre project area over an eight-day period with an average crew of 13 field school participants. Material was recovered from 14 areas within the boundaries of 41LU1 and from nine upland rim sites. A total of 1,549 artifacts was mapped and collected during the survey, the majority (87%) of which were hearthstones. Two new upland sites (41LU91 and 41LU92) were recorded and a new area (Area 78) was designated near the northern boundary of 41LU1. Artifacts found between established sites or areas were designated as isolated finds.

Excavations were conducted using isolated test units and intensive block excavations. Isolated test units were exploratory in nature for the purpose of determining the presence or absence of intact bur-

Table 1. Correlation of Valley Fill Stratigraphic Terminology for the Lubbock Lake Landmark with the Regional Stratigraphic Sequence.

Lubbock Lake Stratigraphy [a]	Regional Stratigraphy [b]
Stratum 5	Stratum 5
substratum 5B	stratum 5s2 and 5gs
substratum 5Bm	stratum 5m
substratum 5A	stratum 5s1 and 5g1
substratum 5Am	stratum 5m
substratum 5m	stratum 5m
Stratum 4	Stratum 4
substratum 4B (upper/A-horizon)	stratum 4s
substratum 4B	stratum 4s
substratum 4A	stratum 4s or 4m
substratum 4m	stratum 4m
Stratum 3	Stratum 3
substratum 3m(upper/A-horizon)	
substratum 3m	stratum 3m
substratum 3e	stratum 3s
Stratum 2	Stratum 2
substratum 2s	stratum 2s
2s local bed c	stratum 2s
2s local bed b	stratum 2s
2s local bed a	stratum 2s
substratum 2e	stratum 2s
substratum 2B (upper/A-horizon)	stratum 2m
substratum 2B	stratum 2m
2B cienaga	stratum 2m
substratum 2A	stratum 2d
2A local bed 5	stratum 2d
2A local bed 4	stratum 2d
2A local bed 3	stratum 2d
2A local bed 2	stratum 2d
2A local bed 1	stratum 2d
Stratum 1	Stratum 1
substratum 1C	stratum 1
substratum 1B	stratum 1
substratum 1A	stratum 1

a. After Holliday (1985a, 1985b, 1985c), Holliday and Allen (1987), and field notes on file at the Museum of Texas Tech University.
b. After Holliday (1995b).

ied cultural deposits or features. Intensive block excavations were aimed at determining the horizontal and vertical extent of cultural deposits, their stratigraphic associations, and the type of occupations present.

Excavation levels within the standard one square-meter excavation units were 5 cm deep within the smallest recognized stratigraphic unit. Excavation tools included trowels, small wooden tools, and brushes. All materials located during excavation were mapped in place and drawn to scale on appropriate Museum of Texas Tech University field forms. Occupation surfaces, features, and significant or unusual artifacts were photographed. The sediment from each excavation unit was bagged according to provenience (unit, substratum, 5 cm level, feature) and was water-processed through a nested set of 6.35 mm and 1.59 mm mesh screens. Microbiological and microcultural materials recovered from this process were cataloged and analyzed (Johnson 1987, 1995a).

The standard Lubbock Lake Landmark methodology for delineating features (Johnson 1987) was followed. Features were assigned a serial number. For a Landmark area, the feature designation combined an abbreviation for feature (F), the excavation area number (e.g., A1 for Area 1), and a serial number. For an upland rim site, the feature designation used the feature abbreviation, individual site number (e.g., 41LU31 became 31), and a serial number. As examples of this system, the designation FA10-1 represented the first feature identified in 41LU1 Area 10, whereas the designation F31-1 represents the first feature assigned in 41LU31.

RESULTS OF THE 1993 TAS FIELD SCHOOL SURVEY WITHIN LUBBOCK LAKE LANDMARK (41LU1)

Fourteen provenience areas within the boundaries of 41LU1 were investigated during the 1993 TAS Field School survey (Figure 3). Thirteen of these areas had been recorded during previous surveys (see summary in Ladkin and O'Brien 1995a). However, the 1993 TAS Field School survey resulted in the documentation of one new provenience designated as Area 78. The following discussion provides a summary of these findings. Table 2 presents the artifact counts recovered from each provenience area during the survey.

41LU1 Area 10

Area 10 lies on the uplands along the southern boundary of the preserve. Previous survey in 1989 recovered a large, mixed assemblage of artifacts representing the entire Holocene sequence (Clifford et al. 1995). Much of the cultural material was located along a dirt utilities road and had been disturbed by vehicle traffic. The 1993 survey recovered mostly

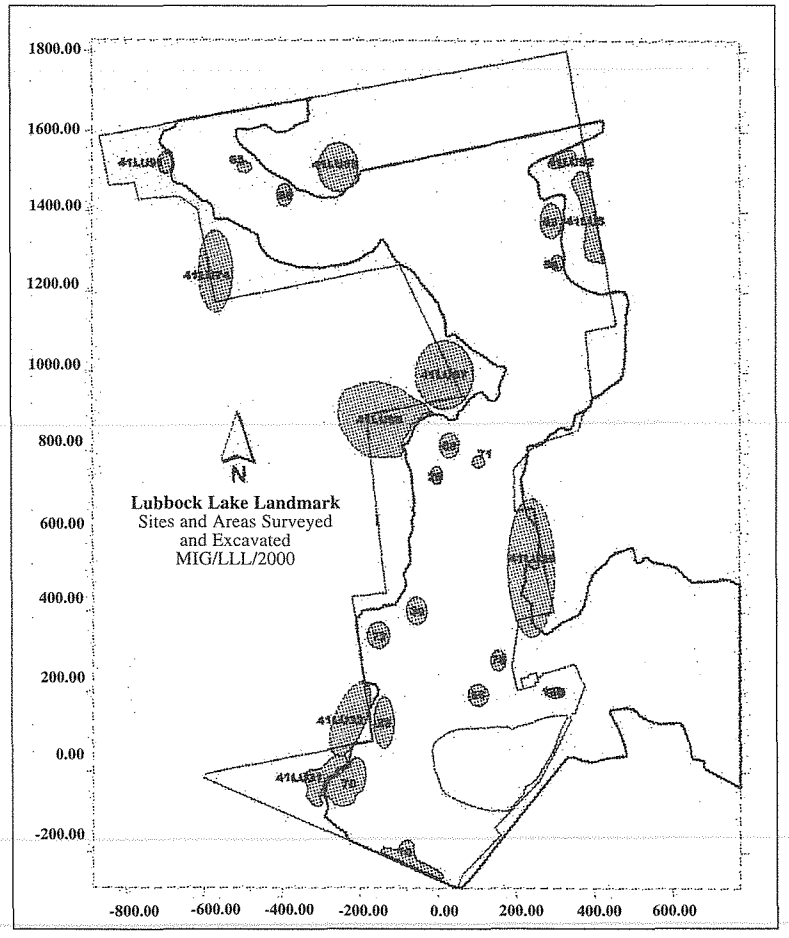

Figure 3. Sites and areas examined during the 1993 field season at 41LU1 and the upland rim landform (dashed lines indicate the projected site boundaries outside of the Landmark preserve).

Table 2. Materials recovered during the 1993 TAS Field School survey by area within 41LU1.

Artifact Category	Area 10	Area 28	Area 30	Area 56	Area 63	Area 70	Area 72	Area 78
Identified bone	0	2	0	13	0	0	0	2
Unidentifiable bone	7	0	0	12	0	3	0	4
Utilized flake	0	1	0	0	0	0	0	0
Utilized debris	0	1	1	0	0	0	0	0
Lithic flake	0	9	2	0	18	0	0	0
Lithic debris	0	4	2	0	12	6	0	0
Hearthstone	25	499	282	1	101	116	1	0
Silicified caliche	0	1	0	0	0	0	0	0
Ceramic sherd	0	2	0	1	0	0	0	0
Coal	0	0	1	0	0	0	0	0
Metal	0	0	1	0	0	0	1	0
Tin can	0	0	0	0	0	0	27	0
Toy marble	0	0	0	0	0	1	0	0
Screw	0	0	0	0	0	0	1	0
Wire	0	0	0	0	0	0	1	0
Glass	0	0	0	0	0	0	24	0
Plastic	0	0	0	0	0	0	2	0
Total	32	519	289	27	131	126	57	6

hearthstones. Spatial analysis of the mapped artifacts corroborates earlier survey findings (Ladkin and O'Brien 1995a) in that most of the artifacts were in a linear concentration extending from the southwest to the northeast along the margins of the dirt road.

41LU1 Area 28

Area 28 is a large locality along the southwestern valley margin of the Landmark. Previous surveys in 1989 through 1992 discovered lithic assemblages indicative of a late Archaic occupation (Clifford et al. 1995; Lewis et al. 2002). These surveys also found multiple hearthstone concentrations, suggesting an extensive area of thermal features that may have been used for an extended period of time. The features have been subjected to modern disturbances and erosion (Ladkin and O'Brien 1995a).

Hearthstones constituted the majority of the artifacts recovered during the 1993 survey. Artifacts were recovered in many of the same concentrations recorded during previous survey, as well as in several newly identified clusters. This pattern indicates that the site has been actively eroding since the time of the original survey. A utilized obsidian flake, a utilized piece of Edwards Formation chert debris, and the base and part of the body of a stoneware jar were also recovered. No manufacturing marks were present on the stoneware item.

41LU1 Area 29

Area 29 is located in the valley axis in the central third of the Landmark. Previous survey in 1990 found hearthstones widely scattered across the area (Ladkin and O'Brien 1995a). The 1993 survey recorded three scattered hearthstones and a bone fragment.

41LU1 Area 30

Area 30 is located on the western valley margin in the midsection of the Landmark. Previous

survey in 1990 found four hearths and two loose groupings of hearthstones (Ladkin and O'Brien 1995a). The 1993 survey recovered mostly hearthstones. Some of the hearthstones were associated with hearth FA30-4. Two distinct concentrations were apparent in the northern and western sections of Area 30, and these did not appear to be associated with the previously recorded concentrations. The addition of these new hearthstone concentrations suggests the presence of at least six thermal features in this area.

41LU1 Area 54

Area 54 lies on the eastern valley margin along the northeastern edge of the Landmark. Previous surveys in 1989 and 1992 documented the presence of lithics artifacts dating to the Late Archaic and four distinct concentrations of hearthstones (Clifford et al. 1995; Ladkin and O'Brien 1995a; Lewis et al. 2002). Only two hearthstones were recovered during the 1993 survey. The artifacts were not found in any previously identified concentration.

41LU1 Area 56

Area 56 is located in the valley axis in the southern quadrant of the Landmark. Previous survey and testing in 1990 revealed Holocene sediments containing lithic flakes, burned bone, and hearthstones (Johnson 1995a). Artifacts recovered in the 1993 survey consisted mainly of bone and were clustered in two distinct loci. An intact hearth was also reported during survey (Hartwell 1993). The boundaries of Area 56 were extended through the addition of the 1993 materials.

41LU1 Area 63

Area 63 is located on the eastern valley margin in the northwest corner of the Landmark. The Area 63 deposits are composed of redeposited playa sediments that are currently being rapidly deflated. The lack of vegetation in the area was helpful in terms of visibility and collection of surface artifacts, but unfortunately has also resulted in an increased rate of erosion. Previous survey in 1990 documented a substantial lithic assemblage and a large number of hearthstones representing four distinct areas of thermal features (Clifford et al. 1995; Ladkin and O'Brien 1995a). Test excavations in 1992 revealed that portions of the site were highly disturbed (Gill 2002), although some intact deposits remain. The 1993 survey located large groups of artifacts in the same areas documented during the previous survey. The 1993 survey extended the boundaries of Area 63.

41LU1 Area 65

Area 65 is in the valley axis in the northwestern quadrant of the Landmark. Previous survey in 1990 found a few widely scattered hearthstones (Ladkin and O'Brien 1995a). The 1993 survey recovered one hearthstone.

41LU1 Area 66

Area 66 is in the valley axis in the northwestern quadrant of the Landmark. Previous survey in 1990 found a few widely scattered hearthstones (Ladkin and O'Brien 1995a). The 1993 survey recovered three hearthstones.

41LU1 Area 68

Area 68 is located on the western valley margin in the central third of the Landmark. Previous survey in 1990 recovered a large quantity of hearthstones widely distributed among several areas that possibly represented disturbed thermal features (Ladkin and O'Brien 1995a). The 1993 survey identified three hearthstones that were not associated with previously identified concentrations.

41LU1 Area 70

Area 70 lies on the western valley margin in the southwestern quadrant of the Landmark. Previous survey in 1990 recovered a Chupadero Black-on-white sherd that provided a general age of A.D. 1150 to 1550 (Oppelt 1988) for at least one component of the site. Hearthstones were found in two widely scattered concentrations that appeared to be the centers of thermal features (Ladkin and O'Brien 1995a). The 1993 survey recovered primarily hearthstones. Artifacts were located primarily in three concentrations, with the most northerly concentration associated with one of the two concentrations recorded during the 1990 survey. A toy marble of black glass

with multi-colored specks also was recovered. This type of marble was made in Japan, Mexico, or China within the last 20 years (Grist 1995).

41LU1 Area 71

Area 71 is located in the valley axis in the central portion of the Landmark. Two concentrations of artifacts were located during the 1990 survey (Ladkin and O'Brien 1995a). The 1993 survey recovered one hearthstone associated within one of the concentrations. The lack of materials from this area indicated that little erosion has taken place and that the deposits are relatively stable.

41LU1 Area 72

Area 72 is located on the western valley margin in the southern quadrant of the Landmark. The area consists primarily of an historic trash dump. A 1992 survey also identified a discrete cluster of hearthstones designated as Feature FA72-1 (Lewis et al. 2002). Artifacts recovered during the 1993 survey consisted of historic glass and tin cans. These historic artifacts were found in two very discrete concentrations separate from the hearth feature. Two bottle bases of brown glass had the maker's mark "Owens Illinois Inc." of Toledo Ohio. The mark was used between 1929 and 1954. Also on the base of each bottle was the Duraglas maker's mark that has been used since 1940. These two marks dated the bottles between 1940 and 1954 (Lockhart and Olszewski 1995). A broken mason jar, consisting of the base and part of the side, had a partial S and an O and N. Lastly, a clear glass inkwell had a manufacturer's mark of an F inside a hexagon. The inkwell was machine made which dates it to post-1913 (Kendrick 1971).

41LU1 Area 78

Area 78, first identified in 1993, is located on the eastern valley margin in the midsection of the Landmark. Six bone artifacts were collected from within a small area during the survey.

RESULTS OF THE 1993 TAS FIELD SCHOOL SURVEY OF THE UPLAND RIM LANDFORM

Nine archeological sites were documented during the 1993 TAS Field School survey of the upland rim landform surrounding 41LU1 (Figure 3). The following discussion provides a summary of these findings. Table 3 presents the artifact counts recovered from each site.

41LU5

Originally recorded in 1974, 41LU5 (Dune site) is located in the northeast quadrant of the preserve. Multiple buried soils have been identified at this location and include a sequence of chronometric dates

Table 3. Materials recovered during the 1993 TAS Field School survey of upland rim sites.

Artifact Category	41LU5	41LU29	41LU32	41LU67	41LU85	41LU92
Projectile point	2	0	0	0	0	0
Lithic biface	0	0	0	0	1	0
Utilized lithic flake	0	0	0	0	2	0
Lithic flake	1	4	1	0	1	1
Lithic debris	2	0	3	0	1	0
Manuport	0	0	0	2	0	0
Hearthstone	30	30	59	12	102	29
Glass	0	0	0	0	0	1
Total	35	34	63	14	107	31

ranging from 34,000 B.P. to the Protohistoric (Holliday 1983). Investigations in 1989 found hearthstones in two concentrations associated with thermal features (Ladkin and O'Brien 1995a) and substantial lithic concentrations. A broken late Holocene projectile point and a Garza point were recovered during the 1993 survey (Figure 4). The remaining artifacts were primarily hearthstones. The survey recovered artifacts in the vicinity of the two concentrations identified in 1989. The two projectile points were found in the more northerly concentration.

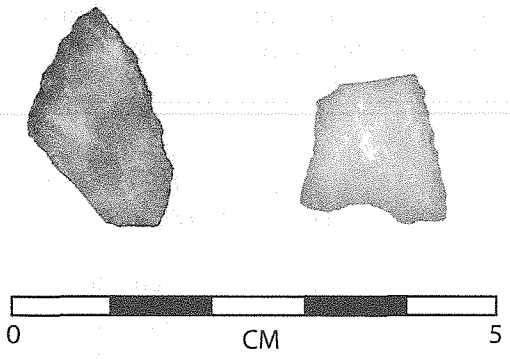

Figure 4. Projectile points collected during the 1993 survey at 41LU5: a) late Holocene point; b) Garza point.

41LU29

41LU29 (Ridgetop site) was first recorded in 1974 and is a large site along the eastern uplands of the preserve. The original survey documented the presence of abundant lithic artifacts and pottery sherds. Five hearths were recorded and a possible teepee ring was found in 1982. The site was surveyed a third time in 1987 (Ralph 1989). Diagnostic artifacts indicated occupations ranging from the Archaic to the Ceramic periods. Tool assemblages suggested the existence of residential settlements associated with food processing and tool manufacture (Ralph 1989). The site extends beyond the boundaries of the preserve property and therefore is much larger than as presently recorded.

Testing and block excavations were conducted during the 1988 and 1989 field seasons (Johnson 1993, 1995b). Nineteen occupation surfaces were identified within Stratum Z, the upland soil unit. Stratum Z is a sandy clay loam to sandy loam that has undergone pedogenesis and is up to one meter thick in some locations (Holliday 1993). Diagnostic artifacts and radiocarbon assays identified late Holocene occupations, particularly from the last 1,000 years (Johnson 1993, 1995b). Another survey conducted in 1990 found a concentration of hearthstones along a trail (Ladkin and O'Brien 1995a). Two concentrations of artifacts were identified during the 1993 TAS survey. The boundary of 41LU29 was extended to include the newly documented artifacts, most of which were hearthstones.

41LU32

41LU32 (Kireilis site) lies on the southwestern uplands across the preserve boundary fence line from Area 28 of 41LU1. The original pedestrian survey was undertaken in 1974. Projectile points representing Protohistoric and late Archaic occupations were recovered during a 1987 survey (Ralph 1989), although subsurface testing conducted later that year failed to locate additional diagnostic artifacts (Johnson 1989). The 1990 survey identified the presence of thermal features (Ladkin and O'Brien 1995a). Hearthstones were concentrated in two distinct locations, one of which was followed a trail. A 1991 survey recovered numerous lithic artifacts, including projectile points representing late Archaic and late Holocene occupations (Lewis et al. 2002). Hearthstones were the most abundant artifact collected. The 1992 survey recovered mostly bone and lithic artifacts along two trails across the site (Lewis et al. 2002). The 1993 TAS survey collected mostly hearthstones from one large scatter.

41LU65

41LU65 (Trailer Park Corner site) was first recorded in 1982 and is a large site along the western rim in the central section of the preserve. While intact features were not recorded, scattered hearthstones, bone, and lithic debris were collected (Ralph 1989). Survey in 1990 found hearthstones in 11 clusters, three that represented hearths (Ladkin and O'Brien 1995a). Excavations of the three hearths during the 1990 field season recovered 26 lithic artifacts but no diagnostic materials (Clifford et al. 1995). The 1993 TAS survey located four hearthstones, three of which were associated with a concentration identified in 1990. The relative scarcity of newly exposed artifacts suggests that the deposits at this site are stable.

41LU67

41LU67 (Halfway site) lies along the western uplands in the central section of the preserve. This site was first recorded in 1982 and the boundaries were expanded during the 1987 survey. The site had been heavily damaged by all-terrain vehicles, agricultural use, and erosion (Ralph 1989). Surveys conducted in 1989 and 1990 found scattered hearthstones but no discrete thermal features or activity areas (Ladkin and O'Brien 1995a). The 1993 TAS survey recovered mostly hearthstones from a single linear concentration.

41LU74

41LU74 (Ted site) is located in the far northwestern reaches of the preserve. It was recorded and tested during the 1987 survey, and over 200 artifacts were collected (Ralph 1989). Hearthstones and lithic flakes were also collected during surveys conducted in 1989 and 1990 (Clifford et al. 1995; Ladkin and O'Brien 1995a). A hearth (FA74-1) excavated during the 1989 season yielded Chupadero Black-on-white sherds and a calibrated radiocarbon date of A.D. 990 (Ladkin and O'Brien 1995b). The 1993 TAS survey recorded only four scattered hearthstones. The scarcity of newly exposed artifacts suggests that the deposits are stable.

41LU85

First recorded in 1989, 41LU85 lies on the western uplands in the north-central portion of the preserve. A small number of hearthstones and lithic artifacts were recovered during the 1993 TAS survey. The artifacts were found primarily in three concentrations. The concentration of hearthstones likely represented thermal features, and the linear arrangement of artifact distributions are a result of old trails through the site.

41LU91

This site was first recorded during the 1993 TAS Field School survey. It is located on the western rim in the northwestern quadrant of the preserve. Eleven hearthstones were mapped and recovered. The cluster may represent the remnants of a thermal feature.

41LU92

41LU92 was also recorded during the 1993 TAS survey. This site is located on the eastern rim of the northeastern quadrant of the preserve. The survey recovered a small number of hearthstones from an eroded and disturbed context along an abandoned dirt road. A glass bottle fragment was also found. The fragment had the words "Cheer Up" and "Carbonated" as part of an applied color label. These labels were used by the industry after 1934 (Sweeny 1995).

ISOLATED FINDS

Fifteen isolated artifact finds were recorded within the boundaries of 41LU1 during the 1993 TAS survey (Table 4). Most of these finds consisted of isolated hearthstones. An additional 30 isolated finds were recorded along the upland rim landform around Yellowhouse Draw. As with the materials within 41LU1, the majority of upland finds consisted of isolated hearthstones.

Table 4. Isolated materials recovered during the 1993 TAS Field School survey of 41LU1 and the Lubbock Lake Landmark Preserve.

Artifact Category	Areas within 41LU1	Upland rim sites
Lithic flake	0	3
Lithic debris	1	5
Hearthstone	11	20
Identifiable bone	2	1
Manuport	1	1
Total	15	30

AREA AND SITE EXCAVATIONS

A second component of the 1993 TAS Field School involved subsurface excavations at four locations. The excavations were conducted at three of the areas within 41LU1 and at upland site 41LU31.

Excavations in Area 10 of 41LU1

Area 10 of 41LU1 is on the upland rim overlooking a meander of Yellowhouse Draw along the

Table 5. Materials recovered during the 1993 field season at Area 10 of 41LU1.

Artifact Category	Non-Feature	FA10-1	FA10-4	FA10-5	Total
Identifiable unburned bone	0	6	1	0	7
Identifiable burned bone	0	34	0	2	36
Unidentifiable bone scrap	17	479	1	0	497
Unidentifiable burned bone scrap	118	896	11	0	1025
Lithic flake	0	17	3	0	20
Lithic debris	0	7	4	0	11
Utilized lithic flake	0	1	0	0	1
Lithic manuport	3	0	0	0	3
Lithic biface	0	1	1	0	2
Projectile point	0	1	0	0	1
Groundstone	0	0	0	3	3
Hearthstone	365	1327	68	9	1769
Ochre	1	0	0	0	1
Charcoal	2	4	9	0	15
Gastropoda	0	1	0	0	1
Total	506	2774	98	14	3392

southern boundary of the preserve. A large hearth feature designated as FA10-1 and two smaller hearth features (FA10-2, FA10-3) were recorded during previous surveys (Ladkin and O'Brien 1995a). Twenty members of the 1993 TAS Field School (Figure 5) participated in the excavation of this site over a period of nine days.

Testing revealed the presence of one stratum (designated as stratum M) that contained archaeological deposits. Stratum M is composed of aeolian and slopewash accumulations that are subject to wind erosion. Stratum M overlies the Blackwater Draw Formation, an archaeologically sterile Pleistocene-aged deposit (Holliday 1995b), and is capped by a layer of recent sediments and construction debris from the last 50 years. The original extent of the prehistoric activity area was unknown since caliche quarrying and construction of a sewer pipe had disturbed areas to the south, east, and west.

Figure 5. Texas Archeological Society field school participants opening up Area 10 of 41LU1 early in the 1993 field season.

Block excavations and test units were excavated during the 1993 field season. The block excavation concentrated on exposing areas around Feature FA10-1 while the test units were used to explore the surrounding area for evidence of buried occupation surfaces (Figure 6). Two additional features, designated as FA10-4 and FA10-5, were identified during these excavations. Feature FA10-4 is an occupation surface adjacent to hearth feature FA10-1. Feature FA10-5 is a discrete pit that was cut below the occupational surface of FA10-4 (Figure 7). Two additional features (FA10-2 and FA10-3) were encountered in two test units placed a few meters to the west. These features consisted of disturbed scatters of small hearthstone fragments.

Four organic sediment samples were collected from Feature FA10-1 for radiocarbon dating. The radiocarbon ages range from the late Ceramic through

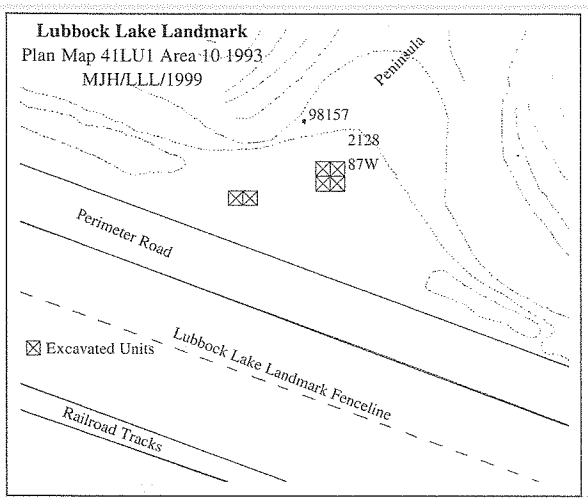

Figure 6. Planview of excavations at Area 10 of 41LU1.

the early Protohistoric periods (Buchanan 2002a). These radiocarbon ages fit with the diagnostic artifacts recovered during the earlier surveys.

A total of 3,392 artifacts was recovered during the excavations at Area 10 (Table 5). The majority of the artifacts (52%) consisted of burned caliche hearthstones, over 75% of which were recovered from Feature FA10-1. Bone accounted for 46% of the overall artifact count. Over 67% of all faunal material was burned, the majority (65.5%) of which is unidentifiable burned bone scrap. All identifiable burned and unburned bone from Area 10 was identified as bison, the majority of which (93%) was recovered from Feature FA10-1. Rib segments represented the most abundant element recovered (Table 6).

Lithic artifacts were placed into five categories, with flakes being the most abundant type (Table 7). The majority of lithics (77%) were recovered from FA10-1. Four tools, including a projectile point and biface, were recovered during the excavation, three of which were from the Feature FA10-1. The projectile point was heavily damaged but its general morphology indicated an age within the last 500 years. Chert was the most common lithic material, accounting for 94% of the assemblage. Edwards and Tecovas Formation cherts represented the most common raw material sources.

Excavations in Area 13B of 41LU1

Area 13B of 41LU1 is located along the valley axis of Yellowhouse Draw. Previous excavations

Figure 7. View of Feature FA10-5, a discrete pit (designated by arrow) identified at Area 10 of 41LU1.

Table 6. Identifiable bison elements recovered during the 1993 field season at Area 10 of 41LU1.

Feature	Element	Unburned number	Burned number	Total
FA10-1	Skull, fragment	1	5	6
FA10-1	Tooth, fragment	1	2	3
FA10-1	Rib, fragment	2	18	20
FA10-1	Diaphysis, fragment	2	8	10
FA10-1	Radius, fragment	0	1	1
FA10-4	Tooth, fragment	1	0	1
FA10-5	Skull, fragment	0	1	1
FA10-5	Rib, fragment	0	1	1
Total		7	36	43

focused on Stratum 5, the youngest stratigraphic unit at the Landmark (Holliday 1995a; Holliday and Allen 1987). Work began in this area in 1988 after geoarchaeological trenching revealed archaeological deposits (Johnson 1993). The 1993 season represented the fifth summer of excavations in Area 13B. Previously opened block units were expanded and test units were opened during the 1993 season (Figure 8). An average of five TAS crew members worked in Area 13B for a period of five days (Figure 9).

Geomorphological and archeological studies conducted between 1989 and 1993 helped explore the boundaries of the cultural deposits and define the microstratigraphic sequence within Stratum 5. Three local beds (LB) composed of lacustrine mud (mw) were identified within Stratum 5 along the valley margin (Holliday 1994). The local beds were

Table 7. Lithic artifacts recovered during the 1993 field season at Area 10 of 41LU1.

Artifact Type	Material	Source	Feature	Count
Projectile point	Chert	Tecovas	FA10-1	1
Biface	Chert	Tecovas	FA10-1	1
Biface	Chert	Tecovas	FA10-4	1
Utilized lithic flake	Chert	Edwards Formation	FA10-1	1
Flake	Chert	Edwards Formation	FA10-1	7
Flake	Chert	Alibates	FA10-1	3
Flake	Chert	Tecovas	FA10-1	2
Flake	Chert	Source Unknown	FA10-1	5
Flake	Chert	Edwards Formation	FA10-4	2
Flake	Chert	Tecovas	FA10-4	1
Debris	Quartzite	Source Unknown	FA10-1	2
Debris	Chert	Tecovas	FA10-1	1
Debris	Chert	Alibates	FA10-1	1
Debris	Chert	Potter	FA10-1	1
Debris	Chert	Source Unknown	FA10-1	2
Debris	Chert	Edwards Formation	FA10-4	4
Total				35

designated, from top to bottom, as 5mwLB3, 5mwLB2, and 5mwLB1. Testing and excavation prior to and during the 1993 TAS Field School revealed the presence of six features within these stratigraphic units. The 1993 excavations focused on features FA13B-1, FA13B-2, FA13B-3, and FA13B-6.

Feature FA13B-1 is a thick layer of bone scrap situated within substratum 5mwLB1 just above Feature FA13B-2 (Willett and Johnson 1995). Feature FA13B-6 was discovered during the 1993 season and consists of numerous large bison bone segments with a caliche cobble base. Radiocarbon dates indicate the bison bone and caliche pavement of Feature FA13B-2 is a late Ceramic Period occupation (Buchanan 2002b) and Feature FA13B-1 dates to the early Protohistoric Period (Johnson and Holliday 1995).

Feature FA13B-2 is one of the two major occupation surfaces investigated in Area 13B. The feature is a bison bone and caliche pavement situated at the break between substrata 5mwLB1 and 4A. It is a layer of dense bone interspersed with burned caliche and underlain by small uniform cobbles of unburned caliche. Whole bone elements are common and the bone segments tend to be large. Many of the bones display evidence of cultural modifications, trampling, and scavenging. Two hypotheses may explain the presence of the caliche pavement. The first hypothesis is that it was formed through natural geologic forces. A similar caliche terrace has been noted at a location higher on the valley margin to the northwest of Area 13B. The layer of caliche nodules forming Feature FA13B-2 could have resulted from slope outwash from this higher terrace. The second hypothesis is that the feature represents cultural deposition by bison hunters in order to produce a stable surface along the marshy edge where butchering activities could take place. Further excavation is needed to determine which hypothesis is correct.

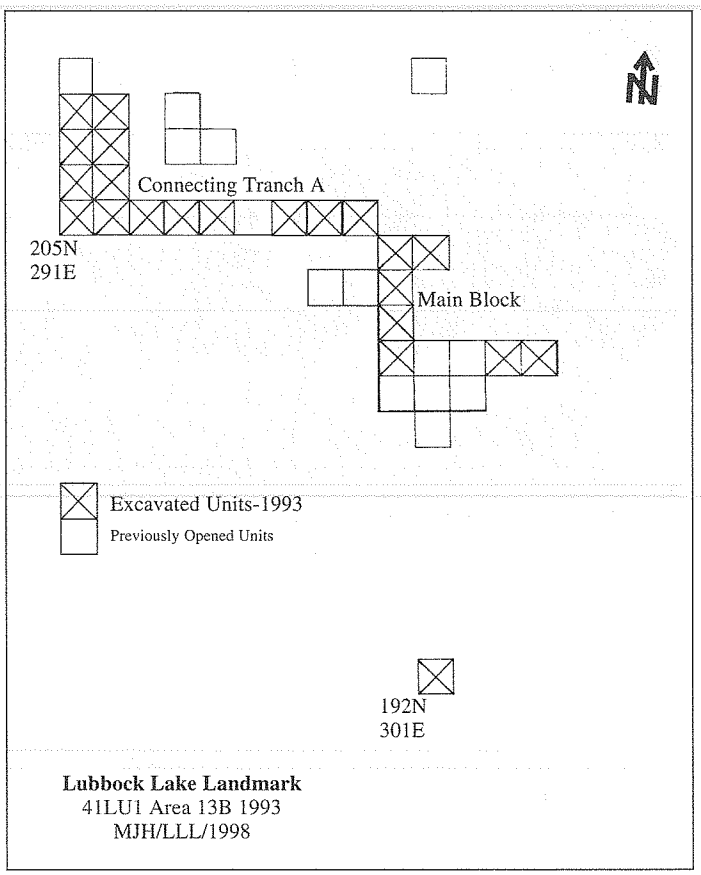

Figure 8. Planview of excavations at Area 13B of 41LU1.

Three features are found within 5mwLB3 deposits. Feature FA13B-3 is a bison trample surface located at or near the contact between substrata 5mwLB3 and 5mwLB1. This feature is notable for several preserved bison hoof prints and also contains culturally modified bison bone. Feature FA13B-4 is another trample surface located above FA13B-3. FA13B-5 is a possible occupation surface near the top of 5mwLB3. It consists of burned and unburned bone and caliche, bone scrap, shell, and charcoal.

A total of 3,455 artifacts was recovered from the 26 excavation units investigated during the TAS Field School and summer field season (Table 8). Unburned caliche nodules represented the most abundant material collected. Bone scrap and identifiable bone constituted the majority of the remaining artifacts. The large number of unburned caliche nodules recovered from non-feature deposits was a result of collecting naturally deposited caliche materials dispersed throughout Stratum 5. These were to be used for a comparative analysis using the cultural caliche materials recovered from the bison bone and caliche pavement of Feature FA13B-2.

Out of the six features investigated, the bison bone-and-caliche pavement (FA13B-2) had the most identifiable bones. All of the identifiable bones from

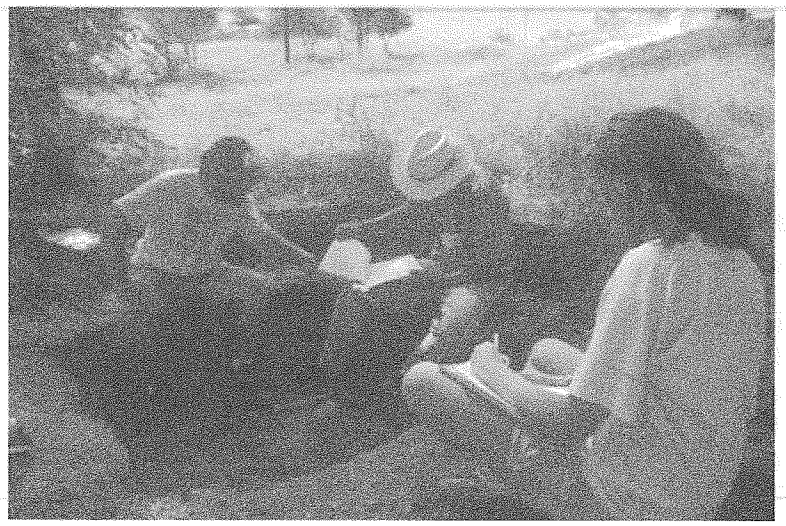

Figure 9. TAS members during the 1993 field season at Area 13B.

FA13B-2 were modern bison (*Bison bison*), with rib segments being the most abundant element recovered. Rib segments also were the most abundant element recovered from Feature FA13B-6. A number of the bison bones show evidence of cultural modification resulting from the butchering process (Table 9). Ribs and long bones were the most frequently affected elements, with blow marks and helical fractures being the most common modification. In addition, bison bones throughout the Area 13B deposits show evidence of trampling and root etching.

Remains from four species other than bison were recovered from the deposits (Table 10). The most abundant non-bison species was black-tailed prairie dog (*Cynomys ludovicianus*). Other species represented include deer (*Odocoileus* sp.), coyote (*Canis latrans*), and turtle. The mammals represent occupation of upland areas while the turtle reflected the marshy environment of the lower elevations of Yellowhouse Draw. None of these faunal elements was culturally modified.

The majority of the 31 lithic artifacts recovered during the 1993 excavations were manufactured of Edwards Formation chert (Table 11). Many of the artifacts were small and represented retouch and resharpening debitage from tools used in bison processing. The majority of lithic material was recovered from stratum 5mwLB1 and Feature FA13B-2.

Table 8. Materials recovered during the 1993 field season at Area 13B of 41LU1.

Artifact	Non- Feature	FA13B-1	FA13B-2	FA13B-3	FA13B-6	Count
Identifiable bone	411	1	123	3	46	584
Unident bone scrap	665	16	180	4	6	871
Unident burn bone scrap	5	0	2	0	0	7
Lithic flake	0	16	4	4	0	24
Lithic debris	1	1	1	0	0	3
Utilized lithic flake	0	0	1	0	0	1
Lithic biface	0	0	2	0	0	2
Hearthstone	243	10	57	1	13	324
Unburned caliche	1315	53	113	4	116	1601
Charcoal bit	22	0	5	0	0	27
Ceramic	1	0	0	0	0	1
Glass	3	0	0	0	0	3
Seed	0	0	1	0	0	1
Gastropoda	6	0	0	0	0	6
Total	2672	97	489	16	181	3455

Table 9. Culturally modified bison bone recovered during the 1993 field season at Area 13B of 41LU1.

Catalog number	Modification	Element	Feature	Count
TTU-A59416	Helical fracture	Tibial segment	None	1
TTU-A67971	Helical fracture	Rib segment	None	1
TTU-A68304	Blow mark	Lumbar vertebra	None	1
TTU-A68423	Helical fracture	Diaphyseal segment	None	1
TTU-A70181	Blow mark, bone tool puncture	Cervical vertebra	None	1
TTU-A51080	Helical fracture	Rib segment	FA13B-2	1
TTU-A66917	Helical fracture	Femur	FA13B-2	1
TTU-A70143	Blow mark	Pelvic segment	FA13B-2	1
TTU-A70213	Helical fracture	Rib	FA13B-2	1
TTU-A59359	Helical fracture	Rib fragment	FA13B-3	1
TTU-A59392	Helical fracture	Rib segment	FA13B-3	1
TTU-A66033	Blow mark, helical fracture	Thoracic spine	FA13B-3	1
TTU-A66607	Blow mark, helical fracture	Rib segment	FA13B-6	1
TTU-A68103	Blow mark, helical fracture	Femoral segment	FA13B-6	1
Total				14

Table 10. Non-bison taxa recovered during the1993 field season at Area 13B of 41LU1.

Element	Taxon	Common Name	Substratum	Total
Femur, fragment	Testudines	Turtle	5mwLB1	1
Maxilla, fragment	*Cynomys ludovicianus*	Prairie dog	5mwLB1	1
Tooth, fragment	*Cynomys ludovicianus*	Prairie dog	5mwLB1	2
Radius, fragment	*Cynomys ludovicianus*	Prairie dog	5mwLB1	1
Scapula, fragment	*Cynomys ludovicianus*	Prairie dog	5mwLB3	1
Phalange	*Canis latrans*	Coyote	5mwLB1	1
Calcaneum	*Odocoileus* sp.	Deer	5mwLB1	1
Total				8

Excavations in Area 72 of 41LU1

Area 72 is an historic trash dump located on the western edge of the valley margin near the meander where Yellowhouse Draw turns towards the east. Test excavations of mid-twentieth century trash dumps within the Lubbock Lake Landmark were undertaken during 1993 TAS Field School. The objectives of the excavations were to determine what remained of the dumps following several disturbances to the area in 1990, to gain insights into post-World War II discard and consumer activity, and to investigate the possibility that earlier pioneer period dumps were present.

Prior archaeological investigation consisted of pedestrian survey conducted in 1981 and 1982

Table 11. Lithic artifacts recovered during the 1993 field season at Area 13B of 41LU1.

Artifact	Material	Source	Feature	Count
Flake	chert	Edwards Formation	FA13B-2	5
Flake	chert	Edwards Formation	FA13B-1	7
Flake	chert	Edwards Formation	FA13B-3	2
Flake	chert	Edwards Formation	non-feature	1
Flake	chert	Potter member	FA13B-1	1
Flake	chert	Potter member	FA13B-2	2
Flake	chert	Tecovas Formation	FA13B-3	1
Debris	chert	Edwards Formation	FA13B-3	3
Debris	chert	Edwards Formation	FA13B-2	2
Debris	chert	Edwards Formation	FA13B-1	1
Debris	quartzite	Ogalalla Formation	FA13B-3	1
Debris	quartzite	source unknown	FA13B-1	1
Debris	chert	source unknown	FA13B-2	1
Biface	chert	Edwards Formation	FA13B-1	1
Biface	chert	Edwards Formation	FA13B-2	1
Biface	chert	source unknown	FA13B-2	1
Total				31

(Johnson 1983) and 1990 (Johnson 1995b). The dump material were positioned on top of and slightly embedded in Stratum 4. In this part of the valley, Stratum 4 is exposed along the valley margin at the surface and is still aggrading today since it was never buried by Stratum 5 (Holliday and Allen 1987; Johnson and Holliday 1989).

The 1990 fieldwork resulted in designation of the area as an historic dump. Also in 1990, artifacts that mistakenly had been removed from the area during park cleanup were recovered and analyzed to determine probable discard dates and an average date for the dumps. Artifact analysis yielded manufacture dates that were used to calculate the Site Mean Date using a modification of South's (1972) Mean Ceramic Date Formula. The computations returned a Site Mean Date of 1954-1955.5 and Artifact Median Dates ranging from 1942-1986 (O'Brien 1995). Evidence from the modern dumps in Area 72 reflect characteristics of Lubbock's development as it underwent a substantial post-war population increase between 1950 and 1960. The incidence of dumping at the Lubbock Lake Landmark correlates with factors such as the absence of a designated landfill area and the direction of the city's expansion (O'Brien 1995).

Texas Archaeological Society members conducted surface mapping and test excavations at Area 72 for a period of seven days during the 1993 Field School. Four excavation units were placed in two distinct areas of the dump that were designated HD 2 and HD 5 (Figure 10). Artifacts were mapped but not collected from unit 290N/179W in HD 2. Material observed in these units consisted of clear glass fragments, tin can fragments, and ceramic sherds. The remaining two units (300N/168W, 300N/170W) were located in HD 5. The units were situated on a slope and excavated in four 5 cm levels. All material was piece-plotted. Most of the artifacts were recovered from the surface of the slope. The artifacts and their associated sediments were lying directly over caliche (Humphreys 1993). Sixty-one artifacts were recovered and included metal, glass, and plastic items (Table 12).

Eight artifacts bore attributes that allowed for identification of manufacturer and date of manufacture (Table 13). Five glass segments had maker's marks that allowed for dating. One base segment

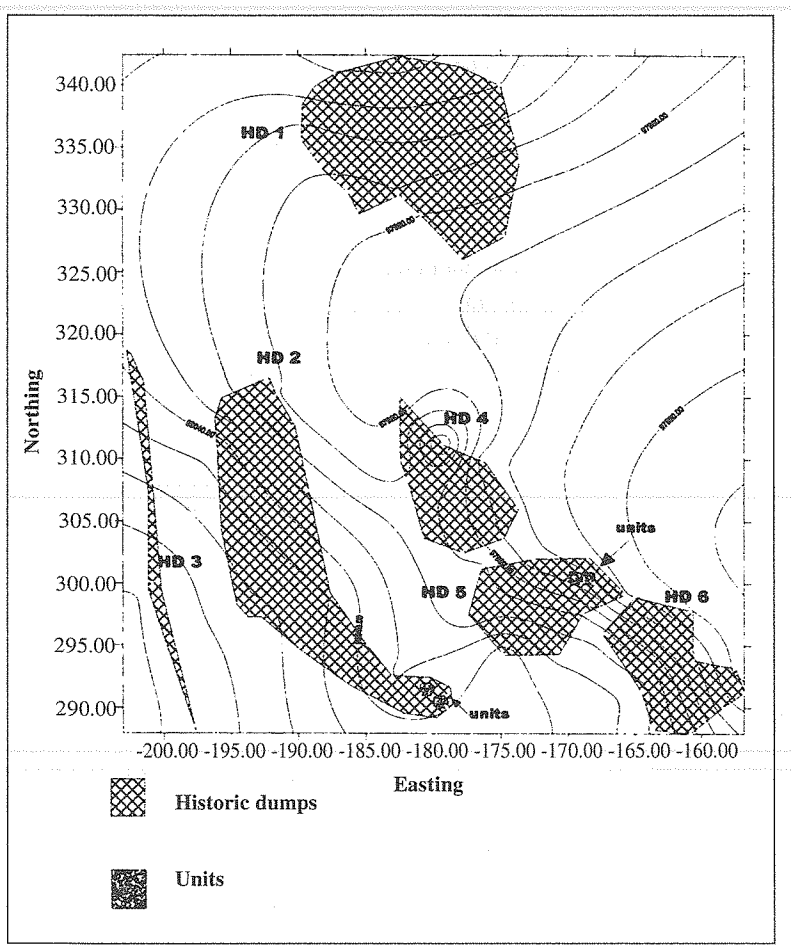

Figure 10. Planview of excavations at Area 72 of 41LU1.

Table 12. Materials recovered during the 1993 field season at Area 72 of 41LU1.

Artifact Category	Count
Can	20
Can fragment	8
Can lid	4
Glass bottle or jar fragment	19
Bottle	1
Windshield fragment	2
Glass fragment	3
Metal clock works	1
Wire clothes hanger	1
Screw	1
Plastic	1
Total	61

from a bottle or jar bore a maker's mark and the word "DURA-GLAS." Additional markings on the base were codes identifying the plant, mold type, and year of production (Figure 11a). The vessel was produced by the Owens-Illinois Glass Company at the Okmulgee, Oklahoma plant between September 4, 1940 when the trademark "DURAGLAS" was first used, and December 31, 1940 when the Okmulgee plant was closed (Toulouse 1971). A second base segment, also marked "DURAGLAS," was produced by the Owens-Illinois Glass Company at another manufacturing plant. The date of manufacture indicated by the code on the base was 1954 (Figure 11b).

A segment from a Royal Crown soda bottle has a maker's mark used by the Liberty Glass Company from 1946 to 1954 (Toulouse 1971). The label style of this item was produced between 1950 and 1958 (O'Brien 1995). Therefore, the manufacture date of the bottle is between 1950 and 1954 (Figure 11c). A complete item recovered during the excavations is possibly an ink bottle and was manufactured by the Fairmount Glass Works, Inc (Figure 11d). The maker's mark on the bottle indicates a date between 1945 and 1960 (Toulouse 1971). A brown glass segment is embossed with the word "RETURN" and part of the message "No Deposit No Return." The style of embossing was that used on beer bottles from 1940 until the mid-1950s (Busch 1987). Another datable glass artifact is a marble made of black glass with colored spots within the black. The marble is classified as a "new foreign-made marble" (Grist 1995) made in China, Japan, or Mexico within the last 10-15 years (Everett Grist, personal communication, 1995).

Two collected cans were of similar size and shape and could be dated based on can type. A partial label visible on one can identified the manufacturer as Lucky X Lager Company in Azusa, California. This company eventually became part of the General Brewing Corporation (Mugrage

Table 13. Manufacture date ranges for historic artifacts recovered during the 1993 field season at Area 72 of 41LU1.

Catalog Number	Artifact	Attribute	Date of Manufacture
TTU-A71926	base segment	"DURAGLAS" and "I" within circle and diamond	1940
TTU-A71933	base segment	"DURAGLAS" and "I" within circle and diamond	1954
TTU-A71921	base and wall segment	Maker's mark "L-G"	1950-1954
TTU-A71906	bottle	Maker's mark "F"	1945-1960
TTU-A71922	body segment	"RETURN"	1940-1955
TTU-A71801	marble		1977-1986
TTU-A71903	Lucky X Lager can	cap-sealed can	1937-1960
TTU-A71930	beer can	cap-sealed can	1937-1960

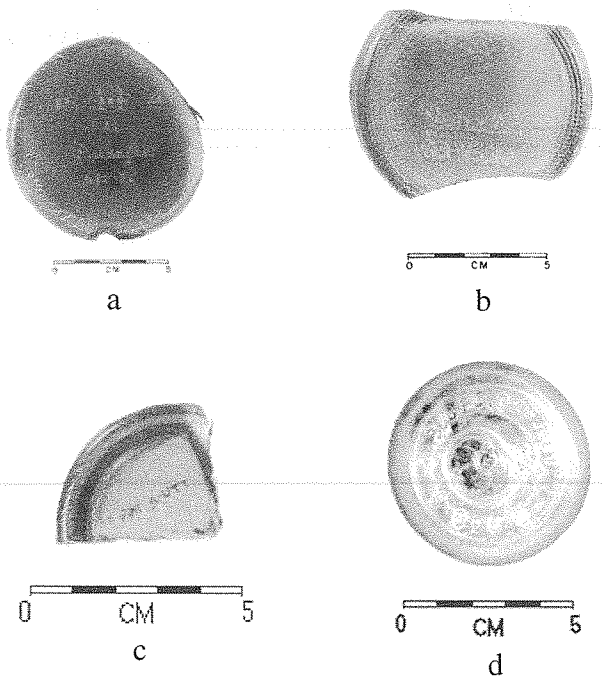

Figure 11. Glass bottle bases with identification marks of manufacture and date: a) bottle or jar base fragment; b) base fragment; c) soda bottle base and wall fragment; d) possible ink bottle.

1993). Specific information on the companies, however, could not be found. The cans were quart-sized cap-sealed cans, with a cone-shaped top to resemble a beer bottle (Martells 1976; Mugrage 1993). By the end of 1960, competition with the flat top style beer can made the cap-sealed cans obsolete (Martells 1976; Mugrage 1993).

Artifact Median Dates of the materials recovered from Area 72 during the 1993 TAS Field School range from 1940 to 1948.5. A Material Median Date for the glass artifacts is calculated to be 1955. Without the marble included in the calculations, the material Median Date for glass is 1949.7. The manufacture date for the marble is 1977 to the present. In 1986, however, public access to the Lubbock Lake Landmark was restricted by construction of a perimeter fence (Johnson 1989), imposing an end date of 1986 on deposited material. The marble may have been deposited during a different event than the older material or may be an indicator that the material was dumped at a date much later than the manufacture dates of the older material. The Material Median Dates for the metal and the glass are averaged to achieve a Site Mean Date of 1951.75 (Figure 12).

Excavations at Site 41LU31

Site 41LU31 is situated on the uplands west of the meander where Yellowhouse Draw turns to the east. Two hearth features (F31-1 and F31-2) were identified and mapped during a 1978 survey of this location (Barkes and Johnson 1978). A subsequent pedestrian survey in 1990 (Ladkin and O'Brien 1995a) identified a third hearth feature (F31-3) by the presence of a concentration of hearthstones and a broken metate (Figure 13).

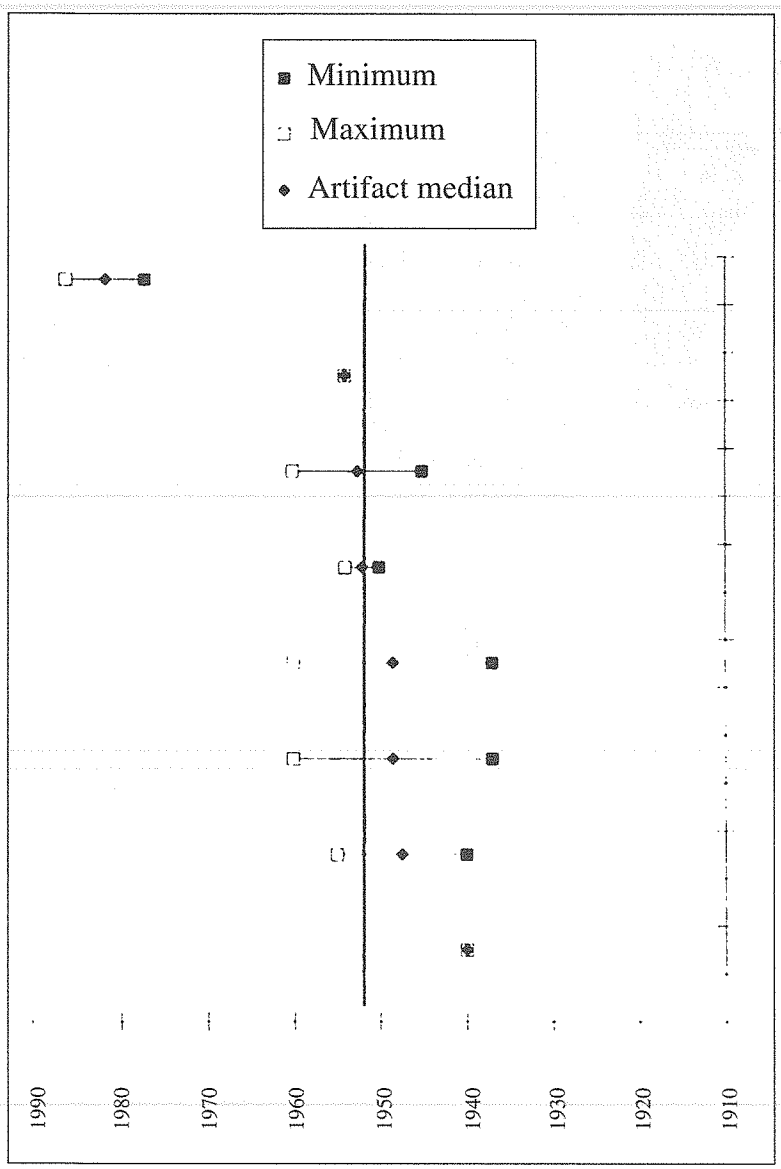

Figure 12. Manufacture date ranges for historic artifacts recovered during the 1993 field season at Area 72 of 41LU1.

Two deposits have been identified at 41LU31 and include Stratum K and the Blackwater Draw Formation. Stratum K is an aeolian sandy clay loam typically found on upland sites (Holliday 1993). At 41LU31, Stratum K is approximately 25 cm deep and contains archaeological materials. Underlying stratum K is an archaeologically sterile, aeolian, fine sandy loam that is the Blackwater Draw Formation (Holliday 1989).

Test excavation of Feature F31-3 was conducted for a period of 18 days during the 1993 TAS Field School to determine the horizontal distribution and vertical depth of the feature. Six 1 x 1 meter test units were placed across the general location of the feature. The placement of the units was based on the distribution of surface artifacts (Figure 14). Test excavations confirmed the presence of a large hearth area. This area contained predominantly hearthstones (96%), the broken metate, and one Edwards Formation chert flake (Table 14). No diagnostic artifacts were found. One bone fragment could be identified as the lower molar from a wolf. The hearthstones were distributed to a depth of 35 cm below the surface among the six excavation units. Most of the hearthstones were concentrated within a 10 to 15 cm thick layer that may represent the original occupation surface (Figure 15).

An organic sediment sample was collected for radiocarbon dating from unit 73S/297W at a depth of 5-10 cm below surface within the main band of hearthstones (Figure 16). The organic sediment was darker than surrounding sediment and was in a concentration of hearthstones. The humate date was essentially modern in age, but could be up to 300 years old (Herbert Haas, personal communication, 1999).

SUMMARY AND CONCLUSIONS

Pedestrian survey of the entire Lubbock Lake Landmark preserve was conducted during the 1993 field season with the participation of TAS Field School members. One new occupation area was defined within 41LU1 and two new upland rim sites were recorded during the TAS survey. In addition, the boundaries of two occupation areas within 41LU1 and one upland rim site were expanded on the basis of new information obtained during the survey. The TAS survey recorded a total of 1,549 artifacts within the previously and newly recorded provenience areas within the Landmark.

Data collected during the 1993 survey program, when combined with information from past and

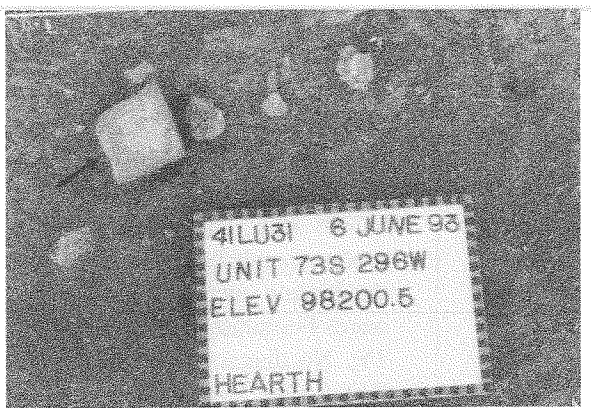

Figure 13. Broken metate found in-situ within Feature F31-1 of Stratum K at 41LU31. The arrow points to the broken metate among the cluster of hearthstones.

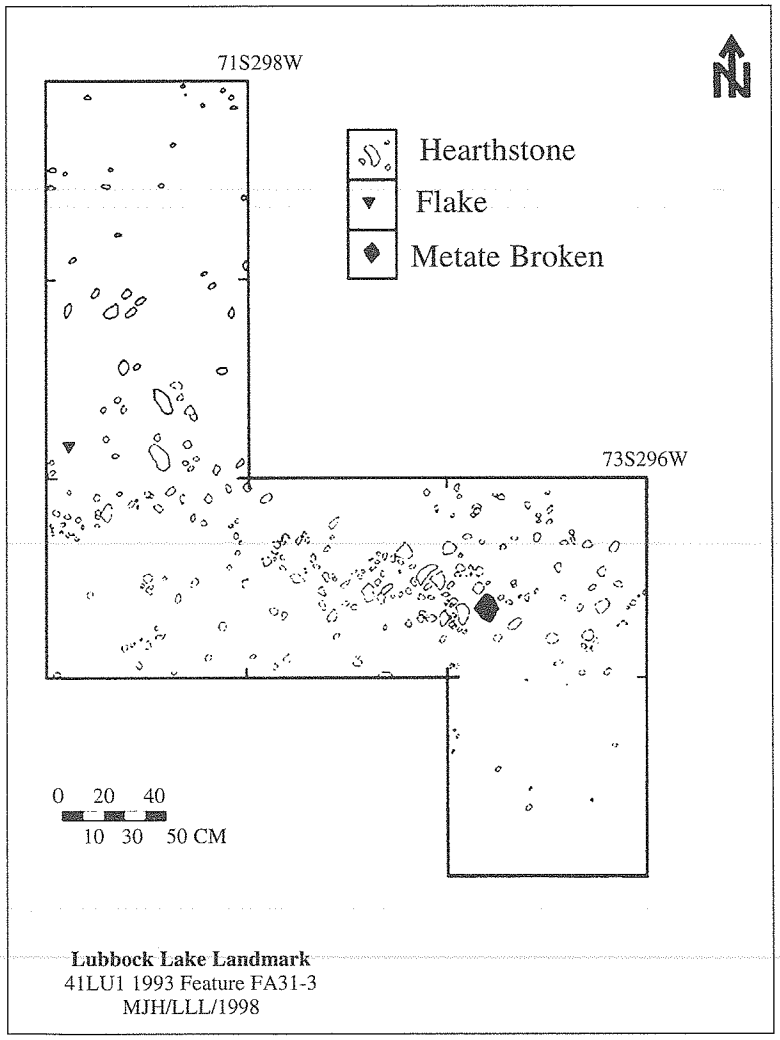

Figure 14. Plan view of the 1993 TAS Field School excavation units at 41LU31 showing the horizontal distribution of hearthstones and artifacts associated with Feature F31-3 in Stratum K.

future surveys, will allow several spatial analyses to be undertaken. Prehistoric human behavior at the landmark may be interpreted through the patterning of artifacts across the surface. Additionally, the continual monitoring of the Landmark surface affords the opportunity to observe rates of erosion and artifact exposure in different geomorphological settings.

At Area 10 of 41LU1, test excavations were carried out with the purpose of exploring the archaeological potential of features identified during previous surveys. Test excavations revealed an extensive hearth feature (FA10-1) and revealed a complex of intersecting and overlapping pit features within Feature FA10-1 surrounded by an occupation surface (Feature FA10-4). The hearthstone concentration designated as FA10-1 was revealed to be a massive layer of disturbed hearth material that capped the activity area but was not a discrete hearth feature. However, the deposits of burned rock did cover a discrete pit contain ash and charcoal designated as Feature FA10-5. Pit FA10-5 contained an artifact assemblage that was similar to that of feature FA10-1, including hearthstones, burned bone, and lithic debitage.

The hearthstone concentrations designated as FA10-2 and FA10-3 were found to be disturbed surface scatters of redeposited materials dislodged during the construction of a modern sewer pipe trench through the excavation area. The occupational events related to the features Area 10 occurred over a period of 600 years. Diagnostic artifacts and radiocarbon ages date the periods of occupation at Area 10 from the early Ceramic through aboriginal Historic periods. The early Ceramic Period is not well known on the Southern High Plains and Area 10 provides an important window into that time period in the region.

Preliminary analysis of the faunal material from these features suggests the Area 10 assemblage consists mostly of culturally

Table 14. Materials recovered from Feature F31-3 at 41LU31 during the 1993 TAS Field School.

Artifact Category	Count
Identifiable bone	1
Unidentifiable burned bone scrap	1
Lithic flake	1
Metate	1
Hearthstone	448
Unburned caliche	13
Charcoal fragment	1
Total	466

fragmented bison bones (Hamilton 1998), suggesting the cultural practice of marrow extraction and grease rendering took place at this location. This evidence also underscores the extensive utilization of bison carcasses. The distribution, size, and extent of burning suggest the bone was used as a source of fuel subsequent to fragmentation.

The results of the TAS Field School investigations prompted continued study of this area and were the beginning of an extensive excavation program that has continued for seven field seasons (Johnson 2002). By the end of the 2000 field season, 11 pits, an unlined basin hearth, and two probable post-molds had been identified within this complex activity area (Backhouse 2002). The original extent of the activity area is unknown as various construction activities over the past 50 years (before the Landmark was given protection as a National Historic Landmark and State Archeological Landmark) destroyed many archaeological deposits. The mechanical excavation of a sewer pipe in the 1960s destroyed part of the site. The present location of Area 10 represents a small remnant of preserved archeological deposits within a highly disturbed area.

The findings of the 1993 TAS field season at Area 13B of 41LU1 reaffirmed that both cultural and natural activities occurred in the area. Area 13B apparently was utilized repeatedly as a bison processing station. Several such activity areas dating to the late Holocene are known elsewhere along the valley axis of the Landmark (Johnson 1987). The distinctive feature of Area 13B is the caliche

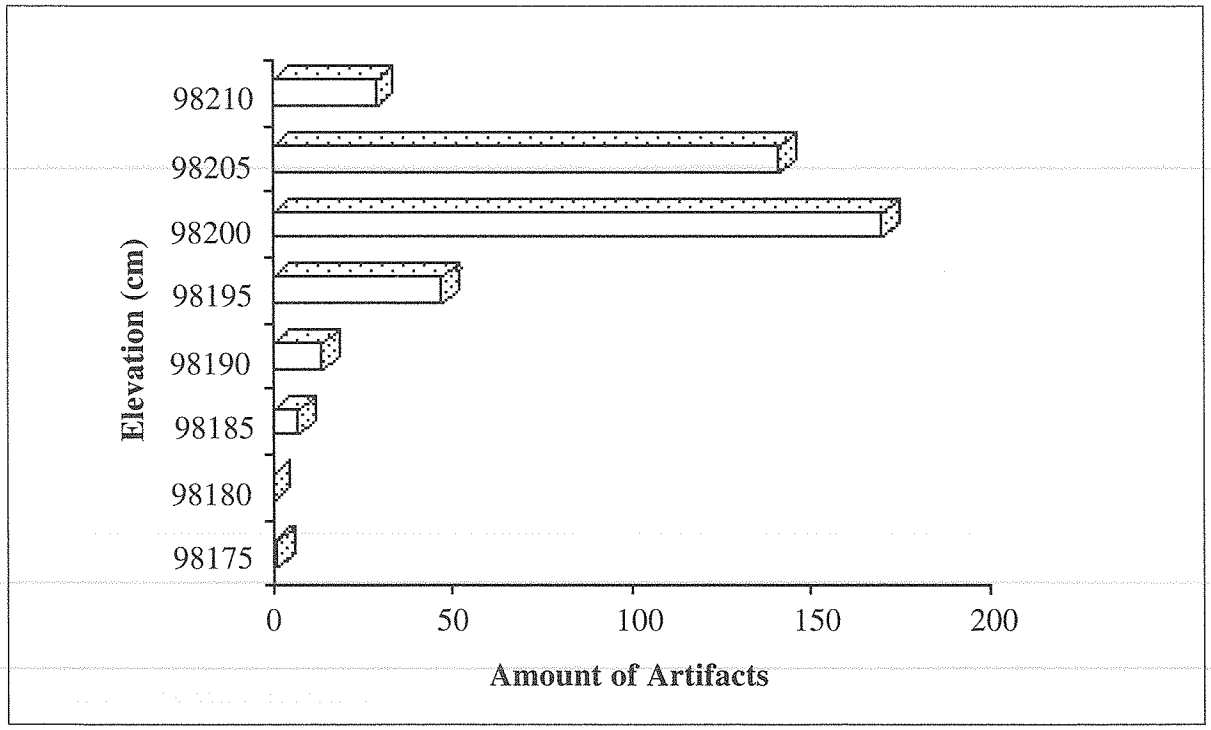

Figure 15. Vertical distribution of hearthstones associated with Feature F31-3 in Stratum K.

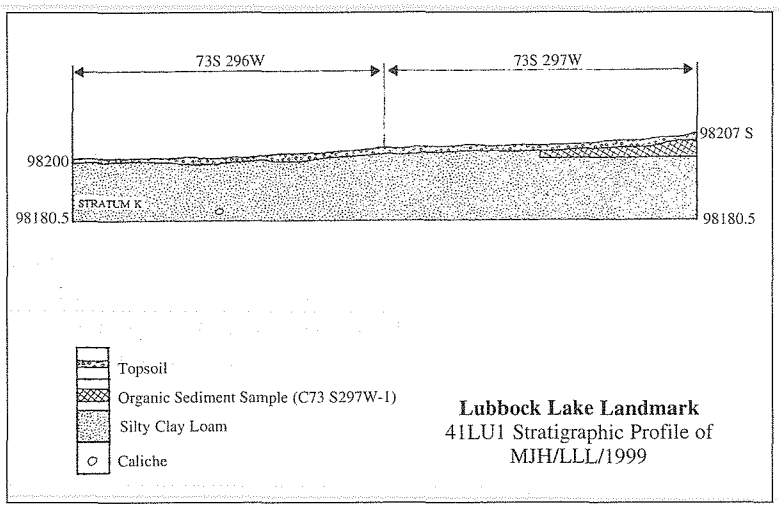

Figure 16. Stratigraphic profile of Site 41LU31 showing the location of the organic sediment sample submitted for radiocarbon dating.

pavement associated with bison processing and the extensive trampling of remains in the upper bone deposits.

The bone-and-caliche pavement contains the remains of several bison that were systematically butchered. This may have taken place close to the original kill location. It is unclear as to whether the bone scrap feature approximately 20 cm above the pavement represents a separate and distinct occupation episode, or whether it is the result of bioturbation and upward movement from the lower bone bed. Many of the bones were standing on end, a pattern thought to have resulted from the bones being trampled. Trampling activities were indicated by the high incidence of compression marks on the faunal remains.

The scarcity of bone specimens modified by carnivores suggests that the period between deposition and burial was brief. If the animal remains had been exposed at the surface for any extended period of time, evidence of gnawing by carnivores would be expected given the proximity of the site to a source of fresh water. Rapid burial also would account for the lack of weathering found on the remains (Johnson 1985; Johnson and So 1993). No cultural markings, carnivore modifications, or fluvial alterations were observed on the non-bison remains, and therefore whether these remains were deposited through cultural or natural processes remains undetermined.

Analysis of the lithic debitage assemblage determined that tool resharpening occurred in the processing area. The variation in raw material sources suggests that at least nine different tools were used in this location, and at least four different non-local lithic source locations were exploited. This pattern suggests that the occupants either traveled great distances to procure resources, or had trade relations with groups nearer the source.

Future excavations within Area 13B will focus on creating a trench between the main excavation block and isolated test unit where the second bone-and-caliche accumulation in order to determine the relationship between these two bone beds.

The TAS excavations at Area 72 of 41LU1 provided information on an historic trash dump. The Site Mean Date for material recovered from Area 72 in 1993 is slightly earlier than the date (1954-1955) calculated from the material recovered in 1990. This discrepancy could be explained by a number of factors. First, it is assumed that the area was used as a dump area over a number of years. Materials of differing ages may have been deposited at over the many years of use. Secondly, the material collected in 1990 had only general provenience information and a question was raised as to whether or not all the material originated from Area 72 (O'Brien 1995:399). Ideally, a calculation of a Site Mean Date should be based on all material recovered from a site. The Site Mean Date for all material collected in 1990 and 1993 from Area 72 is 1955 (Figure 17) and is consistent with the date derived from material collected in 1990. This time period correlates with a population increase in the Lubbock area that occurred between 1950 and 1960 (O'Brien 1995).

It is apparent that the time depth of Area 72 does not extend back to earlier time periods. The dumping behavior was not a continuation from an earlier period and definitely does not date to the pioneer settlement of the area. Despite disturbance to the site, sufficient material remains in place to constitute a valuable resource for future investigation documenting the growth of Lubbock in the mid-twentieth century. Protection and future study of these dump areas can continue to provide information

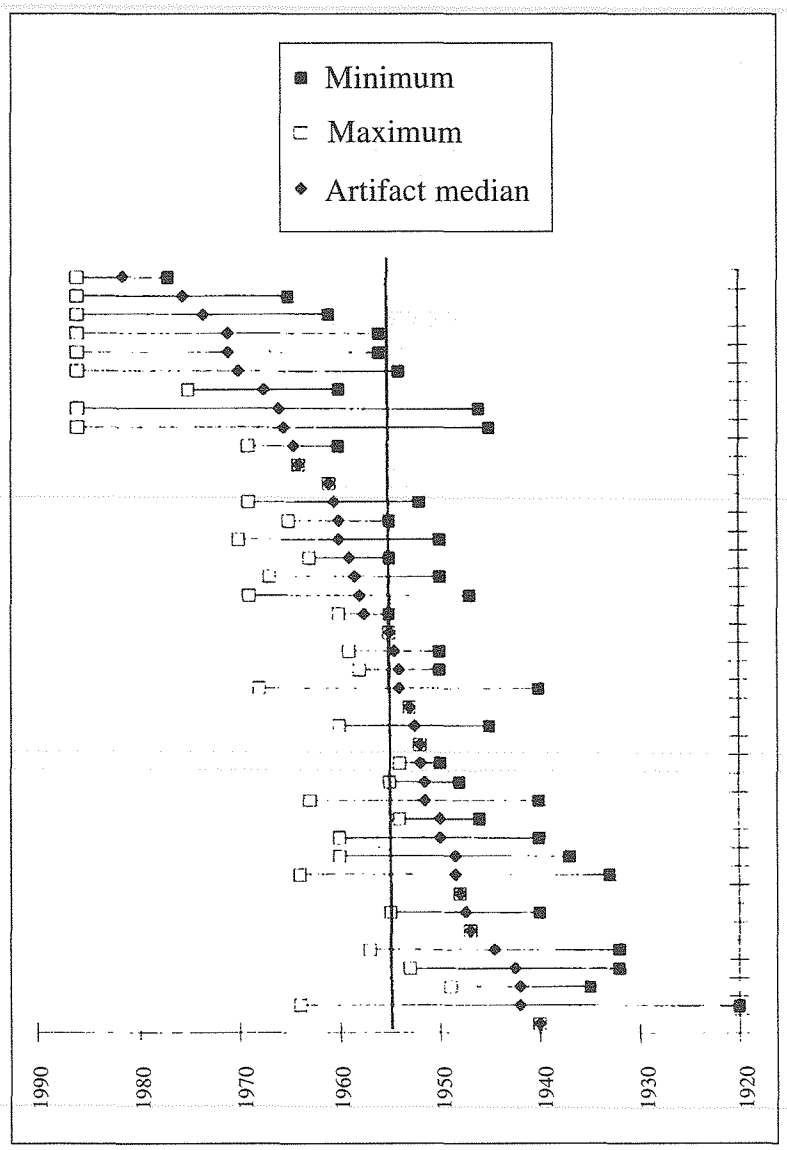

Figure 17. Manufacture date ranges for historic artifacts recovered during the 1990 and 1993 field seasons at Area 72 of 41LU1.

about the changing complexity of American societies within a specific geographic context.

At 41LU31, the amount and concentration of hearthstones in Feature F31-3 is typical of a thermal feature. Such features are a common occurrence at the Landmark (Johnson 1987, 1989, 1993; Ladkin and O'Brien 1995a). The hearthstones were horizontally dispersed over a six square meter area. It is assumed that the darkest organic sediment (where the radiocarbon sample was taken) was associated with the broken metate and as well as many of the larger hearthstones, and therefore represents the location of the hearth pit. While the hearthstones were vertically distributed over a depth of 35 cm, a clearly defined concentration occurred within a 10 cm band. Otherwise, the dispersed nature of the hearthstones across the remainder of the area indicates that this feature had been disturbed. The other two features at 41LU31 have similar surface concentrations of hearthstones and are likely indicative of larger, subsurface features. The three hearth features and large amount of scattered hearthstones found at 41LU31 indicate that this area was repeatedly occupied. No chronologically diagnostic artifacts or radiocarbon age estimates were recovered from these features, although based on the local stratigraphy it is suggested that the occupation of 41LU31 dates to the aboriginal Historic Period. The stratigraphy of the site indicates that much of Stratum K deposition took place before the main occupation. Historic aboriginal occupations have been documented at several locations within the Landmark (Holliday and Johnson 1990; Johnson and Holliday 1987). However, further excavation and analysis will be necessary to determine the timing and nature of the occupations at 41LU31.

ACKNOWLEDGEMENTS

The participation of the TAS Field School members is greatly appreciated and their efforts were instrumental in accomplishing the field objectives of the 1993 season and revealing the incredible potential of Area 10. The senior author expresses thanks in particular to Eunice Barkes and her TAS lab crew. Through their efforts, materials were processed expeditiously that helped underscore the significance of Area 10 and Area 72. Numerous Lubbock Lake Landmark crew and staff members worked during the 1993 field season and on the report. Their efforts are greatly appreciated.

This manuscript represents part of the ongoing research of the Lubbock Lake Landmark into regional cultural adaptations to ecological changes on the Southern High Plains. The 1993 survey and excavations were conducted under Texas Antiquities Permit #1515. The artifact and sample collections obtained under this permit are held-in-trust for the State and People of Texas and housed at the Museum of Texas Tech University.

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Investigations at the Follet Lake Site (41BO138): The 1994 and 1995 TAS Field Schools

Joan Few, Robbie Brewington, Karen Elliot Fustes, W.L. McClure, and Barbara Penhaker

ABSTRACT

The Follet Lake Site (41BO138) is a large, prehistoric shell midden investigated in 1981 and 1982 by the Brazosport Archaeological Society (BAS) and during the 1994 and 1995 field schools sponsored by the Texas Archeological Society (TAS). The shell midden measures approximately 330 meters in length and 100 meters in width, and is located on the southern shore of a freshwater brackish lake that was drained prior to 1860. Three exposed and disturbed areas of the midden were tested during the TAS field schools. The areas excavated by TAS revealed a series of stratified shell and artifact deposits situated along the original lakeshore. Analysis of vertebrate and *Rangia cuneata* shell remains suggest a coastal prairie and lake-focused hunting-gathering adaptation. Seasonality studies conducted on the *Rangia* shells indicate year-round utilization of the local environment with the most intense exploitation occurring during the spring and summer. The ceramics are of a style and technology common in the Galveston Bay area. Based on the presence of ceramics throughout the excavation units, it is proposed that the excavated portions of the shell midden date to the ceramic period, or after A.D. 300.

INTRODUCTION

The Follet Lake Site (41BO138) is a prehistoric shell midden located on the south shoreline of the old Follet Lake bed in Brazoria County, Texas (Figure 1). The site is located approximately one half-mile to the north of the current channel of Oyster Creek. Oyster Creek is an old channel of the Brazos River, and it is possible that Follet Lake also represents an ancient meander channel of the river. Follet Lake was drained before 1860 by constructing a drainage ditch to Oyster Creek. The site is situated on private property leased by Dow Chemical Company USA.

Follet Lake is rather unique because of its location in proximity to several ecological zones. Located on a coastal prairie close to freshwater and saltwater marshes, Follet Lake is located two miles from the Gulf of Mexico, five miles from West Galveston Bay, and five miles north of the mouth of Brazos River. Coastal woodland environments are present ten miles to the west.

The Follet Lake shell midden was originally surveyed and recorded in September of 1981 by Johnney Pollan. The midden had a dirt and grass covering ranging from one to six inches in depth and was estimated to be 500 feet (150 m) long and 100 feet (30 m) wide. The site was discovered when Dow Chemical made a bulldozer cut along the lake shoreline, revealing the presence of a dense deposit of *Rangia cuneata* shell. Because of the density and extent of the shell deposit, it was thought that an historic shell-surfaced road had been encountered. However, an archeological survey conducted by the Brazosport Archaeological Society (BAS) determined that the shell deposits were associated with lithic and ceramic artifacts and thus the site represented a prehistoric shell midden.

The BAS conducted a field school at 41BO138 in November and December of 1981 and May of 1982. Test excavations included four 4 x 4 foot (1.2 x 1.2 m) units excavated in four-inch (10.16 cm) levels. Materials recovered included faunal bone, sandy paste ceramics, and whole and partial *Rangia* shells. A projectile point was recovered at a depth of 13 inches (33 cm) in Level 3 of excavation unit N2/W2. The materials from these investigations are presently curated at the Brazosport Museum of Natural Science.

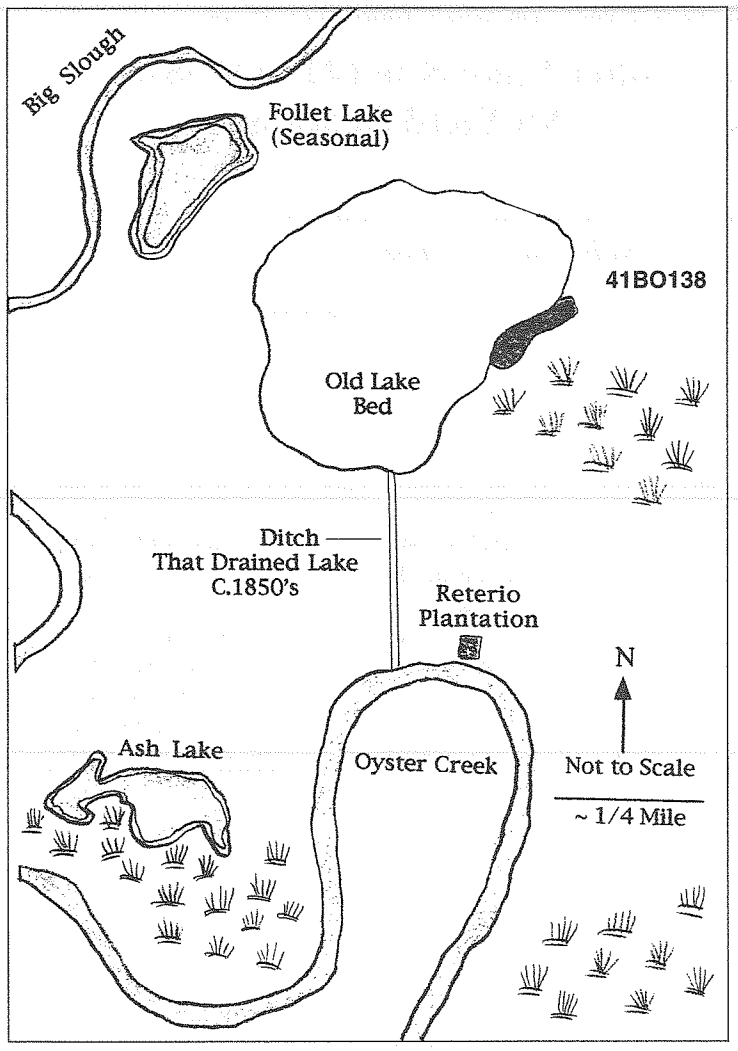

Figure 1. Map showing the old Follet Lake region and the location of 41BO138 (adapted from a 1981 sketch map by the Brazosport Archaeological Society).

No further archeological work was conducted at 41BO138 until the 1994 and 1995 TAS field schools. Ray Olachia of Dow Chemical Company acted as site steward during the period between the two excavations, making periodic surveys and ensuring that the site was protected from vandals and looters. However, during this period cattle grazing had disturbed the protective overburden deposits of one area of the site and the underlying midden had been impacted. This disturbed area was chosen for testing during the TAS field school.

The research goals for the 1994 and 1995 TAS field schools at 41BO138 were both descriptive and analytical. Descriptive goals of the investigations were: (1) define the size and depth of the shell midden; (2) obtain materials to date the midden; and (3) determine if habitation structures, fire hearths, or other features indicative of residential occupations were present within or adjacent to the midden. Analytical goals of the field and laboratory work included: (1) identifying the subsistence and technological activities of the hunter-gatherer groups who occupied the site; and (2) identifying the environmental zones exploited by the inhabitants through analyses of ceramic, faunal, and *Rangia* shell assemblages.

The search for residential structures in the form of shell house mounds was a particularly important research topic. A cultural feature found among several Gulf Coast shell middens is a circular concentration or pavement of *Rangia* shells. The presence of several dozen of these distinctive features at the Dow Cleaver site (41BO35), one of the largest shell middens along the Brazos River, were described by Hollingsworth (1981:5) as:

> ...small tightly compacted *Rangia* shells raised into flat surfaces three to six inches above the surrounding level. A visit to the site in October of 1980 by Dr. Harry Shafer of Texas A&M University strengthened our suspicions that these might be 'house platforms.' Evidence that suggests these mounds were used as living surfaces includes the fact that they are composed of very small shells, largely thumbnail size, some of which are still articulated, an obvious hearth in association with almost every platform, and that the shells are placed on top of clay built up to a thickness of a few inches. The shells are compacted into a very dense surface. The average size and shape of the platforms is oval and approximately five feet by ten feet.

In their overview of the archeology of the Texas coastal region, Shafer and Bond (1985) provide additional examples of possible shell platform house mounds. Reviewing Campbell's (1947) study of the

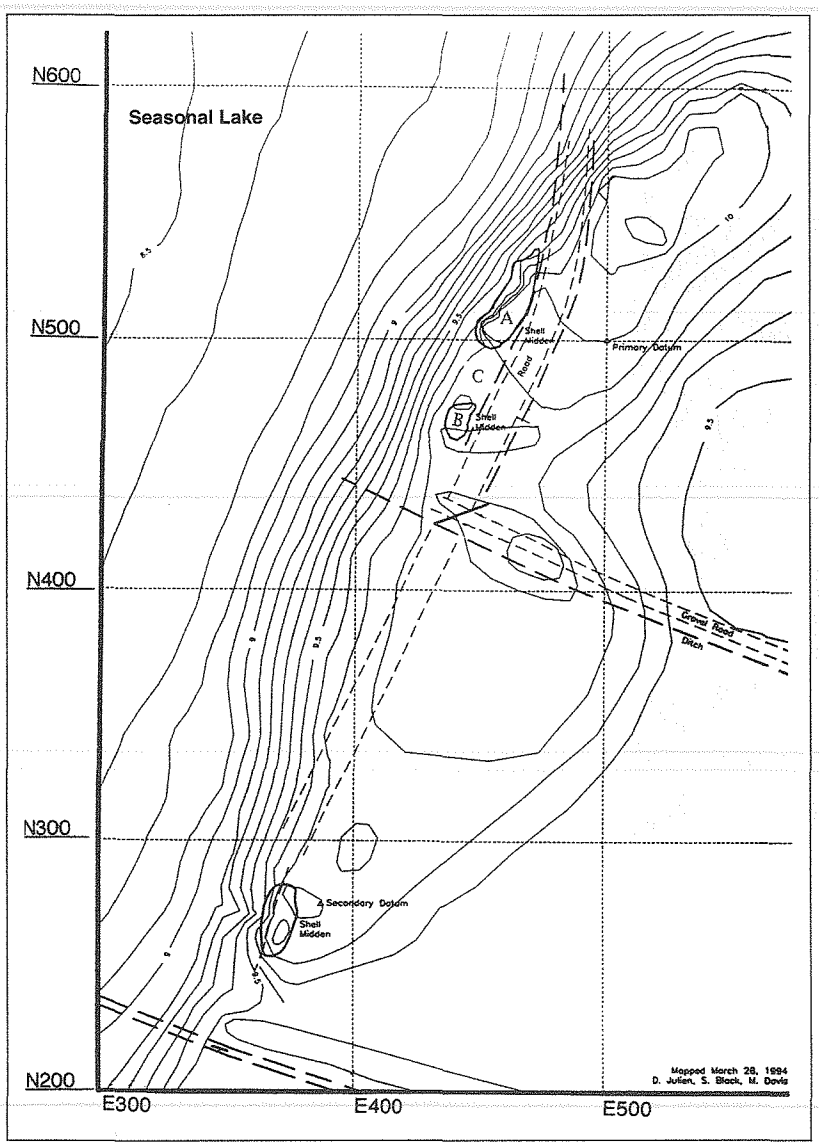

Figure 2. Site map of 41BO138 showing the location of Excavation Areas A, B, and C.

Johnson site, Shafer and Bond (1985:278) note:

> No definite traces of house remains were found . . . but circular pavements of shell about 1.5 meters in diameter may have served as floors for structures surrounding the midden proper.

They further relate these features to Newcomb's (1961:326) description of historic Atakapan settlements in southwestern Louisiana where the shell middens were reserved for the headman's house while the other families camped in the vicinity, and the hearths of the other huts were constructed of oyster shells.

EXCAVATION PROCEDURES AND FEATURE DESCRIPTIONS

Three areas were selected for excavation in 1994 (Figure 2). Area A was selected because of the high concentration of artifacts on the surface that suggested a possible habitation area. Area B was selected to serve as a contrast to Area A because of the abundance of shell and absence of artifacts in this area. Area C was a large deposit of shell located to the south of the original BAS excavations and situated between Areas A and B. Areas A, B, and C are all within areas of the site having the highest elevation.

Area A consisted of a dense surface scatter of *Rangia* shell, ceramics, burned bone, and small chert flakes (Figure 3). Surface artifacts were point-provenienced and collected. The deposits in Area A contained far more cultural material than anywhere else on the site. During the 1994 field school, a series of six 1 x 1 m units and a 50 cm x 1 m unit were placed in the densest deposits of Area A to provide a sample of the whole area (Figure 4). During the 1995 field school, seven 1 x 1 m units and two 50 cm x 1 m units were systematically placed along the east-west axis of Area A. These excavations were intended to obtain a better picture of the depositional history of the midden and to locate any earlier shell deposits. In addition, some limited shovel testing was conducted along the N527 and N528 grid lines between the edge of the shell midden and old lakeshore. Several deposits of alligator bone were found in this area.

Artifacts and samples of shell were collected during the excavations. Deposits in Area A were found to be generally shallow and seldom exceeded 50 cm in depth. Deposits were screened when

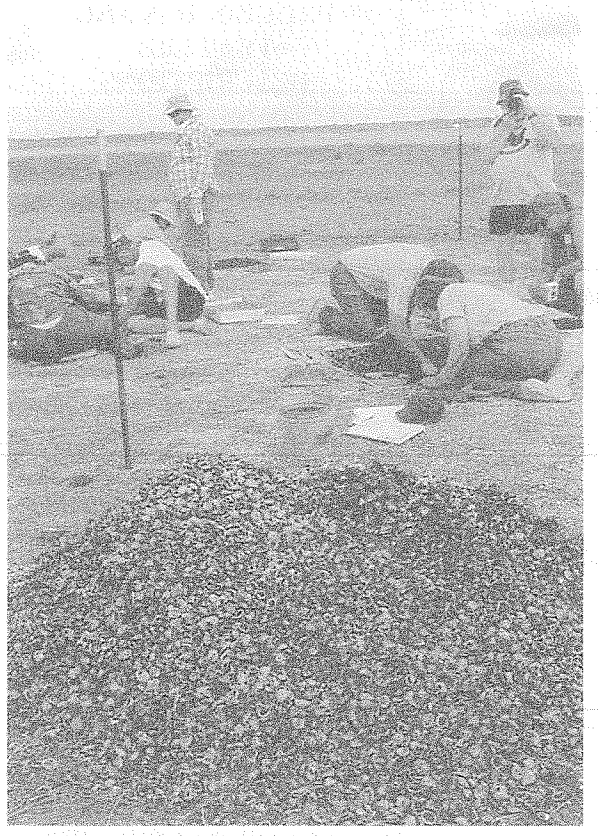

Figure 3. Photograph of the 1994 TAS Field School excavations in Area A of 41BO138.

possible, although the black clay deposits were extremely difficult to screen. The clay deposits also made it difficult to recover organic material and charcoal. No charred material for radiocarbon dating could be identified.

Two features were identified in Area A. Feature 1 was a semi-circular area on the surface that had a very dense concentration of pottery sherds and burned bone. A stone drill and two bone awls were recovered from the base of this feature. A scatter of alligator bone was observed immediately to the east of Feature 1. Norman Flagg provided a description of this feature in his field notes and expressed the difficulties of excavating in the dense clay soils present at the site: "The recovery of the alligator bones was crude but it was the best we could do. Digging with picks, etc., was painstakingly slow and was resulting in destroying more bone than we were saving. The clay was stronger than the bone so when something gave way it was through the bone rather than the clay." Feature 2 was another bone concentration to the northwest of Feature 1. Faunal material in Feature 2 was situated directly on the clay surface and was not associated with shell deposit.

Area B was another disturbed area located approximately 40 meters to the south of Area A. Five 1 x 1 m units were excavated in Area B. Sterile clay soils were encountered at a depth of 30 to 50 cm in these units. Due to the low artifact recovery, excavations in Area B were terminated after three days of fieldwork. In contrast to the common presence of lithic, ceramic and bone materials in Area A, Area B appeared to consist almost entirely of shell (Figure 5), although a small amount of bone and a few small ceramic sherds were also present. In order to provide a quantitative comparison of the two areas, all shell in each 1 x 1 m unit and level was weighed. In Area B, Level 2 of Unit N462/E440 contained 180.3 kg of *Rangia* shell. In contrast, only 89 kg of shell was recovered from Level 2 of Unit N529/E469 of Area A. Aside from the shell deposit, no discrete cultural features were identified within Area B.

Area C was another slightly elevated area situated between Areas A and B. Trenches were excavated across Area C using a small mechanical ditch excavator (ditch witch) provided by Dow Chemical Company. The trenches provided a cross-section of the portion of the site between Areas A and B. The stratigraphic sequence observed in the trenches included a 30 to 50 cm thick deposit of *Rangia cuneata* shell situated above a generally thin layer of black clay (Figure 6). Below the black clay was a deposit of orange-green sandy clay

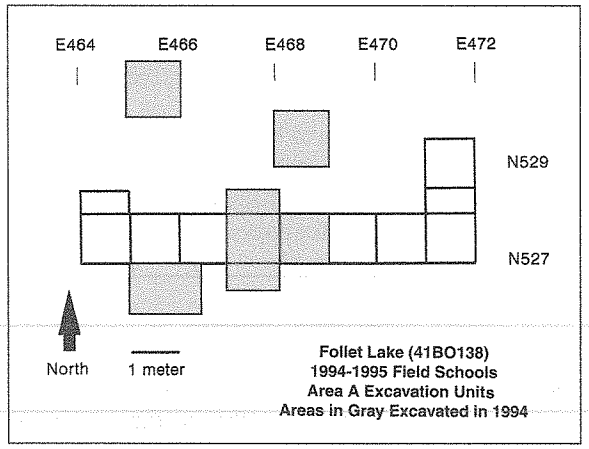

Figure 4. Locations of 1994 and 1995 TAS Field School excavation units in Area A.

Figure 5. Photograph illustrating the density of *Rangia* shell in Area B of 41BO138.

representing the Beaumont Formation of Pleistocene age. The stratum containing *Rangia* shell was not continuous and often alternated with the deposit of black clay. Shell deposits were also observed below the black clay stratum in some locations, suggesting that this stratum represented lake deposits and provided evidence of changing water levels. A projectile point of gray-banded chert was found in the east-west trench during wall profiling. The point was recovered 73 cm below the surface, below the black clay stratum and well below the *Rangia* deposit. Tentatively classified as a Morhiss point (after Turner and Hester 1993:158), the specimen would date to the Late Archaic period and thus predates the midden.

Several depressions filled with burned shell were observed in the trench profiles across Area C. Two of these depressions, designated as Features 3 and 4, were selected for more detailed hand excavation. Feature 3 was removed as a block and transported to the TAS field school laboratory. Feature 4 was excavated in the field, allowing for the dimensions of the depression to be defined.

Analysis of Vertebrate Remains

The remains of vertebrate species were identified to the extent possible through use of direct comparisons with reference collections. Analysis of materials recovered through fine-screening identified several species of small vertebrates and these are included with the tabulation of other bones. Unidentified fragments from the fine-screening are not included in the totals. The vast majority of the faunal remains were recovered from the excavations units in Area A. Very few bones were present in Areas B and C.

Recovered bones from Area A total 25,458, of which 13,245 (52%) could not be related to any taxon other than 'vertebrata.' Table 1 provides a list of the vertebrate remains presented as number of identified specimens (NISP) of each type and the minimum number of individuals (MNI) represented in the total collection. The MNI measure will often under-represent smaller animals since the remains of larger animals are often better preserved. Smaller animals are also under-represented because not all of the soil was subjected to fine screen analysis. However, this tabulation of MNI indicates the relative importance of each species and provides a basis of comparison with other sites.

Fish remains are by far the most common species identified in the assemblage. Among the identified specimens were 8637 fish scales and bones, representing 71% of the assemblage. Other major

Figure 6. Stratigraphic position of *Rangia cuneata* midden deposits above stratum of black clay exposed along the right side of the excavation unit. Orange-green clay of the Late Pleistocene Beaumont Formation is exposed at the left side of the unit.

groups represented in the assemblage include 2416 reptile and amphibian bones (20%) and 1122 mammal bones (9%). Only 36 bird bones were identified, representing 0.3% of the collection. The preponderance of fish remains may be biased by the fact that fish scales (particularly those of various gar species) were probably more favourably preserved than bone remains. Excluding fish scales from the total yields proportions of 53% fish, 31% reptile and amphibian remains, 15% mammal remains, and less than 1% of birds.

The species counts were examined to determine if any variation in vertical or horizontal distribution throughout the shell midden could be detected. No differences that would indicate change in cultural practices or specific activity areas were revealed. Most of the bones were stained from the dark soil so it was not possible to determine whether or not they had been burned. The fine-screening efforts were also greatly affected by the condition of the soil. Much of the soil resisted repeated washing and appeared to be partly fused by heat and/or heated grease.

Varieties of fish identified in the archeological assemblage include gar, bowfin, smallmouth buffalo, catfish, sunfish, green sunfish, largemouth bass, and freshwater drum. All of the fish are presently found in Brazoria County (Hubbs 1982) and would have been available in the waters of the ancient Follet Lake adjacent to the site.

Reptile and amphibian species represented in the assemblage include siren (an eel-like amphibian), tree frog, toad, bullfrog, leopard frog, alligator, snapping turtle, mud turtle, slider turtle, box turtle, green anole, skink, rat snake, mud snake, hognose snake, kingsnake, water snake, coral snake, rattlesnake, and cottonmouth. Identified birds include duck and crow. All of these species are found in the Brazos River Valley in modern times (Dixon 1987).

Mammal species present at the site include shrew, swamp rabbit, cottontail, gray squirrel, fulvous harvest mouse, pigmy mouse, deer mouse, rice rat, hispid cotton rat, prairie vole, white-tailed deer, and either cow or bison. Prairie vole (*Microtus ochrogaster)* became extinct in southeast Texas sometime after 1900 (Davis and Schmidly 1994:202). Other than the prairie vole and the cow

or bison, these mammals all have habitat ranges that presently include Brazoria County (Davis and Schmidly 1994).

Prairie voles were common throughout the coastal prairies of the Texas coast prior to 1900. In addition to the Follet Lake site, the remains of prairie voles have been identified at four archaeological sites in the region: 41CH161 in Chambers County (McClure 1994,1998); 41FB3 in Fort Bend County (Patterson et al. 1998); 41FB32 in Fort Bend County (McClure 1989); and 41WH50 in Wharton County (McClure 1991). These sites date from the Archaic through the post-European contact periods. Modern agricultural practices were probably a factor in the extinction of the prairie vole among coastal prairie habitats.

Two clusters of bones from Features 1 and 2 were carefully excavated and processed through fine-mesh screens because they were thought to represent isolated, single cooking events. The bones recovered from Feature 1 were not in anatomical position and parts of broken bones were not juxtaposed. The larger bones were of alligator, including cranial, vertebral, caudal, dermal, and long bones. Both large and small individual alligators were present, along with the bones of a large slider turtle, gars, and a tooth and trapezoid magnum bone from a deer. The soil matrix surrounding these bones was typical of the site and included a few lithic and ceramic artefacts. Five alligator vertebrae were recovered from Feature 2, along with five pit viper vertebrae. These features may indicate disposal of single meals, although no signs of butchering were observed on any of the bones.

The limited excavations conducted in Area B resulted in lower recovery rates and only 49 identifiable bones are available for analysis from this area. Apparently this area had been used less frequently for disposal of food remains and thus it may be possible to isolate single discard events. All of the alligator bones were recovered from a small area within Levels 2 and 3, while all deer remains were found in a separate location in Levels 1, 2, and 3. These may represent the locations of single food processing or discard events. Trenching and a test pit excavated in Area C yielded a few bones of deer, alligator, fish, and turtle.

The variety of species identified in the Follet Lake site faunal assemblage indicate that the prehistoric inhabitants relied primarily on freshwater fish, alligator, turtle, rodents, and deer, along with occasional other reptile, amphibian, mammal and bird species. If the few fragments of cow-size mammal bones represent prehistoric bison and not intrusive remains of modern cow, their presence is an intriguing component of Ceramic Period subsistence practices along the coastal prairie.

An interesting comparison can be made with the Cotton Lake site (41CH161) investigated by the Houston Archeological Society in 1992 and in 1997. Cotton Lake is located 135 km northeast of Follet Lake. Both the Cotton Lake and Follet Lake sites are *Rangia* shell middens situated on the banks of freshwater lakes of the coastal prairie, and have comparable dates of occupation. However, differences in resource exploitation may be indicated in the faunal assemblages of these sites. The vertebrate assemblage from the Cotton Lake site has been described by McClure (1994, 1998). Nearly 90% of the bones consisted of marine and freshwater fish. No marine fish species were identified at Follet Lake. Perhaps this represents a significant difference in food choices for groups residing on opposite sides of Galveston Bay.

Analysis of *Rangia Cuneata* Shell

Rangia cuneata species are found along the Gulf of Mexico coast from northwest Florida to Campeche, Mexico, and along the Atlantic Coast as far north as Maryland and New Jersey (LaSalle and de la Cruz 1985). These water clams are adapted to brackish water environments of generally low salinity (Carlson 1987). *Rangia cuneata* have been found as far as 25 miles upstream in river deltas (LaSalle and de la Cruz 1985), but reach their greatest population densities in shallow water between freshwater and saltwater environments (LaSalle and de la Cruz 1985; Tarver and Dugas 1973). The accessibility and high population densities of this mollusk accounts for the abundance of large *Rangia* middens along the upper Texas coast.

Rangia shells can provide insight into seasonality of resource use and site occupation through analysis of the growth lines found on the heavy thick shells (Aten 1981; Ricklis 1996). Aten (1981:183) describes the procedure for determining season of death of individual *Rangia* shell specimens based on the amount of new growth beyond the last growth interruption associated with winter, which is represented by a dark ring. Shells are assigned to spring, summer,

Table 1. Species Identified in the Faunal Assemblage from the Follet Lake Site (41BO138)

Common Name	Taxon	NISP	MNI
Fish			
Small fish	Teleostei	588	18
Medium fish	Teleostei	2213	26
Large fish	Teleostei	86	3
Gar	*Lepisosteus* sp.	5332	9
Bowfin	*Amia calva*	75	2
Smallmouth buffalo	*Ictiobus bubalus*	2	1
Catfish	*Ictalurus* sp.	36	16
Sunfish	*Lepomis* sp.	5	2
Green sunfish	*Lepomis cyanellus*	1	1
Largemouth bass	*Micropterus salmoides*	4	2
Freshwater drum	*Aplodinotus grunniens*	295	2
Subtotal		8637	
Reptile/Amphibian			
Salamander	Caudata	3	1
Siren	*Siren intermedia*	2	1
Frog	Anuran	16	3
Tree frog	*Hyla* sp.	14	2
Toad	*Bufo* sp.	3	1
Bullfrog	*Rana catesbeiana*	2	1
Leopard frog	*Rana sphenocephala*	4	1
Alligator	*Alligator mississippiensis*	946	9
Turtle	Testudinata	878	
Common snapping turtle	*Chelydra serpentina*	4	1
Mud turtle	*Kinosternon* sp.	11	2
Slider turtle	*Chrysemys* sp.	189	4
Box turtle	*Terrapene* sp.	32	2
Lizard	Lacertilia	4	
Green anole	*Anolis carolinensis*	6	1
Skink	*Eumeces* sp.	1	1
Snake	Serpentes	235	
Non-poisonous snake	Colubridae	11	
Rat snake	*Elaphe* sp.	3	1
Mud snake	*Farancia abacura*	1	1
Hognose snake	*Heterodon* sp.	4	1
Kingsnake	*Lampropeltis* sp.	2	1
Water snake	*Nerodia* sp.	3	1
Coral snake	*Micrurus fulvius*	9	1
Pit viper	Viperidae	29	
Diamondback rattlesnake	*Crotalus atrox*	3	1
Cottonmouth	*Agkistrodon piscivorus*	1	1
Subtotal		2416	

Table 1. *(Continued)*

Common Name	Taxon	NISP	MNI
Bird			
Small bird	Aves	1	1
Snall/medium bird	Aves	4	1
Medium bird	Aves	18	
Large bird	Aves	7	
Duck	*Anas* sp.	3	1
Crow	*Corus brachyrhynchos*	3	1
Subtotal		36	
Mammal			
Very small mammal	Mammalia	128	
Small mammal	Mammalia	84	
Medium mammal	Mammalia	22	
Large mammal	Mammalia	334	
Very large mammal	Mammalia	4	
Least shrew	*Cryptotis parva*	20	2
Swamp rabbit	*Sylvilagus aquaticus*	2	1
Cottontail rabbit	*Sylvilagus floridanus*	1	1
Gray squirrel	*Sciurus carolinensis*	1	1
Mouse or rat	Rodentia	111	
Fulvous harvest mouse	*Reithrodontomys fulvescens*	30	5
Pigmy mouse	*Baiomys taylori*	29	3
Deer mouse	*Peromyscus* sp.	2	1
Rice rat	*Oryzomys palustris*	2	2
Hispid cotton rat	*Sigmodon hispidus*	112	8
Prairie vole	*Microtus ochrogaster*	15	3
White-tailed deer	*Odocoileus virginianus*	225	5
Cow or bison	*Bos* sp.	2	1
Subtotal		1124	
Total Specimens Identified		12213	

or fall categories according to the amount of growth that took place after the final winter growth interruption.

Deposits within Area B of the Follet Lake site were composed almost exclusively of *Rangia cuneata* shells. Fifty whole shells, representing a very small sample of the total number present, were selected for seasonality analysis. The results of this preliminary analysis indicted that *Rangia* resources at Follet Lake had been harvested during the entire year, but more intensively during the spring and early summer months. Thirty percent of the sample was assigned to the "early" category, indicating procurement during the late winter months. Fifty-eight percent of the sample was harvested during the late spring and summer occupations of the site, and twelve percent indicated a late fall or early winter occupation.

In order to obtain a larger and more representative sample, *Rangia* shell material was examined

from three of the four features in Areas A and C investigated during the 1994 field school. Shell specimens from Features 1, 3, and 4 were analysed by students at the University of Houston at Clear Lake during the Spring semester of 2001. Excavation unit N527/E468 was placed in Feature 1 of Area A. Sample 41B0138-7 from this unit yielded 26 pounds (11.8 kg) of *Rangia* shell for analysis. Sample 41BO138-16 was from units N504/E464 and N504/E463 of Feature 3 in Area A, and provided a sample of 18 pounds (8.2 kg) of shell. Sample 41BO138-11 was collected from unit N497/E455 within Feature 4 of Area C. A total of 26.5 pounds (12 kg) of shell was analysed from this unit. All shell specimens were washed, measured, and weighed. One of every ten specimens was systematically selected for determination of seasonality and age using the procedures established by Aten (1981). Seasonality was determined for a total of 276 shell specimens and age was determined for 299 specimens. The results of these analyses are presented in Table 2.

Measurements are generally consistent across the three contexts. In Feature 1, 80% of the shells measured between 2.5 and 4.0 cm in length and 83% were between 3.0 and 5.0 cm in width. In Feature 3, 81% of the shells were between 2.5 and 3.5 cm in length, and 84% were between 3.0 and 4.0 cm in width. In Feature 4, 82% of the shells were between 2.5 and 3.5 cm in length and 84% were between 3.0 and 4.0 cm in width. Of the total collection, 71% of the specimens were harvested during the spring or summer.

Rangia shells from the Armand Bayou site (41HR81) were also analysed by the University of Houston students and provide a comparative data set (Table 3). The Armand Bayou site is located approximately one mile from Clear Lake, which empties into Galveston Bay. The individual samples of *Rangia* shell from the Armand Bayou site were larger than the Follet Lake samples. The shells from Armand Bayou were much thicker and had a rounder shape (variation in length and width was less than Follet Lake). Trying to explain the differences in shell attributes is complicated by the multiple variables involved among the ecosystems where the *Rangia* specimens were harvested. Seasonality analyses provide the most reliable source of information. Hunter-gatherers groups occupying both Follet Lake and Armand Bayou harvested *Rangia* more often during the spring and summer months, although it is also evident that harvesting was a year-round activity. Because of the temperate climate of the Texas Gulf Coast it seems logical that hunter-gatherers would utilize available resources during any season. This is supported by the *Rangia* shell data at Follet Lake and Armand Bayou.

Ceramic Artifacts

The Brazosport Archaeological Society collected 78 sherd from the surface and an additional 15 sherds from subsurface contexts during the 1980 and 1982 investigations at 41BO138. Most of these sherds were substantially weathered and it was difficult to refit edges, define vessel form or shape, or make observations of surface modifications. Films and coatings were minimally evident. Sherds measuring over 2 cm in size were analyzed for thickness, paste, temper, rim form and orifice diameter, evidence of construction or forming marks, and modifications to vessel exteriors or interiors. The presence or absence of these attributes reflects choices made by the prehistoric potters inhabiting the site (Ellis 1992).

With two exceptions, all sherds from the 1980 and 1982 investigations were sand tempered. Two sherds recovered from the surface were found to have grog and shell temper. Evidence of coil construction was observed on two sherds and interior scraping was noted on one specimen. Two sherds had evidence of interior surface film and one sherd had both interior and exterior surface film.

The ceramic assemblages from the 1994 and 1995 TAS excavations were analyzed using the same procedures. A total of 403 sherds was recovered the surface of the six 1994 excavation units in Area A, and an additional 345 sherds were recovered from the 1994 and 1995 excavation units. Most sherds were recovered within the upper 10 cm (Level 1) of the midden. Only 91 of the 345 sherds recovered from subsurface contexts were of sufficient size for attribute analysis. The sherds ranged between 4 and 7 mm in thickness. Evidence of coil construction was present and interior scraping was observed on seven sherds. Only one small rim sherd was identified in the collection. The majority of sherds had sandy pastes, although shell temper was noted in seven samples. Interior or exterior asphaltum coatings were noted on five sherds and one specimen had another form of exterior film.

Table 2. Size, Seasonality and Age Data for *Rangia cuneata* Shells from Three Sample Units at the Follet Lake Site (41BO138)

	41BO138-7 Feature 1 Area A		41B0138-11 Feature 4 Area C		41B0138-16 Feature 3 Area A		Total	
Size Range (cm)	Length	Width	Length	Width	Length	Width	Length	Width
<2.0	69	4	10	4	3	2	82	10
2.0	24	11	30	8	16	2	70	21
2.0-2.25	22	26	21	11	24	11	67	48
2.5	34	31	163	26	70	21	267	78
2.5-3.0	188	32	244	37	148	43	580	112
3.0	225	19	266	163	187	103	678	285
3.0-3.5	240	59	156	225	179	204	575	488
3.5	125	104	69	218	97	188	291	510
3.5-4.0	106	284	16	136	57	117	179	537
4.0	41	175	15	103	25	78	81	356
4.0-4.5	20	136	5	39	10	29	35	204
4.5	2	74	6	17	3	8	11	99
4.5-5.0	1	81	1	8	1	10	3	99
5.0	0	37	0	2	0	3	0	42
5.0-5.5	0	18	0	5	0	1	0	24
5.5	0	6	0	0	0	0	0	6
Total	1097		1002		820		2919	
Seasonality								
Spring	37		35		49		121	
Summer	32		25		18		75	
Fall	27		34		5		66	
Winter	10		3		1		14	
Total	106		97		73		276	
Age								
1 yr	5		0		0		5	
2 yr	20		31		12		63	
3 yr	66		66		21		153	
4 yr	14		19		17		50	
5 yr	1		4		11		16	
6 yr	0		0		12		12	
Total	106		120		73		299	

Table 3. Comparison of *Rangia cuneata* Size, Seasonality, and Age Profiles from the Follet Lake and Armand Bayou Sites

	4Follett Lake (41BO138)				Armand Bayou (41HR81)			
Size Range (cm)	Length	%	Width	%	Length	%	Width	%
<2.0	82		10		1		0	
2.0	70		21		11		4	
2.0-2.25	67		48		7		4	
2.5	267	9%	78		38		3	
2.5-3.0	580	20%	112	3%	23		16	
3.0	678	23%	285	10%	70		31	
3.0-3.5	575	20%	488	17%	43		33	
3.5	291	10%	510	17%	86	8%	70	
3.5-4.0	179	6%	537	18%	100	10%	67	
4.0	81		356	12%	120	12%	123	13%
4.0-4.5	35		204		130	13%	76	8%
4.5	11		99		135	14%	114	13%
4.5-5.0	3		99		85	9%	96	10%
5.0	0		42		56		127	13%
5.0-5.5	0		24		34		57	6%
5.5	0		6		14		89	9%
5.5-6.0	0		0		1		18	
6.0	0		0		4		31	
6.0-6.5	0		0		1		0	
Total	2919		2919		959		959	

Seasonality	n	%	n	%
Spring	121	44%	81	42%
Summer	75	27%	54	28%
Fall	66	24%	34	18%
Winter	14	5%	23	12%
Total	276		192	

Age	n	%	n	%
1 yr	5	2%	1	
2 yr	63	21%	30	16%
3 yr	153	51%	67	35%
4 yr	50	17%	47	25%
5 yr	16	5%	18	9%
6 yr	12	4%	16	9%
7 yr	0		7	4%
8 yr	0		4	2%
Total	299		190	

Only five sherds were recovered from Area B and all were from Level 1 of Unit N464/E437. Only one sherd was large enough for analysis and was a sandy paste brownware identical to the majority of ceramics found elsewhere at the site.

The ceramic assemblage of the Follet Lake site conforms to the type descriptions of ceramics found in the Brazos River delta and West Galveston Bay region of the Texas Gulf Coast (Aten 1983) and are typical of the Goose Creek and Rockport types described by Suhm and Jelks (1962), Aten (1983), Ellis (1992), and Ricklis (1996). The sherds were predominantly sand tempered, sandy paste brownwares, although seven shell tempered sherds and a single grog tempered sherd were also observed in the assemblage. Aten (1983) considers the presence of shell to be a fortuitous inclusion. However, in the Follet Lake site collection shell tempered sherds have thinner walls (4 to 5 mm) and the shell temper was evenly distributed among the paste. Coil construction was evident in most sherds and interior scraping of vessel surfaces was noted. Surface modifications were rare. Small, incised lines were noted on a single sherd, and asphaltum coatings were present on the exterior or interior of several sherds.

Projectile Points

The lithic assemblage recovered during the 1994 and 1995 field school excavations consists of seven projectile points or fragments, one chert drill, several marginally utilized flakes, and 71 chert flakes. The seven projectile points (Figure 7) were recovered during the 1994 field school and include three points and one unidentifiable tip fragment from Area A, two points from Area B, and one specimen from Area C. Perdiz points are the most common type and their presence supports the ceramic chronology of the midden.

Three Perdiz points were recovered from Area A (Figure 7, top row), all within the upper 10cm of the midden in Level 1. The specimen on the left was collected from unit N529/E469 and measures 21 mm in length, 13 mm in width, 4 mm in thickness, and has a neck width of 6 mm and a haft length of 7 mm. The blade is neither beveled nor serrated. The point in the middle (N529/E469) measures 25 mm in length,

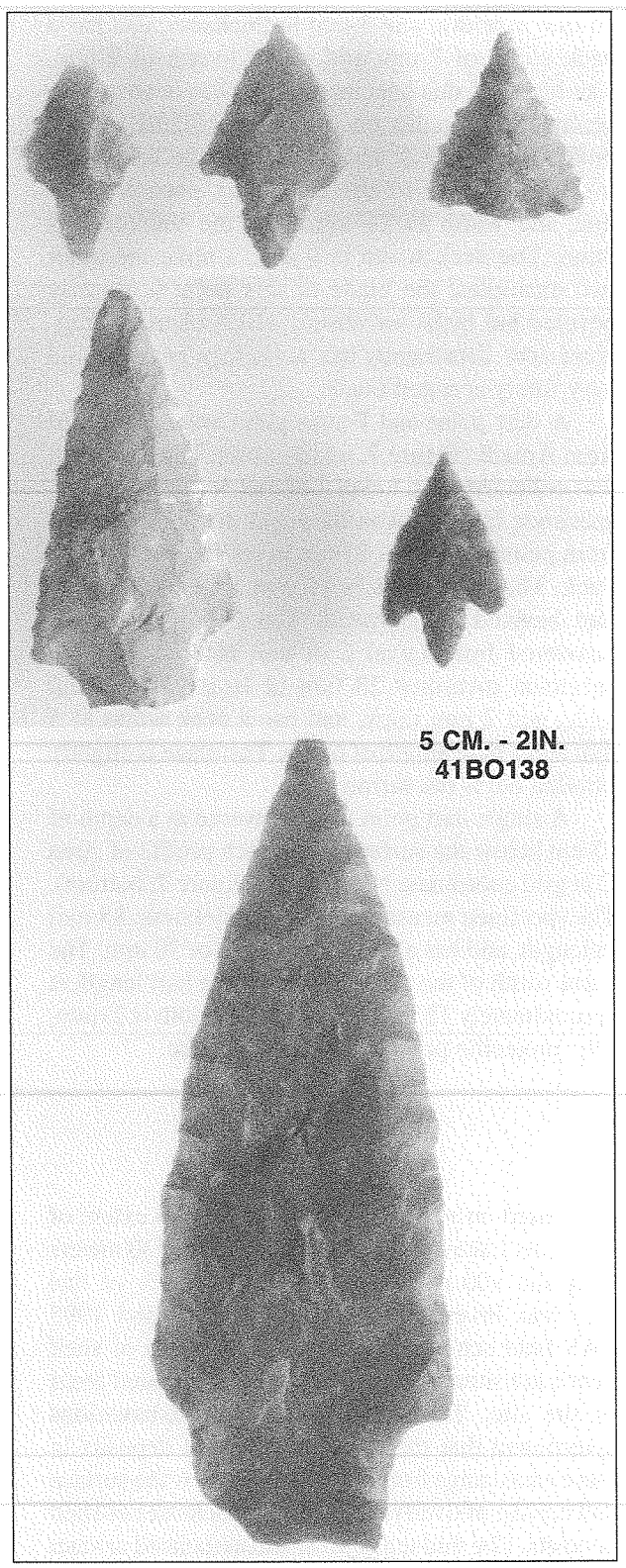

Figure 7. Projectile points from the 1994 TAS excavations at the Follet Lake Site (41BO138). Top row: Perdiz points from Area A. Middle row: Perdiz point and dart point from Area B. Bottom row: dart point recovered from trench profile in Area C.

15 mm in width, and 3 mm in thickness, and has a neck width of 7 mm and a haft length of 9 mm. The blade of this specimen is neither beveled nor serrated. The point on the right (N529/E469) is broken at the neck and is missing the basal section. The length of the remaining portion is 19 mm, the width is 16 mm, and the thickness is 3mm. The neck width is 8 mm. Unlike the other two examples, the blade of this point is slightly beveled but lacks serrations. The broken tip fragment (not illustrated) has a slightly beveled and very finely serrated blade.

A dart point and Perdiz point were recovered from Area B (Figure 7, middle row). The dart point was collected from Level 2 of unit N464/E437. The specimen has a broken base and measures 40 mm from point to neck, is 21mm in width, and is 9 mm thick. The neck width is 11 mm. The blade is neither beveled nor serrated. The Perdiz point was recovered from Level 2 of unit N464/E442. The specimen measures 23 mm in length, is 13 mm wide, and 2 mm thick, and has a neck width of 5 mm and a base length of 6 mm. The blade is slightly beveled but is not serrated.

A single dart point was recovered at a depth of 73 cm below the surface in a trench profile of Area C at grid coordinate N504/E460 (Figure 7, bottom). The specimen measures 7 mm in thickness, 85 mm in length, and has a maximum width of 30 mm. The basal width of the point is 21 mm, the haft length is approximately 13 mm, and the neck width is 21mm. This projectile point has a beveled blade.

SUMMARY

Based on surface indications, the full extent of the Follet Lake site midden appears to be 330 meters long and 100 meters wide. Less than 1% of this area was investigated during the 1994 and 1995 TAS field schools. The greatest densities of shell debris are situated among the highest elevated areas of the site. The TAS field school excavations determined that the depth of the shell deposits in these areas range from 30 to 50 cm below the surface and consist of overlying occupational lenses of shell deposits. The midden deposit and associated artifact assemblages are similar to other shell middens in the Brazos River Valley and Texas coastal prairie (Aten 1983; Shafer and Bond 1985). However, no circular concentrations of shells suggesting the presence of house structures were found during the limited excavations at 41BO138. No evidence of a discrete camp area was found, although several clusters of animal bone may represent the remains of isolated cooking and discard events.

Analysis of the faunal remains determined that the prehistoric inhabitants relied primarily on *Rangia*, clams, freshwater fish, alligator, turtle, rodents, and deer. No salt water shells or fish species were identified that would indicate the utilization of the nearby bays and estuaries of the Gulf of Mexico. The variety of vertebrate species in the assemblage demonstrates that the Follet Lake region was a rich area of food resources and that the prehistoric inhabitants of the site practiced a broad-spectrum hunting and gathering subsistence economy. The uniformity in size and age of the *Rangia* shells suggests selective collecting. The site was utilized year round with the most intensive occupation occurring during the spring and summer months.

The ceramics are of a style and technology common to the Galveston Bay region (Aten 1983; Shafer and Bond 1985; Suhm and Jelks 1962). Since ceramics were found in all levels of the excavations, the date for formation of the midden deposits most likely falls within the ceramic period, or post A.D. 300 (Aten 1983:297). Perdiz points are common to the upper Texas Coast (Suhm and Jelks 1962:283; Turner and Hester 1993). The presence of this style of projectile point in Levels 1 and 2 of the midden may indicate that the upper levels of the midden may have been deposited after A.D. 500 (Aten 1983: 303).

Overall, the 1994 and 1995 TAS field school excavations at Follet Lake contributed to our knowledge of the prehistory of the Texas coastal prairie.

ACKNOWLEDGEMENTS

This report is dedicated to the memory of Norman Flagg, W. L. McClure and Candy Templeton. Excavations at 41BO138 were made possible by the Dow Chemical Company USA, Freeport, Texas. Dow Chemical Company graciously cooperated with all our requests and made our two weeks on their property as enjoyable as possible by providing shade, ice, and water, as well as the use of a ditch witch. Mr. Wayne B. Long, Superintendent of the Salt Dome Operations, and Mr. Ray Olachia provided safety briefings for

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Brazosport Archaeological Society members were generous in sharing the records of their research at 41BO138. All records, photographs, and artifacts of the 1994 and TAS field school excavations are curated at the Brazosport Museum of Natural Science in Lake Jackson, Texas. A very special note of thanks is extended to Sandra Pollan for curating these materials.

Our special thanks to Dan Julien, Stephen Black, and Mike Davis of the Texas Archeological Research Laboratory at UT-Austin for their expertise in mapping the site prior to the commencement of the 1994 field school.

Space does not permit the listing of all the TAS participants who volunteered during the excavations and those who served during the artifact analysis and report preparation. Their dedication to the TAS and the archeology of Texas is greatly appreciated. Robbie Brewington served as site supervisor and also supervised much of the laboratory analyses. Crew chiefs during the 1994 field school were Norman Flagg, Bill Parnell, Jean Parnell, Reba Jones, Bill Schurmann, May Schmidt, Charles Boyle, Lynne O'Kelly, Jim Calvert, and Jerry Grubis. Candy Templeton served as site secretary and Raymond Blackstone as site photographer. Crew chiefs for the 1995 field school were Wendy Lockwood, Candy Templeton, Laverne Shirley, and Bob Shelby.

Students at the University of Houston at Clear Lake spent many hours performing laboratory analyses of the materials recovered during the excavations. Marilyn Horton and Beth Aucoin assisted during the laboratory analyses conducted during the spring of 2001 and in the preparation of this report. Karen Elliot Fustes analyzed the ceramic assemblage, W.L. McClure conducted the analysis of vertebrate remains, and Barbara Penhaker provided the study of *Rangia* seasonality.

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Wilson-Leonard: An 11,000-year Archeological Record of Hunter-Gatherers in Central Texas. Assembled and edited by Michael B. Collins, Studies in Archeology 31, Texas Archeological Research Laboratory, The University of Texas at Austin. Report 10, Archeology Studies Program, Texas Department of Transportation, Environmental Affairs Division, 1998. xx and 1853 pp., 858 figures, 551 tables, 10 appendices, references cited (5-volume set, ISBN 1-887072-24-1).

Reviewed by Daniel S. Amick

Not only does this 1853-page five-volume set add about a dozen pounds to your bookshelf, it provides the comprehensive and authoritatively detailed discussion of this very unique Central Texas archeological site known as Wilson-Leonard. The Texas Department of Transportation, Texas Archeological Research Laboratory, Texas Historical Commission (Office of the State Archeologist), and the Archaeological Conservancy should be commended for their persistence in excavating, analyzing, reporting and preserving a portion of this scientifically and prehistorically valuable location. Specifically, much of this work is a result of the vision and efforts of Michael B. Collins and C. Britt Bousman who co-directed the supplemental excavations and analyses and participated in writing half of the 42 chapters. Although it is not possible to summarize the entire contents of this multi-volume monograph, the highlights of this work deserve a longer discussion than usually provided in most book reviews.

Wilson-Leonard contains a stratified sequence of deeply buried occupations dating to the Late Pleistocene. The site was first identified in 1973 when TxDOT archeologists found prehistoric remains on the floodplain surface where RR1431 crosses Brushy Creek about 33 km NNW of Austin. TxDOT excavations in 1981 and 1982-84 revealed cultural deposits at least 1.5 meters below the surface. Subsequent excavations were conducted by TARL in 1992-93. This impressive work revealed a much deeper and complex sequence of occupation at the site. Ultimately, a total of 477 cubic meters of this cultural deposit were investigated. Significant evidence encountered at the site include the Clovis component, Early Paleoindian Bone Bed, Late Paleoindian (Wilson component), Paleoindian burial, and sporadic but intense occupations throughout the Holocene (both Archaic and Late Prehistoric Periods) with burned rock middens. The total of 92 radiocarbon dates makes this one of the best-dated sites in Texas. Readers are cautioned that none of these dates (nor those used in this review) appear to have been calibrated to calendar ages. Nonetheless, this series of dates combines with the long history of repeated occupation and more than six meters of geologic deposition at the site to make a substantial contribution to the understanding of cultural chronology in the region, including suggested revisions for the typological status of certain Paleoindian and Early Archaic projectile points.

In addition, this multidisciplinary team of investigators also makes contributions to understanding of regional cultural adaptations and processes, site formational processes, and paleoenvironmental reconstruction. Extensive multidisciplinary efforts and special studies were conducted at the site making this work an excellent model for those facing similar settings at complex archeological sites. The intermittent 25-year history of investigation resulted in problems of correlating diverse research goals, methods and procedures, and stratigraphic designations; but the TARL team does an admirable job of addressing these inevitable challenges. Importantly, the TARL team also addresses the complex and dynamic processes of landform evolution at the site, including the primary post-depositional disturbances such as earthworm burrowing. Unusually good preservation and stratigraphic separation of the Paleoindian horizons resulted from rapid rates of alluvial deposition at the beginning of the sequence. Periodic surface stability and soil formation with reductions in the rate of alluvial deposition (but increases in colluvial deposition) resulted in recognizable but less discrete separation of the Holocene occupations.

Wilson-Leonard is situated within the ecotone of the Edwards Plateau savannah and the tall grass prairie of the Interior Coastal Plain and it is unclear

why people repeatedly inhabited this particular location. As Collins and Mear (p. 5) ask, "why for nearly 11,000 years did people keep returning to this rather nondescript place?" They go on to describe the location as "just a narrow bit of valley floor alongside a small stream in rolling limestone hill country with thin soils and ordinary vegetation." Although not providing a very satisfying answer for those who hope to predict and easily comprehend the locations of prehistoric human occupations, they suggest, "Perhaps its answer lies in the **diversity** of resources that characterize the area (p. 5, emphasis in original)."

Volume 1: Introduction, Background, and Syntheses contains the acknowledgments, a forward (written by Thomas R. Hester), and Chapters 1-11 with 94 tables and 187 figures (including an oversized map of the Early Paleoindian Bone Bed component in the back pocket) and a list of references cited. An introductory chapter to this site monograph is written by Collins. This volume represents the core of the entire set with contributed chapters on the site and its setting (Michael B. Collins and C. E. Mear), the history of investigations (C. Britt Bousman, Michael B. Collins, Jan Guy, Paul Takac, and Gail L. Bailey), a background to the archeological investigations (Michael B. Collins), discussion of the research objectives (C. Britt Bousman), geology and stratigraphy (Paul Goldberg and Vance T. Holliday), Early Paleoindian components (Michael B. Collins), Late Paleoindian archeology (C. Britt Bousman), Archaic Period occupations (Michael B. Collins, Jan Guy, and Susan W. Dial), Late Prehistoric components (Michael B. Collins), and the place of Wilson-Leonard in Southern Plains prehistory (Michael B. Collins). In the interest of brevity, my review focuses on the contents of this introductory and synthetic volume.

The stated research objectives at the site include making contributions to prehistoric cultural chronology and paleoenvironmental reconstructions, consideration of site formation processes, defining prehistoric resource exploitation patterns in context of the paleoenvironment, describing and explaining the changing organization of lithic and food processing technology, documenting and interpreting the patterns of spatial organization and prehistoric activities on a few of the best-preserved surfaces (the Bone Bed and the Wilson component), increasing our biological understanding of the prehistoric inhabitants from their skeletal remains, and examining problems of artifact typology and cultural systematics. The greatest contributions to cultural chronology are made in the early parts of the sequence when rapid alluvial deposition results in good stratigraphic separation.

Although ancient pollen is not preserved at the site, paleoenvironmental studies include analyses of plant phytoliths, wood charcoal, vertebrate microfauna (including bird egg shells), stable isotopes from sediment samples, and ostracodes and diatoms from the basal Late Pleistocene pond deposits. Effects of earthworm burrowing on the vertical distribution of these micro-particles and any AMS dates obtained from them can be significant. Consequently, numerous approaches were undertaken to understand site formation processes, including the reconstruction of landscape evolution and alluvial geology, micromorphological study of sediments, magnetic studies of burned rocks to evaluate the context of burned rock features, magnetic susceptibility of sediments to help identify soils in the higher levels and help interpret pit features. Several conjoined stone tools are illustrated in the monograph but it is not clear why refitting studies were not employed to further evaluate horizontal spatial patterning and post-depositional vertical movement. I suspect the sheer volume of artifacts and data recovered may have precluded these approaches for this report, but I suggest future researchers should consider systematic refitting studies of the Wilson-Leonard collection (especially the Clovis and Wilson components and the Bone Bed) to enhance the interpretation of the site.

Studies of resource exploitation patterns include investigating the procurement and processing of plants, animals, and minerals. Approaches to the lithic assemblage include documenting spatial and temporal patterns of raw material use; technology of manufacture; form of objects; patterns of discard, wear (three independent investigations of microscopic use-wear were undertaken), refurbishing and recycling; and testing for preservation of residues, both inorganic and organic (lipids and sterols).

Beginning around 8,700 years ago, people conducted intensive bulk processing of plant foods at the site using hot rock cooking techniques. The study of food processing technology focuses on the evidence of these hot rock cooking features from the Holocene occupations. "Capacity planning models" are used to suggest large cooking features were

used to prepare large packets of food in an effort to reduce the per unit costs of food processing. Although this microeconomic logic may provide a robust behavioral explanation of the increasing size of these cooking features, it still begs the question of how we can distinguish bulk processing for immediate consumption versus storage.

Paul Goldberg and Vance Holliday discuss the site stratigraphy and lithostratigraphy in Chapter 6 of Volume 1. While the TxDOT work was largely soil-geographic in nature, the subsequent TARL work sought to address the complex superimposition of depositional and post-depositional processes (i.e., the geologic, soil forming, biological, and human influences). Difficulties in correlating the results of these two excavations and the contrasting approaches to stratigraphic classification and description of the deposits are made clear in this chapter. Numerous photos (including color plates) and extensive drawings document stratigraphic profiles of the excavated area over six meters deep and 45 meters long and 12 meters wide. In addition, an expansive soil coring program was conducted, which contributed to interpretations of landform evolution. Several chemical and physical analyses were also conducted on the sediments. These investigations reveal phosphate concentration is highest in the burned rock midden areas, while isotopic analysis of oxygen-18 and carbon-13 is used to demonstrate that popcorn carbonates found in Stratum Isl (dated around 11,500 to 10,600-10,000 years B.P.) are pedogenic in origin and produced by an ancient cienega rather than by high groundwater. Rapid silty alluvial sedimentation follows the cienega up to about 9,500 years ago when a period of surface stability is indicated by the Leanne soil. A shift in the geomorphic regime is indicated by Unit II (beginning around 9,500 B.P.) when the depositional sequence indicates a notable contribution of slope erosion sheetwash and colluvium. Unit III is similar to Unit II but contains significant anthropogenic influence (burned rock features and organic-rich soils), which begins around 8,870 B.P. with periodic peaks of intensity around 8,600, 6,250, and 4,000 years ago. These deposits reveal additional periods of surface stability and soil formation around 7,000 years ago (the Stiba soil) and from present to 4,000 years ago (the Wilson-Leonard soil).

The Early Paleoindian components are discussed by Collins in Chapter 7 of the first volume. At least two distinct cultural components containing fauna and lithic remains are identified in this three-meter thick deposit. Clovis artifacts are associated with the lower component while the single projectile point from the 11,000-11,500 year old Bone Bed is intriguing because it appears technologically similar to Folsom but typologically similar to Plainview/Goshen. Materials found in the upper levels of the Early Paleoindian deposits (between the Bone Bed and the Wilson component) are not assigned to a specific cultural complex because of mixing and lack of coherent technological patterning. Some Clovis objects are also found above the Clovis component and Clovis and Midland points are found together in even younger deposits. This evidence from a Late Pleistocene site with good stratigraphic separation may suggest cultural complexity was much greater in Early Paleoindian times than assumed by unilineal models of stylistic and cultural change.

Notably, two bone processing features were identified in the Early Paleoindian component: one is a core and hammerstone with bone splinters associated with the Clovis component and the second contains 63+ bone fragments with charcoal and lithic debitage. This second feature is associated with the Bone Bed component, which appears to represent the edge of an extensive unexcavated bone bed. A domestic area with a possible hearth is located near the edge of the Bone Bed, which is described as a "modest concentration of bison bones and artifacts found in and around a swale (p. 146)." Analysis reveals a broad range of fauna in the Bone Bed with at least 18 different species represented. Many of these bones are splintered by human modification, weathering and erosion. The Early Paleoindian lithic assemblage contains 8,438 waste flakes, 5 burin spalls and 1 blade; 76 unifaces; 74 tools on flakes or blades; 51 bifaces; 26 cores or core tools; 6 battered stones; 4 projectile points; 3 unanalyzed stone tools; 2 gravers; 1 Clear Fork tool; 1 hammerstone; 1 mano; 2 pieces of worked hematite; 4 chert cobbles; and 4 pieces of sandstone. Complex but effective diagrams (Figures 7-3 and 7-4) are used to report material distribution patterns. Detailed analyses of the lithic assemblage are presented in Volumes 2 and 3. Collins uses the Early Paleoindian evidence at Wilson-Leonard to suggest greater diversity in material culture and subsistence behavior than previously recognized (also see Chapter 11).

In Chapter 8, Bousman reports on the Late Paleoindian occupations at the site and describes the approximately 9,500 to 10,000 year old Wilson occupations associated with the Leanne soil. At least two Wilson occupations are identified in the upper portion of Unit I and this site contains the first evidence of the Wilson component in a buried and datable context (31 radiocarbon dates were derived from this stratum). Diagnostic identification of this earliest Holocene cultural phase is recognized by distinctive stemmed Wilson projectile points appearing to be geographically confined to South Texas. It is not clear why this local type is not compared to similar (but slightly later) early Holocene corner-notched forms associated with the Southeast (Kirk cluster) and the Midwest (Thebes cluster). Interestingly, numerous and diverse forms of narrow lanceolate points, most of which are traditionally considered Late Paleoindian types (e.g., Golondrina-Barber, St. Mary's Hall, Angostura), are found mixed in Unit II, which overlies the Wilson components found in Unit I. The overlying Unit II stratum produced 11 radiocarbon dates and this deposit appears to range from 8,400 to 9,500 years old. Paleoenvironmental evidence suggests two brief grassy periods associated with the Leanne soil in the upper portion of Unit I (and the Wilson occupations), but climate during deposition of Unit II (and the narrow lanceolate occupations) appears to have been more xeric resulting in a more grassy environment and shift from oak to oak-juniper forest.

This remarkable record of Late Pleistocene and Early Holocene cultures and environments at Wilson-Leonard makes a significant contribution in questioning how archeologists should distinguish Paleoindian from Archaic. The Wilson component and subsequent narrow lanceolate components described in Chapter 8 are arguably Early Archaic because as Bousman puts it, "shift to the exploitation of Holocene faunas was fully complete (p. 161)." So what defines the term Paleoindian? Does it require association with extinct Pleistocene fauna or the lifeway of big game hunting? Is it simply any occupation prior to 10,000 years ago (the geologic definition of the Pleistocene-Holocene boundary)? Or is it a cultural tradition defined by artifact styles, tool types and technological organization? The important question of what distinguishes Paleoindian from Archaic is addressed again by Collins in Chapter 9 where he suggests that Archaic occupations at Wilson-Leonard are distinguished by the advent of earth-oven cooking technology. Although the evidence from Wilson-Leonard shows that it is not easy to answer this question, it is important it be raised. In fact, many archeologists in the Great Basin have now adopted the term "Paleoarchaic," a trend probably reflecting increased recognition of continuity in the cultural evolution of many Paleoindian and Archaic hunter-gatherers in the New World.

The bewildering diversity of unfluted lanceolate and Early Archaic bifurcate stem points found in the Late Paleoindian assemblage is summarized by multivariate statistical analysis of metric and qualitative attributes. This thorough and thoughtful morphological analysis and numerical classification is presented in Chapter 14 of Volume 2 (authored by Anne C. Kerr and Susan W. Dial). Observations used in this analysis focused on the basal portions of points to minimize the effects of morphological modifications resulting from use, resharpening and rejuvenation (but not the potential effects of rebasing). Kerr and Dial use a sample of 182 unfluted lanceolate points from Wilson-Leonard and several related sites to suggest 21 morphological clusters and 4 outliers, while their sample of 102 bifurcated stem points from Wilson-Leonard is reduced to at least 11 clusters. Kerr and Dial (p. 491) state a cluster solution that could "achieve the most meaningful balance between segregation and aggregation" was chosen. Although clustering dendrograms are illustrated, the Euclidean distances separating cluster solutions are not provided. Use of a scree test or some other objective method of determining the cluster solution would have been preferable. Nonetheless, numerical taxonomy of projectile points seems to have fallen out of vogue and I am pleased to see this application of what is still a useful technique of investigating morphological diversity. Yet I am unclear how much of the variation among these points has been resolved, because the resulting clusters are apparently interpreted as distinctive morphological forms rather than variation within one or more types. In addition, as the authors note, this kind of morphological analysis does not consider information about learned traditions (and cultural or ethnic markers) more likely recorded in the techniques and grammar of production.

More problematic is the question of how one Midland and one Clovis point come to occur in Units I/II and II/III, respectively. These artifact forms are generally believed to date earlier than

these stratigraphic units at Wilson-Leonard. Figure 8-7 illustrates complex mixing and interdigitation of the archeological components at the site. What are the mechanisms for what appears to be "mixing" of temporal markers in some strata (especially Unit II)? Are these artifacts actually contemporaneous with the younger deposits? Are there unrecognized post-depositional disturbances at the site accounting for these apparent anomalies? Or were they older artifacts scavenged or recycled by later occupants? For example, as Bousman (p. 184) notes, "A great amount of recycling occurs especially among the projectile points."

Bousman (p. 174) also suggests Wilson peoples employed a more expendable strategy of stone tool manufacture than the later Unit II occupants who did not leave much debris. Alternatively, this contrast might also be explained by differences in depositional histories, site sampling and the distribution of prehistoric activities, and variation in occupation length and character. The lack of features and definable occupation floors in Unit II suggests an unstable surface and the proportional increase in complete projectile points and distal fragments of points may reflect shorter occupations, which lack retooling activities.

Interestingly, Unit II contains notched stones (Waco sinkers) indicating continuity with the regional Archaic subsistence technology of net fishing or net hunting. However, the Late Paleoindian faunal remains show a reduction in the number of species compared to the underlying Unit I deposits, which may suggest the narrowing of diet breadth or environmental responses to climate change at the beginning of the Holocene. Although a diversity of animals are found in these Early Holocene deposits, there is a general decline in small fauna with deer replacing bison as the common large mammal prey, less-intensive bone processing methods are used, and there is a shift toward aquatic animal exploitation in the upper portion of Unit II. The Late Paleoindian deposits also contain 39 burned rock features, 2 or 3 pit features, and a flexed burial associated with a limestone stab, groundstone tool (mano reworked as chopper), and fossil shark tooth. Bousman (p. 196) notes, "The distribution of burned rock feature types does not demonstrate any significant patterns through time at Wilson-Leonard," although comparison of Unit I versus Unit II shows an increase through time in the average number of rocks per feature and the average size of features. Magnetic analysis of the burned rock features indicated that most (9 of 11) cooled in place and have remained in place. Spatial analysis of the contents of these excavation units was conducted making isopleth maps of artifact and faunal density as well as cluster analysis of excavation block contents defining clustered co-associations of material types.

The entire span of Archaic components (ca. 8800-1300 B.P.) appear to be represented at Wilson-Leonard and includes 167 burned rock features (most of which likely represent simple hearths), 3 burned sediment features, 3 burned sediment and rock features, 2 burned rock middens, 2 partial burials, and 1 lithic artifact cluster. There is a notable absence of evidence for posts, pits and caches, which seems to suggest a lack of investment in housing or storage facilities at the site. Nearly 500,000 artifacts of stone, bone and shell are assigned to these Archaic occupations. The vast majority of this artifact assemblage is lithic debris and despite proximity to Edwards chert outcrops, there are relatively few cores. About half of these artifacts and more than half of the features are attributed to Early Archaic occupations. The Archaic deposits are complex and these cultural components often appear mixed. Consequently, the authors focus on understanding burned rock midden formation rather than culture history. A driving issue is the question of why people continue building cooking facilities in exactly the same place for hundreds and thousands of years. It is proposed that formation processes indicate: 1) large earth ovens coalesce into burned rock middens; 2) small discrete fireplaces do not coalesce in this manner; and 3) subsistence activities maintained through the use of earth ovens differ from those of the small, discrete hearths.

Early Archaic occupations at Wilson-Leonard are seen to show continuity with the Late Paleoindian occupations in similarity of projectile point forms, use of small-medium hearths, diverse subsistence base, and increasing consumption of fish. The major discontinuity appearing to distinguish the Early Archaic pattern is use of earth ovens to cook geophytes. Procurement and earth oven processing of camas (wild hyacinth) bulbs, as well as other secondary plant and animal foods, is proposed as the primary focus of Archaic activities at the site. These roasting events began during the Early Archaic at Wilson-Leonard and include preserved hyacinth bulbs radiocarbon dated as early 8,250 $\pm$ 80 years B.P. Middle Archaic occupations

are comparatively sparse and not well-isolated stratigraphically, but the Late Archaic occupations are substantial. However, the archeological information gleaned from these Late Archaic deposits is limited by compressed stratigraphy and intermixing with the overlying and underlying components. Identifiable Late Archaic features include Burial 1, a disturbed grave with other scattered human bones nearby; an apparent cache of three bifaces; and numerous burned rock features.

Site activities are consistent throughout the Archaic and they appear to be distinct from patterns seen at some other Archaic sites in the region. From these and other observations, Collins proposes that certain localities (like Wilson-Leonard), "were the focus of specific subsistence activities for very long periods of time and that these activities varied between localities (p. 211)." Specifically, the authors conclude that Archaic activities at Wilson-Leonard are focused on the procurement and processing of perennial camas root crops using rock-filled earth-oven cooking methods. These onion-like camas bulbs are rich with inulin, a nondigestible polysaccharide in raw form, which is converted into a highly nutritious food through such cooking. These activities were most likely conducted during the spring, although the faunal and floral remains indicate a mix of other activities and seasons of occupation occurred at the site. Collins suggests the Archaic evidence at Wilson-Leonard underscores the role of a principal resource in "determining where and when it and nearby resources are exploited (p.262)." This proposition should provide a very useful hypothesis in the continuing analysis of Archaic settlement and subsistence patterns in Central Texas.

A relatively thin, surficial archeological deposit of Late Prehistoric occupations is also present at Wilson-Leonard. This horizon is mostly confined to the upper portion of Unit IIIc and concentrated upslope from the crest of what is known as Burned Rock Midden 1. Two burned rock features are attributed to the Late Prehistoric occupations but these younger remains do not appear to be very involved in the burned rock midden formation at the site. Although one ceramic sherd and 94 Late Prehistoric arrow points and preforms were found, there is some mixing of these younger deposits with the underlying Late Archaic component. Interestingly, the on-site activities of these Late Prehistoric inhabitants appears to have differed from the Archaic pattern, but poor context and mixing lead Collins to conclude that Wilson-Leonard "adds little to our understanding of the late prehistory of the region (p. 276)."

In Chapter 11, which is the concluding chapter of the first volume, Collins summarizes the major results from this investigation of the Wilson-Leonard site. He notes more than a dozen points where significant contributions have been made from this study. Many of these contributions are noted in this review but include a few more worth mentioning. First, Wilson-Leonard contains a small lithic assemblage of very early Clovis or perhaps pre-Clovis occupation at the base of the cultural sequence, which is radiocarbon dated about 11,400 to 11,500 years old. In addition, the complexity of the overlying Paleoindian and Early Archaic sequence appears to defy simplistic models of culture history with suggestions of contemporaneous cultural diversity, including overlapping and intergrading traditions. Many Late Paleoindian unfluted lanceolate points previously attributed to what has become the catch-all type of Plainview are proposed to represent a distinctive but previously undefined type called St. Mary's Hall dating about one thousand years later than Plainview. Furthermore, Golondrina and Barber, two unfluted lanceolate types previously considered distinctive, are shown to be morphologically related with a single category. Similar morphological continuity is demonstrated for several Early Archaic bifurcate stemmed forms. Finally, the Wilson component is used to define a previously unrecognized Early Archaic horizon extending throughout South Texas.

Volume 2: Chipped Stone Artifacts contains Chapters 12-18 with 285 tables and 244 figures and the list of references cited. An introductory chapter is written by Collins and Susan W. Dial concerning the cultural materials discussed in this volume. Dial's lithic artifact analyses dominate this volume, which includes contributed chapters on projectile points (Susan W. Dial, Anne C. Kerr, and Michael B. Collins); statistical analysis of unfluted lanceolate and early bifurcate stem projectile points (Anne C. Kerr and Susan W. Dial); Clear Fork tools (Susan W. Dial); bifaces, bifacial tools, perforators, burins, and spalls (Susan W. Dial and Michael B. Collins); unifacial tools (Keith Prilliman and C. Britt Bousman); and core tools, battered stones, cores, and tested and unmodified chert materials (Susan W. Dial and Michael B. Collins).

Volume 3: Artifacts and Special Artifact Studies contains Chapters 19-23 with 41 tables and 123 figures, references cited, and Appendices 1-5. This volume consists of detailed material culture analyses including contributed chapters on debitage analysis (Marilyn A. Masson), ground and other nonchipped stone artifacts (Lauren A. Sullivan), modified bone and shell (Leslie C. Shaw), microwear analysis of chipped stone artifacts (Marvin Kay, Dale B. Hudler, Boyce N. Driskell, and Michael B. Collins), residue analyses (W. Jeffrey Hurst, Curt W. Beck, Edith C. Stout, Jonathan Bingham, and Michael B. Collins). The most substantial contribution here is from Marvin Kay who found microscopic wear traces on 64 of the 122 lithic artifacts he examined. The thoughtful analysis in this well-documented study reaches beyond functional classification of individual tools. Kay defines patterning among different tool types that can be attributed to design principles and economic constraints. Chronological trends in the design of these tool types suggest interesting shifts in the organizational strategies of work and stone tool manufacture and use.

Volume 4: Archeological Features and Technical Analyses contains Chapters 24-29 with 51 tables and 264 figures, references cited, and Appendices 6 and 7. Collins contributes an introductory chapter concerning the contextually oriented studies contained in this volume including contributed chapters on radiocarbon chronostratigraphy (Thomas W. Stafford, Jr.), cultural and noncultural features (Jan Guy), archeomagnetic analysis of burned limestone rocks (Paul R. Takac), magnetic susceptibility of sediments (Paul R. Takac and Wulf A. Gose), and micromorphological analysis of sediments (Paul Goldberg). Organic remains, including charcoal, are not particularly well-preserved at Wilson-Leonard despite impressive efforts taken by the TARL team to increase their rates of recovery. Consequently, one of the most remarkable contributions of this project was Stafford's ability to produce a solid radiocarbon chronology at the site. Although adopting this costly approach will require archeologists to reassess their traditional allocation of project funds, it represents a revolutionary step forward in our ability to investigate archeological site formation and chronology. Another very noteworthy contribution in this volume is Takac's careful archeomagnetic study of burned limestone, which provides impressive reconstructions of the thermal history and complex taphonomy of burned rock features. Among his remarkable findings, most of the rocks in Burned Rock Midden 1 appear to have cooled in place and been only minimally disturbed afterwards. This conclusion contradicts assumptions that burned rock middens are largely composed of rocks that are secondary, detrital deposits.

Volume 5: Special Studies contains Chapters 30-42 with 80 tables and 40 figures, references cited, and Appendices 8-10. An introductory chapter is written by Bousman concerning the largely paleoecological investigations contained in this volume including contributed chapters on human skeletal remains (D. Gentry Steele), stable isotopic analysis (Diane Wilson), vertebrate fauna (Barry W. Baker), fine screening methods (Susan Decker), microvertebrate fauna (Robin Balinsky), eggshell analysis (Susan Decker), the molluscan paleoassemblage (Leslie C. Shaw, Raymond W. Neck, James L. Theler, and Michael B. Collins), diatom analysis (Barbara Winsborough), ostracod remains (Marion J. Henry, Mervin Kontrovitz, and Jerry Marie Slack), carbonized plant remains (J. Philip Dering), phytolith analysis (Glen Fredlund), and stable carbon isotope analysis of soil organic matter (Glen Fredlund and Larry L. Tieszen). Most impressive here is the remarkable recovery and identification of extremely fragile faunal remains (bird eggshell) from the site. These eggshell fragments were found in the 1/8 and 1/16 inch mesh residues from water screening and classified on the basis of comparative shell thickness.

As pointed out by Collins in Chapter 11 (Volume 1), the cultural sequence in Central Texas differs from surrounding regions in that prehistoric hunter-gatherer societies neither developed nor adopted the characteristic traits of formative lifeways (e.g., horticulture, ceramics, sedentism, nondomestic earthwork construction). Importantly, Collins uses the archeological evidence from Wilson-Leonard to address the meaning of "Archaic" and to explore the difficulties of making extra-regional comparisons. In particular, he frames the critical issue of why there appear to be no changes nor movements toward formative lifeways seen in the prehistoric record of Central Texas. Although it is not possible to answer this question, Collins offers some thoughtful observations on this big issue. First, the prehistoric record of hunter-gatherers in Central Texas does not support those who have suggested the adoption of formative

lifeways results from internal causes in response to risk or stress. Neither does this record support those who seek external causes for the appearance of formative lifeways because prehistoric inhabitants of Central Texas do not appear to have been isolated from the formative cultures of surrounding regions. Finally, Collins notes that environmental or climatic limitations cannot explain the failure of formative lifeways to catch on in Central Texas. After all, it was no drier than the American Southwest where substantial investment in horticulture and formative lifeways appeared. In contrast, the prehistoric inhabitants of Central Texas appear to have lacked the need and interest in adopting formative patterns of behavior. These observations lead him to question whether formative traits are possible without a horticultural subsistence base and what the potential role of food storage may have been for the prehistoric hunter-gatherers of Central Texas. Investigation of these issues can provide prehistoric archeologists working in Central Texas with a fruitful research direction for addressing some critical questions in hunter-gatherer ecology and evolution.

For those who are serious researchers of burned rock middens, prehistoric hunter-gatherers, and Early Paleoindian and Central Texas archeology, this five-volume set provides an essential resource. Despite the massive size of this multi-volume monograph, there are relatively few typographic errors or citation omissions. Collins and his colleagues are to be congratulated for accomplishing this demanding task. One minor criticism is that several of the digital images (produced by scanner or digital camera) provided as figures appear grainy and the use of original photographic images would have been an improvement. Although some shorter articles about Wilson-Leonard are already available, I urge the authors to continue publishing papers that are accessible for those who are unable or unwilling to tackle this comprehensive but daunting site report. Better yet, I recommend the authors consider preparation and publication of a book length monograph about one-tenth the size of this tome. I believe many academic book publishers should be interested and am certain that prehistoric archeologists throughout the world would find the analysis and synthesis from this unique site to be very valuable.

After Slavery: The Rubin Hancock Farmstead, 1880-1916, Travis County, Texas, by Marie E. Blake and Teri Myers. Reports of Investigations, Number 124, Prewitt and Associates, Inc., and Archeology Studies Program, Report 19, Texas Department of Transportation, Environmental Affairs Division, 1999. viii + 124 pp.

Reviewed by Shawn B. Carlson

This report chronicles the life of Rubin Hancock, an emancipated slave, who owned property just north of Austin, Texas, during the late nineteenth and early twentieth centuries. His small farmstead is examined in various contexts, i.e., as an owner-occupied farmstead, as part of a rural African American community, and as part of a larger trade network extending from Austin to other parts of the United States.

In a joint effort by Blake and Moore, the report pulls together data from a 1987 testing and data recovery project conducted by John W. Clark, Jr. for the Texas State Department of Highways and Public Transportation, now the Texas Department of Transportation, that was never completed. Though some historical research and oral histories were done at the time of the excavation, additional research was conducted for this report.

In the first chapter, Blake outlines the objectives of the report, drawing upon the previous studies at this National Register eligible site. The four objectives she defines include production of the technical report, development of a curriculum unit for use in the public schools, analysis of a prehistoric component of the site, and preparation of the project materials for curation.

The second chapter outlines the history of the project, detailing the survey, testing, and data recovery methods and touching upon the archival research and oral history interviews. Descriptions of the fieldwork note that 79 5-x-5 ft units and three trenches were excavated and 9,086 artifacts recovered from the historic component of the site.

Chapter 3 is a detailed historical account written by Teri Myers. She begins by explaining her research methods and tracing the chain of title for the site. Next, she documents the members of Rubin Hancock's family and explores the slave-to-slave owner relationship between Hancock, his three brothers, and their half-brother/owner, John Hancock, a prominent Travis County judge. Following emancipation, the four Hancock brothers purchased property in northern Travis County where a small African American community subsequently developed. Myers discusses their property ownership in the context of surrounding communities and the development of those communities through the late nineteenth and early twentieth centuries.

A number of cultural features were recorded at the site and are described in Chapter 4. The more prominent features included a hand-dug stone-lined well, a drilled well, and a chimney hearth and house foundation. Other features were fences and fence lines, yard and garden areas, a dog burial, trash dumps, outbuilding foundations, and a pit feature. All are thoroughly described with accompanying maps and photographs.

In Chapter 5, Blake describes the artifacts, beginning with an explanation of the methods used given that the collection required some reorganization. She provides both descriptive and functional discussions of the artifacts, complimenting them with contextual information.

The final chapter of the report examines site structure looking at both features and artifact patterning. A discussion of consumer behavior places the Hancock assemblage in a broader context as does the discussion of intersite comparisons. Overall, the report satisfies the goals that were set forth in the introductory chapter.

After Slavery is a well-written, well-documented report that deserves a broader audience than the cultural resource management community. This has partly been addressed through the development of a seventh-grade curriculum unit on archaeology. However, the quality of data available for this site is unusual and should be made available to other professionals researching African American archaeology.

Archaeology of the Ojasen (41EP289) and Gobernadora (41EP321) Sites, El Paso County, Texas, by Harry J. Shafer, John E. Dockall and Robbie L. Brewington. Joint publication of the Center for Ecological Archaeology, Texas A&M University, Reports of Investigations 2 and the Texas Department of Transportation Environmental Affairs Division Archaeology Studies Program Report 13 (1999). 375 pages, one computer disk.

Reviewed by Stephen H. Lekson

The Ojasen and Gobernadora sites are two small Jornada Mogollon pithouse sites just north of El Paso Texas. After a somewhat complicated history of earlier research, the two sites were mitigated in 1981 in advance of a highway project. Using a variety of techniques, the Ojasen site was dated to A.D. 1000 to 1150, and the Gobernadora site was dated to A.D. 1000 to 1200; both were assigned to the Dona Ana Phase. The authors argue that both sites were winter occupations. The main emphasis of the reported research, undertaken ten years after the fieldwork, was descriptive; but secondary themes included site structure, lithic analysis, ceramic analyses of various kinds, analysis of subsistence and settlement patterns, and a discussion of the broader socio-cultural context of these two sites—tasks for which the authors are extremely well qualified.

Features located at the Ojasen site included two to four surface concentrations, two pithouses, three hearth/ovens, and 17 pits. Features located at the Gobernadora site included four to six pithouses, three hearth/ovens, three FCR scatters, 15 pits, a midden, and one burial.

Site structure analysis recognized a "core residential area at each site that hints of a linear (Ojasen) and semicircular (Gobernadora) pattern of structures. While in general, the lithic industries are expedient, the analysis suggests that "expedient tools can be multifunctional," and that useful local raw materials "negated the need to import large amounts of raw materials." Several very interesting ceramic analyses included typology and vessel form, and more specialized analyses of El Paso brownware rim form and neutron activation analysis of imported Mimbres Black-on-white. The latter analysis concluded that, contrary to earlier reports, Mimbres Black-on-white found in these Jornada Mogollon sites was not made in the Rio Grande Valley or in the Jornada area. Floral remains were dominated by wild plant resources; corn was only a minor element of the floral remains. Cottontails and jackrabbits were the most abundant faunal remains, but larger game animals were also present, including pronghorn, deer and mountain sheep. The authors conclude that both sites were occupied by small mobile bands that used corn only as a minor element in a hunter-gatherer economy. The sites were fall-winter loci that were repeatedly re-occupied for those seasons. The considerable Mimbres expertise represented by the authors appears to good purpose in the suggestion that, based on Mimbres Black-on-white ceramics in the two sites, "Jornada people may have been visiting the large Mimbres towns to observe plaza ceremonies and participate in feasting" not unlike Navajo visits to Pueblo ceremonies today.

The report is well produced and edited, in 8.5 x 11 inch format. The graphics are clear and tables are well organized and readable. Some data are presented on a floppy disk, attached, in Excel database formats.

The report is an excellent example of the utility of CRM data, competently recovered and recorded, in addressing changing questions and research themes. The fieldwork was undertaken in 1981; the reported research was begun in 1991. The result is a very useful, very professional report with both local and regional implications. The archaeology of the Jornada region and southern New Mexico will benefit from the research and this excellent publication.