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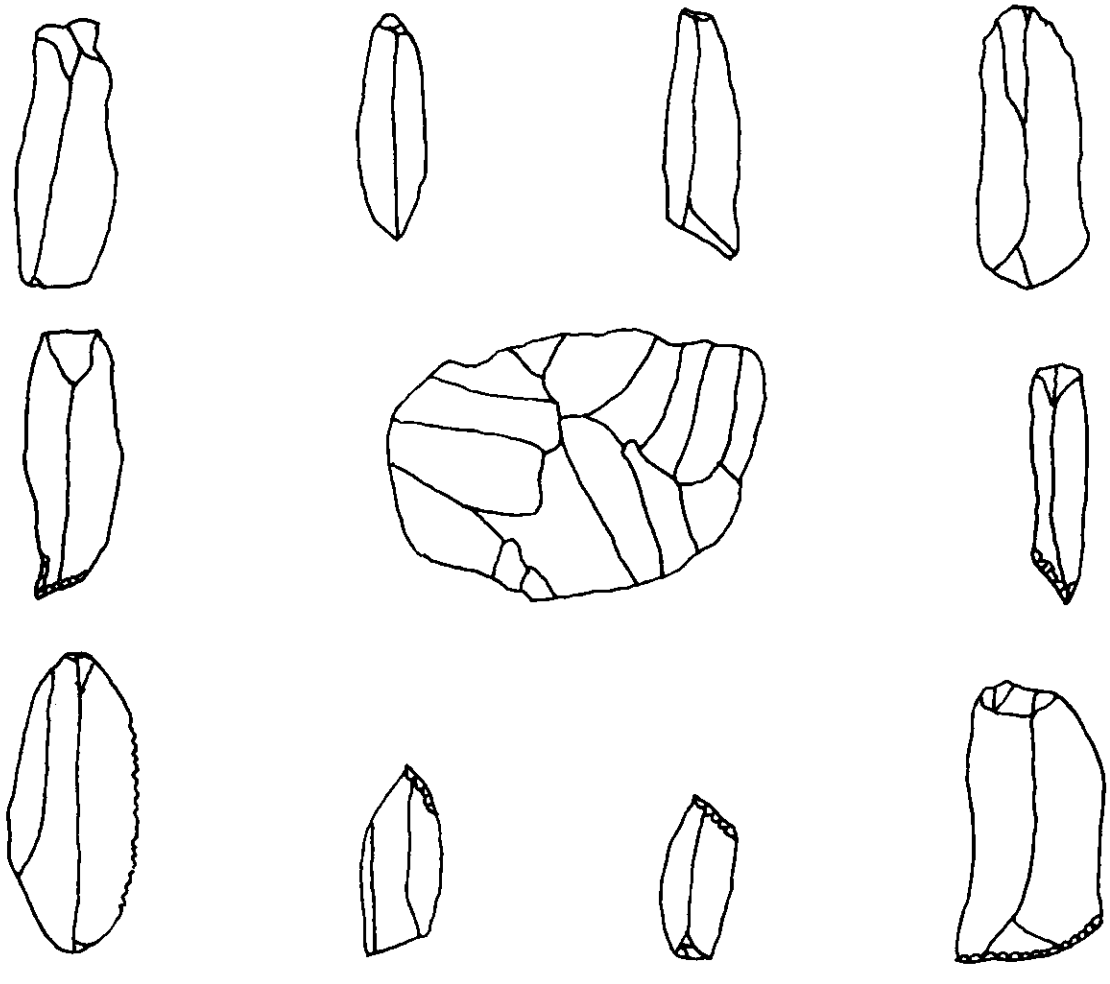

Prismatic Blades and Blade Core from 41HR184

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Prismatic Blades and Unifacial Arrow Points from 41HR184

Leland W. Patterson

Introduction

This paper presents data on prismatic blade technology and unifacial arrow points from site 41HR184 in Harris County, Texas, as a continuation of a previous paper (Patterson 1994b) on a large surface collection from this site. It was noted some time ago (Patterson 1973) that prismatic blade technology and unifacial arrow points are present at some prehistoric sites of inland Southeast Texas. These two types of lithic technology seem to be related to the early start of the bow and arrow in the southern United States. I have proposed (Patterson 1973, 1982, 1992) that the bow and arrow diffused from the far north, accompanied by technology for the manufacture of small prismatic blades, which were used to make unifacial arrow points and other types of lithic tools.

Based on data from excavations at site 41HR315 in Harris County (Patterson 1980), the technologies for manufacturing small prismatic blades and unifacial arrow points seem to have developed about the same time in Southeast Texas, in the late part of the Middle Archaic period or the early part of the Late Archaic period, about 4000 years ago. Odell (1988) has reached the same conclusion for the starting time of the bow and arrow in the midwestern United States, based on the use of unifacial arrow points with minimal retouch. Gibson (1976) has noted the possibility of the bow and arrow in the Poverty Point culture of the Late Archaic period in Louisiana, again with use of unifacial arrow points.

The type of unifacial arrow point discussed here is made as a marginally retouched flake. Standardized types of bifacial arrow points start in Southeast Texas about A.D. 600 (Aten 1983:306). Specimens of bifacial arrow point types are often flaked intensively only on one face, with only short flake scars on the other face, and are sometimes called unifacial (Cox and Smith 1989:283). This is not the type of flaking employed for the marginally retouched unifacial arrow points discussed here.

This paper discusses small-size prismatic blades, polyhedral blade cores, the types of utilization of blades, and unifacial arrow points made as marginally retouched flakes. All of these technologies have been found at several sites in Southeast Texas, including site 41HR184.

Prismatic blades at site 41HR184

Prismatic blades are usually defined as flakes at least twice as long as wide, having parallel lateral edges and at least one ridge on the dorsal face parallel to the lateral edges (Sollberger and Patterson 1976). Prismatic blades are produced by applying force above a ridge on the core face. This causes detachment of a prismatic blade, with the fracture plane following along the ridge on the core face. This process is repeated to make more blades, with a resulting polyhedral core with several parallel flake scars in series. Prismatic blades are occasionally produced fortuitously during lithic reduction. For example, I produce a prismatic blade fortuitously about once for every five bifacial dart points produced. The proportion of prismatic blades here is only one per several hundred flakes produced. There are three principal analytical criteria for identifying an industry for the purposeful manufacture of prismatic blades. There should be a significant number of prismatic blades present in the collection of flakes, and polyhedral cores with parallel flake scars should be present. The distribution of blade widths will usually be bell shaped, reflecting production of a desired restricted range of blade sizes. For example, Anderson (1970) shows bell-shaped blade width distributions at the Onion Portage site in Alaska.

There are 520 small prismatic blades in the collection from site 41HR184, in a surface collection of about 14,000 flakes. The prismatic blades are 3.7% of the total flake collection. This percentage would actually be higher if flakes could be counted only for the time periods when prismatic blades were being made. There is a low incidence of crushed striking platforms (about 15%) on blades from site 41HR184. This implies that hard percussion was not being used very much, with indirect percussion and pressure force application being used instead (Sollberger and Patterson 1976:528).

The distribution of blade widths from site 41HR184 is shown in Table 1, along with blade width distributions from site 41HR315 (Patterson 1980a: Table 11), 41HR206 (Patterson 1980b: Table 2), and 41HR182 (Patterson 1985a: Table 2). As shown in Figure 1, the blade width distribution of site 41HR184 forms a bell-shaped curve. This curve type also occurs for blade width distributions from sites 41HR315, 41HR206, and 41HR182, as shown in Figure 2. The proportions of widths of blades from all of these sites are similar. Hence all four sites had industries producing small prismatic blades. Some typical unmodified prismatic blades from site 41HR184 are shown in Figure 3. The blade width distribution for site 41HR184 is for a larger sample than the blade width distribution previously published for this site (Patterson 1973: Table 5).

Table 1. Blade Width Distributions

blade width, mm	percent of blades			
	41HR184	41HR315	41HR206	41HR182
5	2.9		2.0	1.8
6	7.9	0.4	5.3	3.0
7	8.7	4.1	6.2	3.6
8	10.2	8.2	8.3	10.8
9	12.3	13.2	10.0	14.5
10	16.3	15.2	12.4	16.9
11	12.6	15.2	10.9	13.9
12	11.6	14.4	14.2	13.9
13	6.5	9.9	9.7	8.4
14	4.6	8.2	8.0	5.4
15	2.3	6.2	6.2	3.6
16	1.5	2.1	2.4	2.4
17	1.3	2.1	3.2	1.2
18	1.3	0.8	1.2	0.6
	100.0	100.0	100.0	100.0
no. of blades	520	243	339	166
average width	10.1	11.3	11.0	10.7

Polyhedral blade cores from 41HR184

Four polyhedral blade cores were found at site 41HR184, along with 39 blade core fragments and small spent cores. Some of these specimens are illustrated in Figures 4 and 5. As previously noted (Patterson 1973: Figure 7) for Southeast Texas, cores for the production of small prismatic blades are not very standardized in this region. This is similar to what occurred with the prismatic blade

industry at the Poverty Point site in Louisiana (Webb and Gibson 1981:86). For example, cores shown in Figure 4A,C are single platform with semicylindrical and cuboid shapes, respectively. The core shown in Figure 4B is a multiple platform core, with a series of parallel flakes removed from several force application areas. The core fragment in Figure 4D may be from a wedge-shaped core. Some blade cores are made from pieces of chert with no remaining cortex, while others are made on small chert cobbles with some remaining cortex.

There are not many whole blade cores at sites in Southeast Texas, such as 41HR184, compared to the number of prismatic blades. This can be explained by blade cores being converted to flake cores, which changes the final core morphology. This possibility has been previously noted (Patterson 1993:36) for Texas blade technologies, similar to the European Upper Paleolithic (Kozlowsky 1990:422). The conversion of blade cores to flake cores can be shown by the presence of blade core fragments and blade core trim flakes. Blade core facial trim flakes may sometimes have been removed to correct geometry of a core, but at this site blade core trim flakes may have simply been the first flakes removed when blade cores were converted to flake cores. Several blade core trim flakes are illustrated in Figure 5, all with multiple parallel flake scars. Several small amorphous-shaped cores were found at 41HR184 that may have originally been blade cores.

Prismatic blade utilization at 41HR184

Odell (1994:105) has shown that small prismatic blades were used in the Middle Woodland period of the midwestern United States for a variety of functions, including cutting, scraping, shaving, and drilling, and as gravers and projectile points. In a similar manner, small blades at site 41HR184 were used for a variety of functions, judged by retouch patterns and use wear on specimen edges.

Ten prismatic blades were found at 41HR184 with retouch that forms graver points, such as the examples shown in Figure 3S,T,U. There were 8 pointed prismatic blades with edge wear that indicates use as perforators (drills), with examples shown in Figure 3V,W,X. Thirty-seven blades were found with an edge wear pattern (Tringham et al. 1974) that indicates use of the specimens as side or end scrapers. There were 6 blades with cutting type edge wear (Tringham et al. 1974). Some specimens with edge wear patterns of these two types are shown in Figure 6. Some prismatic blades at 41HR184 were used as arrow points, which is discussed in the next section of this paper.

Unifacial arrow points at 41HR184

It has previously been noted that unifacial arrow points in the form of marginally retouched flakes were being used in Southeast Texas (Patterson 1973, 1982, 1992). Excavations at sites 41HR315 (Patterson 1980), 41WH73 (Patterson and Hudgins 1992), and 41FB223 (Patterson et al. 1994) show that unifacial arrow points started earlier than standardized bifacial arrow point types in this region. Bifacial arrow points start in Southeast Texas about A.D. 600 (Aten 1983:306), but unifacial arrow points were used as early as the Late Archaic (1500 B.C.) and Early Ceramic (A.D. 100-600) periods in this region. Unifacial arrow points are fairly numerous in Southeast Texas. A total of 170 unifacial arrow points from this region were published in 1992 (Patterson 1992: Table 1). Analytical criteria for the identification of unifacial arrow points have been discussed in a separate paper (Patterson 1994a).

At site 41HR184, 47 unifacial arrow points on flakes, and 17 unifacial points on blades were found, with some specimens shown in Figure 7. This type of arrow point is similar to points of the Eurasian Mesolithic period, such as illustrated by Clark (1977:112). There is often retouch on

only one lateral edge to form a point. Unifacial arrow point specimens have purposeful marginal retouch patterns that are best studied with a 10-power magnifier.

All unifacial arrow point specimens from 41HR184 are within the maximum metric values for attributes of standardized bifacial arrow points found in Southeast Texas. Bifacial arrow point types in this region usually weigh less than 2.3 grams, have thicknesses less than 5 mm, and have stem neck widths under 9 mm (Patterson 1985b).

Odell (1988, 1994) has distinguished arrow points made on flakes and prismatic blades, having minimal retouch, in the Middle Woodland period of the midwestern United States by study of impact fractures. Two types of impact fracture found in experimental studies (Odell and Cowan 1986; Barton and Bergman 1982; Bergman and Newcomer 1983) are impact flutes and edge burination. An impact flute is a flake scar on a face of a specimen where flake removal started at the point of impact. Edge burination is the removal of a spall on a lateral edge caused by impact. Another type of impact fracture that has been found experimentally is tip crushing (Patterson 1994c) where multiple small fracture scars occur together.

At site 41HR184, flakes of shapes and sizes suitable for arrow point use were studied for impact fractures. There were 10 flakes with edge burination, 11 flakes with impact flutes, and 3 flakes with tip crushing. Specimens from 41HR184 with impact fractures are shown in Figure 8. When studying impact fractures on flakes, care must be taken to discount impact fractures on the proximal ends of flakes. Impact fractures on the proximal end of a flake can occur during the original removal of a flake from a core. It may be seen in Figure 8 that some of the specimens with impact fractures also have marginal retouch of the type used to make unifacial arrow points.

In experimental studies of impact damage to projectile points, snap (bending) fractures are common. On an arrow point made from a flake with minimal retouch, however, a snap fracture is not very diagnostic in demonstrating that the specimen has been used as an arrow point. As Barton and Bergman (1982:240) note, snap fracture on a flake can occur during flake manufacture. When flakes are removed from cores, snap fractures usually occur with a rolling fracture plane and/or a step fracture at the fracture termination point at the dorsal surface of the flake. This breakage pattern is caused by the flake bending outward from the core face during removal. At 41HR184, there are 15 flakes and blades that would have been suitable for arrow point use with snap fractures terminating at the ventral face. While these snap fractures could be from a variety of causes, there is a higher probability that these specimens could have been used as arrow points, compared to flakes with snap fractures that terminate at the dorsal face.

Summary

Prismatic blade technology and unifacial arrow points at site 41HR184 have been discussed here. These types of lithic technology are important in Southeast Texas, but have received little study in this region except by the author. The potential early use of the bow and arrow before the start of standardized bifacial arrow point types is especially important in the study of subsistence during the Late Archaic and Early Ceramic periods. Early use of the bow and arrow may have contributed to the rapid population increase in Southeast Texas during these time periods, by providing a better weapon system for hunting.

The detection of prismatic blade technology and use of marginally retouched flakes and blades as arrow points requires some analytical work, but most of all it requires that the analyst simply have an awareness to look for these types of lithic technology, which can easily be overlooked in large collections of flakes. It is hoped that this paper will stimulate more regional interest in the subjects discussed.

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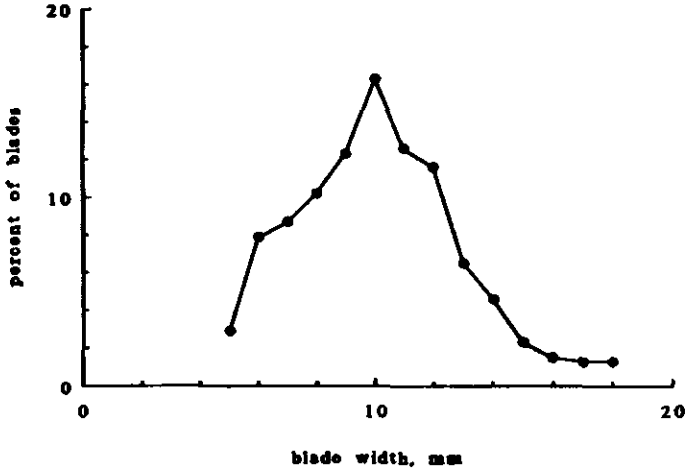


Figure 1. 41HR184 Blade Width Distribution

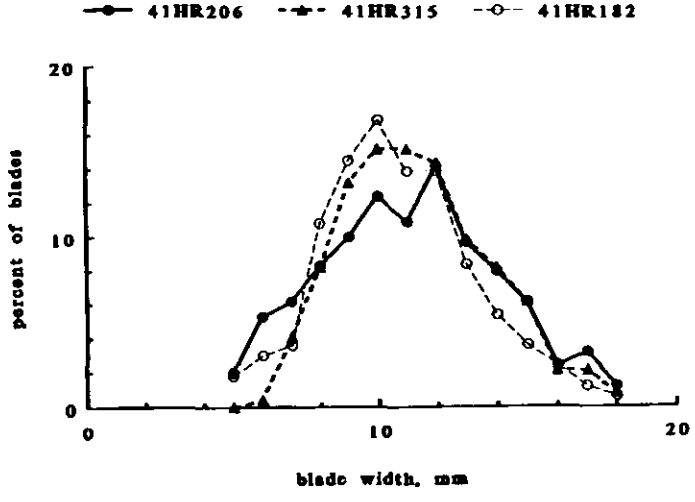
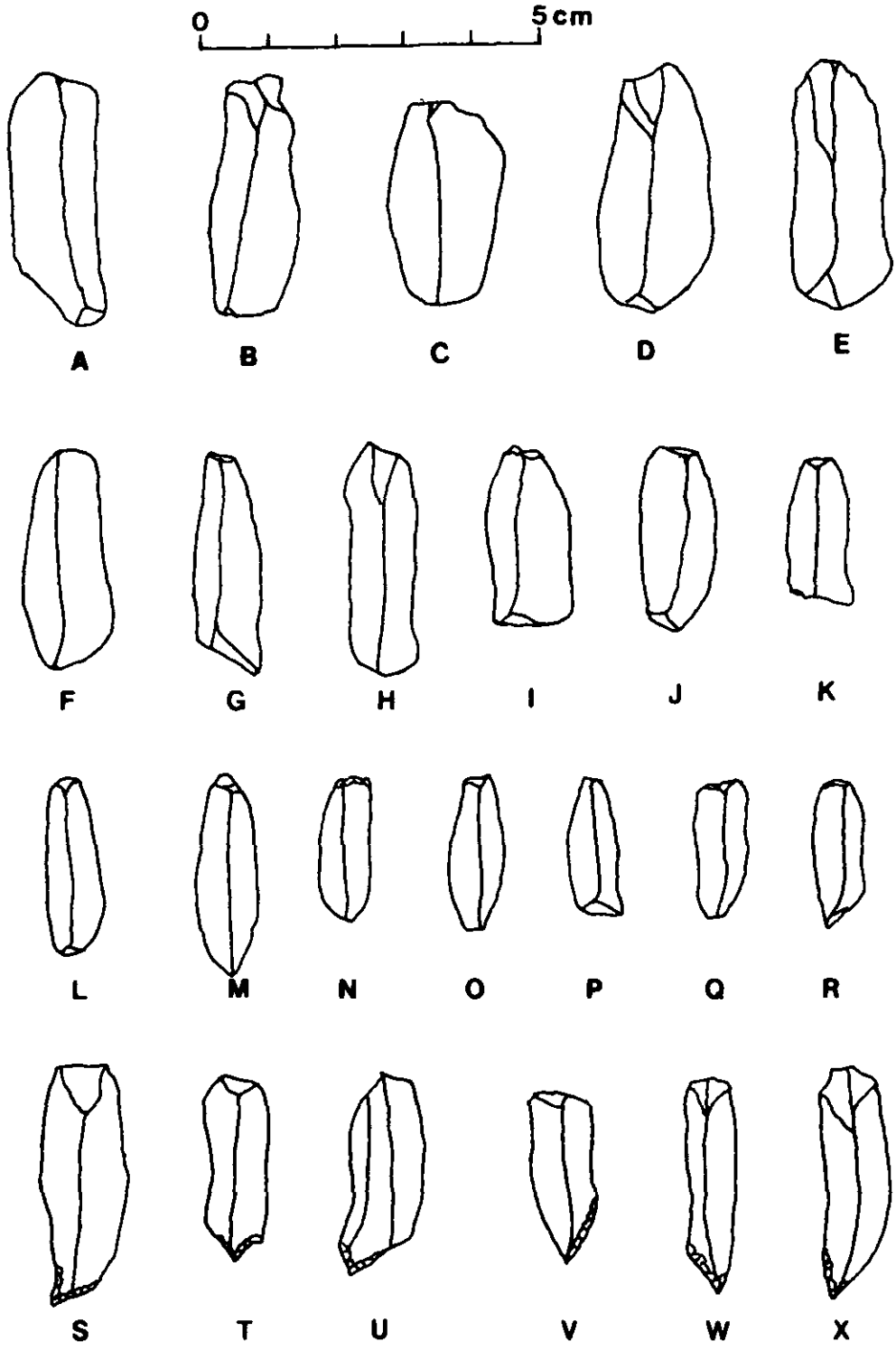
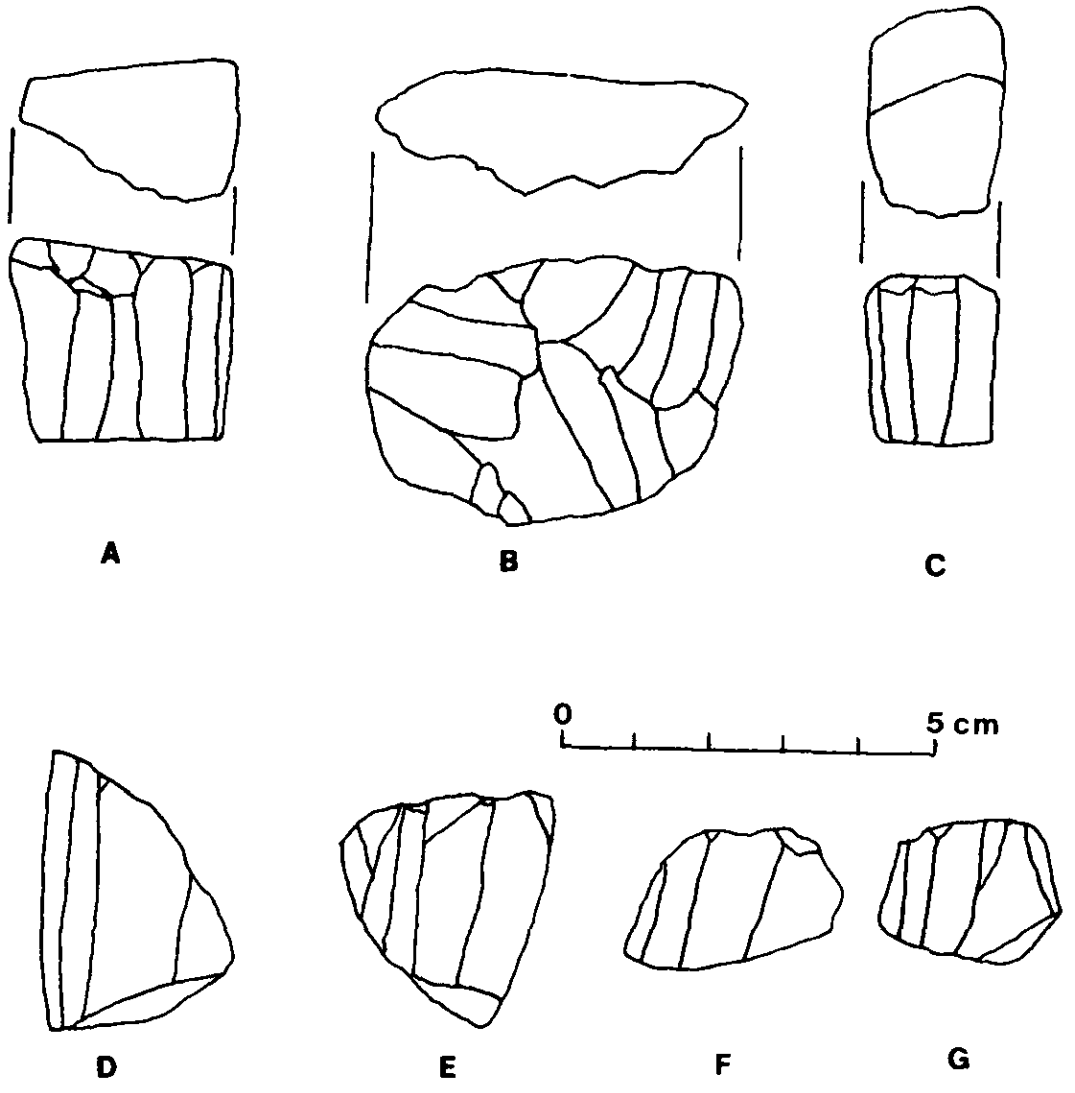


Figure 2. Blade Width Distributions, 41HR315, 206, 182



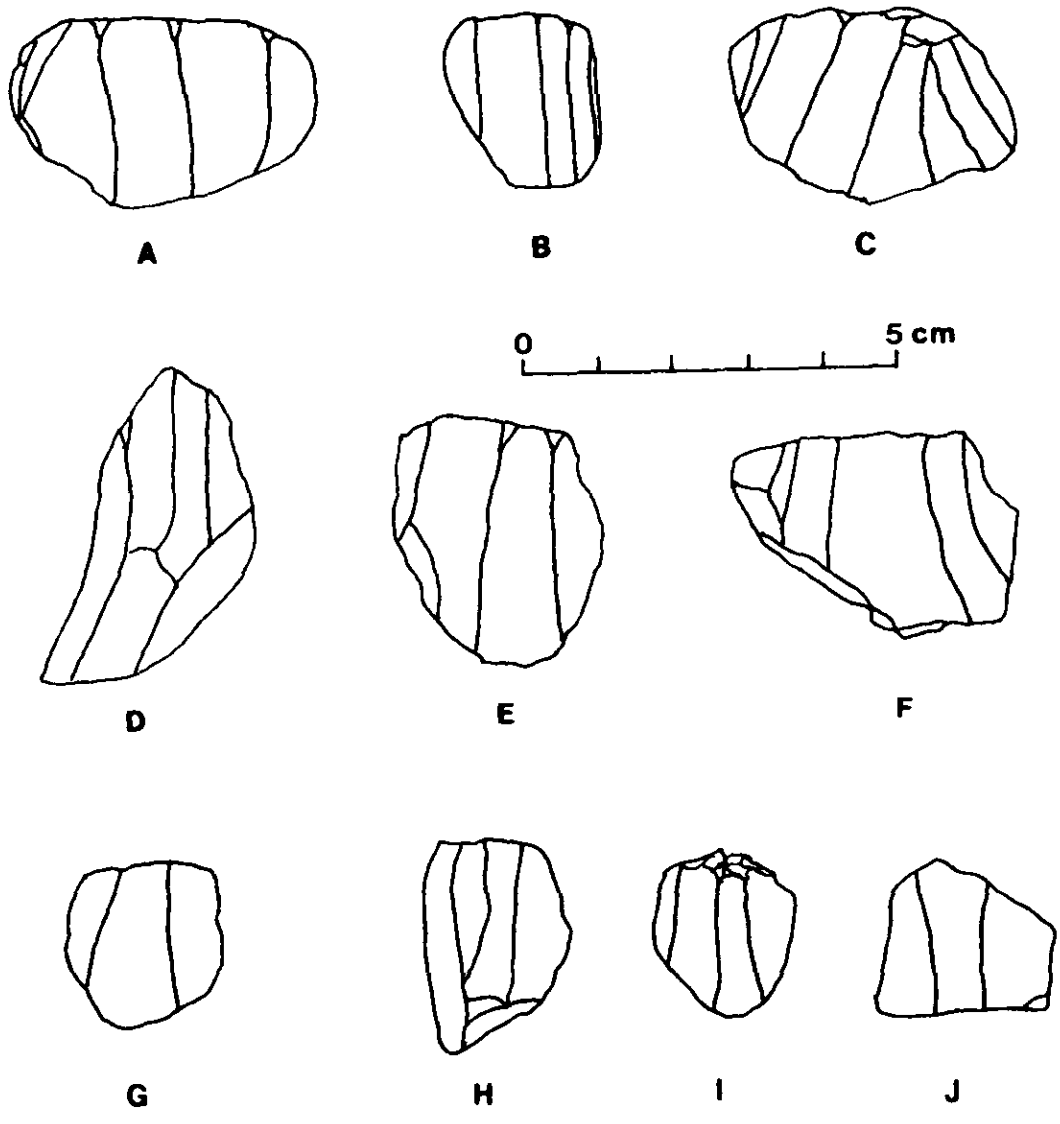
A to R – unmodified blades; S,T,U – gravers on blades;
V,W,X – blades used as perforators

Figure 3. Unmodified Blades and Utilized Blades



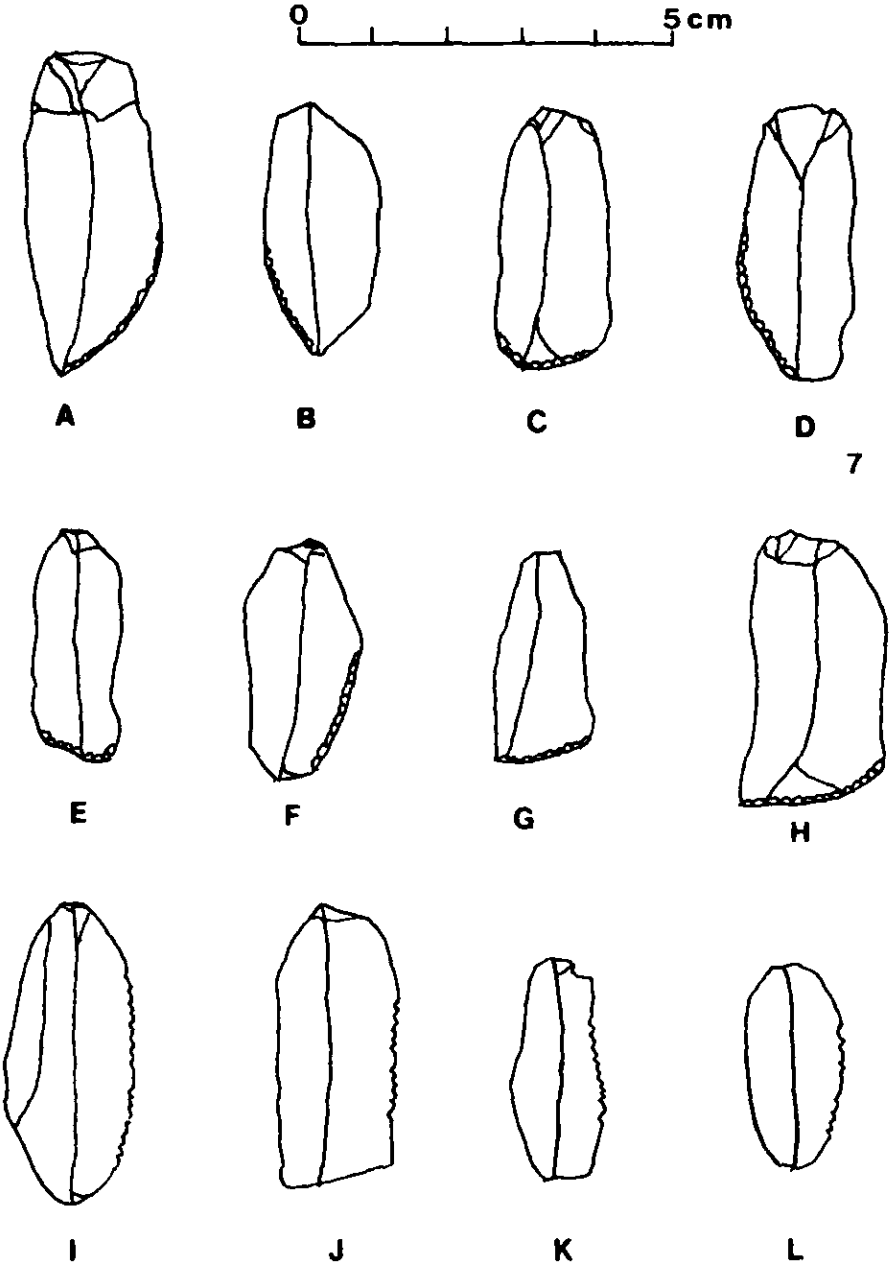
A,B,C – blade cores; D,E,F,G – blade core fragments

Figure 4. Blade Cores



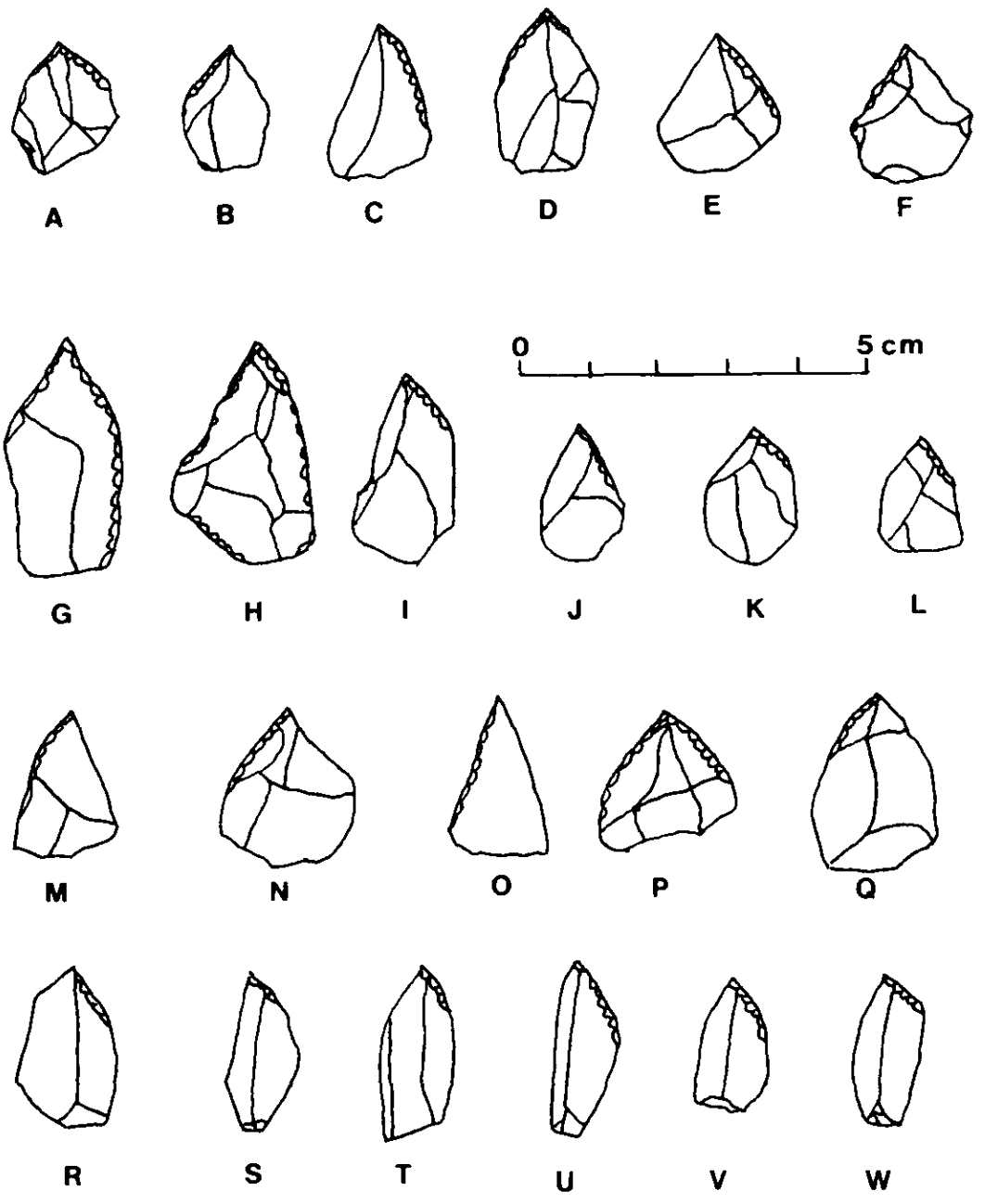
A,B,C – spent blade cores; D to J – blade core trim flakes

Figure 5. Blade Cores and Trim Flakes



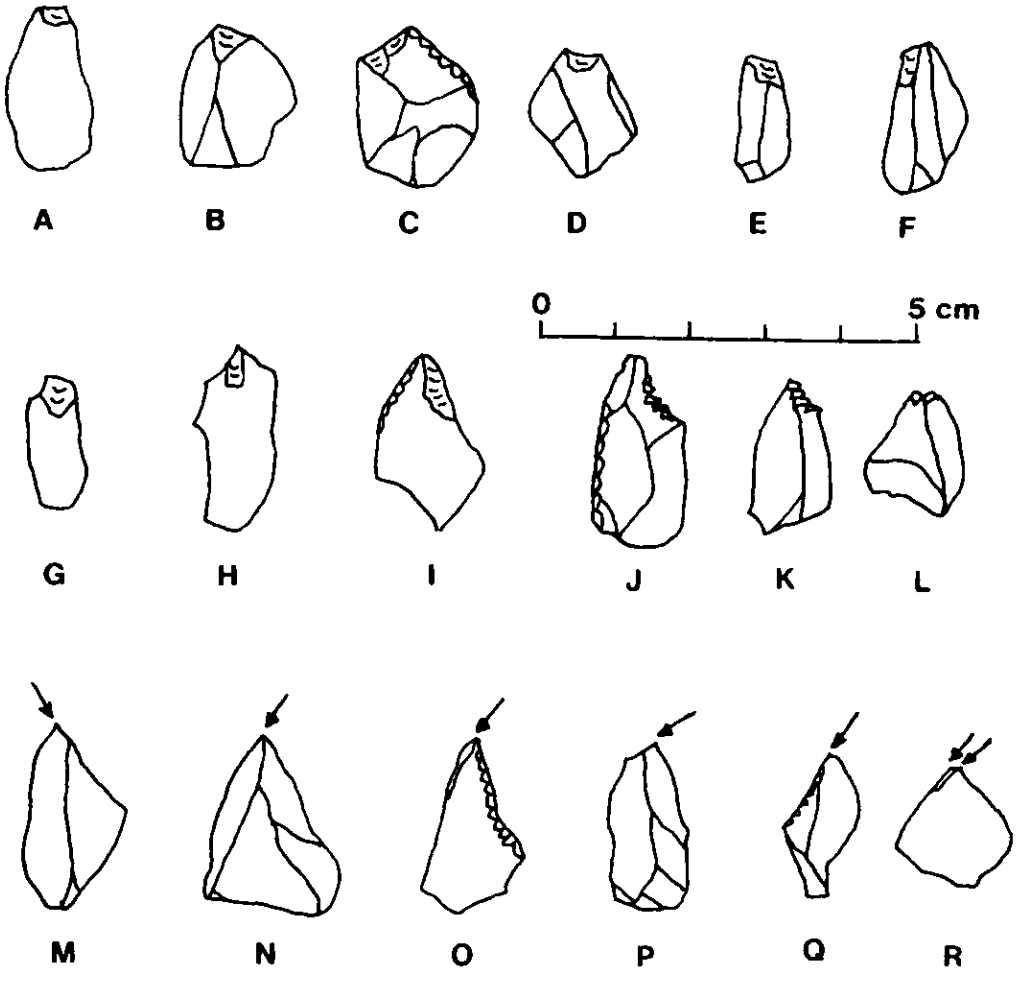
A to H – scraper edge wear; I to L – cutting edge wear

Figure 6. Utilized Blades



A to Q – points on flakes; R to W – points on Blades

Figure 7. Unifacial Arrow Points



A to I – impact flutes; J,K,L – tip crushing; M to R – burination

Figure 8. Impact Fractures

A Proto-Historic Date at 41HR206, Harris Co., Texas

Leland W. Patterson

It has previously been noted (Patterson 1993) that sites of the Proto-Historic and Historic Indian time periods in Southeast Texas are difficult to identify if no European-type artifacts are present, and no radiocarbon dates are available. The Guerrero arrow point (Hudgins 1984; Turner and Hester 1993:216) and loop handles for pottery (Hudgins 1984; Kindall and Patterson 1993) are the main diagnostic Indian artifact types for occupation components after A.D. 1500. The Proto-Historic Indian time period is defined here as an interval of A.D. 1500-1700, before much European presence in Southeast Texas. The Historic Indian period is A.D. 1700-1800+, with much evidence for European presence (Aten 1983; Ricklis 1994).

A radiocarbon date of 280 ± 80 B.P., A.D. 1670, (I-18,006) has been obtained for burned wood from a fire hearth at site 41HR206 in Harris County, Texas. This hearth is located on a stream bank in the southern part of the site, slightly west of where all arrow points have been found. A dart point preform, previously misidentified as a Refugio dart point (Patterson 1980: Figure 2f) was found near the hearth. Perdiz, Catahoula, and Bonham arrow points were found somewhat east of the hearth (Patterson 1980:14). No European-type artifacts were found at this site. Site 41HR206 has a surface collection from eroded areas, with artifact types that show a long occupation sequence from the Late Paleo-Indian through the Late Prehistoric time periods. The new radiocarbon date now extends the occupation sequence of this site into the Proto-Historic period.

Site 41WH19 is another example of a site in Southeast Texas where a Proto-Historic period date has been obtained with no European-type artifacts present. A radiocarbon date of A.D. 1585 ± 80 (SI-6455) was obtained for a stratum that contained Perdiz and Scallorn arrow points and fired clayballs (Patterson et al. 1987).

Both fired clayballs and caliche pieces were used for cooking at site 41HR206 (Patterson 1980:23). The fire hearth found here is about 46 cm in diameter, on an eroded area of a stream bank. Sixteen fired clayballs were collected from the hearth area, with diameters of 20-50 mm. Much burned wood was found in the hearth area. It appears that the hearth was used to roast a turtle. There were 34 pieces of turtle shell and 4 small turtle bone fragments in the hearth area. Some of the turtle shell pieces are large, and a large portion of the total shell seems to be represented.

Fired clayballs have been found at about 18% of Indian sites in inland Southeast Texas. It has been proposed that clayballs may have been used for seasonal processing of plant foods (Patterson 1989), although floral remains are seldom preserved at sites in this region. At sites where clayballs were being used, some evidence for roasting of animal foods has been found. This evidence includes turtle remains at site 41HR206, and a deer jaw on a clayball hearth at site 41WH19 (Patterson et al. 1987:11). Hudgins (1993) has shown experimentally that heated clayballs are well suited for roasting meat. Clayballs retain heat much longer than hot wood coals.

Excavations at sites such as 41WH19 (Patterson et al. 1987) and 41FB42 (Patterson et al. 1993) have established that fired clayballs were used in inland Southeast Texas from the Late Paleo-Indian (8000-5000 B.C.) through the Late Prehistoric (A.D. 600-1500) time periods. Radiocarbon dates at site 41HR206 and 41WH19 show that the use of fired clayballs continued into the Proto-Historic Indian time period in this region.

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The Gassner Site, 41WL22, Waller Co., Texas

Leland W. Patterson

Introduction

This article gives details on prehistoric site 41WL22 located near the city of Brookshire in Waller County, Texas. The site was found during a survey by some members of the Houston Archeological Society. The survey was directed by Sheldon Kindall. The survey team included Charles Boyle, Bill Csanyi, Richey Ebersole, Richard Gregg, Joe Hudgins, Bill Just, Sheldon Kindall, Lee Patterson, and Gary Ryman. This work was made possible through the courtesy of the landowner, Gerald Gassner.

Site 41WL22 was found by observation of some chert flakes on an eroded dirt road. A concentration of lithic artifacts was then found at the main site location. This is a campsite of nomadic hunter-gatherers, with occupation most likely in the Late Archaic time period. Waller County has not been well surveyed for archeological sites. Only a few sites have been published for this county (Patterson 1984). Twenty-two sites in Waller County have been recorded by the Texas Archeological Research Laboratory, compared to several hundred sites in some of the more surveyed counties in Southeast Texas, such as Harris and Fort Bend.

Site description and setting

Site 41WL22 is located on an eastern terrace of the Brazos River. The present channel of the Brazos River is about 3.6 miles west of the site. Bessies Creek, a former channel of the Brazos River, is about 0.4 miles west of the site. The site is at least 50 feet in diameter. The total area of the site was not determined because of the limited nature of surface collecting and shovel tests. It is located about 700 feet from the edge of the Brazos River floodplain, and is about 30 feet above the floodplain. There is an undisturbed area of the site next to the eroded dirt road. Two shovel tests in the undisturbed area showed cultural materials in sand about 30 cm deep above a culturally sterile clay base, which may be the Beaumont Formation. This is a typical type of location in this region for a prehistoric campsite, on well-drained sandy soil.

The site location is in a wooded area, and the general area is a mixture of woodlands and coastal prairie. A variety of floral and faunal food resources would have been available in this mixed environmental setting. There are pecan trees, and deer are still hunted in this area.

Most prehistoric sites found along the Brazos River are located on high terraces at the edge of the floodplain, such as in Austin (Hall 1981) and Fort Bend (Patterson et al. 1993, 1994) Counties. Prehistoric sites on the Brazos River floodplain would be difficult to locate because of deep alluvial sedimentation.

Site chronology

Site 41WL22 was occupied during the Archaic period, before pottery. A Kent dart point (Figure 1A) indicates occupation sometime in the Middle (5000-3500 B.P.) to Late (3500-1900 B.P.) Archaic, because this projectile point was used in both of these time periods (Hall 1981; Patterson 1991). It is most likely that this site represents Late Archaic occupation, because Late Archaic sites are more common than Middle Archaic sites (Patterson 1990a).

Lithic artifacts

Both projectile points and unifacial stone tools were made and used at this site. The lithic manufacturing pattern at this location indicates that local raw materials were being used, in the form of fairly small chert cobbles. Few chert cobbles from the local Brazos River area are larger than 60 mm in length, while chert cobbles from the Colorado River, about 25 miles farther west, are much larger. The largest chert flakes found at this site were in the 35-40 mm square size range.

Bifacially flaked artifacts consist of a Kent dart point and three dart point preforms in various stages of manufacture. All three preforms were made from flat chert cobbles instead of flake blanks. There is remaining cortex on both faces of all three specimens, indicating original surfaces of the flat cobbles. Direct reduction of thick, rounded chert cobbles is generally not appropriate for production of projectile points, because of thinning difficulties. One preform (Figure 1B) was broken during manufacture. A second specimen (Figure 1C) is a thinning failure. A third specimen (Figure 1D) is an early stage preform with much of the original flat chert cobble still intact. Dimensions of bifacial artifacts are given in Table 1.

It is often more difficult to manufacture bifacial projectile points from flat chert cobbles than from chert flake blanks. Both methods were used to make dart points at this site. The Kent point found at this site was made from a flake blank, with much of the original ventral surface of the flake still remaining. Flat chert cobbles were used for making points by direct bifacial reduction because of the limited sizes of chert cobbles that were locally available for the production of flake blanks. In this case, the higher labor cost of making projectile points directly from flat chert cobbles was balanced against low transportation cost of bringing local chert raw materials to the site. Also, the cost of manufacturing failure is relatively low when raw materials can be replaced from local sources. Small chert cobbles are available within a few miles of site 41WL22. At sites more remote from chert sources than site 41WL22, it was more customary to manufacture dart points from flake blanks than from flat chert cobbles. Weber (1991) has described experimental production of small dart points from both flake blanks and tabular chert cobbles obtained from sources on the lower Brazos River.

Only two formal unifacial tools were found, a notched tool (Figure 1E) and a combination scraper-graver (Figure 1F). Eight utilized flakes were found (Figure 2). Four flakes had cutting edge wear, three flakes had scraping edge wear, and one flake had edge sections with scraping- and cutting-type wear patterns (Tringham et al. 1974). The size distribution of lithic flakes is shown in Table 2. The collection includes 124 chert flakes and two petrified wood flakes. If bifacial reduction of flake blanks were being done, a plot of percent of flakes on a logarithmic axis versus flake size on a linear axis would tend to give a straight line (Patterson 1990b). The plot of this type for chert flakes from site 41WL22 does not give a straight line, as may be seen in Figure 3. This can be explained by indications that primary reduction of chert cobbles was being done at this site as well as bifacial reduction.

There are several indications of primary reduction of chert cobbles at this site. Remaining cortex on flakes over 20 mm square includes 10.8% primary flakes (covered with cortex), 47.3% secondary flakes (partially covered with cortex), and 41.9% interior flakes (no remaining cortex). Thus, 58.1% of flakes have some remaining cortex from the original chert cobbles. This percentage of flakes with remaining cortex is similar to the percentage of flakes with remaining cortex from primary reduction of chert cobbles in an experimental study (Patterson 1981:32). Two whole chert cobbles were found here, with lengths of 62.3 mm and 53.9 mm, and diameters of 42.0 mm and 42.3 mm, respectively. Five miscellaneous chert cores and eight thick chert pieces were found, also indicating primary reduction of chert cobbles at this site.

Six ovoid-shaped quartzite hammerstones were found, with weights and dimensions given in

Table 3. Heat treatment of chert was used at this site, as shown by waxy luster and reddish coloration on many of the chert flakes. The proximal section of a prismatic blade was found, with a width of 15.4 mm. This single blade specimen may have been produced fortuitously, rather than purposefully made.

Summary

Site 41WL22 is a preceramic campsite that was occupied some time during the last half of the Archaic time period. Further testing would be required to determine the total site area, the concentration of artifacts, and the occupation sequence. Indians at this location seem to have used mainly local chert resources that were available within a few miles of the site. It is important to do more archeological survey work in Waller County to increase the regional data base, because this county has not had much survey work.

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Table 1. Dimensions of Bifacial Artifacts

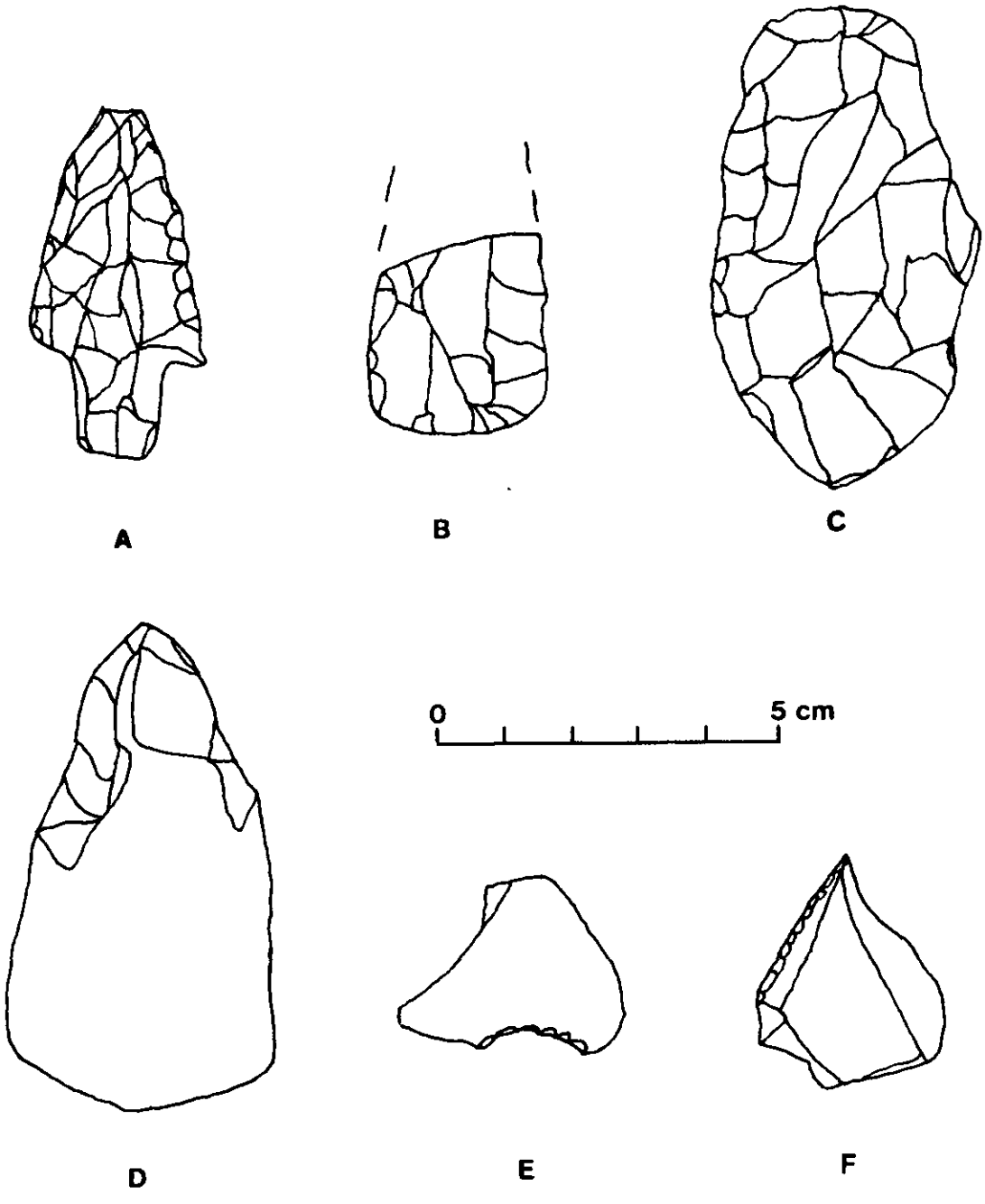
specimen type	dimensions, mm		
	length	width	thickness
Kent point	50.3	23.3	8.5
preform fragment		26.0	7.9
preform failure	69.0	37.6	23.0
early stage preform	68.2	37.0	14.2

Table 2. Flake Size Distribution

flake size, mm square	chert		petrified wood, no.
	no.	%	
under 15	50	40.3	
15-20	35	28.2	1
20-25	23	18.6	
25-30	7	5.7	
30-35	5	4.0	1
35-40	4	3.2	
total	124	100.0	2

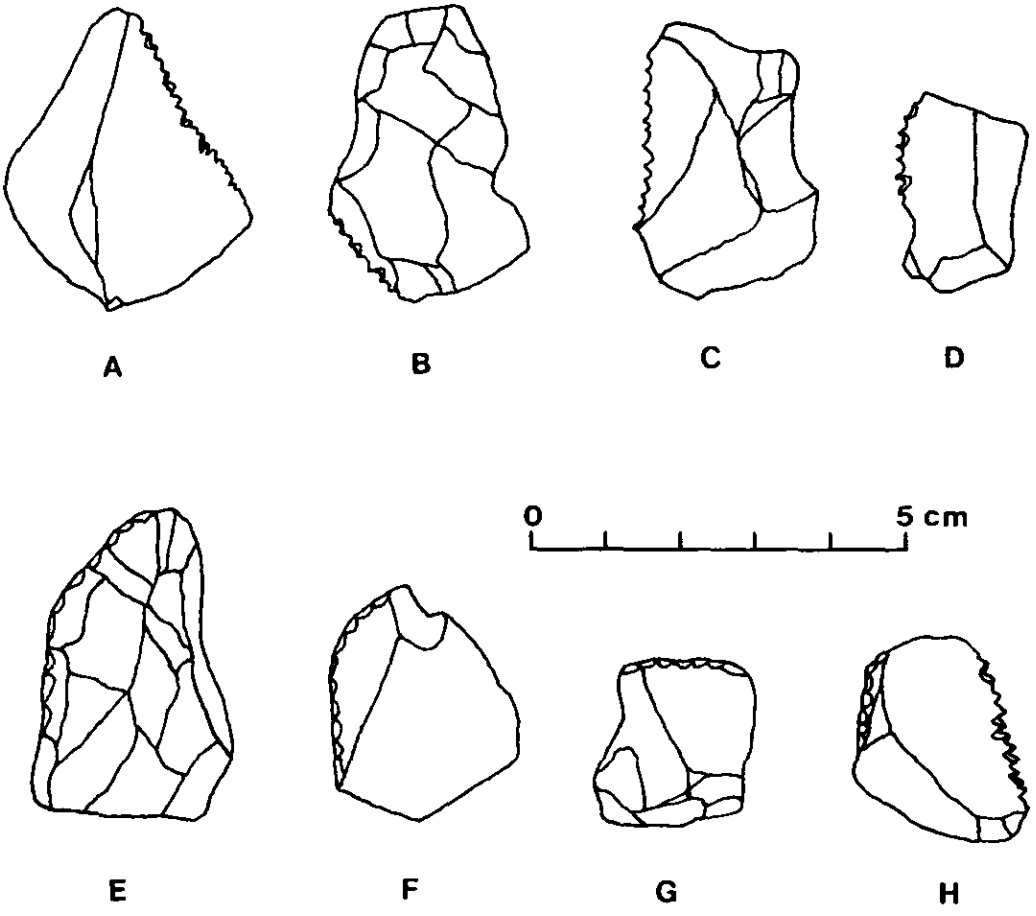
Table 3. Quartzite Hammerstones

wt., gm	length, mm	diameter, mm
115.5	64.9	37.9
49.6	43.0	30.8
55.1	45.0	32.6
34.9	35.0	29.3
30.4	40.0	31.0
34.5	42.2	25.7



A – Kent dart point, B – preform fragment, C – preform thinning failure,
D – early stage preform, E – notched tool, F – scraper-graver

Figure 1. Lithic Artifacts



A to D – cutting wear, E to G – scraping wear, H – scraping and cutting wear

Figure 2. Flakes with Edge Wear

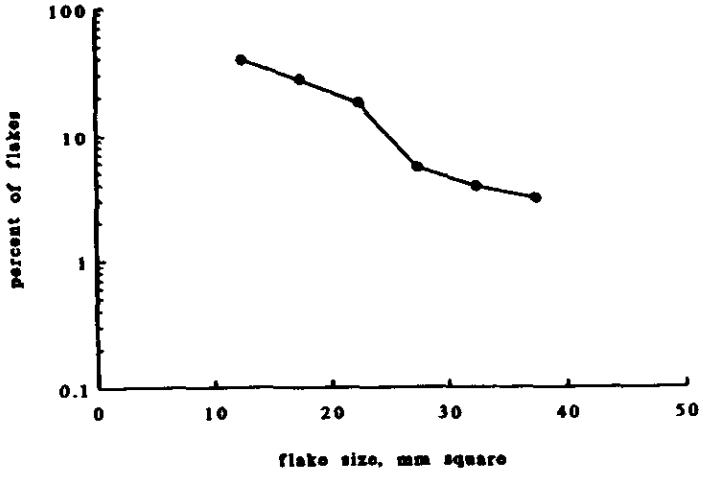


Figure 3. Flake Size Distribution

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