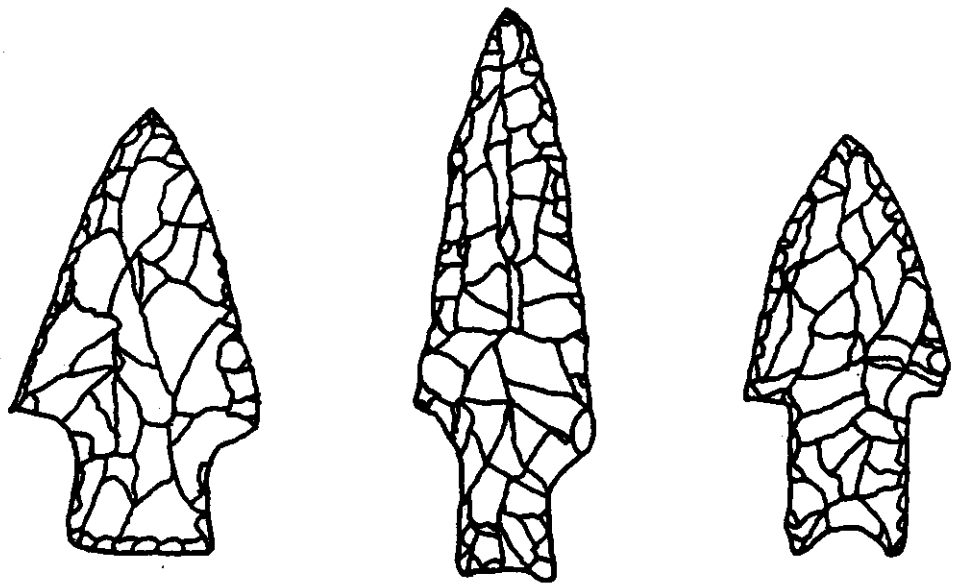
EXCAVATIONS AT THE JOE DAVIS SITE 41FB223, FORT BEND COUNTY, TEXAS

Leland W. Patterson
Joe D. Hudgins
William L. McClure
Sheldon M. Kindall
Richard. L. Gregg



Houston Archeological Society
Report No. 11, 1994

TABLE OF CONTENTS

TABLE LIST

FIGURE LIST

INTRODUCTION

This report gives the results of excavations by the Houston Archeological Society at site 41FB223 in Fort Bend County, Texas. This site was discovered by Joe Hudgins and Grant Hall, and recorded for state records by Hall. Excavation work at 41FB223 was done during the spring and fall of 1993. Work at this site was made possible through the courtesy of the landowners, Joe Davis and family.

Field work was supervised by the HAS Field Director, Joe Hudgins. Sheldon Kindall was in charge of field notes. Richard Gregg supervised site survey work. Laboratory processing of artifacts from the fall season was supervised by Melissa May. Artifacts from the spring season were processed by Lee Patterson. Analysis of faunal remains was done by William McClure.

Individuals who participated in the excavations included Karen Acker, Bill Csayni, Charles Boyle, Richey Ebersole, Dick Gregg, Joe Hudgins, Bill Just, Sheldon Kindall, Mike Marshall, Ray McCausland, Don McReynolds, Bev Mendenhall, Bernard Naman, Tommy Nuckols, Tom Palmer, Lee Patterson, Gary Ryman, Steve Sebesta, Jeanette Siciliano, Robert Shelby, Randy Spalinger, Ray Trebbi, Muriel Walker, Jim Wells, Roy Whitney, and Gina Williamson.

Site 41FB223 is a large stratified prehistoric campsite with significant occupation components from the Late Paleo-Indian through the Late Archaic time periods. No ceramics were found here to indicate any use of this site in the Early Ceramic or Late Prehistoric periods. A trace of use of this site in the Late Prehistoric period was indicated by the recovery of a Perdiz arrow point on the surface. Modern materials were found in the top strata from farm trash dumping, but modern disturbance did not affect most of the strata that contained prehistoric materials. The Late Paleo-Indian and Early Archaic periods are particularly well represented at this site. As with other prehistoric sites in Southeast Texas, occupation at site 41FB223 was probably on a seasonal basis by nomadic Indians with a hunting and gathering lifeway. Since this is a startified site, data from excavations at this location contribute to a better understanding of regional cultural chronology.

GEOGRAPHIC AND ENVIRONMENTAL SETTING

Site 41FB223 is located south of Fulshear, Texas on the eastern edge of the Brazos River floodplain. The site is on a high terrace, and river flooding would generally not have affected this site during periods of human occupation. The location is about one mile from the present channel of the Brazos River. There are presently no trees on this site, but trees may have been present in prehistoric time, before the area was cleared for modern farming.

This area is a mixture of deciduous woodlands and coastal prairie. The general area is well known for nut trees, especially pecan. Prehistoric sites in this area, such as 41AU36 (Hall 1981), 41FB3 (Patterson et al. 1993a), and 41FB95 (McClure 1987), have a large variety of faunal remains. Natural food resources in this part of Southeast Texas were abundant. Due to poor preservation of floral remains, the complete prehistoric diet cannot be reconstructed. Faunal remains from sites in this area indicate use of small animals, such as squirrel, rabbit, and turtle, and large animals, such as deer and occasionally bison. Deer and turtle are generally the most common faunal remains at sites of inland Southeast Texas (Patterson 1990b:Table 10).

At the present time, the closest water source to this site is a tributary stream of the Brazos River that crosses the floodplain about one-half mile from this site. The land contour indicates, however, that there may have been a stream adjacent to 41FB223 in prehistoric time. If this stream channel became inactive at the end of the Late Archaic, this may account for the lack of significant occupation of this site after the Late Archaic period, after about A.D. 100. Prehistoric sites in Southeast Texas are generally near water sources. The climate may have become drier at the end of the Late Archaic period (Story 1990:244).

SITE GEOLOGY

Site 41FB223 is located on a high sandy terrace of the Brazos River. The base of this terrace is clay which probably represents the Beaumont Formation. The clay base is capped with about 8 feet of silty sand, forming a prominent feature called Huntington Mound on the USGS quad map of the area. At the sand-clay interface the clay has a well-scoured appearance, which may represent a severe erosional event from river flooding during the Pleistocene period. It is typical of sites in Southeast Texas to have geological deposits missing from the end of the Beaumont Formation at about 30,000 years B.P. to the start of the Paleo-Indian period at about 12,000 years B.P.

This site is on the south side of a large sand mound, about 2000 feet long and about 1200 feet wide. The sandy fill at the top of site 41FB223 seems to be too high to have been caused by alluvial deposition from river flooding. A colluvial model seems to be more appropriate, where a high portion on the north side of the mound was gradually redeposited on the site 41FB223 location on the south side of the mound. A similar colluvial model has been given by Thoms (1993:Chapter 6) for a site on a high sandy area in Brazos County.

This sand mound is now bisected from east to west by an erosional low area. Erosional bisecting of the mound may represent the end of sand deposition on site 41FB223, after the Late Archaic period. The erosional low area may have been caused by modern farming operations. Late Paleo-Indian artifacts were found at this site down to the clay-sand interface, with all cultural materials being from the Holocene period after 10,000 years ago.

The original formation of the large sand mound at this location possibly occurred during the Late Pleistocene period, caused by alluvial deposit during a period of high rainfall, perhaps followed by ridge formation as vegetation trapped wind-blown material. This would seem to be consistent with the well-scoured appearance of the clay at the base of the deep sand deposit. Another possiblity suggested by Bob Pickens, a geologist, is that the sand mound here originally formed during an interglacial period during river valley accretion related to a rise in sea level.

Various strata of this site have brown silty sand down to the Late Paleo/Indian-Early Archaic interface at about 7000 B.P. (5000 B.C.). Below this depth, there is a sudden change to light tan sand which continues down to the sand-clay interface. No artifacts were found below this interface. Michael Waters of Texas A&M University has suggested that the light tan sand may be the result of horizontal groundwater leaching above the clay barrier. Stratified sites 41WH19 (Patterson et al. 1987) and 41FB42 (Patterson et al. 1993b) also have light colored sand below the Late Paleo-Indian/Early Archaic interface. Perhaps there was a wet climate during the Late Paleo-Indian period of 10,000 to 7000 years B.P. Measurements by McClure show that sand grain size is the same for all occupation levels of this site.

Excavations and core samples show that the clay-sand interface is level, while the site surface is irregular due to erosion. Site stratification has been reconstructed based on equivalent levels from the sand color change, as shown in Table 1. Use of equivalent levels gives a good projectile point type sequence, compared to stratified sites 41WH19 (Patterson et al. 1987) and 41FB42 (Patterson et al. 1993b).

No significant prehistoric artifacts were found above equivalent excavation level A6. Levels A1 to A5 were probably formed after termination of prehistoric occupation of this site. The deepest disturbance from modern materials varied from levels A6 to A13 for various pits. However, only the Morhiss point from Pit A and the Pedernales point stem from Pit V appear to be in levels of modern disturbance. Most of the projectile point sequence appears to be in undisturbed context. Apparently, only some Late Archaic levels were affected by modern disturbance in some pits.

SOIL SAMPLES

Samples of soils from each 5 cm level of Pit H were bagged separately and processed for data relative to the soils as well as faunal materials. The samples were dried and the colors recorded according to the Munsell numbers (Geological Society of America). In the upper (darker) levels there were small aggregations of yellow soils and in the lower (yellow) levels, there were larger aggregations of darker soils. This is an indication of vertical movement of soils due to the activity of worms and other organisms. From surface to -160 cm color is 10YR4/2 (dark yellowish brown) with slightly lighter colors at the -20 and the -110 cm levels. From -190 to -240 cm color is 10YR7/4 (grayish orange). From -160 to -190 cm there is a fairly smooth transition between the above colors.

Later, the samples were each weighed and washed through screens. Less than 1% of each sample was retained on the #40 screen which has an opening of 0.42 mm. This retained sample was later examined with a microscope. The soil passing through the #40 screen was allowed to stand in water for 24 hours. At that time there was a slight color remaining in the water. The color in samples from the lower levels was slightly yellow and from the upper levels it was brownish with yellow cast. None of the soil in any level had the characteristic of cohesion that is in clay, although the silts act as binders when dry. Thus the soil can be classified as fine sand to silt. The yellow color is due to the finer silts and the darker color is due to organic matter. These samples contained organic and inorganic matter that is tabulated in Appendix 1.

The sand grains are mostly clear quartz but there are many grains that have a wide variety of colors. The grains have rounded edges as would be due to long-distance tumbling in water. The sand and silt composition is consistent throughout the depth of the excavation.

EXCAVATION DETAILS

A site contour map is shown in Figure 1A. Layouts of excavation pits in Groups 1 and 2 are shown in Figures 1B and 1C, respectively, for the west and east ends of the site. Figures 1B and 1C do not show Pit V, which was located in the middle of the site. A total of 22 one-meter square pits were dug. Due to lack of natural stratigraphic indications, excavations were done in arbitrary 10 cm increments. All dirt was put through 1/4-inch mesh screens. In addition, soil samples were collected from Pit H, the deepest pit, for fine-screen work by McClure.

This is a large site. Excavations and test cores show that the site is a least 79 feet (24 meters) wide in a north-south direction, and at least 387 feet (118 meters) long in an east-west direction along the southern edge of the sand mound. At the eastern end of site 41FB223, there is a horizontal farm silo that has been deeply placed into the south side of the sand mound. All of the diagnostic lithic artifacts collected from the surface of this site are from the disturbed area around the silo. Shovel tests indicate that artifact density drops off east of the silo.

About 800 feet (244 meters) east of site 41FB223, some lithic artifacts were found on the surface during the original site survey by Hall and Hudgins. This location was recorded as site 41FB222. Later surface collecting and shovel tests at 41FB222 recovered chert flakes and clayballs, but no time-diagnostic projectile points. As at 41FB223, there were no ceramics found at 41FB222, so that artifacts are probably not later than the Late Archaic period. Surface collecting at site 41FB222 yielded 31 chert flakes. Shovel test A at site 41FB222 yielded 14 chert flakes and 10 clayballs at depths of 0 to 40 cm, and 8 chert flakes and 6 clayballs at depths of 40 to 70 cm. Shovel test B at this site yielded 31 chert flakes and no clayballs at depths of 0 to 40 cm, and 11 chert flakes and 1 clayball at depths from 40 to 70 cm. It is concluded that cultural deposits at site 41FB222 are at a lower density and are shallower than at site 41FB223. The time periods of occupation of site 41FB222 remain to be determined.

There is evidence of gopher activity at this site, which would have caused some soil disturbance. As discussed later, regarding chert flake sizes at various excavation levels, gopher activity does not seem to have moved large pieces of material, such as projectile points. There is only one excavated projectile point that is not in expected chronological sequence, compared to other excavated sites in this area. In Pit Q, a Pedernales point was found in Early Archaic excavation level A18. However, this specimen was clearly in displaced context in a small area of the southwest corner of Pit Q, where soil difference was apparent. It appears that there was a small erosional trench on the outer south side of Pit Q on the sand mound edge. The Pedernales point was apparently displaced downward from a higher level and the erosional trench was then in-filled so as not to be apparent on the surface.

Except for Pit H, all excavation pits were located on the sloping south bank of the sand mound. This was done to obtain less excavation depth, so that each pit could be completed in less time. There was a time restraint on each excavation pit here. Because of horses and cattle in the field, each excavation pit had to be backfilled at the end of each day's work. Pit H on the level part of the sand mound was 2.3 meters deep. Both excavation safety and time restraint dictated against most test pits being located to the north on the level part of the mound surface. Judged by the results of Pit H, little data was lost by use of this excavation strategy. Pit H did not have many clayballs above equivalent level A12, and only a few small chert flakes above equivalent level A9.

MODERN MATERIALS

There is evidence of modern disturbance of site 41FB223 in the form of modern materials in the top excavation levels. A summary of modern materials is given in Table 2. An estimate of the depth of modern disturbance in various excavation pits is shown in Table 1. Some very small pieces of modern materials were found below these depths, but were not counted because they appear to be due to gopher activity.

There is no evidence of significant modern disturbance in any excavation pit below level A13. It is judged that modern disturbance of this site only affected some excavation levels

in the Late Archaic period. Excavated materials from the Late Paleo-Indian, Early Archaic, Middle Archaic, and much of the Late Archaic are from undisturbed context, except for gopher disturbance of small-size materials. Gopher disturbance mainly affected small-size chert flakes, below 15 mm in size.

There is no evidence of recent dumping on site 41FB223. No modern materials were observed on the surface, and all excavated modern materials are of types that may be over 50 years in age. At one time, there may have been a building near this site, according to the present landowner, but no evidence of this can be seen. All present buildings are several hundred feet from the site.

PROJECTILE POINTS AND CHRONOLOGY

Data for projectile points found at site 41FB223 is given in Table 3, and a summary of projectile points by excavation level is given in Table 4. The sequence of projectile point types is consistent with projectile point sequences at other sites in the western part of Southeast Texas, such as 41WH19 (Patterson et al. 1987) and 41FB42 (Patterson et al. 1993b).

All of the equivalent B levels are judged to be in the Late Paleo-Indian period (10,000-7,000 B.P.). Cultural materials were found in equivalent levels B1 to B6, but projectile points were found only in levels B1 and B3. Three Angostura points (Figure 2A,B,C) were found in level B1. These specimens appear to be from the later portion of the Late Paleo-Indian period, since they are near the lowest Early Archaic level A18. An Angostura point at site 41FB42 (Patterson et al. 1993b:Figure 6A) was also from the later part of the Late Paleo-Indian period, perhaps between 8000 and 7000 years B.P. Prewitt (1981:77) places the Angostura point in a time range of 8500 to 7000 B.P. in Central Texas. Two Early Notched point stem fragments were found in levels B1 and B3 (Figure 3F,G). These stem fragments are not complete enough to indicate whether the specimens were side notched or corner notched. Two Early Stemmed points were found in level B1 (Figure 3A,B). The Early Stemmed specimen shown in 3B may have a reworked blade, because the blade area is small.

Level A18 is the earliest Early Archaic period (7000-5000 B.P.) level, and at this excavation depth Early Stemmed points become predominant, in the same manner that Early Stemmed points become predominant at site 41WH19 (Patterson et al. 1987:Figure 7) during the Early Archaic. Fagan (1991:310) has noted a progression from notched to stemmed point types throughout the Southeast Woodlands. Early Stemmed points started in the Late Paleo-Indian period as a minor type, and became predominant in the Early Archaic period. All point specimens from Late Paleo-Indian and Early Archaic periods at site 41FB223 have ground stem edges. As at site 41WH19 (Patterson et al. 1987), the practice of grinding stem edges at site 41FB223 apparently stopped in the Middle Archaic period.

No Angostura points and only one Early Notched point (Figure 3E) was found above excavation level B1. Six Early Stemmed points were found in level A18, and one in level A16. As at site 41WH19 (Patterson et al. 1987:Figure 7), Early Stemmed points at site 41FB223 do not have uniform morphologies. Two other stemmed point specimens from the Early Archaic levels can be compared to standardized types. One specimen (Figure 2D) has a Carrollton-like shape, and another specimen (Figure 3C) is a contracting stem that is probably from a Wells point. At site 41FB37 (Patterson 1988), a Carrollton point is placed in the Early Archaic period with a radiocarbon date of 6490 +/-120 years B.P. (I-15,333), and a Wells point was found at a slightly higher stratigraphic position. Because

Early Stemmed points of the Late Paleo-Indian and Early Archaic periods are not standardized, this point type is probably overlooked in many collections as representing these early time periods. In summary, a total of 9 stemmed point specimens were found in excavation levels A18 to A16 that would place this excavation interval in the Early Archaic period.

At site 41FB223, equivalent levels above A16 appear to represent the Middle Archaic (5000-3500 B.P.) and Late Archaic (3500-1900 B.P.) periods. There are not enough data to determine the stratigraphic breakpoint between the Middle and Late Archaic periods, but projectile point types indicate that both time periods are represented. The Bulverde point type is from the Middle Archaic period in Central Texas (Turner and Hester 1993:82) and also in Southeast Texas (Patterson et al. 1993b). A possible Bulverde point stem found in a shovel test was between levels A10 and A15. A complete Bulverde point was found by a farm worker in a pit dug by children at this site.

As noted above, a Pedernales point was found in Pit Q at level A18, but this point probably was displaced from a higher level. In Southeast Texas, the Pedernales point occurs in both the Middle and Late Archaic periods (Patterson 1991b). A Pedernales point stem was found in Pit V at Level A7, and this specimen is probably from the Late Archaic.

At this site, Gary and Kent points represent the Middle and/or Late Archaic time periods. One Kent point made of petrified wood was found at level A11 (Figure 4D), and another Kent point (Figure 4C) was found on the site surface. A Gary point (Figure 4C) was found in level A13. A Morhiss point which represents the Late Archaic period (Turner and Hester 1993:158) was found in unscreened dirt taken from levels A7 to A10 in Pit A. Two fragments of stemmed points (Figure 5A,B) from levels A13 and A14 might be from Gary points.

Two unifacial arrow points (marginally retouched flakes) were found at levels A14 and A15 (Figure 4G,H). This is a further demonstration of early use of the bow and arrow in Southeast Texas, before the use of standardized bifacial arrow point types in the Late Prehistoric period (Patterson 1982,1992). It should be emphasized that use of a 10-power magnifier is generally necessary to identify unifacial arrow points, to distinguish purposeful edge retouch from fortuitously pointed flakes. It is easy to overlook unifacial arrow points in lithic flake collections. Unifacial arrow points in Southeast Texas made as marginally retouched flakes are similar to arrow points used throughout Eurasia in the Mesolithic period, such as illustrated by Clark (1977:112).

A Late Prehistoric Perdiz bifacial arrow point (Figure 4I) was found on the surface of site 41FB223. It is the only indication of any site use after the Late Archaic until modern times. This is similar to sites 41FB95 and 41FB198 at nearby Pool Hill (Patterson and Hudgins 1987,1991), where a few arrow points are the only indication of any site use after the Late Archaic period. The Perdiz point started in Southeast Texas at about A.D. 600 (Patterson 1991a), and somewhat later in Central Texas (Turner and Hester 1993:227).

The total number of projectile points found at this site is not large relative to the amount of excavation work done. Perhaps the density of projectile points should not be expected to be high because of the large site area. Most prehistoric sites in Southeast Texas have a much smaller area than site 41FB223.

The types of projectile points found at site 41FB223 are typical of sites in the western part of Southeast Texas. There is a mixture of types from traditions of the Southern Plains (Central Texas) and the Southeast Woodlands (Patterson 1983). In the Paleo-Indian

period, Angostura represents the Southern Plains tradition at this site, and Early Notched represents the Southeast Woodlands tradition. In the Archaic period, Early Stemmed, Gary, Kent, Carrollton, and Wells are generally related to point styles of the Southeast Woodlands, while Bulverde and Pedernales are related to Central Texas traditions. It should be noted that complete time ranges for each dart point type are not well-defined in Southeast Texas, but point types can be placed in broad time periods as used in this report (Patterson 1991b).

GENERAL LITHICS

At site 41WH19 (Patterson et al. 1987), formal types of heavy stone tools were found in the Paleo-Indian period, but not later. Four heavy stone tools of Paleo-Indian types were found at site 41FB223. A thick bifacial scraping tool (Figure 6D), made from a chert cobble, was found in Pit N at level B2. Edge wear on the working end is of the unifacial type that is characteristic of the scraping function (Tringham et al. 1974). A large thick scraper (Figure 6A) and a combination scraper-graver (Figure 6C) were found on the site surface near the silo. A large bifacial knife was found in Pit S at level A18, at the interface of the Paleo-Indian and Early Archaic levels. Other stone tools found in the Late Paleo-Indian period include a small, thick scraper (Figure 6E) from Pit U at level B1, and a notched tool on a biface fragment (Figure 7D) also from Pit U at level B1.

The utilized flake was the dominant stone tool type in Southeast Texas, especially after the Late Paleo-Indian period. Utilized flakes were often casually selected from biface thinning debitage, which was usually available at campsites from the manufacture of dart points. As would be expected, only a few formal unifacial tools were found at site 41FB223 from the Archaic period. As shown in Table 5, these formal types of unifacial stone tools include 1 perforator, 2 notched tools, 1 nosed tool, 4 gravers, and 3 scrapers. A few utilized flakes had a unifacial edge wear pattern of the scraping use type, including one each from Pit O (A13), Pit R (A16), and Pit S (A16).

There is much evidence of lithic manufacturing at this site, including chert flakes (Tables 10,11), dart point preforms (Table 5), quartzite hammerstones (Table 6), a few chert cores (Table 7), and a few thick chert pieces (Table 9). As shown in Table 5, 26 dart point preforms and preform fragments were found, and are a primary indication of dart point manufacturing activity at this site.

The main lithic raw material used here was chert, which is found as cobbles in alluvial deposits of the Colorado and Brazos River basins. Most primary reduction of chert cobbles to produce flake blanks for dart point manufacture was probably done at a lithic source. Dart points were then made at the campsite. Primary reduction of chert cobbles at the source allows materials to be tested, and reduces transportation volume and weight. As shown in Table 7, 27 chert cores were found at this site, but this is a small number compared to the 8451 lithic flakes recovered. A large proportion of the flakes found at this site are probably from the reduction of flake blanks rather than from the reduction of chunky cores.

It is likely that flake blanks used to manufacture large dart points came from Colorado River sources, and flake blanks for smaller dart points came from nearer Brazos River sources. Chert cobbles up to 150 mm in length are easy to obtain at Colorado River sources, but chert cobbles at Lower Brazos River sources are seldom over 60 mm in length. Weber (1991) has demonstrated experimentally that it is also practical to produce dart points by the reduction of fairly flat (thin) chert cobbles. This strategy would have been best for use of local Brazos River chert cobbles, where transport distance was not a problem. Projectile points shown in Figures 2A,D,E,G and 4C would seem to be too long

to have been made from cherts of the Brazos River. It should be noted that manufacture of a bifacial dart point is a reduction process, and that flake blanks must be somewhat longer than the finished dart point.

As shown in Table 8, there were 16 chert cobbles found, with 15 having diameters of 50 mm or less. It seems likely that these cobbles were brought from nearby Brazos River sources, to be used for miscellaneous lithic manufacturing rather than for the production of dart points. Most of the cobbles are subspherical in shape, and would be difficult to use for the production of flake blanks of sufficient size for dart point manufacture. This is consistent with the forms of chert cores found here that were made on chert cobbles (Table 7). None of the cores had flake scars that were long enough to indicate manufacture of flake blanks for dart point production. The small number of thick chert pieces (Table 9) is another indication that not much primary reduction of chert cobbles was done at this site.

All dart points from site 41FB223 are made of chert, except for a Kent point (Figure 4D) made of petrified wood. A Brazos River source is likely for the petrified wood.

Another indication that not much primary reduction of chert cobbles was being done at this site is the low percentage of flakes with remaining cortex. For flakes over 15 mm square in size, there were 4.6% primary flakes (covered with cortex), 18.8% secondary flakes (partially covered with cortex), and 76.6% interior flakes (no remaining cortex). Thus, there were 23.4% of flakes with any remaining cortex. This percentage of flakes with remaining cortex is much lower than the 53.6% of flakes with remaining cortex obtained experimentally for primary reduction of chert cobbles (Patterson 1981:32), and is even lower than the 40% of flakes with remaining cortex obtained experimentally for experimental reduction of flake blanks made from chert cobbles.

As shown in Table 6, a total of 61 quartzite hammerstones were found at various excavation levels, with diameters of 30 to 70 mm. It is likely that antler billets were also used for percussion flaking, especially for bifacial thinning, but only one small antler tine has been preserved at this site.

Heat treatment of chert was used extensively for materials at site 41FB223, judged by waxy luster, reddish coloration, and small potlid surface scars found on many flakes. Heat treatment of chert lowers the tensile strength and makes chert easier to flake, and permits longer flakes to be removed for bifacial thinning (Purdy and Brooks 1971;Patterson 1981b).

Lithic flake counts by pit are shown in Table 10, and lithic flake counts by excavation level are given in Table 11. Flakes above level A7 are all small size and are likely to be there due to gopher activity.

Flake size distributions for levels A8 to B2 are shown in Table 12, for the levels where significant numbers of flakes occurred. The main section of a flake size distribution curve tends to be a straight line for bifacial reduction, when percent of flakes is plotted with a logarithmic axis versus flake size with a linear axis (Patterson 1990a). As shown in Table 13, only equivalent levels A8 and A14 had linear curve shapes with this type of plot, while the other levels had roughly linear or slightly curved plots. Examples of flake size distributions for levels A14 and B2 are shown in Figures 8 and 9, respectively, for linear and roughly linear curve shapes. The lack of complete linearity for semi-log flake size distribution curves for most excavation levels is best explained by indications that flaking of small cobbles to obtain flakes for tools was being done at this site as well as bifacial reduction of flake blanks to produce dart points. Also, perhaps a few small dart points

were made from flat cobbles instead of flake blanks, which would involve some primary reduction before bifacial reduction.

Flake size distribution by excavation level is shown in Figure 10. There is a trend toward higher percentages of small size flakes in later time. This same trend occurred at sites 41WH19 (Patterson et al. 1987:Figure 20) and 41HR315 (Patterson 1980:Figure 19). This trend in flake size distribution is consistent with a trend toward smaller size dart points in later time, with corresponding use of smaller flake blanks.

Many small quartzite and chert pebbles, with diameters under 15 mm, were recovered at all excavation levels. Small pebbles may occur naturally in Brazos River Valley sands.

FIRED CLAYBALLS

A total of 28,842 fired clayballs were recovered from excavation at 41FB223. Counts of clayballs by excavation pit are given in Table 14, and counts of clayballs by equivalent level are given in Table 15. No clayballs were found above equivalent level A6. As observed at sites 41WH19 (Patterson et al. 1987) and 41FB42 (Patterson et al. 1993b), clayballs were used at site 41FB223 from the Late Paleo-Indian through the Late Archaic periods, and even later at sites 41WH19 and 41FB42. The total number of clayballs at site 41FB223 is the largest number found so far at any site in inland Southeast Texas (Patterson 1989). The unexcavated portion of site 41FB223 may contain several hundred thousand clayballs.

The specific uses of clayballs at sites in Southeast Texas are not well-defined. Clayballs were probably used for cooking and perhaps sometimes for heat treatment of chert. Hudgins (1993) has demonstrated experimentally that clayballs can be used to roast meat. Clayballs retain heat longer than hot wood coals. Clayballs were not a preferred method of cooking meat or heat treatment of chert, however, because only about 13% of prehistoric sites of inland Southeast Texas have clayballs (Patterson 1989). It has been proposed (Patterson 1989) that clayballs may have been used seasonally to roast plant food materials at locations near appropriate plant harvest areas.

It is typical in Southeast Texas, that for sites with many clayballs, there will be nearby sites with few or no clayballs. For example, site 41FB95 (Patterson and Hudgins 1987) has clayballs, but adjacent site 41FB3 (Patterson et al. 1993a) does not have clayballs. Counting recent data from sites 41WH73 and 41FB223, there are only 16 published sites of inland Southeast Texas where over 100 clayballs were found, and only 6 sites in this region with over 1000 clayballs. Apparently, only a few locations had access to sufficient food resources that would justify the large-scale use of clayballs. At sites such as 41FB223, where large numbers of clayballs were made for apparently specialized food processing, clayballs may have been used for more general cooking purposes, since clayballs were already available.

MISCELLANEOUS ARTIFACTS

A bone pendant (Figure 7E) with an incised groove was found in Pit E at level A14. It is similar to a specimen from site 41HR315 (Patterson 1980:Figure 11J). Specimens from 41FB223 and 41HR315 both appear to be from the Late Archaic period. The tip of a deer antler tine was found in Pit H at level A14, which may have been used as a pressure flaking tool.

In analysis of the vertebrate remains, two bones that had been modified were found. One of these is from an unidentified bone. It is 21 mm long, oval at the broken end which is 4.2 mm wide, and tapers to 3.0 mm at a rounded end. All edges are smoothed. It was from level A6 in Pit K at 20-30 cm. The other item is a 38 mm long fragment of a deer humerus that is irregular in shape with all edges rounded and smoothed, recovered in Pit J at the 90 to 100 cm level. These items are not illustrated.

Pieces of asphalt were found in several pits at several excavation levels, as shown in Table 16. Asphalt was probably used to haft projectile points throughout the occupation sequence at this site.

Two pieces of red ochre were found in each of two excavation levels in Pit T, at level A17 and Level B2.

HUMAN REMAINS

Several human bones were found in two of the westernmost pits. Skull fragments were found in Pit K at a depth of 165 cm (excavation level B2), and a partial diaphysis (shaft) of a humerus was discovered about 1.5 m away at the same depth in the north wall of Pit T (see Figures 1A and 1B). Both skull fragments and humerus are of adults.

Fragmentation of the skull is a usual trait of burials in this region, being due to collapse from the weight of the overlying soil. Here, most fragments were found "articulated", as is usual for more complete burials. The fragments comprise about 20% of a complete skull. They are from the upper and rear parts of the skull (frontal, parietal, and occipital bones), with no identifiable fragments from the facial area (brow ridges, eye orbits, zygomatic bones, maxilla, etc.) and none of the thick bone from the temporal regions (mastoid process, petrous portion). Also, no human teeth were found, nor any human bone fragments other than skull and the isolated humerus.

The skeletal parts used to determine sex are absent. Size and thickness of bone can be sexual indicators, but there is much overlap in this regard between the sexes for burials in this region. There is nothing unusual about the size or thickness of the bone at this site.

The bones are in a good state of preservation, especially the skull fragments. They are stained a light brown color from being in the soil, but the staining is somewhat lighter than that of most burials from this region. With the sandy nature of the soil, the underlying clay, and the topography (hill), a high rate of ground water flow, and thus poor bone preservation, would be expected. This seems to be confirmed by the scarcity of unburned faunal material at the site (see section on faunal analysis). So the good preservation of the human remains and their light staining would indicate that the burial is quite late, say Late Prehistoric or even Historic. In fact, it can not be ruled out that the remains are non-Indian, because of lack of proper diagnostic portions of the skeleton, such as teeth.

The good state of preservation of the bones also rules out differential preservation as a reason for the lack of the other bones. Animal burrowing or even large scale soil erosion and (re)deposition also seem unlikely causes. It thus appears that either (1) several larger pieces of skull and a humerus fragment from a burial were somehow redeposited here, and the skull pieces subsequently fractured, or (2) a burial here was considerably disturbed, probably in modern times, with only a small portion of the skull still in its original location.

No evidence of disease, unusual dietary conditions, or trauma was noted in the bone. No artifacts were found with the remains. The only red ochre pieces found at the site came from levels A17 and B2 of Pit T. They may have been associated with this burial; red ochre is often found with burials in this region.

FAUNAL ANALYSIS

The faunal remains that were retained on the 1/4-inch mesh screens were compared to bones of known animals. Identification was carried to the extent possible by the condition of the bones. Nearly all were fragmented to a great extent. Except for a few apparently recent intrusive elements, all appear to have been exposed to fire or heat. Color varies from white through browns to black with a few being bluish. Only 1550 bones and fragments were recovered from the 22 pits. It is probable that all unburned bones that may have been in the soil were decomposed by soil actions.

About 24% of the bones could be relegated to some taxonomic status. Of this fraction, 49% are of turtles, 37% are of mammals, 10% are of fish, 2% are of snakes, and 2% are of birds.

The paucity of faunal remains from this site presented a challenge to get the maximum data retrieval possible with minimum of identifiable remains. The fish bones were of particular interest since vertebrae of some taxa are not easily identified. Some of these bones are unidentifiable fragments and some are parts of bones that could be from any of several species of fish. Fragments of a dorsal spine and a pectoral spine are of some species of catfish. A dentary is of a largemouth bass. Vertebrae of gars include some with centrum diameters of 5 to 10 mm and one of 22 mm. These are probably from at least 4 individual gars.

The assemblage includes a few Teleost fish vertebrae that have diameters of centra of 6 to 9 mm and these were selected for more effort to try to identify them. References were checked to determine the varieties of fish that may have been present at the time of the deposits. Since there has not been a significant environmental change in the interim, it is probable that the current list of native species from the area would be a good indication of the available fish at the time of prehistoric occupation.

Fort Bend County is in the approximate center of Area 2 (coastal prairie) in Hubbs (1982) tabulation of Texas fish. This shows that 53 species of 33 genera of 15 families of native fish could possibly be available in the waters near the site.

Direct comparison is the desired method of identifying bones. In the comparative bone collections of McClure and the Houston Archeological Society, all but two of the families are represented. The missing families are Belonidae which includes the Atlantic needlefish and Percidae which includes a logperch and three species of darters. The needlefish ascends the river to spawn but can be eliminated from consideration due to its elongated body which would not have vertebrae shaped like those that were recovered. The Percidae species can be eliminated since the species in this area are never longer than 15 cm and would not have vertebrae as large as 6 mm.

The Lepisosteidae, Amiidae, Anguilidae, Clupeidae, Catostomidae, and Mugilidae were compared to those that were being examined and were eliminated from consideration due to their significantly different morphology. Vertebrae of available specimens of Cyprinidae, Cyprinodontidae, Poeciliidae, and Antherinidae were measured and diameters were extrapolated for the maximum lengths indicated by McClane (1965), Eddy and Underhill (1978), and Hoese and Moore (1977). Based on this effort, these four families can be eliminated because of their small sizes. Thus, there are only three families of fish that need to be examined closely to resolve the uncertainty.

Within the area of the site there are six species of the Ictaluridae, 11 species of Centrarchidae, and one of Sciaenidae to be considered. The tadpole madtom is eliminated since it is too small. The species of Centrarchidae were measured and extrapolated as indicated above. Five species of sunfish are thus eliminated.

The remaining candidates are channel catfish, blue catfish, black bullhead, yellow bullhead, flathead catfish, spotted bass, largemouth bass, white crappie, black crappie, and freshwater drum. Some of the larger sunfish may get large enough to be considered for the smallest of the recovered vertebrae.

The lengths of centra of the freshwater drum are longer than the diameter at the anterior face while in catfish and sunfish families this is not so. The posterior concavity of the centrum of the drum is relatively deeper than that in the other two families. Some of the vertebrae could be assigned to genera based on the above and some could be further assigned to species based on minute differences in morphology of the similar bones. Of course it is possible that smoked or dried fish were carried from the coast which is about 130 kilometers away from the site. In that event there would be a whole new set of species to consider.

The bones that were recovered during processing the samples from Pit H through finer-mesh screens were identified in the same manner as the larger material except that a binocular microscope was needed. In addition, the unidentified material was not counted. The bones in the samples had all been burned and most are from small fish and small mammals. Breakage is in all possible manner. Edges of most breaks are somewhat rounded. Nearly 200 bones were added to the identifiable list.

This smaller material included numerous fish vertebrae and fish teeth. The vertebrae were as small as 0.45 mm and were not identified except for the gars. Some of the teeth were shorter than 1 mm. The teeth of gars and drums were easily identified. Other teeth were either of the catfish or sunfish (includes bass) families. The differences between teeth in these families are rather subtle and may not be consistent throughout the species.

The effort spent on the smaller bones yielded additional species of fish and rodents as well as a lizard.

Following is a tabulation of vertebrates from the site:

Genera unknown	Teleost fish
Lepsisosteus sp.	gar
Aplodinotus grunniens	freshwater drum
Micropterus salmoides	largemouth bass
Ictalurus sp.	catfish
Genera unknown	turtles
Kinosternon sp.	mud turtle
Chrysemys sp.	slider turtle
Terrapene sp.	box turtle
Trionyx sp.	softshell turtle
Anolis carolinensis	green anole
Genera unknown	snakes
Elaphe sp.	rat snake
Genera unknown	Colubrid snake
Genera unknown	Viperid snake
Genera unknown	birds

cf. *Anas*	probable mallard
Meleagris gallopavo	turkey
Genera unknown	small mammal
Genera unknown	medium mammal
Dasypus novemcinctus	armadillo
Scalopus aquaticus	eastern mole
Sylvilagus sp.	rabbit
Genera unknown	small rodent
Geomys breviceps	Louisiana pocket gopher
Baiomys taylori	pigmy mouse
Bison bison	bison
Bos or *Bison*	large bovid
Odocoileus virginianus	white-tailed deer

Discussion

The small amount of bone that was recovered from the large amount of excavated material only gives a minute hint at the diet of the occupants. A few bones exhibit evidence of exposure to the elements and/or gnawing by rodents and carnivores before being covered with soil. This would indicate periods of time when the site was not occupied by humans. The armadillo and the pocket gopher are obvious recent intrusions, although burned gopher bones are from lower levels.

The total absence of snail shells in the deposits is unexpected but may be due to the acidic soils removing them rather than that they were not present in the environment. A single fragment of clam shell was recovered. Whether this represents food or artifact is uncertain.

The evidence shows that the people were using fish (both small and large), turtles, snakes, birds, and mammals (both small and large) as resources. All of the animals would be expected in the area today. This includes the bison which is now in a few Fort Bend County ranches.

CONCLUSIONS

Site 41FB223 is a large stratified site located on the eastern edge of the Brazos River floodplain. There is an occupation sequence from the Late Paleo-Indian through the Late Archaic periods, covering a time interval from approximately 8000 to 2000 years B.P. No ceramics were found to indicate later occupation in the Early Ceramic period (A.D. 100-600), but there is a trace of Late Prehistoric site use (A.D. 600-1500) in the form of a single Perdiz arrow point. The sequence of dart point types at this site is similar to other sites in Southeast Texas, such as 41WH19 (Patterson et al. 1987). Early Notched and lanceolate (Angostura at 41FB223) point types of the Late Paleo-Indian period are succeeded by a variety of Early Stemmed point forms, in the Early Archaic period after about 7000 B.P. Data from site 41FB223 are especially important because only a few sites found so far in Southeast Texas have stratified sequences for the Late Paleo-Indian and Early Archaic time periods.

Judged by the large site area and the large numbers of clayballs and chert flakes found at various excavation levels in each pit, this site had a high frequency of use, perhaps by large groups. It has been proposed (Patterson 1989) that fired clayballs were used to process plant foods on a seasonal basis. Site occupation was probably on a seasonal basis, with most site use in warmer months during plant harvest periods. This site does not have preservation of floral materials to enable more detail to be developed on plant processing.

Faunal remains indicate that a variety of animals were utilized, such as deer, turtle, bison, and fish. Bison were possibly not present on a continuous basis in Southeast Texas, and not as large herds (Patterson 1992). Deer and turtle are the most common faunal remains found at sites in Southeast Texas (Patterson 1990b:Table 10).

The good state of preservation of a few human bones that were found at a deep excavation level in Pits K and T is not consistent with poor preservation of unburnt animal bones at this site. The human bones perhaps represent an intrusive event, later than the general site occupation sequence of the Late Paleo-Indian and Archaic time periods.

The occupation sequence at site 41FB223 is similar to sites at nearby Pool Hill, about 5 miles from 41FB223, on the same side of the Brazos River floodplain. Sites 41FB95 (Patterson and Hudgins 1987) and 41FB198 (Patterson and Hudgins 1991) on Pool Hill both have occupation sequences from the Late Paleo-Indian through the Late Archaic periods, with no ceramics, and only a few arrow points to indicate any later site use. Termination of the occupation sequence at these locations at the end of the Late Archaic may be due to nearby water sources no longer being available. At site 41FB223, there is indication of a depression that may have been a nearby stream that became inactive. It may be that drier conditions at the end of the Late Archaic period caused a shift to site locations closer to available water. As a general rule, most prehistoric sites in Southeast Texas are located within 300 feet of a water source.

Much lithic manufacturing activity took place at site 41FB223, indicated by the large quantities of chert flakes, and quartzite hammerstones. As at other sites in Southeast Texas, few specimens of formal types of unifacial stone tools were found at 41FB223 during the Archaic period. The utilized flake was the dominant tool form. Lithic procurement at this site appears to have involved chert sources of both the Brazos and Colorado Rivers.

Data from sites 41FB223 and 41FB42 (Patterson et al. 1993b) place the Angostura point in the later part of the Late Paleo-Indian period. Prior to excavations at these two sites, the

Angostura point type was placed only generally in the Late Paleo-Indian period in Southeast Texas, based on data from other regions of Texas.

In summary, excavations at site 41FB223 have produced data for a major stratified site in the western part of Southeast Texas, for the Late Paleo-Indian and Archaic time periods. Results of excavations at this site generally support previous conclusions on the cultural sequence of this region.

REFERENCES CITED

Clark, G.
1977 World Prehistory in New Perspective. Cambridge University Press

Eddy, S., and J.C. Underhill
1957 How to Know the Freshwater Fishes. Wm. C. Brown Publishers

Fagan, B.M.
1991 Ancient North America. Thames and Hudson

Geological Society of America
1963 Rock-Color Chart

Hall, G.D.
1981 Allens Creek: A Study in the Cultural Prehistory of the Lower Brazos River Valley, Texas. Texas Archeological Survey, Research Report No. 61

Hoese, H.D., and R.H. Moore
1977 Fishes of the Gulf of Mexico. Texas A&M University Press

Hubbs, C.
1982 Checklist of Texas Freshwater Fishes. Texas Parks and Wildlife Dept.

Hudgins, J.D.
1993 Cooking with Clay Balls. The Cache 1:47-52

McClane, A.J.
1965 McClane's Field Guide to Freshwater Fishes of North America. Holt, Rinehart and Winston

McClure, W.L.
1987 Bones from Site 41FB95. Houston Archeological Society Journal 89:19-20

Patterson, L.W.
1980 The Owen Site, 41HR315: A Long Occupation Sequence in Harris County, Texas. Houston Archeological Society, Report No. 3

1981a A Chert Cobble Flaking Experiment. La Tierra 8(4):29-34

1981b Fracture Force Changes from Heat Treating and Edge Grinding. Flintknapper's Exchange 4(3):6-9

1982 Initial Development of the Bow and Arrow in the Southern United States. La Tierra 9(2):18-26

1983 Prehistoric Settlement and Technological Patterns in Southeast Texas. Bulletin of the Texas Archeological Society 54:253-269

1988 Radiocarbon Dates from 41FB37, Fort Bend Co., Texas. Houston Archeological Society Journal 91:20-21

1989 Additional Comments on Fired Clayballs. Houston Archeological Society Journal 94:24-26

1990a Characteristics of Bifacial Reduction Flake Size Distribution. American Antiquity 55(3):550-558

1990b The Archeology of Inland Southeast Texas: A Quantitative Study. Bulletin of the Texas Archeological Society 61:255-280

1991a Arrow Point Chronologies in Southeast Texas. Houston Archeological Society Journal 101:6-11

1991b Dart Point Chronologies in Southeast Texas. Houston Archeological Society Journal 101:1-5

1992a Current Data on Early Use of the Bow and Arrow in Southern North America. La Tierra 19(4):6-15

1992b Prehistoric Bison in Southeast Texas. Houston Archeological Society Journal 102:14-19

Patterson, L.W., W.M. Black, W.L. McClure, R. Storey, and S. Patrick
1993a Excavations at the Bowser Site, 41FB3, Fort Bend County, Texas. Houston Archeological Society, Report No. 9

Patterson, L. W., and J.D. Hudgins
1987 The Konvicka Collection (41FB95), Fort Bend Co., Texas. Houston Archeological Society Journal 89:11-18

1991 The George S. Rhemann Collection, 41FB198, Fort Bend Co., Texas. Houston Archeological Society Journal 99:25-29

Patterson, L.W., J.D. Hudgins, R.L. Gregg, and W.L. McClure
1987 Excavations at Site 41WH19, Wharton County, Texas. Houston Archeological Society, Report No. 4

Patterson, L.W., J.D. Hudgins, R.L. Gregg, S.M. Kindall, W.L. McClure, and R.W. Neck
1993b Excavations at the Ferguson Site, 41FB42, Fort Bend County, Texas. Houston Archeological Society, Report No. 10

Prewitt, E.R.
1981 Cultural Chronology in Central Texas. Bulletin of the Texas Archeological Society 52:65-89

Purdy, B.A., and H.K. Brooks
1971 Thermal Alteration of Silica Minerals. Science 173:322-325

Story, D.A.
1990 Cultural History of the Native Americans. In D.A. Story et al., The Archeology and Bioarcheology of the Gulf Coastal Plain, pp. 163-366, Arkansas Archeological Survey, Research Series No. 38

Thoms, A.V.
1993 The Brazos Valley Slopes Archeological Project. Reports of Investigations No. 14, Archaeological Research Laboratory, Texas A&M University

Tringham, R., G. Cooper, G. Odell, B. Voytek, and A. Whitman
1974 Experimentation in the Formation of Edge Damage: A New Approach to Lithic Analysis. Journal of Field Archaeology 1:171-196

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

APPENDIX 1 Fine Screen Recovery, Pit H

Pit H
depth in cm

0 to 5 440 grams
roots+; seeds; bone; arthropod

5 to 10 465 grams
roots+; clear bottle glass; arthropod

10 to 15 590 grams
roots+; seeds; charcoal; ferrous metal object; clear bottle glass; bone; arthropod

15 to 20 900 grams
roots+; seeds; charcoal; ferrous metal objects; 2 pebbles; chert chips; bone; arthropod

20 to 25 690 grams
roots+; seeds; charcoal; ferrous metal objects; clear bottle glass; chert chips; bone; burned dirt; arthropod

25 to 30 880 grams
roots+; seeds; charcoal; ferrous metal object; chert chips; bone; arthropod

30 to 35 900 grams
tiny charcoal flecks; roots+; seeds; clear bottle glass; chert chip; bone; burned dirt; arthropods

35 to 40 950 grams
roots+; charcoal; seeds; durned dirt; bone; small rust flakes; mica flake; tiny fish vert.; arthropod

40 to 45 520 grams
roots+; seeds; bone; arthropod; drum tooth; fish vert frag

45 to 50 1075 grams
roots+; chert chips; seeds; burned dirt; bone; arthropod; fish vert frag; small mammal vert frag

50 to 55 1040 grams
roots+; seeds; charcoal; burned dirt; bone; fish vert (D=1.6 mm); arthropod; gar tooth; fish pelvic spine; anole (maxilla w/teeth + prox end of femur)

55 to 60 1000 grams
roots+; seeds; chert chips; bone; burned dirt; arthropod; drum tooth; 3 fish teeth; 6 gar teeth and scale frag; fish vert frag; rodent incisor frag & cheek tooth frag

60 to 65 1175 grams
roots+; seed; chert chips; burned dirt; bone; arthropod; gar tooth; fish pterygiophore

65 to 70 1160 grams
roots+; seeds; chert chips; burned dirt; bone; arthropod

70 to 75 1000 grams
roots+; charcoal; seeds; bone; burned dirt; arthropod; gar head frag; fish vert (D=0.6 mm)

75 to 80 1040 grams
roots+; seeds; burned dirt; bone; arthropod; gar frag; fish vert (D=1.5 mm)

80 to 85 975 grams
roots+; seeds; burned dirt; bone; gar scale frags; fish spine; fish vert (D=3.2 mm); terminal phalanx of small mammal (unburned)

85 to 90 1020 grams
roots+; burned clay; burned dirt; seeds; bone; arthropod; gar tooth; fish vert (D=1.6 mm)

90 to 95 1035 grams
small gar scale frag; gar tooth (D=1.6 mm); roots+; chert chip; seeds; burned clay lump (35X29X26 mm); arthropod

95 to 100 970 grams
roots+; seeds; burned dirt; bone; flake of gypsum; gar scale frag; 4 gar teeth

100 to 105 995 grams
Teleost vert (D=0.5 mm); fish tooth; unk snake vert (L=2.4 mm); hematite pebble; roots+; hackberry seed; chert chip; bone; burned dirt; burned clay; arthropod

105 to 110 1125 grams
roots+; burned clay; burned dirt; bone; seeds; asphalt?; 2 gar scale frags; gar tooth; 2 fish vert frags; snake vert frag

110 to 115 1150 grams
roots+; seeds; burned dirt; bone; arthropod; gar scale & tooth; fish vert (D=1.7 mm), spine, & pterygiophore; drum tooth; phalanx #2 of small mammal

115 to 120 1200 grams
roots; seeds; chert chip; burned dirt; bone

120 to 125 1220 grams
pebble; roots+; seeds; burned clay; burned dirt; bone; chert chips; 3 gar teeth & scales; 2 fish teeth & 4 vert (D=0.6, 0.8, 2.3 & 8.1 mm); catfish pectoral spine frag; snake vert; phalanx of small mammal

125 to 130 1300 grams
roots+; seeds; asphalt?; chert chip; burned dirt; bone; unk snake vert; 5 tiny gar teeth; gar scale frag; 3 small drum teeth

130 to 135 1175 grams
roots; seeds; hackberry seeds; burned dirt; bone; chert chips; fish vert (D=0.55 mm); arthropod; 4 drum teeth; 3 fish teeth; 3 gar teeth; snake tooth; mouse phalanges # 1 & #3

135 to 140 1150 grams
roots+; seeds; hackberry seed; chert chips; burned clay; burned dirt; asphalt?; arthropod; 2 Teleost fish verts (D= 0.9 & 1.1 mm); 2 drum teeth; gar tooth & scale frag

140 to 145 1350 grams
one burned clay lump (50X50X45 mm @ 85 grams); smaller burned clay lumps; chert chips; bone; roots+; seeds; hackberry seed; charcoal; 2 catfish/sunfish teeth; gar vert & scale; 6 gar teeth; fish vert (D=1.5 mm); arthropod

145 to 150
roots; seeds; burned clay; chert chips; sandstone chunk; bone; burned dirt; gar scale frag; 3 gar teeth; 3 fish vert (D=0.8, 1.8, 2.5 mm); fish ribs & scales; pigmy mouse lt. upper M-1 (worn)

150 to 155 1240 grams
roots+; seeds; chert chip; burned clay; burned dirt; bone; arthropod; 5 gar teeth; 2 gar scale frags; fish vert & dentary frag

155 to 160 1235 grams
roots+; chert chips; burned dirt; bone; fish tooth & vert; arthropod

160 to 165 1225 grams
roots+; seeds; chert chip; burned dirt; burned clay (24X2X22 mm); bone; gar scale & 2 teeth; 2 fish teeth & vert frag; drum tooth

165 to 170 1240 grams
roots+; chert chip; seeds; burned clay (30X18X20 mm); burned dirt; bone; arthropod; asphalt?; fish vert frag + 4 teeth; fish vert (D=0.45 mm); gar tooth

170 to 175 1200 grams
roots+; seeds; burned clay; burned dirt; asphalt?; bone; arthropod; anole lizard caudal vert; gar tooth; fish vert frag

175 to 180 1220 grams
roots+; seeds; burned dirt; bone; drum tooth; gar scale frag + 3 teeth; 3 fish vert frags

180 to 185 1275 grams
roots+; seed; bone; burned dirt; gar scale & tooth; fish vert (D=1.8 mm)

185 to 190 950 grams
roots+; hematite pebble; bone; burned dirt; arthropod; gar scale frag; fish vert (D=1.4 mm)

190 to 195 1230 grams
roots+; burned clay; burned dirt; bone; gar tooth; fish vert frag

195 to 200 570 grams
roots+; seeds; burned clay; burned dirt; bone; arthropod; fish vert frag

200 to 205 1070 grams
roots+; seed; burned clay; burned dirt; catfish/sunfish tooth (L= 1.3 mm)

205 to 210 1200 grams
roots+; seeds; burned dirt; bone; clam shell frag; asphalt?; gar tooth & scale frag

210 to 215
roots; chert chip; burned dirt; bone; roots+; fish spines; gar tooth

215 to 220 825 grams
roots; seeds; burned dirt; bone; gar vert & scale; arthropod; gar vert; ? bass dentary frag

220 to 225 1050 grams
roots+; seed; bone; burned dirt; arthropod

225 to 230
roots+; seeds; chert chips; bone; burned dirt; fish vert frag

230 to 235 825 grams
roots+; bone; gar tooth

235 to 240 650 grams
roots+; burned dirt; bone

PIT K (around skull of burial)
@ 165 cm
drum tooth; 2 fish vert frags; mouse phalanx #1

APPENDIX 2 Faunal Material from Coarse Screens

A-4
tiny fish vert

A-5
small mammal vert frag; drum tooth; fish vert frags

A-6
armadillo scute; modified bone frag (21 mm long, oval end at break is 4.2 mm, tapers to 3.0 mm at rounded end, all smoothed); rodent (incisor & cheek tooth frags); 2 turtle frags; anole (maxilla w/teeth + prox end of femur); fish vert (D=1.6 mm + frag); drum tooth; 3 fish teeth; fish pelvic spine; 7 gar teeth; gar scale frags; 4 frags

A-7
bison? frag of distal end of femur (heavily gnawed); 5 turtle frags; gar tooth; fish pterygoid; 22 frags

A-8
clam shell frag; Leporid (4 cheek teeth); medium mammal tooth frag; vert of viperid; 1 turtle frag; gar frags; 2 fish verts (D=0.6 & 1.5 mm); 15 frags

A-9
large bovid ascending ramus of right mandible (gnawed by rodents); 3 deer? teeth frags; Leporid (5 cheek teeth); rabbit-sized leg bone gnawed by carnivore; small mammal terminal phalanx; 5 turtle frags; gar scale frags + tooth; fish spine + 2 verts (D=1.6 & 3.2 mm); 37 frags

A-10
bison? left upper premolar; 2 deer? teeth frags + sesamoid; prox frag of femur of medium mammal; 1 midshaft of squirrel-size mammal (gnawed by rodents); fish bone frag and vert frag; softshell frag; box turtle plastron frag & 2 pleural frags; mud turtle pleural; 10 turtle frags; gar scale frags + 5 teeth; 61 frags

A-11
large bovid long bone frag gnawed by rodents; bison? upper P M; deer? tooth frag; rabbit-size mammal vert frag & femur dist end frag; pocket gopher upper I, 2 lower I, lower P4, lt mandible, lt tibia [unburned]; small mammal vert frag; cf. mallard dist end of lt tibiotarsus; mud turtle neural & pleural; 12 turtle frags; 2 snake vert; fish vert (D=0.5 mm + frags); 2 gar teeth + scale frags; 35 frags

A-12
deer? sesamoid + longbone midshaft (heavy gnawing by squirrels) + dist end of phalanx + 3 teeth frags; small mammal phalanx #2; bird frag; box turtle peripheral; 9 turtle frags + vert; colubrid vert; viperid vert; gar scale frag + tooth + vert; 3 fish vert (D=1.7, 8, 9 mm, 1 is caudal of bass or catfish); fish spine + pterygiophore; drum tooth; 110 frags

A-13
2 large mammal teeth frags; 2 deer? teeth frags + phalanx #2 (gnawed) + phalanx distal frag + phalanx frag; 1 rat-sized m idshaft of longbone; small mammal phalanx; softshell plastron frag; 3 snake vert; 2 gar vert; gar 8 teeth + scale frags; 3 drum teeth; fish 2 teeth + 4 verts (D=0.6, 0.8, 2.3 & 8.1 mm); catfish pectoral spine frag; 17 turtle frags; 122 frags

A-14
deer rt astragalus; deer? 5 teeth frags + distal condyle of metapodial (fused) + 2 phalanx frags + vert frag + pelvis frag + long bone frag (gnawed); long bone frag of squirrel-size mammal; mouse phalanges # 1 & 3; mud turtle peripheral; softshell turtle frag; box turtle plastron frag; 14 turtle frags; snake tooth; gar vert + scale frags + 4 teeth; large-mouth bass rt dentary; fish bone frag + 3 verts (D=0.55, 0.9 & 1.1 mm) + 3 teeth; 6 drum teeth; 128 frags

A-15
deer? mandible frag + phalanx (prox end) + metapodial frag + 5 deer? teeth frags + tibia rt distal frag of adult (rodent gnawed) + 15 frags longbone (2 are hacked); medium mammal long bone frag; pigmy mouse upper M-1 (worn); box turtle carapace frag.; 14 turtle frags; fish pterygiophore (prox end) + 6 verts (D=0.8, 1.5, 1.8, 2.5, 7 & 9 mm, 1 is bass anterior trunk) + 2 teeth + ribs + scales + frags; gar 2 vert + scale frags + 9 teeth; 147 frags

A-16
deer? phalanx #1 (prox pt.) + phalanx frags; pocket gopher l t mandible with incisor (burned); turkey lt humerus (prox end); box turtle peripheral; mud turtle peripheral; turtle l ongbone frag + 24 frags; colubrid vert; gar 5 teeth + scale frags + vert frag; fish dentary frag + tooth + 4 vert frags (1 has D=7 mm); 97 frags

A-17
2 bison? tooth frags; deer rt. centroquartal; deer? 6 tooth frags + dist end of rt humerus + 2 distal condyles of metapo dial + frag of metacarpal (gnawed) + phalanx #1 (gnawed by rodents) + vert frag + frag of long bone; box turtle peripheral; 12 turtle frags; gar 2 vert frags + scale frags + 3 teeth; fish spine + 6 teeth+ 2 vert frags; 5 fish vert (D=0.45, 6, 6 & 7 mm, 1 is bass anterior trunk); drum tooth; catfish spine frag; 102 frags

A-18
deer lower premolar + altered frag of humerus (L=38 mm, edges rounded); deer? 2 longbone frags (gnawed by rodents) + 4 tooth frags + 2 frags of phalanx; frag of coracoid of medium bird; box turtle peripheral; 10 turtle frags; anole caudal vert; snake vert frag; gar vert + 4 teeth + scale frags; catfish dorsal spine; drum tooth; 6 fish vert frags; 68 frags

B-1
large mammal tooth frag; deer? sesamoid + 4 tooth frags; slider turtle entoplastron; turtle long bone frag + 8 frags; gar scale frags + tooth; 3 fish vert (D=1.4, 1.8 & 6 mm); 71 frags

B-2 deer rt humerus (dist half, hacked & gnawed by squirrels); deer? tooth frags + socket of rt scapula + distal condyle of metapodial; rabbit lt humerus (distal end); mouse phalanx #1;6 turtle frags; rat snake vert; fish 4 vert frags + 4 vert (D=6, 7, & 8 mm, 1 is drum caudal, 1 is drum? trunk, 1 is bass anterior trunk); gar vert + tooth; drum tooth; 85 frags

B-3
bison rt upper M-2; deer antler frag of shaft; 3 turtle frags; viperid vert; gar tooth + scale frags; catfish pectoral spine frag; fish tooth + vert (D=10 mm); 34 frags

B-4
deer tooth; deer? vert frag; bird frag; mud turtle peripheral frag; 2 turtle frags; gar tooth + vert + scale frags; bass? dentary frag; fish spines; 17 frags (one is rodent gnawed)

B-5
large bird frag; 2 turtle frags; fish vert frag; 18 frags

B-6
deer? epip of phalanx + long bone frag (gnawed by rodents); mole humerus; gar tooth; 5 frags

---

TEST PROBE 3# (west of silo)
60 to 120 cm box turtle pleural frag; 2 frags

APPENDIX 3 Faunal Species by Level

clam frag	A-8	1
unk fish	A-4,A-6,A-7,A-8,A-9,A-10,A-11,A-12, A-13,A-14,A-15,A-16,A-17,A-18	52
gar	A-6,A-7,A-8,A-9,A-10,A-11,A-12,A-13, A-14,A-15,A-16,A-17,A-18	80
lg.mouth bass	A-14,A-15,A-17	3
catfish	A-13,A-17,A-18	3
fw.drum	A-6,A-12,A-14,A-17,A-18	13
catfish/bass	A-6,A-12,A-13,A-14,A-15	18
unk turtle	A-6,A-7,A-8,A-9,A-10,A-11,A-12,A-13 A-14,A-15,A-16,A-17,A-18	142
mud turtle	A-10,A-11,A-14,A-16	5
box turtle	A-10,A-12,A-14,A-15,A-16,A-17,A-18	9
softshell	A-10,A-13,A-14	3
anole	A-6,A-18	3
unk snake	A-11,A-13,A-14,A-18	7
Colubrid	A-12,A-16	2
Viperid	A-8,A-12	2
unk bird	A-12,A-18	2
turkey	A-16	1
cf. mallard	A-11	1
armadillo	A-6	1
small mammal	A-9,A-10,A-11,A-12,A-13,A-14	7
small rodent	A-6,A-14	4
pigmy mouse	A-15	1
Leporid	A-8,A-9	9
gopher(unburned)	A-11	6
gopher(burned)	A-16	2
medium mammal	A-8,A-9,A-10,A-11,A-15	6
bison/cow	A-7,A-9,A-10,A-11,A-17	7
deer	A-14,A-17,A-18	4
deer?	A-6,A-9,A-10,A-11,A-12,A-13,A-14,A-15, A-16,A-17,A-18	79
unid	A-6,A-7,A-8,A-9,A-10,A-11,A-12,A-13 A-14,A-15,A-16,A-17,A-18	948
unk fish	B-1,B-2,B-3,B-4,B-5	14
gar(large)	B-2	1
gar (small)	B-1,B-2,B-3,B-4,B-6	12
f.w drum	B-2	1
drum	B-2	2
bass	B-2,B-4	2
catfish	B-3	1
catfish/bass	B-3	1
unk turtle	B-1,B-2,B-3,B-4,B-5	22
mud turtle	B-4	1
slider turtle	B-1	1
rat snake	B-2	1
Viperid	B-3	1
unk bird	B-4,B-5	2
mole	B-6	1
rabbit	B-2	1

small rodent	B-2	
bison	B-3	1
bison/cow	B-1	1
deer	B-2,B-3,B-4	1
deer?	B-1,B-2,B-4,B-6	3
unid	B-1,B-2,B-3,B-4,B-5,B-6	11
		230
box turtle	TT#3	
unid	TT#3	1
		2

total= 1553

CLAM= 1

VERTEBRATES:

TOTAL UNID=	1180
UNK FISH=	18
GAR=	10
BASS=	4
CATFISH=	3
CATFISH OR BASS=	1
DRUM=	1
cf DRUM	1
UNK TURTLE=	164
MUD TURTLE=	6
BOX TURTLE=	10
SLIDER TURTLE=	1
SOFTSHELL=	3
UNK SNAKE=	2
RAT SNAKE=	1
COLUBRID=	2
VIPERID=	3
UNK BIRD=	4
cf. MALLARD=	1
TURKEY=	1
UNK SMALL MAMMAL=	4
UNK MEDIUM MAMMAL=	6
ARMADILLO=	1
MOLE=	1
LEPORID=	9
RABBIT=	1
GOPHER(burned)=	2
GOPHER(unburned)=	6
BISON/COW=	8
BISON=	1
cf. DEER=	90
DEER=	7

total= 1549

Table 1

EQUIVALENT EXCAVATION LEVELS

equiv. level	excavation depth, cm A	B	C	D	E	F
A6		0-10	0-10			
A7	0-10	10-20	10-20	0-10	0-10	
A8	10-20	20-30	20-30	10-20	10-20	
A9	20-30	30-40	30-40	20-30	20-30	0-10
A10	30-40	40-50	40-50	30-40	30-40	10-20
A11	40-50	50-60	50-60	40-50	40-50	20-30
A12	50-60	60-70	60-70	50-60	50-60	30-40
A13	60-70	70-80	70-80	60-70	60-70	40-50
A14	70-80	80-90	80-90	70-80	70-80	50-60
A15	80-90	90-100	90-100	80-90	80-90	60-70
A16	90-100	100-110	100-110	90-100	90-100	70-80
A17	100-110	110-120	110-120	100-110	100-110	80-90
A18	110-120	120-130	120-130	110-120	110-120	90-100
B1	120-130	130-140	130-140	120-130	120-130	100-110
B2					130-140	110-120
B3					140-150	

equiv. level	excavation depth, cm G	H	I	J	K	L
A1		0-10				
A2		10-20				
A3		20-30				
A4		30-40			0-10	
A5		40-50			10-20	
A6		50-60			20-30	0-10
A7		60-70			30-40	10-20
A8		70-80	0-10		40-50	20-30
A9		80-90	10-20	0-10	50-60	30-40
A10	0-10	90-100	20-30	10-20	60-70	40-50
A11	10-20	100-110	30-40	20-30	70-80	50-60
A12	20-30	110-120	40-50	30-40	80-90	60-70
A13	30-40	120-130	50-60	40-50	90-100	70-80
A14	40-50	130-140	60-70	50-60	100-110	80-90
A15	50-60	140-150	70-80	60-70	110-120	90-100
A16	60-70	150-160	80-90	70-80	120-130	100-110
A17	70-80	160-170	90-100	80-90	130-140	110-120
A18	80-90	170-180	100-110	90-100	140-150	120-130
B1		180-190	110-120	100-110	150-160	130-140
B2		190-200	120-130		160-170	140-150
B3		200-210				150-160
B4		210-220				160-170
B5		220-230				

upper lines show modern disturbance
lower line shows soil color change reference level

Table 1 continued
EQUIVALENT EXCAVATION LEVELS

equiv. level	M	N	O	P	Q	R
A6	0-10					
A7	10-20					
A8	20-30					0-10
A9	30-40	0-10			0-10	10-20
A10	40-50	10-20	0-10	0-10	10-20	20-30
A11	50-60	20-30	10-20	10-20	20-30	30-40
A12	60-70	30-40	20-30	20-30	30-40	40-50
A13	70-80	40-50	30-40	30-40	40-50	50-60
A14	80-90	50-60	40-50	40-50	50-60	60-70
A15	90-100	60-70	50-60	50-60	60-70	70-80
A16	100-110	70-80	60-70	60-70	70-80	80-90
A17	110-120	80-90	70-80	70-80	80-90	
A18	120-130	90-100	80-90	80-90	90-100	
B1	130-140	100-110	90-100	90-100	100-110	
B2	140-150	110-120	100-110	100-110	110-120	
B3				110-120		

equiv. level	excavation depth, cm S	T	U	V
A2		0-10	0-10	
A3		10-20	10-20	0-10
A4		20-30	20-30	10-20
A5		30-40	30-40	20-30
A6		40-50	40-50	30-40
A7		50-60	50-60	40-50
A8	0-10	60-70	60-70	50-60
A9	10-20	70-80	70-80	60-70
A10	20-30	80-90	80-90	70-80
A11	30-40	90-100	90-100	80-90
A12	40-50	100-110	100-110	90-100
A13	50-60	110-120	110-120	100-110
A14	60-70	120-130	120-130	110-120
A15	70-80	130-140	130-140	120-130
A16	80-90	140-150	140-150	130-140
A17	90-100	150-160	150-160	140-150
A18	100-110	160-170	160-170	150-160
B1	110-120	170-180	170-180	160-170
B2		180-190	180-190	170-180
B3		190-200	190-200	180-190
B4		200-210		

Table 2

MODERN MATERIALS FROM EXCAVATIONS

Pit A: modern materials observed to level A10

Pit B: level A9- 1 nail, 1 iron piece, 1 modern sherd

Pit C: level A8- 3 iron pieces, 1 modern sherd
level A9- 2 glass pieces

Pit D: level A8- can lid, 8 glass pieces, modern sherd, 1 nail, 19 iron pieces, 1 staple, furniture drawer plate
level A9- 1 glass, 2 nails, 1 staple, iron wire, 3 iron pieces
level A10- 1 glass, 1 nail, iron wire, 6 iron pieces
level A11- 1 nail, iron wire, 1 plastic piece

Pit E: level A9- 2 glass, 1 nail, 1 iron piece
level A10- 3 small iron pieces

Pit F: level A9- 5 glass, 4 iron pieces, 4 nails, 1 modn. sherd
level A10- 4 glass, 14 iron, 6 nails, cloth rivet, 1 rifle shell
level A11- 3 nails, 3 glass, 1 iron piece

Pit G: level A10- 8 glass, nail, 1 staple, 5 iron, 1 modn. shd.
level A11: 2 small glass pieces

Pit H: level A1- 3 nails, 18 glass, 3 modern sherds, 20 iron
level A2- jug sherd, 2 brick frags., 16 nails, 20 glass, 2 modern sherds, wire, plastic, 396 gm misc iron
level A3- glass bead, 3 glass pieces, 22 iron pieces, 2 modern sherds
level A4- 4 nails, 3 glass pieces, 3 iron pieces
level A5- 2 glass, 1 modern sherd, iron wire
level A6- glass bottle neck, 3 glass pieces
level A7- 1 modern sherd, 2 glass pieces

Pit I: level A10- 6 glass, 1 nail, wire, modern sherd, 8 iron
level A11- 1 glass piece, 1 modern sherd
level A12- 1 glass piece

Pit J: level A11- 3 glass, wire, staple, 3 iron pieces
level A12- 2 glass, 5 iron, 2 staples, 3 nails
level A13- glass bottle neck, 2 glass, 3 iron

Pit K: level A6- 1 glass, wire, 2 iron pieces
level A7- 1 modern sherd

Pit L: level A11- 1 glass, 2 modern sherds, 2 iron pieces

Pit M: no modern materials

Table 2 continued

MODERN MATERIALS FROM EXCAVATIONS

Pit N: level A9- small nail

Pit O: level A13- brick fragment

Pit P: level A11- 2 very small modern sherds

Pit Q: level A10- 2 very small glass pieces

Pit R: level A9- 2 iron pieces, 1 iron bolt
level A10- 2 iron pieces

Pit S: level 8- 1 iron piece
level 9- wire, 2 iron pieces

Pit T: no modern materials

Pit U: level A6- 4 iron pieces

Pit V: level A7- 1 iron piece
level A8- 1 iron piece
level A10- 1 glass piece, 6 iron pieces
level A11- 1 glass piece, 1 modern sherd

Table 3

PROJECTILE POINTS

point type	pit	level	dimensions, cm L	W	T	Fig.
Morhiss (A)	A	A7-A10	48.8	28.9	8.1	4F
Pedernales stem	V	A7				4B
Kent	N	A11	--	21.0	7.2	4D
Gary	R	A13	--	28.0	7.9	4C
large stemmed	R	A13	--	42.1	7.8	5A
unif. arrow pt.	R	A14	18.3	15.6	2.0	4H
unif. arrow pt.	P	A15	21.6	12.3	3.4	4G
Bulverde stem?	probe 3	A10-15				
Early Stemmed, stem	Q	A16				3H
Wells stem	J	A17				3C
Early Side-Notched	L	A17	--	27.0	7.7	3E
Pedernales (B)	Q	A18	53.5	25.6	7.0	4A
Carrollton-like	F	A18	--	27.0	7.6	2D
Early Stemmed	G	A18	--	22.7	6.2	2F
Early Stemmed	B	A18	72.1	24.0	11.2	2E
Early Stemmed, stem	I	A18				
Early Stemmed, stem	S	A18				
Early Stemmed,	probe 2	A18	50.0	22.4	8.8	2H
Early Stemmed, stem	U	A18				3D
Early Notched, stem	L	B3				3G
Early Notched, stem	K	B1				3F
Early Stemmed	O	B1	37.8	20.4	8.0	3B
Early Stemmed	L	B1	45.2	25.8	8.2	3A
Angostura base	L	B1			7.0	2C
Angostura	M	B1	60.5	20.2	7.8	2B
Angostura	N	B1		25.2	6.7	2A
Perdiz	surface		26.5	15.5	3.3	4I
Early Stemmed	surface		57.8	32.3	9.3	2G
Kent	surface		58.7	17.0	8.3	4E
Bulverde (C)						

A- from unscreened soil B- displaced in disturbed soil
C- found by farm worker in excavation area

Table 4

PROJECTILE POINT SUMMARY BY LEVEL

Equiv. level	point types
surface	1 Kent, 1 Early Stemmed, 1 Perdiz, 1 Bulverde
A7-A10	1 Morhiss
A7	1 Pedernales
A10-A15	1 Bulverde?
A11	1 Kent
A13	1 Gary, 1 large stemmed
A14	1 unifacial arrow point
A15	1 unifacial arrow point
A16	1 Early Stemmed
A17	1 Wells, 1 Early Side-Notched
A18	1 Carrollton-like, 6 Early Stemmed, (1 displaced Pedernales)
B1	3 Angostura, 1 Early Notched, 2 Early Stemmed
B3	1 Early Notched

Table 5

LITHIC ARTIFACTS

item	pit	level	dimensions, cm L	W	T	fig.
dart point tip	surface					
dart point frag.	probe A					
dart point blade	O	A11			6.5	
dart point tip	P	A11				
dart point blade	F	A14			6.3	
stemmed point frag.	R	A14			8.2	5B
dart point tip	B	A15				
dart point tip	E	B2				
preform reject	surface		59.6	41.3	23.0	
preform, finished	J	A14	60.7	24.6	7.1	5C
preform frag.	R	A15				
preform Frag.	C	A15				
preform frag.	Q	A15				
preform frag.	N	A16				
preform frag.	S	A17				
preform, early stg.	D	A17	59.7	50.9	16.9	
preform frag.	L	A18				
preform reject	E	A9		34.0	18.8	
preform frag.	C	A13				
preform frag.	C	A13				
preform frag.	H	A15				
preform frag.	S	A15		30.2	7.2	
preform	J	A15	61.9	26.8	13.6	5D
preform reject	E	A17	89.2	37.9	24.6	
preform frag.	N	A17				
preform frag.	B	A18				
preform frag.	E	A18				
preform	E	A18	72.5	30.4	13.6	5E
preform, early stg.	K	B1	72.1	43.2	17.8	
large scraper (A)	surface		68.3	43.3	10.7	6A
scraper-graver (A)	surface		52.9	42.2	11.3	6C
bifacial knife (A)	S	A18		40.3	8.0	6B
bifacial scraper (A)	N	B2	73.9	40.2	35.2	6D
unifacial perforator	surface		38.0	9.7	5.1	7C
notched tool	G	A10	44.7	25.8	7.3	
graver	K	A11	21.7	13.1	3.4	7A
scraper	R	A12	27.1	26.2	7.8	
graver	H	A12	25.1	13.6	3.8	
graver	S	A13	30.1	13.9	4.7	7B
notched tool	Q	A14	33.0	19.0	10.2	
nosed tool	L	A16	27.8	17.1	4.8	
scraper	L	A16	35.6	28.0	13.2	
scraper	E	A17	37.1	20.8	8.0	6F
graver	N	A17	15.5	16.0	5.8	
preform	U	A16	51.3	20.5	8.3	5F
preform	T	A18		26.0	8.4	

A- Paleo-Indian tool type

Table 5 continued

LITHIC ARTIFACTS

item	pit	level	dimensions,cm L	W	T	fig.
preform	T	A18		23.8	6.1	
thick scraper	U	B1	32.5	32.4	9.4	6E
notched tool, on biface frag.	U	B1	44.5	21.8	7.3	7D
preform	V	A17		34.0	13.5	
preform	V	A13			9.3	
graver	V	A14	25.0	21.4	2.7	

Table 6

QUARTZITE HAMMERSTONES

pit	level	diam., mm
A	A13	40
A	A16	40
A	A17	40
B	A12	35
B	A12	35
B	A17	35
B	A18	50
D	A17	40
E	A15	50
F	A17	30
F	A17	30
F	A17	40
F	A18	35
F	A18	35
G	A16	50
G	A17	frag.
G	A18	50
H	A17	35
H	A17	35
H	A18	35
H	A18	35
J	A12	40
J	A17	40
K	A14	40
K	A15	50
K	A18	70
K	B1	50
K	B1	30
K	B1	30
K	B1	30
L	A17	35
L	A17	40
L	B1	50
M	A11	35
M	B2	35
O	A14	50
P	A13	frag.
Q	A14	50
S	A11	30
S	A12	30
S	A13	30
S	A14	30
S	A15	30
S	A15	30
S	A15	30
S	A17	30
T	A9	35
T	A15	30
T	A16	35
T	A17	35
T	A17	35
T	A18	30
U	A9	35
U	A9	30
U	A11	35
U	A17	35
U	A17	30
U	A17	30
V	B1	30
T	B1	30

Table 7

CHERT CORES

pit	level	diam., mm
A	A13	50
B	A15	50
B	A16	30
C	A12	40
D	A10	50
D	B1	50
F	A14	40
F	A14	50
F	A18	70
F	B2	70
H	A13	60
I	A11	35
I	A16	50
I	A18	30
K	B1	35
L	A13	30
L	A17	40
M	B2	70
N	B1	50
N	B2	50
O	A15	35
O	A15	60
P	A16	40
P	B1	70
S	A13	40
S	A13	50
U	A17	35

Table 8

CHERT COBBLES

pit	level	diam., mm
F	A12	50
L	A15	50
L	B2	35
L	B2	35
L	B3	35
M	A12	40
M	A12	35
M	A16	35
N	A16	35
O	A13	70
Q	B2	35
T	A17	50
U	A10	40
U	A11	35
U	A17	40
V	A18	60

Table 9

THICK CHERT PIECES

pit	level	number
A	A15	1
A	A18	1
B	A18	1
C	A12	1
C	A15	1
D	A15	1
D	A16	1
D	A17	2
F	A15	1
G	A10	1
G	A12	1
G	A15	1
G	A18	2
H	A12	1
H	A15	1
I	A11	1
I	A16	1
I	A18	2
L	A12	1
L	B1	1
M	A16	1
M	B2	1
N	A15	1
N	A17	1
Q	A18	1
R	A9	2
R	A15	1
V	A14	1 (petrified wood)

Table 10

LITHIC FLAKE COUNTS BY PIT

pit	no. of flakes
A	149
B	314
C	279
D	314
E	313
F	268
G	253
H	458
I	302
J	305
K	253
L	379
M	321
N	508
O	441
P	423
Q	547
R	444
S	521
T	374
U	417
V	868
total	8451

Table 11

LITHIC FLAKE COUNTS BY LEVEL

level	no. of flakes
A1	3
A2	3
A3	3
A4	3
A5	4
A6	27
A7	79
A8	204
A9	323
A10	456
A11	675
A12	840
A13	931
A14	876
A15	918
A16	801
A17	803
A18	524
B1	502
B2	253
B3	131
B4	71
B5	16
B6	5
total	8451

Table 12

FLAKE SIZE DISTRIBUTION BY LEVEL
(percent of flakes by size)

flake size, mm square	A8	A9	A10	A11	A12	A13	A14
under 15	72.8	69.7	69.5	72.9	67.8	68.8	59.2
15-20	20.8	21.7	19.2	17.6	24.3	23.1	25.8
20-25	3.7	4.9	8.6	7.7	6.1	4.7	8.7
25-30	0.9	3.1	1.9	1.0	1.1	2.6	3.8
30-35	1.8	0.3	0.5	0.2	0.7	0.6	1.5
35-40	--	--	0.3	0.2	--	0.1	0.5
40-50	--	0.3	--	0.4	--	0.1	0.3
50-60	--	--	--	--	--	--	0.1
60-70	--	--	--	--	--	--	0.1
over 20	6.4	8.6	11.3	9.5	7.9	8.1	15.0

flake size, mm square	A15	A16	A17	A18	B1	B2
under 15	61.0	58.7	51.2	41.8	48.2	48.2
15-20	24.0	24.9	27.3	29.6	27.7	28.9
20-25	7.8	9.7	12.7	15.6	10.0	15.0
25-30	4.2	3.0	5.3	7.6	8.7	4.8
30-35	2.0	2.7	1.4	4.0	3.6	2.1
35-40	0.7	0.8	0.5	0.5	1.5	0.5
40-50	0.2	0.2	1.6	0.9	0.3	0.5
50-60	0.1	--	--	--	--	--
over 20	15.0	16.4	21.5	28.6	24.1	22.9

Table 13

CHARACTERISTICS OF FLAKE SIZE DISTRIBUTIONS

level	flake size distribution curve shape on semi-log plot
A8	linear
A9	roughly linear
A10	roughly linear
A11	roughly linear
A12	slightly curved
A13	roughly linear
A14	linear
A15	almost linear
A16	roughly linear
A17	slightly curved
A18	linear in main section
B1	roughly linear
B2	roughly linear

Table 14

COUNTS OF CLAYBALLS BY PIT

pit	number	weight, grams
A	630	7711
B	786	6389
C	700	7098
D	605	7350
E	855	9972
F	582	7182
G	748	7429
H	1703	15123
I	1048	10853
J	867	9489
K	907	8247
L	1829	16814
M	1347	12441
N	2735	20787
O	2058	14536
P	1824	12700
Q	1392	9923
R	1295	9913
S	1873	15469
T	1521	11220
U	1728	13762
V	1809	15335
total	28842	249743

Table 15

COUNTS OF CLAYBALLS BY LEVEL

level	number	weight, grams	average weight per ball, gm	size range diam., mm
A6	42	211	5.0	15-40
A7	70	408	5.8	15-50
A8	144	745	5.2	15-50
A9	347	2046	5.9	15-60
A10	608	4011	6.6	15-70
A11	977	6807	7.0	15-60
A12	1484	14902	10.0	15-70
A13	2255	17855	7.9	15-80
A14	2455	23241	9.5	15-100
A15	3366	32857	9.8	15-100
A16	3495	33606	9.5	15-90
A17	4099	37982	9.1	15-80
A18	3721	29797	8.0	15-80
B1	3103	24245	7.8	15-60
B2	1669	13235	7.9	15-60
B3	634	5022	7.9	15-60
B4	263	2098	8.0	15-60
B5	81	477	5.9	15-40
B6	29	198	6.8	15-35
total	28842	249743 (551 lb)	8.7	

Table 16

ASPHALT PIECES

pit	level
C	A10
V	A13
M	A13
E	A15
B	A17
C	A17
F	A17
I	A17
M	A18
E	B1

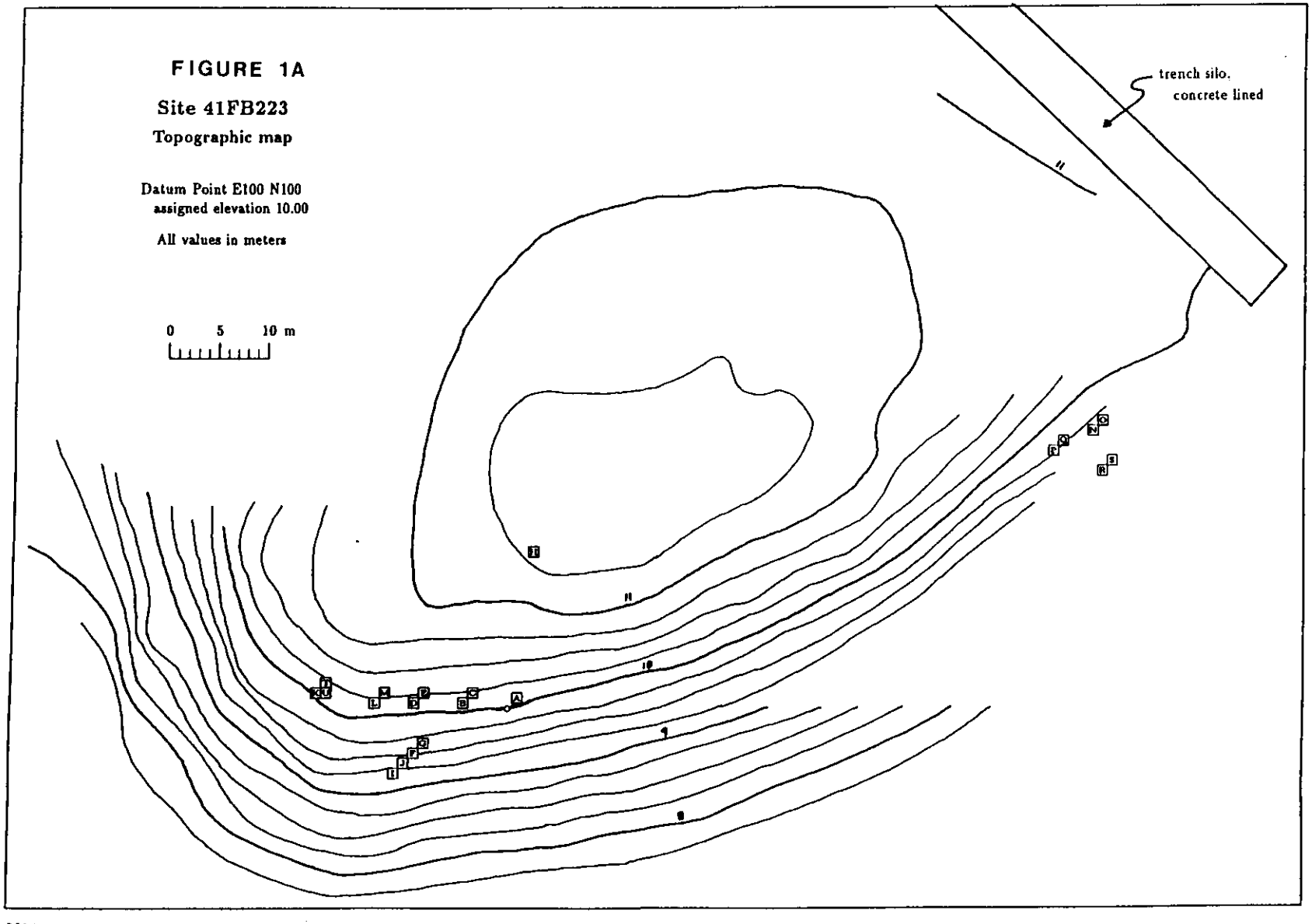

E180 N170
FIGURE 1A
Site 41FB223
Topographic map
Datum Point E100 N100
assigned elevation 10.00
All values in meters
0 5 10 m
trench silo.
concrete lined
11
10
9
8
E50 N80

Figure 1B

EXCAVATION LAYOUT, WEST END

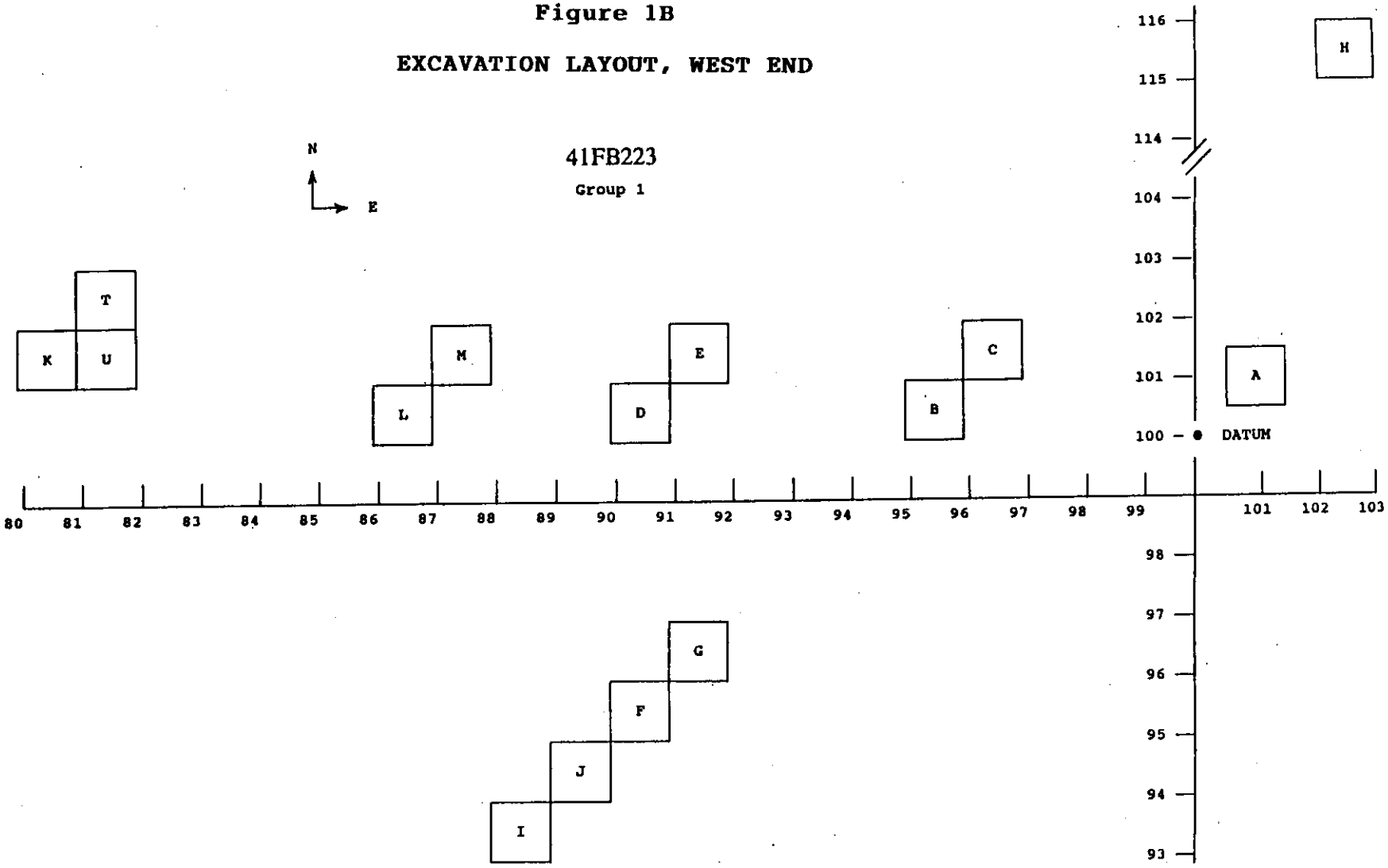


Figure 1C

EXCAVATION LAYOUT, EAST END

41FB223

Group 2

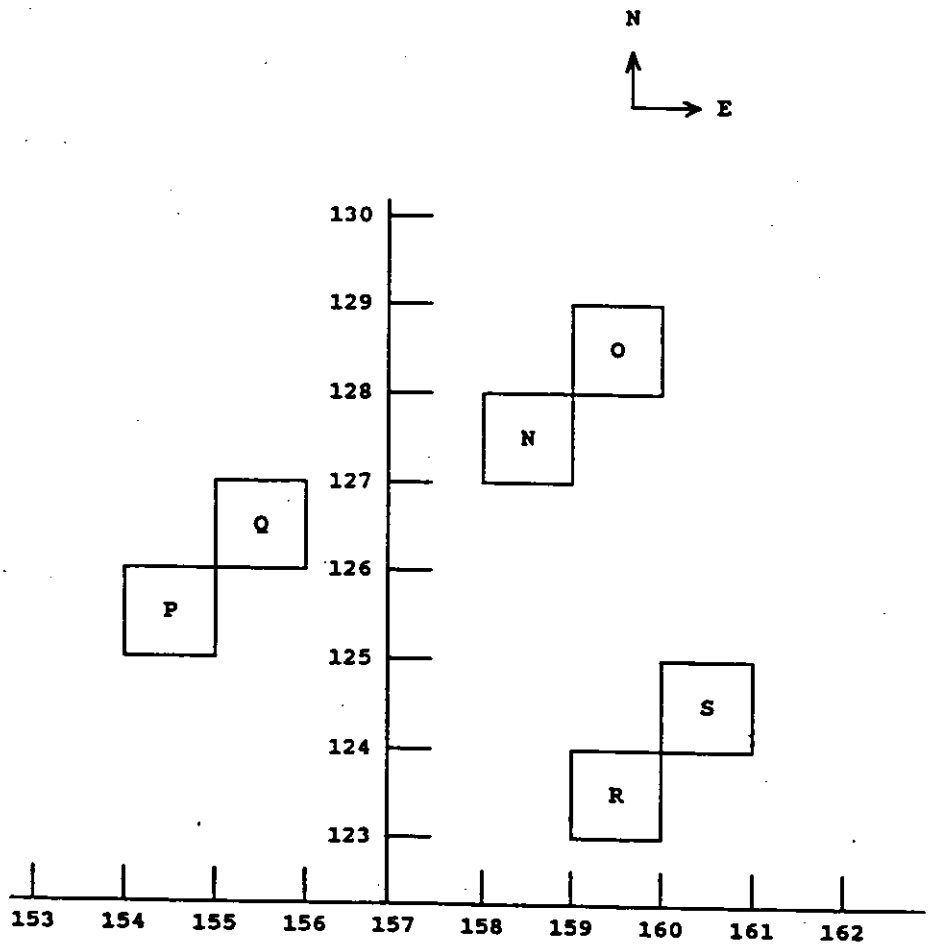
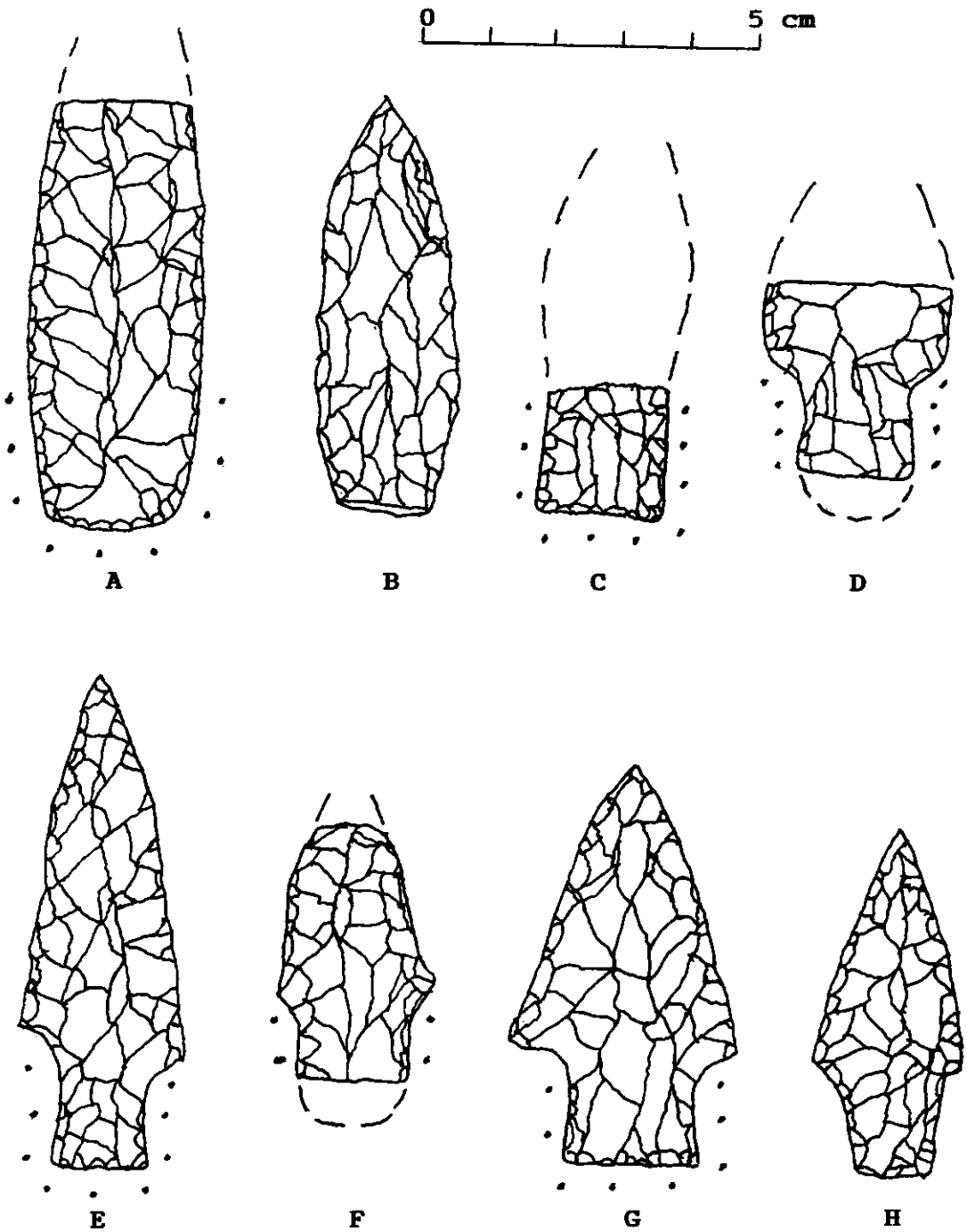


Figure 2

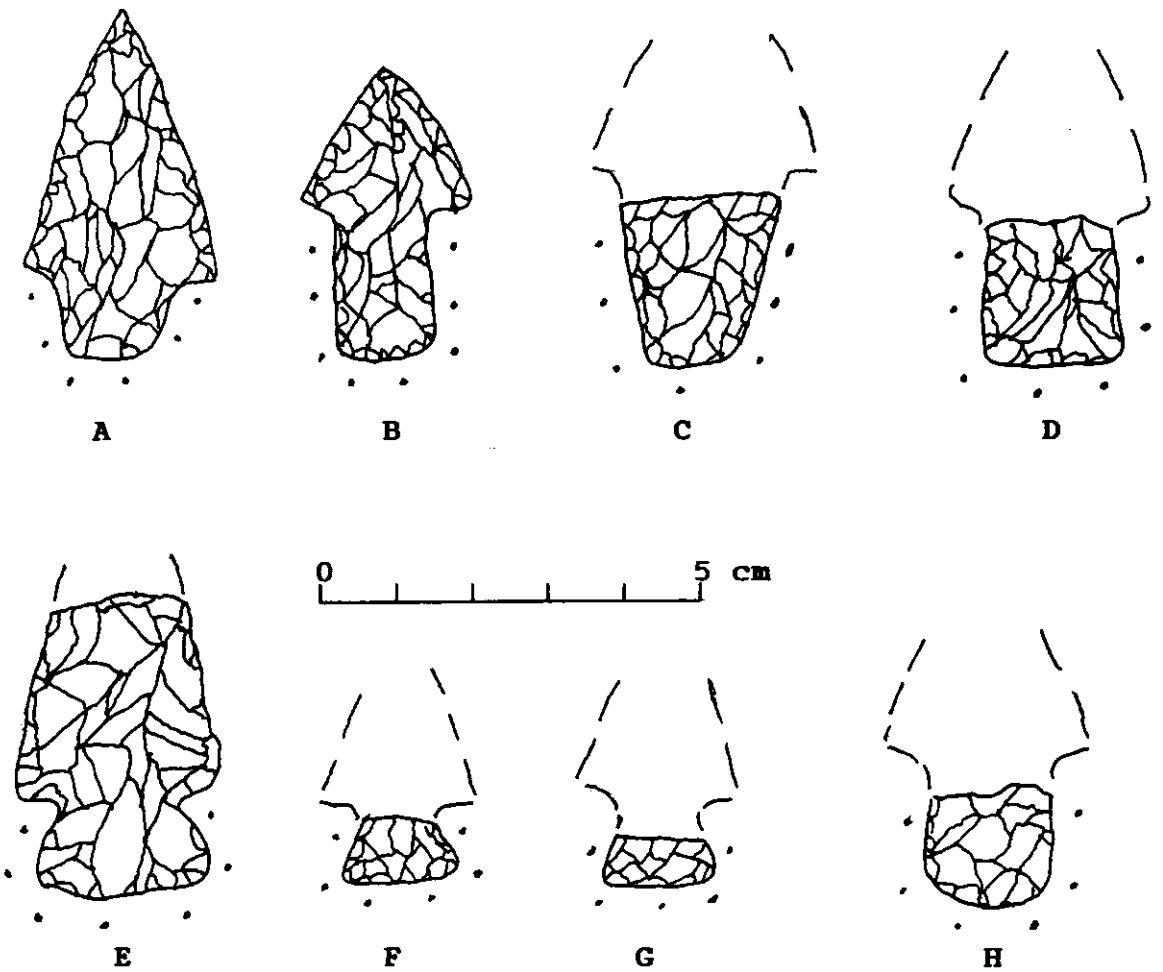
PROJECTILE POINTS



A,B,C- Angostura; D- Carrollton-like;
E to H- Early Stemmed, dots show ground edges

Figure 3

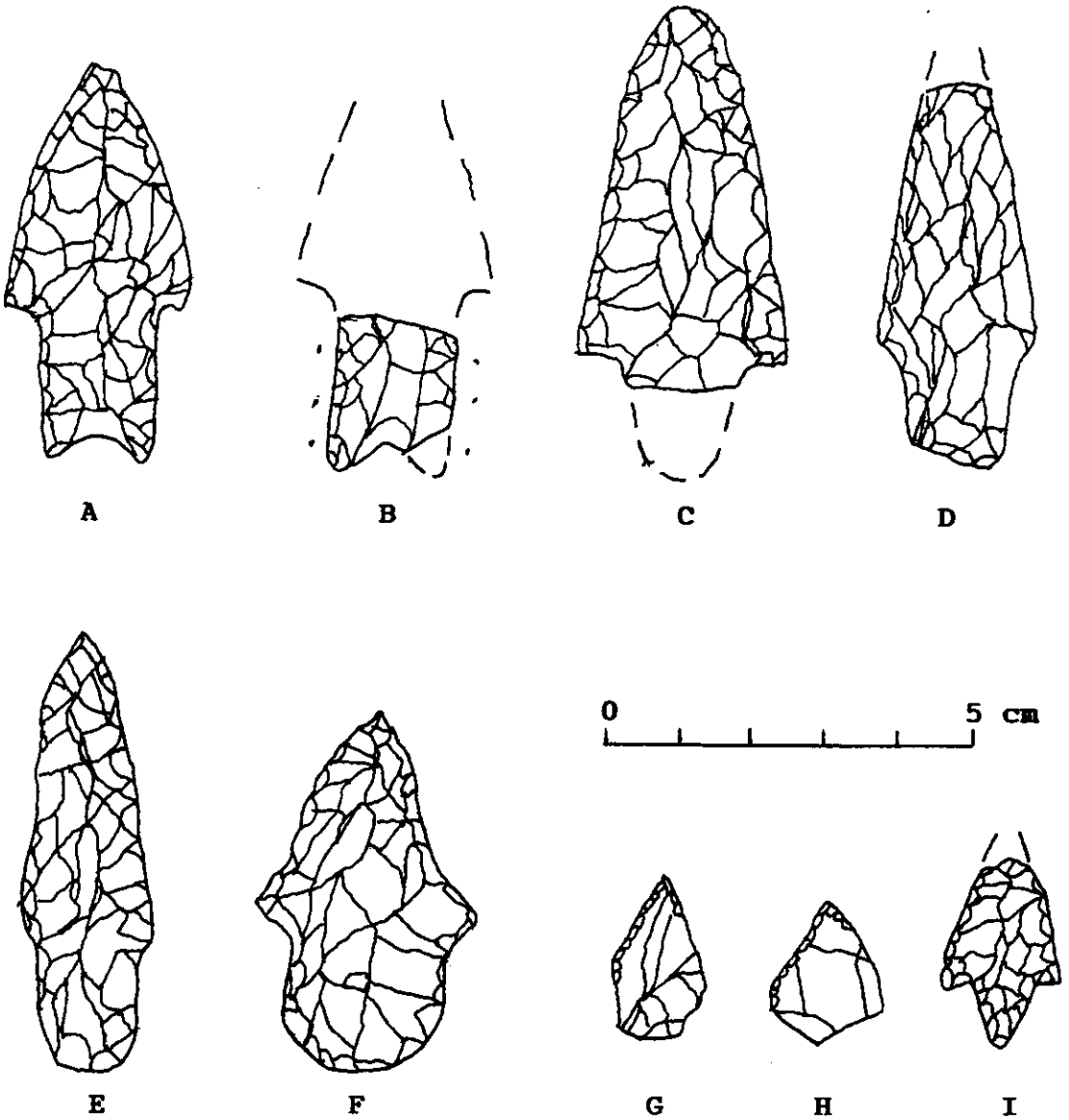
PROJECTILE POINTS



A,B,D,H- Early Stemmed; C- Wells; E,F,G- Early Notched; dots show ground edges

Figure 4

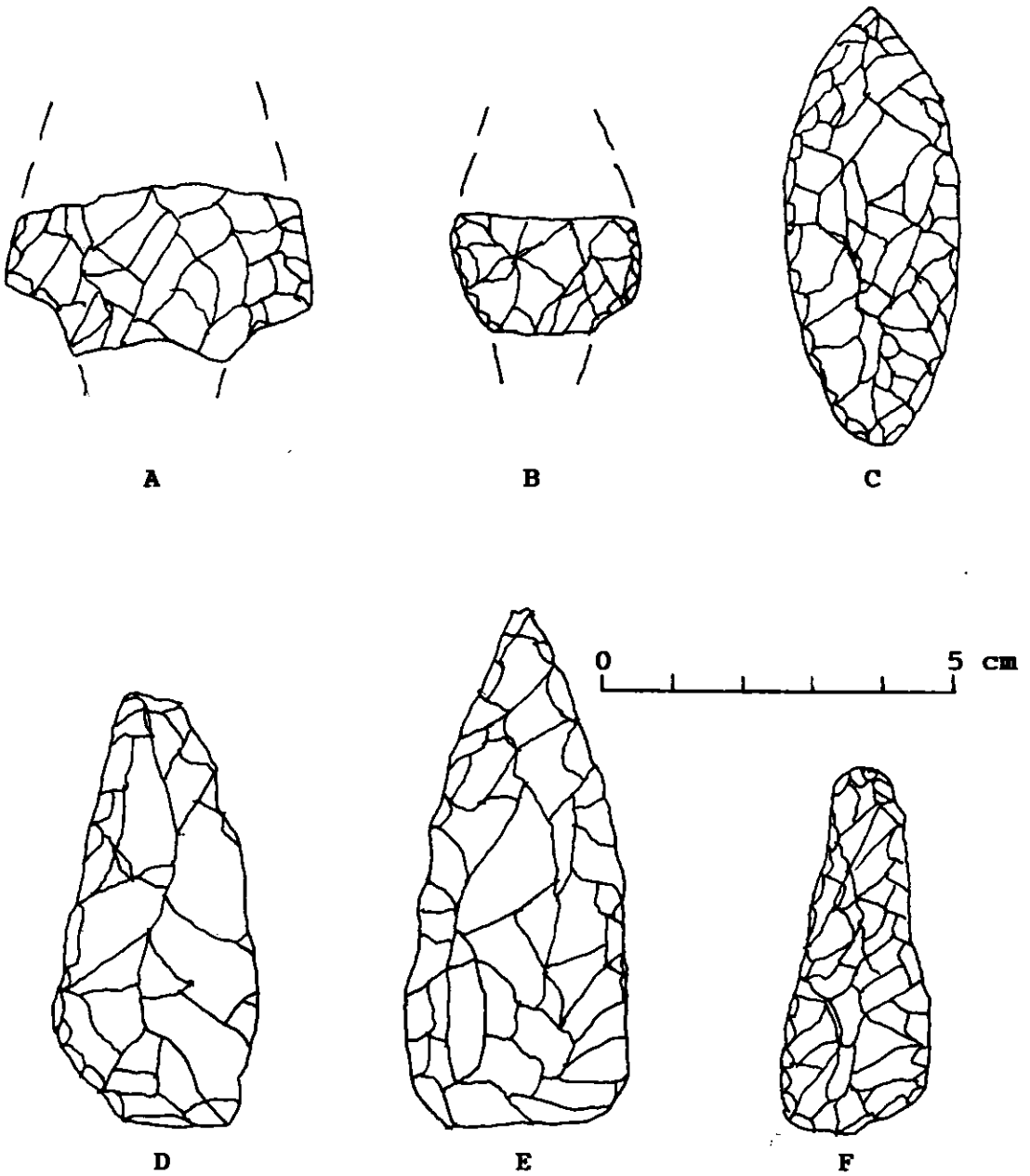
PROJECTILE POINTS



A,B- Pedernales; C- Gary; D,E- Kent; F- Morhiss;
G,H- unifacial arrow points; I- Perdiz;
dots show ground edges

Figure 5

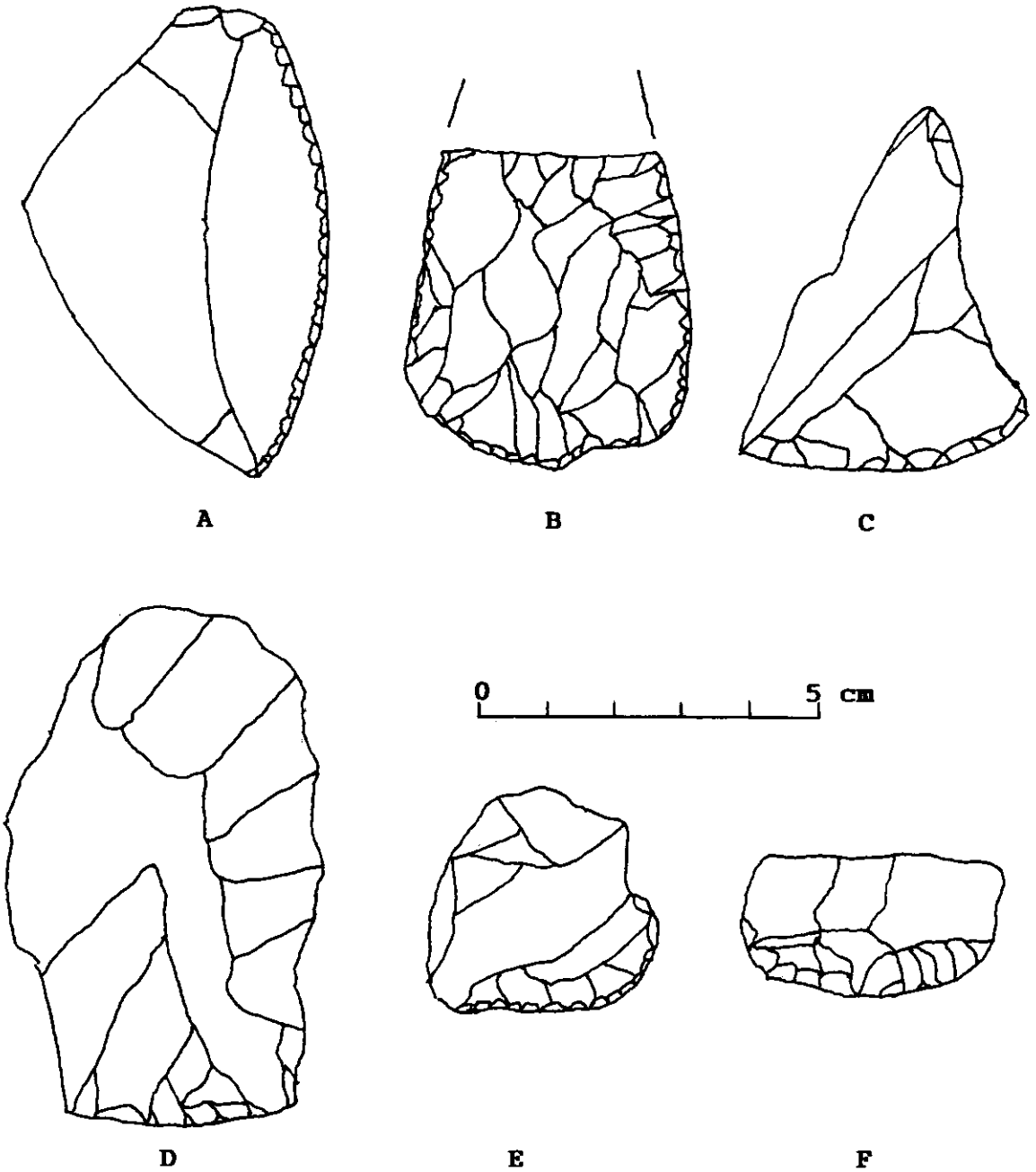
PROJECTILE POINTS AND PREFORMS



A- large stemmed dart point, B- stemmed dart point, C to F- preforms

Figure 6

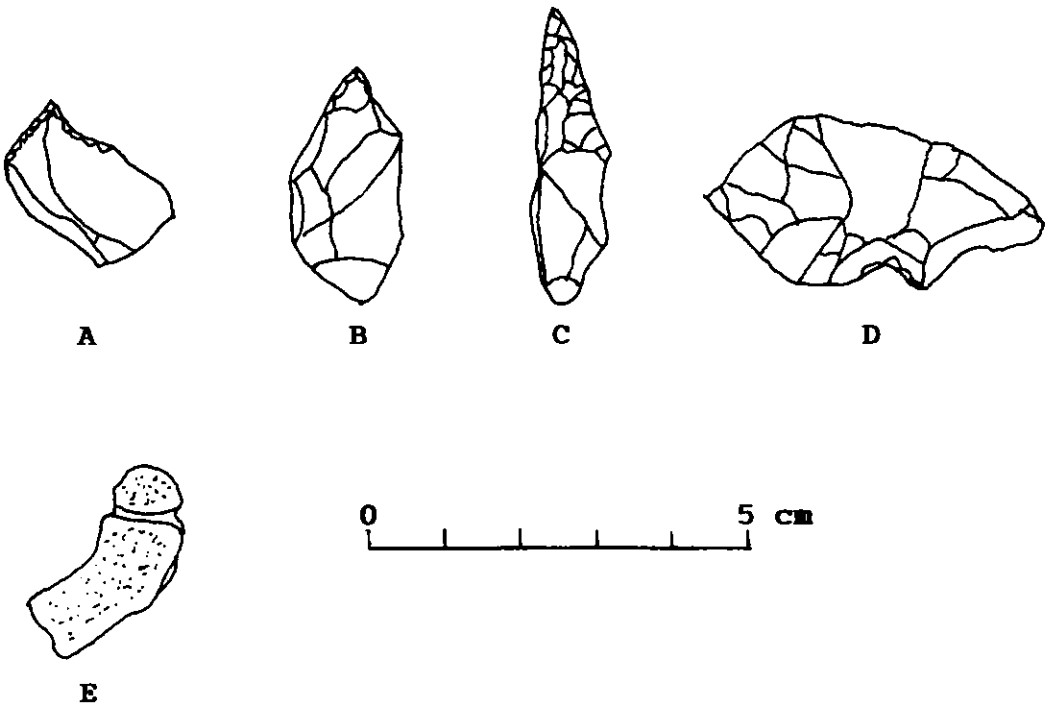
LITHIC TOOLS



A- large scraper; B- bifacial knife; C- scraper-graver;
D- bifacial scraper; E,F- scrapers

Figure 7

LITHIC TOOLS AND BONE PENDANT



A,B- gravers; C- unifacial perforator;
D- notched tool on biface fragment;
E- bone pendant

Figure 8
Level A14 Flake Size Distribution

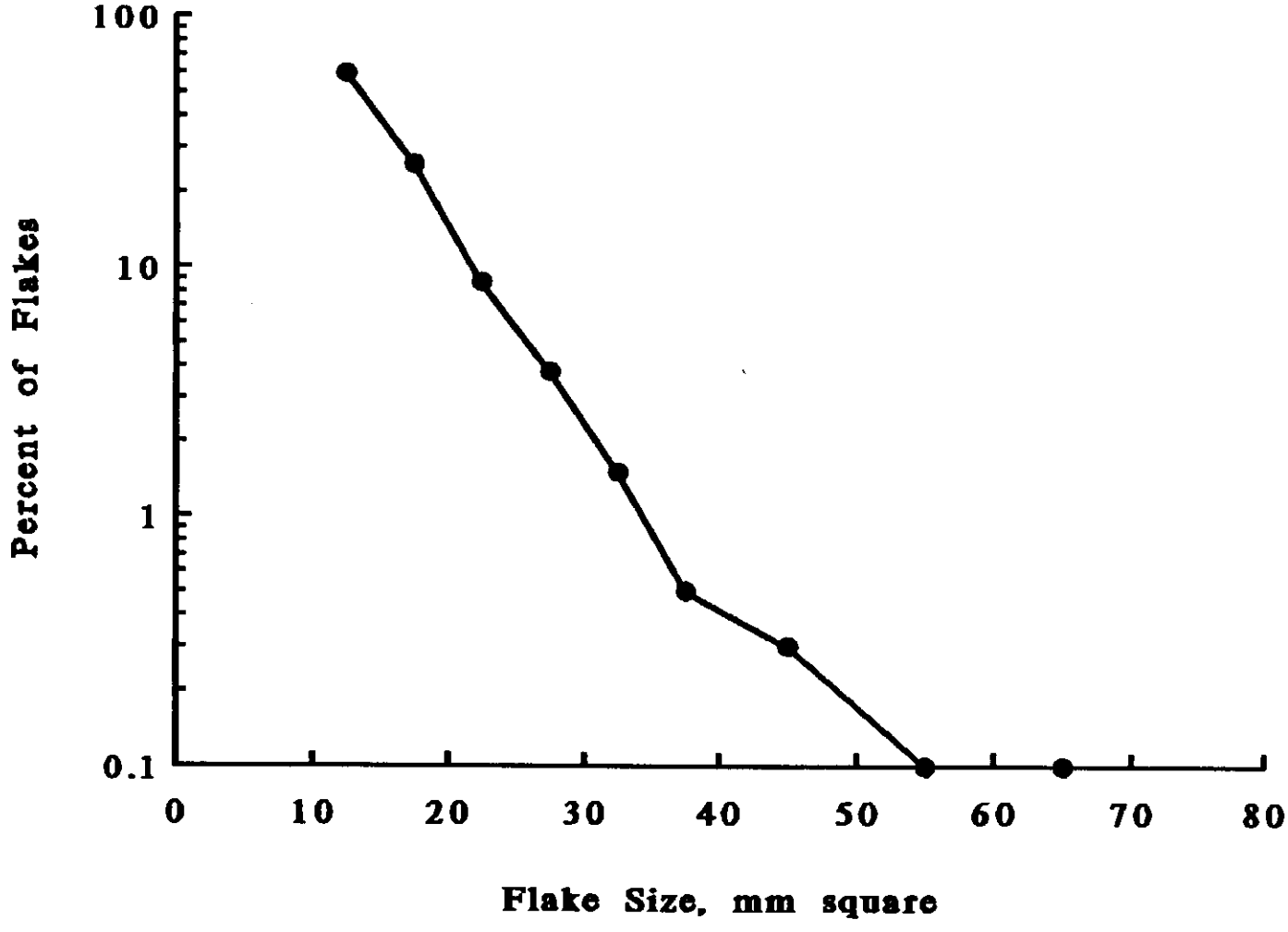


Figure 9
Level B2 Flake Size Distribution

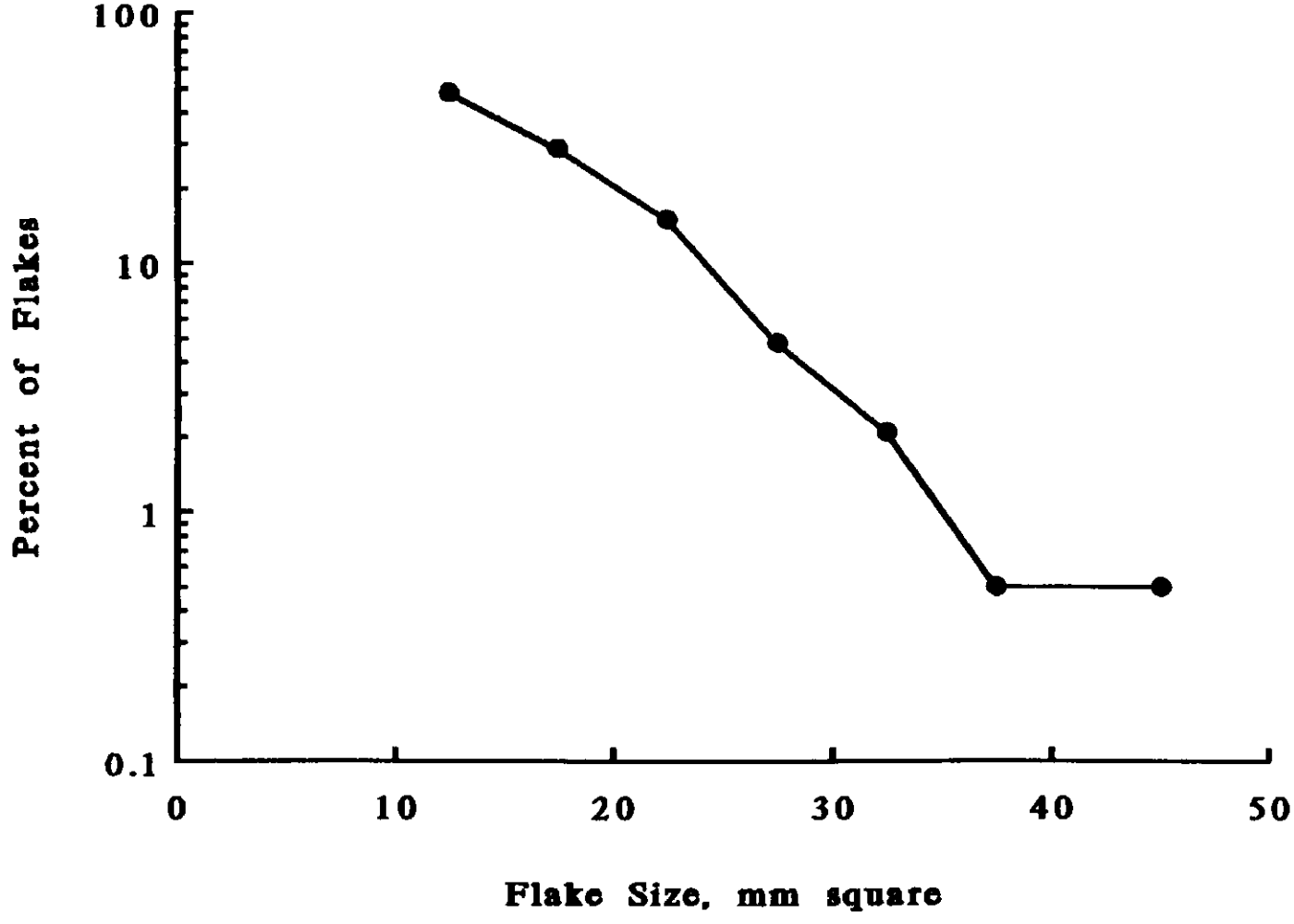


Figure 10
Flake Size Distribution By Level