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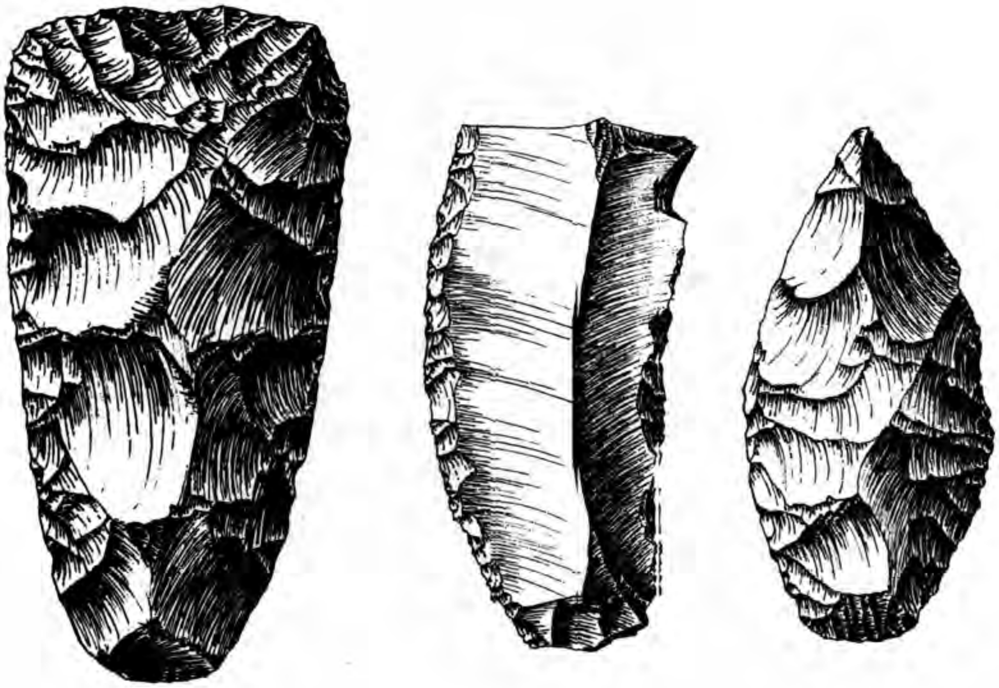

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Thomas R. Hester
Editor

About the cover: Selected artifacts from the J-2 Ranch site drawn by Richard McReynolds. See paper by Smitty Schmiedlin starting on page 6.

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NOTES ON SOUTH TEXAS ARCHAEOLOGY 2002-2

Travels With Smitty and Bill: Archaeology in Karankaway Country

Thomas R. Hester

On March 27, 2002, Texas archaeology lost one of its most enthusiastic and active contributors. E. H. (Smitty) Schmiedlin was one of the founding members of the Southern Texas Archaeological Association, long active in the Texas Archeological Society, and author of numerous archaeological studies (Figure 1).

At the STAA Quarterly Meeting on May 18, 2002, Smitty's memory was honored by the presentation of several papers dealing with the prehistory and early history of the central Gulf coastal plain, often referred to as "Karankaway Country" (Bedichek 1974). In their lectures, the presenters repeatedly called attention to the contributions of Smitty Schmiedlin to the archaeology of this region. One speaker was Bill Birmingham, Smitty's long-time friend and collaborator. As I pointed out in my remarks at that meeting, "where Smitty went, you almost always saw Bill." To me, Smitty was the explorer, the contact-person, the persistent critic of agencies and archaeologists who failed to treat seriously the archaeology of the central coastal plain. Bill was the recorder, the meticulous keeper of notes and artifact catalogs. Bill is a fine excavator and craftsman of trowel-making; Smitty loved to work the screen and bring the beer. They were quite a team, and were jointly recognized by the STAA Avocational of the Year Award for 1998 (Figure 2).

On November 12, 1966, when I was a junior at The University of Texas at Austin, I gave a paper at the 37[th] annual meeting of the Texas Archeological Society, held at the Witte Museum—in the same room in which we honored Smitty's memory on May 18. Unlike today's TAS meetings, there was only one session and a grand total of 12 papers were given. My talk was on "Evidence of the Paleo-Indian Period in Southwest Texas." After the talk, two fellows in their 30s approached me about sites in Victoria County, with photographs and specimens from sites like J-2 Ranch (see this volume). They were so eager to share their information and invited me to come down and let them show me "the sites." I did that off and on for 36 years, and never have I traveled with better guides, hosts, and enthusiastic field companions.

Figure 1. E. H. "Smitty" Schmiedlin.Photograph by Debra Beene.

Smitty and Bill kept tabs on some important Paleoindian sites in Victoria County. One of these is the Willeke site, a deeply buried terrace site on Coleto Creek. They, along with other Victoria avocationals, had done some testing at the site in the 1960s, and Gower and Golondrina were found near the base of the site. The Johnston-Heller site is on the Guadalupe River drainage, exposed by a deeply cut channel of Rocky Creek (Figure 3). It, too, is deeply buried in alluvium. Over the decades, Smitty and Bill have recorded a number of Paleoindian points and tools (Clovis, Golondrina, biface Clear Fork tools; see Birmingham and Hester 1976; Bourbon 1997). They also carried out test excavations that provided information on the upper Archaic deposits at the site.

Figure 2. Smitty and Bill Receive the 1998 STAA Avocational Archaeologists of the Year Award. Left to right, Jimmy Mitchell, Smitty; Bill; Curt Harrell.

Figure 3. Bill Birmingham at the Johnston Heller Site in 1975. Bill points at burned rock at the 12-foot level in the south wall of the gulley at the site.

Figure 4. Smitty and Cecil Calhoun at the Kirchmeyer Site, 1969. Cecil excavating at the left;Smitty, on the right, manning the screen.

Figure 5. Smitty and Crew at Falcon Lake, August 1996. Piloting the "La Belle II," Smitty and survey crew head out on the lake just after dawn.

Smitty and Bill closely monitored 41VT11, Mission Espíritu Santo's third location on the Guadalupe River above Victoria. For many years, they could only make brief forays into the brush-covered site, but they managed some mapping and basic recording. And, when new landowners permitted research, they got the Texas Historical Commission to the site, and later, facilitated the fieldwork by The University of Texas at Austin (1995) and the TAS field schools (1997-1998). Both made more contributions to this research than can be related in the space allotted here (see Walter 2000). Suffice it to say that without Smitty and Bill, the work would never have begun. And during the period prior to the TAS field schools, while the landowners built a new home, Smitty organized weekend "screening" events that led to the recovery of many important specimens from affected areas of the site periphery.

Smitty and Bill did not just record sites, or make collections from them, or publish them in *La Tierra*— th ey watched them like hawks. Many sites in Victoria and Goliad Counties today still survive because of their relationships with landowners. In 1997 STAA gave Smitty the 1996 Heizer Award for Outstanding Contributions to Archaeology, recognizing these and other efforts (see Figure 3).

Smitty and Bill also provided other entrees for scientific research, such as the work at 41VT66 (the Burris site) by UT-Austin graduate student Jeff Huebner, and later, STAA field schools. Smitty greatly valued his appointment as a Steward for the Office of the State Archeologist and worked very hard in this role. He, Kay Hindes and Bob Mallouf made many trips into the thorn brush of Garcitas Creek and its environs in their on-going search for the first location of Mission Espiritu Santo.

In 1982, Bill and colleagues found a Scallorn-age cemetery on the DuPont property. Things were handled much better in those days when it came to such research, and a major site was studied, analyzed and published with the help of the people of Victoria and the DuPont Corporation (Huebner and Comuzzie 1992).

Occasionally, they strayed from their territory. In 1969, Jim Corbin and I, with the encouragement of Cecil A. Calhoun, launched an effort to test the Kirchmeyer Site, 41NU11—a clay dune on Oso Creek. We had applied to the Department of Anthropology at UT-Austin for $716 in student research funds, but were turned down. But thanks to the use of Dick Bowen's house as our "field camp," and Cecil and Smitty's hard work (Figure 4), we got the project done (Headrick 1993). Sometimes, I got Smitty and Bill to travel with me, as they did when Ken Brown and I worked at Baker Cave in Val Verde County in 1984 and 1985.

Smitty was highly vocal about his views on the importance of sites in Karankaway Country. He called the attention of the Texas Department of Transportation to the Smith Site, 41DW270, near Yorktown, as he felt it had been largely written off for further work. Indeed, his "advocacy" got him banned from the site. Here, as in many other cases, to the regret of other federal, state, and local bureaucracies, had it not been for Smitty and for Bill, sites would surely have been lost. Both were active, and Bill continues to be so, on the seemingly never-ending 41VT98 controversy (Buckeye Knoll, an Early Archaic cemetery excavated by Robert Ricklis on DuPont property near Victoria). Smitty raised hell, to put it mildly, with the Texas Historical Commission, the Corps of Engineers-Galveston (the contracting party), and anyone who would listen to him—while Bill set up meetings with DuPont, seeking to reason with them and to explain the tremendous significance of that site. I suspect that without their early intervention, in December 2001, that incredibly important and early cemetery would have been quickly and quietly reburied, without scientific study.

In closing, I would note one project that to me will forever epitomize the spirit of Smitty Schmiedlin. In August 1996, Falcon Lake on the Rio Grande was over 50 feet low. A team of archaeologists (from STAA, THC, TAS, and UT-Austin) and GPS experts (from the National Park Service) converged to do several days of site recording. The lake was so low that the only way to get to the sites was by boat. Our armada was mostly local fishing guides, but Smitty drove all the way from Victoria to Zapata with his boat. It was an important part of our transport up and down the lake. However, after one unfortunate incident—in which it nearly sank, along with UT-Austin's expensive EDM equipment—it became fondly known as "LaBelle II." Unlike the original LaBelle, it did not go under and no permanent damage occurred either to boat or skipper. Figure 5, showing Smitty, his boat, and its hardy crew, heading out onto Falcon Lake on an August morning, will always represent "Smitty" to me—heading not into the sunset, but into the dawn.

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THE FINAL CHAPTER: THE J-2 RANCH LITHIC TOOLS

E. H. Schmiedlin

ABSTRACT

Previous papers published in *La Tierra* by Fox et al. (1978), Flaigg (1995) and Schmiedlin (2000) have documented the existence of Paleoindian and Archaic dart points found at this site, this brief paper documents the 23 lithic and four bone tools from surface finds at 41VT6.

INTRODUCTION

The J2 Ranch site (41VT6) is located on Arenosa Creek in northeastern Victoria County. Flaigg (1995) has described the site and the excavations performed by STAA field schools in 1976-1977. Fox et al (1978) reported the artifacts found during that period of time. Most artifacts from this site were found in gravel bars that formed after an earthen dam on the Arenosa Creek was destroyed by flood waters. The material to build the dam was apparently taken from an adjoining playa lake which contained Paleoindian and Archaic cultural materials. The actual locations of the original sites has never been established. Since these tools were found in a secondary deposition, only a description of the representative tools will be presented.

Bifacial and Unifacial Clear Fork Tools (n = 4; Figures 1, 2).

Figure 1 A illustrates a well made Clear Fork biface with a distinct "bit" at the wide end. It is made from fine grained dark tan flint (chert). The lower half shows intentional heavy edge grinding, possibly related to hafting. The tool has been resharpened resulting in the removal of the high medial ridge that this type of tool often exhibits. The bit edge is steep and straight as well as battered and dulled from use. The tool measures 8.7 cm long, varies from 2 to 5 cm wide, and is 2 cm thick. This is one of the largest of the five tools of this type from the site.

Figure 1 B is a bifacial Clear Fork tool made from dark brown fine grained flint with a small portion of the cortex remaining on the narrow end. This tool is highly polished over three-fourths of its surface, and has a very smooth medial ridge. The edges are nearly parallel and have fine retouch along most of their surfaces. The medial ridge is on the side opposite the bit, which is contrary to most other tools of this type. The bit is slightly concave with fine retouch on the leading edge. The tool measures 8 cm long, 3.5 cm wide, and 1.5 cm thick.

Figure 2 A is a triangular unifacial Clear Fork tool made on a large flake with a steep, slightly concave bit. The high medial ridge has a portion of remaining cortex, resulting in an off-center projection. It appears that repeated unsuccessful attempts were made to remove this projection. The upper surface of this tool is highly polished over the entire surface, while the flat side remains dull. The bit and the blade edges have fine retouch. The tool measures 6.8 cm in length, 4.3 cm at the bit, and 1.5 cm thick at the mid section. In cross section this tool is triangular.

Figure 2 B is also a triangular unifacial Clear Fork tool made from a large flake, with a distinctive steep, convex bit. This tool is made from dark tan flint with light tan inclusions. The high medial ridge is highly polished and its presence gives the tool a distinct triangular cross section. The bit has been resharpened by the removal of several narrow flakes. The bottom of the tool has several small flake scars, but these seem to be from use rather than intentional knapping. This tool measures 6.8 cm in length, 3.4 cm at the bit, and 1.6 cm near the bit.

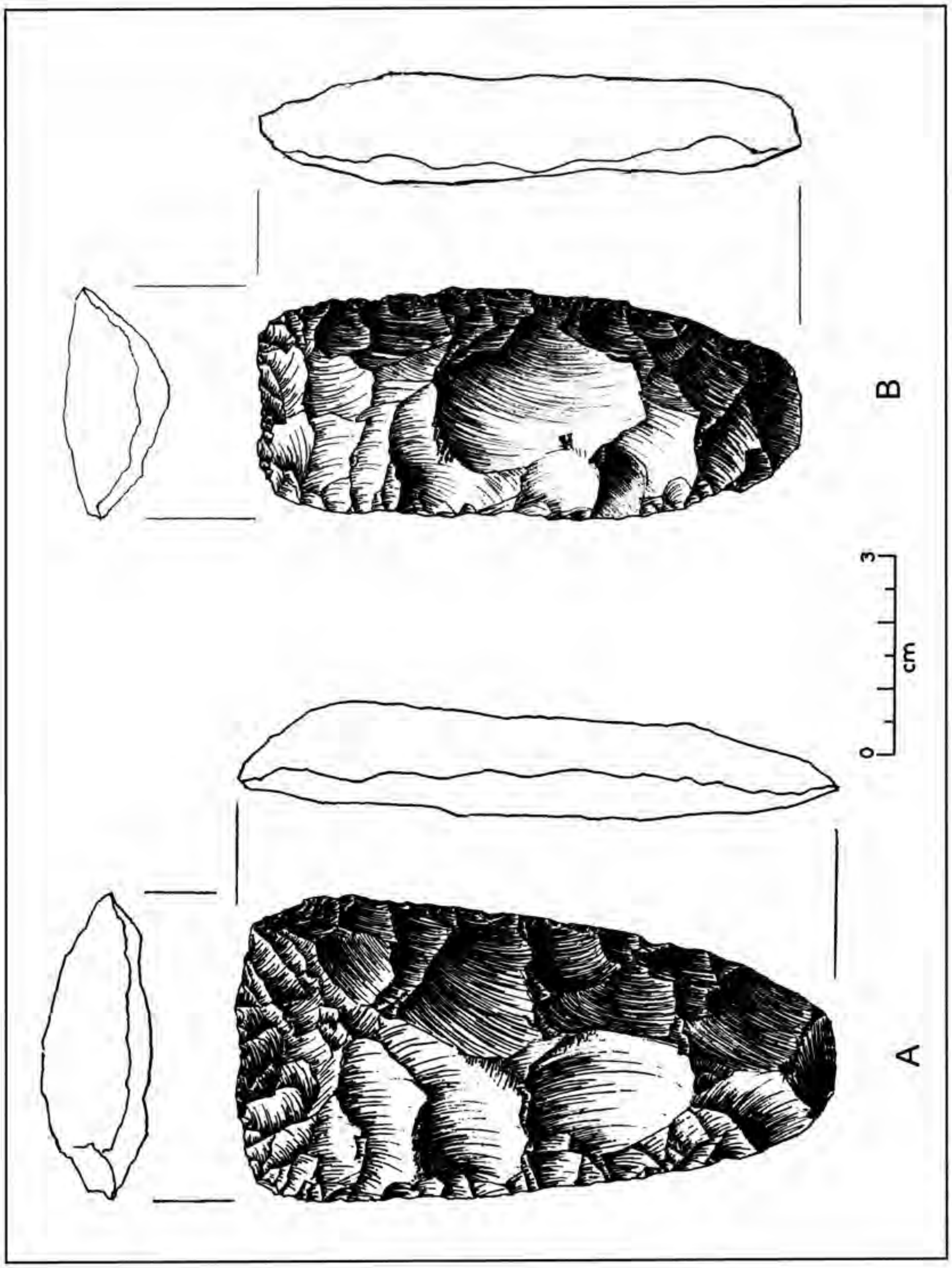

Figure 1.

A, Clear Fork Biface; B, Bifacial Clear Fork Tool.

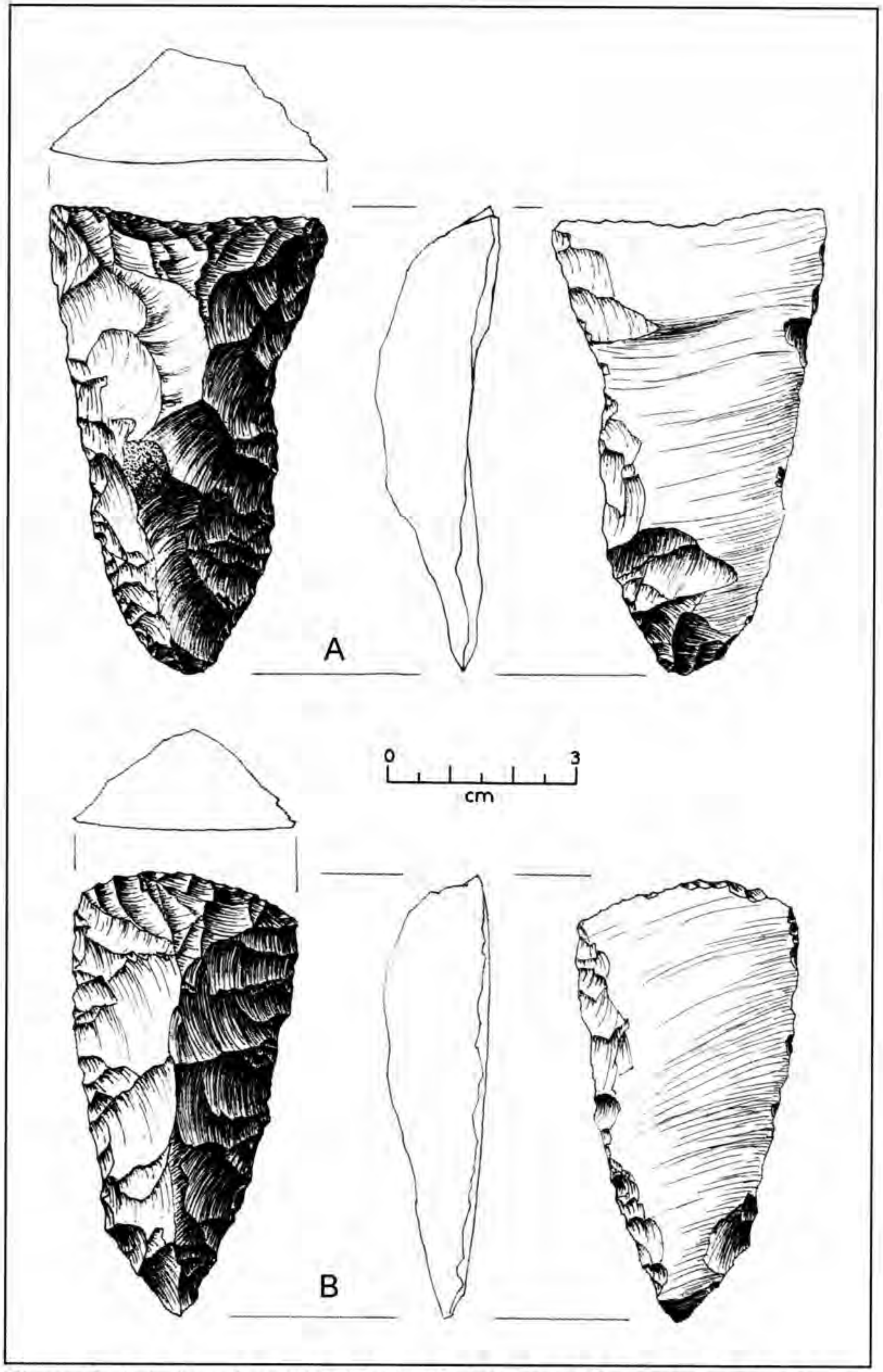

Figure 2. A, Triangular Unifacial Clearfork Tool; B, Triangular Unifacial Clearfork Tool.

Bifacial Tools Made from Thick Flakes (n=4, Figure 3A, B, C; Figure 4E).

The tools shown in Figure 3 A - B are bifaces made from flakes with plano-convex cross section and have a high medial ridge.

Figure 3 A is made from light brown flint with evidence of heat alteration on the proximal end. The distal two-thirds of the tool has been heavily reworked by the removal of large percussion flakes, while the proximal one-third is unifacial and is well worked with some polish. It appears that this tool was originally much larger and was made from a large flake.

Figure 3 B is made from coarse grained tan flint. The distal end has a distinct bit. All edges of this tool are dulled and there is a small amount of residue (possibly asphaltum) near the center of the tool.

Figure 3 C is a Guadalupe tool (see Turner and Hester 1993).

Figure 4 E is made from coarse grained gray flint, with a high medial ridge on one side. The upper or distal half of the tool has been alternately beveled and the medial ridge is polished. A large flake has been removed from the side opposite the high medial ridge at the mid-section.

Thick Symmetrical Bifaces (n=2: 3D, 6A)

Figure 3 D is a thick, narrow, symmetrical flint biface with high medial ridges on both sides and with a bit on the distal and proximal ends. One medial ridge is smoothed and the distal end has been heat treated. This is probably a remnant of a much larger biface. A black residue (possibly asphaltum) is visible on both sides, and in the hinge fractures near the midsection of the biface, suggesting either a hafting mastic or residues from use.

Figure 6 A is a large bifcial tool made from mottled flint. The upper two-thirds of the tool is polished, and the edges are dull and battered, while the lower third remains sharp. The flaking is mostly percussion. A large flake removed from the right edge of the tool thins the midsection of one face, and the slight constrictions of the lateral edges in the same area suggest possible hafting.

Thin Bifaces (n=4: Figure 4A - 4D)

Figure 4, A and B are representative of the triangular tools from this site. These tools are some of the few that remain intact. Most others are represented either by broken distal or proximal fragments.

Figure 4 A is made from a poor grade of flint with many inclusions. The distal end appears heat altered and is polished. The narrow triangular shape resembles a Tortugas point and may be an unfinished example of this type (Turner and Hester 1993).

Figure 4 B is a relatively broad triangular thin biface with a dull tip and convex lateral edges. It is made of dark brown fine grained flint. There is some retouch near the distal end and the entire surface is polished. A large flake has been removed near the center of the tool thinning the midsection.

Figure 4 C is similar in shape to the Refugio point although much thicker and more crudely flaked (Turner and Hester 1993). The tool retains portions of the cortex on one side. The distal tip is heat treated and well polished.

Figure 4 D is made from gray flint, and the center portion of the tool has had several large flakes removed from opposite sides. The distal end has some polish.

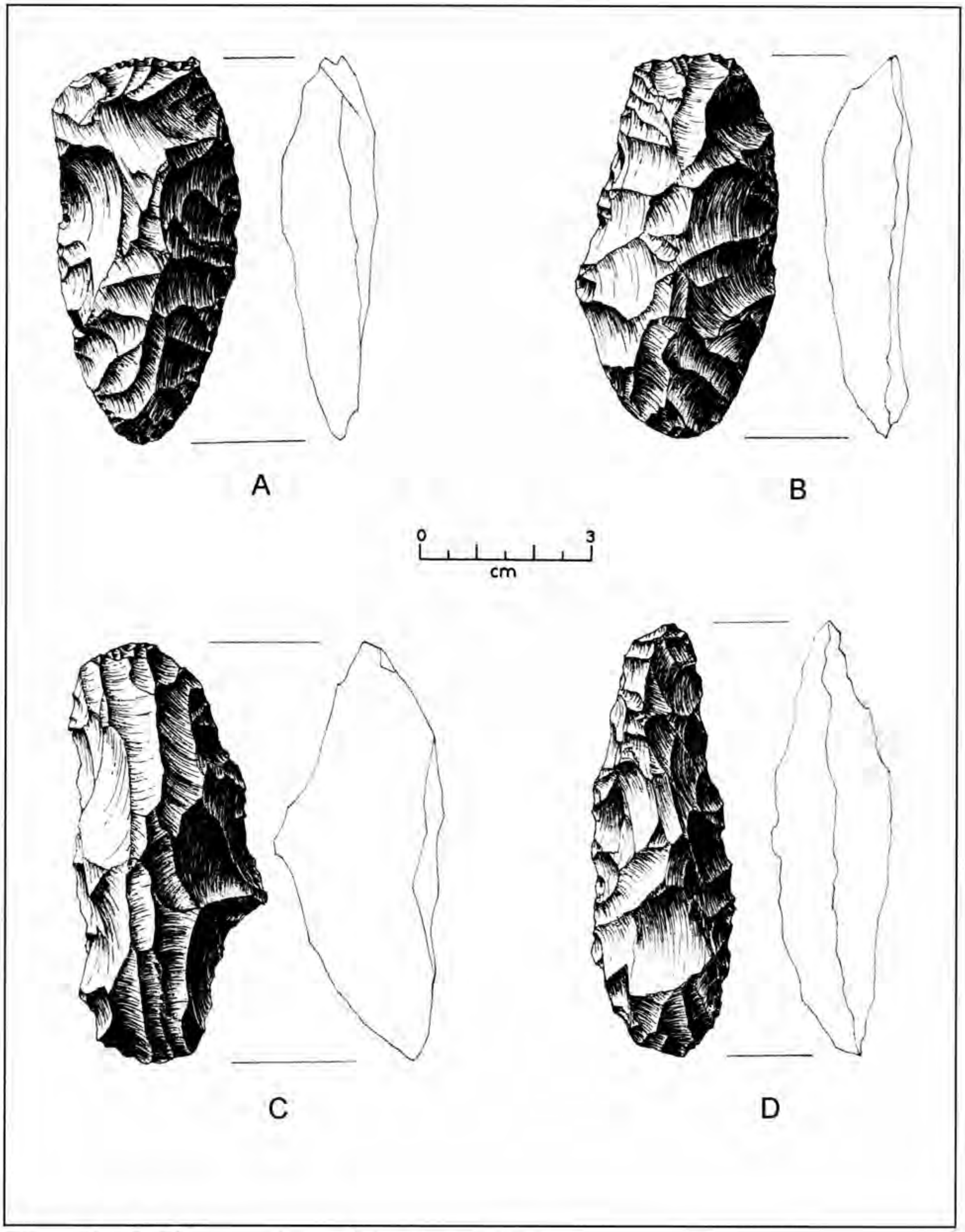

Figure 3. A-B, Bifaces made on a flake; C, Guadalupe tool; D, Thick, narrow, symetrical biface.

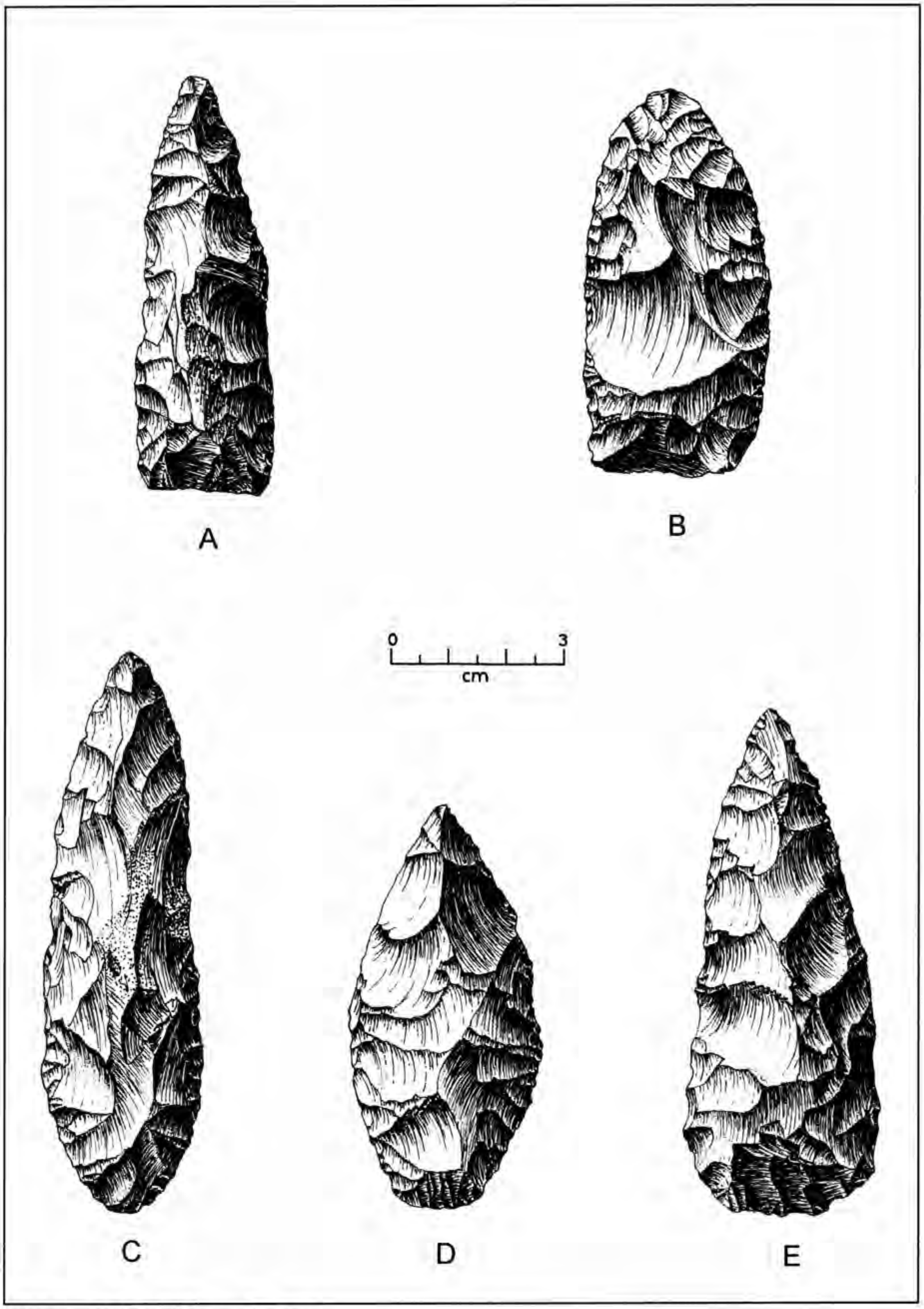

Figure 4. Thin Bifaces. See text.

Unifacially Shaped Tools
(n=1, Figure 5A)

Figure 5 A is made from fine grained dark tan flint, the obverse side retains the bulb of percussion. This tool is extremely well made with fine retouch on the edges. Most of the flaked surface and the medial ridge are well polished. The "humped back" is produced by the knapper's failure to remove a large knob or stack on the flaked surface.

Edge modified flake and blade tools
(n=5, Figure 5B - 5F)

Figure 5 B is made on a blade as distinguished by the two parallel dorsal flake scars, and the high medial ridge on the dorsal surface. The striking platform remains on he proximal edge. The tool has very fine retouch flaking along one edge, and is highly polished on all surfaces.

Figure 5 C is also made on a large blade-like flake with the striking platform remaining on the proximal end. The bulb of percussion remains on the ventral side, while the dorsal side has fine flake scars along most lateral edges. This tool has a good polish on all surfaces, with the dorsal ridges almost smoothed away.

The tool shown in **Figure 5 D** is made from a large flake of chert with the striking platform remaining on the upper right hand corner. The bulb of percussion remains on the reverse side. The tool has very fine retouch on the distal, medial and one lateral edge. The reverse side and the flaked edges are highly polished.

Figure 5 E is made from a flake struck between two ridges on a core. The proximal edge has a smoothed prepared platform with the remaining lateral edges having very delicate flaking. This flake tool is only 1 mm thick. The surfaces of this tool are highly polished, and have a "slick" feel.

Figure 5 F is also made on a blade-like flake probably removed flake from a unidirectional core to clear cortex and a step fracture. A portion of the cortex remains on the distal end. This is the only tool in the collection that has fine serrations along the lateral edges. The distal end has a prepared platform and the proximal end is broken and has a double hinge fracture.

Hammerstones
(n=2, Figure 6 C, D)

Figure 6 C is a hammerstone made from coarse-grained quartzite that appears to have had multiple uses. The edges are heavily battered , with several large pieces having been broken off. The obverse side has two pecked indentions that have been partially smoothed. One pecked area is highly polished while the other is rough with several parallel striations. The area next to these pecked and smoothed areas has numerous parallel grooves, while near the grooves is heavily battered. The side shown has multiple pecked and smoothed surfaces, with some small striations. The upper left edge has been broken, apparently from battering. A large flat surface has been ground away from the lower right edge, while a smaller flat surface is visible on the left edge. The proximal surface is heavily battered on the edge as well as on the face.

Figure 6 D is also made from quartzite. It is heavily battered on the edges while the faces are smoothed. Quartzite is common in the local gravels, but only four hammerstones are in the collection. It is probable that this tool was also used in flintknapping.

Chopper
(n=1, Figure 6B)

Figure 6 B is a bifacial "chopper" made from a poor grade of flint, with the cortex re

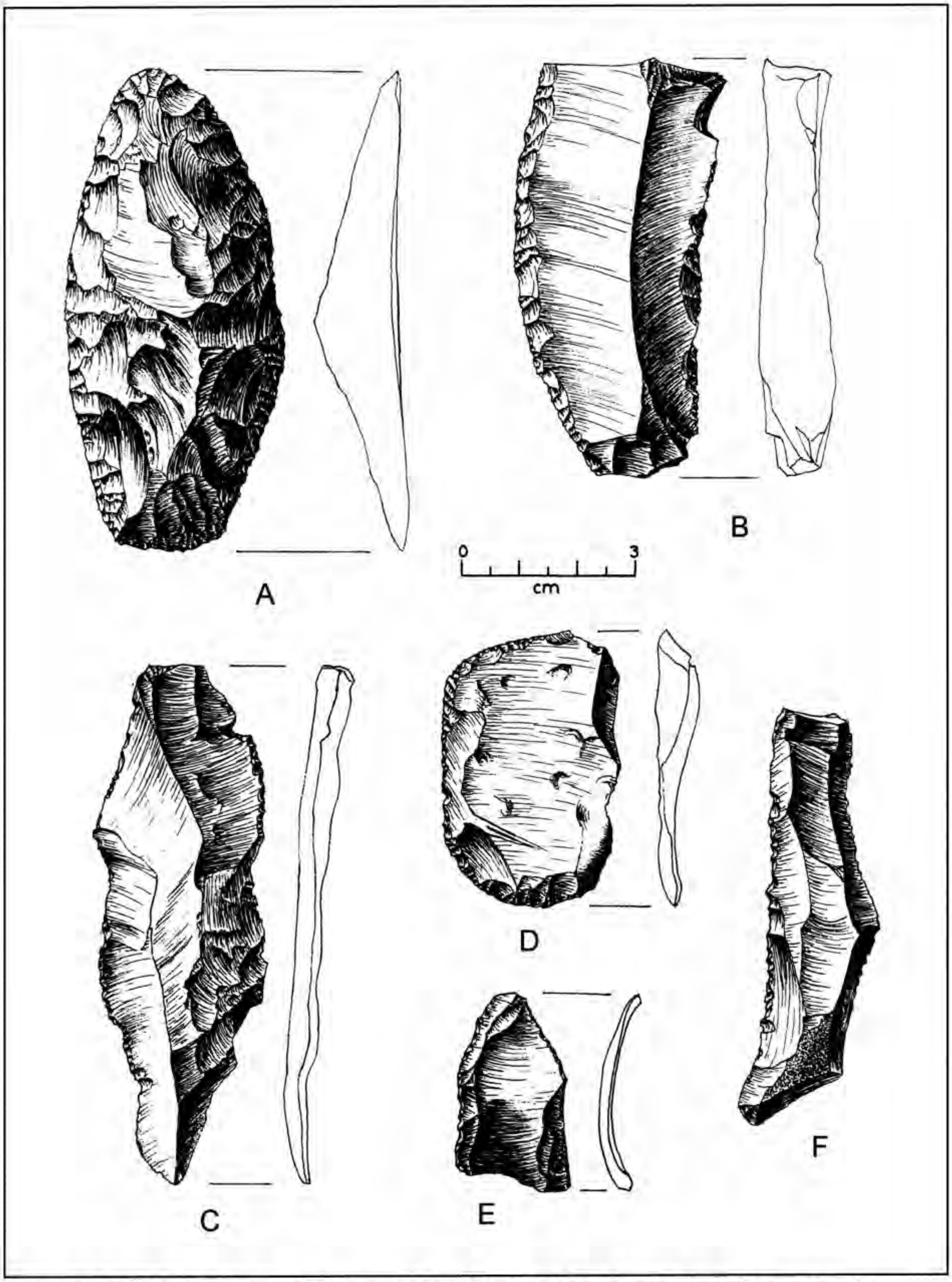

Figure 5. Unifacially Shaped Tools and Edge Modified Flake and Blade Tools. See Text.

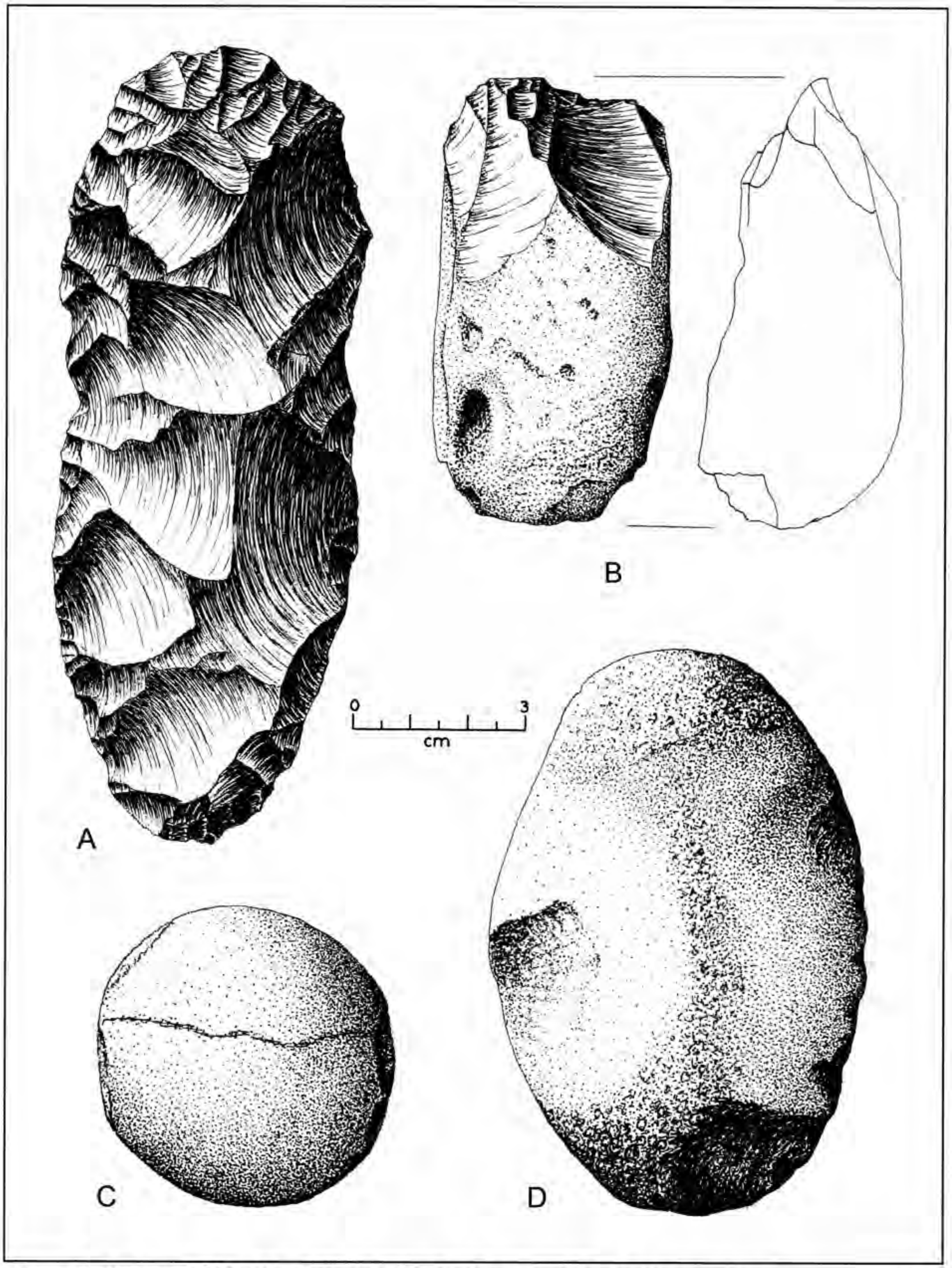

Figure 6. A, Large Bifacial Tool; B, Bifacial "Chopper"; C, D, Hammerstones..

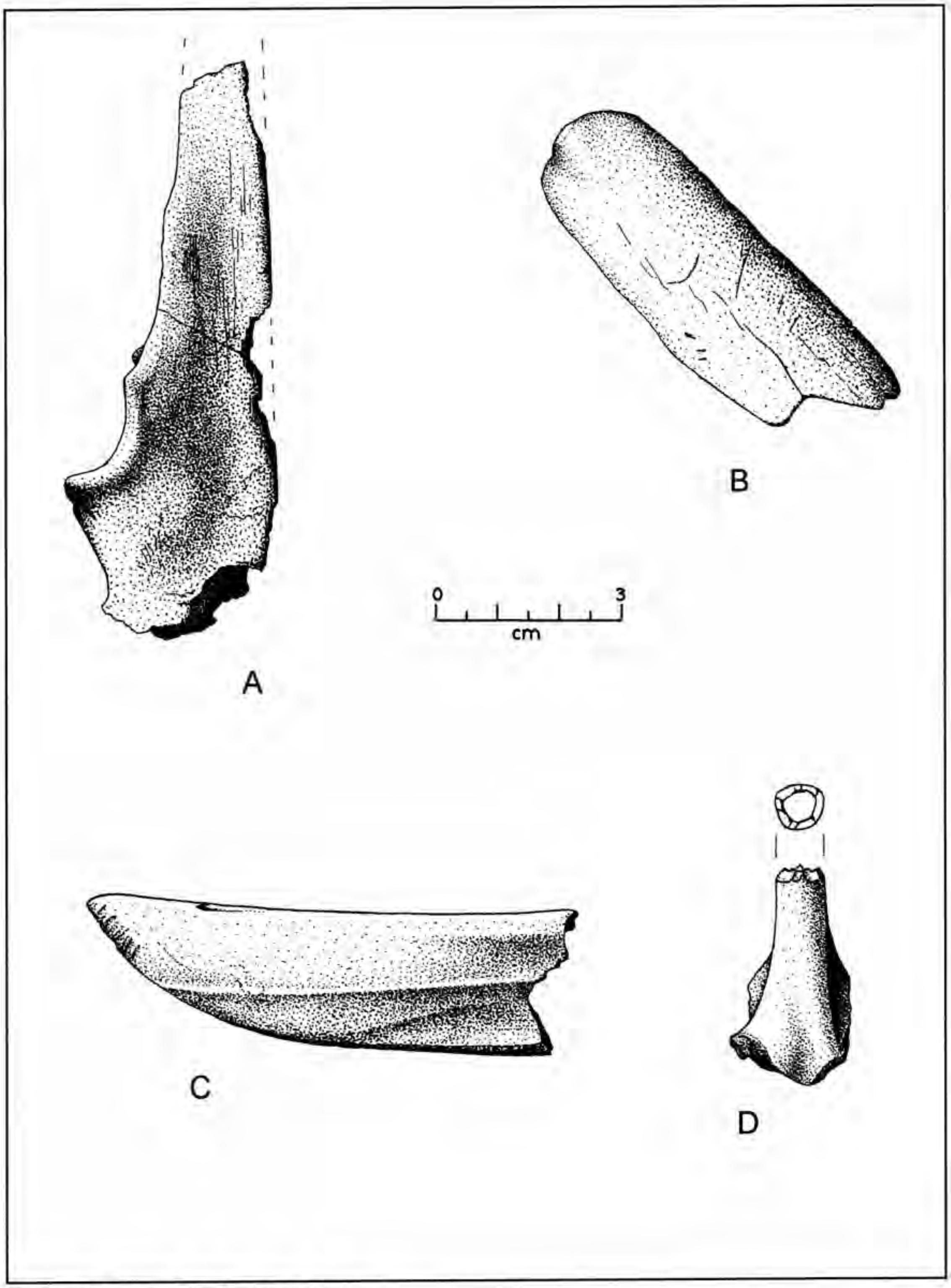

Figure 7. Bone Tools. See Text

maining on three sides. One side of the tool has large percussion flakes removed from most of its surface, while the other only has had smaller percussion flakes removed to produce a bit edge across one edge. This was the only "chopper" present in the collection.

Bone Tools (Figure 7)

Figure 7 A is made from a left deer ulna. The proximal end is broken, as well as the distal end. The distal end has been ground and smoothed. The tool has been broken near the mid-section. The portion missing from the right middle of the tool seems to have been caused by rodent chewing. There are several small parallel striations on the opposite side that may be cut marks. This bone tool may have been used as a flaking tool.

Figure 7 B is made from a large split bone fragment probably from a deer-size mammal. The edges are quite smooth and rounded and there is a slight polish on the entire surface. The distal end appears to have a bit.

Figure 7 C is split from the medial posterior shaft of a deer tibia. There is no evidence of use other than the exterior is well polished. The left or distal edge has what appears to be rodent gnaw marks.

Figure 7 D is made from a proximal right femur of a rabbit-size mammal. The bone has been cut by notching around the entire surface. The bone is highly polished, even in the cut marks, but no practical use can be determined. The bone may have been used to produce bone beads, and the piece remaining is a discarded end.

All of the bone is in excellent condition and highly mineralized. These four pieces represent the entire bone from the surface collection; however, excavations in 1976-77 encountered what appeared to be *Bison* bones in association with Archaic period dart points.

CONCLUSIONS

The tools illustrated in this paper are similar in most respects to the tools found in other sites in the Victoria area. The materials used are most likely from shallow local Pleistocene gravel deposits which are abundant nearby. Some of the material may have also come from Uvalde or Goliad gravels. It is impossible to determine which of these redeposited tools were made during the Archaic or the Paleo-Indian period. However, there is ample evidence from other sites (such as 41VT15; Birmingham and Hester 1976:Figs. 5,6) that long, paralll sided Clear Fork bifaces date to Late Paleoindian times (see also Turner and Hester 1993:246). The large unifacial Clear Fork is probably of Early Archaic date (ibid.). The Guadalupe tool is also of this general age (Turner and Hester 1993:256). Both the Paleoindian and Early Archaic periods are abundantly represented in the projectile points from this site (Flaigg 1995). Most tools in the present study would have been used in butchering and hide processing. The polish reported on most of the tools in this paper may result, however, from sand polish during redisposition.

The lack of grinding tools, other than small quartzite hammerstones that were probably used for flintknapping, indicates that processing of nuts and seeds was not a major activity at the site. It seems reasonable that this isolated playa lake on the open prairie would have been an ideal place to hunt animals from 6000 B.C. until A.D.1000 based on the multitude of projectile points from that period of time. The scarcity of arrow points may indicate that the lake dried up some time after A.D.1000, or the animal population may have been depleted to the point where they were no longer a major resource. As stated in previous papers the possibility of future subsurface excavations at this site would most likely do much to answer these questions.

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The late Jimmy Mitchell's assistance and "prodding" is responsible for getting this paper in print. The views and opinions expressed in this article are solely the responsibility of the author.

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PRELIMINARY SURVEY OF A COMPLEX MORTAR SITE IN WEBB COUNTY, TEXAS

James B. Boyd

ABSTRACT

A preliminary survey conducted in 1996 in west-central Webb County, Texas, located a mortar site on numerous large sandstone rocks on a low hill overlooking the confluence area of two tributary arroyos on the Killam Ranch, just east of Laredo, Texas. The site (41WB356) has significant evidence of prehistoric occupation spanning a considerable period of time. Artifacts recorded within the site are discussed, as is the general setting of the site. The few other known mortar sites in the area are briefly described, and such sites are relatively unique in this large geographic region.

SITE 41WB356

This prehistoric archaeological site was first brought to my attention in 1986 by a U.S. Border Patrol agent who had visited it on many occasions during the 1970s. The agent, along with others, collected a large number of artifacts and excavated a prehistoric human burial in a gully there in the early 1970s (Boyd n.d.a). The burial feature was wholly removed from the site, and placed in situ in a wood and glass display box. It was kept in a private collection, then placed on display at a business in Del Rio, Texas for many years, before being sold to a private collector from Colorado in 1994. Unfortunately, all pertinent data regarding this burial has consequently been lost. However, some of the artifacts collected from the site were made briefly available to the author for study in the early 1990s. The same Border Patrol agent had also reported the presence of numerous mortars at 41WB356.

The site was first formally recorded on May 12, 1991, by Thomas R. Hester, along with E. Shelton, Sr. and J. Douchen. Hester stated (personal communication 1996) that the 1991 visit to the site was very brief, and although its significance as a lithic procurement location as well as a campsite (and possible plant-processing site) was noted in the site form, the mortar features reported here were not observed. Hester did state that a more detailed, follow-up visit to the site for additional data collection should be conducted.

In 1996, I conducted a general survey of 41WB356, with the main emphasis being the mortar features. Three days were spent at the site between April and June, during which time I collected additional information to supplement the original site form. General observations on the prehistoric site were made, in addition to more detailed notes on the mortar component (Boyd n.d.b). This was not a comprehensive survey, and it is hoped that a more detailed study, facilitated by more adequate survey equipment, will be performed in the future. Mapping of the site with the use of a Total Data Station would be highly recommended.

41WB356 is located just east of Laredo, Texas, and just north of U.S. Hwy. 59. The site is located on the Killam Ranch, and the hill where the mortars are located is known to ranch personnel as "Rocky Point" (Charlie Martens, personal communication 1995). It is just northeast of modern day Lake Casa Blanca, and approximately 8 miles from the Rio Grande. The junction of San Ygnacio and Los Tios creeks is about 650 feet north-northeast of the northernmost edge of "Rocky Point." San Ygnacio Creek joins Chacon Creek approximately 0.8 miles to the west-southwest.

The site is located near the northern edge of a relatively high upland ridge that runs generally north to south, crossing U.S. Hwy. 59. The site runs north-northwest to south-southeast, and the hill with the mortars is located in the north-

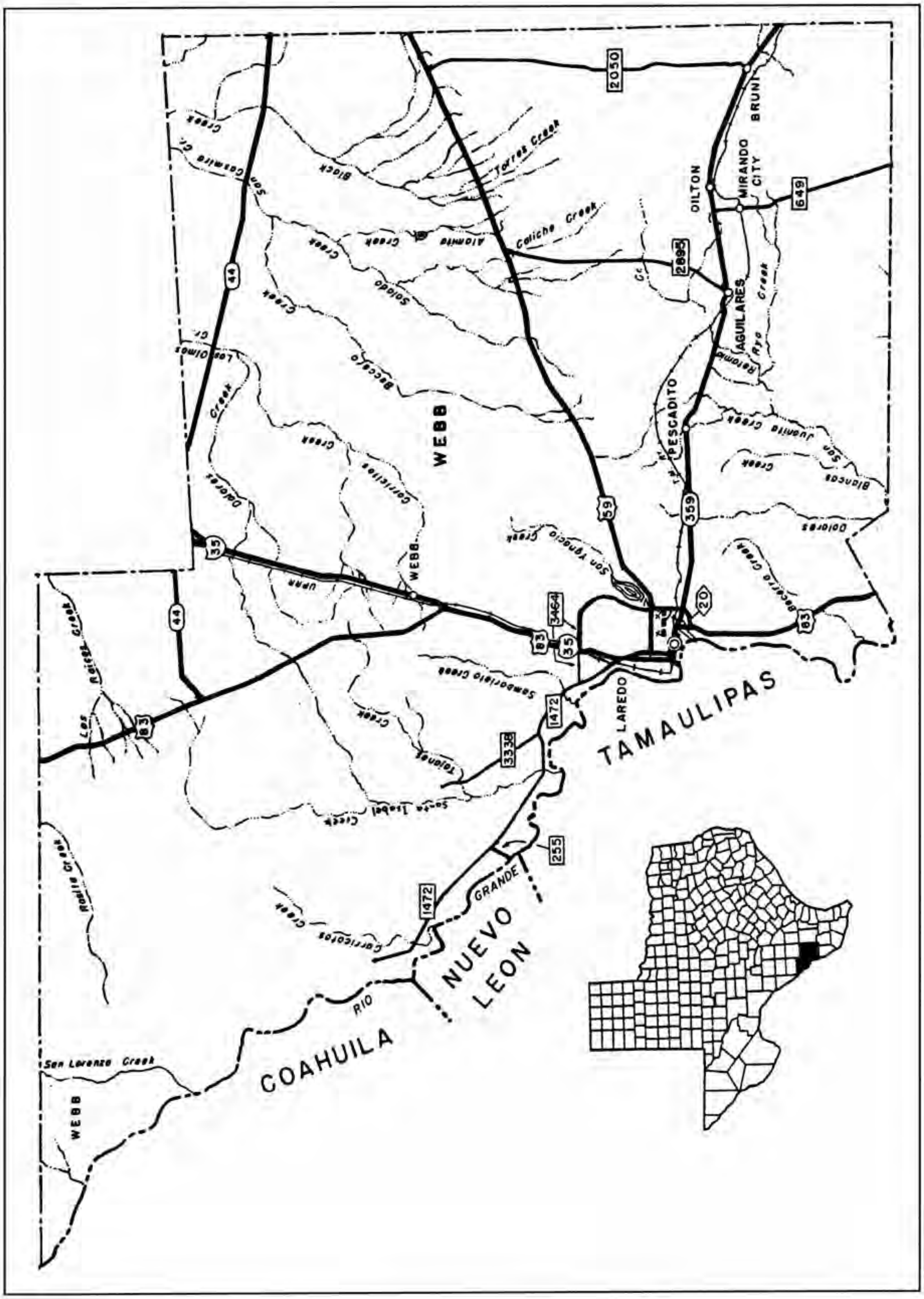

Figure 1. Map of Webb County, Texas. Laredo is located in the lower central area of the map. The mortar site at 41WB356 is just east of the city.

central part of the landform (Figures 2-3). The hill itself, or "Rocky Point," is oriented slightly toward the north-northeast. The elevation varies from about 460 feet above mean sea level (amsl) to about 520 feet amsl. Rocky Point is about 480-500 feet amsl. The site's areal extent is about 0.6 mile (north/south) by 0.4 mile (east/west).

Vegetation noted on the site includes mesquite, creosote bush, sage, coyotillo, leather stem, prickly pear, strawberry pitaya, yucca, and other unidentified species of grasses, weeds, and thorny brush. The vegetation along the nearby arroyo bottoms is more riparian (Figure 4). Deer and javelina were observed on the site during the survey. Other fauna known to be present in the immediate area includes coyote, bobcat, and other mammals, as well as various species of snakes, primarily blue indigo and rattlesnake. The desert tortoise is common, usually observed following rainfall, and numerous bird species are frequent, including the Turkey Vulture and Caracara.

Modern impacts to the site include one main ranch road, as well as a small number of side roads, and some bulldozing activity had minimally impacted some areas. Modern trash was also observed, mainly near the head of the small, unnamed gully that runs along the lowermost slopes on the east side of Rocky Point (see Figure 2). Additionally, this site, as well as other sites on the Killam Ranch, has been heavily surface collected by numerous artifact collectors and ranch personnel over a very long period of time (Bettis 1997:3-23; Ketteman 1997:24-27).

Tremendous amounts of lithic debitage occur across the surface. This consists mainly of chert flakes, cores, and tools, as well as large amounts of burned rock, mainly chert (Boyd n.d.b). In the site form, Hester notes "great quantities of chert, cores, tested cobbles of Rio Grande/Uvalde gravels." There is a noticeable concentration of debitage along the banks of the gully just east of Rocky Point. This gully runs to the northeast and eventually drains into Los Tios Creek. The spatial density of artifacts is highest on the west bank, where there are also large numbers of *Rabdotus* shells. In the northern portion of the site, exposed by sheet erosion on the flats between Rocky Point and San Ygnacio Creek, there is considerable burned rock (chert) as well as chert flakes. On the northern crest of Rocky Point, there is a sandy area with a significant amount of lithic debitage, and several arrow points were observed there.

ARTIFACTS RECORDED AT 41WB356

Only a limited amount of time was dedicated during the 1996 survey to inspect the archaeological deposits visible at the surface in this highly eroded and deflated prehistoric campsite. Despite this, a veritable array of artifacts spanning a long period of time was documented (Table 1). Dart point types recorded included Abasolo, Catan, Desmuke, Lerma, Matamoros, Pandora, and Tortugas specimens, as well as unclassified unstemmed forms and one unclassified contracting stemmed variety common in South Texas and northeastern Mexico sites that superficially resembles the Gary type from East Texas (Boyd n.d.b). Arrow points include Caracara, Cliffton, Fresno, Scallorn, and Young types, and at least one unclassified form. These projectile points hint at the lengthy occupation of this site, from at least the Early to Middle Archaic through the Late Prehistoric period. Other projectile point types, including Langtry, have been documented in 1970s collections from this site (Boyd n.d.b).

Other tools observed during the survey include dart point preforms, apparently from several types (see Table 1), as well as an assortment of stone tools. The most common observed tool form is the Nueces scraper (n=16). This tool type, attributed to scraping or cutting activities, probably dates from the Middle to Late Archaic period (Turner and Hester 1993:267-268).

Noticeably absent in the stone tool assemblage are stone pestles, which would have likely been used in grinding activities on the sandstone boulders at the site. However, it is not surprising

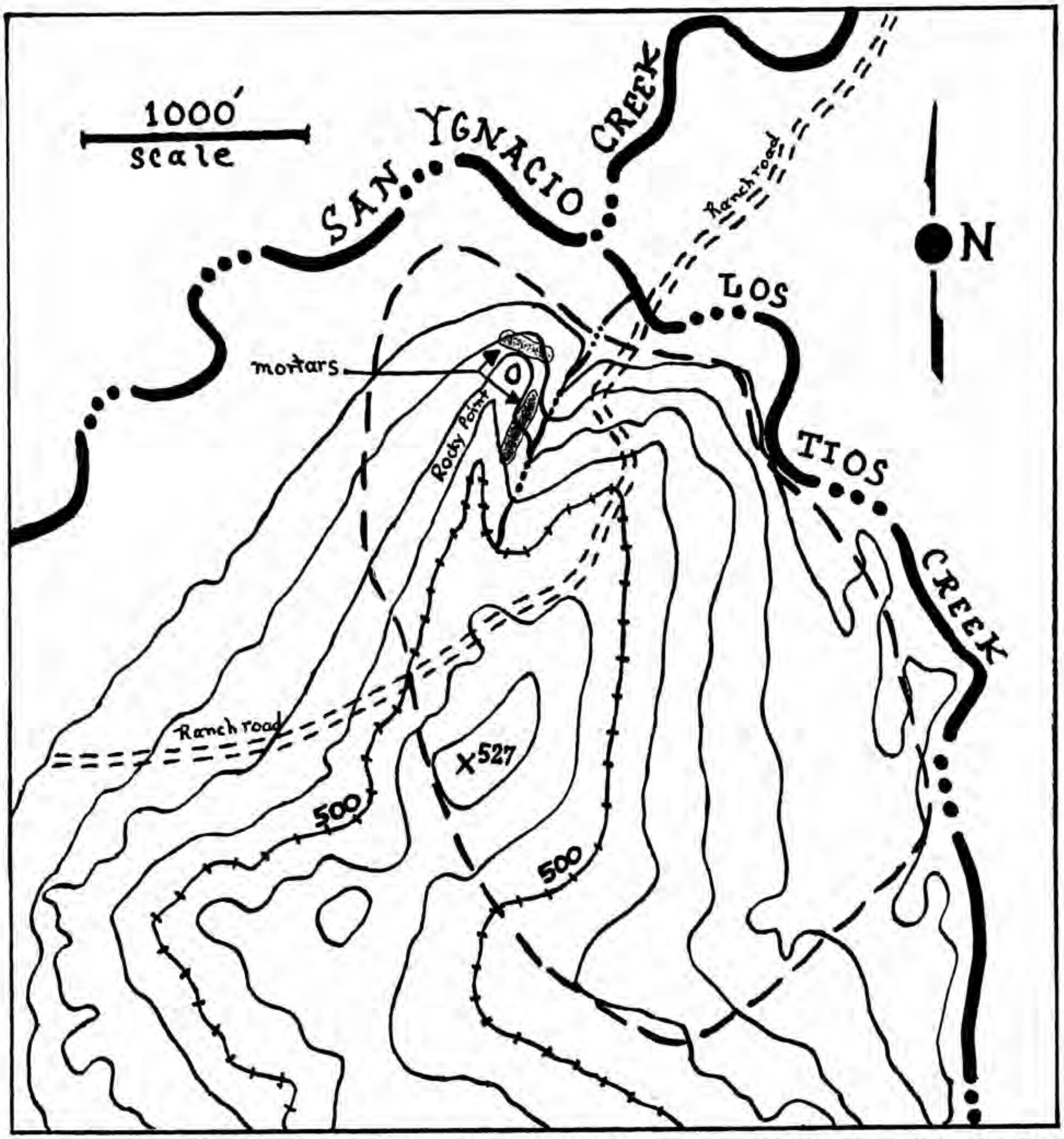

Figure 2. Map of 41WB356. The dashed line indicates the approximate boundary of the site. Rocky Point is in the north central part of the site. The two shaded areas indicate where the majority of the mortar features are located. San Ygnacio and Los Tios creeks are shown, as is the small, unnamed tributary arroyo just east of the mortars. Ticked line indicates 500-foot contour. Map, drawn by the author, adapted from the U.S.G.S. 7'.5 *Laredo East, Texas* Quadrangle.

Figure 3. View of Rocky Point. The mortars are located on the numerous sandstone boulders on this hill. View southwest.

Figure 4. Riparian environment along a section of Los Tios Creek, just northeast of 41WB356. Note the dense overstory of huisache and mesquite, and the grasses and cattails. View south.

Table 1. Artifacts Recorded at 41WB356, 1996 Survey

Dart Points

Abasolo - 1
Abasolo proximal fragment - 3
Catan - 1
Catan proximal fragment - 2
Desmuke - 1
Desmuke proximal fragment - 7
Lerma proximal fragment - 1
Matamoros - 2
Matamoros proximal fragment - 2
Pandora proximal fragment - 1

Tortugas - 2
Tortugas proximal fragment - 1

Miscellaneous distal fragment - 10
Miscellaneous medial fragment - 1
Miscellaneous dart point fragment - 8
Unclassified type (unstemmed) proximal fragment - 1
Unclassified type (contracting stemmed) proximal fragment - 1

Dart Point Preforms

Desmuke - 1
Lerma (?) - 1
Matamoros - 1

Pandora - 1
Pedernales-like - 1
triangular (Tortugas?) - 1

Arrow Points

Caracara - 1
Caracara proximal fragment - 1
Cliffton - 1
Fresno proximal fragment - 3
Scallorn - 1
Scallorn proximal fragment - 4

Young - 2
unclassified - 1
distal fragment - 4

Stone Tools

Nueces scraper - 16
Miscellaneous bifacial tool/blank - 11
Miscellaneous unifacial tool - 4
Unifacial scraper - 1

broken unifacial scraper - 1
chert core - 11
broken end scraper manufactured from dart point - 1
assorted broken biface - 34

that stone pestles are not present, given the great numbers of people who have apparently regularly relic-collected the site for many years.

Stone pestles are commonly relic-collected from prehistoric sites in South Texas and adjacent areas of northeastern Mexico (Hester 1979:24-25; Chandler and Kumpe 1996:24-35). It is also possible that wood pestles were used at the site, as they are known from dry cave deposits in the lower Pecos River region (Collins and Hester 1968:1-8). Wood pestles would, of course, not have survived exposure to the elements in the unprotected environment of this open site.

THE MORTARS AT ROCKY POINT

The mortars are located on the numerous large sandstone boulders that nearly cover the surface of Rocky Point. The occurrence of so many sandstone boulders in such a concentrated locale is somewhat unique in this geographic area. The top of this low hill provides an excellent view across the adjacent San Ygnacio and Los Tios Creek drainage basins. This would certainly have provided prehistoric peoples an excellent vantage point for hunting activities, and for defensive measures.

The boulders are a coarse-grained, relatively soft and easily eroded dark sandstone. They range from less than one yard to several yards in diameter. Crustose lichens are present on many of the boulders. Some of these stones weigh several tons. The boulders occur in large numbers from the base to the crest of Rocky Point. Although the boulders occur on all sides of the hill, as well as the hilltop, nearly all of the mortars are along a narrow zone on the eastward-facing lower slope of Rocky Point, an area paralleling the small, unnamed gully (see Figure 2). The majority of the mortar features are located along the mid-section of the ca. 20 foot high ridge. However, one mortar was found near the northeastern corner of Rocky Point, approximately 18 feet above the base of the hill.

The "main slope" with most of the mortar features runs at a 160°-340° bearing. The length of the "main slope" is about 245 feet. The north/south extent of the mortar site, including isolated mortars on the north side of Rocky Point, is about 360 feet. The "north rim" of Rocky Point runs generally east to west, and the features cover an area about 150 feet in length (see Figure 2).

Altogether, 77 mortars were located during the 1996 survey. Some were filled with dirt and had to be cleaned out. Others were substantially eroded due to exposure by the elements, and because of the softness of the sandstone. The mortars are in clusters (Figure 5) as well as by themselves (Figure 6). The greatest number of mortars (n=49) are in the southern part of the site, with fewer (n=28) in the northern area. Eight mortars are on the northern edge of the hill. The deepest mortars were observed in the north and northeastern areas of Rocky Point.

Four mortars had been completely "ground-through" the sandstone boulder in which they were located (Figures 7-8). Three of these were in the southern part of Rocky Point, and the fourth was in the central area. A fifth, "ground-through" mortar was also found, although it had been broken (see Figure 5). The four intact "ground-through" mortars range in diameter from 4.8-6.6 inches, and are 7.2-10.8 inches in depth. One solitary mortar feature was discovered on the west slope of Rocky Point, opposite the ridge where the majority of the features are located.

The mortars are nearly all conical in shape, and there are numbers of shallow, or "starter" mortars, in addition to considerably deeper ones (Figure 9). One boulder (with mortars) has what appear to be a series of pronounced abrading marks along one edge of the rock (Figure 10; see also Figure 7). Close scrutiny of these marks indicates they are circular in shape, suggesting that they may have been made during the straightening or smoothing of wooden arrow shafts. Although other abrading-like marks were

Figure 5. Large boulder containing several mortars of various depths. Note broken mortar at lower left, where boulder has fragmented. View east. Black stripes on norh arrow are 4 inches in length.

Figure 6. Deep mortar on boulder at base of Rocky Point. View south.

Figure 7. Sandstone boulder with mortars. Note mortar at center, bottom has been ground all the way through the rock. Also note the deep abrading marks on left side of boulder (also see Figure 9). View northwest.

Figure 8. Two deep, conical-shaped mortars. Mortar at left has been ground through the sandstone boulder. The black line on the north arrow measures 3 inches in length. View west.

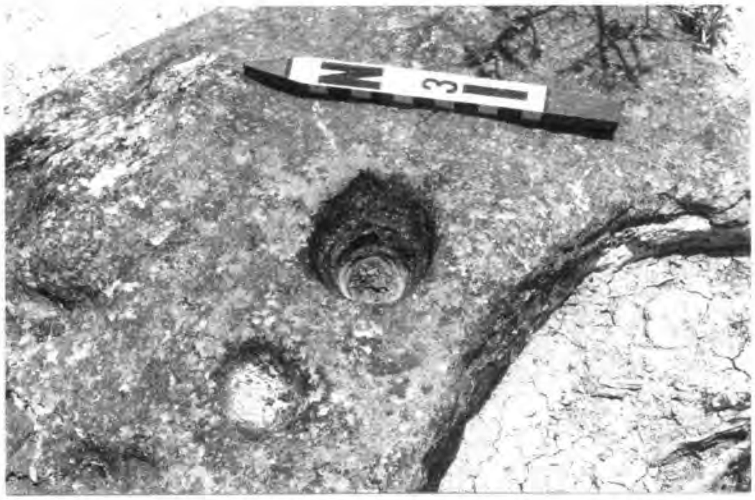

Figure 9. One shallow and one deep mortar on a sandstone boulder. View east.

Figure 10. Detail of abrading marks on edge of sandstone boulder (see Figure 6). Area shown is approximately 12 inches in width. View southwest.

evident on the surface of other boulders on the hill, they were too weathered to determine whether they were naturally produced, or were the result of human activity. In addition to these marks, there are also arc-shaped scratch or abrading marks in some of the rocks that obviouosly been produced by thorny brush being windblown back and forth over the surface of the rock. These arc-shaped scratch marks are also often visible in dirt surfaces under thorny brush in the region, where low hanging branches are blown in a rocking motion by the wind, resulting in a similar series of parallel, but curved, marks on the ground.

DISCUSSION

41WB356 is a multi-component site that apparently attracted prehistoric peoples over a very long period of time. It has adequate lithic resources, which provided the raw materials for the manufacture of stone tools, including a diverse array of projectile points, as well as for use as hearthstones. The site is also in close proximity to numerous creeks, now usually dry arroyos, including San Ygnacio, Los Tios, and Chacon Creeks, as well as the unnamed dry wash just east of Rocky Point. These creeks have running water following infrequent rainfall in the area, and often retain water in *tinajas* for longer durations. The creeks would have provided drinking water for the inhabitants of the site, and would have attracted wildlife that could have been hunted by these peoples. The large number and diversity of projectile points attests to the fact that hunting was an important subsistence activity. The slight increase in elevation at Rocky Point also was advantageous because it was an obvious vantage point that could be utilized for hunting and defensive purposes.

Even though the flora in the site area is now rather diverse in composition, it may well have been much more diverse in past periods, when it is believed that climatic conditions were considerably wetter. This is important when one considers the presence of the many mortars on the numerous boulders at Rocky Point. These mortars likely indicate some type of plant material was ground, presumably for food use, at this site. The grinding of the plant food, probably with stone pestles, produced the numerous conical-shaped depressions in the rocks. Therefore, it appears that this particular location also had desirable species of plant(s) capable of being processed into a usable food source.

Although mortar sites in other parts of Texas are very common, there are no mortar sites reported for extreme South Texas. The nearest *known* mortar site on the Texas side of the Rio Grande is at 41WB58 (Hester 1986:2), where there are a few mortars located in the sandstone bedrock cliffs overlooking the Rio Grande, and in proximity to a well-known rock art site (41WB56). However, this other bedrock mortar site is some 60 miles northwest of Rocky Point. Also, three bedrock mortars are reported from a petroglyph site in southwestern Dimmit County, approximately 9 miles north of 41WB58. Neither of these two sites have the number or complexity of mortars that is evident at 41WB356.

There are a few other known bedrock mortar sites in adjacent areas of northeastern Mexico, four in the state of Tamaulipas, and one in the state of Nuevo León. Two of the Tamaulipas, Mexico, sites have been previously reported (Boyd 1996a:17-23, 1996b:87-90). Although hundreds of *potential* bedrock mortar locations (i.e., areas of exposed sandstone bedrock in proximity to prehistoric occupation sites) have been examined in numerous locations in South Texas and adjacent areas of northeastern Mexico, only six mortar sites have been found (Boyd n.d.b). These include the five Mexican sites briefly mentioned above, and site 41WB356. It thus appears to be the case that the mere presence of suitably exposed sandstone bedrock, or sandstone boulders in the case at Rocky Point, in close proximity to extensive occupation sites, does not, in the vast majority of cases, help to predict the presence of bedrock mortar subsistence activities at these locations. The apparent rarity of mortar sites in this vast geographic region, where there are literally innumerable areas of exposed sandstone bedrock, suggests that a very specific set of circumstances at each location had to be present in order for the indigenous peoples to establish a bedrock mortar site during prehistoric times.

ACKNOWLEDGMENTS

It is through the assistance of many individuals that, nearly five years after my survey of the mortars at 41WB356, this initial report is finally completed. The Killam family of Laredo, Texas is graciously thanked for allowing the author access to this very important site in 1996, and for their generosity and conservation-mindedness. Foreman of the Killam Ranch, Mr. Charlie Martens, is also thanked for escorting the author to the Rocky Point site on the initial visit, and for providing additional background information and guidance. Mr. Fred Soliz, accountant for Killam Oil Company, and Mr. and Mrs. Victor Ramirez, are acknowledged for arranging initial contact with the landowners. Dr. Thomas R. Hester, formerly the Director of the Texas Archeological Research Laboratory (TARL), The University of Texas at Austin, was extremely helpful in regards to additional insights about 41WB356, and for providing several of the references used in this paper. Carolyn Spock, Head of Records at TARL, was helpful in providing site file information for the sites referenced herein. Also, Mike Krzywonski, of Laguna Vista, Texas, assisted the author on one visit to the site, and located additional mortar features, performed site photography, found and identified numerous lithic artifacts, some of which are listed in Table 1, and identified some of the plant species observed in the site. Timothy K. Perttula, of Archeological and Environmental Consultants in Austin, Texas, reviewed earlier drafts of this paper.

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ANDICE/BELL POINT USE FRACTURES

Carey D. Weber

ABSTRACT

Qualitative attributes for breakage of Andice/ Bell points are described. Tabulations of these attributes for 371 prehistoric Andice/Bell points are presented. Statistical data are presented on the morphological variation of Andice/Bell points caused by breakage.

INTRODUCTION

Diagnostic fractures may result from manufacture failures (Weber 1991) or use processes, while non-diagnostic fractures may be caused by both manufacturing and use. Patterson (1980) has previously discussed transverse fractures of projectile points and possible causes for these types of fractures. Huckell (1982) conducted experiments with thrusting spears and Clovis point replicas on an elephant carcass to document breakage types. More recently Cox and Smith (1991) completed a similar study for Perdiz arrowpoints. The strength of these studies is the use of empirical data. However, the experiments fell short of documenting types of breakage resulting from impacts with objects other than target game animals, and no breakage frequencies were established.

The scope of this study did not include microscopic analysis of use wear or experiments to replicate use wear or breakage patterns. Breaks resulting from manufacturing, while included in Table 1, were previously described by Weber (1991), and they are not discussed in this report.

USE FRACTURE SCAR ATTRIBUTES

Use fracture scars were documented wherever they occurred on an artifact, and they included barb loss scar type, distal tip loss scar type, presence or absence of remnant distal impact scar, base and stem snap damage, burins. Use of burin and snap scars (see Figure 1, a and b) was also documented. Barb loss scar type includes transverse snaps, lateral snaps, simple thermal fractures caused by burning, and removal of original barb loss scars by subsequent resharpening. At least three types of blade fractures, transverse snaps, some vertical snaps (non-notching), and burins, were identified that sometimes result in removal of the distal tip, as well as the barbs.

<u>Transverse and Vertical Snaps</u>

Generally, snaps can occur anywhere on the biface and from a variety of causes, including manufacturing, impact, other uses and post discard stresses. Fracture begins on one face and travels perpendicular toward the opposite face. The direction of the fracture path is usually indicated by a curved undulation, which arcs away from the face on which the fracture initiated. This undulation often merges with the rounded edge or sharp edge where the fracture turned to avoid particles in secondary compression before terminating on the opposite face (Sollberger 1986, Weber 1991). Prehistoric points showing transverse blade snaps are shown in (Figures 3,a-f; 6,a-b. Cox and Smith (1991), Huckell (1982) and Patterson (1980) have documented the occurrence of transverse blade snaps (Figure 1,b2) from use of projectile points. The scars of transverse barb snaps (Figure 1,a4) are almost identical to those of transverse blade snaps (Figure 1,b2), but they occur on barbs near the juncture with the blade (Figures 3,a-c; 3,f; 4,c; 5,b-c; 6,a-f). In most cases transverse barb and blade snaps resulting from use cannot be distinguished from those caused by manufacturing (Weber 1991). Weber (1991) identified vertical snaps caused by notching, but some vertical snaps (Figures 3,b; 6,f; 6,h) were found that did not appear to have been caused by notching. Snap fractures that removed the stem

Table 1. Frequencies of Break Scars on Prehisoric Andice/Bell Points.

Location	Break Type	Percent by Discriminant Function Value		
		20.54-35.04	35.04-44.04	44.04-60.54
Barb	Transverse	41.8	47.6	54.1
	Lateral - In	21.8	16.0	16.4
	Lateral - Out	1.5	0.4	1.9
	Burin	1.5	3.6	2.9
	Blade Snap	1.5	3.1	0.5
	Overshot	1.0	-	0.5
	Vertical Snap	1.9	4.0	2.9
	Split	-	-	2.4
	Notching Flake	1.9	0.9	2.9
	Burned	0.5	0.9	-
	Undamaged	26.7	23.6	15.5
Distal End	Transverse	36.9	36.8	36.7
	Roll Snap	14.8	19.1	14.8
	Remnant Roll Snap	4.2	4.4	12.6
	Burin	0.8	0.7	2.3
	Overshot	0.8	2.2	-
	Vertical Snap	-	1.5	-
	Split	-	-	1.6
	Flaked Off	-	0.7	-
	Undamaged	42.6	34.6	33.5
Base	Transverse Stem	2.5	5.0	7.6
	Roll Snap	1.7	-	1.7
	Corner Only	7.6	17.3	20.2
	Center	7.6	2.9	1.7
	Burin (Entire)	2.5	0.7	-
	Flaked Off	-	-	1.7
	Undamaged	78.0	74.1	67.2
Blade Only	Burin	2.6	7.8	7.8
Blade and Barb		-	1.6	3.9
Blade and Stem		-	1.6	1.0
Blade and Base		0.9	0.8	-
Blade, Stem and Base		-	0.8	-
Barb Only		33.3	27.3	25.2
Barb and Stem		1.7	0.8	3.9
Barb and Base		0.9	-	-
Stem Only		2.6	4.6	3.6
Base Only		1.8	-	0.9

Table 2. Provenience and Morphological Data of Illustrated Specimens (Page 1 of 2).

Figure	Provenience	Discriminant Function Value	Variation	Breakage Type
3a	41 BL 323	59.71	1	Transverse Blade Snap/ Transverse Barb Snap/ Barb Thermal Fracture
3b	41 GL	51.82	2	Transverse Blade Snap/ Vertical Snap/ Transverse Barb Snap/ Base Corner Snap
3c	41 BL/WM	-	-	Transverse Blade, Barb Stem Snaps
3d	41 BL 323	39.44	1	Distal Tip Transverse Snap/Barb burin
3e	Central Texas	32.39	3	Transverse Blade Snap/ Lateral-In Barb Snap/ Base Burin from Stem Edge
3f	41 GL	44.94	3	Transverse Barb Snap/ Base Corner Snap
3g	Central Texas	36.12	3	Transverse Blade Snap/ Lateral-In Barb Snap
3h	41 BL	35.74	3	Lateral-In Barb Snap/ Base Snap
4a	41 BN	42.74	1	Impact Burin/Base Burin
4b	41 BL	46.21	4	Impact Burin/Base Snap
4c	41 GL	34.46	3	Distal Tip Impact/ Transverse Barb Snap
4d	41 BL/WM	-	-	Distal Tip Impact/ Transverse Stem/Barb Snaps/Burin From Barb Base
5a	41 WM	50.51	2	Barb Burin
5b	41 BN	40.46	4	Transverse Barb Snap/ Lateral-In Barb Snap
5c	Central Texas	37.40	3	Distal Tip Lateral Overshot/Lateral-In Barb Snap/Transverse Barb Snap
5d	41 BL	35.80	1	Lateral-In Barb Snap/ Barb Burin/Base Snap
5e	Central Texas	45.82	1	Lateral-Out Barb Snap/ Resharpened Barb Loss Scar
5f	41 BL	48.29	2	Barb Burin
5g	Central Texas	57.84	1	Resharpened Barb Loss Scar/Barb Burin

Table 2. Provenience and Morphological Data of Illustrated Specimens (Page 2 of 2)

Figure	Provenience	Discriminant Function Value	Variation	Breakage Type
6a	41 GL/KM	42.16	1	Distal Transverse Snap/ Impact/Transverse Barb Snap
6b	41 BL/WM	50.21	2	Impact Post Transverse BladeSnap/Transverse Barb Snaps
6c	Central Texas	42.84	1	Distal Tip Roll Snap/ Transverse Barb Snaps/ Base Corner Snap
6d	Central Texas	40.48	3	Distal Tip Roll Snap/ Transverse Barb Snap/ Resharpened Barb Loss Scar/Base Snap
6e	41 BL 323	32.83	4	Distal Tip Impact Roll Snap/Transverse Barb Snap
6f	41 BL/WM	56.37	1	Distal Tip Impact/ Vertical Blade Snap/ Transverse Barb Snaps
6g	Central Texas	45.65	2	Remnant Roll Snap/ Lateral-In Barb Snap
6h	Central Texas	41.12	1	Remnant Impact Roll Snap/Vertical Snap
6i	41 BQ 17	44.43	1	Remnant Impact Roll Snap/Lateral-In Barb Snap/Resharpened Barb Loss Scar/Stem Burin

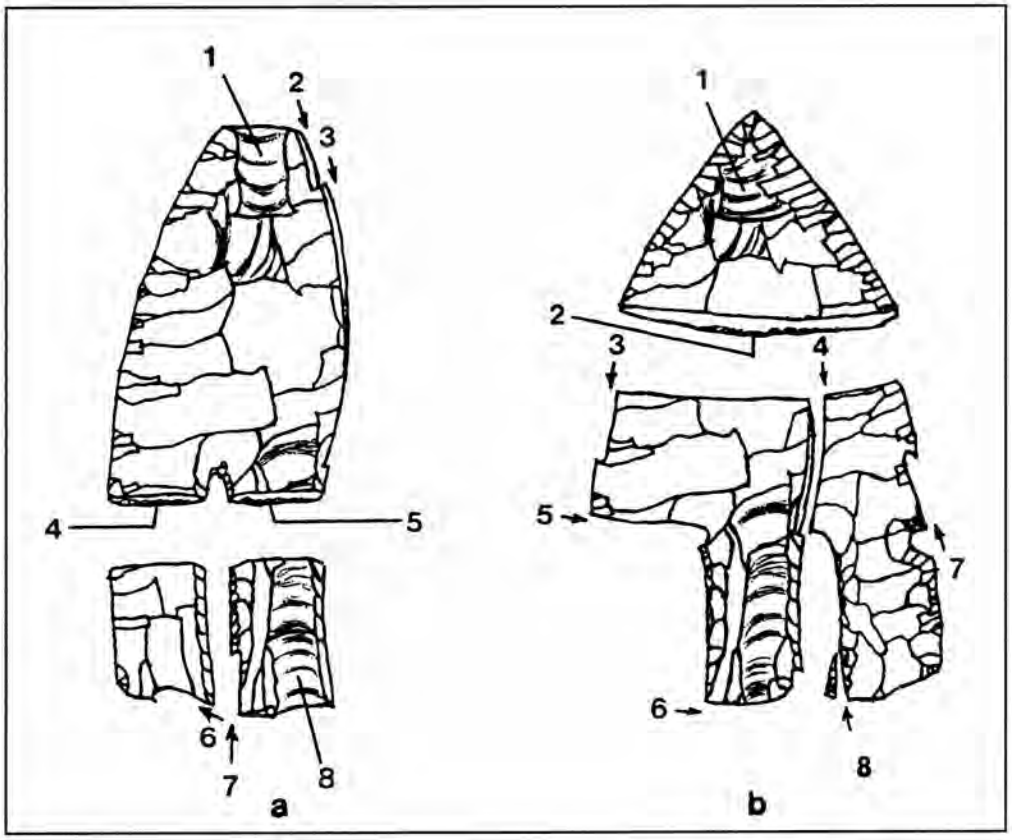

Figure 1. Andice/Bell point fracture types.

a. 1, distal tip roll snap scar; 2, impact/burin scar; 3, impact burin removing lateral blade edge and barb; 4, use of barb snap scar; 5, use of stem snap scar; 6, burin from lateral barb edge removing barb base; 7, burin from base removing lateral stem edge; 8, roll snap from base.

b. 1, remnant roll snap scar; 2, use of blade snap scar; 3, burin from blade snap scar; 4, burin from blade snap scar removing lateral blade edge and barb; 5, lateral-in barb snap or burin from lateral blade edge removing barb/barb loss scar; 6, burin from lateral stem edge removing base; 7, burin from notch; 8, burin from barb base removing barb edge.

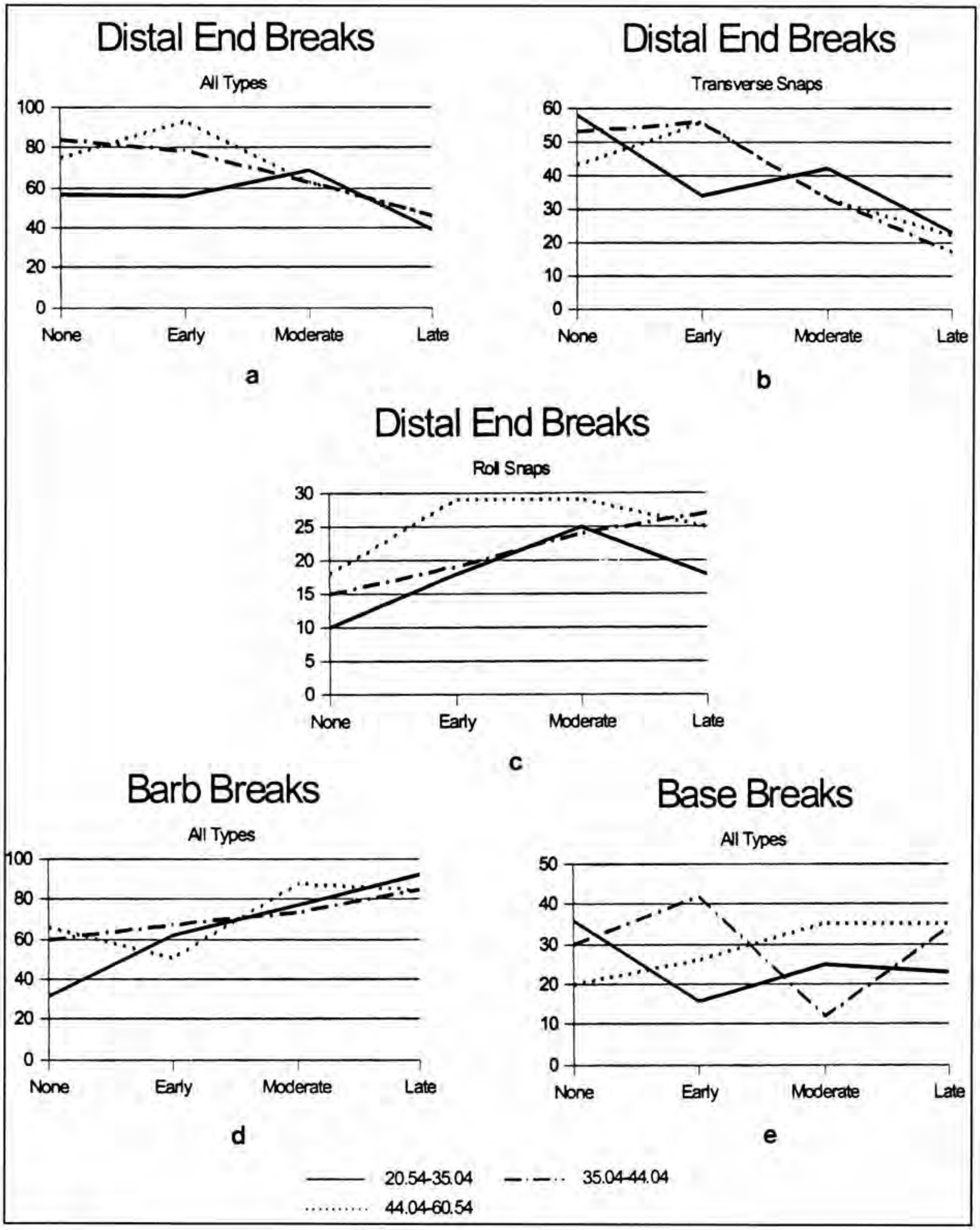

Figure 2. Graph of percent of break frequencies of prehistoric Andice/Bell points by discriminant function value groups and resharpening sequence. a, distal tip (all types); b, distal tip (transverse snap); c, distal tip (roll snap); d, barb (all types); e, base (all types).

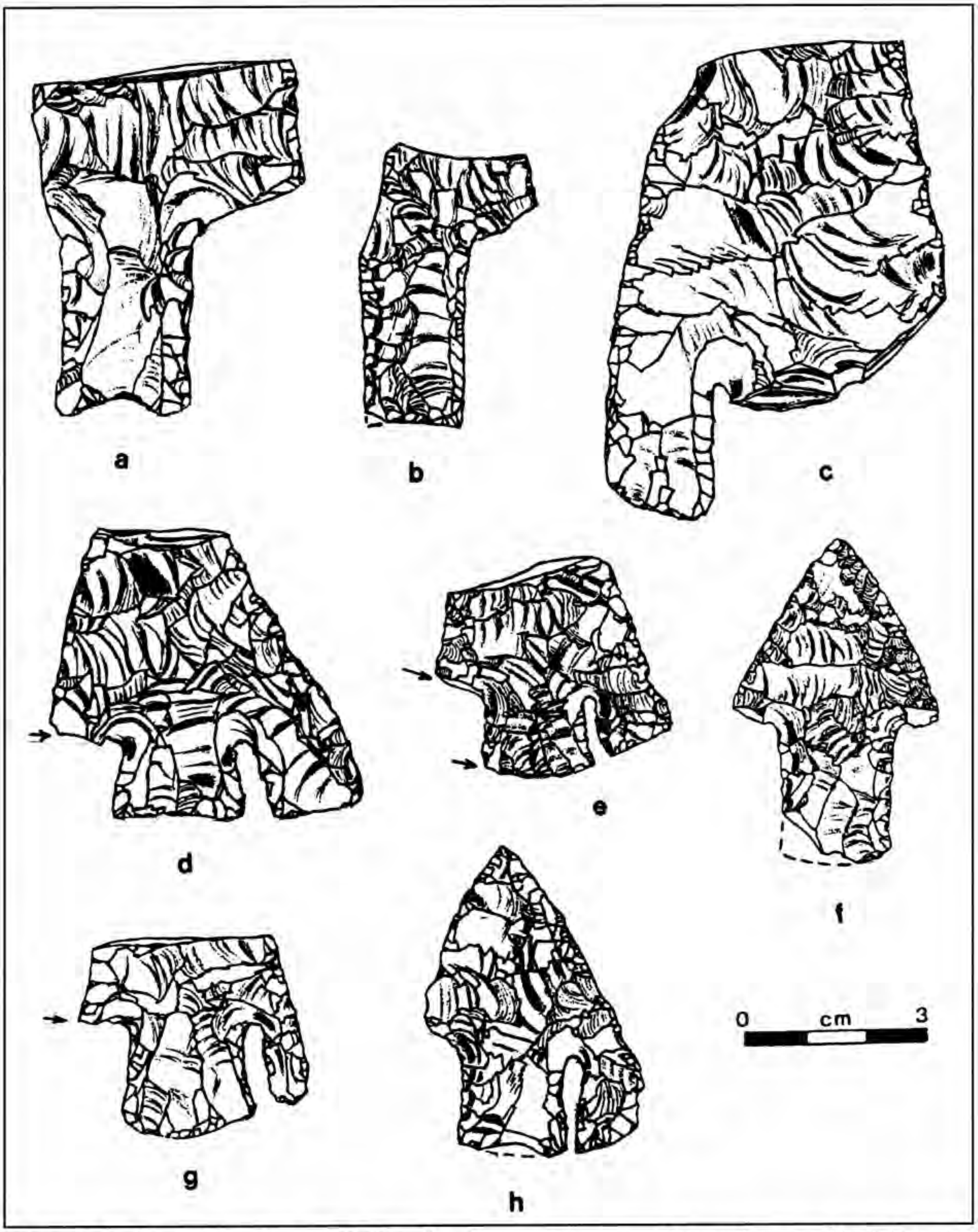

Figure 3. Prehistoric Andice/Bell Points showing snap fractures. Note resharpened barb loss scar on Specimen h. Arrows indicate burin/lateral barb snap scars. Dots indicate extent and degree of edge dulling. See Table 2 for provenience and morphological information.

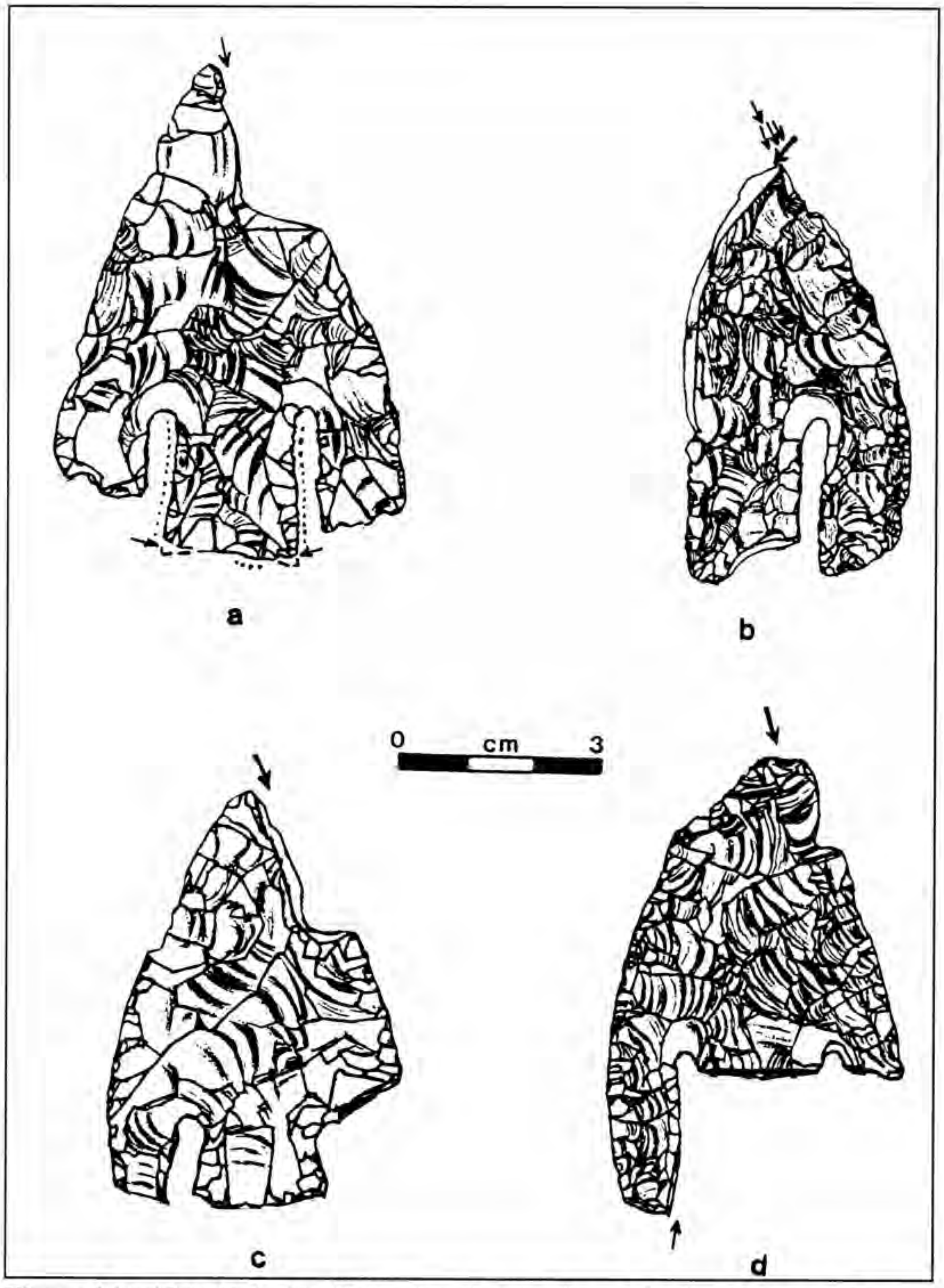

Figure 4. Prehistoric Andice/Bell points showing impact burins. Note post-damage resharpening toward opposite face of left distal blade edge on Specimen c. Arrows indicate burin scars. Dots indicate extent and degree of edge dulling. See Table 2 for provenience and morphological information.

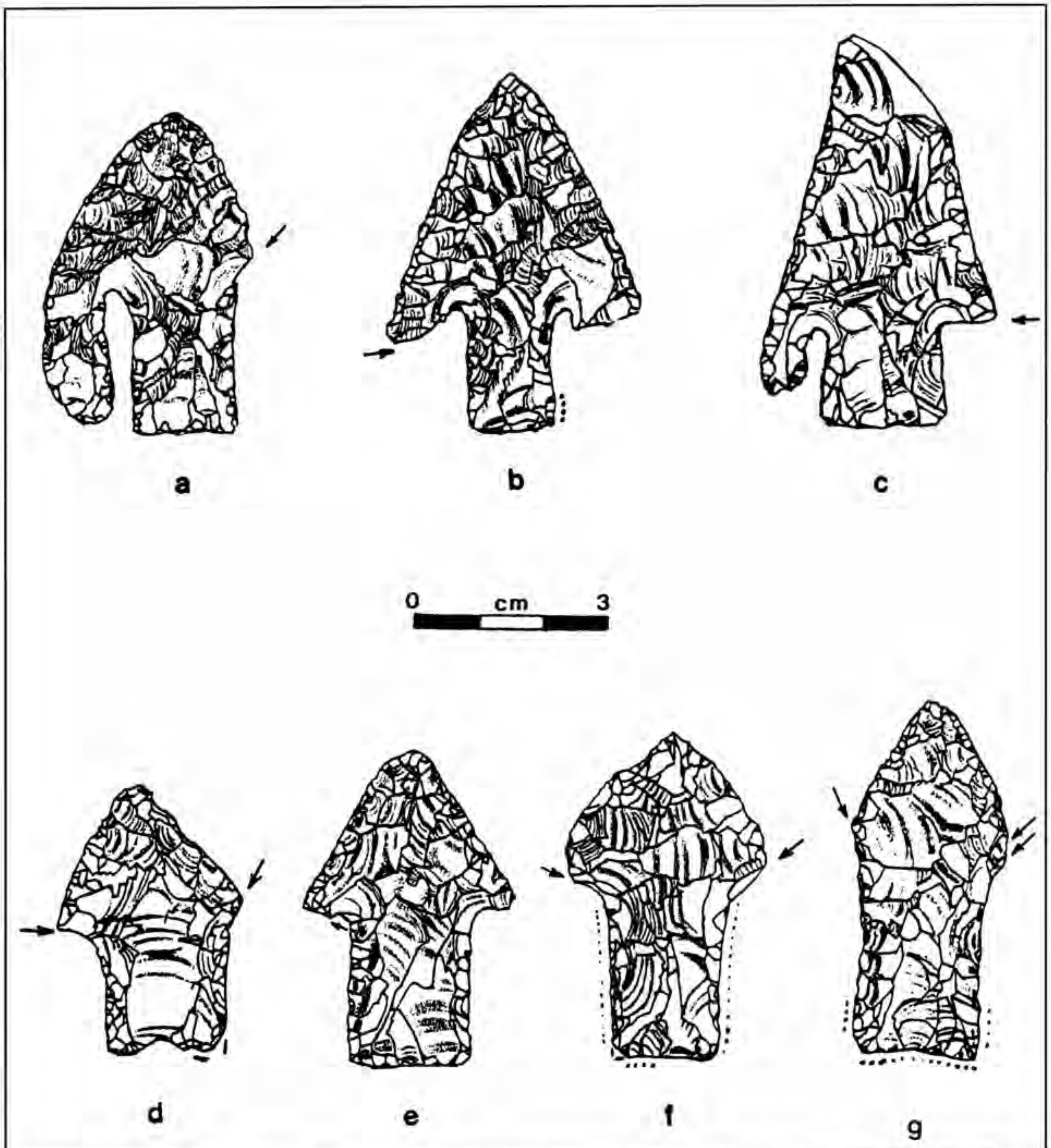

Figure 5. Prehistoric Andice/Bell points showing burins (a,d,f,g), lateral-in barb snaps (b,c,d) and lateral out barb snap (e). Note removal of the distal tip by a large pressure resharpening flake overshot on Specimen c. Arrows indicate burin/lateral barb snap scars. Dots indicate extent and degree of edge dulling. See Table 2 for provenience and morphological information.

Figure 6. Prehistoric Andice/Bell points showing impact roll snaps (a-f) and resharpened impact roll snaps (g-l). Note removal of the distal tip by a large pressure resharpening flake overshot on Specimen c. Arrows indicate burin/lateral barb snap scars. Dots indicate extent and degree of edge dulling. See Table 2 for provenience and morphological information.

(Figure 1a5), the center of the base and basal corners were also documented.

Lateral Barb Snaps

Two types of lateral barb snaps were distinguished based on the orientation of the fracture relative to the stem and outside lateral blade edge. Lateral barb snaps toward the stem edge (lateral-in; Figures 1,b5; 3,e; 3,g; 3,h; 5,b; 5,d; 6,g; 6,i) begin at the outside blade edge near the barb/blade juncture and travel toward the stem edge, usually removing the notch termination. Since they are so similar and because diagnostic features are often removed by resharpening, only some of these scars could be separated from burin scars removed along a barb loss scar from the outside edge, and they were tabulated in both categories. Among mechanical fractures, which include diagnostic manufacturing failures and blade damage that cause barb loss, lateral barb snaps toward the stem edge are the only fracture type that appears to result entirely from use, since none were produced during manufacturing experiments.

The second type of lateral barb snap, lateral barb snaps toward the outside edge (lateral-out), were previously described by Weber (1991). They begin just below the notching platform on the inside barb/notch edge and travel toward the outside barb/blade edge. The force required to initiate the fracture far exceeds the amount of force necessary to travel the short distance through the barb to the outside edge. As the fracture nears the outside barb/blade edge it usually curves and travels a short distance along the thin blade edge toward the distal end. The slow rate of outward displacement of the barb mass being removed (relative to forward fracture advance) and the thickness of the barb fragment (relative to the fracture plane) that resists bending emulate an overshot termination toward the distal end. Figure 5,e shows a prehistoric Andice/Bell point with a lateral-out barb snap.

Roll Snaps

Cox and Smith (1991) demonstrated the occurrence of non-burin impact scars, also called "roll" snaps (Figures 1,a1; 6,a-6,f), on Perdiz arrowpoints. The author has produced these fractures on points of larger projectiles propelled with an atlatl. On prehistoric Andice/Bell points they occurred from distal tips (Figure 1,a1), as well as from stem bases (Figure 1,a8). They begin as snap fractures when the projectile strikes an object. As the proximal section of the point rotates in motion end-over-end from projectile momentum, the fracture rolls out of the perpendicular snap plane onto the blade or stem face when the differential force between the projectile shaft and tip is insufficient to overcome secondary compression (Sollberger 1986). Large flake scars of this type often resemble flutes, and they are difficult to entirely remove by reflaking during repair. Most often, roll snaps on distal tips are part of a series of multiple fractures and crushing caused by repeated contact of the breaking point with the impact surface due to projectile momentum, rather than a single clean flake. On repointed specimens remnant roll snap scars indicate recycling of previously damaged points, and they were tabulated in the study as remnant impact scars (Figures 1,b1; 6,g-6,i). Roll snaps originating from the stem base indicate loose or inadequate hafts.

Burins

In this report burins are defined as fractures that travel perpendicular to the faces, removing lateral edges of the biface. Large burin scars originating at the distal end are generally identified as impact fractures (Figures 1,a2; 1,a3; 4,a-d). Distinctions between incidental and intentionally created burins on other parts of bifaces are speculative without empirical data. Experiments to date have not produced statistically significant data that make a case for either argument. Epstein (1963) documented the variation of burin scars for several point types. In this study the number of burin scars was documented wherever they occurred on a specimen (Figures 1,a2; 1,a3; 1,a6; 1,a7; 1,b3; 1,b4; 1,b5; 1,b6; 1,b7; 1,b8), and also included scars counted as lateral-in barb snaps toward a stem edge (Figures 1,b5; 5,a-d, f-g).

Use of Fracture Edges

The sharp edges of burins and other fractures scars that resulted from point breakage were sometimes used for scraping and cutting tasks that resulted in distinctive edge damage. The author recorded wear that could be seen visually, without the aid of a microscope. This attribute was tabulated in addition to the fracture types. Examples of utilization scars on trans-verse snaps are shown in Figure 1,a4; 1,a5 and 1,b2.

OBSERVED BREAKAGE FREQUENCIES

Attention was focused on identifying and tabulating distinctive types of breakage. As with resharpening and manufacturing qualitative attributes for the three discriminant function value groups (Weber 1994, 2000), a comparison of the frequencies of breakage attributes reveals statistical profiles that are very similar. Transverse snaps are the most common type of distal tip and barb breaks. How the snaps occurred is unclear, since transverse snaps are not unique to manufacturing, use or post-discard mechanical stresses. Barb damage appears to be proportionate to size, while base damage appears to be related to both size and variant stem shape.

Distal End

Over one third of all distal tips are undamaged or reflaked, as shown in Table 1. Like the barbs, transverse snaps (Figure 1,b2) are the most common type of break, with impact roll snaps (Figure 1,a1) and resharpened remnant roll snap scars (Figure 1,b1) the next most common types. Categorization of the data by resharpening sequence (Figure 2,a) shows that most tip damage occurs prior to or during early resharpening, and 60 percent of the blades are fitted with new tips by final use sequences. While transverse blade snaps are most frequent in earliest sequences and decline steadily in later sequences (Figure 2,b), the frequency of roll snap impact fractures is relatively constant throughout the resharpening process (Figure 2,c). Transverse blade snaps are either not associated with the function served by the resharpening, or *they are removed by the resharpening* when the points are refitted with new tips. Alternatively, higher mean blade snap frequencies may simply be associated with larger blades. Tip damage, like barb damage, is somewhat higher for the larger Andice/Bell points.

Barbs

Barbs are the most fragile part of this biface form, and loss of barbs is the most common form of breakage. As shown in Table 1, stresses that cause transverse snaps (Figure 1,a4) and lateral-in snaps (Figure 1,b5) removed over 63 percent of barbs on Andice/Bell points, and transverse snaps alone represented almost half of the barb loss scars. Since over 20 percent of barbs are unbroken, barb loss scars other than transverse snaps and lateral-in snaps are relatively uncommon (Table 1). When categorized by resharpening sequence (Figure 2,d), the larger Andice/Bell points are shown to be more fragile than the smaller points during early use, with nearly the same frequencies of barb loss for all sizes in final use sequences. The mean frequency of barb breakage increases with each use sequence (Figure 2,d).

Base and Stem

Table 1 shows that the stem design of Andice/Bell points was adequate for the hafting technique and utilitarian tasks of their owners. Nearly 75 percent of the stems are undamaged, and approximately 20 percent more show minor damage of corners and bases. Approximately five percent are not functional because of snaps that removed the stems from the blade (Figure 1,a5). Stem snaps and damage to basal corners were noted by Huckell (1982) for Clovis points. No clear relationships are apparent for Andice/ Bell points when the data is categorized by discriminant function value groups in combination with resharpening sequence (Figure 2,e), so damage types were categorized by stem variant (Weber 1986) and alternatively by discriminant function value groups (Table 1). Specimens in the upper size ranges showed proportionately more damage to basal corners (the weakest area of these designs), as well as snap fractures that broke the stem. Andice/Bell points in the smaller size ranges have proportionately more minor damage to the center of the base than those in the upper size ranges. This type of damage may indicate the presence of handles or shafts with diameters that were somewhat less than the point basal width. By stem variant (Weber 1986), the minor damage to the center of the base occurred most frequently in convex base designs, while basal corner damage occurred most frequently in concave and recurved base designs.

Burins

Table 1 shows the frequency of burins on Andice/Bell points. Burins formed by removal of a microblade from a lateral blade edge toward a notch termination, or barb burins (Figure 1,b5) are the most common of all burin categories. However, this type of burin often cannot always be distinguished from lateral-in barb snaps, and the two were counted as both barb breakage and burins in some cases. It should be noted that the barb breakage category in Table 1 includes only lateral-in snaps and burins that completely removed the barb, while the burin category includes burins along barb edges that did not result in barb loss (Figure 1,a6; 1,b8), as well as burins that removed barbs. The next two most frequent categories are burins along blade edges (Figure 1,a2, 1a3) and burins that remove lateral stem edges (Figure 1,a7). Without empirical data, it appears that lateral blade and stem edges are the most likely areas for burins to occur as a result of impact.

USE OF BREAK SCARS

Use scars from the sharp edges of break scars are generally irregular microflakes that were apparently removed by rasping or gouging unifacially along varying lengths of the break edges. Only 6.9 percent of the entire Andice/ Bell sample exhibited these scars. By rank order transverse blade snaps (2.9%), followed by transverse barb snaps (1.3%), stem snaps (1.1%) and burin scars along a lateral blade edge (1.1%), were the most preferred break edges (Figure 1,b2; 1,a4; 1,a5; 1,a3 and 1,b4, respectively). When categorized by discriminant function values groups, the largest specimens showed the most break edge use (13.6%), and they were followed by the mid-range specimens (6.6%). The smallest specimens showed less than one percent use of break scars. Categorization by resharpening sequence showed a similar trend, with the largest specimens (earliest sequences) showing more use than smaller forms (absent - 10.3%; early - 9.5%; moderate - 4.7%; late - 2.5%). These frequencies suggest that the size of the break scar or the size of the remnant piece to grasp may have been important to the function. The relative scarcity of the attribute suggests that these were tools of convenience, that other non-bifacial forms may have been used for the same purposes, or that the task for which they were used was an infrequent one.

DISCUSSION

How stone tools were broken gives clues to how they were used. All of the discriminant function value groups for Andice/Bell points show very similar breakage patterns, with the exception of stem damage. In the case of transverse blade snaps, the frequency of occurrence can be considered identical. Whether these similarities result primarily from morphology or function needs to be verified by experiment. Somewhat dissimilar trends may be explained by size and shape differences. As shown in Table 1, only 10 of the 25 total breakage categories are statistically significant. These categories are transverse barb snaps, lateral-in barb snaps, transverse blade snaps, roll snaps, remnant roll snaps, transverse stem snaps, base corner snaps, base center snaps, blade burins and barb burins. Damage, particularly transverse snap damage that removes significant portions of the barbs, blade and stem occurred most frequently during early use and on larger specimens. Infrequently the edges of these break scars were used as incidental tools, but usually the broken pieces were reflaked for further use as projectile points, knives and, infrequently, as drills and gouges. Damage to stems varies by stem length and stem shape. Long stems are more likely to be snapped off the blade. Concave and recurved base stems are more likely to exhibit damage to corners, while convex bases are more likely to exhibit roll snap damage. Severe stem damage is relatively rare; most damage is to blades and barbs. Although a minute percentage of burins appears to have been created intentionally, most appear to be an incidental form of damage.

In closing, the data presented in this paper indicate that given the original size, breakage types, stem shape and use sequence of Andice/Bell points, the specimens were used as projectile points.

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