

very short-term nature of most of the hypothesized tool functions. A flake used for two minutes to sharpen a stick is not going to develop much wear.

All types and sizes of debitage occur in the MD2 category. Due to the ephemeral nature of the modification, many pieces of debitage classified as unmodified would probably be classified as minutely retouched and utilized if examined under magnification.

#### (MD3) Retouched Debitage with Concave Edge (N=43)

The MD3 category consists of modified debitage specimens that have a retouched concavity (semicircular notch) on at least one edge. Flakes or chips with irregular concavities or concavities formed by a single blow are not included in this group. Similar artifacts are usually referred to as "spoke shaves." It is often suggested that spoke shaves were used to smooth arrow shafts. The 41 JW 8 MD3 specimens are not uniform and vary considerably in the size and shape of the concave edge.

### **Bifacial Artifacts**

Bifaces are two-sided pieces of chert that have been shaped by flaking on both faces. Most of the bifaces from 41 JW 8 are flake bifaces. That is to say, the bifaces were made from flake blanks rather than from an entire cobble (core biface). This is evidenced by the overall small size of most of the bifacial artifacts and the presence of flat flake plane remnants on many specimens. A few of the larger bifaces may be core bifaces.

The bifacial artifacts are divided into several functional and morphological groups. The smallest bifaces are arrow points. The distinctive size and shape of the arrow points from 41 JW 8 leave little doubt as to their functional identification. The larger complete bifaces and fragments of complete bifaces are described under the heading "Finished Bifaces." Four morphologically distinct groups of finished bifaces are defined. These four groups represent tool types that have been previously recognized in southern Texas. Functional differences are suggested for most groups based on morphology and microscopic examination although some functional overlap occurs.

The remaining bifacial artifacts are unfinished and fragmentary and do not fit into well-defined groups. These are divided into groups based on general morphological similarities. These bifacial artifacts were not microscopically examined.

### **Arrow Points**

#### (A1) Contracting Stem (Perdiz) (N=99)

The A1 category consists of complete and identifiable fragments of small contracting stem arrow points (Figs. 4; 5, a-n). The blades are triangular with straight or rarely concave (recurved) or convex edges. The distal tips

In summary, the 41 JW 8 beveled knives and fragments have a very consistent wear pattern. This consists of an evenly rounded and polished edge that is usually accompanied by worn flake ridges that extend 4-9 mm from the edge on both aspects. The polish is comparatively light (in comparison to added or "corn gloss" polish) and follows the microtopography of the rounded surface rather than forming facets. No definite striations were observed. The heaviest wear along the blade edge usually occurs at or near the tip and near the lateral corners. The heaviest wear on the edge aspects consistently occurs on the bevel aspect. Very little additional edge damage was observed on the blade edges. The proximal edges show more variation. Several specimens have similar wear along the proximal edges as that seen on the blade edges. Other specimens have ground proximal edges.

The 41 JW 8 beveled knives are similar in most respects to the Choke Canyon collection (Brown et al. 1982). The most important difference is that a more consistent pattern of wear was observed. The development of extensively rounded and polished edges and flake ridges on most of the specimens appears consistent with use on soft yielding material such as meat and hide.

The similarity between the wear noted on the beveled knives and that noted on the end scrapers at 41 JW 8 suggests that contact with similar material produced the wear. The difference in wear between the two tool types is in location and morphology. The end scrapers have distal edges that are rounded by wear toward the dorsal aspect. The beveled knives have evenly rounded edges. This difference is interpreted as the difference between longitudinal and transverse usage motions. The other major difference is that the beveled knives have rounded and polished flake ridges on both edge aspects that extend well beyond the edge, while the end scrapers have little wear on the ventral aspect, and the wear on the dorsal aspect only extends for a few millimeters. This difference reflects the amount of contact with the yielding material and the direction of use.

A strong case cannot be made for hafting. Certain beveled knives have ground proximal edges or proximal facial wear that could be interpreted as haft wear, but others do not. Some of the proximal wear could have resulted from the use of a protective leather pad bound or held around the proximal tool end to protect the hand and to provide a better grip.

### B2 Triangular Bifaces (N=3; Fig. 7,a-c)

Three triangular bifaces were recovered from 41 JW 8; two specimens are complete, and one is missing the distal tip. All three are comparatively thick bifaces with narrow triangular outline shapes, straight bases, and slightly convex blade edges. The blade edges have been resharpened on two specimens.

Triangular bifaces are the most ubiquitous bifacial artifact form in south Texas. Archaic assemblages are often dominated by triangular forms. These are traditionally referred to as dart points despite a general lack of any functional evidence. The B2 specimens from 41 JW 8 are much thicker and heavier than the small, thin triangular arrow points, A3. A microscopic examination of the B2 specimens showed wear patterns consistent with a tool

used in a cutting or penetrating motion on soft yielding material. This wear is similar to the wear found on the beveled knives, and it is suggested that both forms represent butchering tools.

The Lot 351 specimen (Fig. 7,b) is made of a very glossy white chert that has the tiny, crystal-filled inclusions that are typical of the material type. It is 38.9 mm in length, 18.5 mm in width, 6.7 mm in thickness, and weighs 4.3 g. The edges appear to have been resharpened shortly before discard; they are fairly sharp but do show light abrasion and polish. Some of the remnant flake ridges several millimeters away from the edge show moderate rounding and polish on both faces. The wear is consistent with a penetrating use on soft material, such as meat or hide, in the same manner as a projectile tip or a butchering knife.

The Lot 370 specimen (Fig. 7,a) is a fragmentary biface made of gray to yellow to pink quartzite with numerous voids. The coarse grain material is difficult to evaluate. All edges are abraded. No polish could be detected, however, the highly reflective quartz grains hampered observation. One blade edge is severely ground and also has a thick area adjacent to the edge. The grinding may have been connected with attempts to remove the thick flaw. The opposite edge is lightly rounded. This specimen may have never been completed. It is 24.4 mm in width and 7.9 mm in thickness.

The other B2 biface is a poorly thinned asymmetrical artifact (Lot 128; Fig. 7,c) made of tan chert. It is 44.0 mm in length, 20.7 mm in width, 8.8 mm in thickness, and weighs 6.3 g. Although numerous hinge fractures along the edges attest to futile attempts to further thin this artifact, it was definitely used. All edges have been rounded. The basal edge and the lower 10 mm of both blade edges are abraded but not polished. All of the remaining blade edges are polished. The distal tip is severely rounded and worn. Many small step fractures are present on both aspects along the bladed edges; all are rounded and polished to a distance of 4-5 mm from the edge. This artifact is very heavily worn. The wear is concentrated on the distal third of the tool but present along the entire edge. The basal and lower blade edge grinding and lack of polish suggest a haft. The blade edges are evenly worn (with respect to the aspects). This suggests a longitudinal action. The rounding and polish along the edge and on both aspects of the edge suggest use on a soft yielding material.

### (B3) Perforators (N=4; Fig. 7,d,e)

Two proximal and two distal perforator fragments were found at 41 JW 8. The two proximal perforator fragments are from tools made on flakes; in other words they are flakes that have been marginally shaped rather than completely bifacially flaked. These two specimens have widely flaring bases that are irregularly shaped. All four perforator fragments have narrow, carefully shaped thick blade (bit) sections. Material types are brown chalcedony, white chert, tan chert, and gray chert. All except the chalcedony specimen appear to have been heat treated. Metric data are presented in Table 4.

Similar artifacts are found in many Late Prehistoric assemblages in southern Texas (Hester 1980a). Often these are described as "flake drills." The

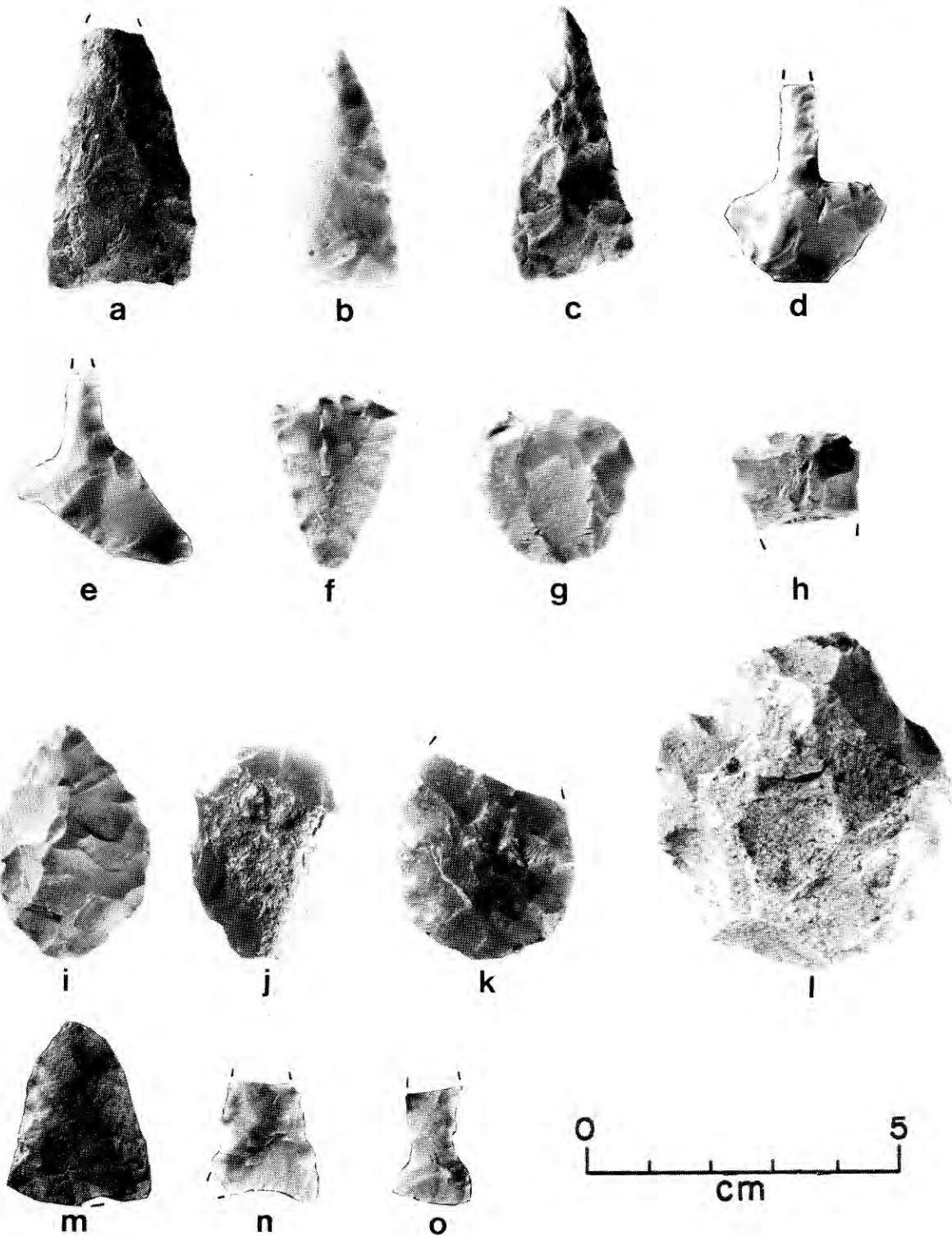


Figure 7. **Bifacial Tools.** a-c, triangular (B2); d,e, perforators (B3); f-h, *Olmos* biface (B4); i-l, round proximal (FB1); m-o, miscellaneous (FB2). Lot numbers: a, 370; b, 351; c, 128; d, 433; e, 131; f, 67; g, 369; h, 113; i, 421; j, 206; k, 261; l, 125; m, 345; n, 284; o, 289.



TABLE 4. PERFORATOR METRIC DATA

| Lot Number | Blade Width | Blade Thickness | Base Width | Base Thickness |
|------------|-------------|-----------------|------------|----------------|
| 76         | 8.8         | 4.7             | -          | -              |
| 131        | 5.3         | 4.3             | 31.0       | 10.4           |
| 433        | 6.3         | 3.2             | 26.0       | 5.7            |
| 482        | 9.3         | 5.8             | -          | -              |

All measurements are expressed in millimeters.

term "perforator" is chosen here simply to indicate that the tool was used to make holes. The exact method used to make the holes could have been drilling, punching, or reaming. The functional difference can only be determined with extensive wear pattern and replicative studies.

A cursory microscopic examination of the B3 specimens revealed evidence of soft material wear (extensive edge rounding and polish) on one artifact (Lot 76) and harder, more resistant material wear (no polish, extensive edge crushing, and step fracturing) on two specimens (Lots 131 and 433). The remaining specimen (Lot 482) had mixed wear indications--edge rounding and polish near the tip and extensive edge damage farther away from the distal tip. Thus it would appear that the perforators from 41 JW 8 were used on several types of material.

#### (B4) Olmos Bifaces (N=3; Fig. 7,f-h)

Three **Olmos** bifaces were recovered from 41 JW 8; two specimens are complete, and one specimen is missing the proximal portion. These distinctive bifaces are subtriangular in outline and have a steeply beveled distal bit (the broad end). The bit when viewed on end is convex. The artifact resembles a miniature gouge. All three specimens are made of chert. Metric data are presented in Table 5.

Shafer and Hester (1971) recognized the **Olmos** biface as an unusually distinctive tool type with a limited spatial distribution. The distribution of **Olmos** bifaces occurs within "a narrow band 70 to 80 miles wide, extending across southern Texas from western Kleberg County to central Webb County," according to Shafer and Hester (*ibid.*:7). More recent work has shown that the distribution extends northeast to almost the Nueces River (Black 1978; Mokry, personal communication). The temporal placement of the **Olmos** biface is less certain due to the lack of excavated specimens. Shafer and Hester (1971) suggested a Late Archaic and Late Prehistoric placement. The 41 JW 8 specimens document the use of the tool during the Late Prehistoric. No other **Olmos** bifaces have been reported from Toyah-like assemblages.

TABLE 5. OLMOS BIFACE METRIC DATA

| Lot Number | Length | Width | Thickness | Weight |
|------------|--------|-------|-----------|--------|
| 67         | 28.6   | 21.0  | 7.3       | 4.1    |
| 113        | -      | 21.4  | 8.7       | -      |
| 369        | 26.8   | 27.9  | 6.7       | 5.6    |

All measurements are expressed in millimeters except weight which is in grams.

The precise function of the Olmos biface is unknown. Some sort of gouging or scraping function seems most likely in view of the morphology. The distribution of the tool type coincides with the northern prickly pear field ("land of the tunas") described by Cabeza de Vaca (Davenport and Wells 1918-1919; Campbell and Campbell 1981). This author was tempted to speculate that this unusual and obviously specialized tool form may have been used to process prickly pear (remove spines?). This suggestion is unlikely given the wear patterns (discussed later), the use spalls on the ventral surface, and the burinlike blows on the distal corners that Shafer and Hester believe are related to use wear. It is interesting to note the distributional coincidence of this specialized tool and one of the few documented ethnohistoric exploitation patterns for the area.

The three Olmos bifaces were examined microscopically. All three have extensive use wear.

The Lot 113 specimen (Fig. 7,h) is fragmentary; the proximal section has been removed by a transverse snap fracture. It is made of a coarse-grained gray chert. This artifact is very heavily worn. The wear is centered on and related to the bit. The central section of the bit edge is severely rounded and polished. The edge is rounded toward the ventral aspect. The well-developed polish extends across almost the entire ventral surface. The rounding and polish form a faceted surface adjacent to the edge that fades out toward the proximal end. This wear is not present on the sides of the ventral surface, only in the center. A series of small microfractures (feathered terminations) adjacent to the bit is present on the ventral aspect on both sides of the heavily worn central area. Striations are present on the polished facet that begin at the bit and run perpendicular to the edge. Under high magnification, 80X, the striations appear as rounded, shallow grooves. The dorsal aspect (the beveled face) is severely step and hinge fractured all along the bit edge. This appears to be from an earlier resharpening episode as the step and hinge edges are partially rounded and polished over. The polish occurs on the higher portions of the flake ridges and extends to the upper portion of the bevel. The side edges of the tool are not worn.

The Lot 67 artifact (Fig. 7,f) is made of a fine grain chert that is yellow tan in color. The bit edge is moderately rounded and polished. The ventral surface is covered by large shallow flake scars and shows no wear except for a narrow band of polish along the bit edge. The bevel surface has a number of hinge and step fractures along the bit that have well-worn and polished edges. The side edges of the tool are not worn except for some light rounding and polish along the proximal one-third. This may suggest haft wear or modification. Some of the prominent ridges on the ventral face at the proximal end are also rounded and lightly polished.

The Lot 369 specimen (Fig. 7,g) is made of gray, variable grain chert. The distal (bit) edge is very heavily worn except for a small area on one side that has a recent removal. The intact section of the distal edge is severely rounded and highly polished. The ventral surface is also heavily rounded and polished adjacent to the bit edge. This pattern is partially interrupted by several wide but short hinge fractures, most of which have been well-smoothed and polished by use. Striations were observed on the heavily polished area of the ventral face which run perpendicular to the bit edge. The bevel or dorsal aspect of the bit does not have hinge or step fractures and is much less worn than the edge or ventral aspect. Moderate ridge rounding and polish are present. The lateral edges of the tool are not worn except for along the proximal one-fourth of the tool. This section and the proximal edge are ground. Some edge rounding but little polish is present on the flake ridges on the faces of the proximal end of the tool.

In summary, the three *Olmos* bifaces from 41 JW 8 have consistent wear patterns that suggest extensive wear, hafting, use on a moderately hard material, and in a specific motion. The location of most of the wear adjacent to the bit edge and on the ventral aspect of the bit edge suggests that the tool was held dorsal side up and pushed (or pulled) bit forward with extensive contact along the ventral surface. The striations confirm the direction. The ventral aspect step fractures on two specimens suggest use on a resistant material but one in which extensive polish can develop. The polish present on two of the tools is much more reflective and extensive than that present on any other examined lithic tool. This wear appears to be consistent with a wood-working function, perhaps as a push-plane. Replicative experiments are needed to substantiate this interpretation.

### **Fragmentary and Unfinished Bifaces**

Biface fragments and unfinished bifaces that cannot be placed in the above descriptive categories are divided into three morphological subgroups.

#### (FB1) Round Proximal (N=16; Fig. 7,i-1)

Eight complete and eight fragmentary bifaces have rounded proximal portions. These specimens are not uniform, varying widely in size, thickness, outline shape, and degree of finish. Most appear to be unfinished preforms that were discarded due to breakage or flaws, excessive thickness, and/or irregular shape. The smaller specimen (Fig. 7,i) probably represents a *Perdiz* preform. One specimen (Fig. 7,j) could be a preform for an *Olmos* biface. The larger

specimen (Fig. 7,1) does not resemble any of the finished biface groups. Material types are all gray to brown chert except for one gray "sugar" quartzite specimen and one white chert specimen. In general, this group of artifacts represents manufacturing failures that could be expected given the relatively poor quality and small cobble size of the available lithic resources. No metric data are presented.

#### (FB2) Miscellaneous Proximal Fragments (N=6; Fig. 7,m-o)

Group FB2 contains six proximal biface fragments (Fig. 7,m-o) that have little in common with each other or the other biface groups. They appear to have been broken before completion. Material types are fine grain chert (2), coarse grain chert (1), white chert (2), and silicified wood (1). No metric data are provided.

#### (FB3) Miscellaneous Biface Fragments (N=154)

Group FB3 is a catch-all category, including distal, lateral, and medial biface fragments as well as many bifacial failure fragments. The term "bifacial failure fragments" is used to describe the flakes, chips, flake fragments, and chunks that evidence bifacial flaking but were obviously never portions of finished tools. Material types are fine grain chert (119), white chert (20), coarse grain chert (5), burned chert (3), quartzite (2), chalcedony (1), yellow jasper (1), and silicified wood (1).

#### Unifacial Artifacts

The unifacial tool category is comprised of flakes or flake fragments of siliceous stone that have been worked or trimmed on one face to form a purposeful shape. Almost all the 41 JW 8 specimens are trimmed on the dorsal face to form a semicircular tool edge. For a discussion and illustration of the morphological terminology used to describe unifacial tools see Black and McGraw (1985). The trimming is usually located on the distal end of the flake, hence the rubric term "end scraper." Traditionally, most unifacial stone tools are given the functional designation "scraper." These tools are characterized by comparatively steep edge angles, semicircular working edges, and comparatively little elaboration. Wear pattern studies have usually borne out the accuracy of the term "scraper" (Wilmsen 1970; Wylie 1975).

The Hinojosa site unifacial tool sample is remarkably uniform in morphology. Group U1 comprises over 95% of the unifacial tools. Group U2 contains a small percentage of atypical unifacial tools. It should be emphasized that the unifacial tools at 41 JW 8 are little more than trimmed flakes. Only the patterned trimming and shaping set them apart from the many MD1 specimens. Functionally, a great deal of overlap may exist between the unifacial tool and the modified debitage categories.