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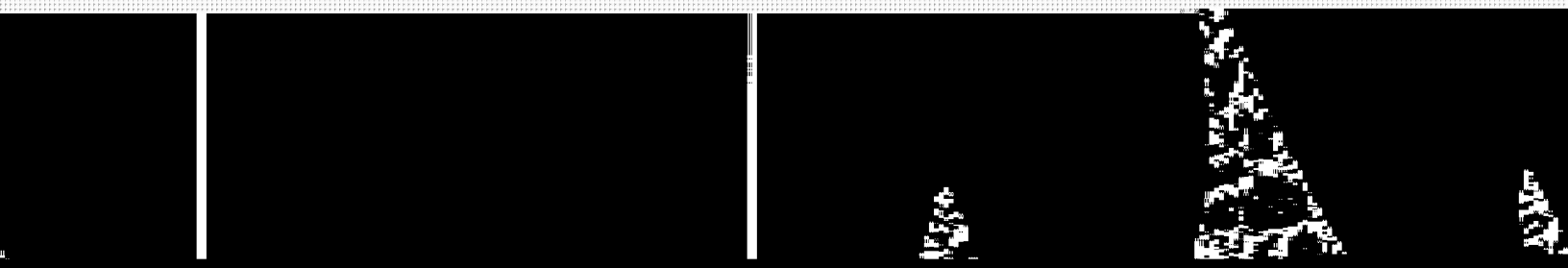

LA TIERRA

QUARTERLY JOURNAL OF THE SOUTHERN TEXAS ARCHAEOLOGICAL ASSOCIATION

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July, 1991 — Editor

About the Cover: Richard McReynolds has drawn several corner-notched bifaces found in south central Texas. See article starting on page 21.

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NOTES ON SOUTH TEXAS ARCHAEOLOGY: 1991-3

Further Notes on the Lithics from the Plainview Occupation at the St. Mary's Hall Site, South Central Texas

Thomas R. Hester and Dennis Knepper

In the previous issue of La Tierra (Hester 1991), a brief summary and a series of illustrations (from Greco, ms.) were provided of the Plainview points excavated at site 41BX229, the St. Mary's Hall site in south central Texas. Reference was also made in that paper to the study of the lithic technology of the Plainview component materials done by Knepper (ms.). With a view towards disseminating some of the data from that manuscript, prior to its eventual and full publication, we have selected a number of the important items from the 1977 excavations (Hester 1979) of the Plainview zone for description and illustration here.

First of all, it must be emphasized that Knepper's study examined the Plainview lithics from the standpoint of developing a behavioral model of the reduction process represented in the assemblage. A four-stage model was proposed, from acquisition of raw materials through the final shaping and edge refinement that resulted in the completed artifact.

A total of 37 bifaces (non-projectile point) and unifaces was examined. All were made from light gray to light brown chert, available locally in the Salado Creek drainage. All of the artifacts were patinated to some degree, ranging from moderate to very dense in intensity. Some pieces were characterized by a pinkish tinge, perhaps related to heat-treating.

Core-chopper (Figure 1,a). The largest specimen (Knepper #1501) in the assemblage is a bifacially worked tabular cobble, roughly triangular in outline. It may represent an unsuccesful attempt to reduce the cobble, or it may have been modified strictly for use as a chopper. Evidence of that function is reflected in the extensive dulling and rounding of the worked edges. Length, 109 mm; width, 91 mm; thickness, 37 mm; weight, 441.8 grams

Blanks/Cores: Six bifaces (#s 1502-1507) represent initial biface reduction, forming what are often called "blanks" in the lithic literature. Four are quite thick and may have actually been used as cores for small flake production. One illustrated specimen (#1503, Figure 1,b) is 94 mm long, 77 mm wide and 41 mm thick; it weighs 265.6 grams. Two others are thinner, with all cortex removed and are blanks broken or abandoned prior to further thinning. The illustrated artifact (#1507, Figure 1,c) was ruined by an overshot flake. It is 97 mm long, 50 mm wide, 23 mm thick, and weighs 81.8 grams.

Initial Stage Preforms. Seven bifaces (and fragments) represent biface preforming beyond the "blank" stage (#s 1508-1512). They are more carefully shaped, have biconvex cross sections, and extensive edge abrading for platform preparation. Three of the specimens have "stacks" (knots) in the central part of one face; attempts to remove these resulted in hinge fracture terminations (see the profile in Figure 1,d). The illustrated specimen (#1509, Figure 1,d) has the following dimensions: length, 122 mm; width, 47 mm; thickness, 23 mm; and weight, 105 grams.

Late Stage Preforms. Nine bifaces represent artifacts at various points near the end of the preforming stage (#s 1513-18; 1520-22). Lateral edges are straight, outlines are

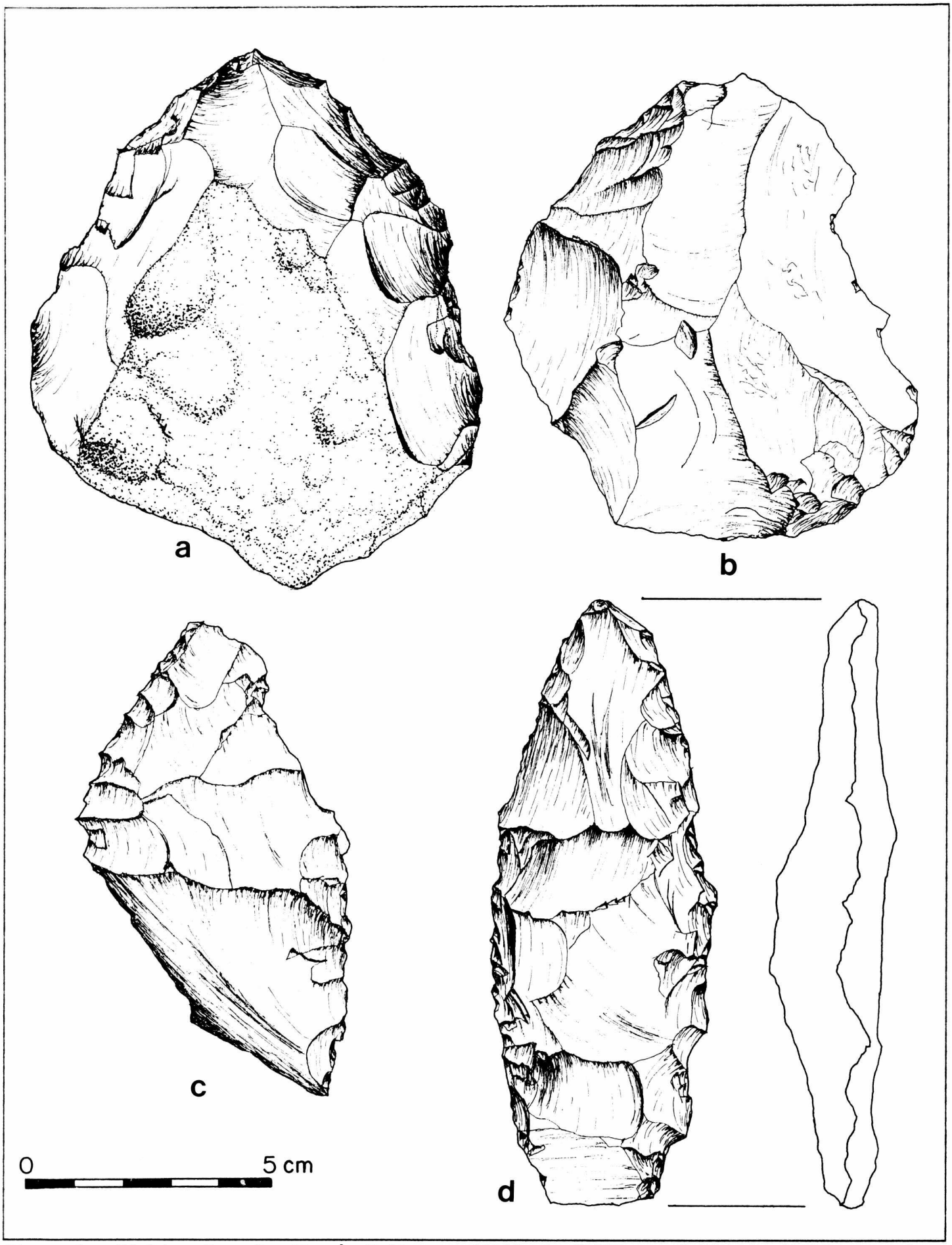

Figure 1. Lithics from St. Mary's Hall. a, #1501; b, #1503; c, #1507; d, #1509. Drawings by Dennis Knepper.

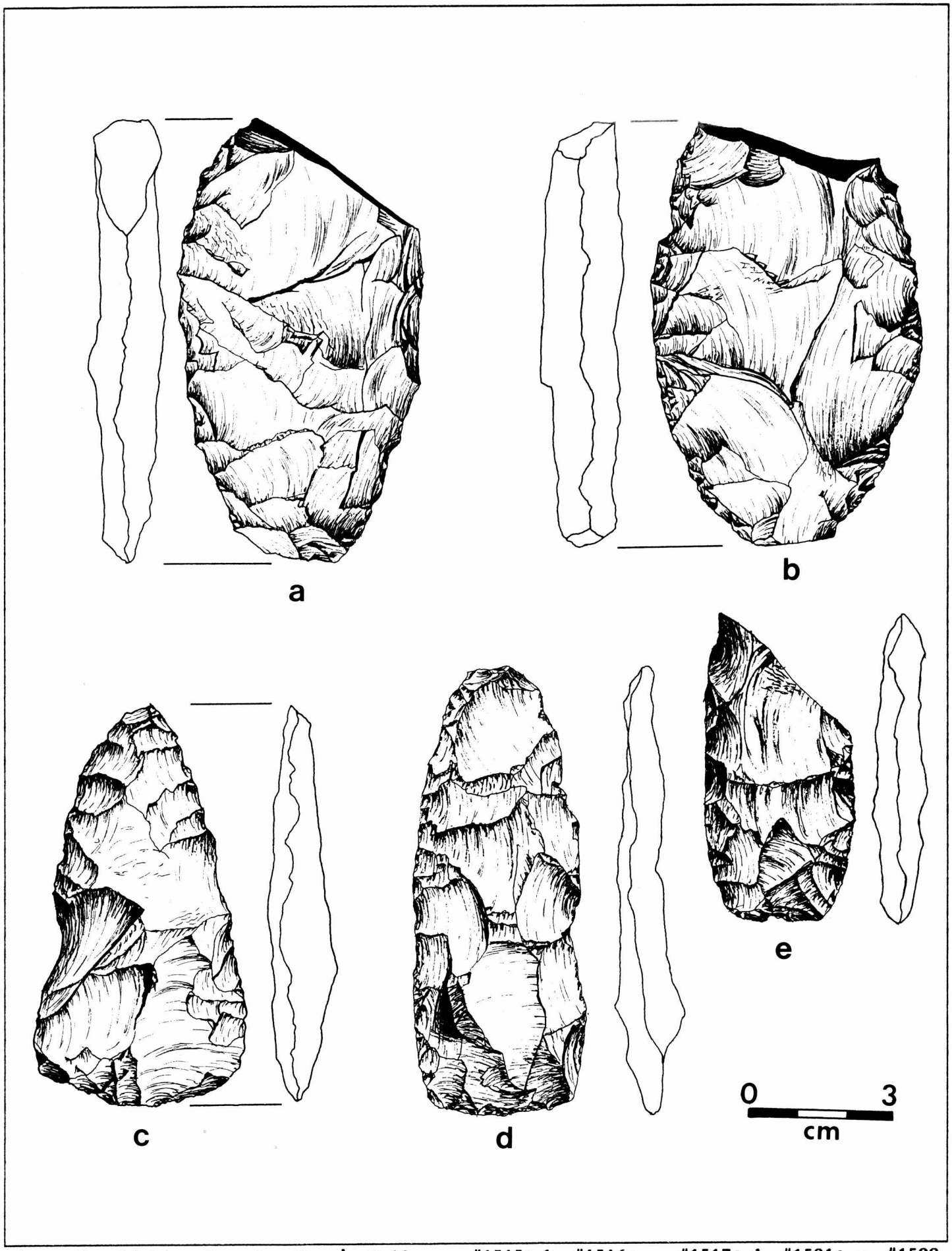

Figure 2. Lithics from St. Mary's Hall. a, #1515; b, #1516; c, #1517; d, #1521; e, #1522. Drawings by Dennis Knepper.

distinctive, and cross sections rather flat. Most appeared to have remained unfinished due to "stacks" or thick ridges (Figure 2) on one or both faces, and others were truncated due to end-shock or related breaks during thinning. The dimensions of the illustrated specimens are:

	Length	Width	Thickness	Weight (grams)
Fig. 2,a #1515	84	54	14	70.4
Fig. 2,b #1516	88	48	12	57.3
Fig. 2,c #1517	78	43	12	35.4
Fig. 2,d #1521	89	35	11	32.4
Fig. 2,e #1522	61	31	9	18.5
Fig. 3,a #1518	94	41	15	56.5

Final Stage Preform. One specimen (#1525, Figure 3,b) represents Knepper's postulated "Stage 4" -- awaiting the finishing touches in completing the artifact, in this case destined to be a Plainview point. This lanceolate preform was clearly at that juncture, but may have been abandoned, in Knepper's view (ms.:17), in that it became "narrow faster than it became thin." Several hinge fractures are present on the lateral edges indicating that some effort was made to further thin the specimen. A heavily patinated biface of literally the same dimensions and remarkably similar technology (but with lateral edge grinding) was found at the surface at 41MI4, in Mills County (Barnett Collection). Length, 117 mm; width, 28 mm; thickness, 11 mm.; weight, 32.4 grams.

Clear Fork Biface. A bifacial Clear Fork tool (#1519, Figure 3,c).was recovered from the Plainview component. Knepper suggests that it may have been made on a late stage preform, similar to one illustrated in Figure 3,a). The bit is concave and has an edge angle of 60 degrees. Low power microscopic examination of the bit edge revealed some polish on both faces of the bit and slight nibbling wear. There is considerable dulling of the lateral edges, perhaps related to haft wear. The specimen is of particular comparative importance given the fact that another bifacial Clear Fork tool, somewhat wider and broken in use (and it was clearly hafted at the time of breakage), was found with the Golondrina component at Baker Cave (Chadderdon 1983; Hester 1983).

Unifaces. Two unifaces (#1533, and #1534, Figure 3,d) not described by Knepper, are also present in the Plainview assemblage. Both are made on cortex flakes (Figure 3,d; one is a bit fragment), with formation of a working edge or bit opposite the bulb of percussion --"end scrapers" in the technological sense. The dorsal surface of the illustrated uniface is covered with cortex; only the bit (Figure 3,d) has been modified. Its dimensions are: length, 85 mm; width, 45 mm; thickness, 18 mm; weight, 80.5 grams; angle of the bit edge (with nibbling macrowear) ranges between 60-70 degrees.

Other Lithics. Among the other lithic specimens in the Plainview assemblage is a small reworked biface fragment and eight utilized flakes. The latter are mostly cortex flakes with minimal edge modification; two, however, might be classified as "concave scrapers" (or "notches"/"spokeshaves"). Debitage from the component includes several thousand flakes, a sample analyzed in preliminary fashion by Colby and Anderson (ms.).

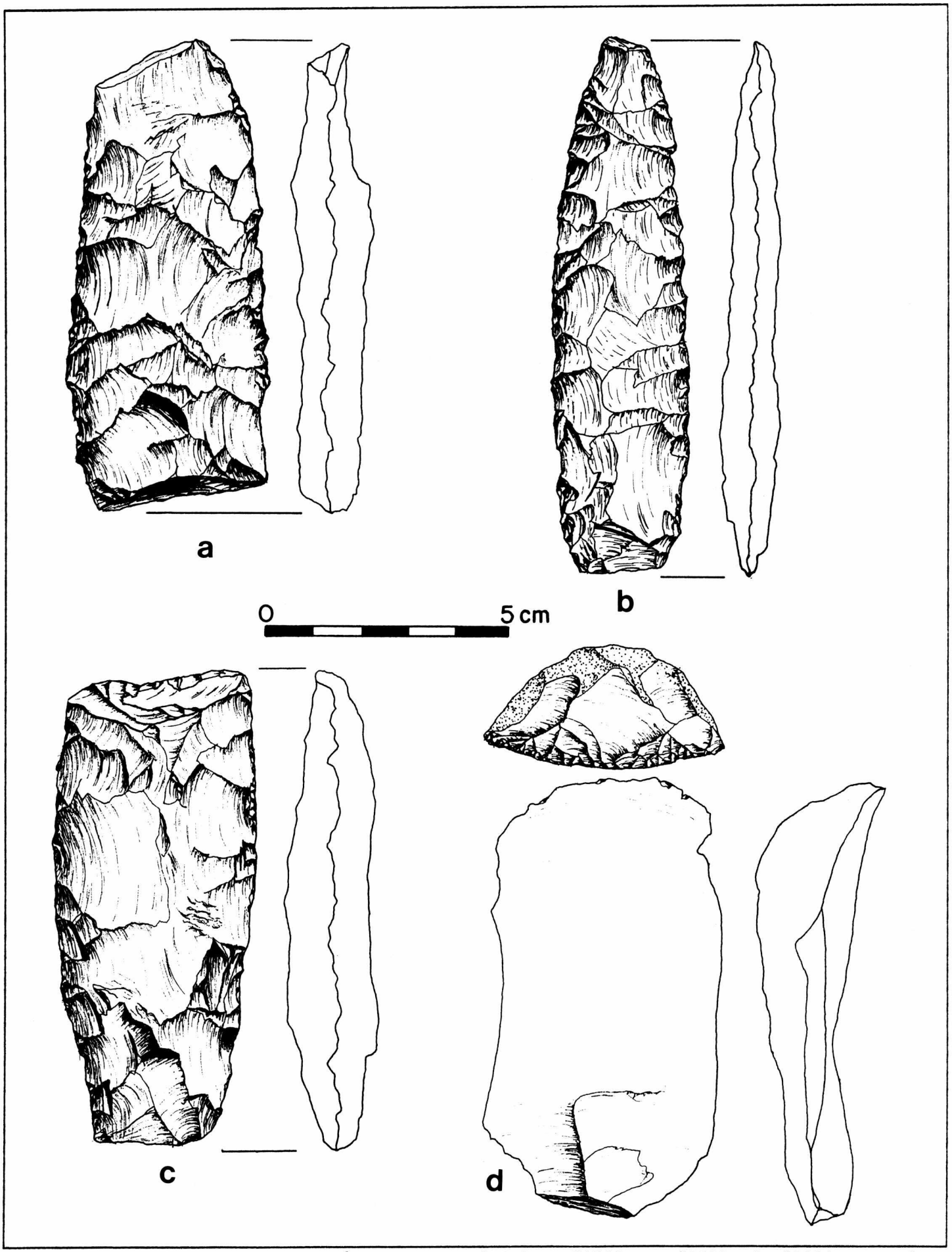

Figure 3. Lithics from St. Mary's Hall. a, #1518; b,#1525; c, #1519; d, #1534. Drawings by Dennis Knepper.

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ERRATUM AND EMENDATION

In "Notes on South Texas Archaeology: 1991-2," I mistakenly used site number 41BX228 when referring to the St. Mary's Hall site. That number (41BX228) is for the Panther Springs Creek site. The correct trinomial for St. Mary's Hall is 41BX229.

In "Notes on South Texas Archaeology: 1991-1," I listed a number of colleagues who had provided obsidian samples for the Texas Obsidian Project (TOP) over the past two decades. I am sure that I inadvertently omitted the names of several persons from that list. One name that should be noted, however, is that of C. K. Chandler. C. K. has pointed me toward several obsidian specimens, including one (TOP #86) analyzed and reported in his paper on the Sour Mash site (41HI34), published in the *Bulletin of the Texas Archeological Society* Vol. 56, 1985.

T. R. Hester

IN MEMORIAM

O. B. BRAMBLETT

Orgel B. Bramblett of Austin, Texas, passed away February 26, 1991 at the age of 84. He was the father of UT-Austin physical anthropologist Dr. Claud Bramblett. Mr. Bramblett and his family were long-time residents of Carrizo Springs, where Claud was a member of the Carrizo Springs High School Anthropology Club (later Archeological Society) founded by Wade House.

Mr. Bramblett worked for many years as an employee of the Texas Highway Department. In summer, 1964, I worked in his crew, as we cleaned the rights-of-way along Dimmit County's highways and farm-to-market roads. Most days, Mr. Bramblett would park the highway department truck for lunch -- and he would park it at an opportune place. While the rest of the crew napped in the shade, Mr. Bramblett and I would hop the nearby fence and go off in search of Indian artifacts. This led to the recording of several sites, including 41DM41 and 41DM42, during that summer.

During his many years in Dimmit County, Mr. Bramblett assembled a very large collection of artifacts. Though he and Claud made an effort to catalog them, most can be best described as representative of that particular county. In 1965, members of the Carrizo Springs High School Archeological Society recorded some of Mr. Bramblett's Collection (*Pena Pow-Wow*, Vol. III, No. VI, pp. 1-11, March 26, 1965). They noted that Mr. Bramblett had been collecting in Dimmit County for 26 years. They recorded and illustrated Carrizo points, Archaic and Paleo-Indian dart points, Late Prehistoric arrow points, drills, shell and stone beads and pendants, and metates.

When I last met with Mr. Bramblett in November, 1990, he wanted to start donating parts of his collection to the Texas Archeological Research Laboratory (TARL) at UT-Austin. Following his death, Claude completed the task. The O. B. Bramblett Collection, now housed at TARL, will be a valuable reference and teaching collection for South Texas archaeology.

Thomas R. Hester

INCISED BONE AND CONCH SHELL ARTIFACTS FROM THE TEXAS WEST INDIES SITE (41VT9)

W. W. Birmingham and Jeffery A. Huebner

ABSTRACT

The Texas West Indies ranch site was discovered in 1960 during road construction that exposed several human burials. In November of 1961 salvage excavations were conducted to recover the remaining in situ skeletal and cultural materials. Based on these activities, a total of 22 individuals were identified. Also recovered from the construction spoil were incised bone implements, and long *Busycon* sp. shell beads. Because of the likely association of these artifacts with the burials, the site is dated to the Late Archaic period, and it is hypothesized that it is part of a larger mortuary tradition in the central coastal plain.

INTRODUCTION

In this brief note, we document seven human burials and two types of artifacts from a site on McDonald Bayou in southern Victoria County, Texas. The Texas West Indies Ranch site [TWI (41VT9)] was located approximately 10 km south of the city of Victoria, west of the Guadalupe River on the right bank of McDonald Bayou, ca. 1 km above its confluence with Linn Lake (Figure 1). The

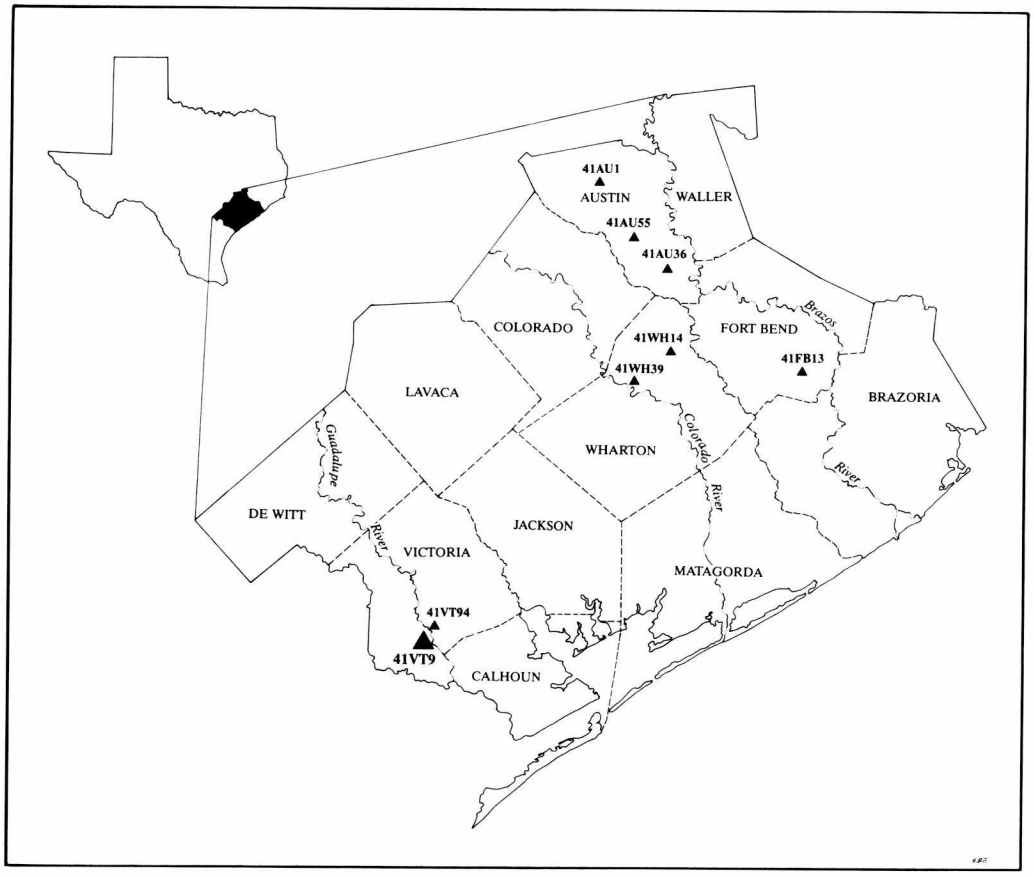

Figure 1. Location of the Texas West Indies Ranch Site, 41VT9, and other cemetery sites discussed in the text.

site was situated on the toe of a sandy Deweyville terrace on the western edge of the Guadalupe River floodplain. Environmentally and physiographically, this site is identical to the Blue Bayou mortuary site (Huebner 1988) except it is on the other side of the river. The site was initially exposed in 1960 by a bulldozer moving fill dirt for road construction. Subsequent erosion further deflated the site, exposing no less than seven human burials. Salvage excavation of the burials was conducted by Virgil Branch and other avocational archaeologists in November 1961. The mortuary portion of the site has since been destroyed by private road construction. Surface collections from the site held by Branch and others, contain over 400 artifacts including lithics, ceramics, and the bone and shell specimens to be discussed in this paper. Temporally diagnostic artifacts from the surface collection indicate occupation of the site during both the Archaic and Late Prehistoric periods. Perdiz arrow points, bone tempered pottery, along with Scallorn arrow points are representative of Late Prehistoric occupations. Many of these Scallorn points have denticulated lateral edges. Archaic-age artifacts include Palmillas, Morhiss, and Tortugas dart points, as well as Guadalupe and Clear Fork tools.

THE BURIALS

Seven human burial features were excavated within a small area of the site. All were disturbed and generally in a poor state of preservation. The following descriptions of the burials were compiled from the excavator's notes and field photographs. A list of the skeletal elements recovered from each feature is in the notes; however, no information on sex, age, or stature is included.

Burial 1

This was an adult in a flexed position on its left side. The skull was oriented to the south, facing west.

Burial 2

This was an adult in a semi-flexed position on its left side. The skull was oriented to the south, facing west. Burial 2 was found directly beneath Burial 1. An unmodified periwinkle (*Littorina irrorata*) shell was associated with this burial.

Burial 3

This was an adult extended on its back, with the head oriented to the west. A stemmed dart point was found between the right arm and rib cage. The position of the dart point was not indicative of a wound, and it is interpreted as a grave offering.

Burial 4

This appeared to be a secondary burial with the remains of four individuals: two adults and two juveniles. The recovered remains consist primarily of long bone elements.

Burial 5

This burial was represented by skull fragments and dentition from an adult with no post-cranial remains.

Burial 6

This was an adult extended on its back with the head oriented to the north. A second individual in this burial was indicated by extra dentition.

Burial 7

These are partial remains of as many as three individuals. Cranial and post-cranial elements were present. It is impossible to determine if this was a highly disturbed multiple primary interment or a secondary interment similar to Burial 4.

A total of 14 individuals are represented in the seven discrete burial features. The partial remains of as many as eight other individuals (based on femur count) were collected from the surface of the site. These represent burials disturbed and scattered by the bulldozer and erosion. Thus, we suggest that a total of no less than 22 individuals were interred at the TWI site.

The burials are assumed to date to the Late Archaic, based on the similarity of the bone and shell artifacts with others found primarily in Late Archaic mortuary sites in the Lower Brazos and Colorado River drainages. Secondly, the extended burial position, as seen in Burials 3 and 6 at TWI is most common at Late Archaic mortuary sites (Grant Hall, personal communication). While extended burials are a hallmark of the Late Archaic, several sites of this period show a mixture in extended and flexed positions, much like TWI. These sites include Crestmont (Vernon 1989), Ernest Witte (Hall 1981), Goeble (Duke 1981), Albert George (Walley 1955) and Johnson (Campbell 1947). Later cemeteries such as Burial Group 4 at Ernest Witte (Hall 1981) and Blue Bayou (Huebner 1988) have yielded predominately flexed burials.

THE ARTIFACTS

Seven incised bone and eleven conch shell artifacts from the surface collection of the TWI site are described below.

Incised Bone

All of the artifacts in this group were fabricated from the split long bones of a large mammal, in this case, most likely deer (*Odocoilus virginiannus*). The artifacts were apparently shaped by abrasion, although no evidence of this can be seen on the smoothed and polished finished surfaces and edges. Metric data are presented in centimeters in Table 1; all length measurements are incomplete as all bone artifacts are fragmentary.

Specimen E-250 (Figure 2 a). This distal portion of a straight, parallel sided bone implement is lenticular in cross section with a blunt tip. An incised geometric design covers the exterior surface. The design consists of intersecting diagonal lines running from lateral edge to lateral edge, forming a diamond pattern. The triangular areas outside the diamonds have between 10 and 16 lines running from the lateral edge to the edge of the diamonds. The proximal end of the artifact is burned and the engraved design shows heavy traces of deep red ocher. This implement is illustrated in Hall (1988).

Specimen E-256 (Figure 2 b). This medial fragment is similar in shape and design to E-250, except the design is more rectangular than diamond shape; one end of the artifact is burned and light traces of red ocher are present in the engraved design. Despite the similarity between E-250 and E-256, they do not appear to be parts of a single artifact.

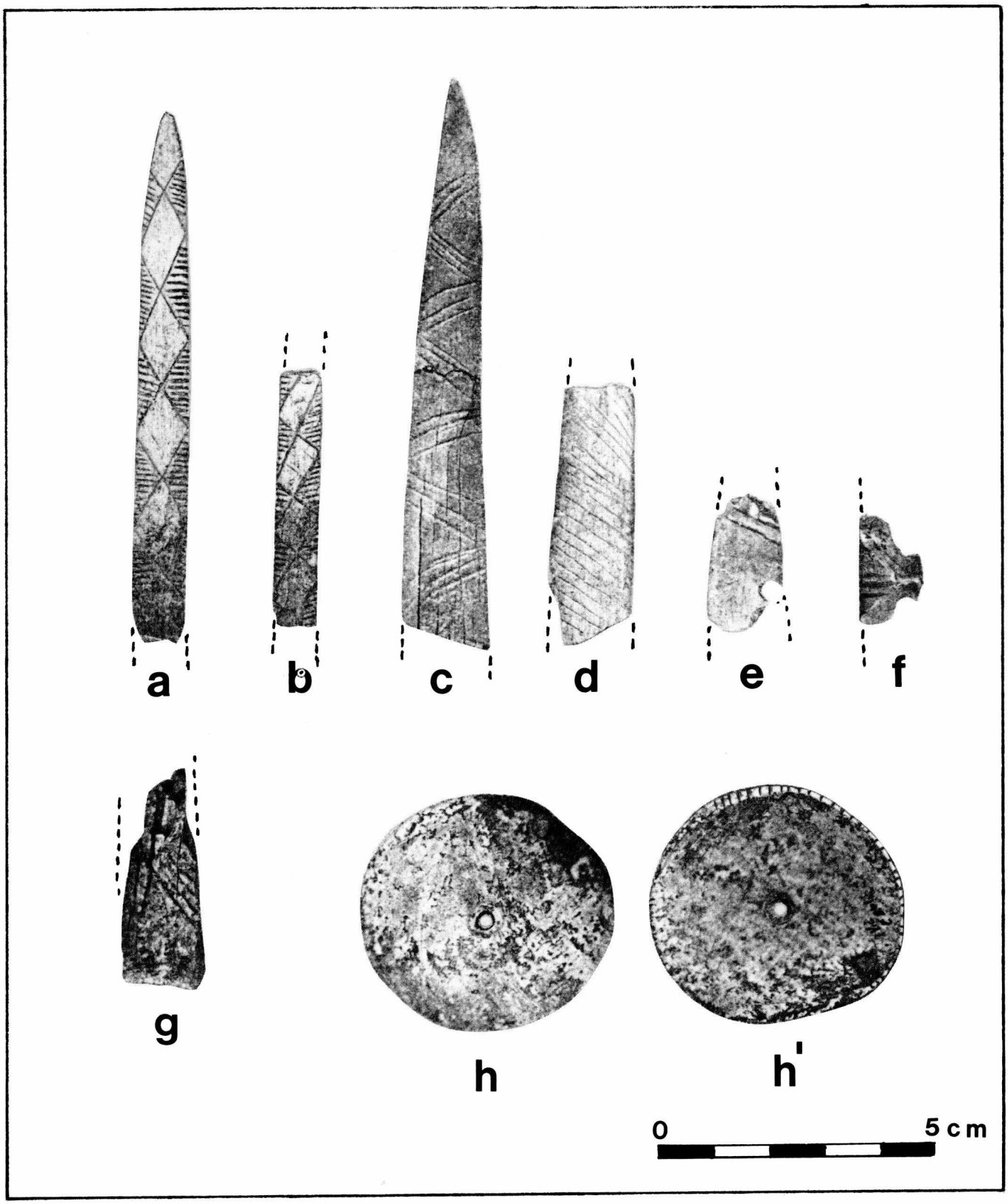

Figure 2. Incised Bone and Shell Artifacts. a-g, incised bone; h, shell disk.

Specimen E-251 (Figure 2 c). This is the distal portion of a straight, contracting sided bone implement with a blunt tip. It retains the cross section of the metapodial used to make it, and a geometric design is engraved on the exterior surface. The design consists of three parallel lines running diagonally from lateral edge to lateral edge in a zig-zag pattern. The proximal end at the fracture is more deteriorated than the remainder of the artifact. This is illustrated in Hall (1988).

Specimen E-254 (Figure 2 d). This is a medial fragment of a straight, nearly parallel sided bone implement. It retains the cross section of the bone used in its manufacture. The design on the exterior surface consists of 20 diagonal lines running from lateral edge to lateral edge.

Specimen E-258 (Figure 2 e). This small medial fragment has two incised lines running diagonally from lateral edge to lateral edge, and the remains of a drilled conical perforation form the interior to the exterior surface. This perforation is not centered, but located near the lateral edge.

Specimen E-257 (Figure 2 f). This badly broken fragment is lenticular in cross section and has engraved lines on both surfaces.

Specimen E-259 (Figure 2 g). This badly deteriorated proximal section still has a portion of the proximal articulation of the metapodial present. The exterior face has four short incised lines running at a 45° angle from one lateral edge to near the middle of the artifact.

The function of these tools has most often been inferred based on their position within a burial feature. The two most common offered for Texas materials are that of a hairpin or an awl. In a recent paper, Hall (1988) has offered the novel proposal, based on ethnographic analogy, that these artifacts functioned as head scratchers or louse crushers. The lack of context and association for these artifacts at TWI makes it impossible for us to further speculate as to their function. However, we agree with Hall (ibid.), that these blunt tipped implements would have functioned poorly as awls, and that their use was probably in the more personal areas as hairpins or louse crushers.

Shell Artifacts

The 11 marine shell artifacts from the TWI site are all manufactured from sections of the large sinistrally spiraled gastropod commonly known as the Lightning Whelk. In her analysis of the shell from the Loma Sandia site (41LK28), Dreiss (n.d.) noted the taxonomic name of this species in the archaeological literature is a point of confusion. The names *Busycon sinistrarium* or *Busycon contrarium* commonly appear, but these are apparently incorrect. Dreiss (ibid.), in reviewing the history of the species name, concludes that the name *Busycon perversum pulley* correctly identifies the sinistrally spiraled gastropod indigenous to the Texas coast. The artifacts made from this species from TWI are all ornamental in nature and fall into two distinct categories: large columella beads, and a disc made from the outer whorl.

Columella Beads. The manufacture of these large cylindrical beads involved the entire *Busycon* columella. The artifacts are well smoothed and retain the natural shape of the columella, and the sinistrally spiraled whorl margins (grooves) are still visible, giving them a twisted appearance.

All seven of the beads show traces of asphaltum. Much of this has eroded away and no pattern is discernable, but it certainly formed some decorative pattern. The four complete artifacts are drilled at both ends for suspension

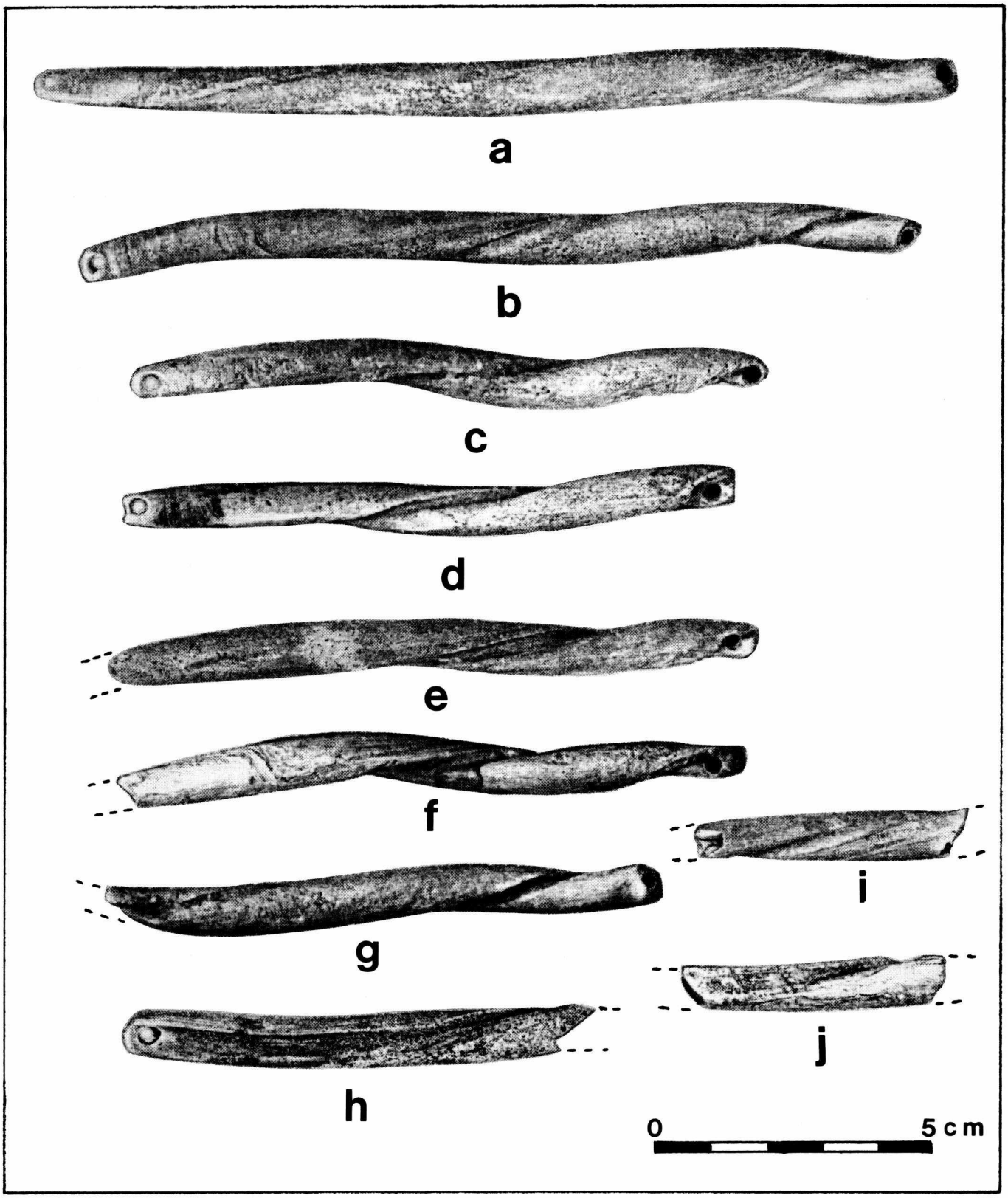

Figure 3. Columella Beads. See text for descriptions.

(Figure 3 a-d). The anterior ends of the beads are roughly oval in cross section and perforated biconically, as is the single anterior fragment (Figure 3 h). The perforations range between 1.5 - 3.0 mm in diameter and 0.9 - 3.0 mm in depth. The posterior ends show three types of drilling treatments (Figure 4). The two largest beads (Figure 3 a,b) are ground to an acute angle relative to the long axis of the columella. They were perforated from the lateral edge and posterior end to create a suspension hole in the form of an obtuse elbow (Figure 4 a,b). The second style of posterior end treatment is illustrated in Figure 4 c. The posterior end of four specimens (Figure 3 d-g) were ground square to the longitudinal axis of the bead, then roughly a third of the diameter was truncated at a 45° angle by further grinding to create a platform for drilling. A perforation was then executed perpendicular to the platform and joined in an obtuse elbow joint by a perforation from the lateral edge. A single bead is representative of the third treatment style (Figure 4 d). In this example a platform similar to the second style was prepared, but the suspension holes were drilled in an inline biconical fashion. The two medial sections are thought to be portions of similar artifacts (Figure 3 i,j). The metrical data for these artifacts are provided in Table 2. Specimens E-415 and E-416 (Figure 3 d,i) were previously illustrated and described by Janota (1980).

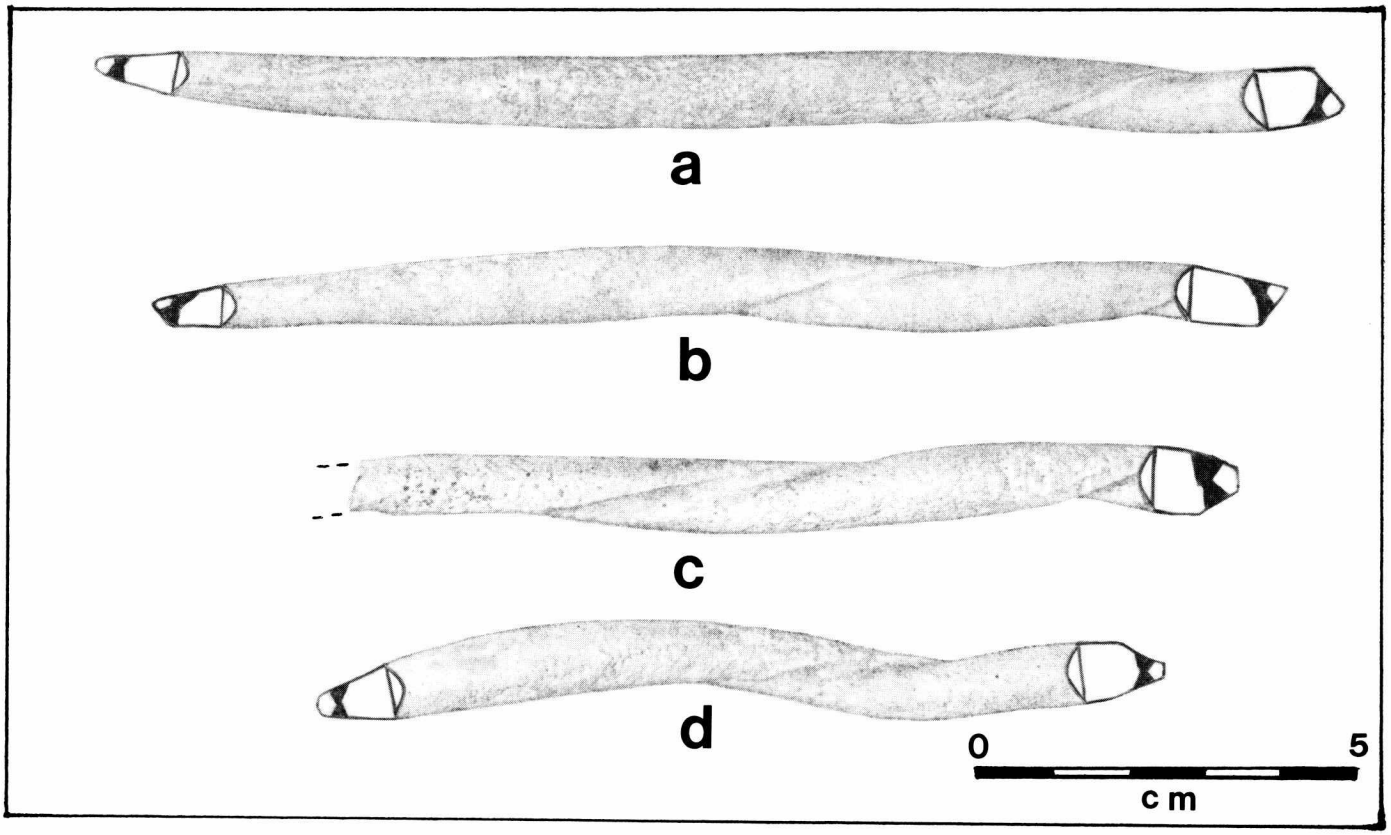

Figure 4. Diagram of Perforation Techniques Used in the TWI Columella Beads.

Table 1. Bone Artifact Dimensions

Spec #	Figure	Length	Width	Thickness	Comments
E-250	2 a	9.40	1.00	0.40	Red ocher in grooves
E-251	2 c	10.10	1.62	0.45	Distal
E-254	2 d	4.70	1.55	0.43	High polish, mid
E-256	2 b	4.65	0.82	0.35	Burned mid end, red ocher in grooves
E-257	2 f	2.10	1.25	*	High polish, frag
E-258	2 e	2.60	1.35	*	Drilled hole, frag
E-259	2 g	3.95	1.60	*	Proximal end

* measurement not taken

Table 2. Shell Artifact Dimensions

Spec #	Figure	Length	Diameter	Drilling	
				Anterior[1]	Posterior[1]
E-229	3 a	16.50	1.00	A	B
E-17	3 b	14.90	.98	A	B
E-240	3 c	11.20	.95	A	A
E-415	3 d	10.90	.90	A	C
E-16	3 e	11.60+	1.00	*	C
E-313	3 f	11.00+	.90	*	C
E-406	3 g	9.75+	.88	*	C
E-29	3 h	8.45+	.93	A	*
E-416	3 i	4.90+	.90	*	*
E-414	3 j	4.75+	.90	*	*

[1] - small end of shell
[2] - heavy end
A - Biconical 180°
B - Elbow > 90°
C - Elbow > 90° with drilling platform
* - Missing

Conch disc. This circular disc is manufactured from the outer whorl of the *Busycon* (Figure 2 h,h'). It is 46.4 mm in diameter, 3.0 mm thick and is biconically perforated in the center. There are 82 short incised lines around the edges. It is similar, although slightly larger than the two discs recovered from the Loma Sandia site (Dreiss n.d.).

TEMPORAL PLACEMENT

Despite the fact that these two types of artifacts were removed from their primary context by the bulldozer disturbance, a good argument can be made for their age and association with the burials. There is a strong correlation between these types of ornamental artifacts associated with human burials in Late Archaic contexts, as opposed to single finds in occupation sites. These sites are shown in Table 3.

Table 3. Late Archaic Mortuary Sites with Columella Beads and Bone implements.

Site Name	Drainage	Reference
Goebel (41AU1)	Brazos	Duke 1981
Ernest Witte (41AU36)	Brazos	Hall 1981
Leonard K (41AU37)	Brazos	Hall 1981
Brandes (41AU55)	Brazos	Highley et al. 1988
41BX1	San Antonio	Lukowski 1988
Albert George (41FB13)	Brazos	Walley 1955
Crestmont (41WH39)	Colorado	Vernon 1989

DISCUSSION

The distinctive shell and bone artifacts recovered from TWI show striking similarities to those recovered from other Late Archaic mortuary sites in the Gulf Coastal Plain. Some also exhibit subtle differences that may reflect a local pattern within a larger cultural tradition.

Of the seven bone implements, three have unidirectional diagonal incisions, one has a zig-zag or lightning bolt pattern, another has partial incisions on both sides running perpendicular to the long axis, and two have a diamond pattern created by intersecting incisions running from edge to edge. The first two patterns, in particular the lightning bolt design, are the most common theme in

this type of artifact (Hall 1988). The other two patterns are unique to TWI. While a diamond pattern has been noted at the Crestmont, Leonard K, and Albert George sites, they are rendered in a different style from the TWI examples. Bone artifacts exhibiting similar designs have also been recovered from Coastal sites. Ricklis (1990) reports a specimen from 41SP120 that is virtually identical in morphology and design to TWI E-251 (Figure 2 c). It was associated with Catan and Matamoros dart points in a discrete shell midden and radiocarbon dated to 950 B.P., making it at least half a millennia younger than the coastal plain specimens. From 41SP78, Hester and Corbin (1975) reported two fragmentary incised bone artifacts. One exhibits a diamond pattern reminiscent of the TWI specimen and the other has diagonal cross-hatching alternating with void spaces. The context of these artifacts is uncertain, but they were associated with a discrete mortuary site of apparent Late Archaic age.

The large columella beads from TWI are different from all but a few other examples that exhibit perforations in both ends. The two principal differences that set them apart from the examples recovered at Crestmont, Little Bethlehem, and Ernest Witte (Burial Group 2, Form 5) are the degree of grinding and the angled perforations in the posterior end of the shell. Beads from these three sites all have a greater diameter, or as in the case of the Little Bethlehem specimens, still retain portions of the interior nuclear whorl; and they all exhibit biconical perforations at both ends. Six beads displaying angled perforations have been reported from two localities, five from a burial at the Pat Dunn site [(41DW234) Hudgeons and Hester 1977] and a single example from an unspecified surface site in northwest Bexar County (Greer 1977). These beads, which are shorter than those from TWI, have angled perforations at both ends. They also lack the beveled drilling platform seen in the posterior perforations on three of the TWI specimens.

There appears to be a significant relationship between the length of a bead and the ability to render angular perforations at both ends. In the complete specimens from TWI the anterior canal is retained and drilled biconically as it is too thin to be drilled at a right angle. In the Pat Dunn examples the anterior canal was removed so that the end of the columella would have sufficient mass to support a hole drilled along the long axis. The illustration of the bead reported by Greer (1977) does not show adequate detail to be included in this discussion, but based on its uniform end diameters, it was probably made from the medial or posterior section of a columella. While the length of the raw material is critical to the size of the finished bead, the style of perforations desired by the manufacturer is also significant.

In his detailed analysis of *Busycon* sp. ornaments from Ernest Witte, Hall (1981) speculated on the non-local origin of shell used in their manufacture. Based on the lack of these types of ornaments in coastal sites with evidence of shell tool production, such as Johnson (Campbell 1947) and Kent-Crane (Campbell 1952), and the import of exotics such as corner-tang knives and boatstones, Hall argued that the shell was also imported, possibly originating from Florida. If this is the case, and assuming that there is a direct cultural link between the mortuary traditions noted in the Lower Brazos and those to the west, why are the styles of beads different and geographically discrete? Initially, sampling bias could be evoked as a cause. While we have a reasonably large sample of mortuary sites, our knowledge of Late Archaic occupation sites in the Coastal Plain is minimal. It would be logical that manufacturing debris would be found in occupation sites, not mortuary sites. Since our data for ornaments are heavily weighted to mortuary sites, we only see the "end-use" of these artifacts, not the potential variation that would be seen in the failures and debris of manufacture.

Another possible explanation could be that the groups who buried their dead at TWI were participating in a different "interaction sphere" (Hall 1981:291-298) --one of a similar cultural pattern, but with different stylistic traditions from those operating in the Lower Brazos.

A third possible explanation, is local manufacture, to local styles, from local Texas materials. We favor this explanation because of the availability of raw material in the area. In his survey of recovered marine invertebrates remains, Steele (1988) documents *Busycon* at 15 of 15 localities running the length of the coast. In the Guadalupe River drainage, the senior author has recorded *Busycon*, and other marine shell debris in eroding sites along Rocky Creek, (41VT15, 41VT23-36) ca. 38 km upriver from TWI, and 70 km from the strand line. Unfortunately these materials cannot be assigned to any specific task or time period due to their surface provenience, however they do beg the question, what type of debitage would be left from the manufacture of columella beads, and how would we recognize it? At manufacturing sites such as Johnson and Kent-Crane, shell debitage was recovered in context with utilitarian tools, thus it was reasoned that these were the only items being produced. We suggest that the manufacture of columella beads would leave little behind to mark their production. The principal techniques used in the manufacture of these items were grinding and drilling which would leave little but shell dust. Failures during manufacture would also be difficult to identify due to the ease at which a misaligned perforation could be removed by groove-and-snap, and the process begun again on a complete, albeit shorter, bead.

A further possibility for the lack of this style of artifact in manufacturing sites is the frequency at which they were produced. Utilitarian tool forms, adzes and gouges, necessary for subsistence and maintenance activities constitute the bulk of shell artifacts recovered from sites. Ornaments, on the other hand, may have been produced at specific times for specific individuals, thus lowering their viability in all but mortuary sites.

Local manufacture is also suggested by the lack of other exotic items such as corner-tang knives and boatstones which were present at Ernest Witte. Due to the deflated condition of TWI, if these types of artifacts had been present in the site they would have been recovered and reported by now.

At this point in time none of these hypotheses can be given more weight than the other. We will have to wait for new analyses on the manufacturing sites, or chemical data on the shell artifacts themselves to determine origin.

SUMMARY

This paper has documented a destroyed mortuary site on McDonald Bayou in Victoria County, Texas and a set of unique bone and conch shell artifacts that are assumed to have been associated with the burials. Based on the style of these artifacts, their potential association, and observed mortuary practices, the site is assumed to be of Late Archaic age. The stemmed dart point found with Burial 3 is seen as evidence of assigning the mortuary portion of the site to at least the Archaic period. The recovered bone and shell artifacts show similarities as well as subtle differences to others from the Lower Brazos and Colorado River basins. The patterns, and manufacture styles of the TWI artifacts seem to point to a regional variation within a larger cultural pattern in the Central and Upper Coastal Plain best identified by its mortuary traditions.

ACKNOWLEDGEMENTS

The authors would like to especially thank Mr. and Mrs. Virgil Branch of Victoria, Texas, for the loan of conch shell columella beads and incised bone awls for analysis, making this report possible. They also loaned slides of the TWI site for copying and projectile points for specimen inventory and drawing, which are now in the Texas Archeological Research Laboratory (TARL) files.

We also thank Marvin Orsak and John Gibbs of Victoria, Texas, for donating two conch shell columella beads which they had found at the TWI site.

Our appreciation also goes to Dr. Grant Hall for his encouragement to publish the TWI site material and for his input, to Dr. Tom Hester of TARL for his review of the draft, and to Elizabeth Huebner for typing the manuscript.

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A CORNER-NOTCHED BIFACE FROM SOUTH CENTRAL TEXAS

Ellen Sue Turner

ABSTRACT

This report presents criteria for a corner-notched biface common in lithic collections from Medina, Bandera and Bexar Counties. These specimens have a single, deep, corner notch found on one basal corner. I propose that these specimens be termed "Pipe Creek Biface" after the geographical location where the largest concentration of specimens were observed.

INTRODUCTION

During the course of documenting and photographing collections from Pipe Creek and San Geronimo in South Central Texas, a substantial number of arrow point-sized bifaces with a single corner notch attracted my attention. Though some may possibly be unfinished arrow points, the considerable number of these specimens in collections from the area (see Figure 1) suggest that they were a specialized tool of some significance. Kirk Vakey and Tom Herrerra of Pipe Creek and Cindy and Mike Zurovec and Neil Hernandez of San Geronimo loaned 22 of the bifaces to me for study. An additional 16 specimens were observed in other collections from the area.

DESCRIPTION

The biface ranges from crudely made to exceptionally fine (see Figure 2). In the artifacts studied, the longest lateral edges averaged 45 mm, varying from 25 mm to 50 mm in length. The edge is straight or slightly convex and often has some serration. This edge joins with the shorter opposite edge (20 mm to 40 mm) to form a long, narrow point. The shortest edge varies from 10 mm to 15 mm. All three lateral edges are finely pressure flaked. They are approximately 12 - 15 mm in width and 3 - 4 mm at their thickest part. The notch is well-formed and positive. All 22 specimens studied were of Edwards chert with the exception of one white and one grey chert.

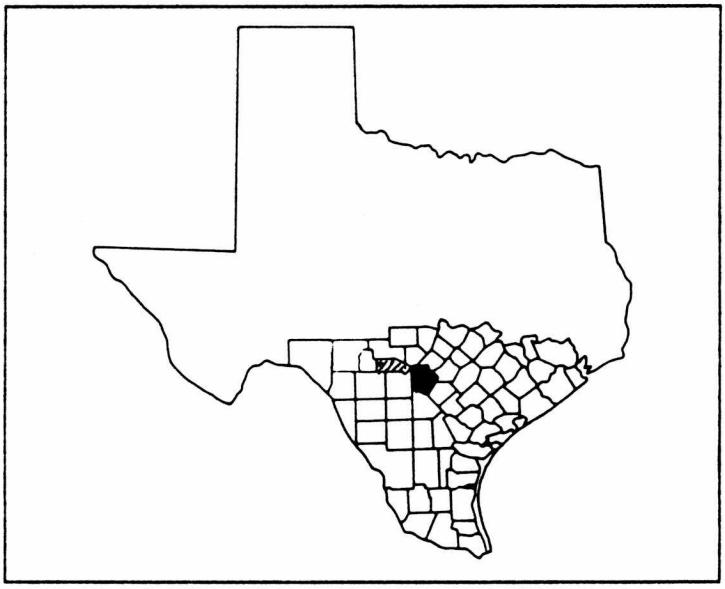

Figure 1. Texas map showing Bandera County (striped); Bexar County, black; Medina County, dotted.

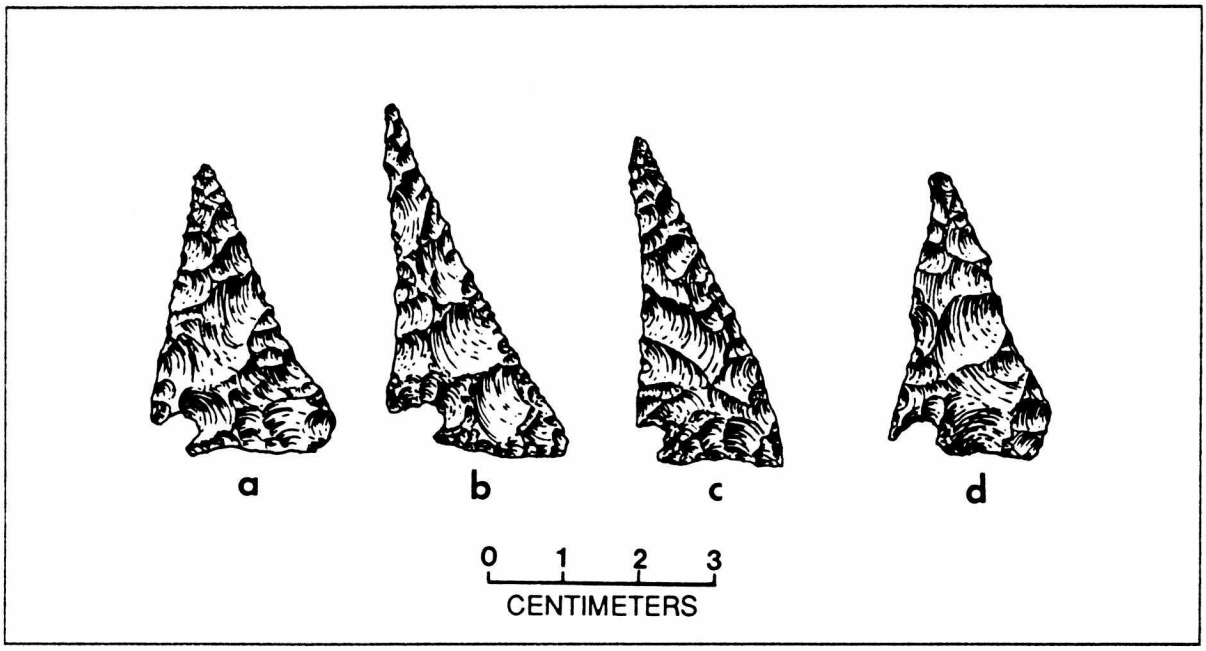

Figure 2. Corner-notched bifaces from South Central Texas. Drawing by Kathy Roemer.

DISCUSSION

The tool is often found in association with numbers of Edwards points suggesting that they exist in Late Prehistoric context ca. A.D. 960 - A.D. 1040 (Turner and Hester 1985). They have been found in rockshelters, occupation sites along rivers and middens in Medina, Bandera and Bexar Counties. Lynn Highley reports a similar biface was found in the Brom Cooper collection. Kirk Vakey has used this artifact successfully as a fletching tool. The long edge served well in cutting the quill and the corner notch for stripping the quill. Much further research as to antiquity, association, distribution and function is needed.

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THE EFFECT OF PERCUSSOR TIP DIAMETER

Leland W. Patterson

ABSTRACT

The results of experiments are presented which examines the effect of percussor striking tip diameter on the dimensions of chert flakes produced by use of quartzite hammerstones.

INTRODUCTION

While some attempts have been made to develop quantitative expressions for the fracture mechanics of brittle stone materials such as flint, the description of the flintknapping process remains on an empirical basis, with manufacturing results best described in a statistical manner. Flintknapping is a manual art with too many variables involved to be easily quantified. In the production of flakes from brittle elastic materials such as chert, many variables can be considered. These variables include: type of material, core geometry, direction of force application, amount of force applied, length and weight of percussor, tip diameter of percussor, and hardness of percussor. The skill of the individual knapper in controlling variables is important. An experienced knapper not only develops good force application techniques, but also has control of core geometry and selection of suitable force application tools. Several papers have given mathematical expressions for the fracture mechanics of flintknapping, such as Speth (1972) and Cotterell and Kamminga (1987), but an overall description of fracture mechanics still seems limited to qualitative treatment such as given by Sollberger (1986).

There are many variables involved in the production of chipped stone items, but experiments can be designed to isolate the effects of individual variables. Speth (1977), for example, has given the results of hard-hammer percussion flaking where several force application variables were controlled on an individual basis. Steel balls were dropped onto glass cores. As Speth (1977:35) concludes, however, "relationships are exceedingly complex, multivariate and nonlinear." Even though there are complex relationships between individual variables in fracture mechanics, a knapper is not prevented from developing a satisfactory set of lithic manufacturing techniques. Modern knappers have demonstrated that tools can be selected and techniques developed for the manufacture of any type of stone tool that is found in the archaeological record.

This article demonstrates by quantitative results of experiments how a knapper determines the effects of individual variables. The knapper will develop a complete set of tools and techniques based on experimental testing. This repertoire is then used on a regular basis for lithic manufacturing. Each knapper develops a favorite set of tools and techniques to fit individual skills, coördination and manufacturing goals. This article concentrates on a single variable, the percussor striking tip diameter.

EXPERIMENTAL RESULTS

The goal of these experiments was to determine the effect of tip diameter of hard percussors on flaking product results. Three quartzite hammerstones were selected that had large and small ends. Paired flaking experiments were then done using the small and large ends of each percussor to produce flakes from the same cores. In this manner, the effect of hammerstone weight was eliminated, and

the effects of core size and geometry were minimized. Since there were other variables that could not be held exactly constant, such as accuracy of striking point, core edge shape, and amount of manual force application, flaking results have been handled on a statistical basis. An attempt was made to use a uniform distance from the core edge for the strike point of each blow, to minimize variation in flake thickness.

Cores used for these experiments were pieces of flint from the Georgetown and Lake Belton areas of Texas. Each core had a natural flat area, so that no striking platform surface area preparation was needed. Some trimming of the core edge was done after each flake removal.

The results of experiments are summarized in Tables 1 to 3. In each case the dimensions of flakes produced are compared on a statistical basis. Platform length times platform width is a rough indication of platform area, even though residual platforms on flakes are seldom rectangular. In all cases the means of dimensions of flakes are somewhat larger for the larger hammerstone tip diameters. The differences of the means of each dimension for each paired set are not statistically significant, however. In all paired cases for all dimensions, simple inspection of data shows that the mean for use of the large tip diameter is within one standard deviation of the mean for use of the small tip.

It is concluded that there can be significant variation in the striking tip diameter of a hard hammerstone without having a very sensitive effect on flaking results.

DISCUSSION

It is concluded from the experiments summarized in this article that, within the limits of hammerstone dimensions used, the tip diameter of a hammerstone can have considerable variation without having a large effect on the dimensions of produced flakes. There are, of course, limitations to this conclusion. Very large diameters of hammerstone tips give difficulties in accurate force placement, especially on small size cores. In general practice an experienced knapper would seldom perform experiments in the explicit manner done here. An experienced knapper can quickly determine which hammerstone weights and dimensions best give desired flaking results for individual manufacturing situations. It has been my experience in observing many knappers in Texas that more attention is given to hammerstone weight than to tip diameter, especially to match hammerstone weight with core size. Heavier hammerstones are used with larger cores to obtain maximum flake size.

Although the percussor tip diameter is generally considered important in fracture theory (Speth 1972, Cotterell and Kamminga 1987), results of experiments presented here do not show that the tip diameter is a highly sensitive variable in flaking results. This may be one example of the gap that still exists between fracture theory and the empirical practice of flintknapping.

It can be noted that the consideration of variables in the production of flakes is more detailed for the knapper than for the lithic analyst. In reconstruction of lithic manufacturing patterns at archaeological sites, the lithic analyst is generally confined to working with the attributes of products, intermediate stage specimens and byproduct flakes and cores. Therefore, the lithic analyst does not have the same detailed view of the manufacturing process that the knapper has. In lithic analysis of archaeological collections, the selection of which attributes to study on specimens will normally not be directed to the fine details of the manufacturing process, but rather to more general questions that can be answered by available data. This should not be a reason for pessimism by the lithic analyst, as it is still possible to reconstruct the general details of a manufacturing process without determining many of the finer details. A knowledge of flintknapping is very helpful to the lithic analyst in

TABLE 1. Results of Experiment 1.

(Hammerstone Weight = 398 grams)

	Small tip, 10.0 mm D Sample N = 30				Large tip, 15.3 mm D Sample N = 42			
Flake Dimensions,mm	Mean	Std. Dev.	Max.	Min.	Mean	Std. Dev.	Max.	Min.
Length	37.6	14.6	85.1	20.4	44.5	11.3	71.4	24.6
Width	32.1	15.5	85.0	13.0	31.3	12.0	67.8	16.2
Thickness	7.0	2.9	15.0	2.9	7.6	3.2	14.1	2.4
Plat. length	16.1	7.4	35.7	6.5	17.9	8.7	50.3	6.8
Plat. width	5.5	2.8	12.5	2.0	6.1	2.5	13.0	2.2
P.L. x P.W.	104.2	102.3	428.4	18.0	126.0	105.4	477.9	16.3

TABLE 2. Results of Experiment 2.

(Hammerstone Weight = 194 grams)

	Small tip, 15.8 mm D Sample N = 26				Large tip, 24.5 mm D Sample N = 27			
Flake Dimensions,mm	Mean	Std. Dev.	Max.	Min.	Mean	Std. Dev.	Max.	Min.
Length	35.1	8.0	59.9	24.2	35.6	6.8	47.4	20.6
Width	27.2	8.0	40.0	15.0	34.9	13.1	65.6	17.1
Thickness	8.1	2.1	13.0	4.8	7.8	1.8	12.4	5.0
Plat. length	15.6	5.1	26.8	7.8	19.7	6.6	33.2	8.5
Plat. width	6.9	1.8	10.1	4.3	6.9	1.7	10.6	4.2
P.L. x P.W.	111.1	52.3	230.0	39.1	140.8	71.4	339.2	35.7

TABLE 3. Results of Experiment 3.

(Hammerstone weight = 221 grams)

	Small tip, 19.5 mm D Sample N = 28				Large tip, 27.5 mm D Sample N = 20			
Flake Dimensions,mm	Mean	Std. Dev.	Max.	Min.	Mean	Std. Dev.	Max.	Min.
Length	44.5	13.1	77.3	24.7	50.8	18.5	83.9	27.9
Width	36.2	13.6	85.0	16.8	37.8	12.9	65.8	22.2
Thickness	9.0	4.1	18.7	3.0	11.8	4.0	21.2	7.5
Plat. length	17.6	6.0	30.2	7.5	18.5	5.7	27.9	8.1
Plat. Width	6.4	2.5	12.5	2.6	7.6	2.5	13.2	3.7
P.L. x P.W.	125.8	88.9	377.5	22.5	147.9	76.8	336.6	30.0

determining which attributes of specimens to study and to formulate reasonable questions that have a possibility of answers. It is common in archaeological reports to see artifacts, especially flakes, grouped by attributes that give little insight to the lithic manufacturing activities of a site that should be described and analyzed.

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TWO METAL ARROW POINTS FROM NUECES COUNTY, TEXAS

Jerry Bauman

ABSTRACT

This report documents two iron arrow points recently recovered from the surface of a large Indian mound in Nueces County. Both metal points were recovered within a few feet of one another by Tom Long, First Vice-President of the Coastal Bend Archeological Society. The Indian mound is registered at the Texas Archeological Research Laboratory (TARL) as the Bluntzer Site, 41NU209.

THE SITE

The Bluntzer Site is located in the northern part of Nueces County within two miles of the town of San Patricio. It is a multicomponent Indian occupation and procurement site as well as a historical Anglo/Spanish ranch site (personal communication with Ben Bluntzer). The site is situated in a cultivated field, resting at the bottom of the wide Nueces River valley. Immediately to the north is a long shallow lake which was once a part of the Nueces River before it changed its course.

Additional information on the site is in a prior publication of *La Tierra* (Vol. 15, No. 4) by the author entitled "A Brass Arrow Point from Nueces County, Texas."

THE ARTIFACTS

Arrow point 'A' (Figure 1) is Artifact #701 of the documented surface finds from the Bluntzer Site. It is a broad bladed stemmed projectile which appears to have been cut by hammer and chisel from thick sheet scrap iron. Both the stem and blade were hammered out to a desired thickness, leaving the thickest part of the projectile at the junction of the blade and stem. Evidence of chisel marks and edge sharpening has been obliterated by excessive corrosion. It is possible that the blade was not sharpened, but hammered, until a suitable sharp edge was formed.

The stem tapers slightly toward a canted base. One face of the stem and shoulder has been hammered more than the other. One edge of the stem and shoulder is beveled from one face by grinding or filing.

Dimensions of the projectile are: Length, 58 mm; Width, 20.5 mm;Thickness, 2 mm to 3 mm, and Weight, 8.1 grams. Blade edges are 45 mm and 46 mm long with respective shoulder edges 7 mm and 8 mm long. The stem is 8 mm long and tapers from 8 mm to 7 mm wide.

A possible arrow point 'B' (Figure 1) is Artifact #702 of the documented surface finds. It is lozenge-shaped and cut from thick sheet scrap metal. Extensive corrosion has obliterated cut marks and possible blade alterations. It appears to have been bipointed with both blade and stem being the same length.

Dimensions of the projectile are: Length, 58 mm; Width, 23 mm; Thickness, 3 mm and Weight, 9.3 grams.

COMPARISON

Arrow point 'A' resembles, in form, five projectiles (A, E, F, G, and H) recovered from Fort Lipantitlán (Kennedy and Mitchell 1988). It is slightly longer than the average length of 51.2 mm for the Lipantitlán points, but falls within their maximum range of 62 mm. The method of production suggests that the scrap iron

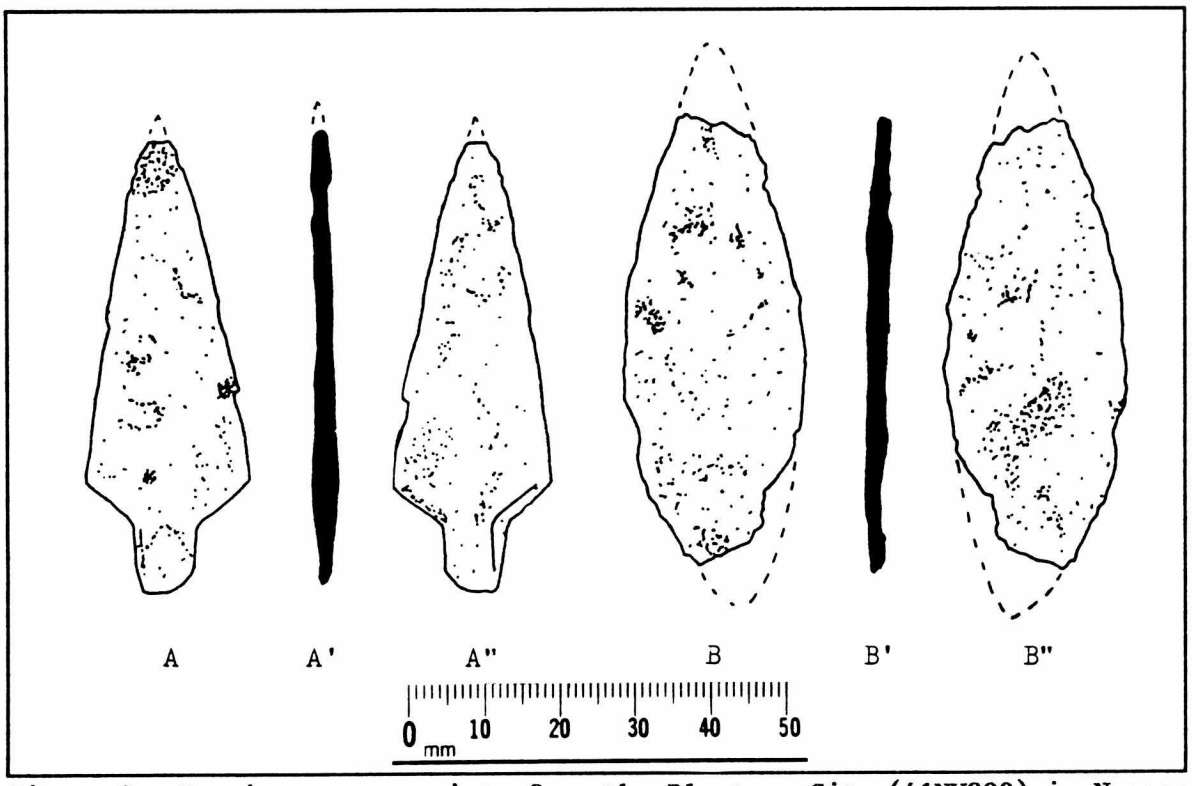

Figure 1. Two iron arrow points from the Bluntzer Site (41NU209) in Nueces County, Texas.

used may have been in the form of barrel hoops (Goebel, et al. 1987). Arrow points from Fort Lipantitlán seem to have been made from barrel hoops as well (ibid.) but the metal is slightly thinner than the points from the Bluntzer Site. All of the points from Lipantitlán have notches on one or both edges of the stems (personal inspection), and none were stated as having been hammered. None of the iron arrow points from the Bluntzer Site have notched stems.

Projectile 'B' does not fit the style of points recovered at Fort Lipantitlán. The only aspect in common is that it was made from scrap iron.

COMMENTS

Since the Bluntzer Site is located within a few miles of Fort Lipantitlán (Bauman 1988), it is certain that contact would have been made between the Indians and Fort personnel. So, it is possible that items from the Fort would be uncovered at the Bluntzer Site. These items are military buttons (#557 and #558 of the surface collections), gunflint (#96), and bullets (#365 and #567). It is possible that these iron arrow points are also from the Fort. However, it is known that a blacksmith shop was located on the Bluntzer Site (ibid.). The date that it was established is not presently known, but it is known to have survived until the early 1900s. The present landowner, Ben Bluntzer, remembers it from his childhood. If the shop was built early enough it could have produced arrow points for trade.

The resemblance of Arrow point 'A' to those from Fort Lipantitlán helps to reinforce the idea that it may have been produced there. The differences could be explained as a different source of scrap iron, and that more than one person was producing the points. It could also indicate that the blacksmith at the Bluntzer Site was copying the popular style being produced at the Fort.

Projectile 'B' is a totally different style of point. Since Fort Lipantitlán was producing a stemmed point that seems to have been popular with the Indians, it seems unlikely that another style would be needed. So, this type of

point may have been produced elsewhere, such as the blacksmith shop at the Bluntzer Site. Another lozenge-shaped arrow point (Bauman 1988) was recovered at the site. This one was a small point made of brass. Brass slag has been collected from the Bluntzer Site (personal observation) which helps support the idea that this point could have been made there. Kennedy and Mitchell (1988) do not mention the presence of brass slag being found at the Fort. Now with the recovery of an iron lozenge point, further support is lent to the possibility that this blacksmith shop was producing at least lozenge-shaped arrow points and could easily have copied other styles.

Lozenge-shaped points may represent an earlier style being made at either blacksmith shop, or possibly the only type being made at the Bluntzer Site. There is not enough evidence to positively support any of the above ideas. The Bluntzer Site needs further investigation to ascertain if arrow points were being produced at that location.

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RESULTS OF PRELIMINARY EXCAVATIONS IN SORCERER'S CAVE, TERRELL COUNTY, TEXAS

Kevin Thuesen

ABSTRACT

Archaeological excavations were conducted at Sorcerer's Cave (41TE282) in May, 1990. The excavation yielded a local variation of a Toyah projectile point which corresponds with the Late Prehistoric radiocarbon date previously taken from a wooden mortar found inside the cave.

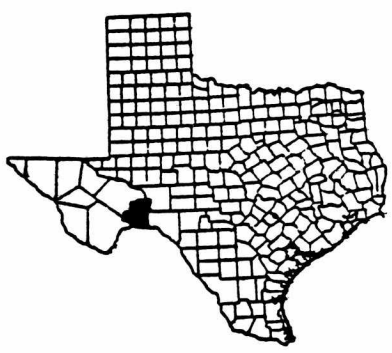
INTRODUCTION

Sorcerer's Cave is currently the deepest cave in Texas and is also the eleventh longest cave in this state. The cave has been designated as site 41TE282, although it has also been listed as 41TE170. The cave is located in Terrell County (see insert) approximately 12 km north of Dryden, Texas. The entrance is situated in a wall overlooking Eightmile Draw. The cave was first explored by spelunkers in 1962, but grafitti indicates the modern discovery of the cave occurred as early as 1941. The site was disturbed by relic hunters at an undetermined date. Since exploration of this cave began, cultural materials, including a wooden mortar, have been found within the cave (Prewitt 1981). In 1980, human bones were found deep inside the cave 150 meters below the entrance, a record depth for the recovery of human bones in Texas (Steele et al. 1984). Our excavation was conducted in the primary entrance to the cave. A small second entrance is located nearby but contains no known cultural material; unless otherwise specified, further discussion of the cave entrance shall imply the primary entrance. The excavation yielded many bones, several lithics, and a diagnostic Toyah projectile point.

SITE DESCRIPTION AND PREVIOUS WORK

The entrance to Sorcerer's Cave measures 3.3 meters high by 4.5 meters wide and is somewhat obscured by brush. On the south wall just outside the entrance are two pictographs, side by side, which are both a zig-zag design. On the wall opposite the pictographs are a series of petroglyphs made up of thin lines scratched into the wall. Just inside the cave entrance are two ledges, one along each wall. The sides of the ledges have been polished from extensive use, such as sitting and frequently being brushed against by early inhabitants. Nineteen grinding facets have been worn into the top of the north wall's ledge. Two of these grinding facets appear to be small mortar holes no deeper than 3 cm. The ceiling of the cave and the sides of the north ledge show signs of smoke blackening.

Ten meters into the cave, the horizontal entrance passage ends abruptly at a pit 14.6 meters deep, Witch's Well (Figure 1). This pit acts as a natural trap for animals, as evidenced by the naturally mummified remains of several animals including squirrels, turkey vultures, and a snake. From the base of this entrance pit a horizontal passage extends 35 meters to the northwest to a shaft 25 meters deep. A wooden mortar and a charred stick (which likely served as a torch) were found in the shaft; the mortar radiocarbon dated to A.D. 890 (Prewitt 1981). Currently, only one other wooden mortar has been found in the Lower Pecos



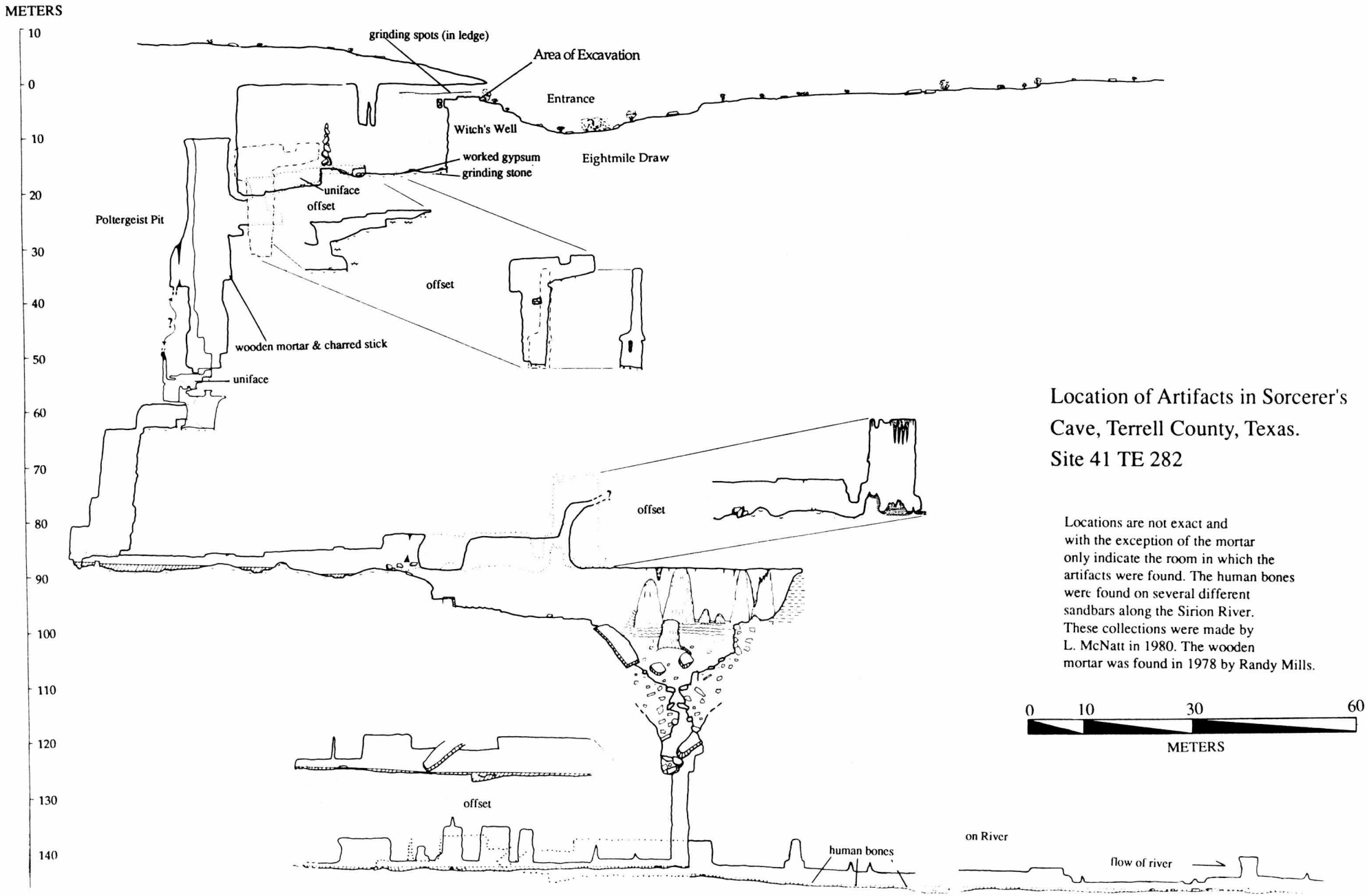


Figure 1. Projected profile of Sorcerer's Cave showing location of recovered artifacts. Map adapted from Veni 1980.

region. The other mortar was found in a cave in Val Verde County (41VV425) and cactus seeds (*Optunia* sp.) removed from cracks in the mortar suggest that it was used in food preparation (Collins and Hester 1968:1). Both mortars were crafted out of Mexican Pinyon Pine, carved by alternate charring and scraping, and cached in caves (Prewitt 1981). Disarticulated human bones were found throughout the stream passage at a depth of 150 meters below the entrance (pieces of the mandible, humerus, two ulnae, two femora, and a tibia); the bones all appeared to be from the same adult individual (Steele et al. 1984).

Six burned rock middens are located 100-200 meters outside Sorcerer's Cave. Projectile points from the middens suggest that they were used during the Archaic time period (McNatt 1980).

OBJECTIVES

The objectives of this excavation were to determine: (1) when the cave was occupied, and (2) if the cave was seasonally used.

THE EXCAVATION

In May of 1990, Janet Steele directed the first excavation at Sorcerer's Cave. Two connecting 1 meter by 1 meter units (A and B) were placed in the entrance area. These units were placed under a ledge approximately 3 meters inside the cave entrance. They were placed under this ledge in hopes of excavating in an area undisturbed by relic hunters. The units were excavated in 10-cm depth increments. Standardized forms were used to record data from each level. The screen used for sifting consisted of 6.4 mm (1/4-inch) mesh; all lithics, sotol remains, bones and some snail shells were collected. Table 1 lists bones recovered from Units A and B.

Under the outermost part of the north ledge is where Units A and B were placed. Unit A was completely under the ledge with its northern side almost touching the back wall. Unit B was connected to Unit A at Unit A's southern side. The floor under the ledge was littered with twigs, sheep dung, snail shells, and pieces of limestone which had fallen from the ceiling. Also noted were several recent horse bones and other miscellaneous mammalian bones. Against the back wall was a water line marked by dung and cedar debris about 20 cm above the floor. This water line may represent a flooding event that reached the cave in 1954. Upon closer inspection mescal beans, flint flakes, and sotol/lechuguilla remains were also found. The site surface was fairly level, rising slightly toward the rear wall under the ledge. An animal burrow was against, and extended into, the back wall in two separate places. One of these burrows was directly behind Unit A.

Twigs and other water-moved debris comprised the upper 3 cm in Unit A. In Unit B this debris was only 1.5 to 2 cm deep, under which were several burned rocks that averaged 10-17 cm in diameter. The units contained gray loamy soil and minor amounts of charcoal ash.

UNIT A

Level 1: 0-10 cm.

Unit A was situated almost against the back wall under the ledge. A variety of bones were found in this level including deer, goat, cottontail, and jackrabbit. One bone fragment, which has also been exposed to more weathering, has signs of burning. Scattered flint debitage was also found in this level (58 pieces: 1 primary flake, 23 secondary flakes, and 34 tertiary flakes). One uniface and one utilized flake were also found. A bottle cap and a 34-cm long rubber strap made up the historic materials of this level.

TABLE 1. Bones from units A and B.

Unit A

0-10 cm
- 3 Jackrabbit mandibles
- 3 Desert Cottontail mandibles
- 1 Jackrabbit humerus
- 1 Jackrabbit radius
- 1 Goat phalange
- 1 Goat vertebra
- 1 Deer calcaneus
- 1 metatarsal (possible pronghorn antelope)
- 2 partial ribs (probably deer)
- 1 unidentified vertebra (probably goat or deer)
- 1 unidentified pelvic (one side)
- 1 unidentified tooth

10-20 cm
- 1 Jackrabbit mandible
- 2 Desert Cottontail mandibles
- 1 Goat tooth
- 1 Deer phalange
- 3 unidentified bones (probably rabbit)
- 1 unidentified bone segment
- 3 unidentified fragments

20-30 cm
- 1 Rat mandible (*Sigmodon*)
- 1 rodent frontal tooth
- 1 Goat metatarsal
- 1 rib bone (probably goat or deer)
- 3 unidentified bone ends
- 1 unidentified bone segment
- 7 unidentified fragments

Unit B

0-10 cm
- 1 human humerus (<= 6 years of age)
- 1 Jackrabbit humerus
- 1 unidentified vertebra (carnivore-like)
- 1 unidentified fragment

10-20 cm
- 1 Jackrabbit mandible
- 1 Desert cottontail pelvic
- 1 Deer frontal tooth
- 1 partial rib (probably deer or goat)
- 1 Cow or bison fragment
- 4 unidentified fragments

20-30 cm
- 1 rat mandible (*Sigmodon*)
- 2 rib fragments (probably deer or goat)
- 1 unidentified rodent-like pelvic
- 1 unidentified fragment

In the NW quadrant of this unit a large mass of organic debris was discovered. This mass of approximately 20 cm in diameter was encountered 4-5 cm below the surface, extending into the second level, and consisting of twigs and cedar debris.

A small projectile point was found and identified as a local variation of a Toyah point. This projectile point was found at a depth of approximately 5-7 cm and is almost completely intact. The point has three serrations on one side and two serrations on the other side with one serration broken off. The base of the point has a serration on each side and the bottom is flat and smooth, measuring 2 cm long and 1 cm wide at the base (Figure 2). This style of point represents the Late Prehistoric period (Turner and Hester 1985:193) and is consistent with the radiocarbon date of A.D. 890 from the wooden mortar.

Figure 2. A local variant of a Toyah point recovered in Sorcerer's Cave.

Snails (*Polygyra* sp.), small walnuts (*Juglans microcarpa*), and two mescal beans were also found in this level.

Level 2: 10-20 cm.

Scattered burned rocks were found throughout this level and charcoal ash was apparent in the soil. A moderate amount of flint debitage was also found in this level (77 pieces: 1 primary flake, 31 secondary flakes, and 45 tertiary flakes), the majority of which were fairly small. Two unifaces and four utilized flakes were also found in this level, along with a small worked fragment. The bottom of the organic pocket discovered in the first layer was reached at a depth of 15-17 cm.

One medium-sized goat scapula (possibly deer) was found partially exposed in the north wall and another scapula of similar shape and size was found in the east wall. However, neither were exposed enough to remove. A goat metatarsal was found in the NE quadrant which extended down into the next level. More small walnuts and common snails (*Polygyra* sp.) were also discovered and specimens of each were collected.

Several rabbit bones were also found; one has signs of burning and another has two thin cuts near the proximal end. A small burrow extended into the unit from the north wall to the west wall. Several rabbit mandibles were also found. The burrow extended down into the next level.

Level 3: 20-30 cm.

The gray loamy soil continued throughout this level with charcoal ash mixed in. Much flint debitage was found (119 pieces: 29 secondary flakes and 90 tertiary flakes), one of which seems to be a utilized flake. At the very base of this level a large uniface was discovered which measured 15.5 cm long by 8.5 cm wide. The goat metatarsal from the level above was removed and has no signs of burning or cutting.

UNIT B

Level 1: 0-10 cm.

Unit B was connected to the southern end of Unit A. Some flint debitage (38 pieces: 17 secondary flakes and 21 tertiary flakes) was discovered in this layer along with two utilized flakes. Several bones and common snails, and one

mescal bean were also found in this level. In the NW quadrant of this unit a large rock was uncovered; the rock appeared to have fallen from the ceiling above the unit.

One of the bones from this level is human, the only human bone recovered from the excavation. This bone appears to be a humerus from a child (Diane Ballinger, personal communication 1990). This bone is in good condition with both proximal and distal ends mostly intact. The bone is not from the same individual whose bones were found in the underground river.

Level 2: 10-20 cm.

In the second level of Unit B the large rock discovered in Level 1 extended south and east and took up approximately 35 percent of the unit. However, more flint debitage was found in this level (36 pieces: 1 primary flake, 6 secondary flakes, and 29 tertiary flakes) one of which was was a utilized flake that has signs of burning. This level also yielded a bone fragment which by appearance and weight appears to be cow or bison. More snails (*Rabdotus* and *Polygyra* sp.), a jackrabbit mandible, and a small walnut (*Juglands microcarpa*) were also collected.

Level 3: 20-30 cm.

In the third level the large rock discovered in Level 1 took up 40-45 percent of the unit; however, the base of the rock was found at a depth of about 25 cm. More flint debitage was found (21 pieces: 9 secondary flakes and 12 tertiary flakes) along with several common snails (*Polygyra* sp.), several walnuts (*Juglans microcarpa*), more small bones (possibly rabbit) and a rat mandible. One small piece of charcoal was also collected.

ROCK ART

Two pictographs are drawn side by side on a wall just outside the cave entrance (Figure 3). Both pictographs are a pair of zig-zag lines; however,

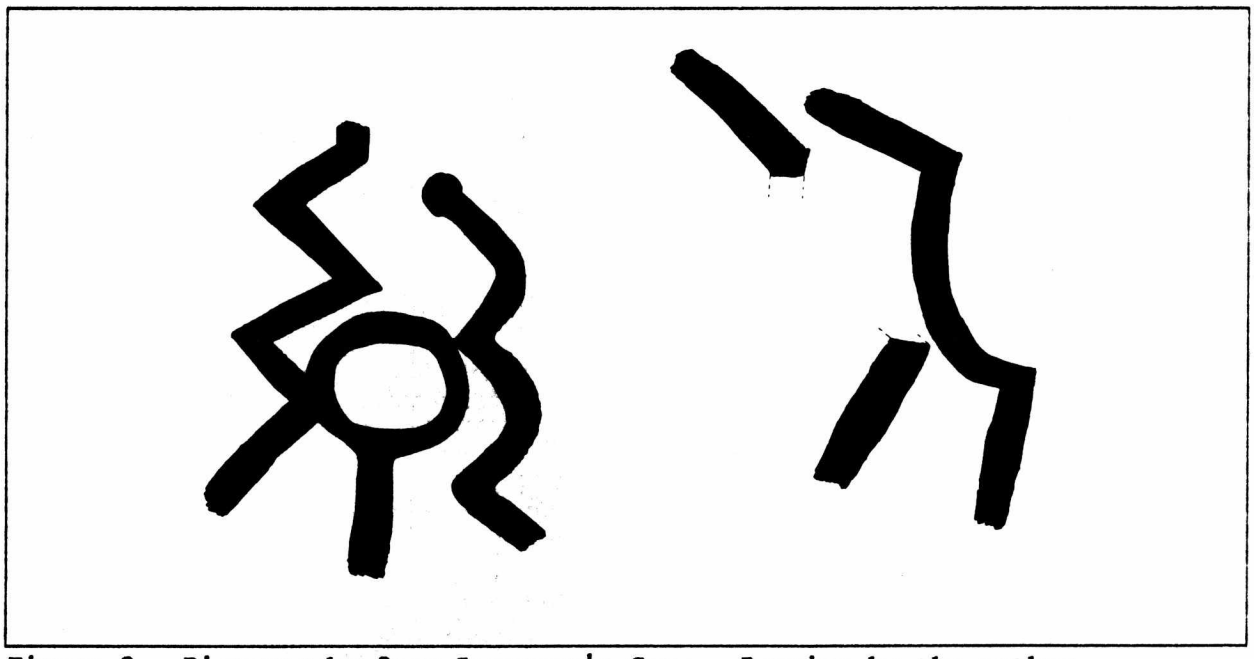


Figure 3. Pictographs from Sorcerer's Cave. Drawing by the author.

the pictograph on the left is the best preserved. It measures 14 cm wide and 31 cm high. The right pictograph has been considerably weathered and is barely visible. Between the two zig-zags of the left pictograph is a circle intersected by a line. This pictograph also may have been drawn by two people. The left zig-zag has straight lines and sharp corners and is orange in color and the circle with the line is the same orange pigment; however, the right zig-zag is not really a zig-zag but rather connected curves. It measures 18 cm wide and 22 cm high. Also, this right side is more purple in color. These pictographs are most similar in style to the Bold Line Geometric Style as described by Turpin (1986:154).

Some grafitti is apparent just above the pictographs and a deep scratch cuts across the left pictograph's right zig-zag. The right pictograph seems to have been drawn on top of a large red stain (probably not man-made) which stops left just before the left pictograph and extends right of the right pictograph to the edge of the wall.

On the wall opposite the pictographs are a series of petroglyphs. These petroglyphs are thin irregular lines scratched into a limestone wall 1.75 meters above the floor. The lines are irregular in length, randomly spaced, and tend to waver. However, there are some definite figures but they are difficult to interpret due to a large amount of black lichens and the flaking of small limestone pieces from the wall.

There are three obvious figures made up of multiple scratches to represent a solid figure (Figure 4, a, b, c). There are many other scratches in the wall, but a coherent figure cannot be determined.

DISCUSSION

Sorcerer's Cave was occupied during the Late Prehistoric period as indicated by the finding of a Toyah point and a wooden mortar that radiocarbon dated to A.D. 890. However, the possible association of the six burned rock middens to the cave may suggest occupation as far back as the Archaic period. The high visibility of the cave entrance would have made it appealing to early Archaic, as well as Late Prehistoric people who may have used the cave on their seasonal rounds.

The primary entrance was probably the only area of the cave that was occupied. The numerous grinding facets, polished ledges, smoke-blackened ceiling and the large amount of charcoal ash found in the excavation seem to support this assumption. The mescal beans and walnuts found scattered through the excavation probably were not associated with the occupation, more likely they were brought to the cave by wind, water, or animals. The numerous bones could be related to the occupation as well as from animals using the cave as a den.

The isolated occurance of a child's humerus suggests the excavation may be located in refuse from relic hunters digging through a burial. However, marks on the bone indicate that a small carnivore could also be responsible for its location. The jumbled nature of both units suggests that this was probably not the original deposition of the bone. Further evidence of mixing (and perhaps relic hunting) is shown by the finding of a Toyah projectile point in the same depth as a rubber strap.

Early inhabitants probably went deep into the cave, as indicated by the location of the mortar (Prewitt 1981). Human bones found at a depth of 150 meters (Steele et al. 1984) all seem to be from the same individual and could have been deposited in several ways. While it is possible the bones were washed down the underground river from an upstream entrance, bones have not been found upstream from the Sorcerer's entrance and no other entrances to the underground river have been found. More likely, the individual was buried or died in Sorcerer's Cave and after several floods was washed down to this final resting place. The bones of other mammals found in the river support this hypothesis.

Figure 4. Petroglyphs from Sorcerer's Cave. a, 13 cm high, 14.8 max. width; b, 29 cm high, 16 cm max. width; c, 16 cm high, 16 cm max. width. Drawings by the author.

Future excavations may be conducted in the primary entrance to determine if evidence of other periods of occupation are present. Also, if any undisturbed stratified deposits remain, additional data on seasonality, diet, and site function may be obtained. Test excavating may be implemented at the base of the entrance pit (Witch's Well) to determine if the pit was used as a trash dump and/or burial.

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