LA TIERRA

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Journal of the Southern
Texas Archaeological
Association

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The Southern Texas Archaeological Association

The Southern Texas Archaeological Association brings together persons interested in the prehistory of south-central and southern Texas. The organization has several major objectives: To further communication among avocational and professional archaeologists working in the region; To develop a coordinated program of site survey and site documentation; To preserve the archaeological record of the region through a concerted effort to reach all persons interested in the prehistory of the region; To initiate problem-oriented research activities which will help us to better understand the prehistoric inhabitants of this area; To conduct emergency surveys or salvage archaeology where it is necessary because of imminent site destruction; To publish a journal (*La Tierra*), newsletters, and special publications to meet the needs of the membership; and to assist those desiring to learn proper archaeological field and laboratory techniques for southern Texas.

STAA Officers and Staff 2004

Information for Contributors

The Co-editors for Volume 32 are Thomas R. Hester and Harry J. Shafer. Original manuscripts should be sent to Hester (Thomas R. Hester, P.O. Box 625, Utopia, TX 78884). Submissions by email should be sent to Hester (secocreek@swtesas.net) and copied to Shafer (hshafer@satx.rr.net). New authors, or authors with questions, can contact either Hester and Shafer for assistance in developing and submitting their papers. We welcome papers on the archeology of South Texas and surrounding areas, and we will also consider relevant papers from other parts of Texas.

Membership Information

Request information on joining the STAA and send membership applications to Lynn Yakubik, Membership Chair, 9607 Fonthill Dr. San Antonio, TX 78254, (210) 521-0091. Email: *lsyakubik@satx.rr.com*. Also see STAA internet address below. Back issues of *La Tierra* and *Special Publications* should also be ordered online or through Ms. Yakubik.

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About the cover: Photograph of abraded sandstone boulder from 41ZP8

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Contents

STAA Awards for 2004

At its first quarterly meeting of 2005, the STAA presented awards to several of its members and supporters.

During 2004, the STAA Board reviewed and reorganized the awards presented by STAA.

One of the awards that continues to be of great significance is the **Dee Ann Story Conservation Award**. The award recognizes outstanding contributions to archaeological preservation. It is named in honor of Dr. Dee Ann Story, Professor of Anthropology, emeritus, and former Director of the Texas Archeological Research Laboratory. Dr. Story is nationally known for her efforts in conservation of archaeological resources, from her work with Federal agencies to her present efforts with The Archaeological Conservancy.

Previous awards recognizing contributions to archaeology by individual STAA avocationals have been combined into the **Jimmy L. Mitchell Outstanding Avocational Archaeologist Award**. The late Jimmy L. Mitchell was one of the founders of STAA, a long-time editor of *La Tierra*, and a tireless worker on behalf of avocational archaeology.

The **C. K. Chandler Lifetime Archaeological Achievement Award** recognizes sustained, long-term work by STAA members on behalf of the Association, as well as other work in archaeology in Texas and elsewhere. The late C. K. Chandler was a long time member, officer, and Board member of STAA, past President of the Texas Archeological Society, author of many papers on Texas archaeology in the *Bulletin of the Texas Archeological Society*—and a major contributor of papers to *La Tierra* for three decades.

The Awards Committee for 2004 (Rick Young, chair) selected the recipients of the awards described below. STAA Chairman Paul Stein presented the awards, assisted by incoming Chairman, Clint McKenzie. Data for the awards was assembled by Rick Young.

DEE ANN STORY CONSERVATION AWARD

For 2004, there were two recipients of this award. Glenn and Cynthia Lindsey, landowners at Quihi, Texas, hosted the 2004 STAA Field School camp. The Lindseys preserve and protect the Schuele-Saathoff house. It is a mid-19th century stone structure that is the only property on the National Register

Glenn and Cynthia Lindsey With Their Dee Ann Story Award.

Russell and Veralyn Mangold Receive the Dee Ann Story Award from Chairman Paul Stein.

of Historic Places in the Quihi area. They also are committed to the protection of prehistoric and historic sites and features on their land.

The Lindseys have an ongoing commitment to cultural resource preservation at Quihi.

The other recipients of the Conservation Award were Russell J. and Veralyn Weimers Mangold. Neighbors of the Lindseys, the Mangolds encouraged the STAA Field School's work at sites 41ME132 and 41ME133 on the Weimers Ranch. STAA surveys found additional sites, and all sites on the ranch are being protected. The Mangolds also permitted full access to the collection from ME132 assembled by the late Buddy Mangold for analysis and publication. Their enthusiastic cooperation provides an excellent example of how landowners can play a very positive role in site preservation and conservation.

Curt and Helen Harrell Receive Their Award from Chairman Paul Stein.

C. K. CHANDLER LIFETIME ARCHAEOLOGICAL ACHIEVEMENT AWARD

The 2004 award was presented to Curt and Helen Harrell, members of the Southern Texas Archaeological Association for two decades. Curt and Helen have dedicated themselves to STAA activities for many years. They have both participated in numerous field schools, helped organize and prepare food for both field schools and quarterly meetings, photographed and documented STAA field activities and have been stalwarts in the effort to photograph artifact collections across the region. The Harrells have represented the STAA at a variety of functions around the state, they have worked with field schools at several universities, and have promoted archaeology and archaeological photography in many different venues. Their ongoing and selfless dedication to the STAA has greatly contributed to its success through the years.

Cindy Smyers holds the Outstanding Avocational Archaeologist Award.

JIMMY L. MITCHELL OUTSTANDING AVOCATIONAL ARCHAEOLOGIST AWARD

Cindy Smyers was presented with this award for 2004. Even though Cindy lives in Odessa, Texas, she worked hard during the year on behalf of STAA and Texas archaeology. She organized four archaeological outreach booths at various fairs and business shows. She sold STAA t-shirts, copies of *La Tierra*, and signed up several new members—along with distributing information about our organization and its goals. During 2004, she also recorded 10 new archaeological sites and personally monitors six other sites to ensure their preservation. She and her family attended the 2004 STAA Field School and were members of the survey team. Cindy has given numerous talks at schools, co-authored two manuscripts for *La Tierra*, and documented and photographed several collections. She is a very active Steward for the Texas Historical Commission, serves as vice-president of the Midland Archeological Society, and attended the Archaeology Academy sponsored by the Texas Archeological Society in San Angelo.

Golondrina Points at Baker Cave
Data from the James H. Word Excavations of the 1960s

Thomas R Hester and James H. Word

From 1962-1966, James H. Word carried out excavations at Baker Cave (41VV213), on a tributary of the Devil's River in Val Verde County, Texas. Working with a group of avocational archaeologists, Word's excavations were systematic and thorough, and the results were promptly published through the Texas Memorial Museum in 1970 (Word and Douglas 1970).

One of the most significant discoveries to come from this fieldwork was the discovery of several Paleoindian projectile points from a stratum at the bottom of the cultural deposit. The projectile points were described as "Plainview golondrina" (Word and Douglas 1970:34). This label followed the classification of that time in which what we now call Golondrina (Turner and Hester 1993) was viewed as a variant of the Plainview type. In addition to the diagnostic points and other lithic artifacts, Word also recovered an extensive faunal sample and obtained two radiocarbon dates on charcoal samples from Zone 1 (Table 1), the first clear indication of the age of the Golondrina type.

The 1976 excavations at Baker Cave, led by the authors and Robert F. Heizer, obtained more data on the Golondrina occupation, including additional formal artifacts and a cooking pit containing a wide variety of charred plant and animal remains (Hester 1980; Chadderdon 1983; Hester 1983). Additionally, two more radiocarbon assays were obtained for the Golondrina materials (see Table 1) and another Golondrina fragment was recovered (Figure 1).

Recently, the senior author came across notes and a photograph sent to him by Word (who passed away in 1999) in 1975, during the preparation for the 1976 field season at Baker Cave. In the note, Word provided more details on the Golondrina points, including the three shown in Word and Douglas (1970: Fig. 14k-m) and four have never been illustrated. The three specimens were illustrated at a reduced scale, and both the photographs and the manner in which they were printed, give somewhat distorted views of the artifacts. It is hoped that the photograph that Word provided in 1975 (Figure 2) will help provide additional visual perspective on these specimens. Additionally, Word provided sketches that better illustrated the nature of the basal thinning of the points—especially the arc-shaped flakes so typical of Golondrina (Figure 3). With these sketches were additional drawings of three previously unpublished Golondrina specimens from the site. Another unpublished point fragment (a distal tip) appears in Figure 2 and no other information is available for it. Given that Word

Figure 1. Golondrina basal fragment from Baker Cave (Hester 1983: Figure 4a). From the Golondrina stratum, 1976 excavations.

Table 1. Radiocarbon Assays Related to the Golondrina Type, Baker Cave, Texas.

Radiocarbon Lab Number	14C-age B.P.	Calibrated B.P.	Calibrated Calendric B.C.	68% range calibrated B.P.
Tx 128 (Word)	8910 ± 140	9964 ± 198	8014 ± 198	9765-10162
Tx 129 (Word)	9030 ± 230	10135 ± 323	8185 ± 323	9812-10135
RL 828 (1976)	9180 ± 220	10355 ± 312	8405 ± 312	10043-10667
Tx 2466 (1976)	9020 ± 150	10121 ± 220	8171 ± 220	9900-10341

grouped it in the photograph with Golondrina, it likely came from Zone 1.

Although the four available radiocarbon dates associated with Golondrina at Baker Cave have been published in two or three earlier publications, they are again summarized in Table 1. Due to the continuing improvements in the calibration of radiocarbon assays, there has been a "shift" in the general age of Golondrina over the past two decades. For example, in a number of papers, I have referred to Golondrina

Figure 2. Golondrina points found by J. H. Word at Baker Cave. Photograph provided by James H. Word. Three specimens, originally published in Word and Douglas (1970: Fig. 14k-m). Third from the left, distal fragment.

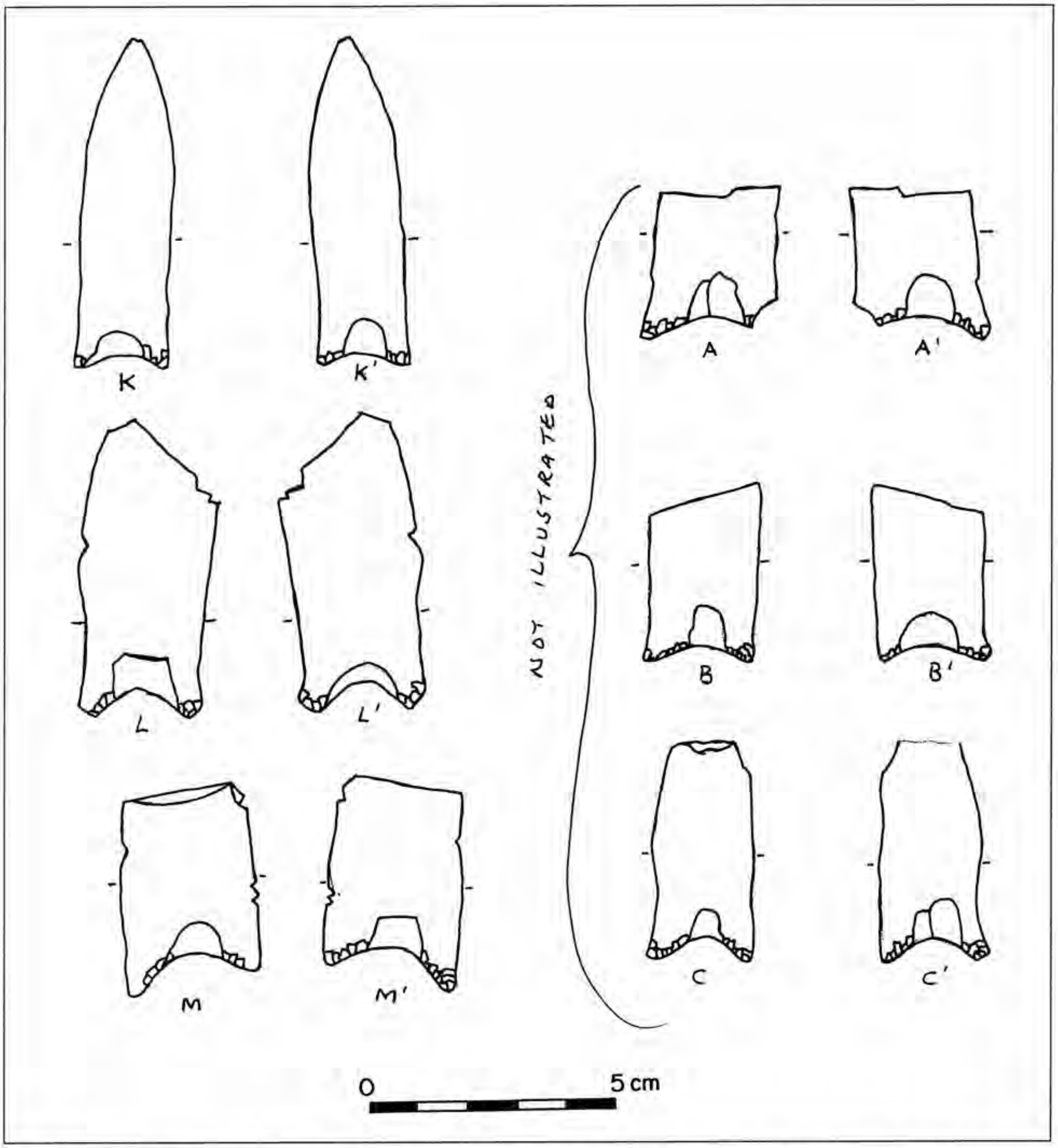

Figure 3. Sketches of Golondrina Points from Baker Cave. Original sketches by James H. Word. K, L, M are published in Word and Douglas 1970 (Fig 14k-m). A, B, and C have not been previously illustrated. L comes from Zone II, the rest from Zone I. Word has emphasized basal thinning and trimming of the basal edge for each specimen.

as dating to 9,000 years ago, or roughly 7,000 B.C. Recently, I re-examined the original dates (2 from Word's excavations; 2 from the 1976 excavations), using the on-line calibration program known as CalPal. This calibration curve (CalPal2004_SFCP) is widely accepted among archaeologists. It is based on the Cologne Radiocarbon Calibration and Paleoclimate Research Package of the University of Cologne (Germany).

Another radiocarbon assay (Tx 526) of this age range has been published for the Devil's Mouth site (Sorrow 1968), also in Val Verde County. Charcoal from Stratum P yielded a date of 8780 ± 310 BP. Although Sorrow (1968:47) suggests that the dated material was perhaps associated with "Group I" (Wilson) points, there are also Golondrina and other Paleoindian projectile points in the same stratum.

Using CalPal, the calibrated calendric BP age from Devil's Mouth is 9871 ± 352, the calibrated calendric age BC is 7921 ± 352, and the 68% calibrated BP range is 9518-10223.

Baker Cave remains the only site that provides a clear chronological context for Golondrina. As shown in Table 1, radiocarbon assays place the type, and the widespread Golondrina Complex, within a couple of centuries—one way or the other—of 10,000 years ago. Word's photographs, and the sketches in Figure 2, are useful in further defining definitive traits of the Golondrina type. Perhaps these data are the most important, since rather exceptional liberties were taken with the Golondrina type in the analyses of lithics from the Wilson-Leonard site (Collins 1998). The specimens from that site were not in good contexts, scattered through several zones, mixed with other Late Paleoindian types, and no radiocarbon dates could be assigned to Golondrina (Bousman et al. 2004:36,83). There seems to have been a fundamental misunderstanding of the Barber type, promoted by always-scary statistical analyses and a misinformed view of a Golondrina cache found in South Texas, all leading to a new type, "Golondrina-Barber." While a detailed review is more appropriate for another forum, the statement used several times in the Wilson-Leonard volumes, and echoed by Bousmann et al. (2004:28) that a southern Uvalde County cache (which has been published in a couple of venues; see Hester 2004:Fig. 4.10) contained "both" Golondrina and Barber (the full range between Golondrina and Barber) is wholly without merit. None of the four illustrated points have even a vague resemblance to Barber and all are Golondrina, including the two distally resharpened points. This illustrates one of the perils of making bold typological assertions based on a single photograph and having never handled the artifacts pictured in it.

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There is More to Langtry than Looks:
Uses and Abuses of Texas Point Typology

Harry J. Shafer

ABSTRACT

Projectile point typology remains an important tool for research in Texas archaeology. Comments are offered on current approaches to typology, and suggestions are provided for its proper application.

The first part of the title for this essay expresses what Judge Roy Bean might have said of Lillie Langtry. However, I use the phrase to introduce the subject of projectile point typology. Misuse of Texas point typology is an old topic that some of us have dealt with many times in the past. Probably one who was most chastised for its misuse was the late R. S. MacNeish, as admonished more than once by Tom Hester (cf. Hester 1986). But he was certainly not alone. There is concern among some of us that the new generation of Texas archaeologists are not as adept, or willing to commit the effort, to learn the Texas point type system and how it can be appropriately used as were people of the older generation, like Elton Prewitt, Mike Collins, Jim Corbin, Tom Hester, John Greer, and a very few others, including myself. We were fortunate to have had the original mentors to teach us: Dee Ann (Suhm) Story and Ed Jelks.

In the 1960s when chronology building and the cultural-historical approach were guiding much of the research in Texas, we were sponges in learning the index fossils needed to work out the chronology. Point types were the essential tool for developing chronologies since types changed in time and were, and still are, used as index fossils and signal characteristics of components. Radiocarbon dating was still in its infancy, and geoarchaeology had only begun to be taught at Arizona and Washington State University. Point types were the most sensitive indicators that we had to work with at the time. Paradigms have since changed, and students and archaeologists are in hot competition to develop new ways of interpreting the archaeological record and illuminating the past. Point and ceramic typologies are left as secondary or tertiary issues at the expense of what some consider as more important and far-reaching research topics: such as more accurately dating features and deposits, and formation processes using technologies that we did not have in the 1960s and 1970s. I am not out to criticize where the field is going so long as it does not venture to far away from the thorough study of material culture. Indeed, I applaud the application of new theory and technologies. But the very tools designed to help define temporal context where it all begins are not being properly used. I am not advocating that chronology be the guiding research issue, but I am saying that reading the chronology correctly and knowing the material culture will lead to better and sounder understanding of context and interpretations. Perhaps too much is relied on radiocarbon dates to define the contextual resolution. Sound interpretations and inferences are dependent on good context. By not being able to understand the chronological implications of a projectile point assemblage could result in not recognizing a mixed or stable deposit. Conversely, recognizing mixed deposits is equally important. Resolving the mystery of burned rock middens helped to explain why these deposits often contain mixed point assemblages (Nickels et al. 2001).

Point morphology often changed during the course of use. Not being able to recognize the typological variability resulting from in-field rejuvenation could cause one to mis-identify what might be a single component deposit. Not all points in any assemblage will be identifiable using Turner and Hester (1993). Variability in skill, raw material, in field retouch, and rejuvenation are among the factors that created variability. Krieger (in Suhm et al. 1954: 5) cautioned that it is *utterly impossible to establish the type of every specimen* (emphasis his).

The typological concept that is in use in Texas had its beginning with the contributions of Alex D. Krieger and J. Charles Kelley. Kelley was the first to name point types in Texas by using both formal and qualifying terminology such as Montell Split Stem, Pedernales Indented Base, etc. (Kelley 1947). Kelley never published his point descriptions, and Krieger retained the names of Kelley's types where appropriate, but dropped the qualifying terms. Krieger (Newell and Krieger 1949:71) emphasized two very important points in his statement on typology: "(1) that types with historical meaning will only be discovered through constant experimentation with trial groupings, followed by plotting distributions in time and space dimensions to test their consistency, and (2) that the analyst must make every attempt to handle more effectively the problem of *variation within type*" (emphasis his). The critical element of Krieger's typological concept was that a formal type has a limited geographic distribution and a restricted time span. This is why point (and pottery) types are useful archaeological tools.

Krieger's method was not quantitative, but carried a common sense, albeit somewhat subjective, application. According to Dee Ann Story, Krieger spent many hours and nights going through collection after collection at The University of Texas sorting thousands of points. The massive lithic collections gathered in the WPA salvage excavations and earlier excavations at Fall Creek sites, Gault, Cedar Park Mound, Yarbrough, Eagle Cave, and others provided the foundation for both Kelley's and Krieger's Texas typologies. Their definition of the Pedernales type, for example, rested on their handling thousands of specimens (Suhm et al. 1954:1-7). By the time someone has done this, they know what is and is not a Pedernales, or Nolan, or Langtry. Why? Because by handling so many specimens, the analyst gains a "feel" for what the archetype is. This "feel" includes morphological and technological nuances. But feel is not everything. It is an intuitive hypothesis put to test with archaeological context. Together, consistent morphology and context (temporal and spatial) define a type.

At the time that Suhm, Krieger, and Jelks developed the Central Texas typologies and when we were applying them in the 1960s and 1970s, point styles were the most sensitive indicators of chronological change. This situation still persists in far west Texas with ceramics. The most widely used chronometric dating method is radiocarbon. Ceramic cross-dating has proven to be more sensitive than radiocarbon (Shafer and Brewington 1996; Shafer et al. 1999). Ceramic cross-dating is not being widely applied in far west Texas due to the fact that few know the material sequence that well.

What Kelley and Krieger did not have working for them when they were originally setting up the point typologies was good temporal control. This was well before the days of radiocarbon dating. Krieger was working with materials from sites others had excavated. Kelley, by contrast, had excavated numerous sites during the WPA days in the Marshall Ford basin and elsewhere while at The University of Texas and had observed stratigraphic changes. Without well-dated context, they missed recognizing the earlier components that we identify today in Central Texas as Early Archaic (Collins 1998:Figure 4-1). This is not because no one had dug sites with Early Archaic components, however. T. N. Campbell (1948) conducted limited test excavations at the deeply stratified Merrill site on Brushy Creek in Round Rock, Texas, and recovered a series of early points beneath a burned rock midden containing Nolan and Bulverde points. These early points included types we would recognize today as Early Triangular, Bell/Andice, Uvalde-Gower, probably Martindale, and Clear Fork tools. Campbell had found a nice long Archaic sequence, but it drew very little attention, perhaps because thinking was biased by Kelley's three foci in the Edwards Plateau Aspect: Clear Fork, Round Rock, and Uvalde. These "foci" were a refinement of J. E. Pearce's bottom and middle layer of the "Texas Kitchen Midden Culture" or burned rock middens. All of the point types that Campbell found at the Merrill Site had been found in numerous sites before, but were not recognized as being early due to poor contextual separation at the other sites. Why no one paid much attention to the Merrill Site sequence is anyone's guess. I used it to compare to the Stillhouse Hollow sequence at the Landslide site (Sorrow et al. 1967).

Three things I have mentioned or implied that require reliable and accurate typological assessment are morphology or shape, context (temporal and geographic), and technology. First, the point must look like a Pedernales as illustrated in either Suhm et al. (1954), Suhm and Jelks (1962), or Turner and Hester (1993). Second, the point must conform to the temporal and spatial distribution or context of the type as defined. Context is all too often ignored in typing a collection. This is where MacNeish misused the Texas typological system (Hester 1986). If a dart point had an indented base and straight stem, MacNeish called it a Pedernales, ignoring the fact that it came from Belize (MacNeish and Nelkin-Terner 1983). Frank Hole (1986) committed the same sin in his analysis of lithics from Guilá Naquitz in the state of Oaxaca, Mexico. David Carmichael (1987) also used Texas typology in the Tularosa Basin of Texas and New Mexico. Carmichael can be forgiven, however, in that Texas was the closest typology he had for comparison, but the results of his efforts have not stood the test of time. Carmichael's study can be used to emphasize that projectile point typologies should be established independently for each region in order to capture the regional variability in style.

Similar point styles can occur at different points in time. Uvalde and Pedernales or Marcos and Martindale are similar point styles. If one were trying to classify a series of Early Archaic point styles that included variations of Uvalde, they may come across a specimen that looks much like a Pedernales. To give a hypothetical example, if I were looking at a collection of Uvalde points recovered from a deeply buried stratified deposit beneath a deposit that contained Pedernales points, and one of the dozen or so Uvalde bore a closer resemblance to Pedernales than Uvalde, what would I call it? Based on the stratigraphic context, odds are it is merely a variant of Uvalde. Going back to what Krieger stated with regards to the typological concept, a Pedernales would be out of place in this context.

The skeptical New Generation archaeologist would interrupt to say: "Couldn't the Late Archaic folks have dug a pit and the Pedernales got mixed in?" Maybe, if the point was found lying vertical or at a sharp angle, but if it was lying flat like the other specimens, and there was no evidence of an intrusive disturbance, I would probably rule that out. Another example is when an earlier point type appears in a later context, such as a Pedernales in an Austin phase component. Our ancient Texans also collected artifacts, and in this case, the point is more likely to be a Pedernales but since it is associated with Scallorn arrow points, it is clearly out of context temporally. Because Scallorn and Pedernales occurred on the same surface **does not** mean they were styles used at the same time. Typological decisions rarely rest on viewing the points alone; more information on context and association is usually needed to make the call with any degree of confidence. Earlier point types commonly appear in later components, but the opposite should never occur unless through some cultural or natural mixing of deposits. The most difficult stratigraphic situation is with an ancient stable surface that was utilized repeatedly over a long period of time, allowing for several point types of different ages to be mixed together in a single deposit. This is common in sites on stable upland topographic features overlooking streams or on old stable terrace surfaces. Stream terraces that rapidly built up often provide good separation between archaeological components (Collins 1995). Good examples of terrace sites are Landslide and Evoe Terrace sites in Bell County (Sorrow et al. 1967), Wilson-Leonard in Williamson County (Collins 1998), and 41MM340 in Milam County (Mahoney et al. 2003). Conversely, deposits that were slow to accumulate, or allowed to deflate, do not provide good temporal separation of artifact assemblages. Examples of the latter include Woodrow Heard (Decker et al. 2000), the Airoso site in Coke County (Shafer 1969), and the Jake Martin site in Upshur County (Davis and Davis 1960). It is equally important in assessing the integrity of context and association to know the geoarchaeological situation in order to read the depositional history of the deposits containing the cultural material.

Third, the point must conform to the technological descriptions. Technology is more difficult to assess, but is a very important criterion. Many people made Pedernales points, and there are subtle regional variants in the type due to the way generations were taught, and to the differential level of skill. Likewise, subtle technological differences occur between point types separated by thousands of years. A Jetta point may have what might appears to be a Pedernales stem, but upon closer inspection one might see that the blade has a peculiar twist to the left, often created by fine pressure flaking. This feature never appears on Pedernales. A broad-blade point may appear to be a Bulverde, but a close inspection might indicate that it is a Bell point with reworked blade and the once large barbs been broken off. It is important to be able to read the life history of a point. Some dart points also were used as knives and blade edges on some points underwent extensive modification through resharpening. Morphology changes from the original form with periodic resharpening and repairing impact damage. Careful scrutiny is often needed to recognize the original form. Sometime the use history of a single point is complex and its original form has changed to the extent that it may resemble another type.

Just how does one learn to "read" the history of a point or any other lithic artifact? It requires the knowledge of lithic technology and handling a lot of points to gain a sense of the subtle, but often important, variation between similar types. To become an effective lithic analyst, one needs first to be able to replicate the technology. This means busting a lot of rocks using hard hammerstones, antler (or copper—modern flint knappers use these cheaters), punches, and pressure tools to replicate hard-hammer, soft-hammer/punch, bipolar, and pressure flaking. This greatly improves one's knowledge of how stone tools are made, how to recognize different kinds of debitage and scars produced by each technique, and how to recognize such attributes as use or impact damage on a point. Only then can one learn effectively how to recognize the strategies, mistakes, fracture mechanics, and cultural traditions in lithic assemblages. That is a pretty tall order, but no one said it was going to be easy! If this advice creates despair or stress among readers who would like to become lithic specialists, busting rocks reduces stress; it is good medicine, but bring some bandages.

The objective for any classification system is to establish order and define variability within the population of items being classified. Typology identifies the various groups within the population that share certain attributes. But typology is not an end unto itself. Prehistoric people learned to make and do things from their parents, elders, and kinsmen who, in tern, learned from their relatives. Handing down ways of making tools to solve problems created historical traditions of technological style (Lechtman 1977). Typology is a necessary step toward identifying technological style because it is through typology that technological variability and nuances are recognized.

The point of this essay is to encourage the new generation of archaeologists and avocationals to learn the Texas point typology and how it can properly be applied. This is still a potentially powerful analytical tool if applied correctly. Point typology is used as a means of cross-dating during both field work and laboratory analysis. The same can be said about ceramics, but that is another essay. If typologies are misapplied, the ineptness will show and the results will lead to false and misleading interpretations. If all three criteria listed above fit—morphology, context, technology, plus knowledge of the archaeological literature and examination of specimens from other cultures—then the point probably is what you think it is. If only one criterion fits, then it probably is not. The credibility of our inferences in archaeology does not rest with how sophisticated our theories may be, or how well our hypotheses hold up, but rather how accurately we are able to classify the things we call data that we use to base our interpretations and inferences. If we are wrong at that level, then everything that follows is likely incorrect as well. While we use scientific methods in archaeology, archaeology is not all science; there is still a lot of art involved. While I believe we need to use more objective approaches such as quantification (Johnson 1989), merely quantifying does not necessarily lead to good science. Using quantitative measures to establish typologies created lively debates in archaeology in the 1950s, especially the famous Ford-Spaulding debate (Willey and Sabloff 1993:161-169); and Nelson's (1983) reliance on the Spaulding approach to discover types failed miserably (Dockall 1991). Elton Prewitt has developed a form for projectile point description that may help to standardize the systems of measurements and description (Hudler 2003). While I encourage avocational and professional archaeologists to use this form, it does not automatically define the typology. That has to come from research and experience. We need not reinvent that debate about quantitative data and how it can be used to define meaningful variability within types. We have a good tool if we use it correctly.

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Notched Shell Artifacts from Nueces Bay, Texas

H. F. Apple

ABSTRACT

This paper documents a collection of notched shell artifacts found on multiple adjacent shell middens on the north shore of Nueces Bay, San Patricio County, Texas. I examine the possible uses of these artifacts, and describe four different notch styles and multiple groove patterns. Six different possible uses are explored, some with experiments. While these notched shell artifacts may represent more than one use, the dominant use was as net or line weights. Since perforated shells found on these middens were apparently used for net or line weights, two technologies for making these weights are represented in the same or nearly the same temporal periods. Since the only other significant examples of shells with linear notches (some with grooves) seem to be from sites along the Ohio, Mississippi, and Tennessee rivers, this raises the possibility of the sharing of ideas and shell technology between the peoples of South Texas and the areas along these rivers.

INTRODUCTION

This collection of shells (Figure 1) includes 51 oyster shells *(Crassostrea virginica)* and three *Rangia cuneata.* Since these shells were found on middens in a plowed field, my initial thought was that their features were the result of farming activity. After accumulating a collection of these shells, however, and seeing the repetition of notches and grooves, I believe that they represent an artifact type.

Each shell has at least one notch. Some of the oyster shells also contain a groove on the opposite side of the shell that is in line with the notch (a notch and groove are illustrated on a shell in Figure 3, see below). Other shells have a groove in the apex of the notch and on the opposite side of the shell, or only a groove in the apex of the notch; still others contain no groove at all. Shells with either a double notch or a groove opposite a single notch comprise a group containing "opposite features" that appear to be the result of an activity that resulted in both sides of the shell being in contact with another material. Over 82% of the shells in the collection are of this type (Table 1). A "linear notch" is defined as one in which the sides of the notch form an acute angle of 40° or less. A "V" notch has sides that form an angle greater than 40°. A spokeshave notch has a rounded shape. A 90° snap fracture notch is a piece removed from the shell so as to create an approximate right angle notch.

The grooves in these shells range from quite rough with significant damage and chipping to smoother

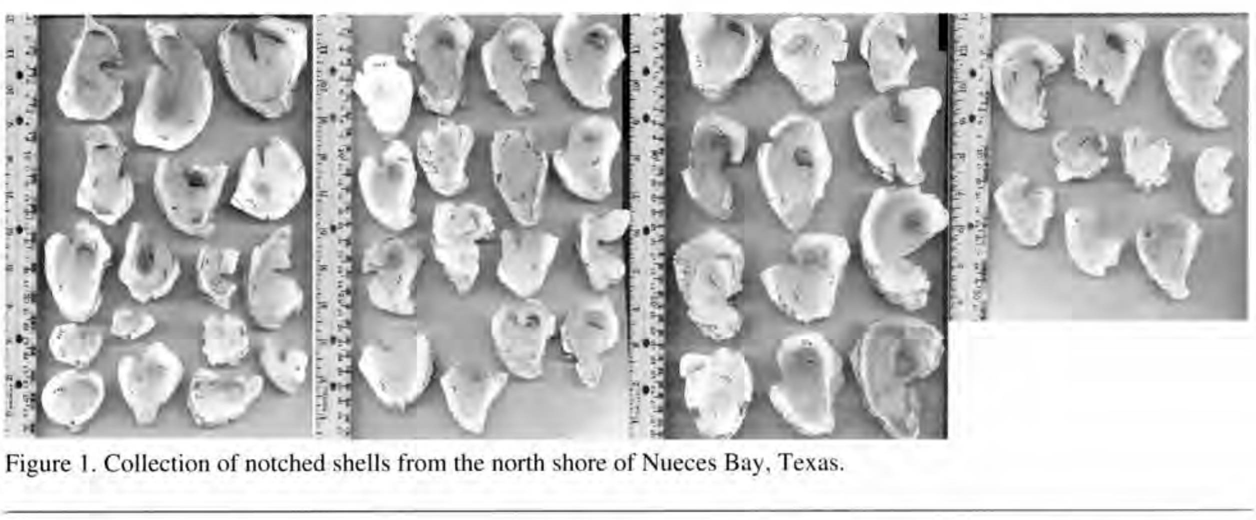


Figure 1. Collection of notched shells from the north shore of Nueces Bay, Texas.

Table 1. Collection Inventory.

		Crassostrea virginica				*Rangia cuneata*		Lithic Artifact	
Modification	ID Nos.	Totals	%	Not Accepting String	No Opposite Abrasions	ID Nos.	Totals	ID No.	Totals
DOUBLE NOTCHED		12	24						
1 Linear Notch, no apical groove; 1 V notch with apical grrove; groove opposite with scoring radiating from groove	352	1							
1 Linear Notch with apical groove; 1 V notch	108, 398	2							
2 V Notches, both with apical grooves	334, E	2							
2 V Notches	393	1							
2 Linear Notches, double hook pattern near umbo	L	1							
2 Linear Notches, 1 with apical groove	394	1							
2 Linear Notches, both with apical grooves	383	1							
1 Linear Notch with 2 apical grooves; 1 Spokeshave Nocth with apical groove	C	1							
1 Spokeshave Notch with apical groove; 1 V Notch	349	1							
1 Linear Notch, 1 Spokeshave Notch	372	1							
SINGLE NOTCHED		39	76				3		1
Linear Notch with groove opposite	A, 318, J, 106 381, 395, 399	7							
Linear Notch with apical groove and groove opposite	I, 96, 97, 348 355, 377	6		I					
Linear Notch, no grooves	D. K. 376, 396	4		D	D, K, 375	382	1		
Linear Notch with 2 grooves internally	105	1							

Table 1. (*Continued*)

		Crassostrea virginica				*Rangia cuneata*		Lithic Artifact	
Modification	ID Nos.	Totals	%	Not Accepting String	No Opposite Abrasions	ID Nos.	Totals	ID No.	Totals
Linear Notch with apical groove	100, 392	2							
Linear Notch from 90 degree snap fracture						335	1		
V Notch with apical groove	M, 138	2							
V Notch with apical groove and groove opposite	H, O, 128, 390	4		H					
V Notch with no grooves	G, 364, 373, 374, 376, 384, 388, 391, 397	9		388				294	1
90 degree snap fracture with groove opposite	F	1							
90 degree snap fracture with apical groove and groove opposite	B	1							
Spokeshave Notch with apical groove	351	1				365	1		
Spokeshave Notch with no grooves	N	1							
Total Artifacts		51					3		1
Total shells with apical groove and groove opposite		11	22%	Not accepting string (7.8%)	No opposite abrasions (5.9%)				
Shells with notch and groove opposite		19	37%						
Plus double notched shells		12	24%						
Shells with opposite features		42	82%						

grooves with minor chipping and irregularities. The groove depths range from less than 1 mm to 4 mm. The groove widths, especially the groove on the side of the shell opposite the notch, range from 1-5 mm. The wider grooves are shallower and lack a clear channel, as if the material the shell was used with did not always strike the shell at the same place on every movement of the shell or the material. All but 6% of the oyster shells that do not have a groove opposite the notch have some minor abrasion in the place where one would expect a groove. The remaining 6% have neither a groove nor any minor detectable abrasion opposite the notch. One specimen has two internal grooves in a straight line in the same plane with the notch, so that a straight piece of string passed through the notch would rest in both grooves. This is possible because of the flat nature of the shell.

Ten of the oyster shells in the collection have sponge holes on the interior surface of the shells, indicating that they were collected from the bay after the oyster had died but before it had been worked into this artifact type (K.A. Cox, 2004 personal communication; Cox and Cox 1993).

DISCUSSION

Other artifacts found on the surface of these same shell middens include small pottery sherds (Rockport ware, with asphaltum on the interiors), shell artifacts, and stone artifacts (Figure 2), including a stone pipe (Apple 2003). Ceramics came into common use in southern Texas after about 1050 years before the present (B.P.) (Ricklis 1993). Faunal remains found on the midden sites include fish otoliths and deer bones.

Shell artifacts are represented by the notched shells, perforated shells, both oyster and *Rangia*, shell "adzes," a perforated oyster shell (possibly an ear drop), columella awls and gouges (and possibly a large columella sinker), gastropod hammers and awls, and gastropod cutting edge tools prepared for hafting (Marquardt 1992). Many of these shell artifact types had at one time been identified as characteristic of the preceramic Aransas focus (Campbell 1952). More recently, however, it has been observed that some of

Figure 2. Lithic artifacts found in association with the collection of notched shells.

the shell tool types considered "diagnostic" of the Aransas focus appear to have been manufactured as early as 7000-5000 B. P. (Ricklis 1993).

Specifying a temporal range for the artifacts surface collected on these middens is difficult, and to do so, I take into account lithic and shell artifact types, the abundance of fish remains, and past environmental conditions in the area. When examined from the perspective of lithic artifact types, the sites would most likely date from Late Archaic II to Late Prehistoric times, which for this area of the Texas coast would be ca. 2000 B.P. to 400 B.P. (Ricklis 2004, n.d.; Cox 1996). While perforated oyster shells have been found in Early Archaic sites (5900-4500 B.P.), fish remains have been found only sporadically in these early sites. By contrast, fish remains show a dramatic increase in numbers around 2000 B.P. Fish remains are found in tremendous abundance, and perforated oyster shells are found in large numbers, in Late Prehistoric (950-400 B.P. sites (Ricklis 2004, n.d.; Ricklis and Cox 1991; Cox 1996). The sea level in this area approximated its modern position around 3000-2500 B.P. This sea level stillstand was followed by the gradual formation of barrier islands and bay sedimentation, which created extensive estuarine shallows. This was an ideal environment for massive fish procurement

(Ricklis and Cox 1991). Based upon these observations of the abundance of fish remains, it appears that the items surface collected on these middens most likely date from ca. 400-2000 B.P.

The variety of features of the shells in this collection is, I think, partly due to some damage done to the shells either during use or at some later time. For example, shells without a groove in the apex of the notch may have been flaked and damaged during use or at a later time so that the groove at the apex has now vanished. Other shells show more of an irregular notch, absent "straight" edges, that could be due to damage during or at some time after their use.

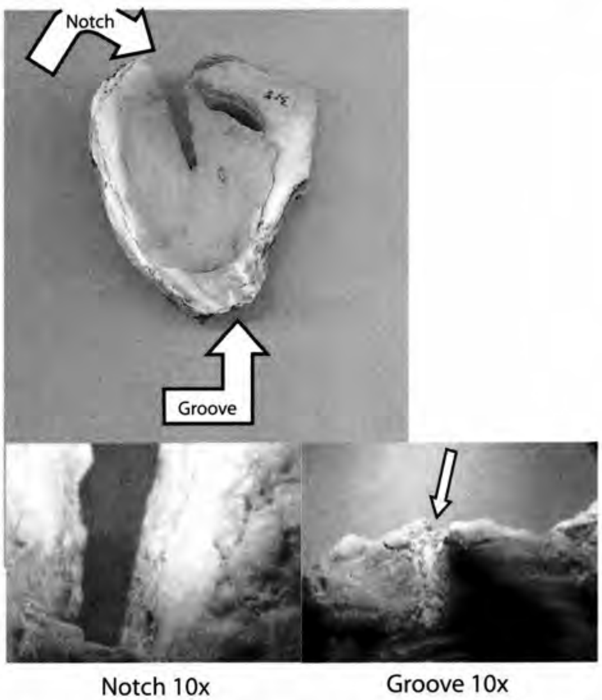


Figure 3. Example of a shell with a notch and a groove opposite.

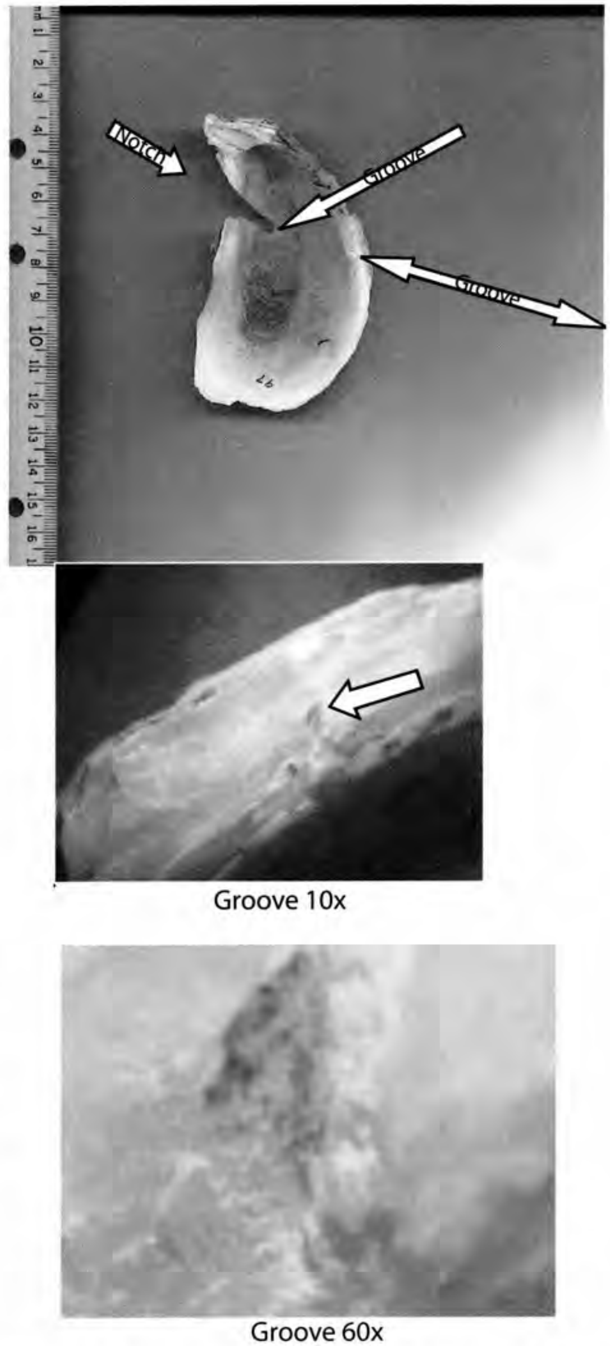
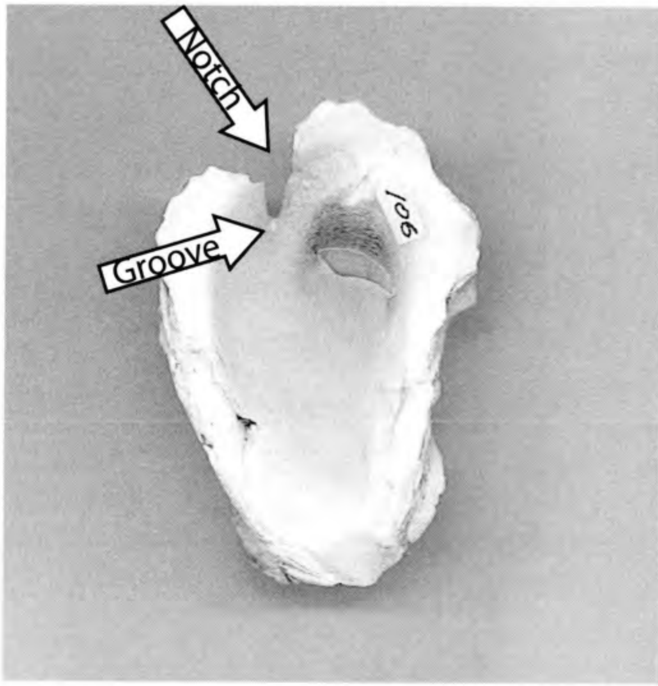


Figure 4. Shell with a groove in the apex of the notch, and a groove on the opposite side.

An example of a shell with a notch and groove opposite is provided in Figure 3, while a shell with a groove in the apex of the notch and on the opposite side is illustrated in Figure 4. Figure 5 depicts a shell with a groove in the apex of the notch; there is also some abrasion on the opposite side of the shell where one would have expected to see a groove.

One specimen has two internal grooves in the same plane with the notch, so that a straight piece of string passed through the notch would rest in both grooves. This is possible because of the flat nature of the shell (Figure 6). A double notched shell with the notches in hook patterns is illustrated in Figure 7.

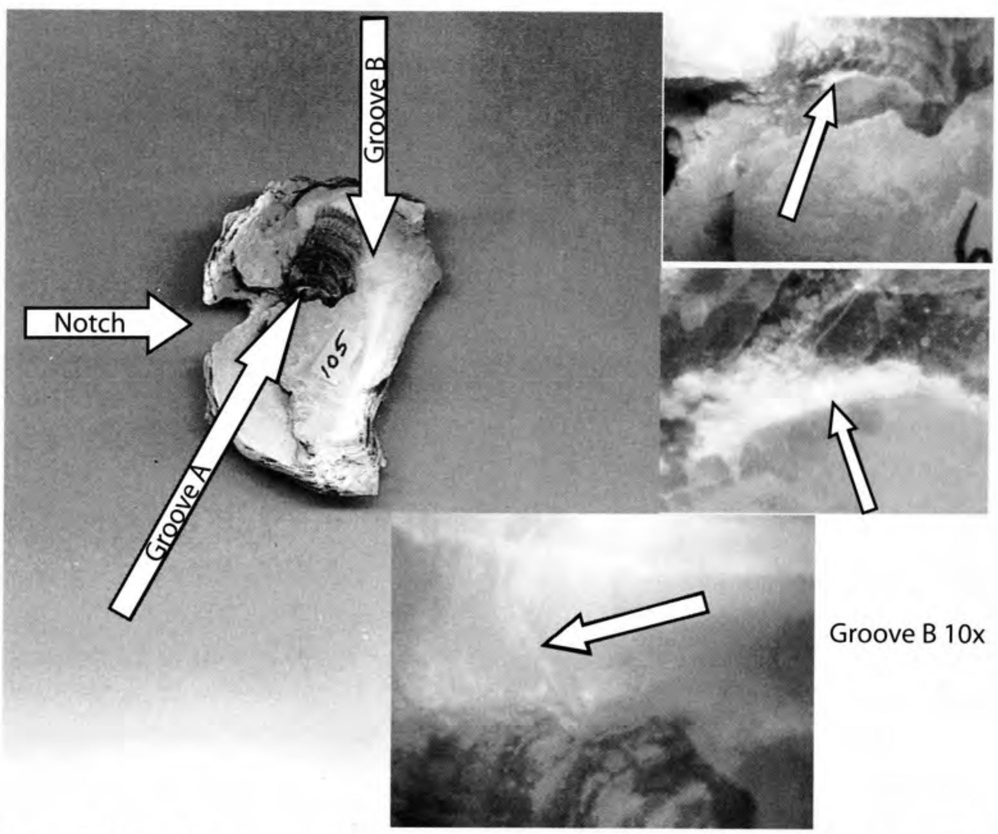
One notched lithic artifact was found on these middens (Figure 8). There is a striking resemblance between it and the shell artifacts. One side is essen-



Groove 10x

Groove 60x

Figure 5. Shell with a groove in the apex of the notch.



Groove A 10x

Groove A 60x

Groove B 10x

Figure 6. Shell with two internal grooves in a straight line and in the same plane as the apex of the notch.

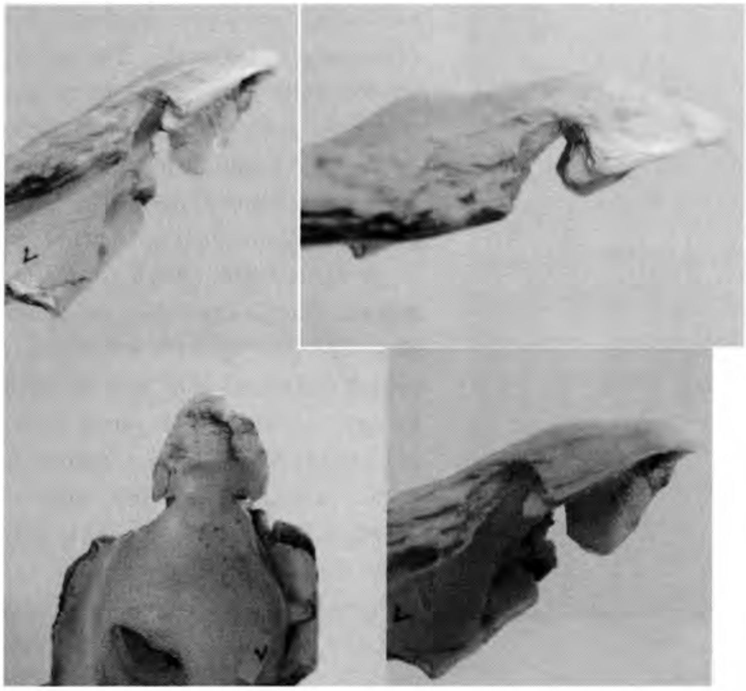


Figure 7. Double-notched shell.

tially flat, while the other is somewhat concave. Microscopic examination of the notch on the lithic artifact suggest it had the same features as are found in many of the notched shells. If this piece is in fact a tool, then it suggests that at least some of the shells in the collection may have been used for the same purposes. Four similar notched flint flakes from a site in Greenup County, Kentucky, along the Ohio River (see below, Figure 11, right, bottom row) were identified as tools with an unknown function. Shells with deep linear and "V" notches and at least one double notched shell were also surface collected from this site (West 1963).

Three notched *Rangia cuneata* have also been found on the Nueces Bay middens (see Table 1). One of the *Rangia*

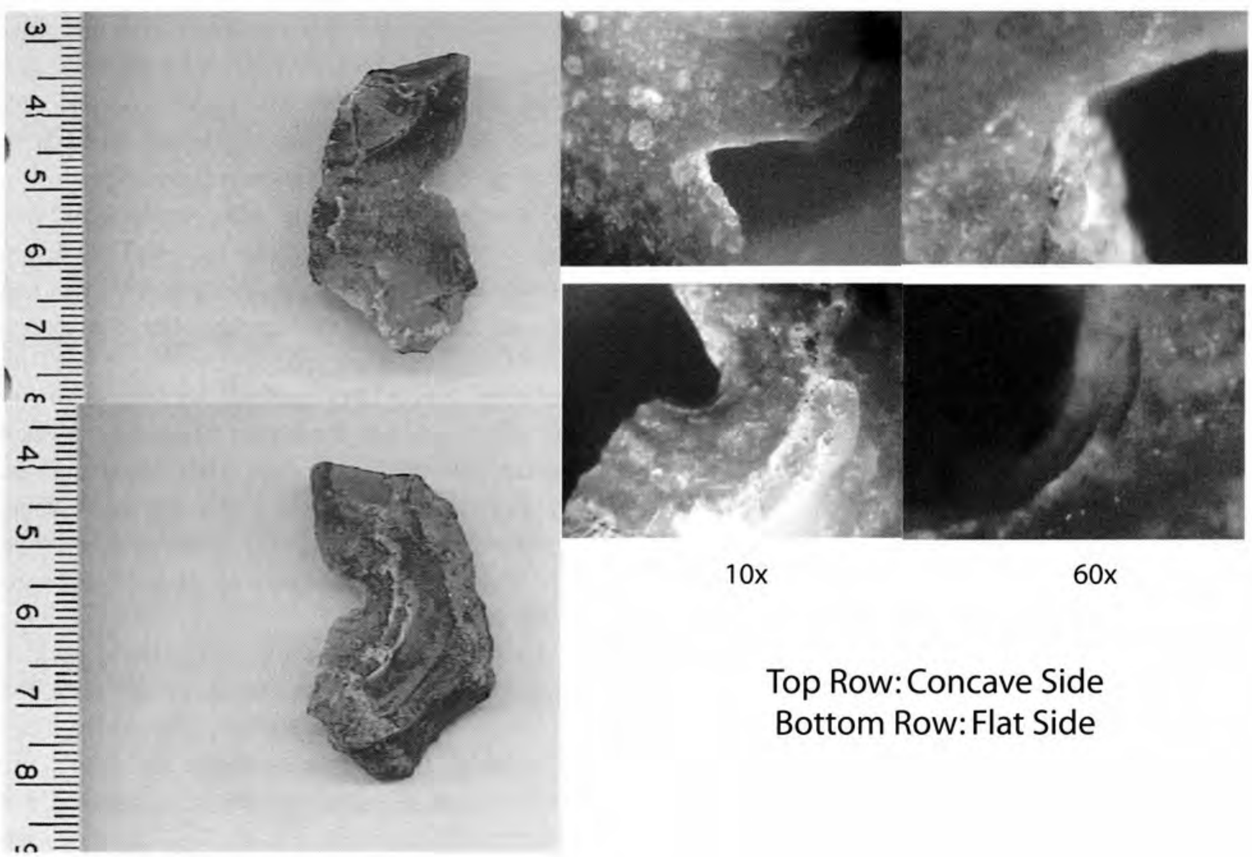


Figure 8. Notched lithic artifact.

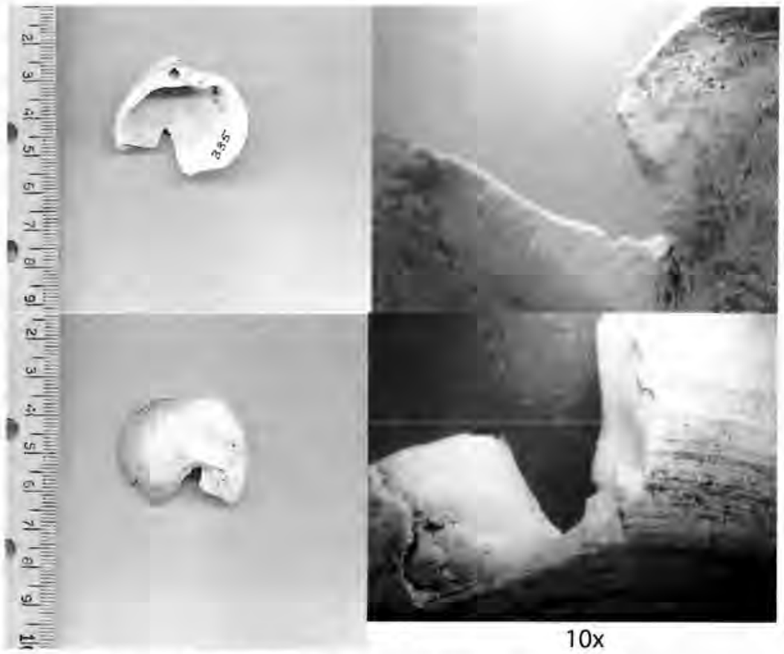


Figure 9. *Rangia* with a 90 degree snap fracture and notch.

shells in this collection has a 90° snap fracture along with a "V" notch. The edges of the notch appear to have use-wear and are sharpened (Figure 9).

FUNCTION

A master leather craftsman, when asked about the wear patterns on these shells, stated that they were probably not used to work animal hides since most hides are too thick to have produced the grooves found in the shells (C. Check, 2004 personal communication). Experiments performed with shells retrieved from the bay and then notched have produced interesting results concerning their possible function, and I discuss the results below.

Notched shells are quite effective tools to use in stripping plant fibers. Yucca leaves can be stripped quickly and easily to produce fibers of various widths. These fibers can be woven to make baskets or braided to make string. Since the yucca leaf has a coarseness similar to fine sandpaper, it leaves a groove in the apex of the notch of the shell very similar to many in this collection. Close microscopic examination of the apical grooves of the shells shows them to be slightly rough internally, perhaps due to the shell layering as well as the microscopic chipping action of working the material. The groove created while working yucca leaves is smoother, with only the beginnings during brief experiments of roughness from the exposure of the shell layering and no apparent chipping.

I have been unable to create grooves on the opposite side of the shell that line up with the notch, a pattern that occurs in 59% of the shells in the collection. The yucca leaves are too pliable to form a groove in such a straight line. While some of the shells may have been used to strip plant fibers, it is impossible to say with assurance that this was their only function. Ochsner (1983), in commenting on notched mussel shells found on 41WH8, believes that they were used to strip unwanted vegetable material from bast fibers and that this bast was then twisted into cord suitable for fish lines. He observed that many tall annual plants such as nettles and giant ragweed, after soaking in water to rot the vegetable matter, are easily stripped of the unwanted material, leaving long fibers. He also described methods of stripping he had used in personal experiments.

Experiments in working with pottery suggest that the shells were not used for this purpose. They would primarily only be useful in working with wet and pliable clay that would not leave grooves in the shells.

Notched shells are effective tools for working with deer sinew. They perform well in removing softer tissue and in separating the string fibers enough to grasp and pull them apart. They could then be woven into string. However, sinew and sinew fibers are too pliable to start a groove in the shell, so most of the shells in this collection were probably not used for this purpose.

The notches on the shells were clearly pecked, chipped, cut, or drilled (see Janota [1980] for a discussion of technologies of working with shells). They appear to be evidence that either a tool was being made (such as for stripping fibers) or that the end product was a shell with a notch that was then used for some other purpose (such as a net weight). Future research on this question could focus on notched shells acquired during an excavation. Residue analysis could then be preformed, provided the shells received minimal handling, were not washed, and were bagged separately. Attempting residue analysis on surface-collected shells from plowed fields is questionable. Starches from modern contamination are even more of a problem than contamination from chemicals broadcast over the fields (L. Perry, 2004 personal communication; Perry 2002).

In prehistoric sites along the central Texas Coast, netting of fish was probably with four inch gill nets; this can be inferred because a bell curve of the size of fish caught (determined by otolith analysis) closely matches a bell curve of the size of fish netted by the Texas Parks and Wildlife Department using four inch gill nets (K. A. Cox, 2004 personal communication). Notched shell artifacts have been found in various locations around the Texas Gulf Coast and in other parts of the country (Table 2). Typically, the notches reported have been "V," spokeshave, and 90° snap fracture types, plus other assorted shapes.

It has been suggested (K. A. Cox, 2004 personal communication) that the notched shells in this collection were used as net weights. It is common to see perforated shells mentioned as net weights in the archaeological literature (see Table 2). The use of perforated shells as net weights has been observed in practice in recent times in Grenada (K.A. Cox, 2004 personal communication).

Perforated oyster shells have also been surface collected from these same middens where the notched shells in this collection were found (Figure 10). The rationale for seeing the notched shells in this collection as net weights include the observation that many of the shells are well worn on their outer surfaces and margins, which would be expected from use where they would be repeatedly dragged across sand, mud, and shell. This use would be consistent with the grooves on the shell being in a straight line in one plane with the apex of the notch. The grooves would have been formed by the abrasion of the net material, possibly woven yucca strands. While it might be expected to find smoother grooves from this action, it may be that time and the increased shell brittleness which comes with it, and/or the repeated use as a net weight, led to tiny chipping and roughing of the groove. It would be somewhat curious, although not without precedent (Cushing 1896), that two different technologies (both perforated and notched shells) for the manufacture of net weights existed simultaneously in the same location. *Busycon* type shells found at the Swan Lake site (41AS16) in Aransas County, Texas, have also been identified as possible "net weights for use with various fishing devices" where they exhibit only "kill holes" and no further modifications (Prewitt and Paine 1988:158).

Figure 10. Perforated oyster shells found in association with the collection of notched shells.

Table 2. Perforated and Notched Shell References.

Site Locations	Shell Type/No.	Modification	Possible Function	Reference
Texas				
Swan Lake (41AS16)	Busycon	Kill holes	Net weights	Prewitt and Paine 1988:158
Kent-Crane, Aransas County	Oyster (numerous)	Perforated	Not stated	Campbell 1952:54
Johnson (41AS1)	Oyster (n=1)	Large shell, Rectangular perforation	Digging	Campbell 1947:55
	Oyster (n=6-8)	Perforated	Not stated	
Olmos Dam (41BX1)	Freshwater mussel (n=2) Conch (n=2)	Small notches, a few mm apart	Pendants	Lukowski 1988:73-80
Live Oak Point, Aransas County	Oyster (n=1)	Perforated	Net weights	Campbell 1958a:427
Channel to Victoria, Calhoun and	Oyster (n=5)	Perforated	Hafted digging	Weinstein 1992:95-96
Victoria counties	Rangia (n=3)	90 degree snap fracture	Net or bolo weight	
Lower Lavaca River, Jackson, County	Oyster	Perforated	Hafted digging/ Net weight/ line Sinkers	Weinstein 1994:83-84
	Rangia (n=3)	90 degree snap fracture	engraving or incising	
Matagorda Bay sites	Oyster (n=23) Busycon (n=8)	Perforated Perforated	Net weights 2 are pendants	Fritz 1975:128-132
41CH28 (Wallisville Reservoir)	Rangia	Perforated	Not stated	Shafer 1966
41CH31	Rangia (n=1)	Perforated	Not stated	Aten 1983a:29, 100, 1983b:265
Eagle's Ridge (41CH252)	Rangia (n=10)/Oyster (n=5)	Perforated and Rectangular blanks	Hafted/scraping, cutting/ornaments	Ensor 1998:425-429
	Rangia (n=1)	Rectangular notch	Unknown	Ensor 1995:31-32
Guadalupe Bay (41CL2)	Oyster (n=70)	Chipped, notched, spokeshave notch	Food processing	Dreiss 2002:459-473

Table 2. *(Continued)*

Site Locations	Shell Type/No.	Modification	Possible Function	Reference
Guadalupe Bay (41CL2), cont'd.	Oyster (n=145)	Perforated	Hafted, digging, scraping, line sinkers, net weights	
	Rangia (n=29)	Perforated	Not stated	
	Rangia (n=68)	Notched	Hafted for digging	
	Rangia (n=127)	90 degree snap-fracture	Not stated	
Allens Creek site	Megalonaias gigantea (n=1)	V notch	Not stated	Hall 1981
Choke Canyon Reservoir sites	Giant Atlantic cockle fragment	small linear notch	Unknown	Hall et al. 1986:335-337
	Mussels (n=3)	Perforated	Not stated	
Stillhouse Hollow Reservoir sites	Mussel (n=7)	Perforated	Not stated	Sorrow et al. 1967
	Mussel (n=5)	Notched	Not stated	
Forney Reservoir sites	Mussel (n=1)	Notched	Not stated	Ross 1966
	Mussel (n=16)	Perforated	Not stated	
Pecan Springs site, Ellis County, (Bardwell Reservoir)	Mussel (n=9)	Perforated and/or Notched	Not stated	Sorrow 1966
	Mussel (n=17)	Notched	Not stated	
Caplen site, Galveston County	Oyster (n=4)	Perforated, flat, ovate	Pendants	Campbell 1957
Mitchell Ridge (41GV66)	Oysters (n=3)	Perforated, 1 with edge damage	1, possible chipping or cutting	Ricklis 1994; Dreiss 1994
Lido Harbor (41GV82)	Rangia (n=4) Oyster (n=1)	Perforated	Net weights	Weinstein 1991:118-123
Coleto Creek drainage, Goliad County	Freshwater mussel (n=2)	Cut and perforated	Not stated	Fox 1979:51, 56

Table 2. *(Continued)*

Site Locations	Shell Type/No.	Modification	Possible Function	Reference
Alabonson Road (41HR273)	Freshwater mussel	Notches including V and hour-glass	Not stated	Zimmerman 1991
Peggy Lake, Harris County	Rangia cuneata (n=6)	Perforated	Not stated	Gadus and Howard 1990
Palmetto Bend Reservoir, Jackson County	Freshwater mussel (n=2)	Square shape, 2 drill holes	Not stated	McGuff 1978:112-113; Fawcett 1978:210
	Ribbed mussel (n=1)	Punched hole	Not stated	McGuff 1978:112-113; Fawcett 1978:210
	Macrocallista nimbosa (n=5)	Circular shape/ notches (small) & bits	Not stated	McGuff 1978:112-113; Fawcett 1978: 209
	Oyster (n=1)	triangular with drilled hole	Not stated	Fawcett 1978:210
	Rangia cuneata (n=40)	Jagged, notched or crushed edges	Not stated	Fawcett 1978:209
41KL13 and 41KN3	Noetia ponderosa (n=1)	Perforated	Not stated	Hester 1969
	Rangia (n=1)	Perforated	Not stated	McKinzie (41NU221)
McKenzie (41NU221)	Oyster (n=1)	Perforated	Net weight	Ricklis 1988:18
White's Point, Nueces Bay, San Patricio County	Oyster	Perforated	Not stated	Ricklis 1993:16-17, 33-35
Eagle Cave, Val Verde County	Mussel (n=1)	Notched	Not stated	Ross 1965
Morhiss Site (41VT1)	Freshwater clam (n=1)	3 Notches, perforated	Separation of plant fibers/piercing/or weaving	Dockall and Dockall 1996:220
	Oysters (n=2)	Perforated	Net weights	
Shanklin (41WH8)	Freshwater mussels/ 30% of shells	Notches, some linear	Unknown	Hudgins 1986:37, 47

Table 2. (*Continued*)

Site Locations	Shell Type/No.	Modification	Possible Function	Reference
Alabama, Florida, Illinois, Kentucky, and Ohio				
Cape Hazel Peninsula, Florida (Ch12, 38, 39, 45)	Pecten (n=6)	Perforated	Ornaments	Bullen 1956
	Arca (n=39)	Perforated	Ornaments	
Caloosahatchee area, Florida	Quahog	Slight notches	Hafted digging tool	Marquardt 1992
	bivalves	Perforated	Net Weights	
	quahog	Notch/Pair of notches	weight or reel	
Chokoloskee Key, Florida	Vermicularia nigricans	Perforated	Net sinker	Moore 1900
	Clam shell	Waisted (gently curved) notch	Sinker	
Key Marco, Florida	Venus (n=27)	Rectangular shape, long curved notch	Net weights, cordage attached	Gilliland 1975:184-187
	Arca and cockle	Pierced	Net weights/cordage with net	
Marco Island, southwest Florida	"umboidal bivalves"	Perforated	Found attached to long gill nets	Cushing 1896:366
	Clam	Chipped and notched fragments	Found attached to long gill nets	
Ohio River, Scioto and Adams counties, Ohio	Mussel (n=30)	V and Linear notches; four with	Ornaments or plant stripping	Servey 1961
	grooves			
Ohio River, Washington County, Ohio	Mussel (n=16)	V and Linear notches	Ornaments or plant stripping	Patterson 1962
Mississippi River in western Illinois and Tennessee River near Decatur, Alabama	Mussel	V and Linear notches	Tools	Mohrman 1961
Ohio River, Greenup County, Kentucky	Mussel	V and Linear notches	Not stated	West 1963

Table 2. *(Continued)*

Site Locations	Shell Type/No.	Modification	Possible Function	Reference
Europe				
Germany and Czechoslovakia	Spondylus gaedaropus	V and Linear notches	Ornaments	Sindell 1961

Note: Additionally, Dreiss (2002) refers to Ambler (1973) as describing perforated Rangia. Widmer (1988) notes that Bullen and Bullen (1976) described perforated pelecypod shells as possible net weights, and Gilliland (1975) mentioned that Goggin (1949) described quahog clam shells as possible weights or reels. Marquardt (1992) refers to the work of Luer (1977, 1986), who described quahog shells with slight notches that may have been used as hafted digging tools.

In order to evaluate the feasibility of the idea that these notched shells are net weights, I tied a string around each shell, including the *Rangia* shells, to determine whether the shell would remain tied when placed in motion or fell out of the string loop. Ninety-three percent of the shells, including the *Rangia*, accepted the string and stayed tied in the loop. These results lend support to the idea that many of these shells were net weights.

Shells in southwest Florida sites have been found in muck and peat that preserved organic material. Some were attached to gill nets and others had cordage attached (see Tables 2). "To the lower edge of these {gill nets}, sinkers made from thick roughly perforated umboidal bivalves, tied together in bunches, or else from chipped and *notched* fragments of heavy clam shells, were attached" (Cushing 1896:366; underlining added for emphasis).

Looking to Florida (and other locations) for possible models to visualize shell use in Texas is reasonable because of the possibility of extra-regional exchange for shell material (and by inference, ideas for using the shells) during the Archaic along the Texas coast. Specifically, it has been proposed (Hall 1981) that artifacts manufactured from large specimens of *B. perversum* were made from shells that originated in Alabama or Florida. This assertion has more recently been challenged (Dreiss 1994), with alternate points of possible origination including South Texas or northeast Mexico. Campbell (1958b), in discussing the function of perforated oyster shells found in Aransas focus sites, thought it was appropriate to use the Florida archaeological evidence (i.e., shells found attached to nets) and stated that since Aransas focus sites have yielded fragments of asphalt-bearing impressions of twined basketry, there was no reason to believe that the Aransas people did not make nets. He thought that it was, therefore, permissible to use the term "perforated oyster shell net weight" in Aransas focus trait lists.

In discussing a growing series of artifacts known to be intrusive in the southern Texas area, Hester (1972:101) notes:

> Such a number of exotic specimens certainly indicates either extensive travel or trade relationships existed between south Texas groups and peoples of other areas. It is tempting to hypothesize the existence of prehistoric trade networks in the region; but until all of the intrusive examples noted here are thoroughly investigated, we can be certain only that the native population of the Rio Grande Plain had avenues of exchange or communication with other cultural groups.

Dreiss (1994:433) also makes a similar observation: "The southeastern U.S., Mesoamerica, and the entire Caribbean Gulf coastal area shared similar styles and uses of shell ornaments and tools. Some form of interaction, at least shared ideas, if not a limited exchange of materials, probably took place between these areas."

The possibility of shared ideas concerning shell use and technology between South Texas and areas of the country along the Ohio, Mississippi, and Tennessee Rivers is raised by reports of significant numbers of linear and "V" notched mussel shells and notched lithic artifacts (mentioned above) found in various sites in these areas. Many of these shells contain notches which are quite deep, similar to some of the shells in this collection. These sites are located along the Ohio River in Greenup County, Kentucky (West 1963); Washington County, Ohio (Patterson 1962); and Scioto and Adams counties, Ohio (Servey 1961); the Mississippi River in western Illinois; and the Tennessee River near Decatur, Alabama (Mohrman 1961). Servey (1961) reports that of 30 shells found with linear and "V" notches, five of the shells contain two "V" notches in each shell and another four contain a small worn area at the bottom of each "V" on the inside of the shell surface. "A piece of ordinary cotton string, comparable in diameter to a small bundle of fibers, fitted perfectly into each worn area. Such wear might have been produced by drawing fiber bundles through the V in a stripping operation" (Servey 1961:31). This is the only report of apical grooves similar to those described herein which has been found in the literature searched. The uses proposed for the shells found at these various sites are suggested as either for stripping of plant fibers or for ornament manufacture. No mention is made of their possible use as net weights. The sites along the Ohio River in Ohio and Kentucky reported by Servey where these shells were found are

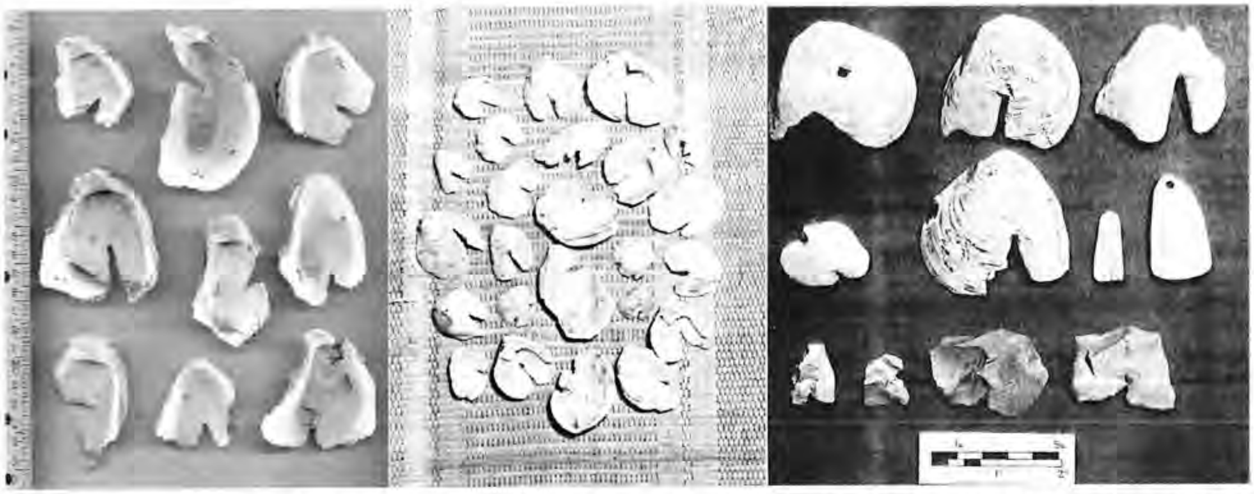


Figure 11. Comparison of selected shells from the Nueces Bay middens (left) with shells from along the Ohio River in Ohio and Kentucky (center) and shells from the Ohio River in Kentucky (right; includes four notched lithic artifacts). Comparison photos used with the permission of The Archaeological Society of Ohio).

identified as "Fort Ancient" sites (Servey 1961). The Fort Ancient culture began around 1000 B.P. and continued into the early historic period (Minnesota State University n.d.). The sites reported along the Mississippi and Tennessee rivers are of Late Woodland and Middle Mississippi cultures (Mohrman 1961). The Late Woodland culture in parts of the Mid-continent dates from approximately 1150 B. P. to historic times and may be contemporaneous with the Middle Mississippi cultures that are found along the Ohio, Mississippi, and Tennessee rivers (University of Kansas n.d.).

Figure 11 illustrates a comparison of selected notched shells from the Nueces Bay middens (left) with shells from along the Ohio River in Ohio and Kentucky (Servey 1961) and shells from along the Ohio River in Kentucky (includes four notched lithic artifacts) (West 1963). The overlapping of time periods for sites in the Fort Ancient, Late Woodland, and Middle Mississippi cultures, and the time periods most likely for the notched shells in this collection, supports the possibility of the sharing of ideas and technologies between South Texas and the cultures of the Ohio, Mississippi, and Tennessee rivers. Don Casto, business manager and past president of The Archeological Society of Ohio, reports the discovery of "conch" shells in burial mounds (some engraved) in southern Ohio, Kentucky, and Missouri. These "conch" shells originated along the shores of the Gulf of Mexico (Don Casto, 2004 personal communication). This also supports the possibility of the sharing of ideas and technology (and trade) between these cultures. Another possibility, of course, is the parallel and independent development of these notched shell technologies in each of these areas.

Finally, as a matter of interest, a parallel development of notched shell artifacts has occurred at sites in Germany and Czechoslovakia from the European Neolithic, Danubian I period. Many of these were found in a mortuary context, some with carmine red coloring, and one found in a child's grave from Vejvanovice that was a part of a necklace. "The evidence almost conclusively indicates an ornamental use for the European notched shells. . . it is most unlikely that the Ohio specimens served as ornaments in the form they were found." (Sindell 1961:87).

CONCLUSION

It is possible that the notched shells in this collection from the central Texas coast may have had more than one use. They are effective in stripping plant fibers and sinew. However, their dominant use was most likely as line or net weights. If perforated shells were also used as net weights, then it is interesting that two technologies for net weights existed more or less contemporaneously in the same location. It is also possible that these shells may provide some evidence of the exchange of ideas and shell technology between the peoples of South Texas and cultures along the Ohio, Mississippi, and Tennessee rivers.

ACKNOWLEDGMENTS

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41VV545:
A Rockshelter in Seminole Canyon State Historical Park

James B. Boyd

ABSTRACT

I discuss an often ignored, yet very large and interesting rockshelter in Seminole Canyon State Historical Park in western Val Verde County, Texas. The shelter contains a variety of features that indicate it was used by prehistoric peoples, including rock art and bedrock mortars. The rock art consists of a panel of obscure pictographs located very high above the floor on an overhanging ledge, as well as an anomalous feature on a large boulder that may be a petroglyph. There are a moderate amount of bedrock mortars in various parts of the shelter. Additionally, there is a small area of Historic period graffiti there, as well as interesting natural features and other aesthetic qualities of the shelter.

INTRODUCTION

Seminole Canyon State Historical Park (SCSHP) is approximately 60 km northwest of Del Rio, Texas (Figure 1). The park encompasses 2,172 acres and contains multitudes of archaeological sites, including both prehistoric and historic period sites, and is administered by the Texas Parks and Wildlife Department (TPWD). Much has been previously written about the park, its archaeological sites, and the natural setting of the area (cf. Turpin 1982).

Between 1997 and 1999 I made numerous trips to SCSHP to explore various archaeological sites and to record new ones, but my attention was often drawn to 41VV545. This large, imposing rockshelter is visible from the visitor's center in the park, and when available references pertaining to the site were researched, I found that very little had been recorded or published. In conversations with Park Superintendent Emmitt Brotherton (1997 personal communication), I discovered that the site contained no cultural deposits, few mortars, and one small panel of pictographs. Brotherton further mentioned that 41VV545 possessed other appealing attributes: an attractive site setting, interest-

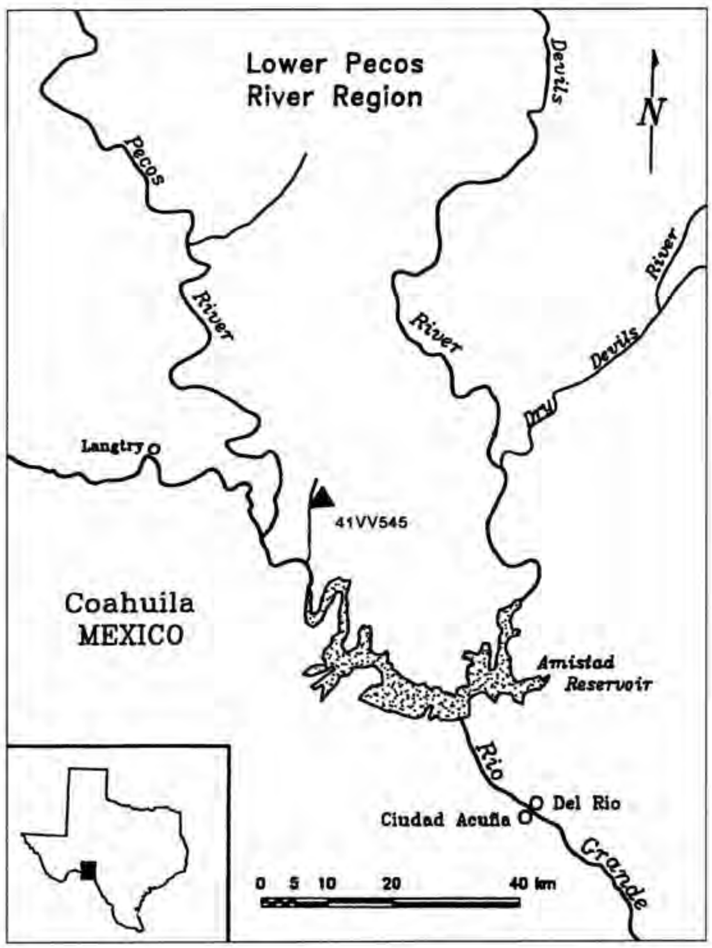

Figure 1. Regional map of area, showing the Rio Grande, Pecos, and Devils rivers. Amistad Reservoir is shown northwest of Del Rio, Texas. The approximate location of 41VV545 is near the center of the map. Inset shows location of area in the state.

ing geologic features, and a semi-permanent pool of water under the overhang that made the overall setting quite attractive. With Brotherton's permission, I first visited 41VV545 on September 26, 1997. During that initial visit I was captivated by the majestic setting of the huge rockshelter, resulting in four additional expeditions to the site over the next 15 months. During the five days I spent in the rockshelter, I completed the following tasks: general photography of the site; detailed photography of archaeological features; mapping of features; and a concerted effort was made to document all bedrock mortars located in the shelter. Also, I was assisted by a member of the Texas Archeological Society Rock Art Task Force in obtaining a detailed drawing of the site's pictograph panel.

THE ROCKSHELTER

41VV545 is located in the left (east) wall of Seminole Canyon, approximately 0.8 km south of U.S. Hwy. 90, and about 0.8 km east of the park's Visitor Center and the well-known Fate Bell rockshelter (41VV74). Also, it is about 0.5 km downstream from another well-known but not well reported rockshelter known as Seminole Watering Hole (41VV72; see Turpin 1982:56-61; Boyd 1999:50-61). The rockshelter is set low in the canyon wall (Figure 2) on a sharp, eastward-trending meander of the canyon. Undoubtedly, the shelter was created over a very long period of time by undercutting of water rushing down the canyon and against the sharply curved canyon wall during large-scale flooding events. Such rockshelters are often found in the outside meanders of the numerous limestone canyons in this geographic region.

Figure 2. Wide-angle view of 41VV545 (bearing 80°). Note the bedrock floor of Seminole Canyon and the pools of water.

41VV545 was recorded on August 8, 1978 by Ronald W. Ralph, a TPWD archaeologist. In the TPWD site form on file at the Texas Archeological Research Laboratory (TARL), The University of Texas at Austin, Ralph states:

> The rockshelter is huge, measuring about 100 meters north/south by 30 meters east/west but stream wash has completely scoured the shelter leaving only a few mortar holes in a break down slab. Large pools of water stand where midden was once laid and only scattered remnants of burnt rock and grey midden remain.

In addition to its designation as 41VV545 by TARL, the site is also known as the "Ken Benad Site 3" according to the site form. Ken Benad was the SCSHP Superintendent in the late 1970s (Emmitt Brotherton, 1997 personal communication). Although the site form acknowledges that the shelter may have once contained a midden deposit and does mention the presence of a few mortars, it does not reference the rock art that is now known to exist there.

Turpin (1982:107-108) also briefly discusses 41VV545, mentioning that there are a few mortars, but there is no mention of the rock art. She eloquently describes the site setting:

> Although not an important site culturally, the physical beauty of the tumbled rocks, the honeycombed limestone, and the choking vegetation surrounding the pool in the canyon bottom provide a natural scenario unequaled in the otherwise broad expanse of Seminole Canyon. These factors also contribute to a proliferation of small creatures, especially lizards and frogs, and their predators, the snakes (Turpin 1982:108).

My five expeditions to the site were made on September 26, 1997, December 31, 1997, January 20, 1998, January 24, 1998, and January 1, 1999 (Boyd n.d.). 41VV545 is huge, by regional standards, and is one of the largest rockshelters in SCSHP. With a

KESON 200 ft. reel tape, I measured the maximum diameter of the overhang at 105 m, and its maximum depth was 32.6 m. The overhang is comprised of four increasingly thick layers of tabular limestone, like an inverted staircase, with the maximum depth of 13.7 m for the innermost overhang (Boyd n.d.). The height of the outer overhang above the bedrock floor of the canyon was 18.3 m as measured with a *SONIN* sonar unit, and the height of the innermost overhang above the natural pool inside the shelter was 8.5 m. The orientation of the overhang is generally north-north-east to south-southwest, along bearings of 30º-210º as measured with the *BRUNTON* transit.

Although there are large rocks and boulders strewn across the floor of the rockshelter, there is a concentration of huge boulders (Figure 3) under the overhang near the center of the site. Some of these measure 6.1-9.2 m in height, and Kochel (1982:258) refers to "the coarse roof-fall blocks which serve to deflect flood flows away from the shelter." Immediately above the highest point of the tallest boulder in this group is where the obscure rock art panel is located. Directly in front of the site the canyon bottom is choked with vegetation and gravel.

Figure 3. Closer view of the rockshelter, showing the overhang. The arrow indicates location of the rock art panel. View east.

During my surveys of 41VV545 there was a clear pool of water inside the shelter, just to the north of the large group of boulders. The only time this pool was dry was during the first visit to the site in September 1997. When water *was* present, the pool contained much algae and abundant wildlife in the form of small frogs and various types of insects, and it likely attracts larger game as well.

Following rainfall in the area, pools of water also collect on the bedrock floor of Seminole Canyon (see Figure 2). Indeed, the large nearly perennial pool of water at nearby 41VV72 (Seminole Watering Hole) is well-documented (Turpin 1982:56), and lies underneath the overhang of this rockshelter. There is often another large pool of water just upstream from the Fate Bell rockshelter (41VV74), although the massive overhang of the shelter does not cover that one (Boyd n.d.). Heavy rains produce abundant standing water in the canyon and large floods, such as the great flood of 1954, cause flash floods of tremendous proportions in this large tributary (Kochel 1982:241). There is ample evidence in Seminole Canyon that the force of the rapidly moving water in the canyon during such massive floods has been great enough to displace a substantial distance huge boulders weighing several tons (Turpin 1982:107; Kochel 1982:241; see section on "Mortars" below). Kochel (1982:260) notes geomorphological evidence at 41VV545 of floodwaters rising to 8 m above the canyon floor. During my surveys I noted the presence of remnant floors adhering to the shelter walls (Figure 4) some 4.7 m above the level of the pool, and in the south end of the shelter there were logs and reeds wedged in crags between boulders 6.1 m above the canyon floor (Boyd n.d.). Further attesting to the effects of the flow of water down the canyon were the *Coca-Cola* and *Lite* beer cans found in front of the cave, and the two miscellaneous beer cans found wedged between boulders near the front center of the cave. Presumably these cans washed down the canyon from the U.S. Hwy. 90 bridge that crosses Seminole Canyon 0.8 km to the north. The area of the park where 41VV545 is

Figure 4. Remnant fluvial gravel floors cemented to the rear wall of the shelter several meters above the present floor.

located is not generally accessible to the public, and intrusive material—save the cans just mentioned—is not present.

The position of the rockshelter low in the east wall of Seminole Canyon, combined with periodic flooding over the centuries, would probably have washed away any cultural midden deposits that may have once been present in the site. A large burned rock midden reportedly located immediately in front of 41VV72, just upstream from 41VV545 (Kirkland 1937:113), is no longer present (Boyd n.d.), presumably having been washed away by the 1954 flood. In that event, a huge flash flood scoured many sites in Seminole Canyon (Emmitt Brotherton, 1997 personal communication). My inspections of the interior of 41VV545 noted only a few burned limestone cobbles located underneath the huge boulders in the site, on the downstream side (Boyd n.d.), but these could have been washed down the canyon from the former midden at 41VV72.

Although the main purpose of my explorations at 41VV545 was to locate and record all archaeological features, I took some time to note the various species of plants that grown in and around the rockshelter. Identified species include live oak, Greg's Ash, guajillo, Texas or Mexican Buckeye, sumac, netleaf forsterior, wild grapevine, buttonbush, and various ferns. There were other plant species in the area of the site that I was unable to identify.

Present in great numbers were white-throated swifts that nest in holes and crevices in the overhang high above the shelter floor (Boyd n.d.). Also heard, but not seen, were bats. Mr. Brotherton informed me (1997 personal communication) that a red-tailed hawk nested high in the shelter in the north end of the site. Numerous varieties of insects and several frogs were also seen in and near the pond. I also observed a very large beehive high on the ceiling in the southern part of the site. Although vacant on my January 1998 visit, it was inhabited by large numbers of honeybees during the January 1999 visit.

THE FEATURES

Rock Art: pictographs

I was initially informed about the pictograph panel at 41VV545 by Emmitt Brotherton (1997 personal communication). Brotherton stated that the pictographs had originally been recorded by Forrest Kirkland in the 1930s, but that he had not drawn them. Brotherton also told me that in subsequent years the pictograph panel had been "lost," and other visitors and archaeologists were unable to relocate them. It was eventually assumed, erroneously, that the pictographs had been obliterated during the 1954 flood due to scouring by water-borne sediments. Sometime during the early 1990s the pictograph panel recorded by Kirkland was "rediscovered" by Joe Labadie, a National Park service archaeologist (Emmitt Brotherton, 1997 personal communication). It is apparent that those who had previously visited the site were looking for the pictographs in the usual areas that such art is found, namely the smooth rear wall of the rockshelter. However, the rear wall of the shelter is presently dark gray and manganese-stained and no rock art is visible. It is possible, perhaps even probable, that the rear wall once displayed an array of pictographic rock art like the other large rockshelters in Seminole Canyon. Again, massive floods and the shelter's low position in the canyon wall possibly accounts for the lack of pictographs in modern times. The spectacular Red Monochrome pictograph panels located at the Seminole Watering Hole site are faded almost to obscurity (Boyd 1999:52) for apparently the same reasons.

Labadie had the good fortune to relocate the pictograph panel, not on the rear wall of the immense rockshelter, but approximately 6.1 m above the rear floor of the shelter on one of the manganese-stained, inverted limestone "stair-steps" of the overhang. Access to the panel is gained by climbing to the top of the highest boulder in the group of huge rocks near the south end of the cave. This boulder is literally "house-sized," and even when one stands atop this boulder, the pictograph panel is virtually unreachable, and the prehistoric artist(s) most probably utilized a ladder to reach this area.

The panel is about 7.6 m in length and about 1.8 m in height. It is rendered on manganese-stained limestone that is minimally spalled. The panel consists of several figures (Figure 5), most notably five upside-down or "flying" shamans (cf. Zintgraff and Turpin 1991:21-23). There is also a larger, more faded shaman, as well as an inverted "V"-shaped motif, and another unidentified motif. The five flying

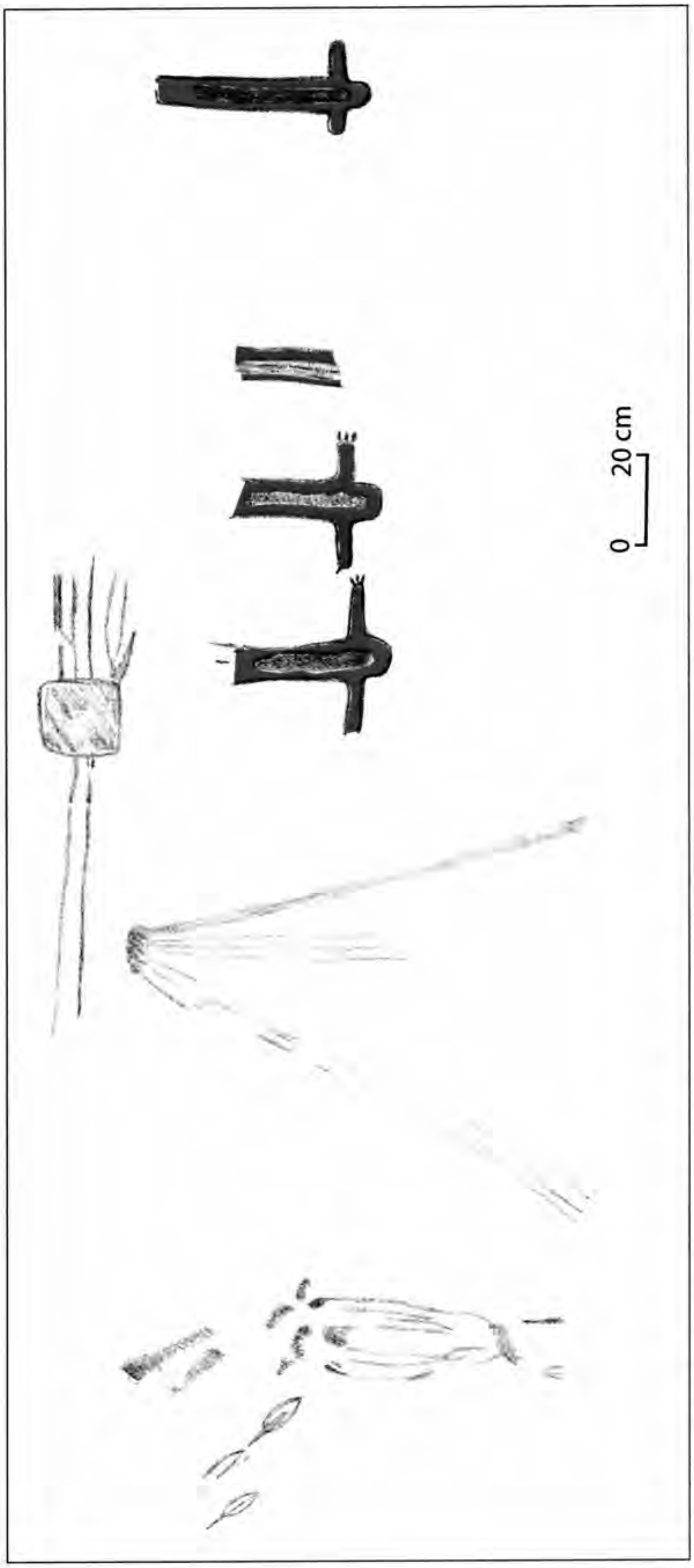

Figure 5. Drawing of the pictograph panel at 41VV545. This panel is located high on a projecting ledge of the rockshelter's overhang, approximately 6.1 m above the cave floor. Reproduced from the original drawing made by Candy Smith of the Rock Art Task Force on January 1, 1999.

shamans are located approximately 2.7 m above the level of the large rock by which they are accessed. They are outlined in black paint, with black and red also present in the interior areas. The shaman are more-or-less equidistant from one another, spanning an area about 1.5 m in width. Each shaman measures about 0.3-0.4 m in height. The best preserved and most apparent is the southernmost one (see Figure 5). Where they are visible, the hands of each shaman have three fingers. The fingers are most evident on the northernmost shaman. There are some faded and indistinct red paint "blotches" to the right (south) of the flying shamans.

Immediately to the left (north) of the five flying shamans is another motif of black painted lines resembling an inverted "V" (see Figure 5). Just to the north of this pictograph is another portraying a large, faded black shaman (see Figure 5). There are also some adjacent black painted figures in proximity to the shaman, some of which may depict spears (see Figure 5). Approximately 4.6 m to the left and about 1.5 m lower on the wall is a lengthy (0.77 m) rectangular figure rendered in red (not shown in Figure 5). Also apparent on the main pictograph panel is a black painted figure appearing as a square with two radiating lines projecting toward the north and several toward the south (see Figure 5). This motif is located about 3.6 m above the huge rock below the panel, and well above the reach of the prehistoric artist(s). There is evidence of other very faded and indistinct black and red pictographs in the area of the "main" panel, but the motifs were indiscernible.

An interesting phenomenon observed during the January 1999 visit to the site was that the pictograph panel was much more apparent during the early afternoon hours. The morning had been foggy and the panel was wet, making the (mostly) black pictographs on the dark, manganese-stained walls difficult to discern. During the afternoon, when the panel began to dry out, the pictographs were much more readily apparent.

Rock art, petroglyph(?)

During my January 1998 expedition to 41VV545, I inspected the upper surface of a large boulder in the north central part of the rockshelter, just northeast of the main pool. The boulder measures 3.6 m in length, 1.7 m in width, and 0.7 m thick. There was a large amount of dust on the face of the rock which I carefully removed, and I discovered what appeared to be a shallow mortar with multiple abraded marks within the "bowl" of the feature (Figure 6).

Figure 6. Shallow mortar on boulder in 41VV545 showing possible petroglyphs inside the "bowl" of the feature.

There are numerous parallel-abraded marks in the feature, although some of the lines do cross, but other marks are perpendicular to the main group. Also, the main grouping of abrading marks appear to be bounded by a trapezoidal-shaped and contiguously-bounded abrading mark. The marks do not extend past the peripheral edges of the bowl of the mortar, which has a maximum diameter of 12 cm and a depth of 3 mm. It is unknown whether the abrading marks are utilitarian or decorative in nature. If the grooves are sharpening or abrading marks, they are the only ones observed in the entire shelter. Conversely, if it is a petroglyph, it would be the third known example in the SCSHP. One of the other known petroglyphs in the park is a zigzag motif on a travertined boulder at the Fate Bell rockshelter (Labadie 2000:28-29 and Figure 10). Another reported petroglyph is located just downstream from the Fate Bell rockshelter at 41VV75 (Labadie 2000:30-31 and Figure 13). The petroglyph at 41VV75 consists of a tree-like motif carved into the grinding facet of one of the many mortars located there and is reminiscent of the feature at 41VV545. On the same boulder, just 0.2 m north of this very unusual feature at 41VV545, there are also two other very shallow "starter" mortars (see below).

Mortars

The most pervasive sign of prehistoric utilization of 41VV545 by prehistoric peoples is the mortar holes. In her comprehensive work on Seminole Canyon, Turpin (1982:107) states that "the only evidence of human occupation of the shelter is mortar holes; the destructive force of the floods which created havoc with the deposits is illustrated by three mortar holes in a huge boulder in the center of the shelter which now point downward at a 120° angle."

The site form for 41VV545, completed by Ron Ralph on August 8, 1978, refers only to "a few mortar holes in a break down slab." My own exhaustive investigations of the site revealed not only the mortars referred to by Turpin and Ralph, but many others. They are scattered throughout the cave and are all located on the surfaces of large limestone boulders. The dimensions of the mortars varies significantly: some are deep and appear to have been extensively utilized, while others are very shallow and may be starter mortars. All are located within the dripline of the shelter, with the exception of one cluster of mortars on a large boulder in the streambed outside the cave that was discovered by my son, Jeremy Boyd.

The most apparent and deepest mortars in the site are located approximately 30.5 m from the north end of the shelter. The cluster of five deep mortars (Figures 7-8) occur on the relatively flat surface of a very large boulder that is slightly (10°) tilted toward the interior of the shelter. This boulder is 7.6 m long, 6.4 m wide, and has a maximum thickness of 1.5 m. These mortars are conical in profile, and relatively uniform in diameter, although they vary somewhat in depth (Figure 9). It is likely that these are the mortars referred to by Ralph in the site form for 41VV545. There is a nearby shallow mortar 0.45 m to the southwest of mortar 5, and as many as 10 starter mortars were recorded south of the main group of five, near the edge of the boulder. This group of very shallow mortars was discovered when the surface of the boulder was cleaned of dust with a brush. They are located in an area about 1.2 m in length and 0.45 m in width, about 2.1 m south of mortar 3.

Figure 7. Grouping of five deep mortars near the north end of the shelter. Black line on north arrow is 3 inches (7.62 cm) in length. Features are numbered 1-5 in chalk next to each mortar.

Figure 8. Close-up view of mortars 2-3 in the main group.

There are other shallow starter mortars on a limestone slab on the shelter floor 5.5 m to the east (bearing 80°) of the main group. These were discovered after dust on the surface of the rock was brushed

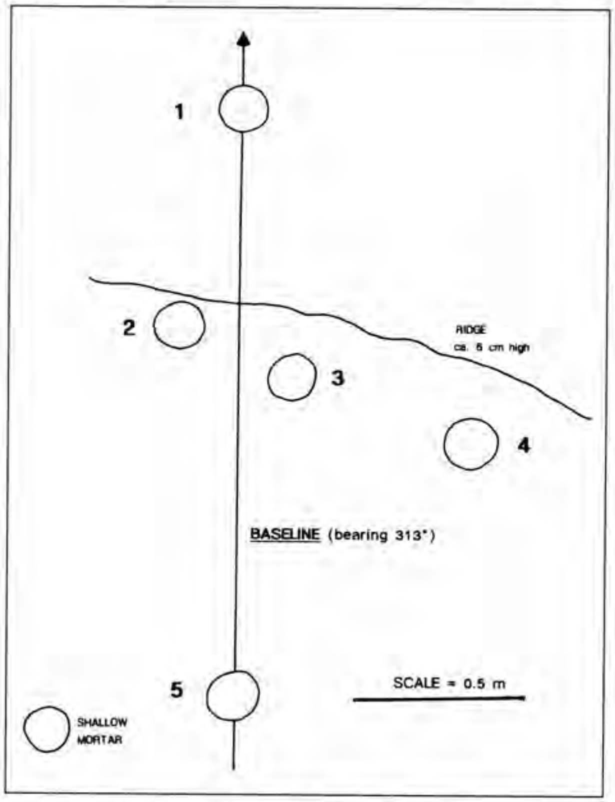

Figure 9. Scale drawing of the main group of mortars depicted in Figure 7.

Figure 10. Unusual grouping of three shallow mortars at 41VV545.

off. The most notable feature is a shallow mortar bounded by two smaller shallow mortars on either side of the main feature (Figure 10). There are also three shallow starter mortars at the crest of the huge boulder in the center of the shelter, immediately below the pictograph panel discussed above.

When I cleaned a portion of the surface of a large boulder at the south edge of the pool inside the rockshelter I noted an array of shallow mortars and metate features. The features consist of eight shallow starter mortars, one shallow conical in profile mortar (7 cm in width, and 3 cm in depth), and two metates. The larger metate measures 24 x 14 cm in length and width and the smaller is 19.8 x 9.1 cm in size. The features are located at the north end of the pool and cover an area about 1.7 x 0.9 m. The mortars and metates are between 1.2-1.4 m above the silt floor of the pool. The boulder measures 6.4 m in length, 3.7 m in width, and has a maximum thickness of at least 1.4 m. It is located between the pool and the huge boulder that provides access to the pictograph panel. It is entirely possible that additional features are present on the surface of this rock, as it was not comprehensively cleaned of a thick accumulation of sediment during my investigations. This cluster of features is significant as it seems to demonstrate an apparent transitional sequence from starter mortars to metate features.

In the southern half of the cave, 6.4 m from the cave wall and near the terminus of the shelter's inner overhang I found a single mortar (9 cm wide, 4.4 cm in depth) on a large rock. The rock measures 1.1 m in length and 0.7 m in width (maximum thickness is 24 cm), and is located at the south edge of a grouping of huge, tilted boulders.

At a distance of 5.2 m to the south-southwest (bearing 205°), and 1.4 m from the rear wall of the shelter, there is a large, flat boulder with additional mortars (Figure 11). This boulder is 3.05 m beyond the terminus of the inner limestone overhang of the rockshelter near its northern end, and measures 2.2 m in length, 1 m in width, and has a maximum thickness of 43 cm. At bearing 245°, 15.2 m from this boulder, there is another very large boulder tipped up on its side against the rear wall of the shelter. This boulder is just within the outer overhang, and measures 3.9 x 3.7 m in length and width with a maximum thickness of 0.76 m. On the side facing the shelter wall, there is a conical mortar (17 cm wide and 14 cm) located 2.4 m above the rocky floor. This mortar faces downward at an 120° angle. There is another, shallower (7.6 cm wide and 7.6 mm deep) mortar 1.4 m below the deeper one. It is just above a smaller boulder that is in contact with the larger one, apparently helping support the larger

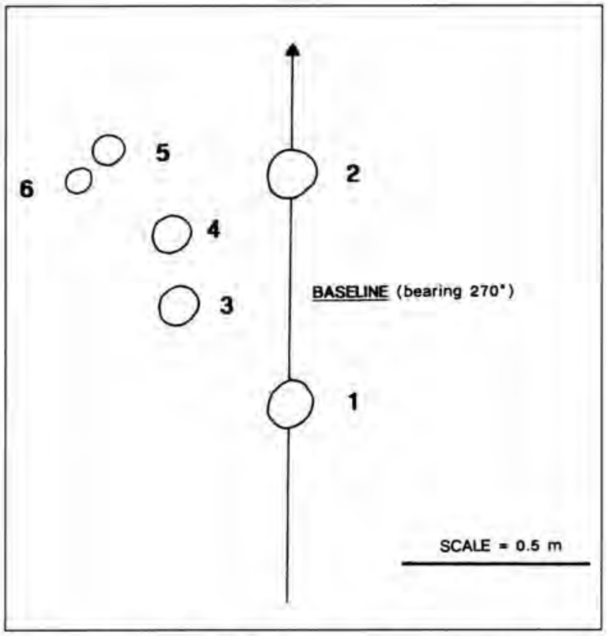

Figure 11. Scale drawing of a group of mortars at 41VV545.

Figure 12. Large boulder outside the front entrance of 41VV545. Eleven mortars were recorded in this large rock, which is turned 90° on its side and is in the streambed in front of the shelter. Mortars 8-9 are not visible in this view (they are below and to the left of mortar 7). Dimensions of these mortars are given in Table 1.

rock against the wall. The downward-facing surface of the larger boulder is dark brown in color and is travertined. It is believed that these are the mortars described by Turpin (1982). Obviously the force of floodwaters that have ravaged this site in the past is clearly apparent in the positioning of this many ton boulder.

On my final expedition to the site in January 1999, I was assisted by my (then) 10 year old son, who discovered a significant feature as we departed the shelter. It is a large boulder containing numerous mortars (Figure 12) in the streambed in front of the rockshelter. The boulder is about 6.1 m beyond the outermost overhang, and about 30.5 m north-northwest of the pyramid-shaped boulder below the pictograph panel. When it was discovered, the boulder was obscured by heavy vegetation in the canyon bottom. A minimal amount of this vegetation had to be cleared in order to facilitate recording (and photography) of the mortar features. Based on the positioning of the mortars on its east-facing side, this large rock is tilted 90° from its original position. An undetermined portion of the boulder remains buried in the gravelly matrix of the streambed. Table 1 provides measurements of each of the 11 mortars that were observed on this boulder. This is the only boulder or area beyond the dripline of the rockshelter with mortars, but this boulder has also obviously been displaced by significant flooding events in Seminole Canyon, so it is unknown whether it was once within the confines of the shelter.

Table 1. Mortar Measurements.

Mortar No.	Width (cm)	Depth (cm)
1	16.8	21.3
2	9.1	7.6
3	10.7	2.4
4	10.7	7.6
5	28.4	6.7
6	9.1	7.6
7	15.2	15.2
8	9.1	12.2
9	9.8	9.1
10	6.7	3.1
11	19.8	45.7

Historic Period graffiti

Very high up in the rockshelter, and just below the pictograph panel, there are several names and initials scratched or painted on the manganese-stained wall (Table 2). There are no dates associated with the

Table 2. Historic Period Graffiti at 41VV545*

C. Denney**
B.F.D.
GABO
OLIVO
CD
DON
BFF (?)
RobbeL**
HWBBE
TALCO
B

*Recorded on January 1, 1999 by J. Boyd
**scratched on the manganese-stained wall. Other graffiti is painted.

graffiti, so the exact time period when they were rendered is unknown.

The graffiti likely dates from the 1880s-1890s railroad era, and other examples from that time period have been previously documented in nearby rockshelters (Boyd 1998:11-14, 1999:52-54; Turpin 1982:56-57, 64, 97). The old Georgia, Harrisburg and San Antonio (GH&SA) railroad grade runs generally north/south on the west bank of Seminole Canyon approximately 1.1 km to the west of 41VV545, and historic period railroad camps and other associated structures and debris are very common in the area. There is a clustering of recorded railroad sites (41VV396, 41VV414, 41VV540, and 41VV544) on the canyon's west bank in SCSHP, and only one other recorded site (41VV375) on the east bank. All this railroad-related activity attracted multitudes of workers and other visitors to the area in the late 1800s, and many of them left their mark in the numerous rockshelters in what is now the SCSHP, as well as other surrounding areas.

Since the graffiti is at a slightly lower level than the nearby pictographs, those who scratched or painted their name on this very high overhanging ledge would only have had to climb up to the top of the highest boulder near the south end of the cave. A ladder or scaffold would not have been necessary, although a slip or fall onto the rocks below from this high point would have had disastrous results. However, the fact that the graffiti was left in such a high place preserved it from the scouring action of floods on the lower walls in the shelter. It is possible that the lower walls in the great expanse of the shelter were once decorated with many other examples of railroad-era graffiti and were obliterated in the flood of 1954, but there is no definitive record of any other graffiti in the site.

CONCLUSION

I spent five days investigating various aspects of the 41VV545 rockshelter, and feel intimately connected with it. Although the shelter is always within view of the Visitor's Center at SCSHP, it is in a restricted area not generally open to the public.

The rockshelter is one of the largest in Seminole Canyon, although important archaeological deposits that it may once have contained have long ago been washed away by floods. Traces of former use of the site in both prehistoric and historic times is evident, the latter in the form of graffiti high on the cave wall. Prehistoric use of the site is amply apparent in the numerous mortars and a few metates located on the surfaces of large boulders in the shelter. The considerable amount of time I spent in the shelter allowed for the identification and recording of several mortar/metate features that had not been previously documented.

The discovery of the shallow mortar with the associated petroglyph was both an interesting and exciting find. It is slightly reminiscent of a petroglyph located within the bowl of a mortar at another large Seminole Canyon rockshelter (41VV75). In conjunction with the larger petroglyph at the Fate Bell Rockshelter, the three petroglyphs represent a significant clustering of such features in a geographic region where such art is rare.

The pictographs high up near the ceiling of the rockshelter are enigmatic at best. They are not in an area where pictographs are ordinarily found, and they are difficult to distinguish at first glance since they are rendered on the dark gray manganese-stained wall. Furthermore, the upside down, or "flying" shaman motif is relatively rare in the region. Of further interest is that the panel of obscure pictographs was "lost" for over 50 years until they were inadvertently rediscovered in the early 1990s.

Beyond the archaeological significance of the rockshelter are the appealing aesthetic qualities of the site in general. The pool inside the shelter is quite picturesque and provides a habitat where multitudes of aquatic creatures thrive. The large boulders near the entrance are covered in complex patches and patterns of crustose lichens of various colors, and the honeycombed nature of some of the limestone rock formations in the shelter are both beautiful and complex. The various species of plants and animals that are drawn to the site adds to its attractiveness, and its off-limits status to the public has left it virtually pristine, save for a few aluminum cans that most likely washed down the canyon from the highway. Finally, the changing lighting and texture of the shelter's walls and ceiling at various times of the day adds a natural artistic touch to this site. It is all of these qualities that combine to make it one of the most interesting sites in the park, albeit one that has been mostly ignored and underappreciated.

ACKNOWLEDGMENTS

None of the work performed at 41VV545 (or anywhere else in the SCSHP) would have been possible without the permission and cooperation of TPWD Superintendent Emmitt Brotherton, who has carefully overseen and encouraged my past work in the park. Mr. Brotherton's attention and commitment to the archaeological resources in SCSHP is both comprehensive and commendable. Candy Smith of the Rock Art Task Force took time from her busy schedule to accompany me to the site on a cold day in January 1999 to record the long lost rock art panel as well as the historic period graffiti. Carolyn Spock at the Texas Archeological Research Laboratory, The University of Texas at Austin provided useful data from the 41VV545 site file. Lastly, Jeremy Boyd is acknowledged for accompanying me during two expeditions to the shelter, and especially for discovering the large, partially hidden boulder with numerous mortars in front of the site.

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Archaeological Investigation of a Small Rockshelter at 41ZP8, International Falcon Reservoir

James B. Boyd

ABSTRACT

I discuss the results of investigations conducted at a small rockshelter located in a rich prehistoric occupation site in western Zapata County, Texas. The site is within the conservation pool of International Falcon Reservoir, and is exposed during low water episodes at the lake. The components of the site and an array of artifacts collected there during the past several years is briefly discussed, and emphasis is given to a small sandstone overhang in the upper elevations of the site. There are abrading marks on boulders in front of and in the area of the overhang, indicating prehistoric use of the site. Other similar abrading marks recorded in a few other Falcon Reservoir sites are also discussed for comparative purposes.

THE SITE

The site recorded as 41ZP8 by Jack T. Hughes on June 18, 1950, is located on a peninsular-like, southern trending landform bounded on its southern edge by the Rio Grande, on its eastern edge by a short but deep nameless tributary arroyo, and to the west by another tributary. This area is approximately five miles west-southwest of Zapata, Texas (Figure 1).

Just across the arroyo at the east edge of the site is 41ZP7, another deeply stratified prehistoric archaeological site that was recorded by Hughes on June 18, 1950. Wilson and Hester (1996:12) state that 41ZP7 and 41ZP8 may be two sectors of one large site, bisected by an arroyo. It is notable that in later years both recorded sites have yielded numerous prehistoric burials.

At the time it was recorded by Hughes, 41ZP8 would have been a brushy terrace and ridge approximately 200 yards north of the Rio Grande. In the original site form for 41ZP8, Hughes noted "Some wind-blown sand on ridge top, slope wash on sides; as much as 15 feet of silt in terrace." He also noted "... low sparse chaparral on ridge, grass and mesquite on terrace." However, this area was inundated by the waters of Falcon Reservoir following the building of Falcon Dam on the lower Rio Grande in the early 1950s. Still in operation some 50 years later, Falcon Dam is located approximately 24 miles downstream (south) from the site.

Figure 1. Map of International Falcon Reservoir, showing approximate location of 41ZP8. Inset shows location of area in the state.

Figure 2. View east across a portion of the lower terrace area at 41ZP8. Note scattered hearthstones and other lithic artifacts in foreground. 41ZP7 is visible beyond the inlet in background. Channel Marker 13 is visible at right. Photo taken on April 23, 1996.

Following the impoundment of International Falcon Reservoir, 41ZP8 was either partially or completely submerged by the waters of the lake many times. Although this cyclic inundation and exposure changed the character of the site somewhat, the "ridge" and "terrace" aspects of the location are still evident. Presently, the upper, northern portions of 41ZP8 consist largely of an exposed sandstone bedrock ridge comprising the higher elevations of the site, between approximately 280-305 ft. above mean sea level (amsl). Even these higher elevations would have been covered by the lake several times since the building of the dam. When the lake is at its conservation elevation of 301.2 ft. amsl, the entire site is inundated. The rockshelter discussed below is located at approximately 300 ft. amsl. Although much of the ridge is now exposed sandstone bedrock, it likely had an overlying mantle of soil or sand in the pre-Falcon Reservoir era, and this is substantiated in Hughes' reference to "wind-blown sand on ridge top. . ."

Below the sandstone ridge is a broad, relatively flat terrace comprised of accumulated river silt of undetermined thickness, upon which prehistoric peoples favored establishing their campsites. This is evidenced by the abundance of accumulated occupational debris visible there (Figure 2). Hughes noted "at least 5 or 6 productive, well-separated occupational levels exposed in a deep gully in terrace part of site." Hughes also noted that evidence of prehistoric occupation was visible "along top and slopes of ridge descending toward river, and in terrace at river-end of ridge." My archaeological surveys at 41ZP8, however, indicate that the most utilized portion of the site was the terrace area below the ridge. The greatest accumulation of occupational debris and other artifacts was encountered in a zone between about 265-280 ft. amsl. Areas below 265 ft. amsl were heavily silted during my examinations of the site in 1998 (Boyd n.d.). The thickness of the silt, accumulated during years of inundation by the reservoir, was evidenced by the upper branches of large mesquite trees protruding just above the silt (Boyd and Perttula 2000:9 and Figure 5). These trees, just a very short distance away from the original riverbed of the Rio Grande, were killed when they were submerged by the lake in 1954.

Due to its orientation, the site is exposed to the prevailing southeasterly wind that blows in this region during the majority of the year. During the warmer months, this would have been an important consideration by aboriginal populations in selecting a desirable location to camp. During colder months, the ridge above the terrace area would have partially shielded those camping on the more southerly terrace from the cold northerly wind. Additionally, the ridge would also have provided additional elevation that would have afforded a vantage point that probably had strategic benefits and even aesthetic appeal. Direct proximity to the Rio Grande would have provided the most important element of survival, namely water, as well as the corollary benefits of attracted game, plant foods and resources, and firewood. Furthermore, the site is located only one mile southeast of the junction of the Rio Grande with the Rio Salado, a river that meanders generally southeastward through adjacent areas of Mexico, merging with the Rio Grande just west of Zapata, Texas (see Figure 1). The junction can be seen from the top of the ridge at 41ZP8. This junction of two major rivers would probably have been of considerable significance to the prehistoric populations that moved through the area due to the increased quantity of natural resources that would have been provided in this unique habitat, and perhaps even for spiritual reasons. The junction is usually, however, submerged in the waters of Falcon Reservoir except in times of very low water levels, as in the late 1990s. It is clearly apparent that 41ZP8 possessed many attributes that attracted prehistoric peoples over a long period of time.

EXPLORATIONS AT 41ZP8

Hughes conducted only limited explorations of the site at the time of its original recording in 1950. Hughes' original site form at the Texas Archeological Research Laboratory (TARL) and the attached University of Texas Specimen Inventory reveals that a small number of lithic artifacts were collected at the time of the original recording of the site on June 18, 1950. Lithic classifications of the collected artifacts (Table 1) are somewhat ambiguous, at best, and barely hint at the richness of the site.

Table 1. The University of Texas at Austin Specimen Inventory for 41ZP8*

14 knives or points
1 secondary flake
1 tertiary flake
3 from "Refugio, Abasolo, Pandora pts"
(1 broken in 2)
1 spokeshave
4 knives
1 biface
1 turtleback scraper
1 end scraper
2 Krieger's Tortugas/Kinney point
3 scrapers
14 points—some Refugio
1 unidentified point

*Form dated 1950 and labeled "Descriptive terms according to Krieger." In the 41ZP8 file at TARL.

Hughes noted on the site form in his recommendations for further work "more collection from ridge top, extensive excavation of terrace strata. This is one of most promising sites yet seen in the region." He further stated "Excavation of a site like this should serve as a key to much of the archeology of the Falcon region." Hughes also elaborated that: "The rich but mixed remains on the ridge top probably are fairly well represented as well as nicely stratified in the river terrace; surface collection on the ridge and excavation in the terrace should be profitably complimentary." Clearly Hughes recognized that 41ZP8 was a very significant site that apparently had deeply stratified deposits in the river terrace, and those attributes had the potential of supplementing the early archaeological explorations that were occurring in the area.

These early explorations were prompted by the building of Falcon Dam and the subsequent inundation of the area just a few years later by International Falcon Reservoir. Hughes conducted his work under the auspices of the Smithsonian Institution River Basin Survey. However, it appears that following its initial recording, no further work was conducted at 41ZP8 by either Hughes or other archaeologists that worked in the region. There is no mention of the site in the works of Krieger and Hughes (1950), Cason (1952), or Hartle and Stephenson (1951). These early surveys of the area that would later be inundated by the reservoir were cursory in nature and they provide only limited data of scientific value.

I began exploring Falcon Reservoir sites in 1983, and was soon informed about 41ZP8 by artifact collectors from the Rio Grande valley. The site, locally known as Hayne's Point, was easily accessible and had a reputation for having dense archaeological deposits that consistently yielded significant numbers of projectile points when the water levels at the lake were low. Although my explorations at 41ZP8 were limited in scope, the site was visited several times and numerous artifacts of various classes were recorded. These include many styles of dart points, arrow points, other various types of stone tools, and prehistoric burials were also noted (Boyd n.d.; Boyd et al. 1997:418-419), all of which were recorded in the terrace portion of the site.

Although the site was recognized as archaeologically significant, I performed more detailed explorations at various other archaeological sites that were more remote and less visited by artifact collectors. During several visits to 41ZP8 in the early 1980s, numerous collectors were encountered, some from the Rio Grande valley of Texas, some local Zapata residents, and even residents from other states as far away as Wyoming (Boyd n.d.). Certainly the most prolific artifact collectors that I encountered at 41ZP8 were Jim and Cynthia Scott of Zapata, Texas. The Scott's residence is located on a bluff just above 41ZP8 where they have resided for over 20 years. During low water levels at the lake they explored and collected from the site on a daily basis, accumulating a large number and variety of artifacts.

Their collections from the site included approximately 1,500 complete projectile points, both dart and arrow points, as well as literally thousands of broken specimens. Some of the dart point styles in the Scott's collection from 41ZP8 included examples of Abasolo, Almagre, Andice, Angostura, Catan, Desmuke, Early Stemmed, Early Triangular, Ensor, Fairland, Golondrina, Kinney, Lange, Langtry, Lerma, Marshall, Matamoros, Nolan, Palmillas, Pandora, Refugio, Scottsbluff, Shumla, Tortugas, and others (Jim and Cynthia Scott, personal communication 1985-1998). Arrow points collected in the site by the Scott's include Caracara, Cliffton, Fresno, Guerrero, Perdiz, Starr, Toyah, and others. Stone tools such as Clear Fork gouges, Nueces scrapers, and numerous other varieties were plentiful in their collection. Ground stone artifacts—manos, metates, and pestles—were also collected, as were scores of sandstone abrading stones and two stone pipes. Ornaments found by the Scotts at 41ZP8 include marine shell and river mussel shell beads, as well as two stone pendants, one made from a fine-grained tan-colored sandstone and the other from a black slate-like material.

The Scotts also noted the presence of several prehistoric burials at 41ZP8 during the 1980s and 1990s, including one infant and another burial with several relatively long bone beads. Exotic artifacts collected from the site include one small iron arrow point, and a plano-convex chunk of obsidian, derived from a source near the famous site of Teotihuacan in central Mexico (Hester et al. 1996:2). Many other various classes of prehistoric artifacts too diverse and numerous to list here were also collected by the Scotts at 41ZP8. This single collection from the site validated Hughes' contention that ". . . a site like this should serve as a key to much of the archeology of the Falcon region." Although I was fortunate to be able to examine the Scott collection for many years, it was not comprehensively documented or inventoried, and was subsequently sold to a private collector in Colorado in the late 1990s. The loss of this precisely provenienced artifact collection is both unfortunate and irreplaceable. The incidental loss of data clearly illustrates the importance of documenting such collections both comprehensively and promptly while they are accessible. Information about the artifacts collected from 41ZP8 by the hoards of other artifact collectors who have looted the site in the past three or four decades has apparently been lost forever.

In addition to the innumerable prehistoric artifacts collected from the site, large numbers of Historic period artifacts were also collected. The site is less than 1 mile east-southeast of 41ZP85, the old town of Zapata inundated by Falcon Reservoir in 1954. Some of the outlying buildings of Old Zapata, mainly small ranchos, are within a few hundred yards to the west. The ruins of some of these stone buildings are visible during low water episodes (Boyd n.d.). Additionally, a few hundred feet to the southwest of the site is the Historic period Calleja Cemetery, with numerous graves, some of which were partially looted in the early 1980s (Jim and Cynthia Scott, personal communication 1986). McCulloch et al. (2003:99,138) refer to the historic component at 41ZP8 as the Potrero Ranch, containing a sandstone structure and the Calleja Cemetery with 37 marked graves. The dating of that ranch is listed as "prob. late 19th-mid-20th c." Byfield (1966:53) lists 38 graves in the cemetery, but does not state whether they are marked.

A large number of antique bottles and other historic relics were collected along the western edge of 41ZP8 during the 1980s. Attempts were even made to dig down into the silty terrace in an unsuccessful attempt to locate a "treasure cave" rumored to be along the western edge of the ridge, below where the small rockshelter is located (Jim and Cynthia Scott, 1990 personal communication)! The bottles and other historic relics may be associated, at least in part, with the Potrero Ranch, and the sought-after "treasure cave" was never found.

THE ROCKSHELTER

The rockshelter was initially located and photographed on April 23, 1996, and a few brief field notes were taken at the time (Boyd n.d.). Present at the time were Daniel R. Potter, Sergio A. Iruegas, and Sharon Fleming of the Texas Historical Commission, as well as Raul Guerra of the International Boundary and Water Commission. A recommendation was made then that more work should be conducted at the site. I subsequently revisited 41ZP8 twice in 1998, and on one of those visits a relatively detailed survey of the upper levels of the site was conducted. Since very low water levels had exposed the entire site since the early 1990s, large portions were considerably overgrown with dense vegetation, hindering the gathering of any significant useful data in the lower terrace area. It was during this survey that I formally recorded the small rockshelter and adjacent workshop area, the latter consisting of abraded sandstone rocks situated on the upper sandstone ridge.

Since I had been informed by the Scotts of a rattlesnake den in the area of the site, as well as the presence of large numbers of javelinas, coyotes, bobcats, and even a mountain lion that had been seen at Hayne's Point, due caution was exercised during the survey. A 7 ft. long blue indigo snake, in pursuit of a rat, was encountered near the shelter. The abundance of wildlife near the site was due to the thick cover of brush and trees that had taken root in the fine silt deposited by the reservoir, as well as the availability of water. Also of interest in the area were tens of thousands of Asian Clam (*Corbicula* sp.) shells that were observed along a relic shoreline of the lake between the 280-285 ft. amsl level (Boyd n.d.).

The rockshelter is located on the west side of the sandstone ridge, near the crest of the slope (Figure 3) at approximately 300 ft. amsl. The shelter itself is unimpressive, but its significance is enhanced by evidence of prehistoric use in the form of abrading marks on numerous rocks and boulders surrounding it. As mentioned above, it was submerged when Falcon Reservoir was at its conservation pool elevation or higher. This small rockshelter faces in a southwesterly direction, and the axis of the overhang is along bearing 135-315. The maximum length of the overhang is 13.6 ft., the maximum ceiling height is 3.3 ft., and the maximum depth is only 3 ft.

About 100 yards southwest of the site there is a small, meandering relic tributary arroyo that is visible when the lake level is low. The rockshelter could have provided aboriginal hunters a natural blind above this arroyo, as well as a refuge from the sun during the morning and early afternoon hours in the warmer months. The floor of the shelter is approximately 12 ft. above the silt-covered terrace that forms the eastern bank of the arroyo. An inspection of the floor revealed a few small sandstone cobbles, windblown dust, small sticks, and various animal bones (species unidentified), indicating modern use of the rockshelter as a lair by a predatory animal. No test excavations were conducted at the shelter, but it is likely that if any cultural deposits were ever present they would

Figure 3. Wide view (northeast) of rockshelter in upper elevations of 41ZP8. Photo taken on December 12, 1998.

probably have been washed away by wave action from the reservoir. From the shelter the Sierra Madre, approximately 60 miles to the west and southwest, are clearly visible in the distance on clear days (Boyd n.d.). Also visible is the junction of the Rio Grande and the Rio Salado to the northwest. The site is approximately 200 yards north of the original riverbed of the Rio Grande, where Channel Marker 13 is visible a short distance to the east-southeast.

Rockshelters on the Rio Grande plain on the U.S. side of Falcon Reservoir are quite rare, although on the Mexican side of the lake they are relatively common (Boyd n.d.). Testing of a small number of the Mexican shelters revealed that they often contain thin deposits with associated cultural materials (Boyd 1999a:18-23, 2004) and sometimes rock art (Boyd 1999b:9-17, 2004). Although the small rockshelter at 41ZP8 was not suitable for habitation, the presence of the overhang within the confines of a very large occupation site probably contributed to its being utilized for other purposes.

THE ABRADING STONES

Immediately in front of the overhang and just beyond the drip line is a large sandstone boulder that exhibits numerous abrading marks (Figure 4). This boulder is 3.3 ft. in length, has a maximum width of 1.7 ft., and a maximum height of 1.2 ft. It weighs several hundred pounds and is likely in its original position, 3 ft. from the rear wall. This is significant because it has several wide and deep abrading marks on the edge of the rock facing the interior of the shelter. It appears that when the marks were made the person(s) responsible must have been inside the shelter. There are five wide, deep abrading marks on the northeastern edge of the boulder (Figure 5). These marks are much deeper and wider than those normally seen on the smaller, hand-held sandstone abrading stones commonly found in prehistoric sites in the region. Also, the marks are drastically different than those found on cave walls and boulders much farther to the west and southwest, in the Sierra Madre. This seems to indicate that a differ-

Figure 4. Closer view (northeast) of the shelter and the abraded sandstone boulder just beyond the drip line. Photo taken on April 23, 1996.

Figure 5. Detailed view of abraded sandstone boulder in front of the 41ZP8 rockshelter. Black line on face of north arrow is 3 inches in length. Photo taken on December 12, 1998.

ent function created the marks. At the time of the survey I speculated that the smoothing of wooden bows could have created the marks, although there is no evidence to substantiate this.

On the southeastern edge of the rock there are several smaller, U-shaped abrading marks that are less wide or deep than the others (Figure 5). These marks are similar to those on the small, hand-held abrading stones found in various sites in the area, including 41ZP8. These smaller sandstone abrading stones are commonly found in sites that have large numbers of arrow points, indicating that they are probably of Late Prehistoric origin (Boyd n.d.). On the south edge of the boulder there is a large single U-shaped abrading mark (see Figure 5) that is 1.3 ft. in length, 0.35 ft. in width, and just over 0.5 inches deep.

The boulder appears to have been extensively utilized for smoothing, abrading, or sharpening implements of several types. Whether these implements were of wood, stone, or bone is undeterminable. It appears, based upon the orientation of the rock to the interior of the shelter, that whomever was doing the abrading did so from the interior of the small rockshelter.

In addition to the abraded boulder, there are numerous other large, abraded sandstone rocks (Figure 6) on the ridge and within 150 ft. of the rockshelter, indicating that abrading activities were conducted regularly in the upper levels of 41ZP8. Although many of these other rocks exhibit abrading marks of various widths, most are U-shaped in cross-section and none exhibit the types of very wide and deep marks seen on the boulder at the front of the shelter. Also, these other rocks are considerably smaller and many of them are light enough to be moved, although they are still significantly larger than the more common hand-held abrading stones referred to above. Other large abrading stones from nearby sites have been previously reported (e.g., Boyd 1997:30-33).

A large sandstone boulder with numerous deep abrading marks was recorded at the Southern Island site on the Mexican side of Falcon Reservoir (Boyd n.d.). The marks on this stone vary somewhat in width and depth (Figure 7), but they are generally U-

Figure 6. One of the numerous abraded sandstone rocks in the area of the rockshelter. This stone is 105 ft. east-southeast of the shelter. Photo taken on December 12, 1998.

Figure 7. Large abraded sandstone boulder at the Southern Island site on the Mexican side of Falcon Reservoir, across from Zapata, Texas. Note the wide and deep abrading marks on this stone. Photo taken on December 28, 1995.

shaped. This large stone is quite heavy and is not portable. It lies in the higher elevations of the Southern Island site, an extensive prehistoric site best known for the prehistoric cemetery documented there in the mid-1990s (Boyd et al. 1997:387-425). Although much smaller hand-held abrading stones are extremely common in the area, large abrading stones like this one are rare (Boyd n.d.). However, another similar large sandstone abrading stone was found at a site near the Arroyo La Hedionda on the Mexican side of Falcon Reservoir in the 1980s (Boyd n.d.; Figure 8). This specimen exhibits a few deep U-shaped abrading marks, as well as some much wider and shallower marks.

CONCLUSIONS

The significance of the small rockshelter located in the topographically higher parts of 41ZP8 is that it occurs in combination with an extremely diverse occupation site that has yielded thousands of prehistoric artifacts over the last 20 years. The shelter is of further interest because there is evidence that it was used to some extent during the prehistoric period as a workshop area, exhibiting various types of abrading marks on numerous sandstone rocks and boulders around the shelter. The most significant is the large boulder near the front of the shelter that has very wide and deep abrading marks, indicating perhaps a different type of implement was being smoothed there. Rockshelters of any sort are rare on the U.S. side of Falcon Reservoir, exemplifying the importance of the one at 41ZP8.

Although smaller hand-held sandstone abrading stones are commonly found in Falcon Reservoir sites, particularly those with a Late Prehistoric component, large abrading stones like the one in front of the rockshelter are rare in this region. This abraded stone may be the result of its position relative to the shelter;

Figure 8. Large abraded sandstone rock from near the Arroyo La Hedionda on the Mexican side of Falcon Lake, just west of Zapata, Texas. This stone is approximately 20 inches in length and 9 inches wide and was found in an artifact-rich prehistoric site.

i.e., it would have provided a stable, unmoving platform on which abrading activities could be conducted by the former inhabitants of the site while conveniently sheltered from the sun or the wind by the sandstone overhang. The proximity of many other large abraded stones around the shelter indicates that it was a preferred activity area. This is due not only to the obvious resource at hand—sandstone rocks—but the location would have also afforded those working there a commanding view of their surroundings. This includes the adjacent Rio Grande, the nearby junction with the Rio Salado, and the ghostly flanks of the Sierra Madre in the distance.

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A Note on Historic Manganese Mining in Val Verde County

Solveig A. Turpin

ABSTRACT

In 2001, volunteer archaeological survey of the Ross Ranch in Val Verde County, Texas, recorded two of several manganese mines or exploratory prospects dug in 1918 in response to shortages imposed by World War I. Prospecting and limited exploitation resumed during World War II but the ore was low grade and the logistics of extraction and transportation outweighed its value. Sites 41VV1924 and 41VV1934 are now just a series of pits, some of which are shored with railroad ties or surrounded by artifacts. The historic record, however, documents the two periods of exploitation and the reasons for their abandonment.

INTRODUCTION

For decades, the manganese mines of Val Verde County, Texas, have been mentioned in casual conversations about the source of the black pigment used in the well-known polychrome pictographs for which the region is famous. In 2001, the Ullrich Ross Ranch at Shumla Bend, in the narrow area between the Pecos River and the Rio Grande above their confluence, was bought and subdivided into ranchettes to be sold as recreational units. The developers welcomed a volunteer survey that might enhance the archaeological and historical values of the properties. Since the ranch encompassed the ruins of the old railroad town of Shumla, such significant features as the original train depot were clearly expected and duly recorded (41VV1937). Less obvious were a series of pits that proved to be prospects for manganese.

41VV1924 AND 41VV1934, 1918 MANGANESE PROSPECTS

With the help of Jack Skiles, whose father Guy had shown him some of the pits decades ago, the field crew recorded 41VV1924 and 41V1934, both of which consist of pits or prospects that follow a fault line from the Pecos River, crossing the Southern Pacific railroad tracks and U.S. Highway 90, and terminating about a kilometer from the Rio Grande. These two sites correspond to locations mapped in 1918 in a report issued by the Bureau of Economic Geology and Technology at the University of Texas at Austin (Figure 1). That report also contained plots of several other prospects, profiles of exploratory and mine pits, and detailed descriptions of the ore bodies (Roberts 1918).

41VV1924 is on the north side of U.S. 90 and the Southern Pacific Railroad tracks and corresponds to the break that crosses the boundaries of blocks 63 and 64 northwest of Shumla (see Figure 1). The site consists of four pits, some scattered mine tailings, and a stone enclosure that may have held paydirt. Artifacts in the vicinity were modern and did not reflect the 1918 prospecting period.

41VV1934 is on the south side of the highway and railroad along the break that Roberts tested with prospects 5 and 6. The more southerly prospects may extend as far south as his Prospect Pit 1 (see Figure 1). Seven different activity areas were recorded on the upland and side slopes of a relatively prominent hill. Five prospects, ranging from one large rectangular pit shored with railroad ties to shallow pits surrounded by discarded manganese nodules, and two spoil piles were found. Artifacts were not common except on the upland flat where there are two rock piles, barrel hoops, dimensional lumber, a hoist bucket assemblage, paint cans, Prince Albert tobacco cans, spikes, scrap metal, a hurricane lamp base, wire nails, and scrap metal. Reportedly there was once a structure on this landform but its plan can no longer be discerned. According to Roberts, the miners had a shack somewhere near Shumla but the development

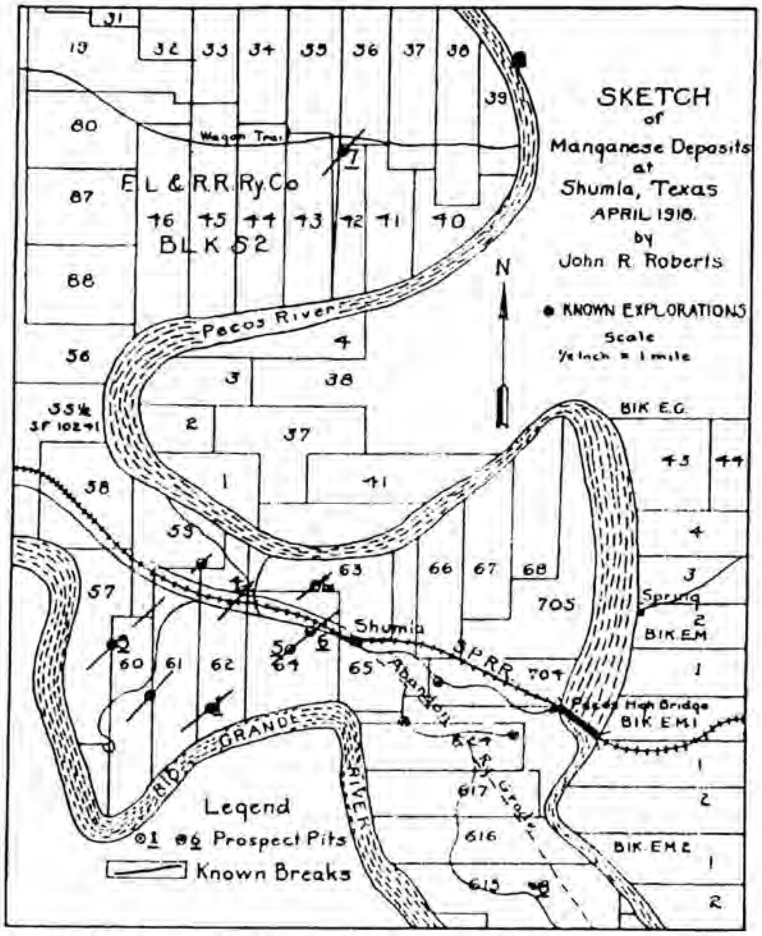

Figure 1. Roberts (1918) map of manganese prospects at Shumla and other points in Val Verde County.

of the railroad, highway, and town (41VV1890) have made it impossible to determine where it stood. One would assume it would be closer to the railroad where any traces may have been destroyed by construction or assimilated into the general debris scatter.

OTHER 1918 MANGANESE PROSPECTS

In addition to the manganese prospects recorded as 41VV1924 and 41VV1934, Roberts mapped as many as four additional breaks on the Ross Ranch that could probably be found following his maps. One location, his number 3, was described as a surface exposure not over 40 acres in extent on a low hill. The break trended northeast-southwest through the outcrop but the test pits showed only thin layers of limestone impregnated with manganese oxides (Roberts 1918:31). This break was cut by the Southern Pacific Railroad and U.S. 90. His location 4, slightly to the east, is also bisected by both the train tracks and roadbed (see Figure 1).

Outside the Shumla area, Roberts (1918:34) plotted the location of an old prospect pit, "dug several years ago," north and west of Shumla Bend on land later referred to as the Ingram-Howe Ranch (see Figure 1: Pit 7; Warren 1942) and south and west of the Pecos High Bridge. He also indicated a Location 8, southeast of Shumla, and mentioned the ore at Feely that is further discussed below.

THE 1918 INVESTIGATIONS

Roberts' (1918) report was a geological reconnaissance of the county that included economic notes on manganese-bearing and other potential commercial deposits, but he acknowledged in his introductory statement that the urgent need for manganese was the primary motivation for his study. Although the deposits had been known for some time, "no enterprising citizens had thought to make use of them" (Roberts 1918:23) until their economic potential increased during World War I. By 1915, most glass manufacturers substituted selenium for the manganese they used as a clearing agent, thus providing archaeologists with one of their historic index markers: the purple glass created by the solarizing of its manganese content. Previously, the principal suppliers of manganese had been Brazil, Russia, and India, but the war in Russia and the lack of transport ships was forcing other manufacturers to use lower grade domestic ores. These shortages prompted some enterprising citizens to explore the potential in the Val Verde County deposits. The Shumla prospects were the work of San Antonians—brothers-in-law Scherer and Whall (*San Antonio Express* 1949)—"the first active seekers for manganese ore bodies" (Roberts 1918:28).

Of the 111 manganese-bearing minerals identified in nature, only three were found in the county—

wad, pyrolusite, and bog manganese—and only the first two were thought to have any commercial value (Roberts 1918:23-24). Both are oxides of secondary origin. Manganese was found in all the geological formations in Val Verde County, not in veins but in caverns and sinks where it was deposited by water that circulated through the dip and strike joints and porous strata of the Comanchean formations (Edwards limestone) (Roberts 1918:39). Secondary deposition is supported by the sand, clay, vegetable material, and boulders around and within the mineral lenses.

The prospectors began all of their explorations along so-called "breaks:" their name for the clefts where ore was visible on the surface. As can be seen in Figure 1, the breaks are roughly parallel and at right angles to the axis of the Pecos River syncline, trending as a rule N 40° E. In rare instances, the mineralized breaks reached vertical depths of 300 ft., which Roberts thought was a result of the depositing water descending to unusual depths.

Roberts estimated that 10,000 tons of ore material could be extracted from the known deposits by a few miners under the direction of a skilled supervisor. Capital investment would be low since equipment would consist of picks, shovels, a hand-windlass, hammers, and powder. The deposits at Shumla, near the Southern Pacific Railroad, had more economic potential since transportation costs would be much lower given the admittedly poor road system in Val Verde County. However, a motorized vehicle was considered superior to mule-drawn wagons.

WORLD WAR II INVESTIGATIONS

In 1942, the Bureau of Economic Geology issued a report based on a Works Progress Administration (WPA) survey of mineral resources and geological data (Warren 1942). The WPA funded prospecting for manganese on the Ingram-Howe Ranch on the Pecos River in Val Verde County with some additional attention to deposits on the Babb and Mills ranches near Pandale. The former is indicated on Roberts (1918) map as Prospect 7 (see Figure 1). Warren relied heavily upon Roberts, excerpting his geological profile of the Pecos River from Roberts' detailed sections published in his 1918 report. Mention is made of the manganese prospects near Feely, a railroad station east of the Pecos, but the writer quoted a report by George H. Shafer, who supervised the excavation of 15 test pits on the Ingram-Howe Ranch:

> Both systematic "hit and miss" methods have applied to some extent in the past to locate deposits of manganese ore in the Feely area. In 1918 geologists dug several test pits over the area, but only small quantities were uncovered. In addition to these pits, other have since been dug by various individuals, some of whom live in the community. All efforts thus far in this vicinity have, however, resulted in finding only small quantities of manganese ore (Warren 1942:3).

Warren's description of the manganese deposits is also similar to that of Roberts except that, for the large part, the Ingram-Howe outcrops were surficial, and the extent of surface exposure was no measure of depth, since they did not reach over 2 feet below the surface. Warren (1942:3) concluded that the manganese was deposited on an old erosional surface and was not related in any way to the structure of the underlying formations. He proceeded to describe the Babb Ranch deposits near Pandale where he found manganese intermingled with sand and gravel between limestone ledges along the river, mixed with gravels in the floodplain, and on high hills in depressions in the limestone. At the Mills Ranch, 3 miles west of Pandale, manganese is mixed with rock debris on either an old terrace or a fan conglomerate. He commented that two car loads of manganese had been shipped from here but he felt the highly irregularly shaped deposit was limited in its lateral extent (Warren 1942:3). Warren concluded that wad and pyrolusite are of secondary origin, "and the manner in which they occur in the Pecos River area, intermixed with sand, clay, gravel, vegetable matter, and soil in shallow depressions, disseminated through gravels, and in the joints of exposed limestone, indicates that these materials are stream deposited." Furthermore:

> The great lateral extent of the high gravels suggests that before the Pecos River had cut so deeply through the underlying limestone, the water spread over a large and relatively flat flood plain at times of flood. This spreading facilitated greater oxidation of the

> manganese carbonates precipitating the manganese as oxides in the gravels. Subsequent leaching and erosion of the gravels has concentrated the manganese oxides in the shallow depressions and joints. Much manganese is disseminated through lower gravels which are little modified in thickness. . . (Warren 1942:4).

THE MODERN ERA

In 1962, the Bureau of Economic Geology issued a report on the mineral resources of South Texas. Their map of Building and Chemical Materials shows manganese deposits at Feely, Shumla, the Ingram-Howe Ranch, and around the Pandale Crossing of the Pecos in the areas referred to by Warren as the Babb and Mills ranches (Maxwell1962:Plate 2). Thus, there has been very little change in the known distribution of manganese deposits in Val Verde County since Roberts' pioneering work in 1918.

The two episodes of manganese prospecting in Val Verde County—in 1918 and 1942—coincide with periods of increased need and decreased supply. Before World War I, one location in Russia accounted for half of the world's manganese production. Imports already affected by the diversion of ships to the war effort were further impeded by the Russian Revolution so that the value of manganese skyrocketed from $40 to $400 a ton. Across North America, the search for manganese accelerated with the resultant opening of mines from Newfoundland to Alaska. Most of these were not sustainable once shipping was restored and imports began to flow into the country.

The role of manganese in steel production accounts for the second evaluation of the Val Verde County prospects in 1942. Stalinist Russia had been supplying the German industrial complex, allowing it to build up its formidable armory. The U.S. war machine was in dire need of materials to produce weaponry and once again imports were threatened by the disruption of shipping. Manganese was added to the critical materials list in Canada by 1940 and its production given priority over that of precious metals, such as gold (Huebert 2001). Before its entry into the war, the U.S. began a policy of purchasing and stockpiling critical materials, including manganese (Stevens 1999) from Allies such as Brazil. Nevertheless, some low-grade ores once again became profitable, thus accounting for the interest in the Ingram-Howe, Babbs, and Mills prospects.

Unfortunately for the prospectors of Val Verde County, the deposits proved to be so sparse, dispersed, and inferior that only a few carloads were ever shipped from the Shumla station. Improvements in steel technology resulted in a reduction of its dependence on manganese, thus lowering imports. With the abandonment of the U.S. steel industry, manganese lost much of its residual value and the mines closed. No manganese has been mined in the U.S. since 1997, although exports continue as the government reduces the stockpiled reserves (International Manganese Institute 2004). The humble pits and prospects of Val Verde County mirror global events during a time when the U.S. was capable of producing its own steel and steel products, as well as reflecting the aspirations of local prospectors. Unfortunately, the widely dispersed, low-grade ores failed to contribute substantially to either regional or global fortunes.

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A Prehistoric Burial from Gull Island, International Falcon Reservoir

James B. Boyd

ABSTRACT

An unusual burial from Gull Island was salvaged in a large prehistoric archaeological site at Falcon Reservoir. The burial context consisted of the skull being placed over the tightly compacted and vertically arranged long bones of the skeleton. The configuration is unlike the numerous other prehistoric burials found at Falcon Reservoir. I describe the burial site, as well as the various classes of prehistoric artifacts that were recorded there. Comparisons are made to a similar burial in Starr County, other nearby prehistoric burials, and burials described in the 1930s by A.E. Anderson.

THE GULL ISLAND SITE

The prehistoric site where the burial was found is known as Gull Island. It is on the Mexican side of International Falcon Reservoir on the lower Rio Grande (Figure 1). The site was named Gull Island for the birds that often inhabited and nested on the island after it became exposed (Boyd n.d. a).

Falcon Reservoir was formed following the impoundment of waters after the building of Falcon Dam in the early 1950s. The site is normally covered by the waters of the reservoir, which has a mean elevation of 301.2 ft. above mean sea level (amsl) when it is full. Gull Island becomes exposed when the elevation of the reservoir is low, and falls below 274.0 ft. amsl. The site first appears as an island (Figure 2), and if the reservoir's waters drop low enough, it connects to the mainland and other nearby sites (Boyd n.d. a).

The Gull Island site is on the Arroyo Centurion on the Tamaulipas side of the reservoir. This arroyo is also locally known as Arroyo Gonzaleño. In pre-reservoir days, the site would have been a low hilltop on the south bank of the arroyo, about 1 km west of the channel of the Rio Grande. This site would have given those who inhabited it a commanding view of the tributary valley of the arroyo and of the Rio Grande valley to the east. Access to water in the Rio Grande was reasonably close and accessible and the Arroyo Centurion may have held water, perhaps in tinajas, or waterholes. Due to the proximity of water,

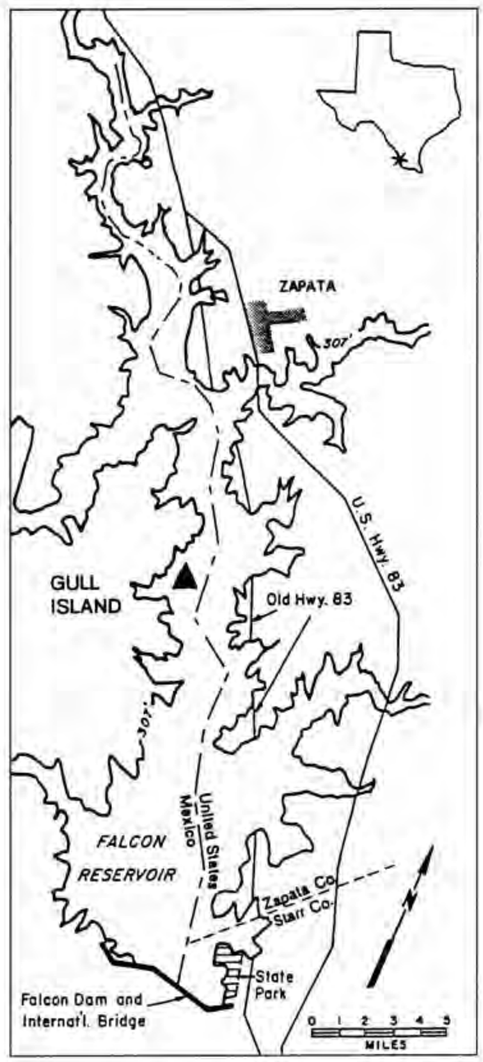

Figure 1. General map of International Falcon Reservoir, showing the approximate location of Gull Island.

Figure 2. Gull Island on April 14, 1995. The island had just been exposed by the dropping water level at Falcon Reservoir during the previous night. The elevation of the reservoir was 273.68 ft. View south.

game and plants probably would have been abundant food resources, and both would have provided raw materials for tools and cover. The added enticement of it being a good vantage point probably accounts for the site having been utilized over what appears to be a very long period of time. This is evidenced in the variety and large numbers of artifacts that were collected there (Boyd n.d. a).

Since 1984 thousands of artifacts have been recovered at the Gull Island site by numerous individuals, even though the site is only infrequently exposed by low water levels (Boyd n.d. a). Information on many of the artifacts is not available, nor is it likely that it will ever be, as many of them have long since been sold and are no longer available for study. In some instances, individual collectors have recovered nearly one hundred projectile points in a single day there (Boyd n.d. a). Loss of the archaeological record in many Falcon Reservoir sites due to looting has been previously discussed and remains a serious problem (Perttula and Boyd 1998:6-15). Fortunately, a small part of what was recorded at Gull Island was well documented and remains available for study. Classes of artifacts found at the site include large numbers of projectile points (both dart and arrow points), numerous forms of bifacial and unifacial stone tools, various types of scrapers and gouges, choppers, sandstone abrading stones, ground stone implements (pestles, manos, and metates), and ornaments fashioned from marine shell and mussel shell.

Based upon an analysis of the types of artifacts recovered at the Gull Island site, it was a favored long-term location for utilization by prehistoric peoples. This is also evidenced by the huge amount of burned sandstone rock found there. Recovered dart point styles include, but are not limited to, the following types: Abasolo, Almagre, Andice, Bell, Catan, Desmuke, Early Triangular, Ensor, Fairland, Gary-like, Kinney, Lange, Langtry, Lerma, Marcos, Matamoros, Palmillas, Pandora, Refugio, Shumla, and Tortugas. Collected arrow point styles include Caracara, Cliffton, Fresno, Guerrero, Perdiz, Toyah, Young, and others. The diagnostic age range of these projectile points indicates use of the site from at least the Early Archaic period (ca. 4050 B.C.-3050 B.C.), based upon the estimated age of Andice points (Turner and Hester 1993:71), to the Historic period (18th century), based upon the presence of Guerrero arrow points (Turner and Hester 1993:216).

The most highly eroded parts of the site are the southern and eastern parts (Figure 3), both subjected

Figure 3. Looking south at eastward-facing beach with eroding deposits at Gull Island on April 21, 1995. After one week of continued lowering water levels at Falcon Reservoir, the island is now much larger. On this date the elevation of the reservoir was 271.69 feet amsl. Burial was found at the far end (top center in photo) of the island.

to significant and prolonged wave action from the waters of the reservoir as the island becomes exposed. The wave action is caused by the prevailing southeasterly wind, especially in the spring and summer months when water from the reservoir is released in large quantity for downstream use. The combination of significant wave action and dropping water levels intensifies the degree and rapidity of erosion in Falcon Reservoir sites. Gull Island is especially prone to wave-induced erosion because it is located in the open channel area of the Arroyo Centurion, and there is a considerably wide and lengthy stretch of open reservoir waters south of the site. This allows large and repeated waves to pound the shoreline of the island.

Between 1984 and 2003 the island was exposed several times (see Table 1). Each time, the archaeological deposits continued to be deflated, and more prehistoric artifacts were exposed. The majority of the arrow points found at Gull Island were recovered the first time the island was exposed (and shortly thereafter) as water levels continued to drop and the upper deposits dried out, causing the sandy surface

Table 1. Years when Gull Island was exposed by low water levels.

1984
1985
1986
1990
1995-2003*

*During these years Gull Island was continuously exposed from April 1995 until November 2003. During much of that time, especially in later years, heavy vegetation engulfed the site. In the years 1984, 1985, 1986, and 1990, the site was exposed for only part of the year.

to slowly blow away, exposing the artifacts. The burial was found at the southern edge of the island, near the waterline.

THE BURIAL

The Gull Island burial became exposed by wave erosion on the southern shore of Gull Island on April 21, 1995. On that date the elevation of Falcon Reservoir was 271.69 feet amsl (International Boundary and Water Commission, personal communication 1995), or 29.51 feet below the conservation pool elevation. Upon arrival at the site I observed a person actively collecting artifacts. He was Bob Huston, a "Winter-Texan" who was visiting Zapata and who made daily excursions up and down the reservoir in search of Indian artifacts (Boyd n.d. a).

Mr. Huston advised me that a burial was in the process of washing out on the south edge of the island. I immediately located the eroding burial feature at the waterline. Visible were several long bones jutting vertically several inches out of the mud, and the fragmentary skull and mandible were immediately next to the tops of the long bones where wave action appeared to have displaced them. It appeared that the skull/mandible was originally placed directly over the vertically positioned long bones. The long bones appeared to be relatively tightly clustered together, as though a narrow vertical pit ot hole had been dug at the time of interment and the bones then dropped in or placed in it. I had not previously seen such a Falcon Reservoir burial: other burials were either flexed; were bundle burials or "bone piles" (Boyd et al. 1997:387-425; Boyd n.d. b); some were cairn burials (Boyd 2000:45-51, n.d. b), and one was a cremation (Boyd and Wilson 1999:4-7). Still another burial consisted only of the cranium and mandible of the individual (Boyd and Wilson 2002:4-11).

The Gull Island burial is unique because this post hole style burial is the first and only example documented in the Falcon Reservoir region, and only a small percentage of the individual's skeletal remains were apparently selected to be interred. The "post hole" term for the burial denotes the relatively tightly clustered and vertically oriented position of the long bones that had been inserted into a narrow hole at the time of burial.

Knowing that the burial feature was sure to be decimated or otherwise destroyed by erosion or by looters as other Falcon Reservoir burials had been, I undertook an emergency salvage of the skeletal remains. Time and equipment constraints prevented a methodical excavation of the burial, but every step was taken to carefully remove the bones from the muddy beach. First the skull and mandible were set to one side so that they would not be inadvertently damaged. Following this, the exposed long bones were gently pulled from the muddy matrix with minimal force. A few days later I screened (through 1/4-inch mesh) the mud from where the long bones had been removed, but no associated mortuary artifacts or other skeletal remains were recovered. It was impossible to delineate the burial pit's outline or edges due to the extremely muddy conditions on the shoreline.

The skeletal remains were later taken to the Texas Archeological Research Laboratory, The University of Texas at Austin (TARL), where they were examined by Diane Wilson (n.d.). The somewhat eroded remains were those of an adult of undetermined sex. A fragmentary skull was present, including cranial vault and facial bones, as well as a mandible with teeth. Also present were the right clavicle, left humerus, radius, and ulna, and both femora, fibulae, and tibiae. There were five teeth; four were heavily worn, suggesting a coarse and gritty diet that was a product of the sandy environment and/or the use of manos and metates to process food. The only caries was in the fifth tooth, possibly a supranumery tooth, which was a right lateral mandibular incisor.

Although no radiocarbon dating was done utilizing the Gull Island remains, their generally eroded appearance suggests considerable antiquity. They are more similar in appearance to Archaic period burials that had been encountered in prehistoric sites in the reservoir area. Generally, Late Prehistoric period burials are in much better condition than the bones from the Gull Island burial (Boyd n.d. a). Naturally the condition of the bones is also dependent upon the pre-interment disposition of the skeletal remains. Were the remains buried immediately after death? Or were they left exposed to the elements prior to interment? Also, differential soil conditions along this stretch of the Rio Grande may have affected preservation of the bones differently once they were buried.

OTHER NEARBY BURIALS

Several other prehistoric burials in the Arroyo Centurion drainage system have been identified and investigated in the 1990s. These include three burials at the Scissors Island site, located approximately 400 m east of the higher elevations of the Gull Island site. These two distinctively separate sites connect when the waters of Falcon Reservoir are very low (Boyd n.d. a). In contrast to Gull Island, on a low hill overlooking Arroyo Centurion, the Scissors Island site is on a flat terrace on the west bank of the Rio Grande approximately 600 m west of the original riverbed, but still within the Arroyo Centurion basin (Boyd n.d. a). The Scissors Island site also is several m lower in elevation than Gull Island.

The first burial encountered at Scissors Island (burial #1; see Boyd and Wilson 1998:11-15) consisted of the skeletal remains of a headless female aged 25-34 years at the time of death. Two lithic artifacts recovered in the grave fill may or may not have been associated with the burial.

The second burial (#2, see Boyd 2000:45-51) included fragmentary skeletal remains of a male of unknown age, accompanied by at least 82 perforated Yellow Sandshell (*Lampsilis teres*) river mussel shells as mortuary inclusions. This burial had been placed underneath a cairn comprised of a cluster of large sandstone rocks. Another larger but undisturbed cairn in the site is probably also a burial.

The third Scissors Island burial (#3) was investigated after looters had plundered the eroding skeletal remains. I salvaged the skeletal material that had been haphazardly discarded on the surface of the site and later took the remains to TARL. I later contacted the person who had disturbed the burial and learned that no associated artifacts were recovered with the remains. The three burials were all found in an area less than 200 m wide, and it is very likely that other burials are also present in this site.

The scattered (by wave action) skeletal remains of another prehistoric burial were found at another nearby site on the north edge of the Arroyo Centurion. This burial, primarily the long bones of an adult individual, was highly eroded and probably dates to the Archaic (Boyd n.d.a; n.d. b). The eroded appearance of the bones is nearly identical to that exhibited in the skeletal remains from the Gull Island site. Combined with the three burials from Scissors Island and the one from Gull Island, this represents at least five burials from within a small area of the Arroyo Centurion drainage system.

SIMILAR POST HOLE BURIALS

Warren (1991) excavated an eroding burial in a Starr County site (41SR294) that is similar to the Gull Island burial. The burial had some of its long bones jutting vertically from the ground, and the skull was displaced slightly to the side (Warren 1991:4 and Figure 4). Warren (1991:7) attributed the position of the skeletal remains to having been placed in a post hole or pit that had deflated and eroded. The Starr County burial differed from the Gull Island interment in that it also had vertebrae and phalanges and numerous other unidentified fragments of human bone, in addition to the cranium, mandible, teeth, radii, and ulnae (Warren 1991:6). The Gull Island burial lacked the vertebrae, phalanges, and unidentified human bone fragments reported with the burial from 41SR294. These two burials are separated by a distance of only about 32 km.

In his early paper on burial customs, A. E. Anderson (1933) described some Cameron County, Texas, burials. He noted that "burials may be designated as two types—bone burial and body burial. In the bone burial only the skull, jaw, long bones of arm and leg, and sometimes pelvis are interred. The arrangement of the bones varies. In instances the skull with jaw in place is placed on top of the other bones. Again, the skull and jaw are first set in the bottom and then the long bones are stuck up vertically surrounding the skull."

Although coastal mortuary customs may differ from those in inland areas of Texas, similarities also exist (cf. Boyd et al. 1997:387-425; Perttula 2001:2-83). One of the types of burials described above by Anderson is similar to the burial from Gull Island. In combination with the Starr County burial reported by Warren (1991), the vertical placement of long bones along with the skull and mandible was not an isolated or rare occurrence in prehistoric times in parts of South Texas. However, such a mortuary context does vary from that of most burials in the region.

DISCUSSION

In the last several years much new knowledge has been gleaned about the mortuary customs of the aboriginal peoples who once inhabited the area in and around what is now Falcon Reservoir. Prior to the 1990s, little information was available about burials or mortuary practices in the region, as few had ever been investigated or formally recorded by professional archaeologists. The long-standing belief that prehistoric cemeteries in this part of South Texas did not occur away from coastal areas has since been discounted by the documentation of several cemetery sites in the Falcon Reservoir and other parts of the region.

A review of the prehistoric mortuary patterns in Falcon Reservoir area burials that have been documented indicates that although isolated burials do occur quite frequently, interment of individuals in cemetery sites, usually found within the confines of large occupation sites, was also a widespread practice. The Falcon Reservoir burials that have been documented—whether as isolated burials or in a cemetery—have often been in a flexed position or were bundle burials in which the remains of the individual were apparently allowed to decay into skeletons, then the disarticulated bones collectively disposed of. The interments, whether flexed or bundle burials, were then buried beneath the surface. Some of these were also covered with cairns of large sandstone rocks. In only one instance is there evidence for the cremation of human remains in a Falcon Reservoir burial, and another burial consisted only of the skull and mandible of the individual. Similarly, the Gull Island example is the only instance at Falcon Reservoir of a post hole type of burial. Although similar burials have been reported in both Starr and Cameron counties, these types of burials occur only infrequently and appear to be the exception rather than the rule. A continuation of the studies of the mortuary customs and practices in the region of Falcon Reservoir will likely yield significant new information that will enhance our understanding of the lives of the prehistoric peoples who once settled this region.

ACKNOWLEDGEMENTS

Dr, Diane Wilson performed the osteological analysis of the Gull Island skeletal remains. Appreciation is extended to Dr. Timothy K. Perttula for editing the original draft of this paper. Dr. Thomas R. Hester arranged for the Andice points recovered at the site to be included in a study of Andice point technology at the Texas Archeological Research Laboratory, The University of Texas at Austin. Also, the late Bob Huston is remembered in 2005 at the 10th anniversary of his unfortunate drowning in the Arroyo Centurion near Gull Island on May 5, 1995.

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Notes on an Unusual Shell Container from the Rio Grande Delta

Mike Krzywonksi

ABSTRACT

A container made from a complete *Polinices duplicatus* univalve, and sealed with asphaltum, was found eroding from the surface of a site in the Rio Grande Delta. Several items were found within the container.

INTRODUCTION

A large complete unmodified shell of the species *Polinices duplicatus*, commonly known as "Shark's Eye," was discovered recently eroding from the surface of a prehistoric site in the Washington Beach zone just below the mouth of the Rio Grande (MacNeish 1958:186).

The shell, which is in an excellent state of preservation, was completely exposed, except for the aperture which remained buried. Its exposure may have been caused by brush-clearing and cultivation, both evident at the site. Upon extracting the shell from the soil it was discovered that the aperture was completely sealed or plugged with asphaltum (Figure 1). The outer surface of the asphaltum was also very well-preserved.

The visible outer surface of asphaltum was relatively smooth and flat, and did not extend beyond or higher than the outer lip of the shell. Further examination of the outer surface of the asphaltum revealed the end of a narrow rectangular cross section of what appeared to be bone embedded in the asphaltum. This partially visible section of the bone was positioned even or slightly below the surface.

Figure 1. *Polinices* shell container. Asphaltum seal is in place. Specimen photographed on a mirror. Maximum diameter of specimen is 72 mm.

DETAILED EXAMINATION

Under a more controlled examination of the artifact, the asphaltum was carefully removed/separated intact from the shell. The shell itself measures 72 mm in maximum diameter, while average examples of *Polinices duplicatus* are generally 25 to 75 mm in diameter (Andrews 1971).

The asphaltum follows the contour of the inner whorl and extends approximately 33 mm below the lip to the interior of the shell while still leaving a void or cavity below. In essence, the asphaltum was intended to seal or plug the natural opening of the shell. It appears to have been poured into the shell when in a liquefied or semi-liquefied state. The shell cavity was relatively free of soil or other contaminants.

Figure 2. Views of asphaltum from *Polinices* container with embedded bone artifact. a, bone artifact (left in place) partially exposed; b, another view.

The extension of what had appeared to be bone embedded in the asphaltum surface is clearly visible within the asphaltum mass (Figure 2a-b). The asphaltum does not completely surround the bone on all sides as it penetrates the mass at an angle.

The specimen was left in the asphaltum and is described here based on what can be seen at the present time. Only the "loose" bone fragments were given specific specimen numbers for later description.

The bone is rectangular and appears to be modified. In cross section it is flat on one side and convex on the opposite side. It is 38 mm in length, 11 mm wide, and approximately 3 mm in thickness. The end terminating in the interior of the shell appears to be a break (probably fits to Specimen 2, see below). The view of the opposite end is partially obscured by asphaltum.

An examination of both ends of the bone object shows a slight overlap of asphaltum. This would indicate that the bone artifact was inserted in the asphaltum from the outer surface while the substance was still malleable.

CONTENTS OF SHELL CAVITY

Further examination of the shell cavity revealed eight modified fragmentary bone artifacts and two very small bone fragments. Figure 3 illustrates the group of artifacts found within the shell and asphaltum that filled it. The specimens are described in detail below.

Specimen 1A & 1B

These specimens consist of two tiny bone fragments or chips that may derive from other bone artifacts during the intentional breaking of the bone or they may have become separated later within the shell cavity.

Figure 3. Contents of *Polinices* shell container. Bone contents are shown. Note decorated bone artifact (Specimen 8) on lower left.

Specimen 2

This modified bone artifact is flat in cross-section on one side and convex on the opposite side, and tapers to a rounded blunt tip on the finished end. The opposite end is broken. The artifact measures 24 mm in length, 9 mm at the widest point, and is approximately 4 mm in thickness.

It appears that this is the distal portion of the bone artifact imbedded in the asphaltum mass described earlier. If this is correct, there are three possibilities concerning the break and placement in the cavity. The break and subsequent placement with other contents would have occurred prior to the sealing or closure of the shell and also prior to the insertion of the remaining portion imbedded in the asphaltum. Another possibility is that it broke off during the insertion process and somehow managed to fall into the cavity without adhering to the asphaltum. A third possibility is that the distal portion was broken off and placed in the cavity. The remaining piece would then have been placed upright in the aperture of the shell. The asphaltum was then introduced to fill the opening, engulfing only the upright portion.

Specimen 3 & 4

These modified bone artifacts are extremely thin in cross section, being flat or slightly concave on one side and convex on the opposite side. The surfaces as well as the edges have been smoothed and highly polished. The ends of both specimens are fractured. The bone is in excellent state of preservation.

Specimen 3 measures 30 mm in length, 12 mm at the widest point, and 2 mm thick. Specimen 4 measures 8 mm in length and 10 mm at the widest point.

The two artifacts are fragments of a single piece with one fragmented end matching on each. The artifact appears to have been broken subsequent to being placed in the shell container.

Specimen 5 & 6

These artifacts are very similar to Specimen 3 and 4, except one edge on both pieces is broken or in an unfinished condition. With the fractures aligned, the single piece measures 19 mm in length and 8 mm wide.

Specimen 7

This is a single modified specimen with the same general description and comments as for Specimen 3- 6. One edge exhibits a break or unfinished condition. Both ends are broken. The specimen measures 17 mm in length and 11.5 mm wide.

Specimen 8 & 9

Specimen 8 (see Figure 3) is the most unusual and interesting bone artifact within the assemblage. It is the largest section of bone found in the cavity (Figure 4, see also Figure 2) and is rectangular in shape with one end finished and the opposite end

Figure 4. Bottom view of asphaltum seal. Note embedded bone on lower right, and the impression (notches and punctates) left by the design on Specimen 8.

broken. A small triangular fragment that matches part of this broken end is labeled as Specimen 9. The bone is flat or slightly concave on one side and convex on the opposite side. The surface has been smoothed and polished (including both edges). The artifact measures 41 mm in length, 20 mm wide, and 2 mm thick.

One side of the artifact has a series of approximately 10 distinct notches decorating the finished edge or end. Directly adjacent and parallel to the notches are two rows of drilled pit punctations. The row closest to the notches consists of five punctates followed by four punctates in the next row.

As the liquefied asphaltum was introduced into the shell it came in contact with the decorated side of this artifact. A negative imprint or image of the decorated bone is clearly visible on the underside of the asphaltum plug (see Figure 4).

DISCUSSION

Large unmodified specimens of *Polinices duplicatus* are encountered in prehistoric sites within the Rio Grande Delta (Salinas 1980). Most of these sites can be linked to the Brownsville Complex (Hester 1969; 2004; Ricklis 2004). The large specimens of this gastropod would clearly function as an ideal small container and could serve a variety of uses in that capacity.

The specimen discussed and illustrated in this article measures approximately 72 mm at the widest part of the shell. There was no residue or visible traces of asphaltum adhering to the interior or exterior of the shell once the contents were removed.

Asphaltum, usually in the form of solid nodules, is also encountered in prehistoric sites within the Delta area. These pieces of asphaltum are undoubtedly manuports, relatively easily collected by prehistoric inhabitants as lumps washed up along the Gulf beaches. However, the use of asphaltum to seal a shell "container" has not previously been reported from the region. The intentional or ritual breaking of artifacts subsequent to their preservation or containment is significant (see Hester [1969] on ritual use of human bone on the lower coast).. The unusual circumstance of the asphaltum seal remaining intact for hundreds of years, thus allowing the contents to remain preserved in context, is extraordinary. The likelihood of this occurring again is remote.

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A Study of Corner Tang Bifaces from 41RV49, Reeves County, Texas

Cindy Smyers and David L. Calame, Sr.

ABSTRACT

Corner tang artifacts are often found on archaeological sites in Central and southern Texas. However, they are known to be present in the lower Pecos, in Southeast Texas, and into the Southern Plains. Eleven specimens from West Texas are documented, 10 from Reeves County (with nine from 41RV49), and another from Winkler County.

INTRODUCTION

Site 41RV49, the White Post site, is located in Reeves County, western Texas, approximately 13 km northwest of the town of Mentone (Figure 1). The site is on the slope of an alkaline gravel ridge, on Smith Draw, that terminates at the Pecos River floodplain, about 3 km east of the river channel. The desert terrain is marked by, low hills and several small draws. The soil is a soft caliche with patches of overlaying sand. Flora is low mesquite and greasewood.

Pecos River gravels are exposed on the site surface, but most of it is very small and probably not suitable for knapping. Signs of habitation include burned rock (no intact hearths), scattered sandstone fragments, broken metates and manos, and lithic debitage. Materials are widely scattered, due to extensive sheet erosion.

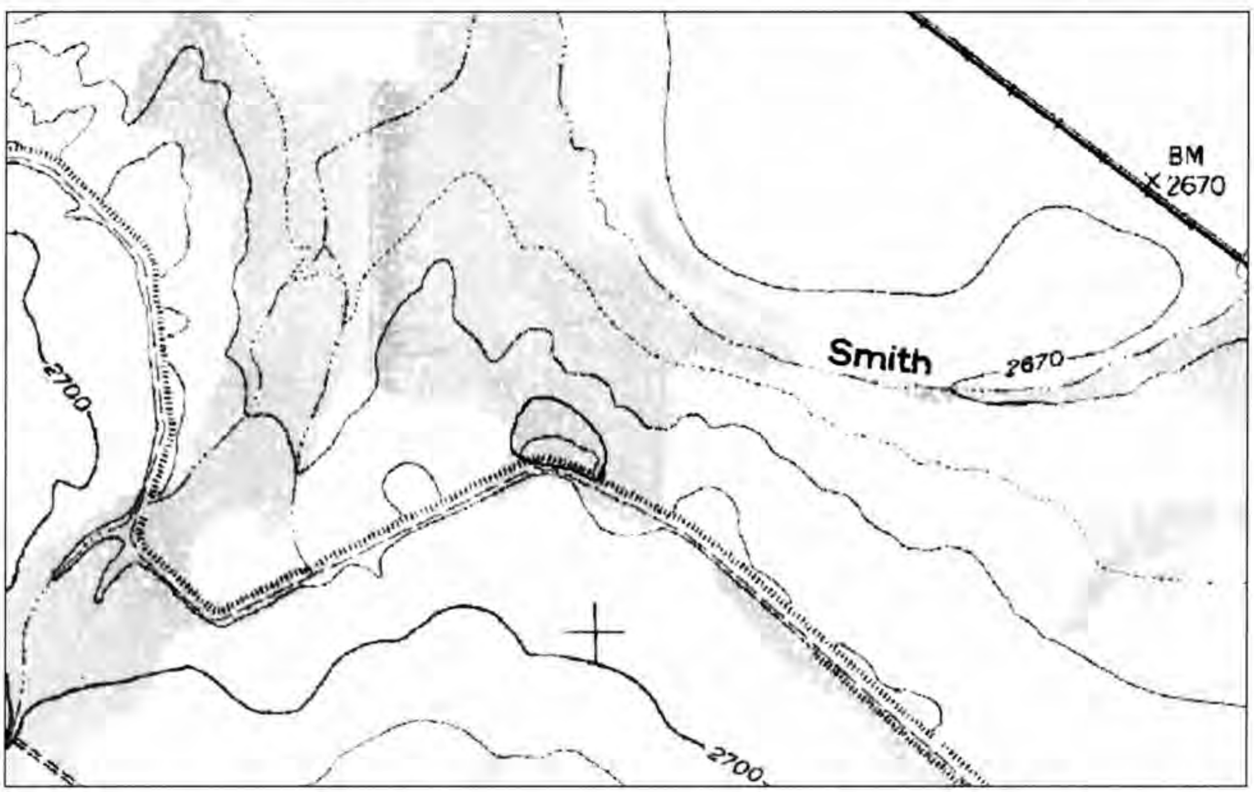

Figure 1. General Location of 41RV49. The site area is shown, near Smith Draw, Reeves County, Texas. Adapted from the USGS Anderson Ranch 7.5 quadrangle.

Nine corner tang bifaces have been surface collected at 41RV49 and the adjacent locale (over an area about 3 km in length) by the Martin family during the last 20 years. These specimens are described in detail in this article. They have also been examined using ultra-violet light techniques in an effort to determine the source of the raw material(s) of which the artifacts are made. As part of this article, we were also able to study a corner tang biface from Winkler County and another from a different Reeves County locale.

The landowner at 41RV49 reports being aware of several other corner tang bifaces (six to eight specimens) having been surface collected from the site by the previous owners of the ranch. At the time of this writing, we have been unable to obtain more information on these additional artifacts.

We have documented a number of other artifacts collected from the surface at 41RV49. The following diagnostic projectile point types were recognized (Turner and Hester 1993) and photographed (on file with senior author): **Archaic dart points:** Val Verde, Pandale, Marcos, Ensor, Bulverde, Langtry, Frio, Paisano, untyped triangular; and Carlsbad (the latter defined by Justice [2002:229-230]); and **Late Prehistoric arrow points:** Toyah and a corner-notched form that Justice (2002:233) has typed as Guadalupe (in his "Livermore Cluster").

Corner Tang Bifaces from 41RV49

Specimen 1 (Figure 2)

The specimen is bifacially worked with percussion and pressure flake scars evident. It has a slight median ridge. The distal tip is offset to the left of center, leaving the right lateral edge curved and longer than the left lateral edge. This suggests that this specimen may be a small corner tang preform. The top one-third of the distal end does not appear to have been finished. Thinning pressure flakes exist where the tang notches would normally be expected.

The material is a glossy, white, fine material that appears to have flaked well, with some flaking traveling more than half way across either face. Flaking is random, with both percussion and pressure flaking. The artifact measures 0.8 cm in thickness, 7.1 cm at the maximum length, and 3.9 cm at the maximum blade width. The UV light response for this artifact is bright lime green.

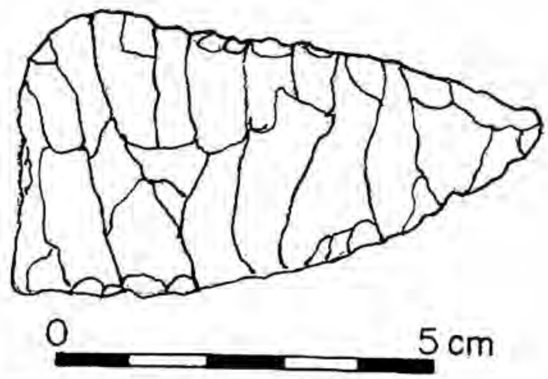

Figure 2. Specimen 1, 41RV49.

Specimen 2 (Figure 3)

One side is beveled on the left lateral edge and randomly flaked. The other side is heavily patinated. The artifact is 1.8 cm in thickness. It has a maximum length of 8.0 cm and a maximum blade width of 2.8 cm. The material is a mottled, reddish-yellow color, and resembles Alibates. Of the artifacts described in this article, this specimen has the tang notches made farthest from the base along the lateral edge. This specimen is more heavily reworked than any of the other artifacts.

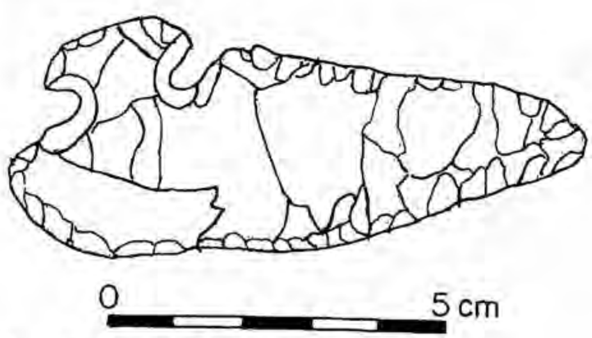

Figure 3. Specimen 2, 41RV49.

Specimen 3 (Figure 4)

This specimen is alternately beveled. The tang notches are perpendicular to each other, one originating directly from the base and the other from the left lateral edge. The notches are deeper, narrower, and better defined than the notches on any of the other artifacts. The artifact measures 0.9 cm in maximum thickness, has a maximum length of 7.5 cm, and a maximum width of 3.3 cm.

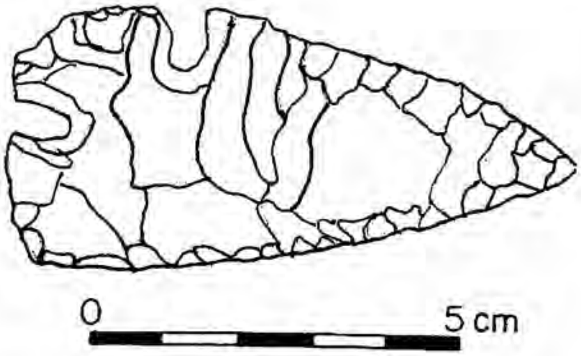

Figure 4. Specimen 3, 41RV49.

Specimen 4 (Figure 5)

The right lateral edge is finely pressure-flaked with some pressure flakes running more than half way across the face of the artifact. From the tip to the first tang notch on the left lateral edge, it is a white colored flint, which may be remnants of cortex from the original nodule. This specimen has been resharpened. The artifact is 1.8 cm in maximum thickness. It has a maximum length of 7.5 cm and a maximum width of 3.45 cm.

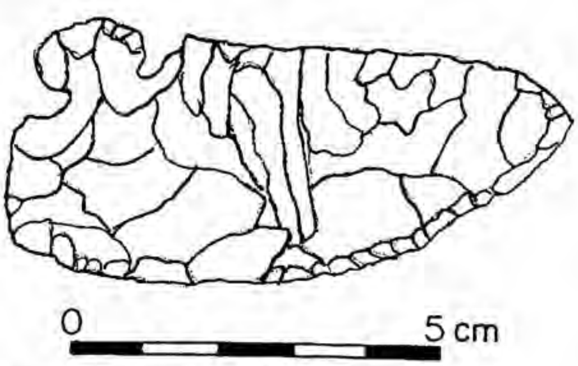

Figure 5. Specimen 4, 41RV49.

Specimen 5 (Figure 6)

The left lateral edge is steeply beveled from the distal end approximately midway to the base. The artifact is formed by a small notch in the right lateral edge, and a shallow but wide notch in the base. The artifact has a maximum thickness of 0.9 cm. The maximum length is 8.4 cm and the maximum width is 4.15 cm.

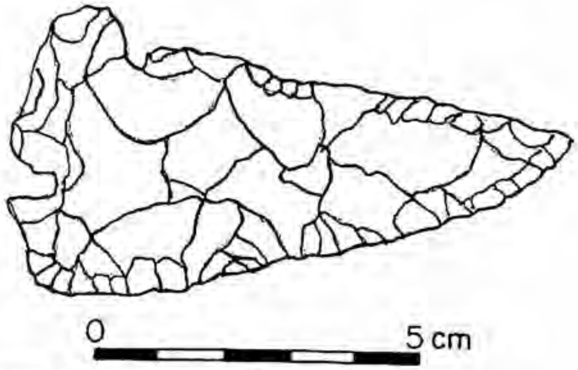

Figure 6. Specimen 5, 41RV49.

Specimen 6 (Figure 7)

This specimen is a basal fragment that is very thin (0.6 cm maximum thickness). Because of the visible luster and the waxy feel to the touch, we believe that this artifact may have been heat-treated. The fracture on this artifact appears to be a bending break, caused by pressure applied against one side of the tool. Because the break is so close to the basal end, there is not enough surface area remaining between the fracture and the base to have allowed enough pressure to be applied to initiate the fracture, unless this artifact had been hafted. It is possible that the artifact was broken by being stepped on; however, the surface of the fracture did not appear to be a new surface, so it is thought to have been broken in antiquity.

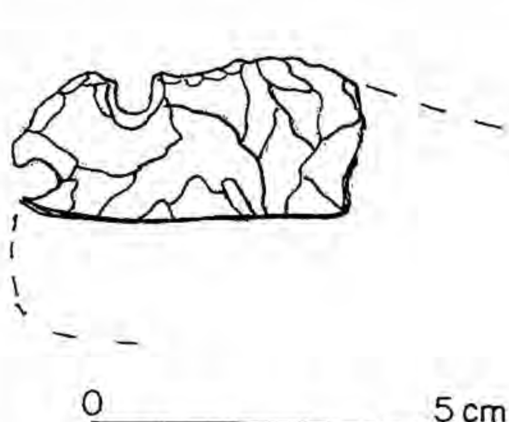

Figure 7. Specimen 6, 41RV49.

Specimen 7 (Figure 8)

The left lateral edge is moderately beveled from the distal end to midway to the tang. The artifact has a maximum thickness of 0.75 cm, a maximum length of 7 cm, and a maximum blade width of 3.7 cm. The material is a coarse flint. The flaking is random and crude in appearance; however, the artifact is the second thinnest of the group, possibly attesting to the skill of the knapper.

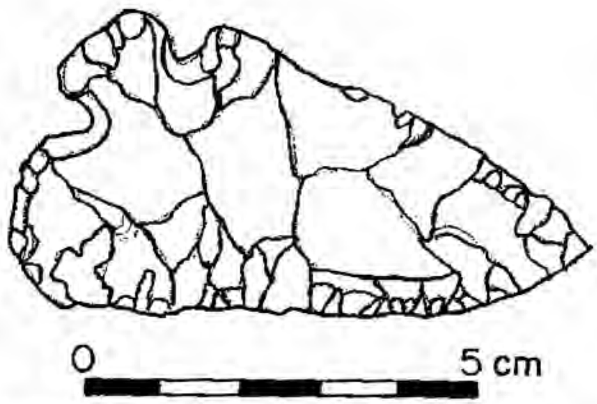

Figure 8. Specimen 7, 41RV49. A photograph of this specimen is also shown in Figure 14.

Specimen 8 (Figure 9)

This tool is bifacially worked with percussion and pressure. It has a slight median ridge. The material is a glossy tan-colored chert. The maximum length is 6.7 cm. The maximum width is 4 cm, and the maximum thickness is 0.9 cm.

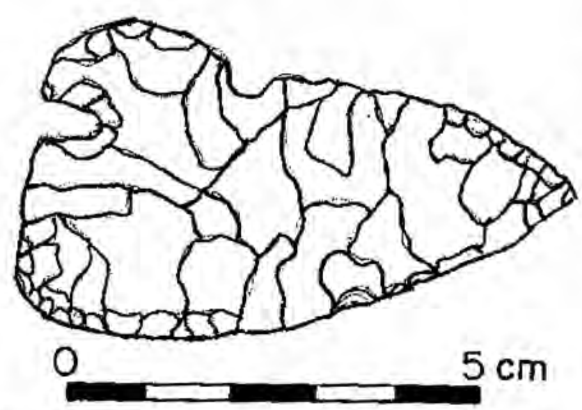

Figure 9. Specimen 8, 41RV49.

Specimen 9 (Figure 10)

This is the most finely flaked of all the specimens and has very little use wear. The working edge is convex and the lateral edge opposite the working edge is straight. The notches that created the tang are much wider than all of the other specimens from 41RV49. There is a remnant of cortex on one side. Measurement data are not available.

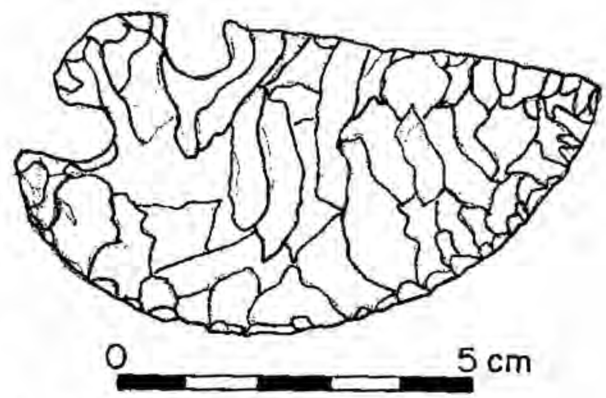

Figure 10. Specimen 9, 41RV49.

Other Specimens
Winker and Reeves Counties

Our Specimen 10 (Figure 11) is a corner tang biface found in Winkler County in 1957, by the father of Richard Rose of Midland. This specimen is made of a tan/gray Edwards chert and measures 13.4 cm in length. The maximum width is 4.2 cm and the maximum thickness is 0.7 cm. It has some use wear, but is relatively pristine in condition.

This artifact has been included in this article for two reasons. First, because it is a West Texas surface find, and secondly, because it is more representative of the corner tang bifaces found in Central Texas. This specimen clearly shows the difference between Central Texas-style corner tang artifacts and those reported in this paper from the White Post site.

Dr. Donny Hamilton (personal communication) has reported to us one other corner tang biface from Reeves County (Figure 12). The specimen was found in a road grader furrow in an area known as 16 Mile Hills. Hamilton stated that this corner tang might have come from a disturbed grave, as there are a number of burials looted in the immediate vicinity. This biface is similar in size to the nine bifaces documented from 41RV49.

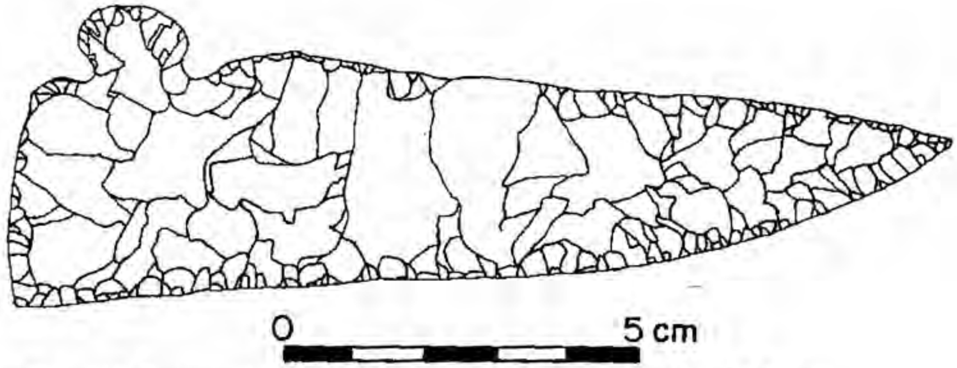

Figure 11. Specimen 10. Winkler County, Richard Rose Collection, Midland.

Figure 12. Corner Tang Biface from Reeves County, from the 16 Mile Hills area. Photograph courtesy of Dr. Donny Hamilton.

UV Light Analysis

Ultraviolet light analysis was accomplished using UVGL-55 UV light with short and long wave lengths of 254 and 365 respectively. Analysis was done in total darkness using a penlight for illumination of the Munsell color chart and a cardboard divider to separate the right and left eye. The UV light was turned on and the right eye used to view the specimen's response to the UV light, while the left eye viewed the color chart illuminated by the pin light, and compared the chart colors to the specimen response. Calame operated the UV light, while Smyers compared specimen responses to Munsell chart colors. Two of the specimens analyzed in this fashion are Specimen 4 (Figures 5 and 13) and Specimen 7 (Figures 8 and 14).

The authors discussed these results with Dr. Michael B. Collins, who has carried out extensive UV Light studies of Texas cherts. It was not possible to relate any of our results to lithic sources. The technical data are published here in the hope that they may be of use in future UV light comparisons.

DISCUSSION

The primary distribution of corner tang bifacial artifacts encompasses Central and South Texas and westward in counties along the Balcones Escarpment.

Table 1. Site 41RV49, UV Light Responses for Specimens 1-7.

Spec#	Visible	Short wave	Long wave	Visual description
1	white - no response	lime green	Gley1 - 8/5g	possible preform-white
2	7.5YR - 4/4	10YR - 4/4	2.5YR - 4/6	corner tang-gray
3	7.5YR - 5/1	2.5YR - 6/8	2.5YR - 5/6	corner tang-gray
4	7.5YR - 5/2	2.5YR - 5/6	2.5YR - 6/2	corner tang-grayish-brown
5	10YR - 5/1	10YR - 5/8	2.5YR - 5/8	corner tang-gray
6	5YR - 6/2	5YR - 4/1	10R - 3/6	corner tang base – heat-treated?
7	10YR - 7/2	5YR - 3/4	10R - 3/4	corner tang-white coarse material

Figure 13. Photograph of Specimen 4, 41RV49. See a sketch of this specimen in Figure 5. Scale in centimeters.

Figure 14. Photograph of Specimen 7, 41RV49. See a sketch of this specimen in Figure 8. Scale in centimeters.

(Turner and Hester 1993). Distributional overviews by Patterson (1937), Hall (1981), Rogers (1999), and Broehm and Lovata (2004) demonstrate the concentration of corner tang bifaces in Central Texas, as well as in southern Texas and the Lower Pecos. Examples are found well into Southeast Texas, where they appear to have been imported as high status objects that were subsequently placed in burials (e.g., Ernest Witte site; Hall 1981). These artifacts are known to extend into western and Panhandle Texas, and then into the Plains (Kraft 1994). However, since corner tang bifaces are comparatively rare in the west Texas area, outside the "core" area of Central Texas, the nine specimens from a single site (41RV49) are of particular note

The artifacts documented in this report are very uniform in size and shape. They are smaller than many of the corner tang bifaces observed in Central Texas and most exhibit signs of use wear. Their smaller size is almost certainly due to the need to conserve resources in this chert-poor region. Dr. Michael Collins tells us (personal communication) that Reeves County is situated in an area where several chert sources are equally accessible, though none are really close other than cobbles which might be obtained from the Pecos River. About 110 miles west of Mentone, in the mountains to the north of Van Horn, are several varieties of chert. Some of these cherts closely resemble Edwards, which itself could have been obtained about 75 miles to the east and southeast on the western fringe of the Edwards and Stockton Plateaus. Then, as mentioned above, there are chert cobbles in the Pecos River derived from the Guadalupe Mountains of southern New Mexico that appear very similar to the brown to tan Edwards varieties.

Although the authors think it significant that all these very similar specimens were found in such a relatively small and remote area in Reeves County, we also find it troubling, and difficult to explain, that the specimen find-spots were spread out over a two-mile distance. There are many possible scenarios as to why this is so. These specimens may possibly have been grave offerings, a cache or part of a cache, or simply left or discarded at this site over a long period of time. It appears that often corner tang bifaces have been found in association with burials as grave offerings, and so it can be speculated that these specimens were part of a grave offering, either combined as a cache or individually, and that this grave(s) were disturbed or eroded, exposing a biface to be picked up and reused by another individual at a latter date This same scenario can be applied to a non-burial cache of bifaces being discovered or recovered. Finally, there is the most likely scenario that Late Archaic peoples repeatedly occupied this area and that most or all of these specimens were discarded in use. Corner tang bifaces often have evidence of resharpening and rejuvenation, possibly from use as knives, and some were modified for use as drills and perforators.

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The authors wish to thank Larry Martin, Richie Martin, and Randy Martin of Odessa for allowing these artifacts to be photographed and documented, and for additional information on the site. We are grateful to Bob and Kathy Helton for permitting us to visit the site. Thank also to Richard Rose of Midland, and Dr. Donny Hamilton of Texas A&M University for additional information, and for allowing us to include their artifacts in this report. Dr. Michael B. Collins of The University of Texas at Austin also provided both comments and information. A special thanks goes to Roy Smyers, for his input, advice, and continued support. Without Roy, this report would not have been possible.

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