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The 10,000-Year-Old Lubbock Artifact Assemblage

Ruthann Knudson, Eileen Johnson, and Vance T. Holliday

ABSTRACT

Five lanceolate flaked stone tools, two with fitted or matching debitage flakes, and three flake tools were recovered from feature FA5-17, a Bison antiquus kill/butchering activity area, in substratum 2s at the Lubbock Lake Landmark (41LU1), Texas. These artifacts are identified as the Lubbock assemblage, with contracting-stemmed Lubbock points named as a mnemonic rather than a type. A radiocarbon determination of 9950±120 BP is associated. The Lubbock artifacts reflect a bifacial reduction technology applied to a variety of lithic materials (e.g., Jemez Mountain obsidian, Pedernall chert, Alibates agatized dolomite, Edwards Formation chert, chalcedony), with final parallel-collateral facial flaking of the stylized tool. Most appear to have been resharpened but not recycled. The typical lanceolate form has a converging proximal end and a narrow, straight-edged base, as if made to be socketed into a foreshaft of prescribed width. Several if not all of the lanceolate points were used as knives, and two exhibit heavy battering as if used as adze bits. Various combinations of the Lubbock assemblage’s attributes are found in the Agate Basin, Bonfire, Carter/Kerr McGee, Clovis, Hell Gap, Jones-Miller, Packard, Plainview, or Ryan site assemblages. The presently available chronological framework suggests that parallel-collateral flaking is not itself a temporally diagnostic attribute on the North American Great Plains during the Pleistocene-Holocene transition. Haft detail combined with facial flaking may be temporally and geographically more sensitive.

Keywords: Agate Basin; Eden; Hell Gap; Lubbock; Plainview

THE LUBBOCK LAKE SITE

The Lubbock Lake Landmark (41LU1) is a well-stratified, 121+ hectare (300+ acre) archaeological site on the eastern edge of the Southern High Plains (Llano Estacado), along the upper Brazos River drainage. The site is on the northern outskirts of the City of Lubbock in Yellowhouse Draw, a tributary of the Brazos River (Fig. 1), and has been a focus of Paleoindian studies since the late 1930s. For the past 25 years an ongoing research program has examined the stratigraphy and cultural activities evident at selected archaeological locales (Johnson 1987a, 1987b, 1993, 1995; Johnson and Holliday 1989).

Excavations in 1983 produced an assemblage of five lanceolate points, three flake tools, and a few flakes (Table 1) within a 10 m² area associated with a Bison antiquus kill/butchering locale (Fig. 2) designated FA5-17 (Feature 17 in Area 5; see Fig. 1) (Holliday and Johnson 1984; Johnson and Holliday 1985; Knudson 1994). Based on its stratigraphic position, radiometric age, and the facial flaking of the lanceolates, the FA5-17 locale and its toolkit were thought to be related to the Plainview assemblage (Knudson 1973, 1983) from the Plainview site (41HA1; Sellards et al. 1947), less than 40 km northeast of Lubbock. The flaked stone assemblage from FA5-17 is now recognized as significantly different from that found at Plainview and is reassessed in this paper.

FA5-17 STRATIGRAPHY AND DATING

Lubbock Lake feature FA5-17 is in stratum 2, which is primarily a lake and marsh deposit composed of several subunits (Holliday 1985, 1997;
Figure 1. Topographic map of Lubbock Lake in the reservoir area with locations of excavation areas (after Johnson and Holliday 1987b:Fig. 1.5). Area 5, the location of FA5-17, is on the tip of the “island” on the west side of the reservoir. Inset shows the southern High Plains with locations of Lubbock Lake and other Paleoindian sites mentioned in the text.

<table>
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<tr>
<th>Artifact Catalog No.</th>
<th>Artifact Description</th>
<th>Fig. No.</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
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<td>44.8</td>
<td>21.1¹⁰</td>
<td>6.8¹¹</td>
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</table>

¹ Measured along bulbar axis. ² Measured at the top of the edge grinding and just below the apparent resharpening. ³ Measured at the top of the distal spall scar. ⁴ Measured at 42.7 mm above proximal edge. ⁵ Measured at 36.9 mm above proximal edge. ⁶ Measured at midsection. ⁷ Measured at the height of the distal ripple on ventral face. ⁸ Measured at 31.5 mm above proximal edge. ⁹ Measured at 38.9 mm above proximal edge. ¹⁰ Measured at 35 mm above proximal edge. ¹¹ Measured at 33 mm above proximal edge.
Figure 2. Map of feature FA5-17 bison kill/butchering locale, noting relationship of faunal remains and lanceolates (as in Wheat 1972:Fig. 25 for Olsen Chubock).
Holliday et al. 1983, 1985) (Fig. 3). A sandy near-shore facies of stratum 2, designated substratum 2s, was deposited along the valley margin during most of the period from 11,000 to 8500 BP. In Area 5, substratum 2s is composed of lenses of predominately sand-sized particles of carbonate and quartz washed off of the valley wall located immediately south of the excavation area. This deposit also includes lenses of clayey, organic-rich marsh sediment from transgressions of the stratum 2 lake-marsh system across the gently sloping valley floor. Substratum 2s is subdivided into three local beds (LB) lettered from the bottom up (Fig. 3). Substrata 2sLBa and 2sLBc are 10 to 20 cm thick and composed of marsh sediments; 2sLBB is about 10 cm thick and contains a considerably higher content of slope wash. All three subunits become very sandy upslope, towards the valley wall. The FA5-17 bonebed is at the top of 2sLBB and follows the sloping paleotopography down toward the marshy edge of a pond.

Several radiocarbon ages are available from stratum 2 in Area 5 (Fig. 3) (Holliday et al. 1985a; Haas et al. 1986). Thin, organic-rich lenses within 2sLBB (associated with FA5-17) yielded a radiocarbon assay of 9950±120 BP (SMU-1261; NaOH-soluble fraction, corrected for $^{13}C/^{12}C$ fractionation). Organic-rich sediments from 2sLBc provided a radiocarbon age of 9780±100 BP (SMU-699; NaOH-soluble fraction). The base of substratum 2B, which overlies 2s in Area 5, yielded radiocarbon ages of 9170±80 BP (SMU-829; NaOH-soluble fraction corrected for $^{13}C/^{12}C$ fractionation) and 9075±100 BP (SI-4179; NaOH-insoluble fraction). The authors are aware of the ongoing discussions of radiocarbon plateaus and calibration issues during this time period (e.g., Taylor et al. 1995), but that is a topic for another paper.
THE FA5-17 BONEBED

Reservoir construction at Lubbock Lake in 1936 disturbed the FA5-17 bonebed; the full extent of the activity area and number of individuals will never be known. The remaining portion of the bonebed exposed during excavations in 1983 (Fig. 2) contained the partial remains of at least three adult females and one subadult ancient bison (Bison antiquus). Age is based on epiphyseal closure (Koch 1935) and tooth eruption and wear schedules (Frison 1974). Sex is based on measurements compared with the Lubbock Lake database (Johnson 1976).

Three clusters of bison bone occurred along the western eroded edge of FA5-17, all composed primarily of ribs and vertebrae (Fig. 2). The few other bones recovered include a maxilla (TTU-A39306), a mandible (TTU-A84720), and three metatarsals (left proximal ends, TTI-A84720 and TTI-A29222; right distal end, TTI-A40442). The mandible has all of its teeth erupted and in wear; it ages at 5.6 years or greater (Reher 1974:116). The maxilla contains a partial tooth row of P3-M1, all erupted and in wear with the lingual style of M1 in wear. This pattern ages the maxilla as older than 3.6 to 4 years (Wilson 1974:157). All the metatarsals have helical fractures. The two proximal ends preserve the impact area on the lateral; the distal end exhibits cut lines on the diaphysis. The epiphyses on the distal end are well fused, indicating an age of five years or greater (Koch 1935). The distal fragment does not conjoin either of the proximal fragments; therefore, the metatarsals represent three individuals. The fourth individual (subadult) is represented by the maxilla. The age grouping for the maxilla indicates a possible spring kill, but this determination is tenuous, based as it is on a single specimen. No fetal remains were recovered.

The bonebed resembles the other Paleoindian bison bonebeds at the Landmark in several respects: its grouping of bones, the small number of individuals represented, and the ever-present muskrat remains (Johnson 1987b). However, two aspects are unusual. Metatarsal TTI-A84720 is noteworthy in that it was found articulated with its hock joint. Bison carcasses in all the other Lubbock Lake bison kills dated to around 10,000 BP are completely disarticulated. Some articulated lower leg units appear in the Firstview period (ca. 8600 BP) bison kills at the Landmark (Johnson 1987b). The relatively large number of lithic artifacts, points in particular, is also striking and quite a contrast to other Landmark Paleoindian bison kills (Johnson and Holliday 1987). A sharpened point of Edwards Formation chert (TTU-A39340; Fig. 5a; PP#3 on Fig. 2) and a complete point of Pedernal (7?) chert (TTU-A39427; Fig. 4b; PP#1 on Fig. 2) were associated with the articulated bison bone unit and in general with one of the clusters of bison ribs and vertebrae. This central and the adjoining southwestern bone cluster were ringed by those two points as well as two flake tools of Edwards Formation chert (TTU-A29228; Fig. 6c; TL3 on Fig. 2) and Tecovas Jasper (TTU-A29142; Fig. 6a; TL1 on Fig. 2), and flakes. Additional flakes and an obsidian point (TTU-A39314; Fig. 5b; PP#4 on Fig. 2) were adjacent to a small concentration of bison bone scraps and rodent bones. A sharpened point of Pedernal (?) chert (TTU-A40455; Fig. 4a; PP#2 on Fig. 2) and a thin chaledony flake tool (TTU-A40419; Fig. 6b; TL2 on Fig. 2) were associated with the northernmost cluster of bison ribs and vertebrae. A shattered Alibates agate point (TTU-A40469; Fig. 5d; PP#5 on Fig. 2) was near another cluster, lying adjacent to a broken bison rib.

THE FA5-17 FLAKED LITHIC ASSEMBLAGE

Lanceolates

Long, light gray1 chaledony2 point3 (No. TTI-A39427; Fig. 4b; Table 1; PP#1 on Fig. 2). This is a “classic” Paleoindian lanceolate point. It is made of a light gray chaledony that has small white blebs, light gray streaks, one patch of yellow brown, and fine red brown dots. It does not appear to be annealed. Its material source is presently uncertain, though the lack of local knappable bedrock deposits (cf. Holliday and Welty 1981; Holliday 1997) and presence of north-central New Mexico obsidian and perhaps chert in the collection suggest that the chaledony may also have originated in deposits in that area. Judge (1973:143-145) mentions the presence of Rio Grande chaledony associated with Paleoindian
Figure 4. Lubbock lanceolates: (a) TTU-A40455; (b) TTU-A39427. Dorsal views are to the right, previous stage bifacial flaking scar remnants are noted on the outline drawings, and employable or tool units are identified by number.
assemblages in that area, and Banks (1990:69) notes that Pedernal chert is sometimes referred to as chalcedony, jasper, or agate. The point is identified tentatively as being Pedernal chert. A few flake scars (Fig. 4b, outer outlines) appear to remain from an earlier bifacial reduction stage. No other indication of the type of original core or preform remains. Final scars are parallel-collateral across each face, probably from pressure flaking, and average 5 mm wide, but are not precisely regimented. The cross section is softly diamond shaped. Because of its completeness, the tool is presumed to have been lost by the Lubbock inhabitants (i.e., during butchering use, when it need not have been hafted) rather than deliberately discarded.

Edges 1 and 3 on this piece (see Fig. 4b) are relatively straight in profile and slightly convex in plan; both appear appropriate for use as cutting edges. Both have some light spalling that could be from resharpening or from use. The latter possibility is more convincing. The distal point is quite sharp.

The proximal 30 mm of the point's lateral edges are slightly converging and moderately ground, and the proximal (basal) edge is moderately to lightly ground. The base is essentially square, and proximal edge thinning is fairly abrupt, leaving 5 mm long flake scars on both faces. There is no clearly identifiable shoulder, but the piece widens by approximately 2 mm (1 mm on each side), 14 mm above the proximal edge (caused possibly by more edge grinding toward the base). Some of the medial facial arrises on the proximal 25 mm of the point are lightly abraded, as from wear.

Short, light gray chalcedony point (No. TTU-A4045S; Fig. 4a; Table 1; PP#2 on Fig. 2). This apparently resharpened piece is a generally lanceolate form with a converging base. It is a light gray chalcedony with white or yellow brown blebs, light gray streaks, and a small dark red brown patch. It does not appear to be annealed and is tentatively identified as Pedernal chert, probably from the same source locale as the chert for point TTU-A39427. A few remnants of an earlier bifacial stage are evident (Fig. 4a, outer outline), but no indication of the original core or preform type. The facial scars on the proximal half (assumed not to be reworked) of the artifact tend toward parallel-collateral orientation, average 4-6 mm wide, and are not tightly regimented; cross sections y and x trend toward a diamond shape. The piece's apparent completeness suggests that it also was lost by the Lubbock inhabitants; however, a material flaw in the piece (Fig. 4a, right outline) may have caused it to be deliberately discarded.

The distal lateral edges of this piece are somewhat serrated in profile and slightly convex in plan, with light fine scars along them. The placement of maximum tool thickness high on the piece suggests that it was reworked from a longer, broken artifact. The apparent ripping (use-flaking of edge arrises) of edges 1 and 3 suggests the tool was used as a knife (cf. Frison 1978:301-328; Knudson 1973, 1983; Wheat 1977, 1979). The distal tip is quite sharp.

The base is slightly convex in plan now, but it appears that at least one "corner" of what was originally a relatively square base has been broken off. The absence of edge grinding along the proximal edge, except in its center, supports the idea of an originally square form. Basal thinning is by wide flakes up to 14 mm long on one face, and smaller flakes on the other; the proximal edge is 15 mm wide. Heavy grinding extends up the expanding proximal lateral edges for 31 mm, with a slight 1 mm expansion of those edges at points 12 mm above the proximal edge. Grinding of the center of the proximal edge is moderate.

Resharpened, dark gray brown chert point (No. TTU-A39340; Fig. 5a; Table 1; PP#3 on Fig. 2). This resharpened and end-spalled point remnant is apparently the basal section of what originally was a longer point. The tool is made of a dark gray brown chert with a few small blebs of very pale brown and thin edges of a lighter brown. Although it does not fluoresce, the color is typical of Edwards Formation chert. The tool does not appear to be annealed, but it does have a fracture embedded in it that may have been the reason for its intentional discard.

The piece's cross section is strongly lenticular at the base of that distal scar, but is more of a rounded diamond midway up the unsplayed portion of the tool. Flake scars on both faces (Fig. 5a, outer outlines) indicate that the tool was shaped from a bifacial preform of the same thickness as
Figure 5. Reworked and/or used Lubbock lanceolates and associated debitage: (a) TTU-A39340; (b) TTU-A39324; (c) TTU-A39315; (d) TTU-A40469; (e,f) TTU-A40460. Dorsal views are to the right, previous stage bifacial flaking scar remnants are noted on the outline drawings, and employable or tool units are identified by number. Note that flakes (e) and (f) can be refit to (d), as shown in the bottom far left profile.
the final point. Edges 1 and 2 appear to have been bifacially flaked to form new edges that are shallowly convex in plan, and edge 2 may have been smoothed by use as a cutting edge. The distal shattering of the presumed point could have occurred from impact on bone during wounding or killing of a bison, or perhaps from using it as a stabbing tool during butchering.

The proximal lateral edges and the proximal edge are ground as if for hafting (Fig. 5a). The base is 15.7 mm wide, and that edge as well as the proximal 12 mm of the lateral edges are more heavily ground. Each lateral edge expands by about 1 mm at the top of the heavier grinding. The base is essentially square in plan view, with strong medial thinning (scars form a triangle that is 10 mm long). Apparent wear abrasion occurs on the facial arrises and perhaps some scar faces toward the proximal end of the piece.

Obsidian point (No. TTU-A39314; Fig. 5b; Table 1; PP#4 on Fig. 2) with matching flake (No. TTU-A39315; Fig. 5c; Table 1; FL#1 on Fig. 2). This tool is a midsection/distal fragment that appears to have been broken during resharpening and discarded. The immediately previous stage of the piece's life history could have been as either the distal tip or midsection of a larger point. The obsidian is black with very pale brown. X-ray fluorescence of the artifact (Johnson et al. 1985) indicates that the raw material originated from the southeast side of the Valles Caldera in the Jemez Mountains of north-central New Mexico (Banks 1990:66; Holliday and Johnson 1984:12; Johnson et al. 1985; Mitchell et al. 1980).

The point remnant exhibits a tendency toward parallel-collateral flaking (scars average 5 mm wide and are not tightly regimented) that is obscured by more recent scars, presumed to be from pressure flaking done to resharpen the edges rather than for deliberate thinning of the piece. The cross section is lenticular in the middle, more thinly lenticular at the proximal edge. The lateral edges are shallowly convex in plan. Some tiny flakes were removed from the proximal fracture face, but they mostly likely were caused by natural forces over the millennia since the break occurred. Slight evidence of abrasion on edges 1 and 3 is probably from scrubbing to establish platforms for resharpening flake removals. Edge 2 is quite sharp.

Flake TTU-A39315 (Fig. 5c) is debitage and appears macroscopically (based on hue and translucency) to be from the same source as the obsidian point remnant. It was removed by force applied perpendicular to its distal edge (and parallel to the scar arrises on its dorsal face), but no striking platform remains. It could not be fitted to TTU-A39314.

Alibates point base (No. TTU-A40469; Fig. 5d, Table 1; PP#5 on Fig. 2) with 2 flakes (both No. TTU-A40460; Fig. 5e and 5f; FL#2 and FL#3 on Fig. 2). This tool may be more appropriately labelled an adze rather than a point. It has a generally lanceolate form and converging base. It is made of banded weak red, pale blue, and yellow brown to brown yellow Alibates agatized dolomite (Banks 1990:91-92, 127-128; cf. Hillman and Shelley 1994) that outcrops about 250 km north of 41LU1. The piece does not appear to be annealed. Evidence of an earlier bifacial form (of the same thickness as the recovered artifact) exists on both faces (Fig. 5d, outer outlines), and there is slight evidence of parallel-collateral facial flaking. The cross section is lenticular.

The distal end of this piece has been shattered as if it was hit directly, leaving a crack parallel with the long axis of the tool. Two Alibates flakes were found that can be refit to each other and then to the ventral face of the tool (Fig. 5e,f). The dorsal face of one flake (Fig. 5f) reflects the same two stages of reduction as does the core tool. Edge 3 shows evidence of use as a knife. The opposing edge (edge 1) is too complicated by the distal shatter to interpret. The medial portions of both lateral edges are lightly abraded, as if from wear.

This tool has an abruptly thinned, apparently unground but lightly abraded proximal edge that is 12 mm wide. Both proximal lateral edges are lightly ground along 10 mm from the proximal edge. No specific shoulder exists, but the piece widens by 1 mm on either side above the edge grinding. At the top of this grinding, the profile is 16.3 mm wide and 6.3 mm thick.

Flake Tools

Yellow brown chert flake tool (No. TTU-A29142; Fig. 6a; Table 1; TL#1 on Fig. 2). This tool is the midsection of a relatively thin worked flake of yellow brown chert, with touches of very
Figure 6. Lubbock flake tools and debitage: (a) TTU-A29142; (b) TTU-A40419; (c) TTU-A29228; (d) TTU-A40466. Dorsal views are to the right and employable or tool units are identified by number. Flake bulbar axes are indicated relative to ventral faces by a broken arrow in the direction of force, and the striking platform is illustrated on (c).
pale brown and a few streaks of yellow red. It was not annealed. The bedrock source of the material is Tecovas jasper. The tool is apparently a percussion flake from a much larger bifacial or discoidal blank, probably from a bedrock rather than gravel source. Prior to breakage, the flake had been unifacially worked on edges 1 and 2 with the removal of short flakes to leave a 46° angle on edge 1 and 43° angle on edge 2.

The long proximal break scar is smooth along its termination on the ventral face, but this is probably due to the nature of the fine hinge fracture rather than use wear. Apparent smoothing of the raised ripples occur on the ventral surface and central arris on the dorsal face, perhaps from hand wear, and scratches are suggested perpendicular to the long proximal fracture on both faces.

**Used, light gray chalcedony flake (No. TTU-A40419; Fig. 6b; Table 1; TL#2 on Fig. 2).** This unworked chalcedony flake is light gray with white blebs and has no indication of annealing. Its relative dimensions suggest that its parent core was bedrock rather than gravel, and it may be from the same source as the two gray chalcedony points. It appears to be the medial-distal portion of a percussion flake from a discoidal core.

Areas of unifacial nibbling (removal of very small flakes) and polish occur along most all sharp thin edges of the piece that protrude in plan outline, and there are possible scratches on the ventral face of edge 4, parallel to the working long axis of the piece. Slight polish appears on the distal ripple of the ventral face.

**Used, dark gray blue chert flake (No. TTU-A29228; Fig. 6c; Table 1; TL#3 on Fig. 2).** This small flake is of a dark gray blue Edwards Formation chert with some dark gray brown with dots of dark gray blue and veining of white to light gray. Its relative dimensions and facial scar patterning do not clearly indicate whether it is from a bedrock or gravel derived core. It has a solid multifaceted platform remnant (Fig. 6c, bottom right), appears to be from a discoidal core, and has an area of limy chert along edge 2. The senior author's sense is that this is a flake of river gravel, probably derived by bipolar reduction (frequent in the Lubbock Lake Paleoindian collection), and was used as an expedient tool. Tool unit 1 does not appear to have been deliberately flaked, but there is a suggestion of wear polish on edge 2 and the dorsal midline arris.

**Unmatched Debitage**

**Light gray chalcedony edge-shatter flake (No. TTU-A40466; Fig. 6d; Table 1; FL#4 on Fig. 2).** This small chalcedony flake was found in situ and does not match other known artifacts in the Lubbock collection. It is light gray with gray red purple spots, has no platform, and appears to be the result of tool shatter (like that exhibited by the Alibates artifact and its matching flakes, Fig. 5d-f) rather than the product of deliberate tool retouch.

**THE ASSEMBLAGE PATTERN**

The Lubbock points from the 1983 excavation of FA5-17 are intriguing because they represent a lanceolate haft form not previously identified at the Landmark nor elsewhere on the Great Plains. They provide a new model with well-established stratigraphic and temporal control, and shared flaked stone artifact technological, design, and use information. Observed attributes of the collection as a whole form the basis for the following inferences about cultural behavior of the makers and users of the Lubbock tools:

1. use of high quality cryptocrystalline material from outcrops some distance (240-320 km) to the north and northwest of the site, as well as Edwards Formation materials from southeast of Lubbock, for designed tools (points);

2. use of thin flake by-products of the designed construction process for expedient cutting tools, either worked on the edges or without modification;

3. possible use of regionally available gravels, such as flakes and shards from bipolar smashing, as raw material for small expedient tools;

4. reliance on bifacial or discoidal cores and staged edge-narrowing piece reduction to produce designed lanceolate tools, with the final designed reduction stage tending toward unregimented parallel-collateral scar patterning across tool faces;

5. designed construction of thin, shallowly convex distal edges on the distal portion of lanceolates to form an edge that would cut smoothly when hand-held (using the elbow as the fulcrum of the stroke), yet still penetrate hide when used as a hunting implement;
designed construction of lanceolates that are wide enough to provide structural strength when the distal lateral edges are used as cutting tools;

(7) as a counterpart to the curving distal lateral edges and lenticular (rather than strongly diamond-shaped) cross sections, and to accommodate slotting of the tool base into a narrow foreshaft, there is designed convergence of the proximal lateral edges of the tool;

(8) designed construction of the proximal portion of the lanceolate to fit a small thin foreshaft (such as a mammal rib section; cf. Judge 1973:325; Knudson 1973:134, 1983:162) with a ground straight proximal edge and nearly straight lateral edges ground for a distance of 10-14 mm up from the proximal edge—i.e., an edge-ground square base with a “collar point” (12-15 mm wide and 4-6 mm thick) at the top of the grinding so that it appears that the piece has 1 mm outset “shoulders,” and proximal edge thinning that varies to accommodate the tool’s cross section and thus achieve the desired thin lenticular cross section at the “collar point” (i.e., shorter flakes if the section is already relatively thin, stronger flakes leaving triangular scars if section is more diamond-shaped);

(9) conservation of broken pieces (5 cm length?) of designed lanceolates and modification of them for continued use as cutting or stabbing implements where possible (but such modification done away from the immediate butchering area);

(10) use of designed hafted lanceolates, in original form or reworked, for cutting and stabbing where elbow force is needed, as in heavy meat butchering;

(11) use of those expedient (hafted in some way, or unhafted) thin flake tools for light cutting activities done with wrist motion not requiring significant application of force;

(12) conscious discard of designed tools only when they were so shattered or broken, flawed, or too small to be reworkable yet another time; and

(13) relatively casual discard of expedient tools when the task was completed, or when the tool was no longer useful to the task for which it was first selected.

The Lubbock lithic assemblage is a set of kitchen tools, supplemented by a cutting tool retaining most of its designed attributes that was probably lost by the original FA5-17 inhabitants.

The traditional archaeological approach to evaluating Paleoindian lanceolates—viewing them primarily as stylized projectiles or killing implements so as to ascribe tool style or classificatory type assumed to have culture-historical significance—does not work well with a small assemblage such as this. However, given the stratigraphic and temporal context of the collection, and its retention of design elements, some comparative statements can be made. At first glance, the tool points seem to indicate Hell Gap rather than Plainview affiliation; design similarities are stronger to materials 1000 km from Lubbock than to those 65 km away at about the same time. However, they are not Hell Gap. Thus, we prefer to label the FA5-17 artifacts “Lubbock points” simply as a mnemonic device for characterizing a Lubbock assemblage.

The Lubbock points exhibit no attributes of the Southern Plains Clovis blade technology (Green 1963), nor of the thin flake technology found in the Plainview assemblage (Knudson 1973, 1983). Rather, Lubbock points appear to be reduced bifacial cores, or are made from flakes struck from bifacial cores, as is typical of Folsom (Boldurian 1991; Stanford and Broilo 1981).

Several other Plainview-age bison kill/butchering locales are known at Lubbock Lake. In Area 6 (Fig. 1), some 60 m north-northeast of Area 5 and the FA5-17 locale, feature FA6-11 was found near the base of substratum 2B in a subunit designated 2B ciénega (Holliday and Johnson 1981; Johnson 1983; Johnson and Holliday 1980). Radiocarbon assays (Haas et al. 1986; Holliday et al. 1983, 1985a) date the FA6-11 component as generally contemporaneous with the FA5-17 locale. Only two lanceolate artifacts were recovered from the FA6-11 feature (Johnson 1983: Fig. 36c; Johnson and Holliday 1980: Fig. 4, 1985: Fig. 10-8), both of Alibates material, apparently reharpened, and with associated rejuvenation debitage. All could fall under the rubric of the Plainview (41HA1; Knudson 1973, 1983) or Lubbock inferred design and use parameters. A comparable component, FA9-11, occurs in Area 9 (Johnson 1987a; Johnson and Holliday 1985), along the north wall of the center of the reservoir some 100 m southeast of Area 5 (Fig. 1).

DISCUSSION AND CONCLUSIONS

Lubbock lithic artifact design elements that have been identified as possible culture-historical
marks elsewhere include the following attributes.

Reduction technology, including material selection: Discoidal or bifacial core reduction of distant bedrock materials. The Lubbock tools appear to have been produced from serially reduced bifaces, rather than from a blade or from deliberately struck thin flakes. The latter two core types appear to dominate the technology used to manufacture the artifacts left at the Plainview (Knudson 1973, 1983) and Ryan (Hartwell 1995; Hartwell et al. 1989; Johnson et al. 1987) sites and in the "Portales Complex" at the Clovis site (Hester 1972:136-142; Knudson 1971; but see the discussion of this complex in Holliday 1997 and Johnson and Holliday 1997). Discoidal or bifacial core reduction is common to 10,000-year-old sites in the Northern Plains, such as Casper (Frison 1974) and Agate Basin (Frison and Stanford 1982). The FA5-17 obsidian is from bedrock outcrops in the Jemez Mountains of north-central New Mexico, as is the macroscopically identified Pedernal chert; the Alibates and Tecovas materials are from north of Lubbock. Without good identification and relative frequencies of raw materials in the various assemblages, any comparisons drawn may be moot. Nevertheless, it is the senior author's impression that the Lubbock assemblage is more reflective of western High Plains-Front Range resources, whereas materials from the Plainview (Knudson 1983) and Ryan (Hartwell 1995) sites reflect the eastern side of the Llano Estacado (e.g., Alibates, Edwards Formation, Tecovas).

Designed facial scar patterning and resharpening: Parallel-collateral flaking; resharpening until not usable as any kind of cutting or penetrating tool. Relatively unregimented parallel-collateral flaking is apparent on the faces of Clovis points dated to 11,200 BP at the Clovis site (Bell 1958:PI.8E; Cotter 1937:PI.3-1; Haynes 1995; Knudson 1971). In contrast, both tightly regimented and more general parallel-collateral flaking are apparent on a variety of points from the "Portales Complex" at that site (Hester 1972:136-142; Knudson 1971), which is now dated to between 9000 and 8600 BP, and is demonstrated to include a mixture of artifacts from at least two bonebeds well separated in time (Johnson and Holliday 1997). The mix of both generally and tightly regimented parallel-collateral facial flaking is found on the Plainview points, which are contemporary with FA5-17 and the Lubbock assemblage. Materials from the younger Finley and Horner sites in Wyoming (Frison 1978:180-188; Frison and Todd 1987) are generally parallel-collateral flaked with more or less regimentation (Frison 1978:Figs. 5.19, 5.23), comparable to the variation shown in the Plainview and Portales Complex materials.

Use: Initial use of designed lanceolates as cutting as well as killing (penetrating) tools; when broken, use as butchering tools to penetrate with the point and/or cutting edge. Apparent damage from use as butchering tools is common in the Plainview (Knudson 1973, 1983) and Lubbock assemblages, both deposited in sites some distance from bedrock outcrops suitable for the production of long lanceolate points. Contemporary assemblages are difficult to compare, because use evidence has not been analyzed and published for most of these; however, the lanceolates from the 10,000-year-old Casper site in central Wyoming (Frison 1974, 1978:Figs. 5.14-5.17) may have use evidence comparable to that from the FA5-17 assemblage.

Hafting technology, including proximal thinning technique and basal form: Proximally converging lateral edges; proximal edge thinning with flakes removed to leave a thin lenticular cross section at the top of the inferred "haft"; minimally inset edge-ground square base. Four of the Lubbock lanceolates are inferred to have been prepared for and then placed in a narrow thin foreshaft, such as a piece of mammal rib. The lanceolates left at the Plainview site have slightly incurving proximal edges and relatively straight ground lateral edges that, on the specimens that probably retain the most evidence of original point design, extend half the length of the piece before converging to a distal tip (Knudson 1983). The basal thinning scar pattern is stronger on the Plainview as compared with the Lubbock tools. Lanceolates from the Casper site (Frison 1978), Jones-Miller site (Stanford 1974), and several components at the Hell Gap (Agogino 1961; Haynes et al. 1965; Irwin 1968) and Agate Basin (Frison and Stanford 1982) sites have distally con-
verging ground lateral edges with a variety of basal geometric forms (square, slightly convex, slightly concave) that are generally contemporary with the Lubbock assemblage.

Many Folsom preforms, e.g., at Adair-Steadman (Tunnell 1977:Fig. 2) and Lindenmeier (Wilmsen and Roberts 1978:107-109), have converging lateral proximal edges, as indeed do many Folsom points themselves (e.g., Wilmsen and Roberts 1978:Fig. 146). This fits a hypothesized pattern of shaping the haft to fit when socketed into a foreshaft (cf. Judge 1973:324-326).

Various attributes of flaked lanceolate points are shared among the Lubbock assemblage, Hell Gap site Agate Basin and Hell Gap assemblages, Agate Basin site Agate Basin and Hell Gap components (Frison and Stanford 1982), Carter/Kerr-McGee site (Frison 1978) Agate Basin and Hell Gap components, and the Jones-Miller assemblage (Stanford 1974), but in varying combinations. Again in varying combinations, Lubbock lanceolate attributes are also shared with artifacts in the Portales Complex from the Clovis site (Green 1962:Fig. 1g; Hester 1972:136-142; but see the discussion of the Portales Complex in Holliday 1997 and Johnson and Holliday 1997), Belen materials from the Rio Grande Valley (Judge 1973), Packard site assemblages in Oklahoma (Wyckoff 1985, 1989; Johnson 1989), and with Perino’s (1968:2-3) definition of the Agate Basin type in the Southern Plains. Attribute similarities also occur with the Southern Plains Angostura type (Suhm and Jelks 1962:167-168) reported at the Richard Beene site south of San Antonio (Thoms and Mandel 1992). Mallouf (1990) has identified the presence of proximally converging points (labelled “Hell Gap” points) found on the surface of West Texas sites. A number of attributes are shared between the Lubbock assemblage and both Bonfire Shelter Bonebed 2 (Dibble and Lorrain 1968) and Devil’s Mouth (Johnson 1964:48, 52, Fig. 17b) on the lower Pecos. However, no single defined lithic type or described assemblage mirrors the Lubbock lanceolates.

The authors know of no other published Paleoinindian assemblage of the same time period and specific attribute combination displayed in the Lubbock assemblage. Sites of the same time period and apparent function (e.g., Agate Basin, Hell Gap, Plainview) exist, as do assemblages that display one or more of the design attributes of the Lubbock lanceolates, but there is no clone. The authors recognize that sites reflecting different behavioral contexts (e.g., camp vs. kill; cf. Bamforth 1991) will frequently have artifacts with variable attribute sets even if the same human group was originally associated with both sites. Indeed, as Knudson (1973, 1983) has described for the Plainview site, the same knapper can produce different combinations of technological, functional, and stylistic attributes within a single assemblage. Given the authors’ experience with such variability, we prefer to describe and label the collection characterized in this paper as the “Lubbock Assemblage.”

Comparing this small assemblage with others immediately brings up the issue of whether the tools reflect a group-accepted design, an idiosyncratic aberration of a group-accepted design reflecting an individual knapper’s skill and personal preference, or just an individual’s design selected from an array of design elements that could meet functional tool requirements in several different combinations (cf. Bamforth 1991; Bradley and Stanford 1987; Knudson 1995). The senior author’s opinion is that the Lubbock lanceolates all could have been made by a single highly skilled knapper, therefore, either that knapper's or his group's design concept(s) (or both) could be represented.

At present, a cultural-historical assignment for the Lubbock assemblage cannot be made. Technological, design, and use information for this collection are carefully described here so that comparisons can be made with other collections in which design features have been clearly differentiated from reworking and use attributes. The well-dated Lubbock assemblage should serve as a baseline in seeking out cultural affiliations and other patterns. At present more questions than answers abound, but the questions are intriguing.

END NOTES

1. Color terms used are hue/value/chroma designations set forth in Munsel (1954) and OSA (1970).

2. The term chalcedony is used here to denote a translucent cryptocrystalline silicate that has been identified only macroscopically, and under microscopic investigation could be either a chert or fibrous quartz (cf. Leudtke 1992:6).
3. In archaeological tradition, the term point labels a tool presumed to have served as the tip of a lance or arrow projectile, whereas the term knife labels a tool presumed to have been used in a push-pull cutting motion. In this paper, point is used as a convenience to refer to tools possibly used as projectile, cutting tools, and/or adzes. See Ahler (1971), Judge (1974), Knudson (1973, 1983), and Wheat (1977) for discussions of Late Paleoindian point form and function.

4. Don Wyckoff (1995) differentiates two types of flaked stone bifacial tool reworking: resharpening allows the tool to continue to perform the same function that it did (or was intended for) before being broken or damaged; recycling alters the tool’s edge or shape so it can be used to perform a new function.

5. The description and analysis of the FA5-17 assemblage was completed using a hand lens and a Bausch and Lomb stereoscope with up to 4.5X magnification.

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