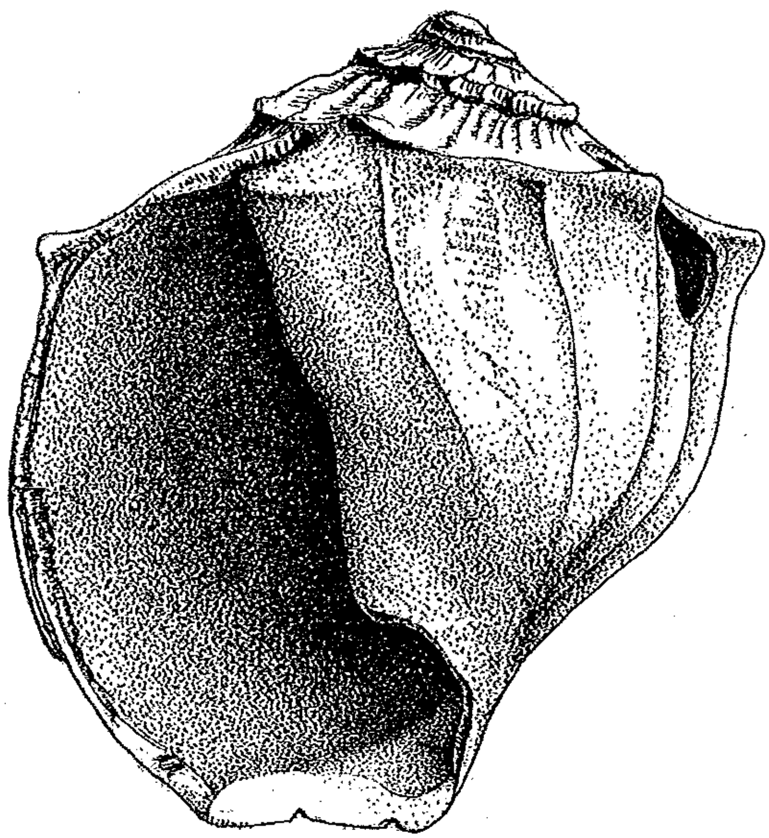
LA TIERRA



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Association

The Southern Texas Archaeological Association

The Southern Texas Archaeological Association was founded in 1973 to bring together persons interested in the prehistory of 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 concerted efforts to reach all persons interested in the prehistory of the region. To initiate problem-oriented research activities that will help us to better understand the prehistoric inhabitants of this area To conduct emergency survey 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 2012

Information for Contributors

The editor of *La Tierra* is Thomas R. Hester. Original manuscripts should be sent to Hester either by mail (PO Box 625, Utopia, TX 78884) or if possible, by email to *secocreek@swtexas.net*. Authors with questions about their manuscripts or illustrations should contact the editor. New authors are particularly urged to seek assistance in developing and submitting their papers. *La Tierra* welcomes papers on the archaeology of South Texas and surrounding area, but consideration will also be given to relevant manuscripts dealing with the archaeology of other parts of Texas.

Membership Information

Information on joining the STAA can be obtained by writing to the STAA at
PO Box 791032, San Antonio, Texas 78279.

The website at www.staa.org also provides contacts and information for new members.

Back issues of *La Tierra* and Special Publications can be ordered on line at www.staa.org.

Cover art by Richard L. McReynolds. A whole-shell cutting edge tool from Refugio County (see Fig.5, page 57)

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Contents

Ellen Sue Turner (1924–2012)

Thomas R. Hester

Texas archaeology has lost a great practitioner and enthusiastic supporter. Ellen Sue Turner died at age 88 on July 22, 2012. She was widely known in the Southern Texas Archaeological Association (STAA) and the Texas Archeological Society (TAS) maintaining many friendships within the avocational and professional communities. Indeed, she championed avocational archaeology, with her advocacy, time, hard work, and donations. She had the ability to work with many collectors over the years. They loaned artifacts and data that could be incorporated into publications, and here again, many friendships were formed. In this memoriam, a few of Sue's many accomplishments and activities are chronicled..

Sue was born in Jackson, Michigan on April 30, 1924 to Clyde E. and Ella Jane (Hutto) Redinger. Sue was salutatorian of Jackson High School's Class of 1942, and did three years of undergraduate work at the University of Michigan, as well as courses at Boston University in the early 1950s. She resumed her academic work in 1975 at The University of Texas at San Antonio, obtaining the BA degree in Anthropology in 1978.

Sue was greatly influenced by her father in developing her interests in archaeology. He took the family on vacations focused on the outdoors, and Sue always kept a few projectile points that her father had given her. Additionally, an aunt and uncle, who she visited in her childhood, were also key to her interests. They lived at Petit Jean Mountain in central Arkansas (location of the first state park in the state), and her uncle, T. W. Hardison. M.D. and Sue's father explored the Mountain's "Seven Caves" including rockshelters with pictographs. Sue could not go with them due to rattlesnakes. But, it was 1928, and Sue was only 4. She always insisted, however, that she had been greatly jealous to be left behind. Her dad made drawings of the rock art motifs and gave them to her in a 1988 visit. This experience proved to be very meaningful , and in a newspaper article (Sept. 19, 2009, *Petit Jean Country Herald*), Don Higgins (noted naturalist and expert avocational archaeologist in the area) gave details of Sue's early visit to the area. This was in the context part of her involvement in the 2009 Annual Founder's Day event held in honor of Dr. Hardison, who also helped start the Arkansas State Park System!

In 1945, Sue married Norman I. Turner, who was serving at the time aboard the *USS Iowa*. Norm was an architect in New York and Boston, before he and the family moved to San Antonio in 1955, where he had been hired by the Southwest Research Institute as a senior research architect. Sue and Norm had four children, Charles, Richard, Norman and Ellen. Norm spent the rest of his career at Southwest Research, and passed away in 2000.

In the 1970s, Sue was able to pursue her archaeological path, and in addition to completing her college degree, she became involved in collaborative research. She was a research associate at Trinity University from 1978-1980, working with Dr. Tom Greaves (a former Division Director at UTSA) to edit and produce the *Anthropology of Work Newsletter* for the American Anthropological Association. Sue and her husband, Norm, along with Mayanist R. E. W. Adams, began studies of the volumetrics of Maya architecture in the 1970-1980s (including a chapter in Adams' book, *Lowland Maya Settlement Patterns*, 1980).

Sue was active in UTSA archaeology courses from 1975-1979, including field schools under Dr. Joel Gunn in Gillespie County (1976) and in 1977, my field school at St. Mary's Hall in San Antonio. This time period was marked by her involvement in the STAA., the TAS, and other organizations.. She was President of the TAS in 1994, a *Bulletin* co-editor in 1985-1986 and was recognized as a Fellow in 2000.

Ellen Sue Turner. Summer 2010. Photo by Curt Harrell.

Sue Turner at the Hop Hill field school., Gillespie County, 1976.

In 1986, Sue received a preservation award from the San Antonio Conservation Society, the Archaeological Lifetime Achievement Award from STAA in 2001, and in 2007, the Texas Historical Commission presented her with the Curtis Tunnell Lifetime Achievement Award in Archeology. Sue donated her library to the College of Liberal and Fine Arts at The University of Texas at San Antonio, with the help of Dr. Daniel Gelo (Dean). Dean Gelo has equipped a special library for Sue's library within his college, where it will be available to Anthropology students.

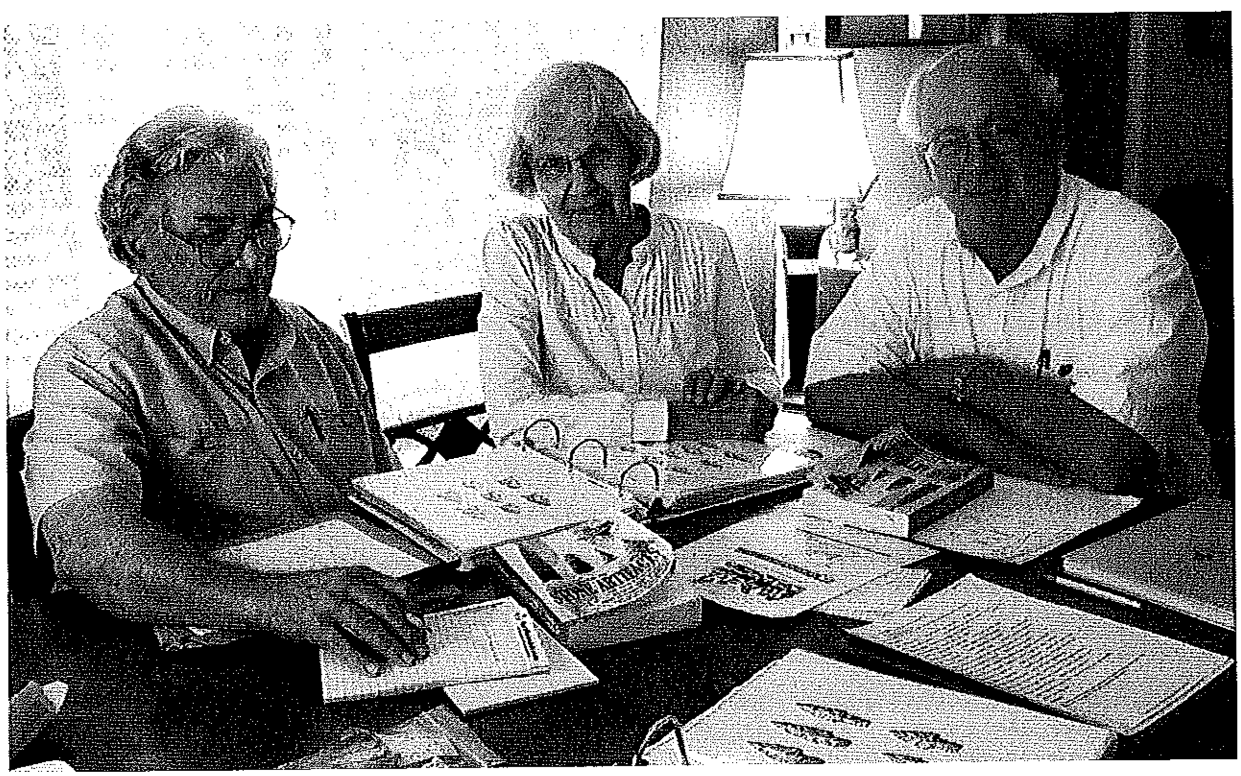
Although she traveled widely, in North America, Mexico, and Europe, nothing was more exciting than her trip to the Range Creek Canyon (Utah) in 1999. This remote ranch was beginning to receive national attention for its well preserved archaeological ruins and the protection afforded them by Waldo Wilcox, owner of the property. In June, 1999, Sue was invited by three friends to fly with them to the ranch. Wilcox gave them a tour of sites on the ranch, which included some remarkable petroglyphs. These

Sue Turner at the St. Mary's Hall site, June 1977.

archaeological remains can be linked to the Fremont culture, occupying the region between A.D. 600-1400. Sue documented many of the sites, and also reviewed much of the Wilcox family collection of the past 50 years. On her return to San Antonio, Sue posted a paper on the trip on the website of the STAA. She also began to receive calls and inquiries from the media who were interested in what she had seen! This included prominent attention given her by the Smithsonian, in a documentary filmed for PBS.

Sue was an organizational phenomenon, and to someone like the author who exists in perpetual clutter, she was indeed miraculous. Of course, these skills were used with family activities, in her part-time work, her role in her church, and as an accomplished geneaologist, well before computers helped simplify that kind of research. In 1988, she completed a 400-page history of the Turner and Redinger families. Add to all of this, her many archaeological efforts, and Sue surely "multi-tasking" long before the term was developed. And, as Sue's children would tell you, her determination to get things organized extended to a document on to how to handle her death and burial, and even what songs were to be sung at the memorial service.

But it was with her book, *Stone Artifacts of Texas Indians*, in which her organizational prowess was evident. In 1983, Sue came to my office at UTSA to talk about her idea for a new typological review of Texas chipped stone artifacts. She wanted it to be comprehensive, and for it to be published in a format available to, and friendly to, the public. My reaction was underwhelming, but she assured me that if I could pull together the data, she would organize and compile a book. We arranged with Kathy Roemer, then on the staff of the Center for Archaeological Research at UTSA to do the illustrations and the first edition appeared through Gulf Publishing in 1985. A 2nd edition came out in 1993, also through Gulf Publishing. The book was bought in 2001 by Rowman and Littlefield (Lanham, MD), a nationwide publisher, and placed with one of its divisions, Taylor Trade Publishing of Boulder, CO. It was not until 2009 that Sue and I could be talked into taking on a 3rd edition. But, our reluctance was abated when Richard McReynolds made the offer to contribute original new drawings to the effort. Richard not only drew more than 1600 new illustrations, from the actual artifact in his hands, but he was also invaluable in understanding many facets of Texas typology. So, we invited him to join us, as



At work on *Stone Artifacts*, 3rd edition, 2010. l to r, Richard McReynolds, Sue Turner, Tom Hester. Photo by Lynda Hester.

a coauthor, in this 3rd edition.

With Sue's never-wavering determination, the new, much larger, and heavily revised edition was published in November 2011. In our many work-sessions in Sue's kitchen, Richard and I gave her a hard time, with every claim she made about the project -- "...this book is just too much, and I'll never live to see it finished" (one other version: "... you know I'll never live to see it published").

While most folks might be busy enough with the sorts of tasks Sue had assumed, she found time and interest for more. She authored papers for the TAS *Bulletin*, for STAA's *La Tierra*, and for the *New Handbook of Texas* (1996) published by the Texas State Historical Association. In the late 1980s, Sue "volunteered" to work with me on the assembling and organizing of a major manuscript on "ancient heavy transport" – the ways in which ancient peoples moved huge stone monuments. This work had been initiated by Prof. Robert F. Heizer (UC-Berkeley) and prior to his death in 1979, he asked me to finish the job. I was supremely lucky that Sue was very interested in the topic and especially in the formidable process of organizing boxes of notes, photos, and draft book chapters into a finished product (Heizer's organizational skills were quite similar to my own). The 285-page volume, filled with color photographs, appeared in 1990. (*The Age of Giants*, by Robert F. Heizer, edited by Thomas R. Hester and Giancarlo Ligabue, with the collaboration of Ellen Sue Turner; Venice 1990)

Sue was a treasured friend of so many people. She was an optimistic and amazingly cheerful person (a few lapses during difficult times in book production), and my wife, Lynda, and I always felt better after a visit with Sue. My daughters loved Sue, and two of their children got to know her. But that scenario can be repeated numerous times with her friends and their families. I will always consider my nearly 40-year friendship with Sue as remarkable beyond expression through typed words. She insisted on calling me her 'mentor', but I firmly believe that she "mentored" me in so many different areas of life.

[Adapted, with some changes and addition of photographs from *Texas Archeology, The Newsletter of the Texas Archeological Society* 57(2):24-25. Thanks to Jonelle Miller-Chapman for her help with the original version.]

Some New and Revised Projectile Point Classifications for the Eastern Trans-Pecos and Big Bend Region of Texas

Robert J. Mallouf

INTRODUCTION

With regard to projectile point typology, archaeologists working in the Eastern Trans-Pecos and Big Bend (ETP/BB) region of Texas have drawn historically from established classificatory frameworks in surrounding regions—particularly those of Central Texas, South Texas, and the Lower Pecos River. This past dependence on inter-regional typological constructs has been primarily a function of perceived similarities of ETP/BB point attributes with those of adjacent regions, in combination with generally erratic, non-systematic data sets from the ETP/BB region. This latter factor is significant in that temporal and contextual data for most projectile point styles of the region have been lacking due to a paucity of controlled, large-scale excavations over the past seventy years. As a consequence, detailed studies of projectile point types—often an outgrowth of enhanced data sets and numerically adequate specimen samples—have been generally lacking for the region.

Since the launching of its Trans-Pecos Archaeological Program (TAP) in 2004, the Center for Big Bend Studies at Sul Ross State University has been making notable progress regarding the integration of past and contemporary research findings. A very active survey and excavation program, coupled with periodic documentation of regional museum and private artifact collections, is bringing new perspectives to bear on long-existing interpretive issues. Re-evaluations of regional projectile point classifications, while not a focus of TAP investigations *per se*, are a natural outgrowth of the Center's more recent intensive research efforts.

The ETP/BB region is home to a daunting array of projectile point forms, particularly in its central and northern sectors. The Big Bend, which constitutes the southern sector of the eastern Trans-Pecos, is easily the best known part of the region in terms of projectile point typology and distributions—largely due to numerous archaeological reconnaissances and surveys conducted there through the years (Mallouf 1985; Cloud 2004).

Still, as noted by Turner and Hester (1999:9), the ETP/BB as a whole remains one of the state's regions for which published typological information is limited at best. To make matters worse, some new categorical constructs have been introduced recently into the ETP/BB region that tend to further confuse an already perplexing typological situation. One of these (Justice 2002) constitutes an admirable and unprecedented effort to standardize projectile point typology for the entire Southwestern United States, but uses a "broad-brush" methodology that has, at least in one case, resulted in the lumping of various dart and arrow point types under a single typological rubric, thus blurring their respective temporal, functional, and descriptive properties. In this case, the author seems to have pushed the bounds of acceptable typological practice in archaeology, even should one try to argue for such a categorization from a "lumpers" (versus "splitters") perspective.

While not pretending to resolve a plethora of typological issues current in the ETP/BB region, this paper does attempt to partially address the conundrum discussed above through the separation and re-classification of one style of arrow point that has been included by Justice with dart points under the designation "Guadalupe" (2002:231-238). In order to accomplish this, a new arrow point type, described herein and designated as the Diablo arrow point, is introduced.

Also included here is the introduction of a second new arrow point type, termed the Means arrow point, which has come to light primarily as the result of work by the Center for Big Bend Studies with Late Prehistoric projectile point caches in the ETP/BB region.

Among these and other goals of this paper is the description and naming of an arrow point type previously recognized, but left unnamed, by John A. (Jack) Hedrick for the Plateau area of the ETP/BB's central sector (Hedrick 1986). Herein termed the Alazan arrow point, new data resulting from both survey and excavation are included here in a revised description.

And lastly, this paper re-introduces and redefines the Hueco dart point, a common Late Archaic point type of the ETP/BB, which has generally been subsumed under other point type assignments in adjoining regions. Its reintroduction as a distinctive ETP/BB point type seems warranted in light of new regional data.

The author would like to recognize the contributions of Craige, Samuel, and Jesse Means, Alfred and Ruth Means, James Smith, Homer Mills, Robert Haynes, and Bobby Gray to this research effort. The excellent pen-and-ink specimen drawings are by Richard McReynolds and are adapted from Turner, et al. (2011).

THE JOHN Z. AND EXA MEANS PROJECTILE POINT CACHE

The John Z. and Exa Means Cache, herein termed the "Means Cache," provides a significant source of information for this paper and for general typological studies in the Eastern Trans-Pecos and Big Bend region. The Means Cache was discovered in December 2002 on the summit of a small igneous peak in the Y-6 Hills of Jeff Davis County, Texas (Mallouf 2009). The discoverers, Craige Means and his sons Samuel and Jesse, were hunting and had climbed the peak in an attempt to spot game animals. While at rest at the northern end of the peak's summit, they noticed a few scattered stone arrow points around the base of a small stacked cairn of rocks and boulders. As they dismantled the cairn they encountered dozens of complete and fragmentary arrow points. Excited by their discovery, the three obtained window screening and tools and began excavation of the cairn with the intent to recover all of the cache contents, regardless of specimen size. As they probed the cairn, dozens of points became hundreds of points. Upon having excavated approximately 80% of the cairn, the elder Means was struck by the scientific potentials of their find and terminated his excavation in order to notify archaeologists at the Center for Big Bend Studies (CBBS), Sul Ross State University.

Shortly after examining the cache spot in company with the Means, the author, then director of the CBBS, fielded a party of archaeologists to scientifically document the discovery, including oral interviews with the discoverers, instrument mapping of the peak summit, detailed mapping of the cairn, and controlled excavation of the remaining 20% of the cache feature. In the course of careful excavation, multiple examples of arrow point styles, including those addressed by this paper, were encountered in-situ within the cache and their association with the feature was painstakingly documented. Excavations by the Means family and CBBS archaeologists resulted in the combined recovery of over 1250 complete and fragmentary arrow points having direct and/or indirect (some displaced by erosion) association with the feature. All artifactual contents of the cache proved to have affinity with the Late Prehistoric period, as there was no Archaic or Historic period contamination of the feature.

Importantly, during the course of investigation, multiple examples of what are now termed Diablo, Means, and Alazan arrow points were documented in-situ within the cairn feature and in direct association with Livermore, Toyah, and other arrow point types. The cache and its contents remain under study by the CBBS, and findings from the discovery are scheduled for publication in 2012. The Means Cache, along with recent CBBS surveys and excavations and the regional archaeological literature, form the basis for this paper.

THE DIABLO ARROW POINT

Background

A new typological assignment, the Diablo arrow point (Fig.1), is proposed for a distinctive stone projectile of the northern Trans-Pecos of Texas and southeastern New Mexico. Recently, this point style has been lumped within a "Livermore Cluster" construct and included in a typological subset termed the "Guadalupe point" (Justice 2002:231-240). The Guadalupe point type, as defined and illustrated by Justice, is comprised of a confusing array of projectile styles that includes both dart and arrow points. Unfortunately, this commendable attempt by Justice to resolve a number of long-standing regional typological issues serves only to complicate matters further.

In order to separate and clarify the chronological, stylistic, and distributional parameters of a distinctive point style included as "Guadalupe" by Justice, the designation Diablo arrow point is herein proposed. The term Diablo is drawn from the Sierra Diablo range, which is located in western Culberson and eastern Hudspeth counties, Texas, and which falls within the known distributional range of the Diablo point type.

As noted earlier, excellent multiple examples of the Diablo point are contained in the Means Cache. In addition, a perusal of the regional archaeological literature yields numerous illustrated examples of Diablo points that have previously been described and left untyped, or routinely assigned by researchers to Livermore, Scallorn, Perdiz, or most recently, Guadalupe point types (eg. Applegarth 1976: Figs. 36,39,40,45; Boisvert 1985:30 and Fig. 8a-d; Cloud 2004:96 and Fig. 46; Justice 2002:233-234 and Fig. 29; Katz, P. R. 1978:42 and Fig. 14g; Katz and Katz 1974: Plate 11; Katz and Lukowski 1976:18 and Fig. 7c; Katz, S. R. 1978:83 and Fig. 22d; Leslie 1978:115 and Figs. 12a, 12b; Roney 1995:53 and Fig. 6e-l; Wheaton 2009:335-336 and Fig. 19.30c-e).

Similarities of the Diablo point with the Neff point style as defined by Wiseman (1971) are duly noted, and there can be little doubt that the two types are interrelated. However, Neff points are narrowly characterized as having expanding stems and L-shaped tangs (barbs?) (Wiseman 1971:24 and Figs. 12 and 13), while Diablo points are morphologically more diverse, the latter including parallel-sided and bulbous, as well as expanded stems—all apparently representative of a single technological tradition. In addition, while Diablo points, like Neff points, usually exhibit hook-like barbs, they may also have barbs that are essentially perpendicular to the long axis of the specimen—in a fashion more similar to Livermore points. Wiseman does note that examples of Neff points from the Neff site are "...not truly representative" of type specimens examined in private collections (1971:24), but does not go on to describe the range of variability that distinguishes the type.

Justice incorporates the Neff point type into his Guadalupe point construct, noting that the Neff type is "...well within the overall variation described for Guadalupe but it typically exhibits strongly angled shoulders (L-shaped) with straight sides below a narrow serrated blade which may show progressively smaller serrations moving up the blade" (2002:231). Complications relative to Justice's Guadalupe type are discussed above.

Two specimens in the Means Cache conform reasonably well to the typical Neff point style as illustrated by Wiseman (1971:21, Fig. 12). They are very narrow-bladed with strong, hook-like barbs, and appear somewhat more technologically refined than other Diablo points in the assemblage. However, unlike the example provided by Wiseman in Figure 12, both have stems that are parallel-sided rather than expanding. In sum, while a relationship between Neff and Diablo points, as defined here, seems likely, for purposes of this paper the Neff style is considered to be a subset of the Diablo point type. It is perhaps telling that many researchers working in the southeastern New Mexico area have tended to leave their examples untyped or have assigned them to Livermore and/or Scallorn types rather than Neff—possibly a reflection of typological uncertainty.

Description of the Diablo Arrow Point Type

The following type description is based on examination of 18 complete or nearly complete specimens from the Means Cache, multiple examples in private artifact collections, and comparative data from examples in the archaeological literature of the region.

Blades

Diablo arrow points are typified by narrow, short to moderately long triangular blades having straight to slightly convex lateral edges. In some examples blade edges are recurved. Moderate to strong serration of lateral edges that extends all the way to the distal blade tip is common, and occasional notching of the blade base just above the barbs serves to exaggerate the blade/barb juncture. Remnants of the original flake removal scar are sometimes present on one blade face.

Barbs

Barbs are often wide relative to overall point length and are typically strong to exaggerated, often exhibiting a severe arching curve that results in a hook-like configuration that is enhanced by deep corner notching. In some examples barbs simply project at right angles to the long axis of the point.

Stems

Stems are variable and may be slightly bulbous, parallel-sided, or expanding. The width of the stem

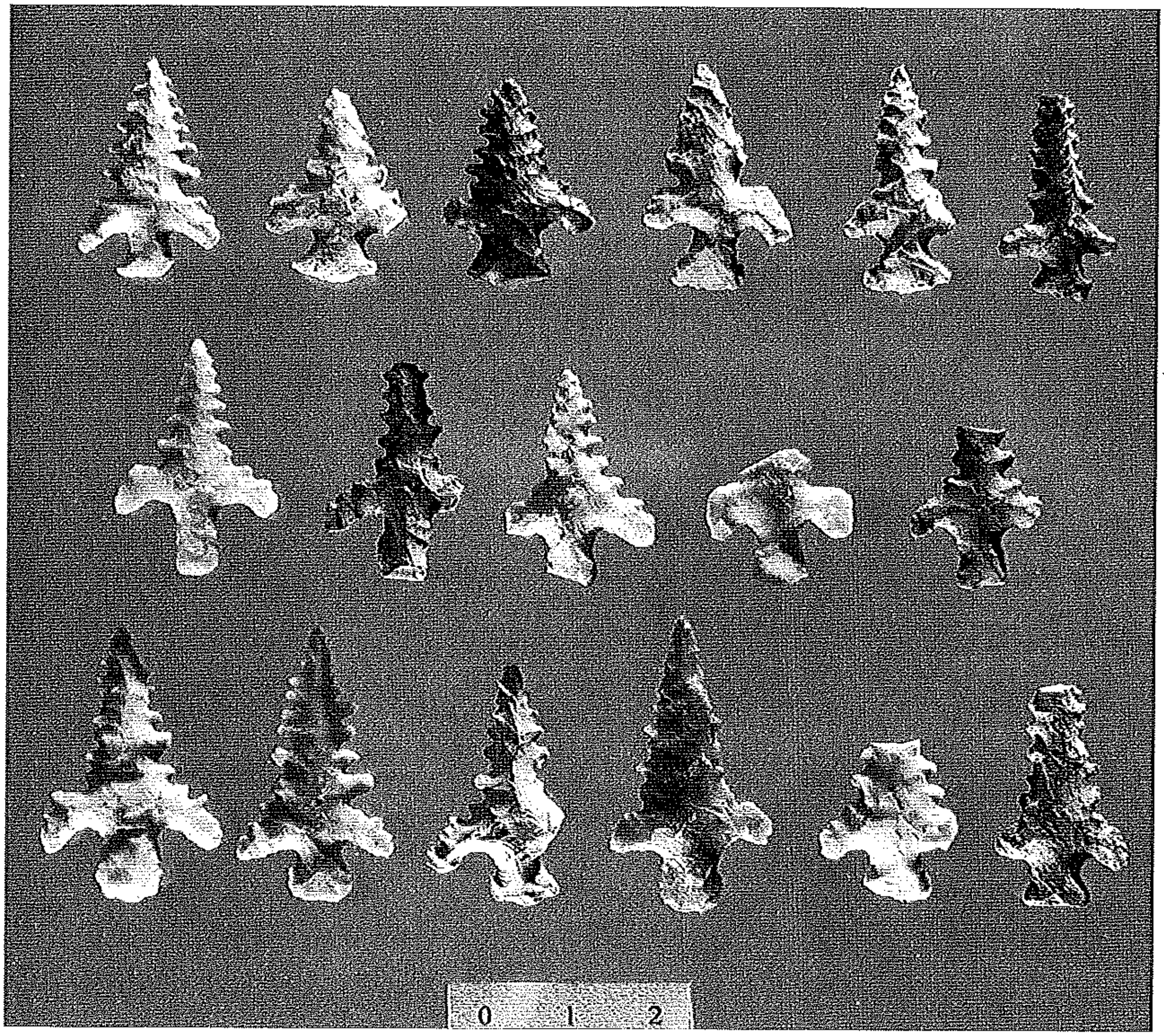


Figure 1. Examples of Diablo arrow points from the ETP/BB.

neck may approximate the base width of the blade (at its juncture with the barbs) or may be more narrow. Expanding stems are typically small in relation to overall specimen size, and are wedge-shaped with straight to slightly convex basal edges. In both expanding and bulbous stem examples, stem elements usually constitute only 20-30% of overall specimen length.

Cross-Sections

Typically lenticular but may be plano-convex.

Workmanship

Fair to excellent.

Dimensional Data for the Diablo Arrow Point Type

Dimensional data is based upon 18 complete or nearly complete specimens available for study. All dimensions are in millimeters (mm).

Range of maximum length: 25.5–40.6
Mean length: 31.7

Range of maximum width: 14.0–21.3
Mean width: 17.6

Range of maximum thickness: 3.3–4.8
Mean thickness: 3.9

Distribution of the Diablo Arrow Point Type

The Diablo point (Fig.2) is found primarily across portions of the central and northern sectors of the Eastern Trans-Pecos region of Texas and in areas of southeastern New Mexico. More specifically, its known distribution includes the northwestern Davis Mountains, northern Lobo Valley, Salt Basin, Sierra Diablo, Delaware Mountains, and Guadalupe Mountains in Texas. Diablo points are much less common, but do occur, south of the Davis Mountains in the Big Bend area of Texas. In southeastern New Mexico the distribution includes the Guadalupe Mountains north to the Capitan Mountains and east to the Mescalero Escarpment.

A recent reconnaissance conducted by the CBBS in high elevations of Guadalupe Mountains National Park yielded three Diablo points from small open campsites (Samuel Cason, personal communication 2012). In addition, a Diablo point was recovered from a tested midden deposit in the Chinati Mountains (Cason 2010:4).

Interestingly, an excellent example of a Diablo point was discovered recently in Midland County, Texas (*El Despoblado* 2009).

Age Range of the Diablo Arrow Point Type

In his age estimation for Guadalupe points, which includes examples of what is here termed the

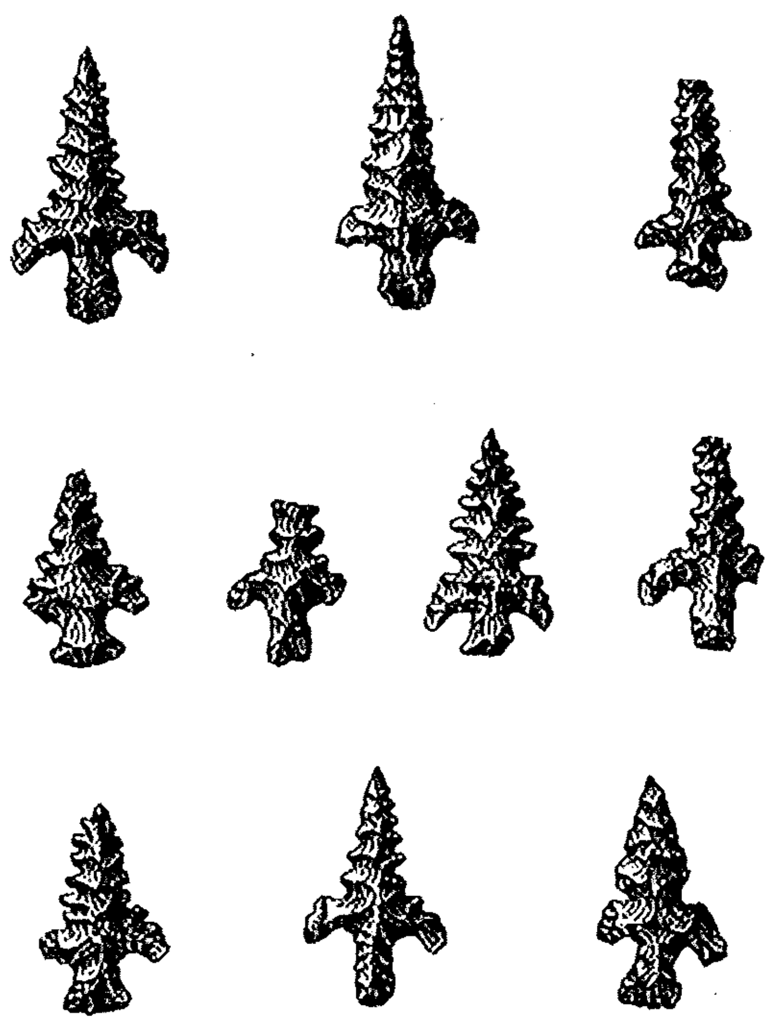


Figure 2. Examples of Diablo points from the ETP/BB. Actual size.

Diablo point as well as several other point types, Justice (2002:231) suggests a core age range of ca. A.D. 100 - 800, with a possible extension to A.D. 1000 – 1200. His inclusion of Late Archaic dart point styles (including Van Horn dart points) with arrow points within his "Guadalupe" designation accounts for his age estimation that is, in all likelihood, too early for arrow points within that category. Justice's extension of "possible" dating to A.D. 1200 is, however, within the parameters suggested here for Diablo arrow points.

Leslie (1978:114) has suggested an age range of A.D. 1000 – 1200 for similar but un-named arrow points from the vicinity of the Mescalero Escarpment in far southeastern New Mexico.

An arrow point reported but not typed by Cloud (2004:96, Fig.46) from the Arroyo de la Presa site on the Rio Grande near Presidio, Texas is from an excavated context. Although the blade has been reworked, the specimen otherwise conforms well to the Diablo type and was recovered from a stratum radiocarbon dated to A.D. 690-890 (Beta 155178).

Wheaton (2009:335-336) reports a point, described as "...a barbed variation on the Livermore style," from fill also containing ceramics within a pit structure near the Guadalupe Mountains (Site 41CU658). This excellent example of a Diablo point occurs in mixed context with ceramics dated at A.D. 1150-1300.

Attention was drawn repeatedly during the 1950s to Donald Lehmer's (1948:30 and Plate VIIf) discovery of an "intrusive Livermore point" at the Mesilla phase (Jornada Branch of the Mogollon) site of Los Tules in the El Paso area (e.g. Suhm, Krieger, and Jelks 1954:502; Kelley 1957:51). The Los Tules specimen is actually an excellent example of a Diablo point in a Mesilla phase (A.D. 200-1100) context.

The direct association of Diablo points with Livermore, Toyah, and other arrow point styles in the Means Cache is strongly suggestive of an age range of ca. A.D. 800 – 1350, or some span thereof, for Diablo points. Reliable radiocarbon assays for Toyah points in the Texas Big Bend cluster between ca. A.D. 1150 – 1350 (Corrick 2000; Cloud 2001), which may also provide a rough terminal span for Diablo points. From a purely technological standpoint, Diablo points—like Livermore points—appear to occur early in the transition from dart to arrow point usage in the eastern Trans-Pecos, probably arriving on the scene at roughly A.D. 800 or slightly earlier.

Cultural Affinity of the Diablo Arrow Point Type

The presence of Diablo arrow points in the Means Cache assemblage, which is easily dominated by Livermore points, is, at least on the surface, suggestive of an affinity with the Late Prehistoric Livermore phase. Assignment of the Diablo point to the Livermore phase is, however, problematical in that Diablo points are not present in the Livermore Cache, nor are they an element of Livermore phase components at Tall Rockshelter (Mallouf 2001) and Wolf Den Cave (Mallouf 2002) in the Davis Mountains. Other possibilities exist for their inclusion in the Means Cache. Simply stated, determination of cultural affinity for the Diablo point must await additional research.

THE MEANS ARROW POINT

Background

A new arrow point type, termed the Means point (Fig.3), is proposed for the central and northern sectors of the Eastern Trans-Pecos region of far West Texas. This distinctive point style has been noted previously by the author during cursory examination of private surface collections in Jeff Davis, Culberson, Pecos, and Reeves counties, but has only recently been recovered from a reliable context within a prehistoric cultural feature—in this case, the Means projectile point cache.

The Means arrow point is named for the Alfred and Ruth Means family of Valentine, Texas, on whose land the cache was discovered. The Means family subsequently donated the cache to Sul Ross State University.

Description of the Means Arrow Point Type

The following type description is based on examination of 22 specimens from the Means Cache and 8 specimens located in various private collections from across the region:

Blades

Means arrow points typically have long, narrow blades with moderately to strongly serrated lateral edges. Lateral blade edges, which are typically straight but may also be recurved, are in some instances strongly beveled to obtain the desired

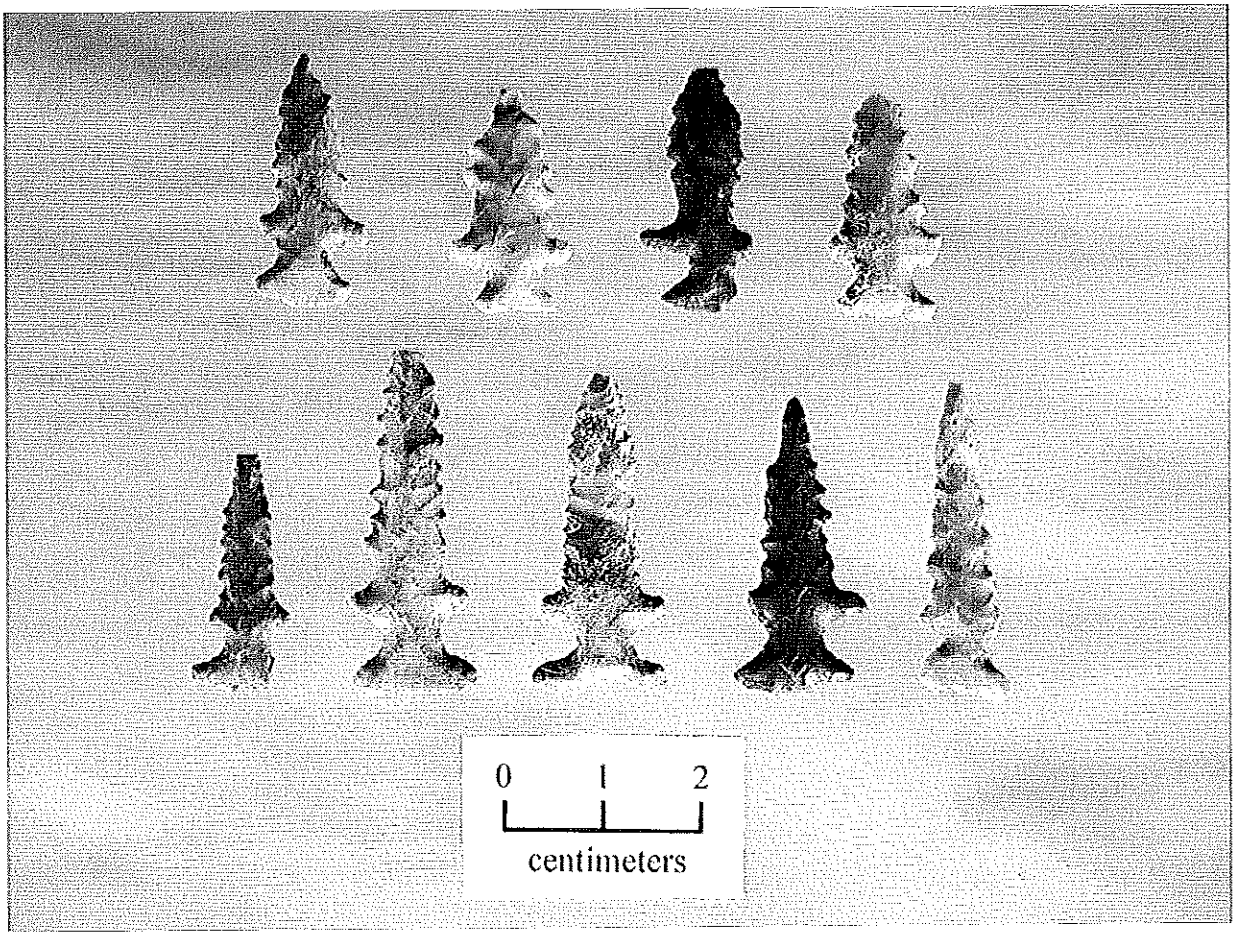


Figure 3. Examples of Means arrow points from the ETP/BB.

narrow configuration. Distal blade tip beveling is common, sometimes resulting in a tiny, perforator-like tip, but with no evidence of use wear. Base width of the blade at its juncture with the barbs roughly equates to neck width below the barbs, but may be slightly wider or slightly more narrow.

Barbs

Well-defined barbs project laterally at roughly right angles to the long axis of the point. Specimen width at the barbs roughly equates with the maximum width of the stem.

In rare instances, strong shoulders may supplant true barbs.

Stems

Stem necks are short and fairly wide relative to the overall length of the point, with neck width roughly equivalent to the basal blade width. Stems expand quickly and strongly from the stem neck, and basal edges of stems are commonly straight, but may be slightly convex or slightly concave. Width of the basal stem edge often approximates specimen width at the barbs.

Cross-Sections

Lenticular

Workmanship

Good to excellent

Dimensional Data for the Means Arrow Point Type

Dimensional data is based upon 22 specimens available for study. All dimensions are in millimeters (mm).

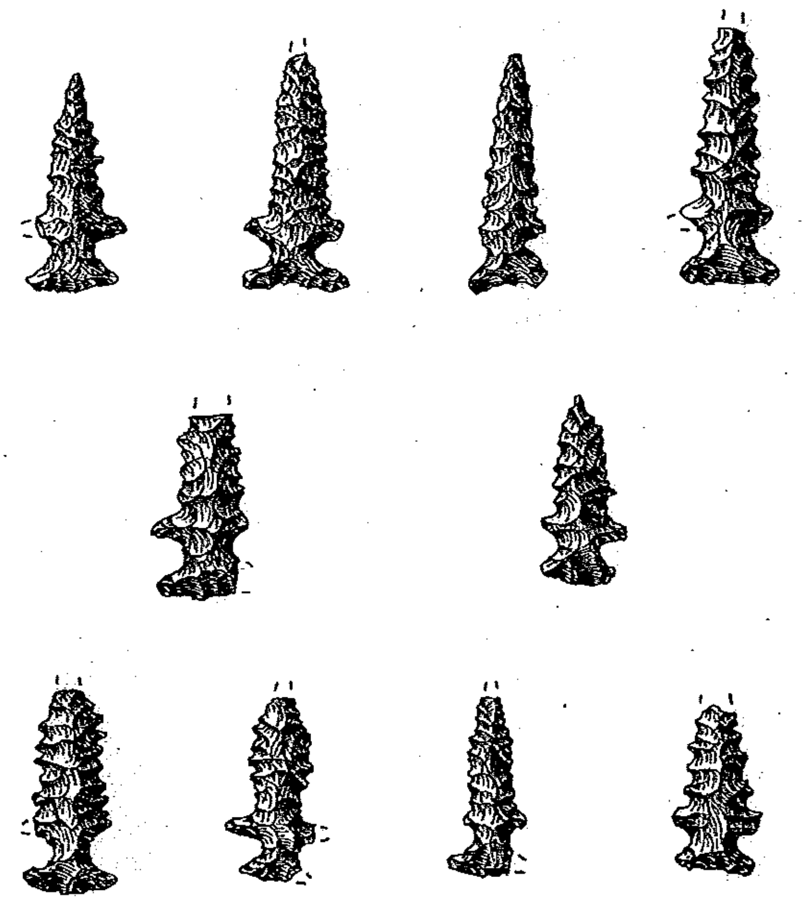


Figure 4. Examples of Means arrow points from the ETP/BB. Actual size.

Range of maximum length: 22.3–36.1
Mean length: 28.4

Range of maximum width: 10.0–14.5
Mean width: 12.3

Range of maximum thickness: 2.3–4.4
Mean thickness: 3.2

Distribution of the Means Arrow Point Type

Current knowledge of distribution would indicate that the Means point occurs primarily in the central and northern areas of the Eastern Trans-Pecos region, and probably extending northward into southeastern New Mexico. More specifically, Means points are known to occur in the Davis and Guadalupe Mountains, in Lobo Valley and the Salt Basin, and in the Glass Mountains and areas north to the Toyah Basin. As far as is known, this point type is relatively rare in the Big Bend proper, although at least one specimen has been recovered by CBBS archaeologists in Big Bend National Park. The western extent of distribution is currently unknown.

Age Range of the Means Arrow Point Type

The chronological span of the Means arrow point (Fig.4) is within the Late Prehistoric period, or roughly A.D. 700–1350, based upon average size, thickness, and stylistic parameters, as well as upon its direct association with Livermore and Toyah points in the Means Cache. Radiocarbon dates for Toyah points in the region cluster generally at A.D. 1150-1350 (Corrick 2000; Cloud 2001), and it is suspected that the terminal age for Means points is within that 200 year span.

Wheaton (2009:334; Fig. 19.29d-f) illustrates three specimens, identified by him as "Scallorn variants," that are actually good examples of Means points. All are from mixed midden components containing ceramics in the vicinity of the southern Guadalupe Mountains.

Cultural Affinity of the Means Arrow Point Type

The occurrence of Means points in direct association with Livermore and Toyah points in the Means Cache suggests cultural affiliation with the Livermore Phase of late prehistory. Livermore arrow points easily dominate the Means Cache assemblage, and Toyah points are a common component of Livermore Phase assemblages. However, Means points are absent from the Livermore Cache and from Livermore assemblages at Wolf Den Cave (Mallouf 2002) and Tall Rockshelter (Mallouf 2001; Jensen et. al. 2004), making assignment to the Livermore Phase problematical pending additional research.

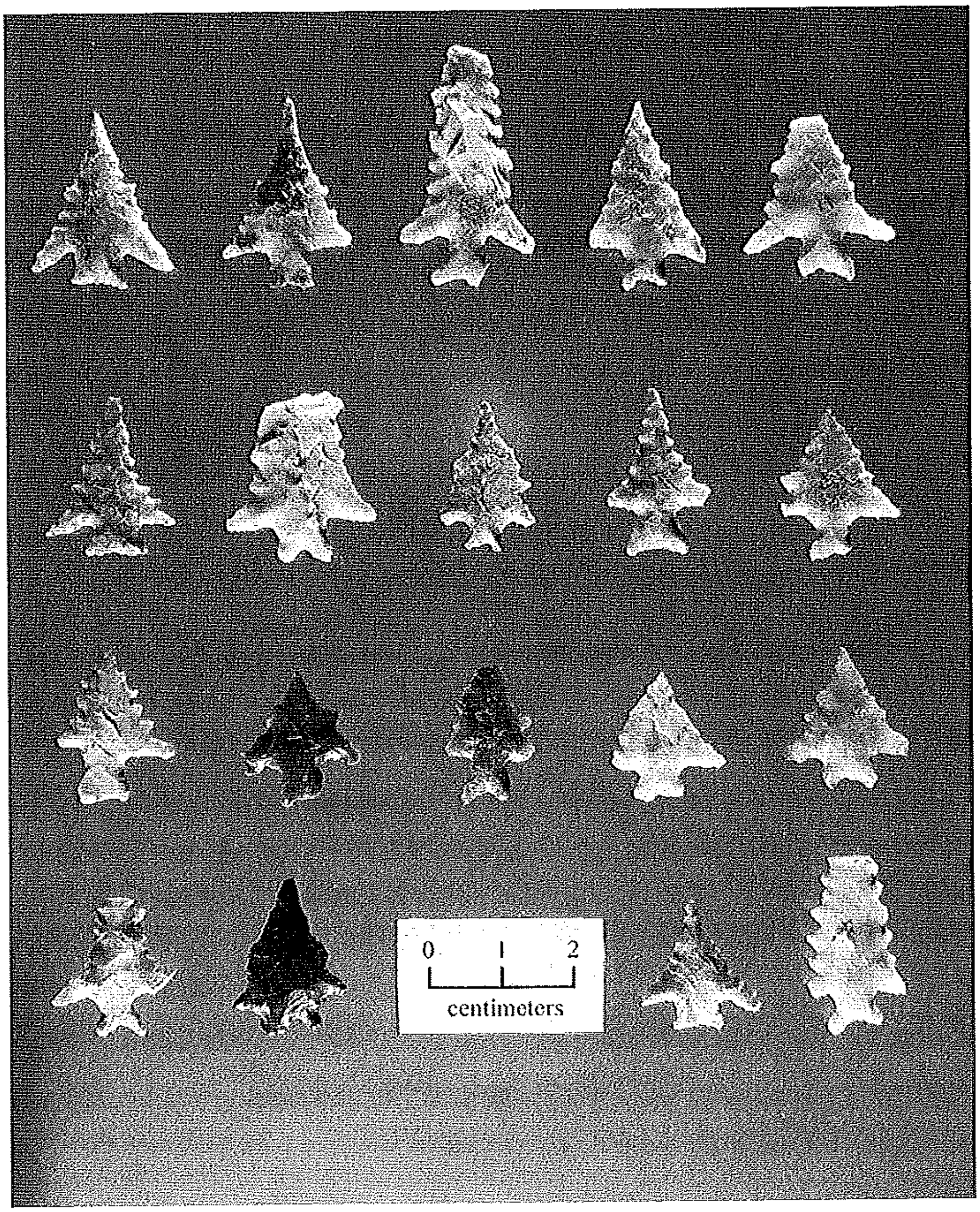


Figure 5. Examples of Alazan arrow points from the ETP/BB.

THE ALAZAN ARROW POINT

Background

A new projectile point designation, the Alazan arrow point (Fig.5), is proposed for the Eastern Trans-Pecos and Big Bend region of West Texas. This arrow point style was first recognized by John A. (Jack) Hedrick of the El Paso Archaeological Society during his archaeological surveys of the Van Horn/Plateau area during the 1970s and 1980s. Initial descriptions of the point were published in *The Artifact* during the mid-1980s (Hedrick 1986), but the point was never given an official type name. Data recovery since the mid-1980s supports Hedrick's original contention that this point style is distinctive and in need of further research.

While originally assigned by Hedrick to only the Plateau Complex of the Van Horn area, more recent research indicates a much broader distribution for this point type. Archaeological surveys and some excavations conducted at various times across the central (Davis Mountains) and southern (Big Bend) sectors of the eastern Trans-Pecos have yielded more examples of the Alazan point type. The examination of private artifact collections from the region has yielded many additional specimens as well, and several specimens are present in the recently discovered Means Cache from western Jeff Davis County (Mallouf 2009).

As in the case of the Diablo point style, a perusal of the regional archaeological literature yields numerous examples of illustrated Alazan points. In some cases, researchers have left this style of point untyped, but more frequently have attempted to force their specimens into established typological categories—particularly Scallorn and Livermore. Some previously reported examples of the Alazan style of arrow point are found in Marmaduke (1978:142 and Fig.33l-m); Hedrick (1975:69 and Fig. 7H); Ing et. al. (1995:120 and Fig.7.7h-i); Katz and Lukowski (1976:38 and Fig. 7a-b); Mallouf and Wulfkuhle (1989:15 and Fig. 6n); Roney (1985:177 and Plate 2f-j); and Turpin (1998:35 and Fig.12c).

The type name Alazan is derived from the Alazan Hills area of southeastern Presidio County, Texas.

Description of the Alazan Arrow Point Type

Descriptions of several closely related varieties of this point are provided by Hedrick (1986:15-27), who breaks the varieties into five separate "types." It is recommended, however, that Hedrick's "Type 3" (pg. 21, Fig. 4), a bulbous-stemmed arrow point style, be removed from consideration as a variety of Alazan point, as it probably represents a separate, but as yet unresearched and unnamed projectile type. The remaining four "type" descriptions of Hedrick all are included appropriately under the single type designation of Alazan arrow point.

Blades

Alazan arrow point blades are triangular and variable as to lateral edge configurations, which are usually straight but may be slightly concave to slightly convex, or even slightly recurved. Blades range from wide to narrow and lateral edges are frequently serrated—sometimes strongly so. Distal blade tips are sometimes enhanced by beveling, giving them a needle-like appearance. Refurbishing of blades is common, sometimes resulting in a short, wide configuration relative to the overall length of the artifact.

Barbs/Shoulders:

Moderate to large-sized barbs may project at right angles to the long axis of the point, or may slope downward, occasionally flaring outward. Infrequently, specimens exhibit strong shoulders instead of barbs.

Stems

Stem necks vary from narrow to wide, and stems are typically short and small relative to overall specimen size. They may be parallel-sided to moderately expanding, usually with a small, cursory indentation in the stem basal edge. In some cases the basal indentation may result in a small "fish-tail" configuration. In most cases, the stem constitutes 20% or less of the total specimen length.

Cross-Sections

Lenticular to plano-convex.

Workmanship

Poor to excellent.

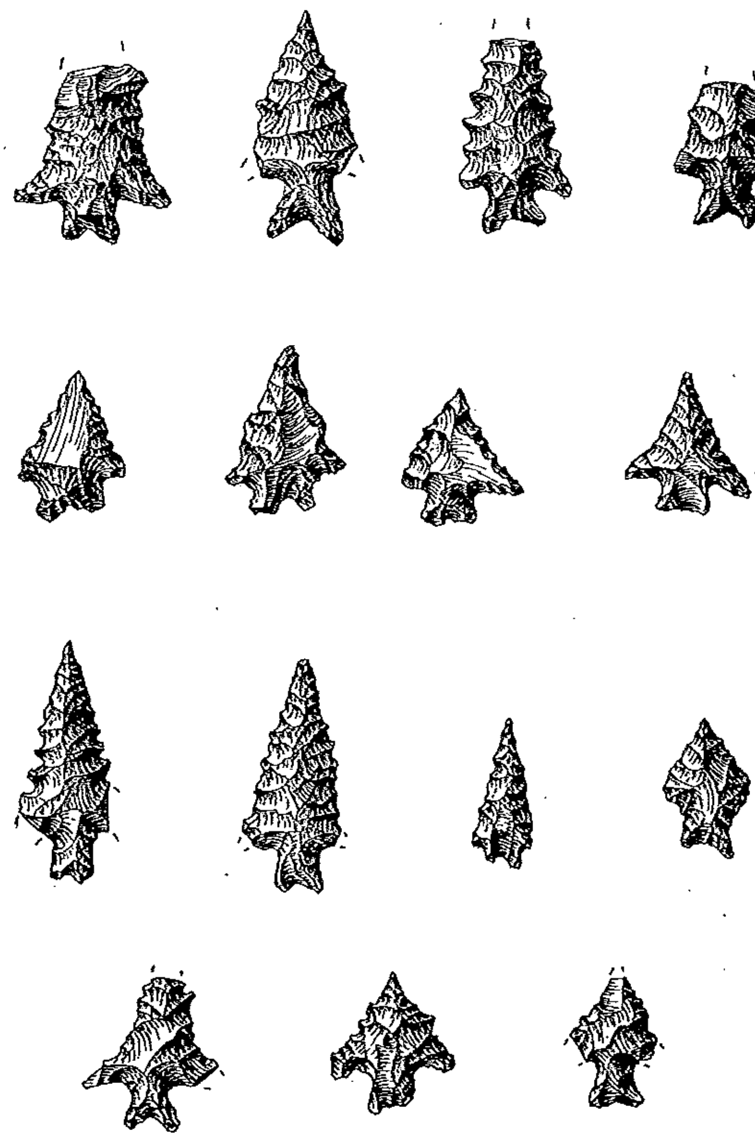


Figure 6. Alazan arrow points from the ETP/BB. Actual size.

Dimensional Data for the Alazan Arrow Point Type

Dimensional data is derived from 18 complete or nearly complete specimens available for study. All dimensions are in millimeters (mm).

Range of maximum length: 17.7–31.7
Mean length: 22.3

Range of maximum width: 8.1–20.5
Mean width: 15.3

Range of maximum neck width: 4.5–8.3
Mean neck width: 5.9

Range of maximum thickness: 2.1–4.3
Mean thickness: 2.9

Distribution of the Alazan Arrow Point Type

Alazan arrow points (Fig.6) are known to occur in the Terlingua Creek, Bear Creek, Glass Mountains, Big Canyon, Chisos Mountains, Bofecillos Mountains, Rosillos Mountains, Maravillas Creek, and Persimmon Gap areas of the Big Bend proper. They appear to have an increasing frequency to the north, being known from the Davis Mountains, Y-6 Hills, Lobo Valley, and Plateau areas. Continuing north, they are found in the Guadalupe Mountains, Delaware Mountains, and Salt Basin areas. Their general distribution across southeastern New Mexico is currently undetermined. It should be noted that Leslie (1978) does not include this arrow point style in his typology of the Mescalero Escarpment area of New Mexico.

Age Range of the Alazan Arrow Point Type

Hedrick does not attempt to place this arrow point style chronologically, other than noting its repeated occurrence in a surface context with Late Prehistoric Perdiz, Scallorn, and Toyah points (1986:22). At least four specimens were recovered by Marmaduke during investigations at Bear Creek in the Big Bend (1978). Three of the four were encountered in the upper strata of test excavations at two rockshelters (41BS466 and 41BS522). Marmaduke, who mistakenly equates these specimens with Scallorn variants, suggests their occurrence in the early part of the Late Prehistoric period. Marmaduke does note, however, that "...likening them to Scallorn is here a means of emphasizing that they are small, expanding-stem forms" (1978:142), thus indicating his uncertainty with typological placement of his specimens.

Kelly, in his Big Bend excavations at Roark Cave in Reagan Canyon, discusses six recovered specimens that fall within the Alazan point type, noting that they "...resemble the Cuney type" and that it is "...possible that they are concave-base Scallorn points" (Kelly 1963:202). Like Marmaduke, Kelly indicates uncertainty with his typological assignment, but suggests that these points are among the earliest arrow points found at Roark Cave. Kelly, unfortunately, does not provide stratigraphic detail for his finds.

More recently, an untyped point having similarity with the Alazan type, along with Toyah arrow points, was recovered from test excavations at a concentrated midden deposit (Feature 2) at Tres Metates Rockshelter (41PS915) in the Pinto Canyon area of the Big Bend. Radiocarbon assays of the feature indicate an age of A.D. 1130 - 1380 for the feature and for this associated point (Seebach 2007:46-61 and Fig. 2.20b, Specimen N25-18-13).

The inclusion of a few Alazan arrow points with Livermore, Toyah, and other arrow point types in the Means Cache in the Y-6 Hills near Lobo Valley (Mallouf 2009) implies a possible age range of from A.D. 800 – 1350 for this point type. Recent radiocarbon assays of cultural features having Toyah points in direct association in the Big Bend (e.g. Corrick 2000; Cloud and others 1994; Cloud and Piehl 2008) would seem to narrow the chronological range for Alazan arrow points, through association with Toyah points, to ca. A.D. 1150 – 1350 or somewhat later.

Cultural Affinity of the Alazan Arrow Point Type

The association of Alazan arrow points with Livermore and Toyah points in the Means Cache is suggestive, but not conclusive, of affinities with the Livermore phase of the Eastern Trans-Pecos. As noted above, Alazan points have been recovered from most, if not all areas of the Eastern Trans-Pecos and from a wide variety of contexts. However, additional research is necessary to confidently assign cultural affinities to this point type.

THE HUECO DART POINT

Background

Originally included as a material trait of the Hueco phase in the El Paso region by Cosgrove (1947) and Lehmer (1948), the Hueco point (Fig.7) is a common dart point type of both eastern and western sectors of Trans-Pecos Texas including the Big Bend. In his Southwestern point typology, Justice (2002), following in the footsteps of a number of Southwestern archaeologists, incorporates the Hueco point into the San Pedro dart point type while noting a tendency "...to label as San Pedro forms possessing narrow and more elongated blades while assigning the name Hueco or Basketmaker II to specimens exhibiting wide blades" (2002:202). In order to compensate for the extreme morphological variety thus introduced into the San Pedro point type, the terms "narrow" and/or "wide" and "large" and/or "small" are often used in combination with the San Pedro type name. However, at least two fairly recent studies in the El Paso area (McNeish and Beckett 1987:18; MacNeish 1993:182-183) retain the Hueco point type while making the case for it being "...a distinctive type for

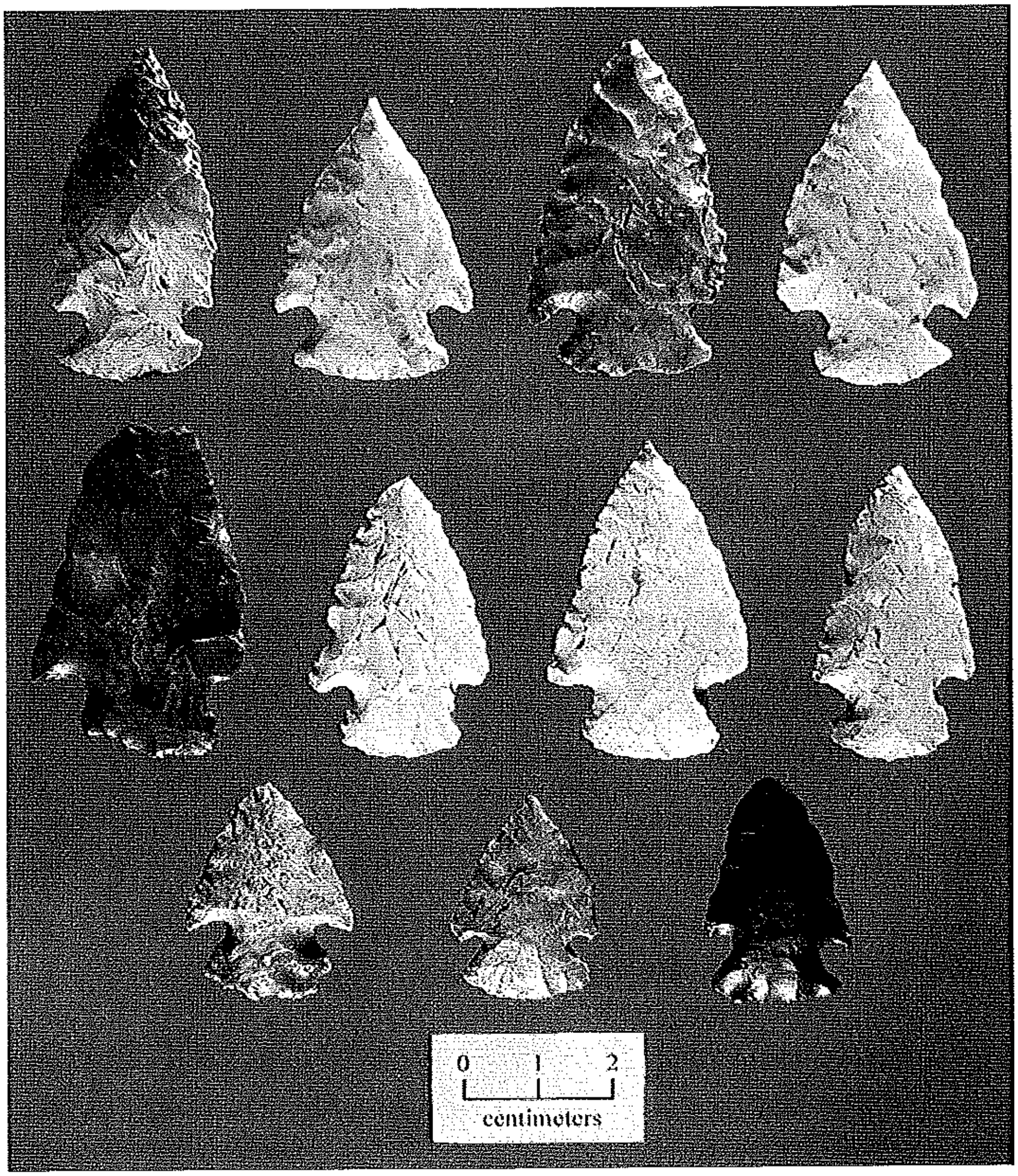


Figure 7. Examples of Hueco dart points from the ETP/BB.

the Jornada region, occupying a definite time period" (MacNeish 1993:183).

In the eastern Trans-Pecos and Big Bend archaeologists have historically disregarded the Hueco point type, attempting instead to force Hueco-like specimens into standardized Texas typologies, or sometimes more appropriately leaving such specimens un-typed. Justice aptly addresses this conundrum by noting that:

> "The region of southeastern New Mexico and West Texas is an area where a transition, and in some cases a buffer exists, between Archaic lithic technologies arising from separate developments in Northern Mexico, the Southwest, the Big Bend, Edwards Plateau, and Plains regions, which makes constructing typologies for the area rather difficult." (2002:207)

This observation is certainly relevant as it pertains to the Hueco dart point type, which has fairly strong similarities to several other dart point styles—both in the Southwest and in adjoining parts of Texas. These include San Pedro, Tularosa, En Medio, Ellis, Marcos, and Ensor. Along with Hueco, at least four of these types occur in the Big Bend alone.

That considerable confusion exists with respect to expanding stem dart point types in the ETP/BB is revealed by perusal of the regional literature. Many of those expanding stem dart points described and/or illustrated often do not conform easily to the types to which they are assigned. While a number of issues enter into play here, including the common aboriginal practice of refurbishing and/or re-sharpening of damaged projectiles, at least part of the problem may lie in the "lumping" of morphological and/or technological attributes by analysts, ultimately obscuring potentially significant chronological and/or cultural patterning.

The Hueco dart point type is reaffirmed here for much of Trans-Pecos Texas, including the Big Bend. While having similarities with some other point types, as noted above, the Hueco point is distinguished by several attributes, among which are corner notching, notable width of blade, marked convexity of lateral blade edges, typical absence of blade edge serration, and moderate to strong convexity of stem basal edge.

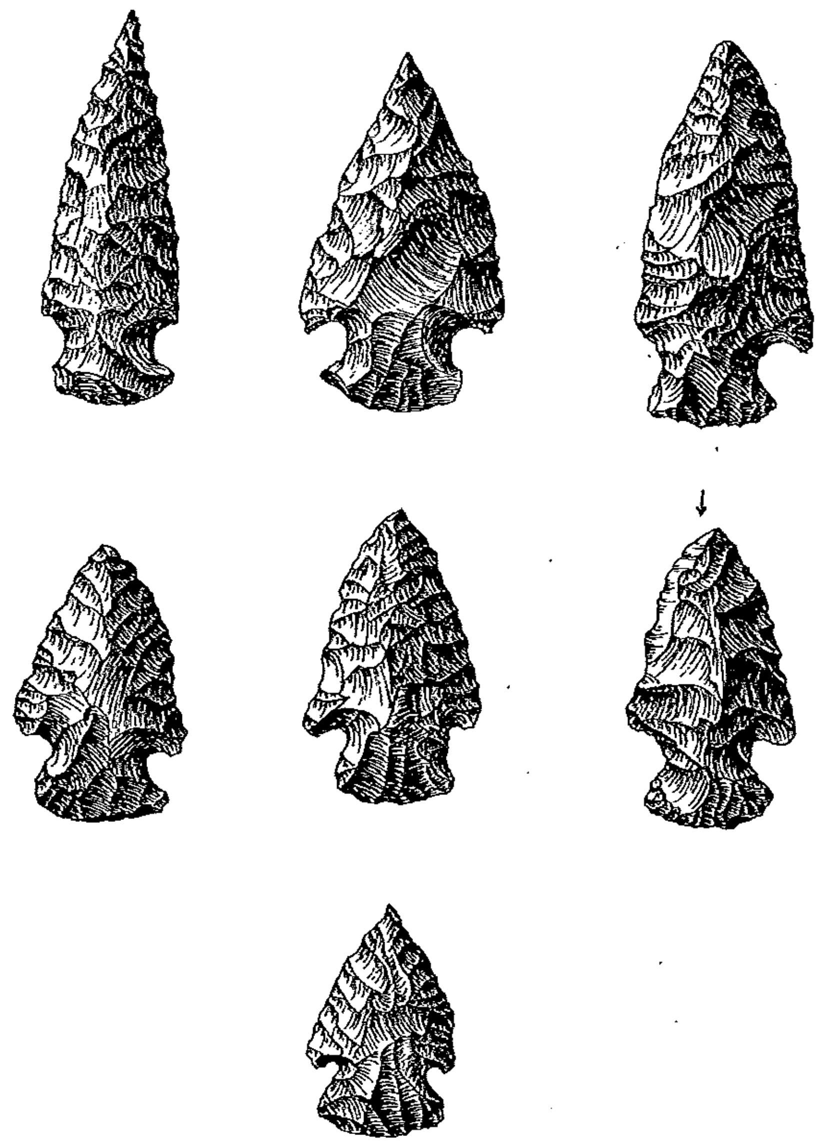


Figure 8. Examples of Hueco dart points from the ETP/BB. Actual size.

Description of the Hueco Dart Point Type

Blades

Blades typically are broad and leaf-shaped with moderate to strongly convex lateral edges. Straight to slightly recurved edges occur, but are much less common and are often related to refurbishing of points, the latter sometimes resulting in a bevel to the blade edge. Lateral blade edges are rarely if ever serrated.

Barbs/Shoulders

Barbs are down-sloped and small relative to the overall size of blades and stems. Infrequently, specimens exhibit strong shoulders resulting from the reworking of broken barbs.

Stems

Corner notches are typically small relative to the overall specimen size, resulting in short, broad expanding stems. Stem necks are wider than most other dart point styles. Stem ears are pointed to rounded, and stem basal edges are moderately to strongly convex.

Cross-Sections

Lenticular. Specimens may be fairly thick relative to specimen size, with the thickest portion typically occurring immediately above the juncture of the blade with the stem.

Workmanship

Good to excellent

Dimensional Data for the Hueco Point Type

Dimensional data is derived from 28 complete and nearly complete specimens, all from the Big Bend area. Dimensions are in millimeters (mm).

Range of maximum length: 28.0–50.5
Mean length: 38.8

Range of maximum width: 19.4–30.6
Mean width: 24.9

Range of maximum neck width: 10.4–16.5
Mean neck width: 13.5

Range of maximum thickness: 4.8–8.2
Mean thickness: 6.4

Distribution of the Hueco Dart Point Type

The Hueco point type (Fig.8) occurs throughout the ETP/BB, western Trans-Pecos, and El Paso regions. As noted by MacNeish, it does not appear to range west as far as the Gila drainage system or into the Ventana Cave area of southern Arizona (1993:183). Importantly, the range of the Hueco type in the Southwest appears much more restricted than that of the San Pedro type, with which it is often typologically combined (see earlier discussion).

To the north of Trans-Pecos Texas the Hueco type extends into the Mescalero Ridge area of far southeastern New Mexico (e.g. see Leslie 1978:129-131 and Fig 18a), and appears to be present (e.g. Applegarth 1976:222, Plate 8) but less common in the Guadalupe Mountains to the west. Farther north, the type occurs in the Sacramento Mountains (Lentz 2006:63-68 and Fig. 9.1, Group 6) and Capitan Mountains (Wiseman 1993:45-57 and Fig. 5).

In the eastern area of the ETP/BB the range of the Hueco type may extend slightly into the Stockton Plateau of Terrell County. Further east, in the Lower Pecos region, the Hueco type is essentially replaced by the Marcos dart point type which, although similar morphologically, is distinguishable by its typically straight basal stem edge, deeper and more narrow corner notching, and stronger, more exaggerated barbs (e.g. see Turner, Hester, and McReynolds 2011:130).

The distribution of the Hueco type to the south in Mexico remains unclear. Hueco points are apparently absent as far south as the Cuatro Cienega area of Coahuila. They are, however, present in private collections of northeastern Chihuahua, where they have been attributed in the past to the Marcos type (e.g. Mallouf 1999:59 and Fig. 4). The extent to which they occur south of the Sierra de Cuchillo Parado and Sierra Virulento of Chihuahua is unknown to this author.

Age Range of the Hueco Dart Point Type

In the El Paso region, MacNeish and Beckett (1987:18) and MacNeish (1993:183) place the Hueco point in the Late Preceramic (Hueco phase) to Early Ceramic (Mesilla phase) periods, indicating a temporal span of ca. 1000 B.C. to as late as A.D. 500 to 1000. The Mesilla phase, or that span from roughly A.D. 1 to A.D. 1100, is included within the Formative period as discussed by O'Laughlin (1980:25-26). Hydration dating of several obsidian Hueco and San Pedro points from the Organ Mountains of New Mexico has yielded a date range (with large standard deviations) of ca. 182 B.C. to ca. A.D. 308 (MacNeish 1993:325; Justice 2002:203).

At High Rolls Cave in the Sacramento Mountains of New Mexico, a series of Hueco points are dated stratigraphically to 350 B.C. ±60 to A.D. 340 ± 80 (Lentz 2006:68).

Dates for this point type are not yet forthcoming from the Texas Big Bend; however, they are expected to have a temporal span within the Late Archaic period—sometime between 1000 B.C. to A.D. 700-800.

Cultural Affinity of the Hueco Dart Point Type

As noted above, Hueco points are found throughout the preceramic (Late Archaic) Hueco phase and early ceramic Mesilla phase in the El Paso region (MacNeish and Beckett 1987:18; MacNeish 1993:183). O'Laughlin notes that the Mesilla phase "...evidences the first known occurrence of ceramics and the bow-and-arrow in the El Paso area" (1980:25). In the ETP/BB, cultural affiliation of the Hueco point type remains unclear at present.

DISCUSSION

The three arrow points described above—Diablo, Means, and Alazan—have come to light primarily as a result of analysis of the Means Cache, where multiple examples of each type are forthcoming from a single, well-documented cultural feature. Subsequent perusal of the regional archaeological literature indicates that these point types are found in a variety of environmental settings and site types, and they appear to be quite distinctive—thus deserving of typological separation both morphologically and technologically.

Far more problematical from a typological standpoint is the range of Late Archaic corner-notched dart points that occur across the ETP/BB region. Those having the closest morphological similarities with the Hueco type include Marcos, Ellis, Tularosa Corner-Notched, San Pedro, and Carlsbad. All have distinctive attributes, however, and separation can normally be achieved with acceptable accuracy by the careful analyst.

As noted by Justice (2002:3), projectile point types are based on the recognition of special attributes including shape, flaking pattern, edge treatment, hafting characteristics, re-sharpening characteristics and metrical attributes—all tempered by cultural traditions of varying rigidity All of these factors should be carefully weighed by the analyst in order to avoid introducing typological errors into the archaeological data base. Perhaps the best rule of thumb is to avoid applying type names to specimens that do not fit well within established typological constructs. The past tendency of forcing specimens into existing types has been and continues to be the source of much confusion and frustration when working with projectile point assemblages in the ETP/BB.

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Evidence of Foreshaft Size and for Reflaking of Hafted Triangular Dart Points

Richard L. McReynolds and Don Kumpe

ABSTRACT

This paper illustrates triangular dart points and knives with basal flake snap escarpments, crescent-shaped basal ridges that sometimes formed when triangular points or knives were reflaked in the haft. Pressure flakes unable to continue beneath the barrier of a tightly affixed haft were interrupted and diverted into a series of snap fractures that formed the basal escarpments or ridges. Basal flake snap escarpments partially or completely outline the contact area of the haft, and measurements of the protected haft areas within the escarpments provide accurate dimensions for the distal ends of vanished foreshafts. This paper also compares the measurements of protected haft areas to measurements of the distal ends of available wooden foreshafts.

INTRODUCTION

Over several years of looking at flaking patterns, the senior author noticed that some reflaked triangular points, usually Tortugas or Matamoros but occasionally Early Triangular points as well, have a visible crescent or semicircle of snap fractures on one or both proximal faces. These basal flake snap escarpments (or ridges) enclose a raised, flat surface area that had been protected from reflaking, and the basal escarpments appeared to have been formed by pressure flakes that snapped when they encountered a barrier. The barrier that snapped pressure flakes during reflaking was initially thought to be mastic, because the protected surface areas were notably wider on average than the distal ends of known foreshafts (see below). Examples of triangular points with basal flake snap escarpments were shown to archeologists and flint knappers, Harry Shafer, Tom Hester, Glenn Goode, Carey Weber and others, who agreed that surface areas within the basal escarpments had been protected from reflaking. Weber's (2012, this issue) subsequent reflaking of replica triangular points determined that mastic was no barrier to flaking; he found instead that a carefully prepared and tightly affixed haft was the barrier that interrupted pressure flakes and created basal flake snap escarpments. Measurements of protected or remnant haft areas (areas within basal escarpments) provide dimensions for the distal ends of vanished foreshafts (see below). This paper illustrates triangular points and knives with basal flake snap escarpments (see Figures 1 and 2), and compares the measurements of their protected haft areas to measurements of the distal ends of available wooden foreshafts (see Tables 1 and 2).

MEASUREMENTS OF PROTECTED HAFT AREAS

Twenty-seven triangular dart points and two triangular knives, all from various sites along the lower Rio Grande, were selected for measurements of their remnant or protected haft areas. Each side of a split foreshaft is approximately equal in size; therefore, the protected haft area on one side of a dart point is believed to measure within one millimeter of the protected area on the opposite side. Even partial flake snap escarpments can sometimes produce reliable widths of the missing foreshafts.

The protected haft areas of 27 triangular points measured between 13 and 20 mm in width. Their average width was 16 mm, and nineteen width measurements clustered between 15 and 17 mm. Average length of the 27 protected haft areas was 15 mm, although Weber (2012, this issue) notes that measurement of remnant (protected) haft length is

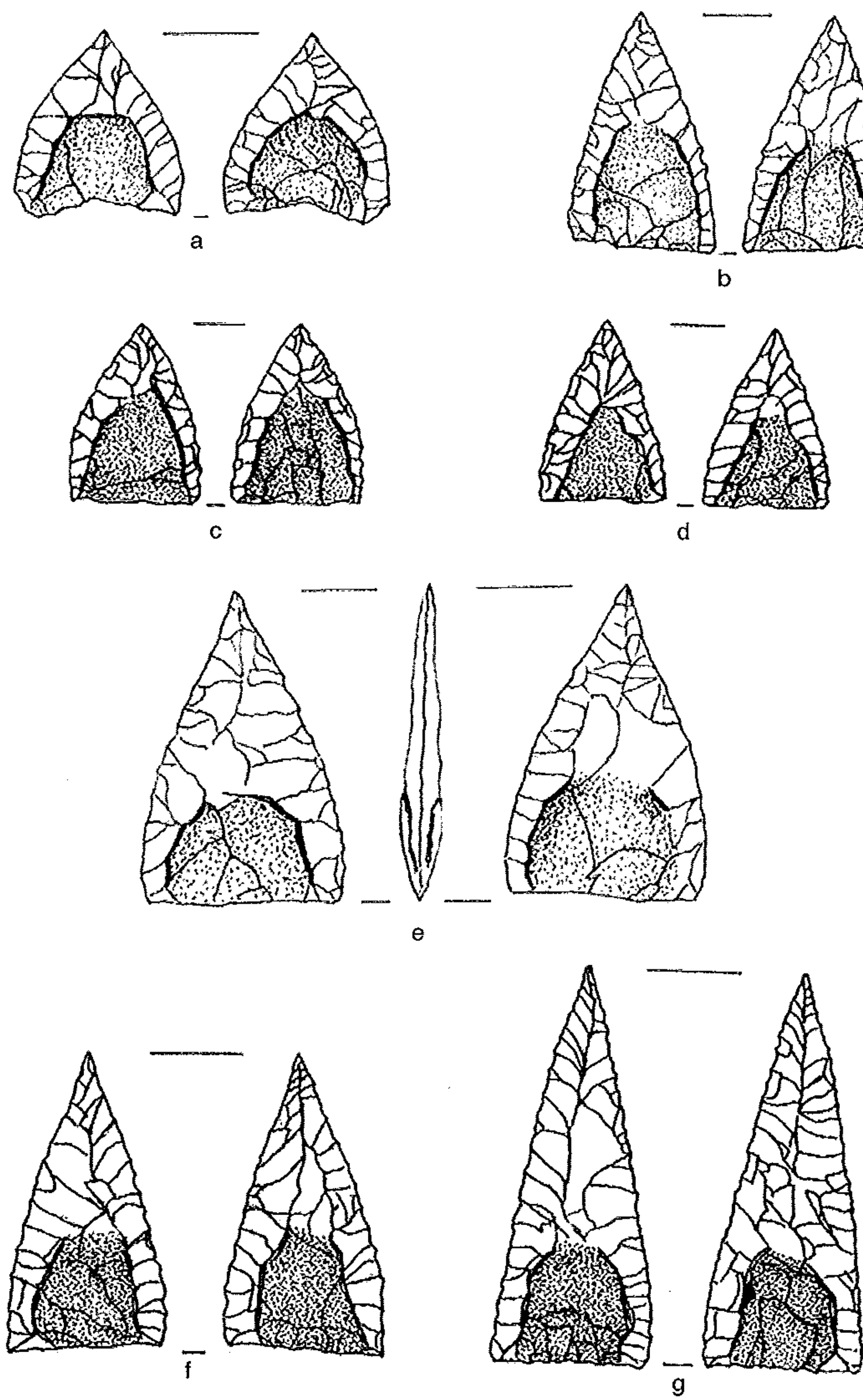

Figure 1. Drawings of Reflaked Triangular Points With Basal Flake Escarpments on Both Sides. a-d, f-g, triangular points; e, triangular knife. Both sides were shown.

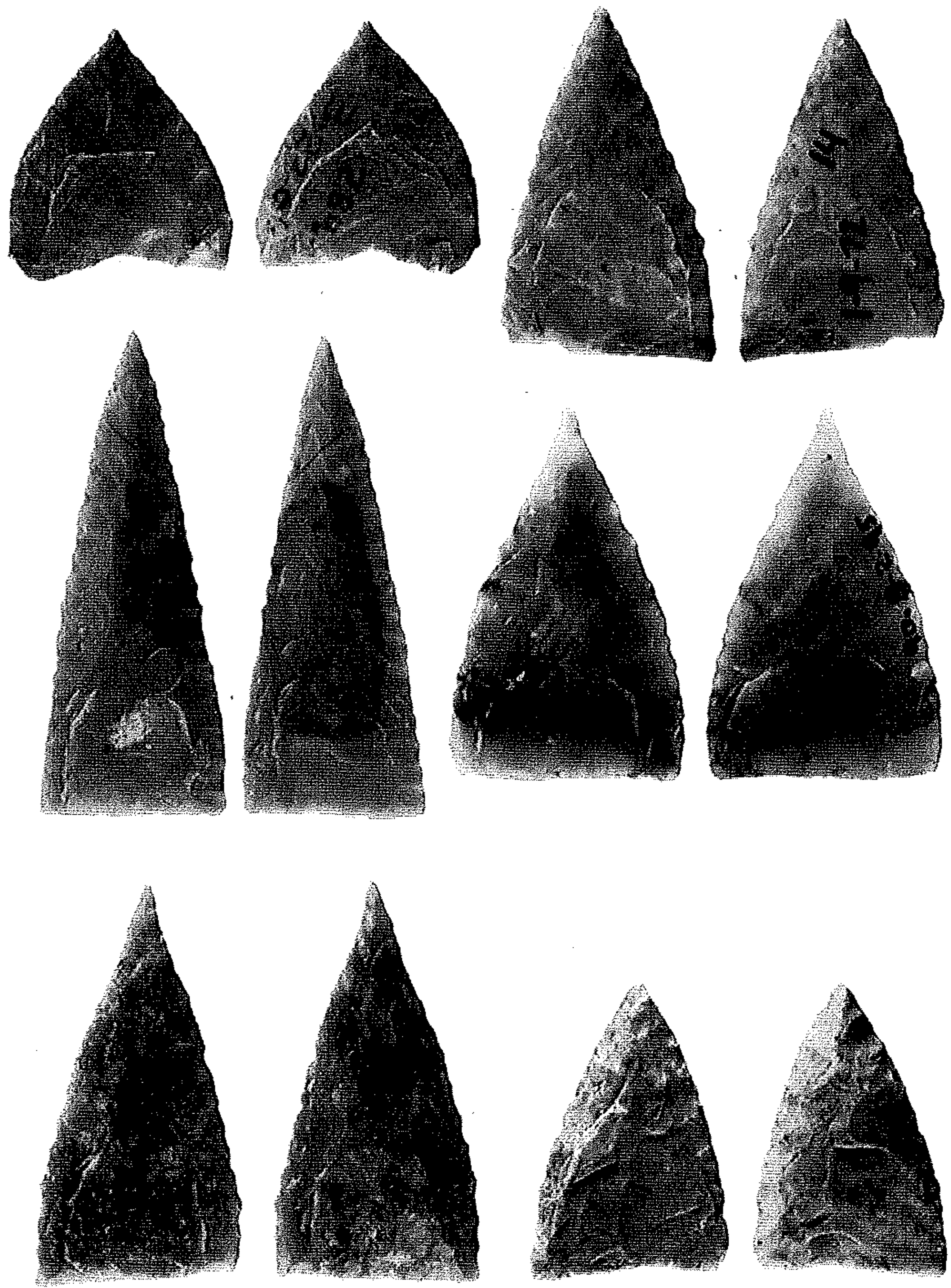

Figure 2. Reflaked Triangular Bifaces from the Lower Rio Grande. These photographs have been enlarged to enhance the view of the basal flake snap escarpments, which outline the areas protected from reflaking by a tightly affixed haft. Both sides are shown. Photographs by John Neil Hernandez.

Table 1. Metric data: Protected haft areas on triangular dart points (N=27)

	Length*	Width
Minimum	10	13
Maximum	21	20
Mean	15	16

*All measurements in millimeters.

Table 2. Metric data: The distal ends of available foreshafts.

	Length (N=22)* (of hafting slot)	Width (N=27) (of distal ends)
Minimum	7.7	8
Maximum	18.4	13.3
Mean	11.42	10.39

*All measurements in millimeters.

imprecise, because reflaking did not always reach the distal end of the foreshaft.

Two triangular specimens were determined from use wear to be knives. Both were apparently resharpened in the haft and have prominent basal flake snap escarpments. One of the two knives was drawn (see Figure 1e) and photographed (Figure 2d). It has use wear on one lateral edge, and its protected haft area is 21 mm in width. The second knife has an alternate right bevel and its distal end is rounded; its protected haft area is 22 mm in width.

MEASUREMENTS OF AVAILABLE FORESHAFTS

Wooden foreshafts are not plentiful artifacts in any museum, but due partly to the efforts of previous researchers, information was gathered on 34 prehistoric foreshafts from the dry rock shelters of Southwest Texas and northern Mexico. Brown (n. d.) provided measurements for two foreshafts, and the data for twenty foreshafts that had been gathered by LaBudde (2008) for his thesis at Texas State University, San Marcos. Twelve additional foreshafts were measured at the Witte Museum in San Antonio. After eliminating duplicates and specimens with missing distal ends there were 27 useful foreshafts. Their distal ends ranged from 8 to 13.3 mm in width and had an average width of 10.39 mm. Their hafting slots averaged 11.42 mm in depth (see Table 2).

Although many Central Texas point types are larger than Langtry or Shumla and have broad stems, the foreshafts that were measured are of the same general size, and some are hafted to dart points with small stems, like Langtry, Shumla, and Carlsbad. From measurements of their protected haft areas, the 27 triangular points had foreshafts that averaged 16 mm with width at their distal ends. In comparison, the 27 foreshafts for points with small stems averaged only 10.39 mm in width at their distal ends (see Table 2).

DISCUSSION

Martin (1933) said that he could see nothing other than guajilla gum holding Lower Pecos dart points (like Langtry or Shumla) in place. However, Turner, et al.(2011:24) illustrate a hafted Shumla from the Lower Pecos that was secured by resin-covered binding. Some hafts utilized binding only. Creel (1997), for example, illustrates six hafted Carlsbad points that were only secured with binding, all six from Ceremonial Cave (41EP19) in El Paso County.

Information on hafting triangular dart points comes from MacNeish (1958:65), who remarks on three hafted Tortugas points that were found in the Sierra de Tamaulipas:

> "Three of this (Tortugas) type were found in the Sierra Madre attached to their original shafts. The two smaller ones were attached to

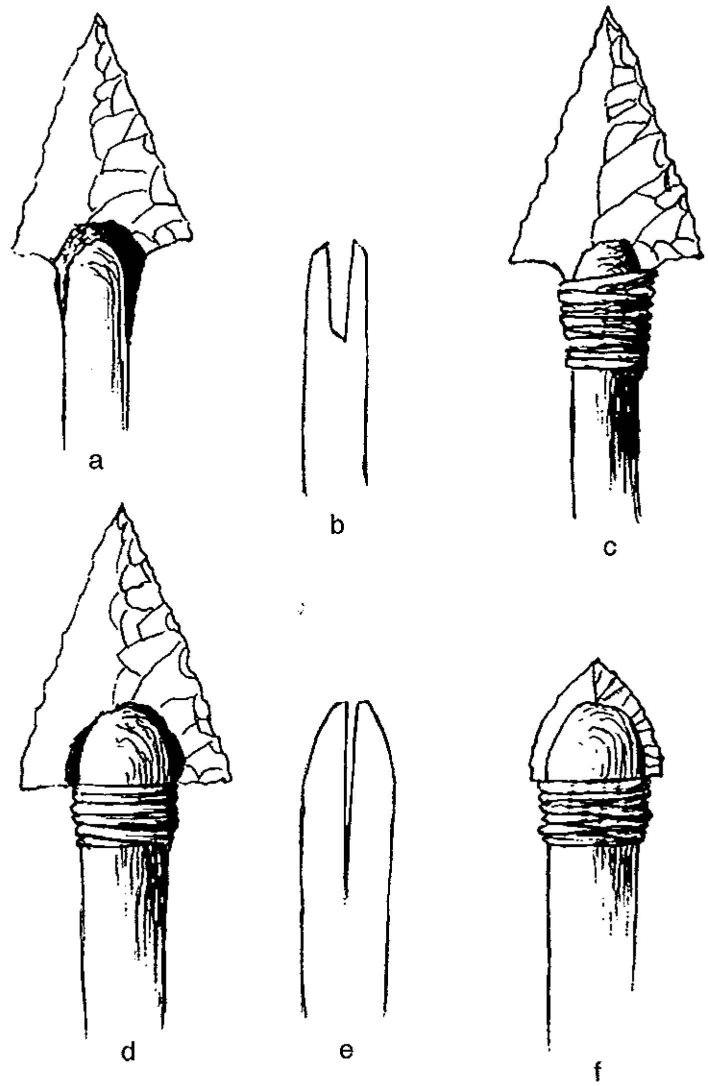

Figure 3. Drawings Suggested by the Measurements of Foreshaft Made for Small-stemmed Points, and by Measurements of the Protective Haft Areas on Reflaked Triangular Points. a,c, Langtry points on comparatively narrow foreshafts; d, f, triangular points on wider foreshafts. b, foreshaft using tongue and groove, e, foreshaft with split.

atlatl foreshafts and had been inserted into a V-shaped slot and stuck to it with gum. The V-shaped slot then had been closed against the basal flutes of the points by a tightening of stringaround the foreshaft, just below the base of the point. The other, larger point had been inserted into the slot at the end of a thick piece of cane, which served as a lance shaft. Thus it is safe to conclude that the larger Tortugas points were lance tips, while the smaller ones were tips of dart foreshafts."

Although MacNeish does not give the dimensions of the attached foreshafts, his note of the "string" binding is important information for the process of forming a tight haft. A split foreshaft can be clamped tight by binding at the base of the point, while the tongue and groove slots cannot be similarly tightened (see Figure 3). As Weber (2012) determined, a firm bond between dart point and foreshaft was the essential, to form basal flake snap escarpments and preserve the dimensions of vanished foreshafts.

To summarize, basal flake snap escarpments formed during reflaking, when a series of flakes were interrupted by the barrier of a tightly affixed haft and diverted into a series of snap fractures. The resulting crescent-shaped ridge, the basal flake snap escarpment, encloses a protected or remnant haft area. Measurements of protected haft areas provide dimensions of the distal ends of vanished fore-shafts, and may indicate the depth of the missing foreshaft's hafting notch. It appears that foreshafts fitted to triangular dart points in south Texas and northern Mexico were notably wider at their distal ends than were the foreshafts made for small-stemmed dart points. Many of the small triangular points typed as Matamoros may have originally been large enough to type as Tortugas. Also see Weber (2012, this issue).

ACKNOWLEDGMENTS

The authors owe special thanks to Carey Weber for replicating, hafting, and reflaking more two dozen triangular points; he recreated basal flake snap escarpments and gave the senior author useful advice. Our thanks also to John Neil Hernandez for the great photos and computer work. Harry Shafer gave early encouragement. Glenn Goode, an experienced flint knapper, gave his help and advice. Stephanie Mueller at Witte Museum Collections pulled items; she also removed, photographed, and measured several foreshafts that were on display. Dr. Ken Brown provided information on foreshafts. Finally, we would like to thank Tom Hester, David Calame, Steve Tomka at CAR, and Ben McReynolds for their assistance.

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Replication of Flake Snap Escarpments on Remnant Haft Areas of Triangular Projectile Points

Carey D. Weber

ABSTRACT

Attributes of remnant haft areas on Tortugas and Matamoros projectile points are described. Experiments designed to replicate these features are described and results presented.

INTRODUCTION

Richard L. McReynolds and Don Kumpe loaned me eight examples of Tortugas and Matamoros points from Hidalgo, Starr and Zapata counties in southern Texas and Tamaulipas in northeastern Mexico to examine for possible remnant haft surfaces and for my opinion on how they were formed. I concurred that the artifacts exhibited remnant surfaces protected by foreshafts from reflaking, with margin escarpments formed by flake snap terminations. The obvious questions were how the flake snap escarpments were produced while the points were hafted, whether the flake snap escarpments represent the extent of the foreshaft or the mastic, and whether asphaltum used as the mastic could have caused the flake snap terminations.

ATTRIBUTES OF REMNANT HAFT AREAS

Attributes of hafted points and remnant haft areas with flake snap escarpments are shown in Figure 1. McReynolds and Kumpe (2012) describe a remnant haft surface on a triangular point as a "visible crescent or semi-circle of snap fractures on one or both proximal faces" (Figure 1.f-f'). These surfaces have a raised, flat appearance when compared to the reflaked areas of the point (Figure 1.f'), and they are the extent of the surface protected by the haft from the reflaking. Some remnant haft areas have margins with flake snap escarpments. These escarpments (Figure 1.h-h') are formed when adjoining flakes removed from a hafted point prematurely terminate in snap fractures (usually 1-2 overlapping flakes). The prematurely terminated fractures extend underneath the remnant haft areas (Figure 1.g-g'), whose edge surfaces resemble potato chips (Figure 4.b-c), and which are the distal parts of the flakes that were not fully detached (Figure 1.h-h'). In excellent examples the flake snap escarpments form a salient arc from one side of the base to the other (Figure 1.f, Figure 4.c).

McReynolds gives the range for maximum width of the features on prehistoric points as 12-22 mm. with mean width of 16 mm. and mean length of 15 mm. Don Kumpe estimated that the frequency of occurrence of remnant protected haft surfaces on reflaked triangular points in his sample is about 4%. This low frequency indicates that the hafting and/or reflaking technique for these bifaces is atypical when compared to other points of these types.

In addition to the eight examples from the Rio Grande area that Richard and Don loaned to me, I collected quantitative data from 53 triangular points from the area of southern Texas including Bandera, Bexar, Comal, Edwards, Kerr, and Uvalde counties for comparison. These points fit well within the Tortugas and Abasolo type descriptions published by Turner et al. (2011). Key attributes used to distinguish them from non-projectile point bifaces of similar sizes and shapes include basal thinning, pressure flaked edges, well-defined distal tips and occasional impact fractures. Nine of the points (17%) had remnant haft areas. Combined with the eight furnished by Richard, the remnant haft areas averaged 19.1 mm. long (SD: 2.39) and 17.9 mm. wide (SD: 2.06).

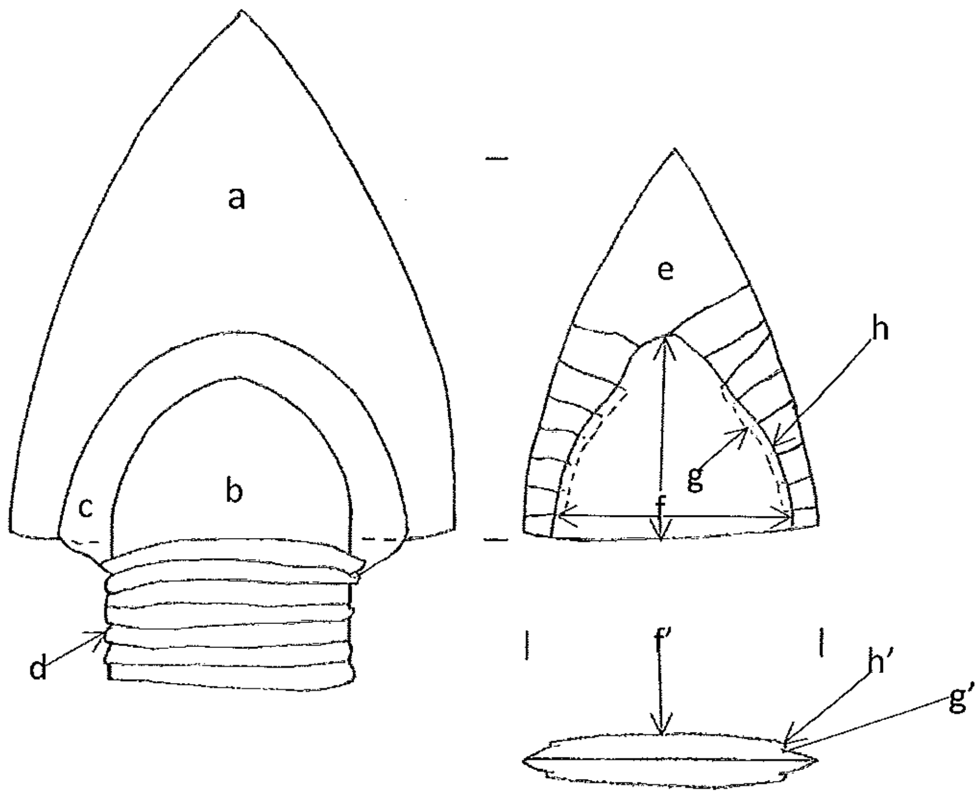

Figure 1. Attributes of Hafted and Reflaked Triangular Points. a, unreflaked biface. b, foreshaft. c, extent of mastic. d, binding. e, reflaked blade. f-f', remnant haft area. g-g', limit of fracture front. h-h', flake snap termination.

I found that measurement of remnant haft area length is imprecise, as many examples do not have flake snap escarpments or reflaking scars in the distal area of the foreshaft because reflaking did not reach that area of the biface.

Experimental Replication

What do the size of the remnant haft areas and flake snap escarpments indicate relative to hafting and reflaking of triangular points? To answer these questions successive replications were conducted and adapted based on results of earlier attempts as they were evaluated. These produced a likely explanation of the hafting technique, including foreshaft and mastic attributes, as well as a mathematical relationship of the remnant haft areas to the foreshaft size.

Experiment Design

Point Replication. 26 Tortugas points were made from Edwards chert to use in the experiment (two others were manufacture failures). The first six of these, of unheated Georgetown, were made to be my estimation of what six of the eight Rio Grande area points may have looked like before they were reflaked. These six were used in the first replication. The rest of the points were made from heated Edwards chert from Kimble County, and they were more standard in size and shape intended specifically to produce remnant haft areas with flake snap escarpments.

Hafting Technique. All of the points were hafted as described by MacNeish (1958:65) for Tortugas points found in Tamaulipas, Mexico (also quoted by McReynolds and Kumpe (2012):

"The two smaller ones were attached to atlatl foreshafts and had been inserted into a V-shaped slot and stuck to it with gum. The V-shaped slot then had been closed against the basal flutes of the points by a tightening of string around the foreshaft, just below the base of the point."

I used Mexican Buckeye to produce all of the foreshafts except for two in Replication 3 that were made of Bald Cypress (just because they were the right diameter). Rather than gum or resin, I used Elmer's Carpenter's Glue on Replications 1, 2 and 3 because it was a readily available and comparable substitute. I used asphaltum (Gilsonite) on Replication 4. For string I used braided 50 lb. test, .014" diameter nylon fishing line for Replications 1,2 and 3 and cotton string for Replication 4.

MacNeish's description of the string binding suggests a clamping effect when the string is wound. Conceivably this may be achieved by winding the string from the proximal area of the split toward the base of the mounted point, or by affixing a simple clamp (two sticks pressed together by a slip collar) at the proximal area of the split and then winding the string.

In all the replications, the diameter of the foreshaft where the base of the fitted point would be was measured prior to hafting and recorded in Table 1 as Shaft Diameter Base.

In Replications 1-3, glue was applied to each point and foreshaft notch to eliminate air voids, clamped, bound with string, and then stabilized in a non-drip position to dry. After initial drying, the extension of the foreshaft beyond the base of the point was measured and recorded as Shaft Extension. Two to three additional applications of glue were made to strengthen the area around the foreshaft on the point face. The completed tipped foreshafts were then allowed to dry for at least three days prior to reflaking. The width of the thick mastic area was measured and then recorded in Table 1 as Mastic Spread Length and Mastic Spread Width.

Reflaking was performed with an antler tine, both on a leather-padded wood anvil as well as leg-assisted, and percussion flaking was included in Replication 3. Reflaking was discontinued if a point broke free from the haft. Once reflaking was completed, the hafts were disassembled, and measurements of the point were made.

RESULTS OF EXPERIMENTS

Replication 1

The first six points were intended to be more or less replicas of selected points from the eight furnished by McReynolds and Kumpe. The pairings are shown in Figure 4a. Even though the replica foreshafts (10.42 mm. mean diameter, 12.43 mm. mean extension beyond the point base) made for this replication were made without any prehistoric data to compare with, they almost matched the mean data of the prehistoric foreshafts furnished by McReynolds (10.39 mm. mean diameter, 11.42 mm. notch depth).

For this replication only hand pressure was used to clamp the split foreshaft together on the point after the glue was applied and the binding was applied. I have had considerable experience in mounting and using split foreshaft mounted points with an atlatl. The splits in each foreshaft were made to be durable and precise enough to fit any of the points and not fail during impact. Excessive voids were compensated for by the glue and binding (Figure 1). In spite of that, one of the points broke loose during reflaking, as force is applied from the distal tip rather than the lateral edges. The foreshaft bent and loosed the mastic adhesion on the point face.

None of the Elmer's glue produced any flake snap terminations. The fractures advanced easily beneath the glue, even into heavily glued voids inside the foreshaft notch (Figure 2).

While it was relatively easy to produce remnant haft areas, flake snap escarpments were difficult to produce with any degree of certainty. All six of the reflaked points produced remnant haft areas which could be identified by changes in facial contouring, flake terminations and flake scar size (Figure 3 and Table 1). However, only one, Replica 2, retained any flake snap escarpments (16%). These occurred only from one edge on one face just outside the contact area between the foreshaft and basal thinning scar ridges.

While the remnant haft area length and width were well within the range of the prehistoric examples, the results were inconclusive statistically. The production of a flake snap escarpment from one edge of one face on one point seemed to indicate that it was the contact surface between the wood and the point, not the mastic that caused the escarpments.

Replication 2

For Replication 2 I used larger, more standard points and foreshafts, to attempt to eliminate voids and achieve a more uniform contact surface. The foreshaft diameter was increased, as well as the foreshaft extension, to provide a stronger haft that would resist failure while being reflaked (Figure 2b). To further improve the contact surface, a custom fit with each point was obtained by abrading the inside of the split foreshaft notch with the point while it was being fitted. Also, a vice grip (rather than the

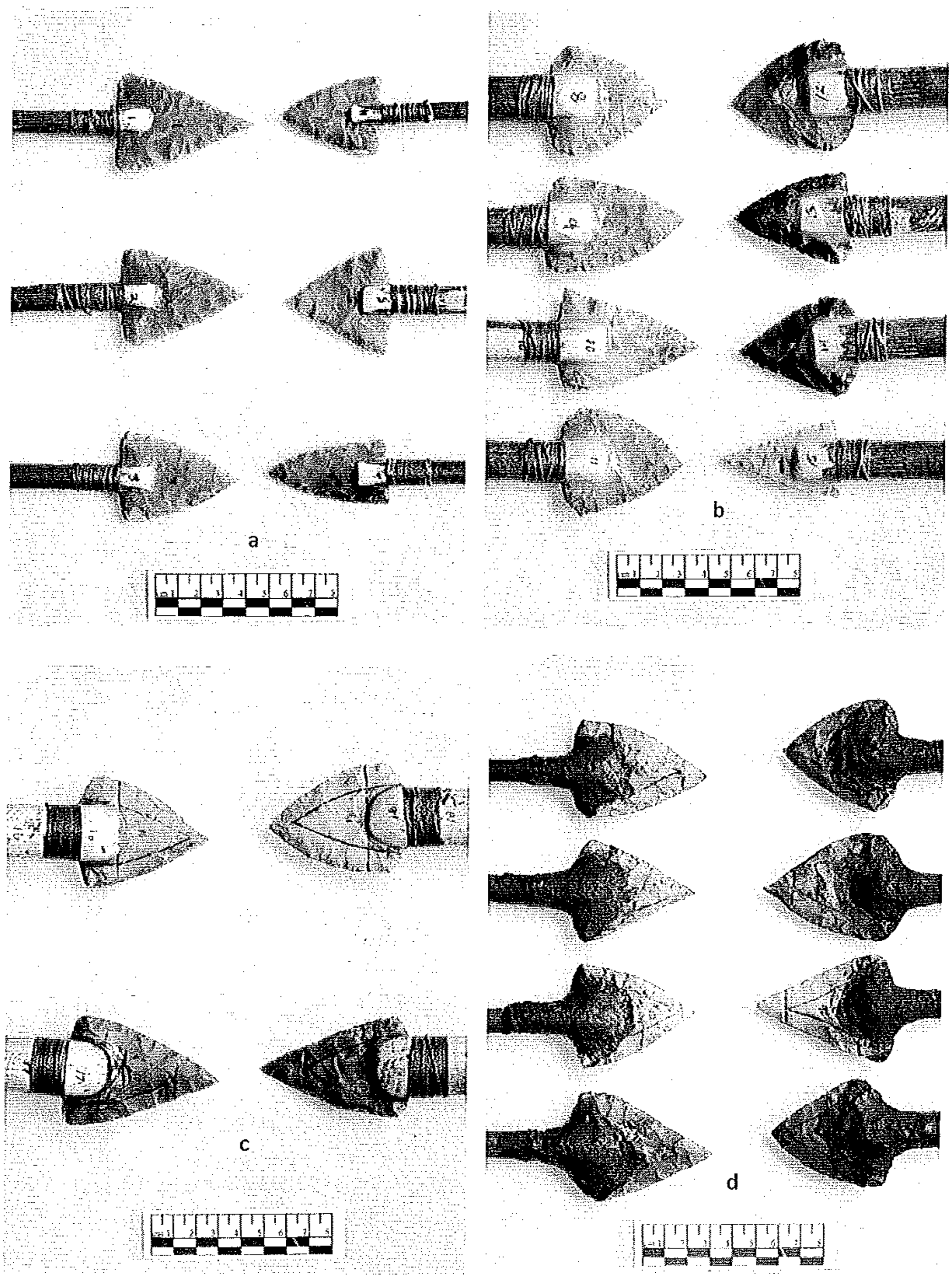

Figure 2. Hafted, Unreflaked Replica Points. a, Replication 1. b, Replication 2. c, Replication 3. d, Replication 4.

Table 1. Triangular Point Reflaking Replication Data

ID	Provenience	L	W	T	WT Ratio	LR	WR	TR	WTR Ratio	Remant Haft L	Remnant Haft W	Haft area LW ratio	Shaft Extension	Shaft Diam. BS	Mastic Spread L	Mastic Spread W	MX Haft T w/ Mastic	Rem. Haft L/ Shaft Ext.	Rem. Haft W/ Shaft Diam.	Flake Snap Escarpment	% Points	Flake Snap Escarpment #Face Edges	Flake Snap Escarpment %Face Edges
1	Replication 1	60.2	42.7	6.7	6.4	60.2	23.3	6.2	3.8	17.6	17.8	1.0	9.1	10.2	-	14.0	-	1.9	1.7	None	0.0%	0	0.0%
2	Replication 1	54.3	42.2	6.9	6.1	34.4	23.1	6.7	3.4	18.4	18.7	1.0	13.8	11.6	-	14.5	-	1.3	1.6	Face 2 right	16.7%	1	4.2%
3	Replication 1	52.7	39.3	5.2	7.6	29.8	26.5	5.3	5.0	17.1	16.6	1.0	13.7	11.1	-	13.7	-	1.2	1.5	None	0.0%	0	0.0%
4	Replication 1	45.0	34.4	5.5	6.3	34.9	23.6	5.4	4.4	16.4	18.9	0.9	12.1	7.4	-	11.0	-	1.4	2.6	None	0.0%	0	0.0%
5	Replication 1	47.6	46.7	6.0	7.8	47.6	32.0	5.5	5.8	18.0	17.8	1.0	12.3	12.0	-	15.9	-	1.5	1.5	None	0.0%	0	0.0%
6	Replication 1	53.5	28.5	6.9	4.1	30.0	20.9	5.8	3.6	18.3	14.6	1.3	13.6	10.2	-	12.8	-	1.3	1.4	None	0.0%	0	0.0%
7	Replication 1	55.0	45.5	6.2	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-
	Mean Replication 1	**52.6**	**39.9**	**6.2**	**6.5**	**39.5**	**24.9**	**5.8**	**4.3**	**17.6**	**17.4**	**1.0**	**12.4**	**10.4**	-	**13.6**	-	**1.4**	**1.7**		**16.67%**	**1**	**4.2%**
	Std Dev Replication 1	**5.0**	**6.5**	**0.7**	**1.2**	**12.0**	**3.9**	**0.5**	**0.9**	**0.8**	**1.6**	**0.1**	**1.8**	**1.6**	-	**1.6**	-	**0.2**	**0.4**				
8	Replication 2	51.0	47.3	6.8	7.0	38.5	22.4	6.4	3.5	20.8	17.0	1.2	18.0	19.0	23.8	25.1	-	1.2	0.9	Face 2 left and right	12.5%	2	6.3%
9	Replication 2	60.0	41.7	7.4	5.6	59.0	23.0	7.0	3.3	21.9	18.1	1.2	18.0	17.3	23.9	25.2	-	1.2	1.0	Face 1 right, Face 2 right	12.5%	2	6.3%
10	Replication 2	60.5	44.9	6.7	6.7	60.1	20.9	6.4	3.3	18.1	16.4	1.1	18.0	16.3	21.7	25.1	-	1.0	1.0	Face 1 right, Face 2 right	12.5%	2	6.3%
11	Replication 2	52.6	46.4	7.4	6.3	48.9	19.8	7.4	2.7	19.7	14.8	1.3	18.6	16.6	24.1	25.1	-	1.1	0.9	Face 2 right	12.5%	1	1.3%
12	Replication 2	54.0	47.8	7.6	6.3	42.3	24.2	7.6	3.2	22.3	19.5	1.1	18.0	18.2	22.1	26.1	-	1.2	1.1	Both faces, both edges	12.5%	4	12.5%
13	Replication 2	49.7	40.9	8.4	4.9	40.6	19.2	7.9	2.4	24.4	13.8	1.8	19.5	15.8	23.4	24.5	-	1.3	0.9	All except Face 1 left	12.5%	3	9.4%
14	Replication 2	52.2	43.4	7.9	5.5	44.0	21.8	7.9	2.8	23.0	17.0	1.4	18.0	18.0	24.5	24.5	-	1.3	0.9	Both faces, both edges	12.5%	4	12.5%
15	Replication 2	51.7	33.7	6.0	5.6	35.6	21.0	5.9	3.6	17.4	16.8	1.0	18.0	16.2	23.4	25.6	-	1.0	1.0	None	0.0%	0	0.0%
	Mean Replication 2	**54.0**	**43.3**	**7.3**	**6.0**	**46.1**	**21.5**	**7.1**	**3.1**	**21.0**	**16.7**	**1.3**	**18.3**	**17.2**	**23.4**	**25.1**	-	**1.1**	**1.0**		**87.5%**	**18**	**54.4%**
	Std Dev Replication 2	**4.1**	**4.6**	**0.8**	**0.7**	**9.2**	**1.7**	**0.8**	**0.4**	**2.4**	**1.8**	**0.2**	**0.5**	**1.1**	**1.0**	**0.5**	-	**0.1**	**0.1**				
16	Replication 3	56.6	49.0	7.2	6.8	48.4	31.2	6.7	4.7	17.4	26.7	0.6	14.4	22.4	21.5	29.4	18.7	1.2	1.2	Face 1 both, Face 2 left	25.0%	3	18.8%
17	Replication 3	65.0	47.7	7.3	6.5	49.2	29.3	6.4	4.6	19.3	25.5	0.8	15.4	23.3	19.0	28.0	17.0	1.3	1.1	Face 1 both, Face 2 right	25.0%	3	18.8%
18	Replication 3	60.5	48.4	7.7	6.3	50.8	30.5	7.2	4.2	19.9	25.4	0.8	15.0	24.8	17.4	30.0	19.4	1.3	1.0	Face 1 both, Face 2 right	25.0%	3	18.8%
19	Replication 3	67.8	44.7	8.1	5.5	48.1	30.3	7.4	4.1	22.3	23.7	0.9	14.5	25.9	19.0	30.0	20.4	1.5	0.9	Face 1 right, Face 2 right	25.0%	2	12.5%
	Mean Replication 3	**62.5**	**47.5**	**7.6**	**6.3**	**49.1**	**30.3**	**6.9**	**4.4**	**19.7**	**25.3**	**0.8**	**14.8**	**24.1**	**19.2**	**29.4**	**18.8**	**1.3**	**1.1**		**100.00%**	**11**	**68.8%**
	Std Dev Replication 3	**4.9**	**1.9**	**0.4**	**0.6**	**1.2**	**0.8**	**0.5**	**0.3**	**2.0**	**1.3**	**0.1**	**0.5**	**1.6**	**1.7**	**0.9**	**1.4**	**0.1**	**0.1**				
90	Presa Garcia, Tamaulipas, Mexico	-	-	-	-	47.7	30.0	5.3	5.7	18.3	23.6	0.8	15.1	23.6									
20	Replication 4	58.6	42.4	6.9	6.1	-	40.6	-	-	-	-	-	16.4	9.6	20.7	23.8	15.2	-	-	None	0.0%	0	0.0%
21	Replication 4	53.5	44.8	6.4	7.0	47.4	31.2	-	-	-	-	-	16.0	11.4	19.9	26.4	15.1	-	-	None	0.0%	0	0.0%
22	Replication 4	53.0	44.8	6.7	6.7	51.0	37.4	-	-	-	-	-	15.0	10.4	22.3	23.3	15.8	-	-	None	0.0%	0	0.0%
23	Replication 4	63.7	47.5	8.0	5.9	-	39.3	-	-	-	-	-	15.5	11.0	18.5	28.0	18.0	-	-	None	0.0%	0	0.0%
24	Replication 4	50.6	48.6	8.2	5.9	-	48.0	-	-	-	-	-	16.0	12.3	20.1	27.1	17.5	-	-	None	0.0%	0	0.0%
25	Replication 4	61.1	46.7	8.3	5.6	-	36.0	-	-	-	-	-	16.0	9.7	21.5	25.5	17.2	-	-	None	0.0%	0	0.0%
26	Replication 4	60.5	46.5	8.0	5.8	53.3	-	-	-	-	-	-	15.3	10.4	22.1	27.9	15.8	-	-	None	0.0%	0	0.0%
27	Replication 4	53.5	47.5	7.8	6.1	-	44.4	-	-	-	-	-	15.0	12.8	24.6	28.2	18.9	-	-	None	0.0%	0	0.0%
28	Replication 4	64.9	44.2	7.8	5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-
	Mean Replication 4	**57.7**	**45.9**	**7.6**	**6.1**	**50.6**	**39.6**	-	-	-	-	-	**15.7**	**11.0**	**21.2**	**26.3**	**16.7**	**0.0**	**0.0**		**0.0%**	**0**	**0.0%**
	Std Dev Replication 4	**5.2**	**2.0**	**0.7**	**0.5**	**3.0**	**5.5**	-	-	-	-	-	**0.5**	**1.2**	**1.9**	**1.9**	**1.4**	**0.0**	**0.0**				
	Mean Sets 2-3	**52.8**	**41.7**	**6.9**	**5.7**	**44.3**	**22.6**	**6.6**	**3.3**	**19.3**	**18.1**	**1.1**	**16.0**	**18.0**	**20.6**	**24.6**	**18.8**	**1.2**	**1.0**				
	Std Dev Sets 2-3	**15.1**	**11.4**	**1.9**	**1.6**	**12.2**	**7.4**	**1.8**	**1.1**	**5.3**	**6.3**	**0.4**	**4.7**	**5.9**	**6.1**	**7.2**	**1.4**	**0.3**	**0.3**				
	Mean Total	**51.5**	**40.3**	**6.6**	**5.7**	**41.4**	**26.0**	**5.8**	**3.5**	**17.3**	**17.0**	**1.0**	**14.2**	**14.0**	**19.9**	**21.3**	**16.4**	**1.1**	**1.1**		**46.2%**	**60**	**57.7%**
	Std Dev Total	**15.7**	**12.2**	**2.0**	**1.7**	**14.5**	**10.7**	**2.1**	**1.4**	**6.2**	**6.9**	**0.4**	**4.8**	**6.5**	**6.1**	**8.7**	**4.6**	**0.4**	**0.5**				

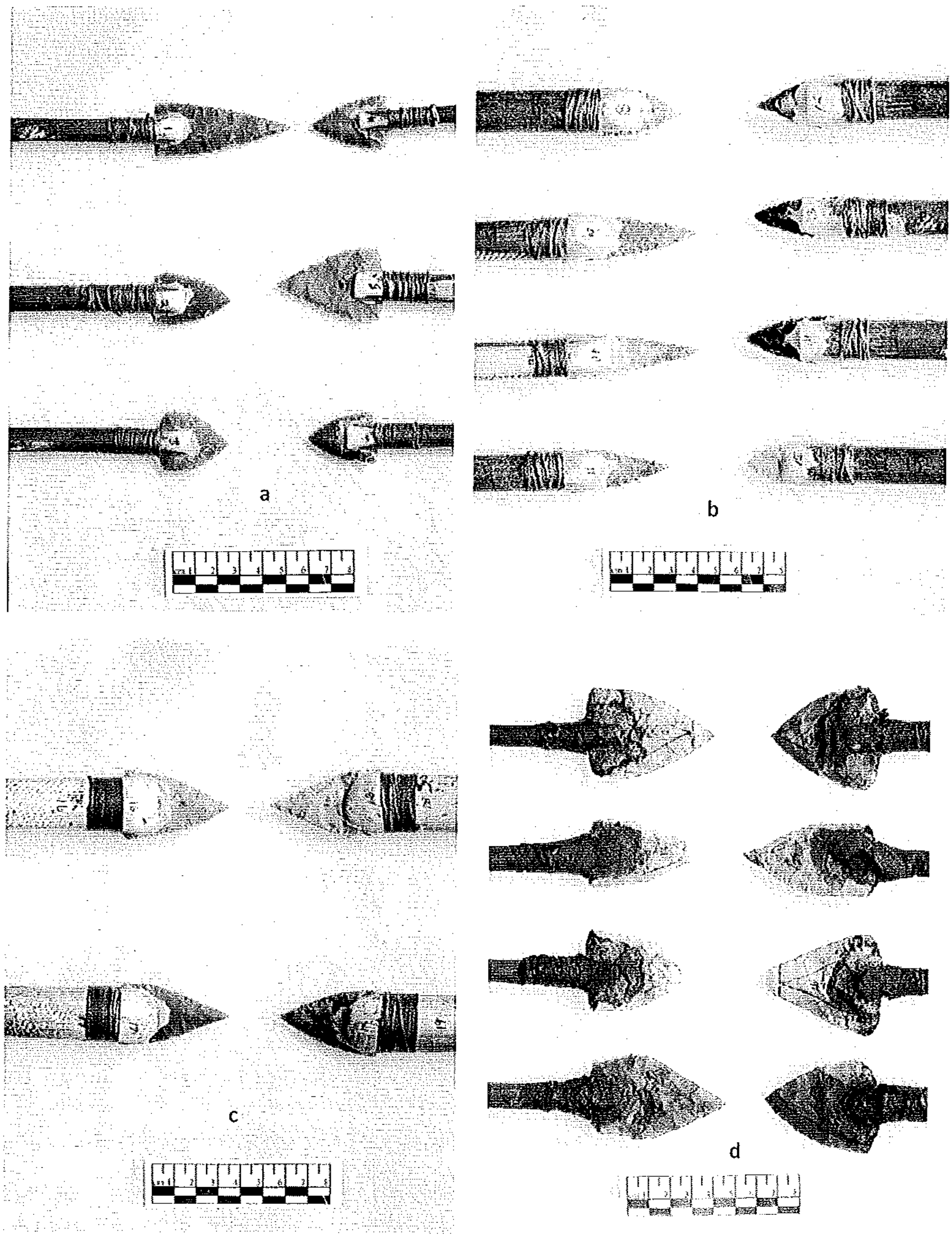

Figure 3. Hafted Reflaked Replica Points. a, Replication 1. b, Replication 2. c, Replication 3. d, Replication 4.

primitive two-stick slip collar model) was used just above the proximal end of the split foreshaft while the being bound. After the dissatisfying result of Replication 1, I thought that the points were whittled down to almost the foreshaft diameter at the base, as the flake snap escarpments tend to be fairly near the lateral edges.

None of the eight points came loose from the haft while they were being reflaked (Figure 5), and production of flake snap escarpments improved from 16.7% to 87.5% of the points and from 4.2% to 54.5% of the edge faces. Inadvertently, the points had been fitted deeper into the larger foreshafts, as shown in Table 1, to about 18.3 mm., and this produced a longer remnant haft area (18.3 mm) than was on the prehistoric points (15 mm.). Furthermore, the distal ends of the foreshafts were not rounded, but left straight. When the remnant haft area size was compared with the foreshaft size, it was found that the ratio of the remnant haft area length to the foreshaft extension was about 1.1 to 1, and the remnant haft area width to the foreshaft diameter at the point base was about 1 to 1. This indicates that the flake snap escarpment outlines are produced by contact with the foreshaft. In addition, rather than being rounded, the remnant haft areas indicated a straight or squared distal end, further indicating a direct relationship of the remnant haft area with the foreshaft surface.

Replication 3

One of the prehistoric points, #90 from Presa Garcia, Tamaulipas (Figure 4.a.5, right; McReynolds Figure 1.e), was larger and appeared to have been reflaked by percussion. Four point replicas were devoted specifically to replicating this point. Using the size ratios derived in Replication 2 (1.1 to 1, 1 to 1) and the size of the remnant haft area of point #90 (L – 18.3 mm., W – 23.6 mm.), very wide (24.1 mm. mean) foreshafts were made and custom fitted to each point replica with the foreshaft extending a relatively short distance (14.8 mm. mean) beyond the base. Percussion, followed by pressure, was used to reflake the point replicas to the approximate finished size and shape of the prehistoric point. As Point #90 appears to have been percussion flaked post-hafting, all of the Set 3a replicas were percussion flaked, as well as pressure flaked, with no loosening of the haft.

None of the four points came loose from the haft, and all of the attributes matched those of the prehistoric point very well (highlighted in gray in Table 1).

Replication 4

As Elmer's Glue did not cause the formation of any flake snap escarpments, the intent of this replication was to demonstrate whether or not asphaltum could. I had a limited amount of natural asphaltum from Padre Island, which was solid and glossy. I had found it to be difficult to handle when molten, and very brittle when cooled, and I did not have enough to perform the experiments. I found Gilsonite, a natural form of asphaltum that is commonly used for art pigments and hardeners in other petroleum products, commercially available. Once it was obtained, I found it to be essentially identical to the asphaltum that I had from Padre Island.

Fauvelle, et al. (2012) conducted hafting and impact fracture experiments with replica Cottonwood type (unnotched triangular) obsidian arrow points using three hafting techniques and found asphaltum applied to the tip of both faces to somewhat reduce impact damage. They obtained their asphaltum from the La Brea tar seeps in Los Angeles County, California. They boiled off the water in a pot, added crushed charcoal (Agave, approximately 1:1 by volume) and dabbed it on each arrow point haft. They do not mention the attributes of this after application. They also wrapped sinew around the lateral point edges. Sinew wrapped in this manner would have prohibited formation of the flake snap escarpments. They acknowledged that use of asphaltum may not have been the preferred mastic in all cases. However, there is a significant difference between shooting small (mean 23.4 mm. L X 3.0 mm. T) obsidian points into ribs and reflaking larger Edwards chert points that are hafted.

I prepared the Gilsonite in the manner described by Fauvelle, et. al. (2012) using crushed mesquite charcoal. I found that application of asphaltum by dabbing molten asphaltum on the larger points and foreshafts was highly unsatisfactory, leaving voids and asymmetrical funnel cake-like structures that easily break off. Dipping was also problematic, as asphaltum builds up over the hafted point. In any case, the techniques produced very weak hafts that I guessed may have withstood one impact but no reflaking.

The Gilsonite came in powdered form, so I attempted to make a water-based paste from it. As it would not go into suspension, I added crushed charcoal and abraded the mixture between my fingers until it finally produced a paste that could be easily formed. Recycling the Replication 1 foreshafts, I

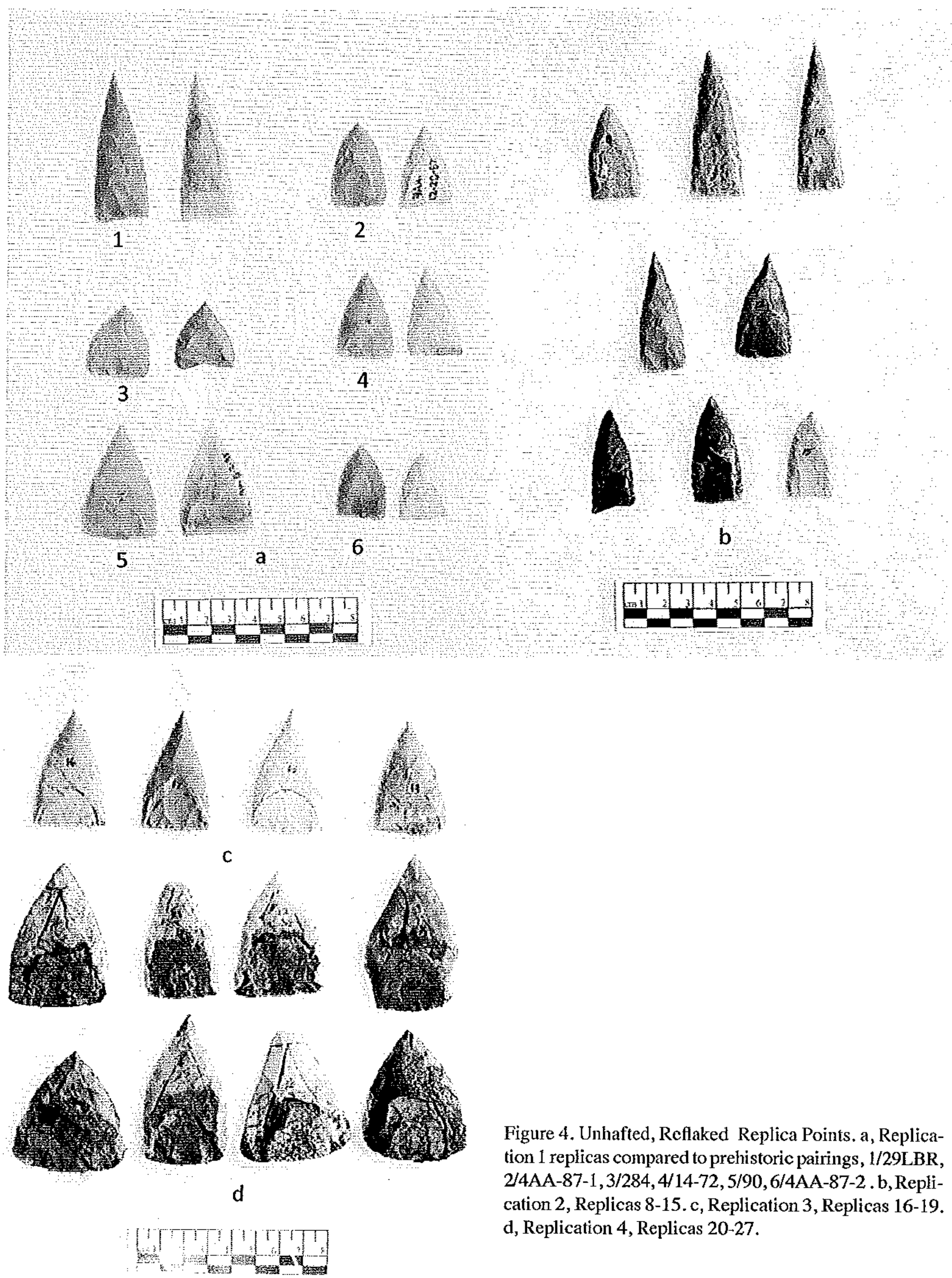

Figure 4. Unhafted, Reflaked Replica Points. a, Replication 1 replicas compared to prehistoric pairings, 1/29LBR, 2/4AA-87-1, 3/284, 4/14-72, 5/90, 6/4AA-87-2. b, Replication 2, Replicas 8-15. c, Replication 3, Replicas 16-19. d, Replication 4, Replicas 20-27.

formed the hafts with the asphaltum in lieu of the glue. After these had dried, I roasted them over an open flame just to the boiling point and formed the mastic with my hands while it was still warm, repeating the process until I was satisfied with the haft (Figure 2d).

As in Replication 3, the asphaltum hafted points for Replication 4 were intended to make replicas of Point #90. While they would have been good for at least one impact, the mastic was completely unsatisfactory for reflaking, regardless of technique or how they were held, much less for producing flake snap escarpments. All of the points came loose before they could be completely reflaked (Figures 8 and 9).

As I had an experiment rule that reflaking would end when the point broke free of the haft and/or all of the mastic fell from the haft, I was unable to achieve the amount of reflaking necessary to replicate point #90 on all of the asphaltum hafted points.

EXPERIMENT OBSERVATIONS

Flake snap escarpments occur at or just outside the area of contact between the wood and the shaft, and they indicate a very precise and tight contact area, perhaps achieved with the aid of a clamp.

The dimensions of the haft area are directly proportional to the diameter and forward extension of a shaft fitted with the surface of the proximal faces of the biface. Because of this, means of these attributes in the replica sets vary from the prehistoric sample used, i.e., the replicas, except in the case of Replication 3 for point #90, were not specifically intended to achieve exact replicas of specific points.

Application of excessive mastic had absolutely no effect on producing flake snap escarpments. I cannot think of any natural mastic that will withstand the force of even very small flake removals enough to cause formation of flake snap escarpments. The flakes consistently disengaged themselves from the mastic, flaked off the edges of the mastic, and formed voids underneath the mastic between the shaft slot and the point.

Only the shaft-to-chert contact area caused the flakes to snap. Using wider foreshafts and a clamp during the mounting process significantly increased production of flake snap escarpments, from 4% to 57%. The qualitative attributes of the replicated remnant haft areas matched those of the prehistoric points, while the quantitative attributes varied according to the foreshaft size.

DISCUSSION

McReynolds (2012) published the mean quantitative data for diameter, 10.39 mm. and notch depth (similar to shaft extension), 11.42 mm. for prehistoric foreshafts, which is smaller than the mean remnant haft area dimensions, 16 mm. wide and 15 mm. long, found on prehistoric points. While this would seem to suggest that mastic or perhaps an errant initial flake snap that perpetuated snap terminations in subsequent flakes was responsible for the flake snap escarpments, this was definitely not demonstrated in the replication experiments. Instead, use of wide, strong foreshafts or handles with precise fits was indicated. Flake snap escarpments consistently formed at the area of contact between the wood and the shaft regardless of adhesive or flake sequencing.

While large foreshafts are not represented in the very small prehistoric sample available (minute compared to the number of triangular points found), it does not mean they were not used. I have seen large thin triangular bifaces hafted in wide handles in Anasazi collections, as well as collections from Mexico, that were apparently used as knives. Also Also, the frequency of prehistoric points in the Rio Grande area collection having remnant haft areas with flake snap escarpments was estimated at 4%, which is generally considered to be statistically insignificant. Yet, points with those features are representative of a highly specialized hafting technique not used on the majority of hafted points. Use of wide, strong foreshafts is applicable to the 4% of prehistoric points that have remnant haft areas with flake snap escarpments.

Comparison of the shaft diameter to the reflaked remnant haft area width (1:1) and the shaft forward extension to the reflaked remnant haft area length (1:1.2) from the two successful replications (2 and 3a) yielded ratios derived from experimental replication that can be used to estimate the size of shafts used by prehistoric peoples on points with remnant haft areas. The remnant haft area length averaged 1.2 times the foreshaft extension as measured from the base of the hafted biface. This is because reflaking usually did not reach the distal tip of the foreshaft, but left an area without flake snap escarpments that could be identified as a remnant surface.

As an example application of these mathematically proportionate relationships, the mean length (15 mm.) and width (16 mm.) of remnant haft areas with flake snap escarpments on prehistoric points in the Rio Grande area collection indicate a mean foreshaft size approximately 16 mm. in diameter extended approximately 12.5 mm. beyond the hafted point base.

Use of clamps to achieve a tight haft should not be viewed as sophisticated technology that was unavailable to prehistoric craftsmen. Simple clamps can be made by binding two pieces of wood with flattened surfaces, or by using a slip collar, also of wood, in place of the binding. Clamping, in addition to custom fitted notch surfaces, significantly increase the friction necessary for solid, durable hafts.

The points in Replications 2 and 3 were reduced by an average of 16% in length, 46% in width and 5% in thickness. Prior to reflaking, the points had few distinguishing features. Reflaking formed distinct remnant haft areas and reflaked blade areas, and it accentuated original blade and basal thinning flakes. In cases where short flakes were used bevels were formed. It may be that some points that have not been reflaked are not identified as formal types and that some examples of smaller points, such as Catan and Matamoros, may be final forms of reflaked Tortugas and Abasolo points.

CONCLUSIONS

Remnant haft areas, some of which exhibit flake snap escarpments, are identifiable on triangular points which have been reflaked in the haft. The flake snap escarpments are definitely formed by reflaking a triangular biface in a wide, strong shaft w/ a haft that has good contact with the chert surface, possibly clamped during application. Remnant haft areas wider than observed prehistoric dart point foreshafts may have been used as knives, rather than projectile points. Remnant haft areas with flake snap escarpments indicate a specialized hafting technique that was used to construct tight, solid hafts that could withstand high leverage use from a handle and reflaking.

Features of prehistoric reflaked triangular points having remnant haft areas with flake snap escarpments were successfully replicated. Custom fitting of the foreshaft and use of a clamp increased the success of replication of remnant haft areas with flake snap escarpments to 100% of points and 68.8% of face edges. The adhesive that was used prehistorically to produce flake snap escarpments at remnant haft area edges had strength approaching or equal to Elmer's brand carpenter's glue, which was supplemented by precise fit of the biface to the wooden shaft and a tight clamp held by the binding. Asphaltum was found to be adequate as a 1-shot projectile point adhesive, but completely failed for use as a knife or reflaking in a haft, and could not have served as an agent that helped produce flake snap escarpments.

The experiment demonstrated a means to estimate foreshaft diameter and extension beyond the hafted point base using the length and width of remnant haft areas. Remnant haft areas are also features that can be used as a way of distinguishing tools from preforms. Reduction of point size and formation of reflaked areas and remnant haft areas demonstrated that some points classified as Matamoros and Catan may be reflaked final forms of Tortugas and Abasolo points.

ACKNOWLEDGMENTS

I would like to thank Richard L. McReynolds and Don Kumpe for furnishing prehistoric examples to examine. I would also like to thank Richard for furnishing me the MacNeish reference, and for encouraging me to contribute to this study.

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Miscellaneous Notes and Remembrances: Starting an Archaeological Career in Central Texas

Harry J. Shafer

ABSTRACT

The author describes his early memories of archaeological field work in Bell and Coryell Counties. In the 1950s, while in junior high school, significant information was obtained from the Stampede I site, 41BL1262. The stratigraphy and artifacts are summarized and illustrated here. A Late Prehistoric burial found in the midden was mapped and recorded, and the remains were turned over to the Strecker Museum at Baylor University. The contact with Strecker Museum led to joining the Central Texas Archeological Society (and later the Texas Archeological Society). In 1956, two burials were excavated sites in Coryell County, and sent to Dr. T. W. McKern (University of Texas) for study. The author met Edward B. Jelks while at Temple Junior College, introduced him to many sites in the area, and started a professional archaeological career after being hired by Jelks in 1962 to work at the Texas Archeological Salvage Project.

INTRODUCTION

One of the chores of retirement, particularly when that means leaving one's office and relocating, is to clean out boxes of stored files and packing up the library. I will admit to being a hoarder with the habit of keeping letters, manuscripts, reports, books, and notes with the anticipation that someday some use will come of them. It was while going through some boxes of old correspondence that I ran across some old notes and other items that brought back some fond memories. Tom Hester suggested that I share some of these old notes that go back to my childhood days of collecting and exploring the creeks and canyons in western Bell and southern Coryell Counties. These childhood adventures led to some interesting finds and a career in archaeology.

Most Texas archaeologists in my generation and earlier were introduced to archaeology from artifact collecting as kids, James Corbin (Corbin 1963), Mike Collins[1], Tom Hester, Frank Weir (Weir 1956), Curtis Tunnell, Jim Bruseth, to name a few. Even some of the generation before us started out as avocational archaeologists such as Jack Hughes (Tunnell 2000) and Joe Ben Wheat (Kelley 2009). I have no apologies or regrets for having that as a start to my career. Many sites were located in those adventurous years; no sites were destroyed, although some were left with a few holes. Like others of my generation I accumulated and read every archaeological report that I could. These combined experiences and what literature I could gather gave me practical knowledge that led me to become familiar with material culture, lithics, ceramics, bone, human remains, and the signatures of prehistoric sites, things that often are not learned in classrooms, especially now days. These avocational activities connected me to a network of professional archaeologists that proved to be invaluable later on. It was inevitable that I would come across some significant findings although I did not realize it at that time.

Texas archaeology was still in its pioneering years in the mid 20th century and Texas was a rural state with lots of family farms and ranches. Gaining access to survey and excavate was not a problem then; and from my personal experience we did not encounter any landowner who denied a couple of kids the opportunity to go "hunt arrowheads" so long as we did not carry guns.

There were less than a dozen professional archaeologists in Texas at that time and, to the person, they relied heavily on avocational archaeologists for information and stewardship, especially Texas Archeological Society members and regional societies such as Dallas, Houston, Travis County, Midland, El Paso, and Central Texas. It was mainly through the TAS network that people learned about archaeology. It was not taught in grade schools or high schools for the most part although Carrizo Springs was clearly an exception. Some of us were fortunate to have mentors like J. W. House (Tom Hester), D. T. Kent (Elton Prewitt), or in my case, E. O. Miller and Frank H. Watt, who directed us toward archaeology as opposed to relic hunting. Prehistory or any information about Indians was completely ignored in my school. If one wanted to pursue archaeology you had to be self-taught.

A BURIAL IN BELL COUNTY

Sammy Houston, a classmate at Reagan Jr. High School in Temple, also hunted arrowheads. Sammy and I became close friends; we had paper routes, played on the same little league baseball team, and talked arrowheads. I lived on a farm on the south edge of Temple (where Scott and White Hospital is today) at that time. There were several archaeological sites near Temple where we would ride our bikes to and surface collect. His stepfather, Henry Hutka, also collected artifacts. The difference is that he dug, and sometimes took Sammy along. They invited me out from time to time to go "digging" with them. Late Prehistoric sites along the Leon River valley very often contained cemeteries and isolated burials. On one such trip Sammy encountered a burial at a small site on Stampede Creek west of Temple in Bell County. My number for the site was SM-1 (Stampede midden #1) It has since been given a trinomial number by the Texas Archeological Research Laboratory [41BL1262]. Mr. Hutka did not want anything to do with the burial, so Sammy turned it over to me. It took me two trips to excavate the burial, which I exposed before removing the bones. I was fascinated by two factors: the burial was covered with a cairn of rocks and it was laid out in a tightly flexed position. The burial dated to the Late Prehistoric period, probably the Austin Phase, ca. A.D. 900-1100. A Late Prehistoric burned rock midden capped a deeper Late Archaic component that contained Marcos and Ensor points and the burial intruded into the top of older component.

I took the bones to our farmhouse and laid them out on the dining room table. I closely studied each and every bone, and was fascinated by the human skeleton. My grandmother, Alice Mitchell, however, was rather unnerved by this and asked that I remove the skeleton from the premises. Not knowing what to do, I wrote the Strecker Museum at Baylor University to see if they wanted it. They did. Dr. Brice Brown and William Atlee came down to get the burial, and invited me to join the Central Texas Archeological

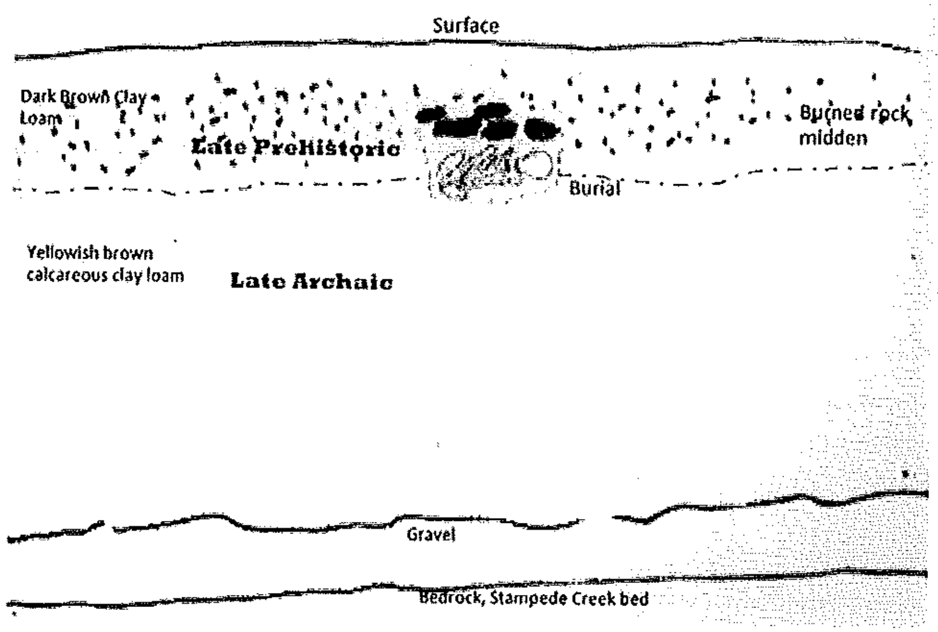

Figure 1. Schematic profile at SM-1 (41BL1262) showing the position of the burial in relation to the Late Archaic midden.

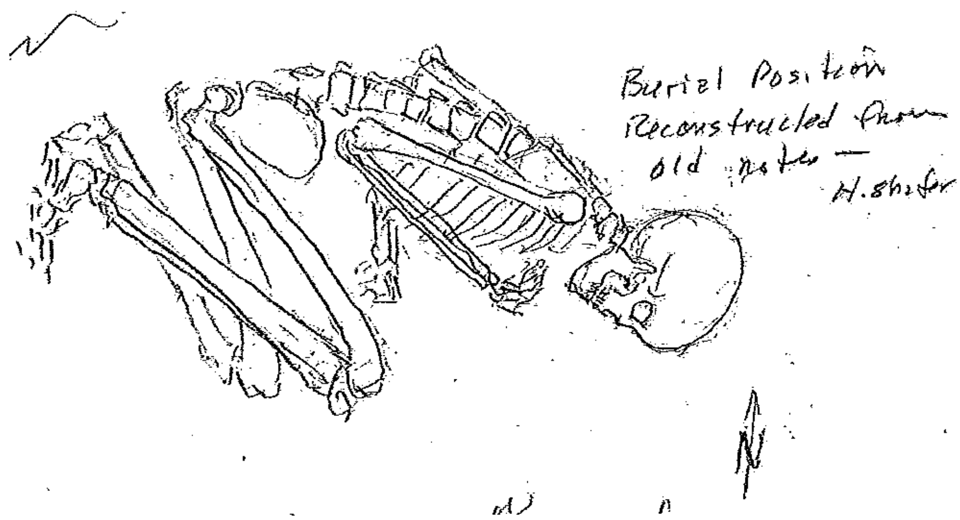

Figure 2. Position of the burial on Stampede Creek (41BL1262) reconstructed from old field notes.

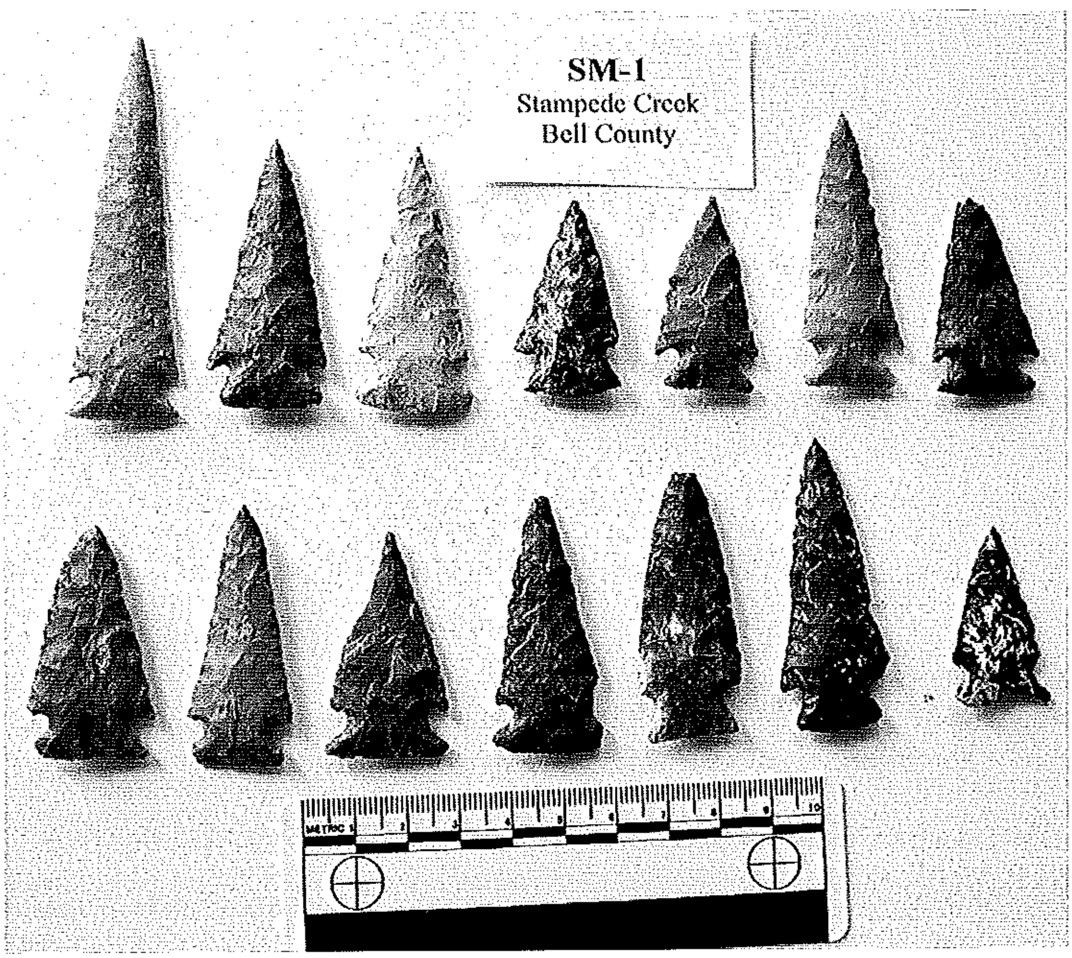

Figure 3. Ensor points from SM-1 (41BL1262).

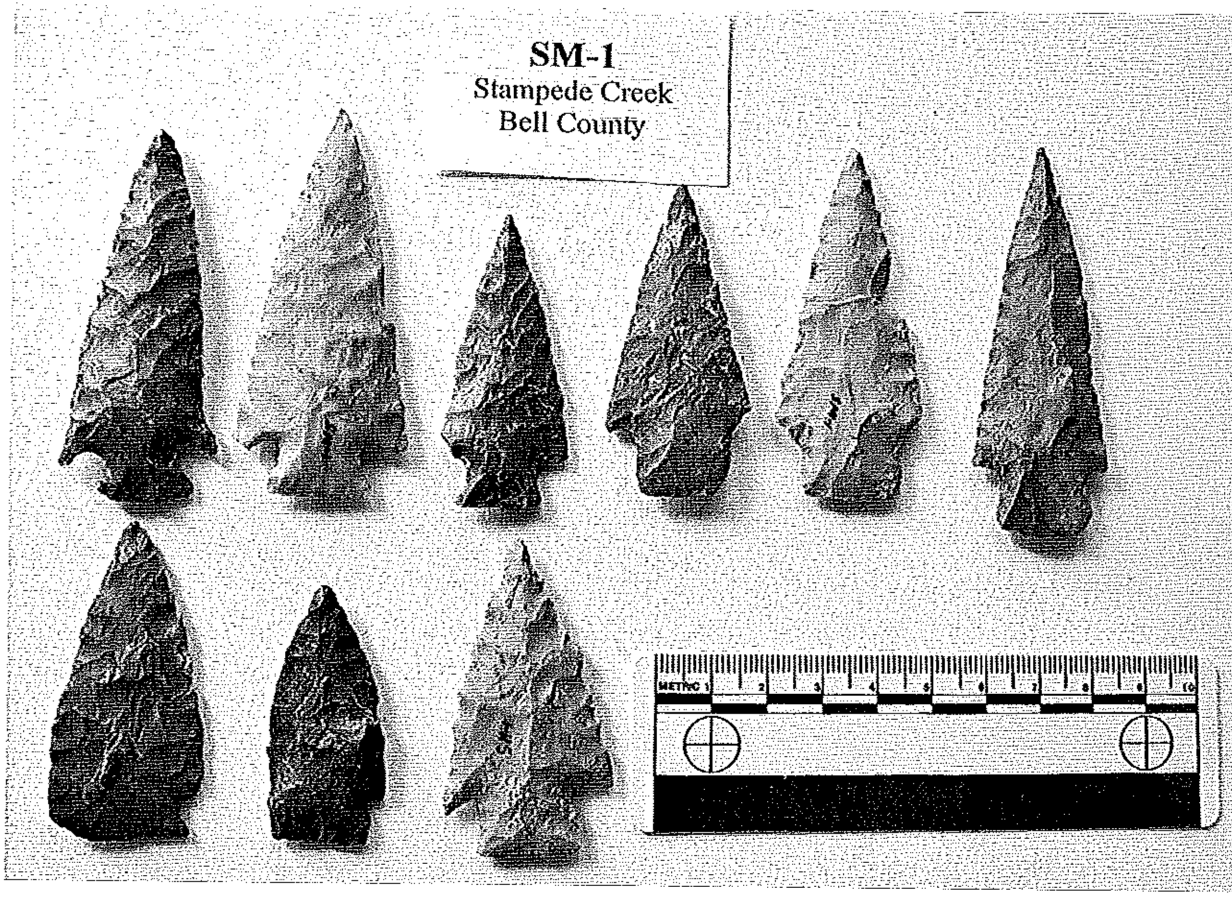

Figure 4. Marcos and untyped points from SM-1 (41BL1262).

Figure 5. Untyped arrow point, Marcos and Castroville points form SM-1 (41BL1262).

Figure 6. Corner-tangs and drills from Stampede Creek site (SM-1) or 41BL1262 .

Society (CTAS) at Waco. This was in 1954 in my freshman year in high school. Excited that there was such a thing, I talked my mother into driving me to Waco for the monthly meetings. There I got to know Frank H. Watt (see Davis and Redder 1983), and to meet such speakers as E. Mott Davis and Lathel Duffield in 1957 who were excavating sites in the Ferrells Bridge Reservoir at the time (Davis et al., 2010). I also met some pretty active relic hunters too such as Buddy C. Jones of Longview. Much of Buddy's collection is now in the Gregg County Museum at Longview (Perttula 2006).

CORYELL COUNTY BURIALS

One high school friend, Wilbur Ray Corbin, shared a passion for archaeology, not just relic collecting. Wilbur also had an uncle who was the postmaster in Moody, Texas that had once worked as an archaeologist. His name was Ensor O. Miller who had worked with Edward Jelks in the River Basin Surveys (see Tunnell 2000: 114-121). Mr. Miller introduced me to the 1954 *Handbook of Texas Archeology* (Suhm, Krieger and Jelks, 1954, BTAS Vol. 25). Seeing this book led me to join the Texas Archeological Society and I ordered a copy of the *Handbook* in 1956, and used my paper route money to buy all of the back issues I could afford. I also attended my first TAS meeting in 1956 in Waco. By this time I had accumulated a pretty sizeable collection of artifacts from the Youngsport site (Shafer 1963), and other sites and shelters along the Leon and its tributaries, particularly 41BL22, Grimes Houy midden and shelter, among others (Shafer 2010), and used the *Handbook* to identify what I had from each site.

Wilbur and I had excavated two more burials along Horse Creek in Coryell County in 1956, one in the Grimes Houy Shelter (41CV13) previously tested

* * *

TWO CORYELL COUNTY BURIALS

During the past winter Harry Shafer and Wilber Corbin of Temple excavated two burials in southeast Coryell County, one near the mouth of Horse Creek and the other in the Grimes Houy Shelter.

The first burial was found under a small overhang of the face of a bluff. The burial was in a very fragile condition and accurate measurements could not be taken. As it was late in the day no pictures could be made. It was in a flexed position and facing north-northeast. The age was estimated to be about 50 to 60 years.

The second burial was found about April 1, 1956. The shelter runs along the north side of a spring, facing south, one and two tenths miles north of Moody Leon store.

The burial was approximately two feet from the back wall of the shelter, but the depth could not be accurately determinied due to the disturbed conditions. Reportedly about 25 other burials had been removed. It was of a child about seven or eight years old, facing north-northeast, flexed and somewhat disturbed. The skull was crushed on one side. This may have been due to a covering rock, sometimes used in this area over burials.

Four artifacts were found near it. One, a gar scale, probably a projectile point, was under the right scapula. A hammer stone under the burial and two broken points near by were probably in the grave fill, rather than in association with the burial.

Pictures were made of the burial in its position in the shelter, then it was carefully removed, numbering and labeling the various parts.

* * *

FRANK H. WATT
President

Figure 7. In *Central Texas Archeologist* No. 7, 1956.

by E. O. Miller (Miller and Jelks 1952) (Fig. 8), and one beneath a small overhang near the confluence of Horse Creek and the Leon River (Watt 1957). We collected the skeletons and I took them to the University of Texas Department of Anthropology for Dr. Tom McKern, a noted physical anthropologist, to analyze. He wrote a letter back providing some details about the skeletons. The sub adult was a possible female about 6 years old, and other was an older adult female.

Wilbur also had an acquaintance in Moody, Darl Hill, a relic hunter who dug artifacts to sell. If you get the Ensor and Darl connection here, you are correct; Ed Jelks named central Texas point styles after each one. Darl dug numerous rockshelters along the Leon, including one that contained a mass grave. This shelter, located on the east side of the river about half a mile above Iron Bridge (west of Moody Leon store, Bell County). When Wilbur and I visited this site in 1957, Darl had dug a massive hole in the

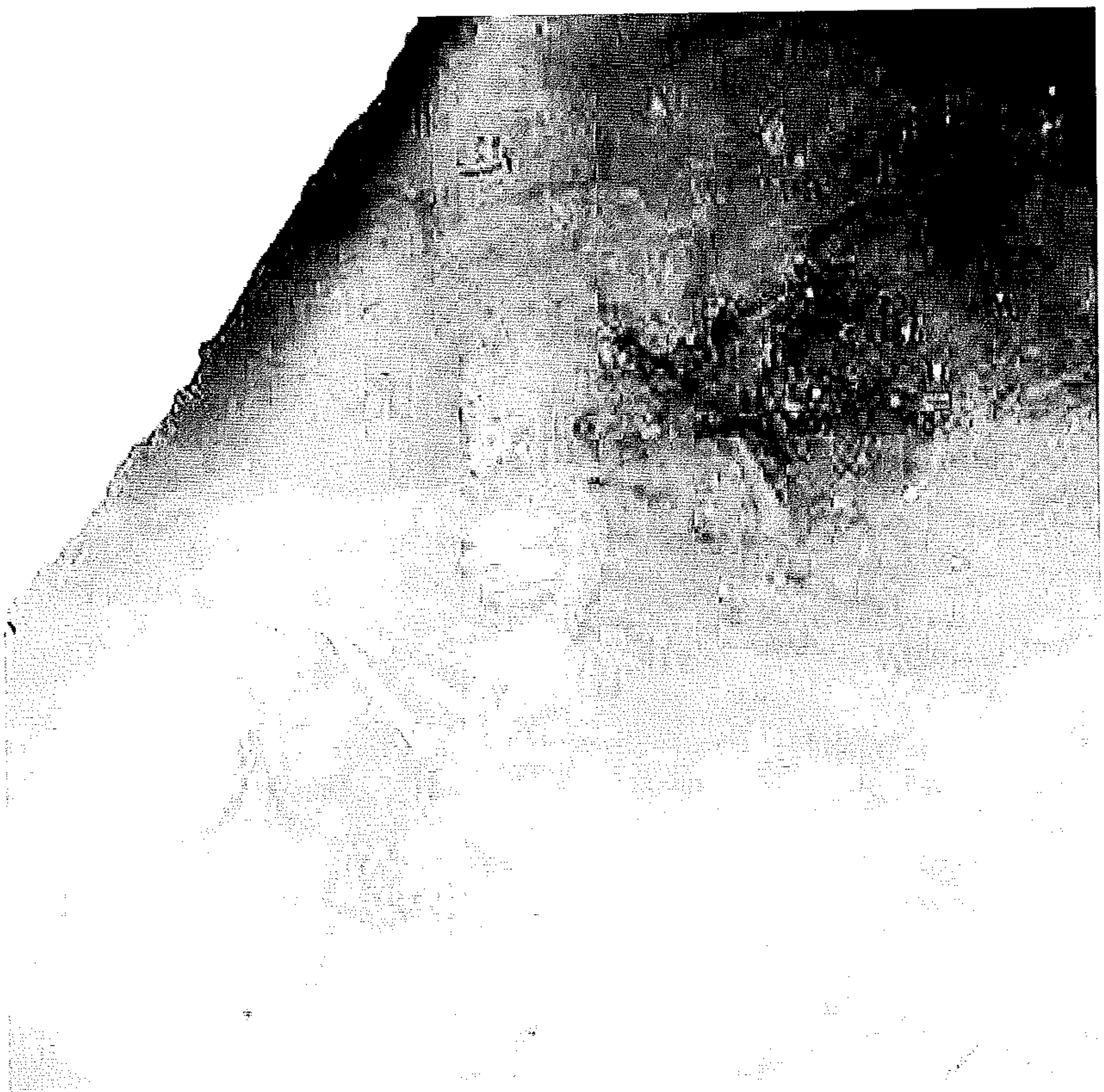

Figure 8. Sub adult burial excavated by Wilbur Ray Corbin and Harry Shafer at the Grimes-Houy Shelter (41CV13) on April 1, 1956.

THE UNIVERSITY OF TEXAS
AUSTIN 12

DEPARTMENT OF ANTHROPOLOGY

March 21, 1962

Mr. Harry Shafer
4006 Burnet Road
Austin, Texas

Analysis of skeletal material from Belton:

The skeletal material consists of two skeletons in fairly good condition. One is a female about six years of age. No pathology was observed.

The second skeleton is that of a female approximately 50 years old. Included in this burial were two fetal bones.

The most outstanding feature of this second skeleton was the pathology. Both maxillary and mandibular dentition was in very poor condition. Severe alveolar abscesses were common. She also suffered from tempro-mandibular arthritis evidenced by necrotic erosion of the mandibular condyles and slight lipping of the glenoid fossa. Arthritis is quite extensive throughout the lumbar area.

Dr. Thomas W. McKern
Physical Anthropologist

Figure 9. Letter from Tom McKern

middle. Human remains could be seen in the walls of this hole and throughout the back dirt. Darl said he lined skulls up on the back dirt and people would come and collect them. The only artifact he found among the remains was a single white Bonham or Alba point. It is very unfortunate that this important mass burial was never properly documented, and it is now beneath the waters of Lake Belton.

MEETING EDWARDS JELKS

I entered Temple Jr. College following graduation from Temple High School, with a major in business and marketing. I worked my way through school by working at Johnson's Men's Store, formally Charles Cox and Sons Men's store, on Main Street. I worked there for three years, and it was there that I met Ed Jelks in 1960. Ed was looking for confirmation of his theory that the Late Prehistoric Austin and Toyah assemblages constituted separate chronological periods; he was analyzing Kyle Site material from Whitney Reservoir at the time (Jelks 1962). He was also scouting for ceramics sites in the Belton Reservoir area in advance of a planned enlargement of the reservoir. Ensor Miller told Ed to look me up, so Ed called me and met me at the men's store and set up an appointment to visit some archaeological sites in the Belton Reservoir area. That weekend we visited several sites in the area that I knew had both Austin and Toyah materials. He even paid me for my time. More importantly, I got to know Ed personally and we had lengthy conversations regarding Austin and Toyah sites.

Ed hired me as a staff member with the Texas Archeological Salvage Project (TASP) staff at UT-Austin in the fall of 1962, changing my status in archaeology from an avocational to a professional. I was to conduct reservoir surveys, assist in excavations, and laboratory chores of washing, cataloguing, and artifact analysis. The first project I worked on was to assist Dan Scurlock in the test excavations at Belton Reservoir, investigating some of the sites that I showed Ed two years before. Dee Ann Story was the person in charge of this field project and I assisted her in the analysis. I spent a lot of time working on the report and she rewarded me by making me the senior author (Shafer et al., 1964). I also took both LeRoy Johnson and Dee Ann to the see the deeply stratified deposits at the Youngsport Site that year (Shafer 1963). Following the Belton Reservoir work I was assigned lab duty and helped to process the massive collections coming from the Amistad Reservoir excavations directed by Parker Nunley (Nunley, et al., 1962) which was my first experience in handling Lower Pecos material culture.

STILLHOUSE HOLLOW RESERVOIR

LeRoy Johnson conducted a reconnaissance of the Stillhouse Hollow reservoir area along the Lampasas River in Bell County in 1961 (Johnson 1962). Ed contacted me to guide LeRoy to numerous sites that I knew of in the reservoir. The opportunity to return to my old haunts in western Bell County occurred when the TASP returned to Stillhouse Hollow Reservoir in the fall of 1964. Richard (Dick) Ross led the team that investigated several sites, including Landslide (41BL85) a site that I had recorded earlier; Dick named the site after LBJ's landslide victory. The testing showed the site, located at the base of a Holocene terrace of the Lampasas River, to be deeply stratified and worthy of more investigations. In 1966 TASP returned to Stillhouse and carried out extensive test excavations at the Evoe Terrace Site (41BL104), a very large multi-component site also buried in a Holocene river terrace of the Lampasas River discovered by Bob Burleson (Sorrow et al., 1967). Additional work was done at Landslide too where we excavated to a depth of about 11 feet and never reached the bottom of the cultural deposits. We were very much aware of the fact that the sequence that I first described at the Youngsport Site was not only present at Landslide, but other previously unidentified early Archaic components were present as well.

The one event that I recall most at the Landslide was that our director at the time, the late Richard Ambler, had told us to end our excavations on a certain day. Well, on that day we were trying to test a burned rock deposit at the bottom of our hand-excavated units. It was the earliest, deepest cultural deposit ever investigated in central Texas at the time and we found one broad corner-notched point. I argued that we should stay regardless of what Ambler wanted us to do in order to finish the excavation units. William A. (Bill) Sorrow, a hulking fellow and former OU football prospect, was in charge of the field team. The argument got so heated that he invited me out of the unit to settle the matter *mano y mano*. I may have weighed at most 155 pounds at the time and Bill probably topped the scales at about 250. So I declined his invitation and the excavation was backfilled. That deepest point that we found incidentally is now typed a Wilson after the Late Paleo-Indian Wilson points from the Wilson-Leonard site (Bousman 1998). Landslide is, in many ways, very similar to Wilson-Leonard and was a traditional campsite used for many generations of American Indians.

Figure 10. Wilson point from the Landslide Site (41BL85) (from Sorrow et al., 1967: Figure 15f).

POTTERY VESSEL FROM BELL COUNTY

One site in the Lake Belton area that I guided Jelks to was 41BL22 known then as the Garth Site near a tall bluff on Cedar Creek northwest of Temple; the site was tested by the Texas Archeological Salvage Project in 1962 (Shafer et al., 1964: 76-78) and is now beneath the waters of Lake Belton. The Late Prehistoric component at 41BL22 was a shallow veneer usually no more than a foot thick that contained Scallorn, Perdiz, and Bonham arrow points, end scrapers, and bone artifacts (awls and deer ulna tools) overlying the Late Archaic deposit that yielded Late Archaic material culture, including Ensor and Darl dart points. The site is described in Shafer et al., (1964: 76, 77, Table 1). There was a significant Toyah component at 41BL22 as indicated by the Leon Plain pottery, Perdiz points, end scrapers, and beveled knives, the diagnostics of a Toyah Phase assemblage (Arnn 2012: 52-61; Kenmotsu and Boyd 2012: 10-15).

I recruited one of my high school classmates, Charles Beseler, to "arrowhead hunt" in 1956-57 because he had a car. Beseler found three sherd concentrations in his excavations at 41BL22, one was a plain thick carinated bowl with a red slip, grog tempered, and dark core to the paste. This bowl was clearly of Caddo origin as the shape and slip conformed to Caddo technology.

The second vessel is the one illustrated here (Fig. 11). It is a thin bone-tempered beaker with punctated design and brushed exterior. The fabric is compact , well smoothed on the interior with vertical brushing on the exterior. The design was executed with a curved implement that left a crescent-shaped punctuation that consisted of two rows parallel to the rim and but dipped down to a U-shaped motif. The color was reddish-tan with dark fire clouds. I borrowed the sherds and showed them to Dee Ann Story. She compared it to Booth Brushed form the Collins Site (see Suhm 1955). The Garth site beaker was notably thinner (4 to 6 mm) and she did not think it compared well to Booth Brushed from the Collins Site. Unfortunately the Garth Site vessels are no longer available for comparison or further study and their location is unknown.

The third sherd concentration encountered by Beseler was consisted of a thin, bone-tempered jar or olla typical of central Texas Toyah pottery that could be classified as either Doss or Leon Plain. Sherds of the vessel were obtained by the author and donated to TARL. Darrell Creel submitted one for his INAA study of central Texas pottery (Creel 2012). The chemical profile of the sherd (Creel's log # UT383 12.341BL00022) fit a cluster that was locally made in central Texas.

Another series of sherds that I collected and donated to TARL was from a relatively thick grog-tempered brushed jar. One of these was also tested by Creel was labeled UT384 10 41BL00022 and grouped as "Caddo untyped." It is my observation that Late Prehistoric sites along the eastern margins of the Leon River and its tributaries had an unusual quantity of ceramics, both locally made and Caddo in origin. My thoughts regarding the presence of Caddo pottery, particularly early Caddo ceramics, were incorporated in the TxDOT module entitled *People of the Prairie: Possible Connections to the Davis Site Caddo* that I prepared and was published on-line by Prewitt and Associates, Inc. on the Council of Texas Archeologist web site (Shafer 2005).

One Toyah Phase feature that I encountered at 41BL22 was a cache of three four-edge beveled knives. These are shown to scale below. One is of dark gray "Georgetown" chert, possibly from the Gault Site area, and the others are varieties of

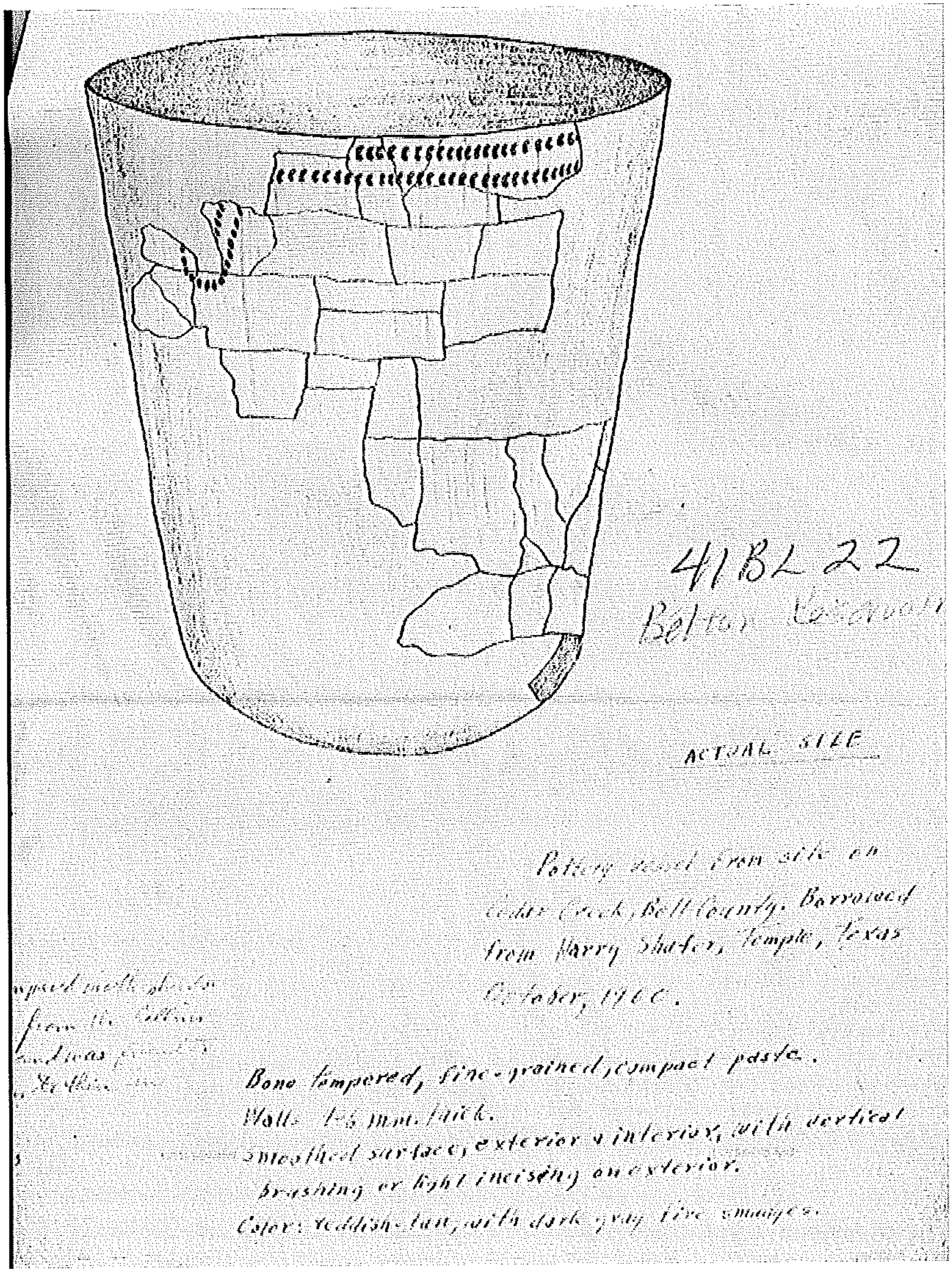

Figure 11. Note page describing the 41BL22 beaker.

Figure 12. Four edge beveled knife cache from 41BL22.

Edwards chert that can be duplicated at Ft Hood. No other information is available on this cache other than to note that it came from the Late Prehistoric veneer at the site that contained the Toyah assemblage and Caddo pottery. I do recall quite a bit of bison and deer bone at the site but none of this was documented. Furthermore, Scurlock did not save the animal bone from his test excavation either and collected only on bone artifact (Shafer et al., 1964: Table 1).

SUMMARY AND RETROSPECTIVE

The remembrances presented here partly chronicle my avocational background that came at a fortunate time in Texas archaeological history. I say fortunate because youngsters engaged in the Texas Archeological Society in the mid 20th century got to meet (and sometimes know) the true pioneers in our field. It was a small community of interested, if not passionate, participants who readily shared their information and enthusiasm. This was before archaeology became a for-profit business that operated with confidential clauses. In the case of those archaeologists of my generation we were fortunate to work with and learn from pioneers such as Thomas N. Campbell, E. Mott Davis, Dee Ann Suhm Story, Jack Hughes, Jerry Epstein, Ed Jelks, LeRoy Johnson, Ernie Lundelius, Thomas McKern, R. K. Harris, Jay Blaine, Clarence H. Webb, among others. Texas archaeology was little known at the time:

chronologically, systematically, or regionally. There was much to learn and any major excavation and investigation promised to make a lasting contribution and to yield another brick to the foundation structure.

While admittedly I lacked archaeological training and discipline in my youth to properly excavate and record, I was able to make use of some of the relatively uncontrolled information in later years as a professional archaeologist, and thereby salvage some of its relevance. Curtis Tunnell foresaw the need to record recollections from the true pioneers of Texas archaeology as part of our history (Tunnell 2000). I encourage others of my generation to sit down and pen some of their thoughts about their journey as archaeologists for the information and history they contain. It will be lost to future generations if they do not.

ACKNOWLEDGMENTS

I want to thank Thomas Hester for the encouragement to submit this bit of personal history, and to Darrell Creel for sharing the unpublished information on the NAA analysis of potsherds from 41BL22.

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Whole-Shell Cutting-Edged Tools from the Central Texas Coast

Don Kumpe, Mike Krzywonski, and Bill Birmingham

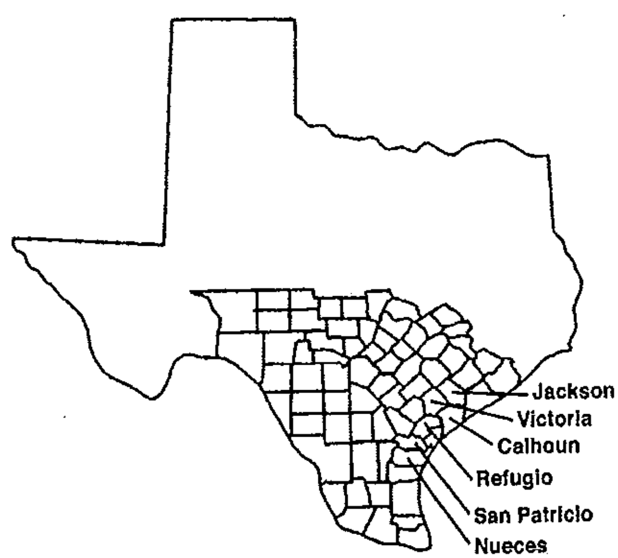
ABSTRACT

This paper describes four whole-shell cutting-edged tools from the central Texas coast. These usually hafted woodworking tools made from large, nearly complete gastropods, commonly *Busycon* sp. but sometimes *Pleuroploca,* are widely distributed in the Circum-Caribbean and Gulf of Mexico regions. They are rarely reported in Texas where seven of only eight known specimens are from the central Texas coast. The lightning whelk's thickened inner wall ridge is also described. Indian craftsmen employed a part of the thickened ridge to strengthen their whole-shell cutting-edged tools.

INTRODUCTION

Certain cutting-edged shell tools made from large, nearly complete gastropods were once commonly known as "shell picks," a term that was in use as early as the 1880s (Hester n.d.:6 from Holmes 1883, Plate 27). Other terms were also in use, until Luer et al. (1986:110) pointed out that the various terms, "adze," "ax," "spokeshave," "pick" and so on, may be accurate for a particular specimen, but each term appeared to be too restrictive for this general tool class. They noted that the tools are seldom pointed (as are picks), and that the manners of hafting and beveling, and thus the methods of use, were varied; consequently, they used the general term "cutting-edged tool." Marquardt (1992:191, 193-194) also took referencing certain hafted gastropods as picks to task and used the term cutting-edged tool. "Whole-shell tools" (another general tool class in Florida) were made from the whole shell with few modifications to the overall form (Torrence 1999:72). Steinen (1982:87) includes (gastropod) dippers or cups, *Venus mercenaria* valves (whole-valve tools), and cutting-edged tools made from large, nearly intact *Busycon* sp. and *Pleuroploca* among the whole-shell tools recovered from Fort Center, a site in Florida's Lake Okeechobee Basin. This paper continues the term cutting-edged tool, which is in common use in Florida (see Luer et al. 1986:110), and combines the terms whole-shell and cutting-edged for specificity.

Whole-shell cutting-edged tools are common on the Gulf coast of Florida. There they were usually made from large, nearly complete lightning whelks *(Busycon* sp.*)* by chipping back a shell's outer lip, placing a hafting notch in the modified lip, pecking one or more hafting holes in the shell, shortening the shell's siphonal end, and grinding a beveled bit on the shortened end (Luer et al. 1986). Rare cutting-edged tools without perforations or notches for hafting (like cutting-edged tool D in this paper) have been found in Florida (Marquardt 1992:199), but the



majority of cutting-edged tools from the Gulf coast of Florida were clearly hafted. Texas specimens lack the hafting notch usually cut into the lip of Florida's cutting-edged tools (Hester n. d.:6), but George Luer (personal communication 2012) remarks that the earliest forms of cutting-edged tools in Florida also lack hafting notches. The placement of hafting holes differed among cutting-edged tools found in Florida (Luer et al. (1986:106), and it appears that the same is true of hafting holes in cutting-edged tools found in Texas (see below).

This paper describes four whole-shell cutting-edged tools made from the sinistral shells of the lightning whelk *(Busycon pulleyi)* (see Tunnell et al. 2010:223 for taxonomic information). All four are from the central Texas coast (Figure 1) which is defined by Ricklis (2004:156) as including the coastal plain to a point approximately 40 to 50 kilometers inland, between the Colorado River on the north and the northern margins of Baffin Bay on the south. He remarks that the area is unified by it five similar, major bay estuarine systems protected by a barrier island chain, in contrast to the Brazos-Colorado River delta to the north and the shoreline of the lower Texas coast, which has no bays. The four cutting-edged tools were loaned to the authors by Sue Prudhomme, director of the Museum of the Coastal Bend in Victoria, Texas.

A search for additional whole-shell cutting-edged tools in Texas turned up only four specimens, and three of the four are from the central Texas coast. Story (1968:29, Figure 33) illustrates a robust (thick or stout) whelk from Ingleside Cove (41SP43) in San Patricio County that appears to be a cutting-edged tool. She remarks that most of the spire has been removed and the anterior portion of the columella and adjacent section of the body whorl have been ground down. Fritz (1975:130, Figure 17) illustrates a perforated whelk shell from 41JK114 in Jackson County; she remarks that the spire has been removed and the anterior end ground into a "gouge." The third and final specimen from the central Texas coast is a "shell pick" (a cutting-edged tool) in the Stanton Collection, Nueces County (Hester n.d.:6). O'Brien (1974:64-65, Figure 24) illustrates a cutting-edged tool from the upper Texas coast, the only shell artifact from the Fullen site (41HR82) in Harris County. He refers to the tool as a "hammer," although the shortened anterior end has been ground to produce a beveled, gouge-like bit that is primarily on the end of the columella. No whole-shell cutting-edged tools have been reported from the lower Texas coast.

The lightning whelk's "thickened inner wall ridge" is described (see Figure 1). This strengthening structure on the inner walls of the shell also strengthened whole-shell cutting-edged tools. By chipping back the outer lips of the shells, Indian craftsmen were able to position the bits on their cutting-edged tools below the thickened ridge, and so greatly strengthen the tools (see below).

THE CONTINUUM OF MODIFICATION REPORTED IN FLORIDA

Luer et al. (1986) report whelk shell tool blanks (for cutting-edged tools) from south-central Florida as one part of a continuum of modification, i.e. the progressive use and intentional fashioning of whelk shells that pass from an unmodified state to a blank stage, then to a cutting-edged tool stage (with beveled bits), and ultimately to a hammering tool stage (hammering

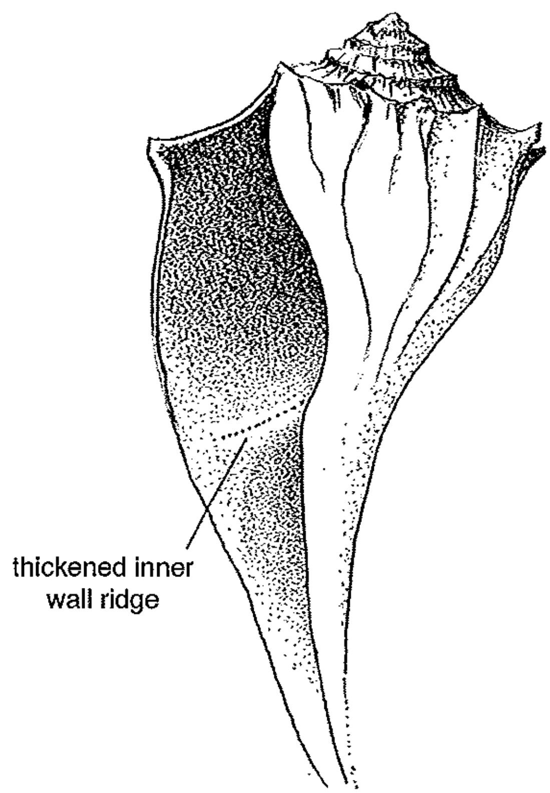


Figure 1. Drawing of a Gracile Lighting Whelk Illustrating the Usual Downward Curve of the Shell's Thickened Inner Wall Ridge. However,as it is shown by Luer et al. (1986:94, Figure 2), in very robust whelks the thickened ridge may bend toward the shell's outer lip at a right angle to the long axis of the shell. Drawing by Richard McReynolds.

tools have a blunt working surface worn by repeated pounding of the anterior end of the remnant columella). Their tool blank description is derived from 19 whelk shell tool blanks found in two caches on Big Mound Key (8CH10) in Charlotte County, Florida: a usually oblong perforation in the spire, removal of almost the entire length of the natural, thin outer lip, a carefully shortened siphonal canal, and a very rough bevel on the end of the shortened siphonal canal. Applicable to south-central and south Florida, the continuum of modification does not apply to all cultures in Florida that used similar tools. Nor does it apply to the culture or cultures that used whole-shell cutting-edged tools in Texas, where the blank and hammering tool stages have not been reported.

THE LIGHTNING WHELK'S THICKENED INNER WALL RIDGE

The following description is made with the whelk shell held in the conventional position for the examination of a gastropod, with the aperture toward you and the apex uppermost, with the axis vertical (see Andrews 1977:5).

Although it is a continuous strengthening structure on the inner walls of the shell, the lightning whelk's thickened inner wall ridge is in one part spiraling and curving in the other. From its uppermost point in the tip of the spire, the thickened ridge is initially a part of the spire's and then the whorl's sinistral spiral around the columella and is completely hidden from view. Ending its spiral at the start of the siphonal canal, the thickened ridge emerges from beneath the columella on the inner wall of the aperture, curving toward the shell's outer lip. Its curve toward the outer lip is usually downward, toward the anterior end of the shell (see Figure 1). However, in very robust whelks the thickened ridge bends toward the shell's outer lip at a right angle to the long axis of the shell (see Luer et al. 1986:94, Figure 2). In either case, the thickened ridge coalesces into the shell's inner wall before reaching the outer lip.

Torrence (1999:35, Figure 12) shows the exterior constriction of the body whorl tracing the thickened inner wall ridge as the "arc of constriction," a term he also applies to the thickened ridge on the inner wall of the aperture. For purposes of this paper, however, the strengthening structure on the inner walls of the lightning whelk's shell is the thickened inner wall ridge.

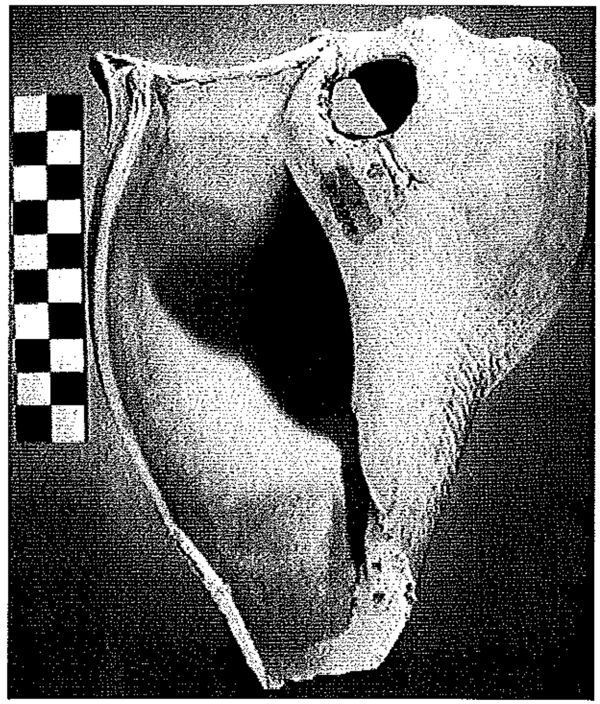


Figure 2. The Obverse (Interior) of Whole-Shell Cutting-Edged Tool A from Calhoun County. This robust shell has a hafting hole pecked partly in the body whorl and partly in the thicker parietal wall. A perforation in the spire is aligned with the hafting hole, but was used as a hafting aid for lashings (see text). Also see Figure 3. Photograph by Bill Birmingham.

PROVENIENCE OF THE ARTIFACTS

Whole-shell cutting-edged tool A (in Figures 3 and 4) was recovered by Cecil Calhoun at the Sonneman site (41CL7), a Late Prehistoric and possibly Historic Indian site on the shoreline of San Antonio Bay in Calhoun County (Gadus et al. 1993).

Whole-shell cutting-edged tools B and C (in Figures 4 and 5) are from Refugio County. They were found on O'Connor Ranch property on the western shoreline of Copano Bay and donated to the Museum of the Coastal Bend by Louise O'Connor. The Aransas River discharges directly into Copano Bay, a shallow, almost rectangular, body of water with a smaller bay, Mission Bay, opening directly into it on the west (Calnan 1980:1).

Whole-shell cutting-edged tool D (in Figure 6) was recovered by Bill Birmingham from Hopper's Landing (41RF11D) in Refugio County. This shell midden and multi-component site south of Hopper's Landing is on the west shoreline of San Antonio Bay; it was reported by Grombacher and Dibble

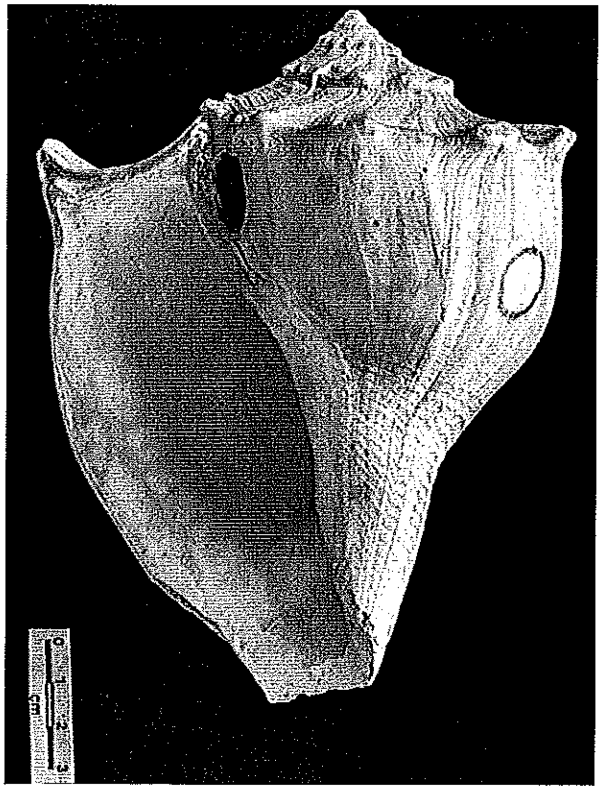


Figure 3. Another View of Whole-Shell Cutting-Edged Tool A from Calhoun County. The circle penciled onto the exterior of the shell shows the interior location of an impact area, apparently from repetitive collisions between the hafted end of the handle and the shell's inner wall. Photograph by Mike Kryzwonski.

in 1973 (Carolyn Spock, personal communication 2012). Birmingham (personal communication 2011) remarks on Tortugas, Morhiss, Ensor, a corner-tang biface, Perdiz, Scallorn, Starr, and Fresno (including heavily serrated Fresno) from 41RF11 (for information on these types see Turner,et al. 2011). Shell artifacts from the site include a nested stack of seven giant Atlantic cockle valves *(Dinocardium robustum)* and modified (edge-flaked) valves of the sunray venus *(Callista nimbosa)*.

THE ARTIFACTS

Figures 2 and 3 illustrate the obverse of whole-shell cutting-edged tool A from Calhoun County. This robust shell has a squat, heavy character, and the naturally smoothed, thick outer lip indicates an offshore origin (its outer lip was flattened and smoothed during the empty shell's journey to shore). The shell's prominent, thickened inner wall ridge and unusually thick outer lip (it is up to 9 mm thick) appear to explain the rarely seen, largely intact outer lip (the outer lips of the three remaining cutting-edged tools in this paper are fully chipped back). Like all of the cutting-edged tools described in this paper, the shortened anterior end of the shell was ground on the inner side, to produce a steeply beveled bit with a working edge on the harder, exterior side of the shell. The harder prismatic layer of shell on the exterior of the softer, nacreous interior layer is described by Andrews (1977:44-45) as conchiolin (flexible protein) imbedded with crystals of aragonite. Indians took advantage of the harder exterior layer by placing the contact edges of adzes (for example) on the exterior sides of whelk shells (Kumpe and Krzywonski 2010:60). The surviving edge on the angular bit of cutting-edged tool A is rounded and polished, and Ed Mokry (personal communication 2013) describes similar edge wear on rectangular adzes. The columella is a part of the bit, but has been ground back and thinned, probably

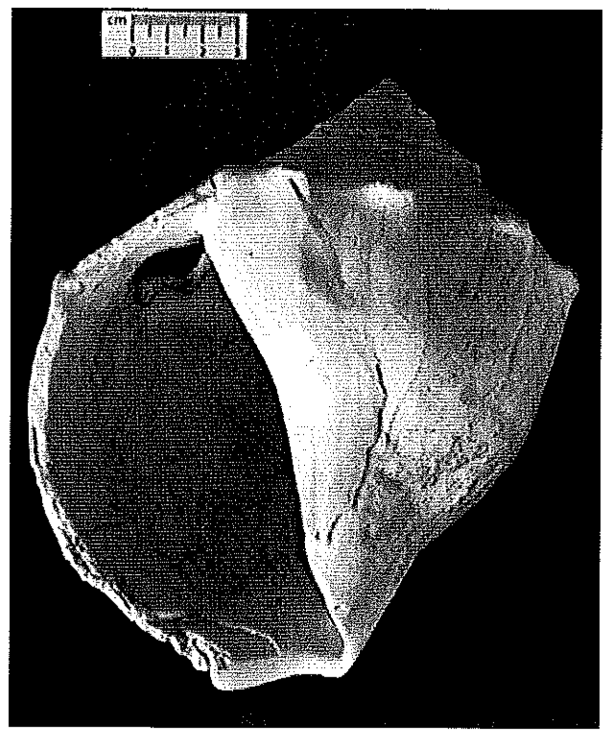


Figure 4. The Obverse (Interior) of Whole-Shell Cutting-Edged Tool B from Refugio County. This tool has a concave adze-like bit ground entirely on the whorl. The rounded end of the remnant columella in the shell's interior is immediately above the upward curve of the bit. Photograph by Bill Birmingham.

to remove jagged edges. Although the bit is comparatively narrow and the anterior end shortened but little, the columella appears to have broken and splintered on an earlier bit. Splintering, along the aperture side of the columella, reaches up to 80 mm above the edge of the bit (see Figure 3). A polished area with interrupted (obliterated) growth lines on the exterior of the bit, apparently from contact with the work surface, reaches up to 12 mm above the bit edge. Heavily polished growth lines reach farther, up to 34 mm above the bit edge. A well-made round hafting hole (21 x 20 mm) pecked into the shell near the posterior canal, partly in the body whorl and partly in the thicker parietal wall, is aligned with an oblong perforation (25 x 12 mm) pecked in the spire (see Figure 2). It might be surmised that well-made aligned perforations were for hafting hole-to-hole, but that possibility is blocked by the columella. Instead, the perforation in the spire is believed to have been used as a hafting aid for lashings. Luer et al. (1986:110 from Rau 1880:67; and from Cushing 1897:40) remark that oblong perforations in the spires of Florida's cutting-edged tools were used as hafting aids for lashings. They also cite Reiger's (1981:10) remarks made on the basis of stains on two cutting-edged tools, stains apparently from the decomposition of leather thongs against the shells. Evidence of the hafting method for cutting-edged tool A is a clearly outlined, circular impact area (about 14 mm in diameter) on the inner wall of the shell, apparently from repetitive collisions between the hafted end of the handle and the shell's inner wall (see Figure 3). Marquardt (1992:199) remarks on a cutting-edged tool from Key Marco, Florida with evidence that the haft came to rest against the inner surface of the shell; the evidence in that instance was a highly polished circular area produced by friction during tool use. Whole-shell cutting-edged tool A measures 158 x 120 x 97 mm. It weighs 526 grams.

Figure 5 illustrates the obverse of whole-shell cutting-edged tool B, the first of two from O'Connor Ranch property in Refugio County. This is the largest and heaviest of the five cutting-edged tools, but its outer lip, despite being fully chipped back, is only 5.4 to 6 mm thick (compare to whole-shell tool A). The concave, adze-like bit, which is from 4.5 to 7.5 mm thick and 40 mm in length, is entirely on whorl. The columella was apparently broken on an earlier bit, then rounded as it was ground back into the shell's interior (the rounded end of the columella is immediately above the upward curving length of the bit in Figure 4). On the shell's exterior, heavily polished areas with interrupted growth lines reach up to 80 mm above the edge of the bit. Such far-reaching areas of polish suggest a sizable work surface, perhaps a dugout. A large, comparatively symmetrical perforation pecked into the penultimate whorl measures 23 x 21 mm; its exterior edge is rounded and polished, possibly from use as a hafting hole. A smaller, nearby perforation (14 x 7 mm) could have served as a hafting aid for lashings. The severely shortened anterior end and rounded, remnant columella in the shell's interior indicate at least one earlier bit. Whole-shell cutting-edged tool B measures 178 x 139 x 106 mm. It weighs 586 grams.

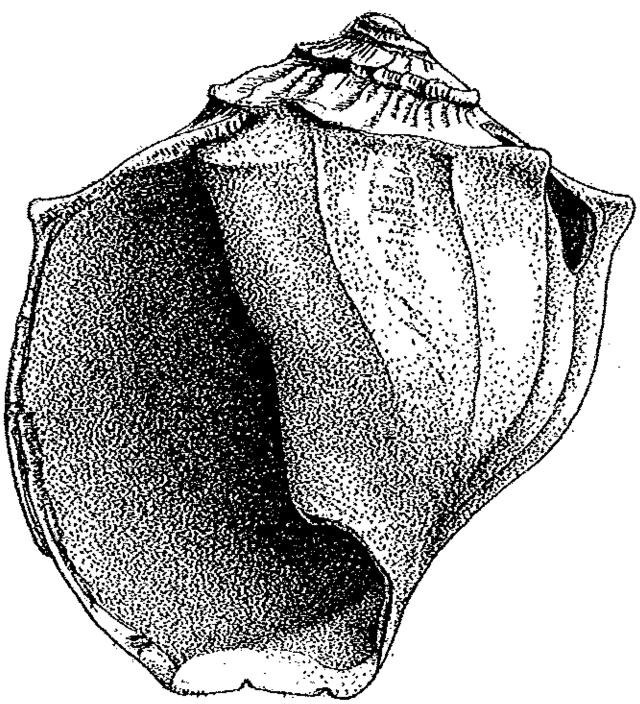


Figure 5. The Obverse (Interior) of Whole-Shell Cutting-Edged Tool C from Refugio County. The anterior end of this shell is so severely shortened that part of the upper edge of the bit is in line with the summit of the thickened inner wall ridge. The broad working edge is entirely on whorl, and the broken columella's jagged end is deep in the shell's interior. Drawing by Richard McReynolds.

Figure 6 illustrates the obverse of whole-shell cutting-edged tool C, the second of two from O'Connor Ranch property in Refugio County. It is not as robust as cutting-edged tools A or B, and the shell's outer lip, although fully chipped back, is only 3.8 to 4.4 mm thick. The siphonal or anterior end is so severely shortened that part of the upper edge of the bit is in line with the summit of the thickened inner wall ridge, making re-sharpening impractical. The slightly concave bit, from 5 to 7 mm thick and 40 mm in length, is entirely on whorl. There are small nicks or breaks in the edge of the bit and slight impact scarring is seen along its exterior edge. The columella was apparently broken on an earlier bit as its jagged end is deep in the shell's interior, approximately 60 mm above the edge of the bit. The only polished area with interrupted growth lines on the exterior of this tool is at a comparatively steep angle and reaches only 2 to 5 mm above the edge of the bit. This tool was apparently applied to the work surface at a much steeper angle than was cutting-edged tool B. The perforation (35 x 27 mm), which is partly in the penultimate whorl and partly in the body whorl (between the two knobs on the far right in Figure 5), was roughly made by breaking. The thinness of the shell probably made breaking the preferred option. Whelk shell does little cracking and splitting when struck with a pointed chert tool because the calcium carbonate crystals making up the layers of shell are deposited with different crystal alignment in each layer (Brown (1983:102). The severely shortened anterior end and the broken columella with its jagged end deep in the shell's interior indicate at least one earlier bit that included the columella. Whole-shell cutting-edged tool C measures 136 x 116 x 98 mm. It weighs 314 grams.

Figure 6 illustrates the obverse of whole-shell cutting-edged tool D from Refugio County. This is a robust shell with a fully modified (chipped back) outer lip from 5 to 7 mm thick. Marine organisms have neatly perforated the aperture edge of the penultimate whorl. That part of the bit that includes the columella is curved (convex) and closely resembles the bits on columella gouges illustrated by others: Andrews 1977:5, Figure 4d; Hester 1980:123, Figure 5.20c-d; Ricklis 2004:170, Figure 5.15. The same tools are referred to as "columella beveled tools" by Dockall and Dockall (1996:218, Figure 8), while Marquardt (1992:204) and Torrence (1999:40, Figure 16) refer to similar tools in Florida as "columella cutting-edged tools." The bit on whole-shell cutting-edged tool D is 50 mm in length. Its greatest length is on whorl and there are two breaks in the edge that look like notches (see Figure 6). Longitudinal impact scars behind the breaks appear to result from impact with a hard material like wood. A third area of longitudinal impact scars on the exterior appears to date from an earlier bit. The present bit is only 3 mm thick where impact scars have thinned the reverse, but undamaged parts of the bit are up to 9 mm thick. Polished areas with interrupted growth lines on the exterior, apparently from contact with the work surface, extend up to 20 mm above the edge of the bit. Growth lines then appear in a naturally concave part of the shell before another heavily polished area (43 x 21 mm) with interrupted growth lines appears on the bulge of the body whorl. Although there is only one small hole in the spire and no indication that the tool was hafted, breaks in the bit and longitudinal impact scars indicate that the tool was used for chipping or chopping. Marquardt (1992:199) reports similar but rare cutting-edged tools in Florida without holes or notches for hafting. The severely shortened anterior end and earlier longitudinal impact scarring on the reverse of cutting-edged tool D indicate at least one earlier bit. The present bit is so near the shell's thickened inner wall ridge (see Figure 1) that re-sharpening was impractical. Whole-shell cutting-edged tool D measures 140 x 110 x 94 mm. It weighs 508 grams.

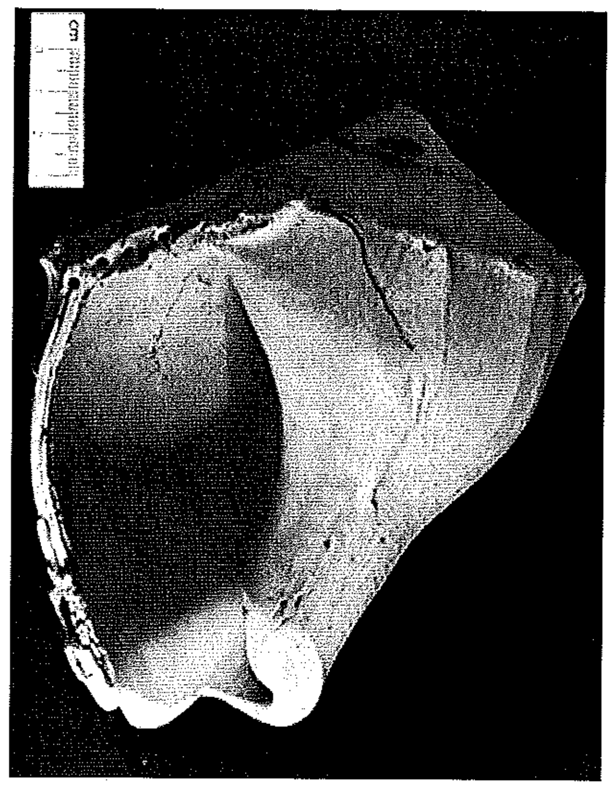


Figure 6. The Obverse (Interior) of Whole-Shell Cutting-Edged tool D from Refugio County. The outer lip is fully modified by chipping back, which positions the bit below the thickened edge. One of three areas of longitudinal impact scars on the exterior appears to date from an earlier big. Photography by Bill Birmingham.

DISCUSSION

Luer et al. (1986:119) remark on the effort that Indians on the west coast of Florida must have expended to obtain robust whelk shells from hard to reach locations like inlets, barrier islands, and in the Gulf of Mexico. Gracile whelks were easily obtained from quieter waters in Florida's bays, but Luer (2008:73) remarks that Indians apparently needed robust whelk shell cutting-edged tools for hollowing and making dugouts. These are proven woodworking tools. Brown (1983:102) illustrates an experimental shell "ax" with a handle (a whole-shell cutting edged tool made from a large whelk) and remarks that it chopped wood surprisingly well (see Figure 5).

By chipping back the outer lip of a whelk shell intended for a cutting-edged tool and removing the shell's anterior extremity, thicker parts of the columella and adjoining body whorl are prepared to receive a strong bevel and cutting edge (Luer et at. 1986:106, Figure 10). Chipping back the outer lip of a whelk shell also enabled the whole of the bit to be positioned below the shell's thickened inner wall ridge (see Figure 1). The thickened ridge strengthened whole-shell cutting-edged tools, and resharpening was impractical once the bit neared or reached the thickened ridge. The bits on cutting-edged tools B, C, and D, for example, are so near the thickened ridge that resharpening was impractical. Part of the upper edge of the bit on cutting-edged tool C is actually in line with the summit of the thickened ridge, the absolute limit for a bit on whole-shell cutting-edged tools.

Major and minor bevels (bifacially beveled bits) on cutting-edged tools are reported in Florida; major bevels are on the interior side of the shell, while minor bevels (many said to be scarcely noticeable) are on the outer or exterior side of the shell (Luer et al. 1986:12). Two of the cutting-edged tools from the central Texas coast (B and C) have use-wear behind their bits that somewhat resembles beveling, but none of the cutting-edged tools found in Texas are known to have bifacially beveled bits.

Radiocarbon dating of the two caches of whelk shell tool blanks found on Big Mound Key (8CH10) in Charlotte County, Florida indicates that the caches are about 1000 years of age or slightly younger (Luer et al. 1986:104). In Texas, excavations at the Ingleside Cove site (41SP43) on Corpus Christi Bay, which recovered a cutting-edged tool, were of a Late Archaic shell midden overlain by a Late Prehistoric (Rockport) midden; radiocarbon dates appeared to put the terminal Archaic component at A.D. 1100 – 1250 (Story 1968:40; Ricklis 2004:155).

One Florida site, the Wightman site (8LL54) on the Lower Gulf Coast, contained 100 cutting-edged tools and 400 (gastropod) hammers (Luer et al. 1986:105, Table 3). Many of the 400 hammers may have originally been cutting-edged tools (see above). Cutting-edged tools are so numerous in Florida that Marquardt (1992:193-199) lists types from A to J. In Texas, however, only eight whole-shell cutting-edged tools were located, including the four in this paper. Three types of shell hammers have been reported in Texas, conch shell hammers (Campbell 1947), columella hammers (Dockall and Dockall 1996), and quahog hammers (Chandler and Kumpe 1998), but there are no gastropod hammers that were formerly cutting-edged tools. Although they are common tools in Florida, whole-shell cutting-edged tools are apparently among the rarest of shell tools on the Texas coast.

ACKNOWLEDGMENTS

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Aboriginal Ceramic Sherds from Three Sites Along the Navasota River in Madison County, Texas

Timothy K. Perttula

ABSTRACT

The analysis of aboriginal ceramic sherds from three archeological sites along the Navasota River in Madison County, Texas, document that sherds from plain sandy paste ceramic vessels (Goose Creek Plain, *var. unspecified*) and a few decorated sandy paste sherds were likely made and used locally. The dominance of sandy paste sherds in sites in this part of East central Texas suggests that the three sites represent separate components of the inland Mossy Grove Culture. Relying on radiocarbon-dated ceramic assemblages at a number of sites on Gibbons Creek in the Navasota River basin suggest that the sandy paste ceramic wares on the three Madison County sites are the product of occupations that dated from cal 172 B.C. to A.D. 993, while a later occupation with a bone- and grog-tempered brushed sherd at one site likely dated from cal A.D. 1175-1406.

INTRODUCTION

Aboriginal ceramic sherds from sites in the southern part of the Post Oak or Prairie Savannah of Texas are not particularly common, even on sites that have been subjected to extensive data recovery excavations (Fields 2004). The rarity of aboriginal sherds has made it difficult to characterize their nature either spatially or temporally, or establish with any reasonable certainty their origins, ethnic affiliations, or relationships to other ceramic assemblages in the general region. Arnn et al. (2010:63) have noted that "archeological evidence from numerous sites in the Prairie Savanna archaeological region indicate an area of shifting cultural boundaries. Ceramic assemblages are technologically diverse and understanding this diversity will require a more comprehensive approach to ceramic studies than has been accomplished to date." The opportunity to examine aboriginal ceramic sherds (n=58) from three sites along the Navasota River in western Madison County, Texas, in light of the issues just mentioned, provides the framework for this analysis.

The analysis of the Madison County ceramic sherds is based on differences in temper, type of sherd (i.e., rim, body, or base), rim and lip form (cf. Brown 1996:Figure 2-12), decoration (if present, including the identification of motifs and elements), surface treatment (smoothing, burnishing, or polishing; see Rice 1987), and firing conditions (cf. Teltser 1993). Temper is the deliberate and indeterminate materials found in the paste (Rice 1987:411), including a variety of tempers (grog or crushed sherds, burned bone, etc.). Sherd cross-sections were inspected macroscopically and with a 10X hand lens to determine the character of the paste and its inclusions. Determining the firing conditions was based on the identification of the firing core in the sherd cross-sections and the identification of oxidation patterns as defined in Teltser (1993:535-536 and Figure 2a-h). Finally, wall thickness was recorded in millimeters (mm), using a vernier caliper, along the mid-section of the sherd.

CERAMIC ASSEMBLAGES

The ceramic assemblages from the three Madison County sites range only between 17-21 sherds per site (Table 1). Few of the sherds (10%) have decorations, and most of the sherds are from vessels that have a sandy paste (79%) and no temper inclusions. A few sandy paste sherds (8.6%) have either bone or grog temper inclusions, while another 12% of the sherds are from vessels that have a silty or clayey paste with bone and/or grog fragments used as a temper in vessel manufacture.

Table 1. Ceramic assemblages from the three Madison County sites.

Site	No. of Sherds	No. Decorated	SP	b/SP	g/SP	g	b-g
41MA27	20	1	15	2	1	2	–
41MA29	17	4	15	–	–	1	1
41MA30	21	1	16	2	–	2	1
Totals	58	6/10.3%	46 79%	4 6.9%	1 1.7%	5 8.6%	2 3.5%

sp, sandy paste; b, bone temper; g, grog temper

41MA27

The sherds from 41MA27 include one decorated rim sherd, 16 plain body sherds, and three base sherds. Ninety percent of the 41MA27 sherds have a sandy paste, ranging from a fine to coarse paste (cf. Kalter et al. 2005:202). Two of the fine sandy paste sherds also have bone temper inclusions, and another fine sandy paste sherd has grog temper. Finally, two other body sherds with a clayey or silty paste have fine grog temper inclusions.

The sherds are from vessels fired predominantly in a low oxygen or reducing environment (85%). Three other sherds (sandy paste only) are from incompletely oxidized vessels. Of the reduced fired vessel sherds, the majority of them had been fired in a reducing environment but cooled in the open air, leaving thin lighter oxidized bands at one or both surfaces of the vessel core (cf. Teltser 1993:Figure 2f-h). All of the grog-tempered sherds from the site are from vessels fired in this manner compared to 60% of the sandy paste sherds.

The sherds are from fairly thick vessels, probably mostly jars. The one sandy paste rim is 8.9 mm thick. Sandy paste body sherds are 7.48 ± 1.45 mm thick (range from 4.9-9.4 mm), but with considerable variability within this ceramic group. Sandy paste base sherds are 8.55 ± 0.85 mm in thickness. The bone-sandy paste sherds include a 7.4 mm body sherd and an 8.9 mm thick base sherd. The grog and grog-sandy paste body sherds range from 6.6-7.7 mm thick, with a mean thickness of 7.23 ± 0.42 mm. The sherds are from vessels that were regularly smoothed on either interior (35%) and/or exterior (40%) surfaces.

The one decorated sherd from 41MA27 is a thick (8.9 mm) jar rim (direct rim and a rounded lip) from a Goose Creek Incised, *var. unspecified* (see Aten 1983:Figure 12.2; Suhm and Jelks 196:Plate 28) vessel with a coarse sandy paste. The jar had been fired in a reducing environment, but cooled in the open air (cf. Teltser 1993:Figure 2f). It is decorated with incised lines in a chevron motif that would have encircled the vessel rim.

41MA29

The 41MA29 sherds include one sandy paste plain rim (direct rim and a rounded lip, 4.8 mm in thickness, probably from a bowl) and 16 plain body sherds. Approximately 88% of the sherds have a sandy paste, ranging from a fine to a coarse paste. Two other sherds have a clayey to silty paste and are tempered with grog or bone and grog. The sherds are from vessels fired predominantly in a low oxygen or reducing environment (88%). Two other sherds (sandy paste only) are from incompletely oxidized vessels. Of the reduced fired vessel sherds, the majority of them had been fired in a reducing environment but cooled in the open air (69%), leaving thin lighter oxidized bands at one or both surfaces of the vessel core (cf. Teltser 1993:Figure 2f-h). The grog-tempered sherd was also from a vessel fired in this manner, while the bone-grog-tempered sherd was fired and cooled in a reducing environment.

The sherds from 41MA29 are from moderately thin vessels, slightly thinner than the sherds from 41MA27 and 41MA30, probably mostly sherds from jars and simple bowls. Sandy paste body sherds are 6.87 ± 1.32 mm thick (range from 4.9-10.5 mm), but there is considerable variability in vessel wall thickness within this ceramic group. The one sandy paste rim sherd is only 4.8 mm in thickness. The grog and grog-bone-tempered body sherds range from 4.8-6.7

mm in thickness, with a mean thickness of 5.75 ± 0.95 mm. The sherds are from vessels that were regularly smoothed on interior surfaces (47%), but less commonly on exterior (12%) surfaces.

There are four decorated body sherds in the 41MA29 ceramic assemblage (Figure 1a-d). Three of them have punctated elements and are from sandy paste vessels, while the latter has a partially smoothed-over parallel brushed decoration (Figure 1a); although the orientation of the brushing is not definitive, it likely ran vertically on the body of a utility ware jar. This latter sherd, from a bone-grog-tempered vessel, is very likely from a vessel made by a Caddo Indian group in East Texas, although this has not been confirmed by either instrumental neutron activation analysis or petrographic analysis. Nevertheless, the co-association of bone and grog temper—common temper inclusions in East Texas Caddo vessels—with a brushed exterior surface points to a vessel made after ca. A.D. 1250 by a Caddo potter. Brushed pottery became a common utility ware vessel decoration after that time in much of East Texas, especially among Caddo groups in portions of the Angelina, Neches, Sabine and Big Cypress drainage basins (Perttula 2010).

The first of the sandy paste punctated sherds has rows of fingernail punctates covering the sherd surface (see Figure 1b). The surface of the vessel may then have been smoothed over, as there are no raised clay ridges associated with the punctates themselves. The second sherd has lunate-shaped tool punctations that freely or randomly cover the vessel surface (see Figure 1d). There are low ridges of clay on the surface that were apparently pushed up adjacent to the tool punctations when the tool was pushed into the wet clay. The third sandy paste punctated sherds

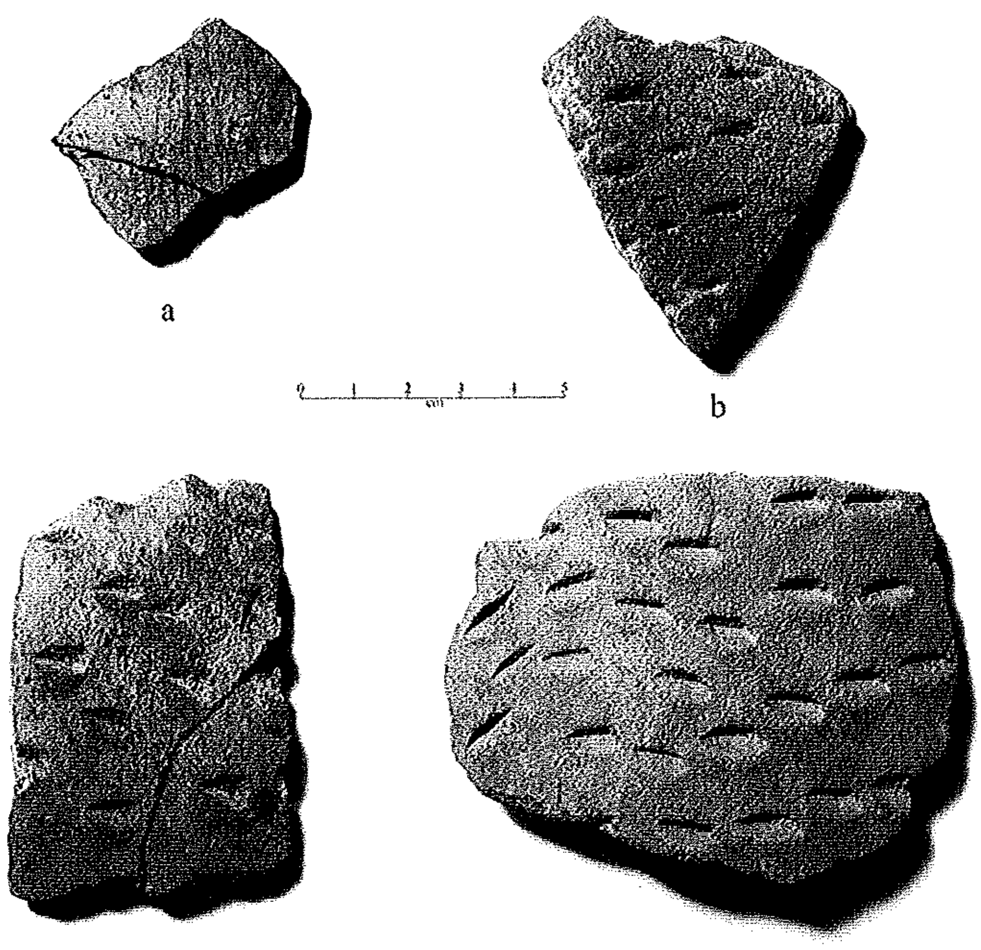

Figure 1. Decorated sherds from 41MA29: a, parallel (vertical) brushed; b, fingernail punctated; c-d, tool punctated.

has both lunate- and triangular-shaped tool punctates freely spread across the exterior vessel surface (see Figure 1c). Low clay ridges were pushed up alongside each of the punctates, and were created when the tool used for punctating was pushed into the wet clay surface.

41MA30

The sherds from 41MA30 include one plain grog-tempered bowl rim (direct rim and a rounded lip, 6.7 mm in thickness), with smoothed interior and exterior surfaces, 17 body sherds, and three base sherds. Almost 86% of the 41MA30 sherds have a sandy paste, ranging from a fine to coarse paste. Two of the sandy paste sherds (either fine or coarse paste) also have bone temper inclusions. Two sherds have grog temper and a clayey or silty paste. Finally, one body sherd with a clayey or silty paste has fine grog and bone temper inclusions. The sherds are from vessels fired predominantly in a low oxygen or reducing environment (76%). Four other sherds (sandy paste only) are from incompletely oxidized vessels, and one is from a vessel that was fired and cooled in an oxidizing environment (sandy paste sherd). Of the reduced fired vessel sherds, the majority of them had been fired in a reducing environment but cooled in the open air, leaving thin lighter oxidized bands at one or both surfaces of the vessel core (cf. Teltser 1993:Figure 2f-h). Only one of the bone-tempered, grog-tempered, or grog-bone-tempered sherds (20%) are from vessels fired in this manner compared to 37.5% of the sandy paste sherds. The majority of the tempered vessels were fired and cooled in a low oxygen environment.

The sherds are from moderately thick vessels, probably mostly jars and simple bowls. Sandy paste body sherds are 7.24 ± 0.85 mm thick (range from 5.3-9.1 mm), but there is considerable variability in vessel wall thickness within this ceramic group. Sandy paste base sherds are 10.8 ± 0.93 mm in thickness. The bone-sandy paste sherds are 7.25 ± 0.35 mm thick. The one grog-tempered rim is 6.7 mm in thickness. The grog and grog-bone-tempered body sherds range from 6.4-7.4 mm thick, with a mean thickness of 6.9 ± 0.50 mm. The sherds are from vessels that were regularly smoothed on either interior (62%) and/or exterior (38%) surfaces.

The one decorated sherd from 41MA30 is from a jar body sherd (6.9 mm) with a bone-tempered and fine sandy paste. The jar had been fired and cooled in a reducing environment (cf. Teltser 1993:Figure 2b). It is decorated with a single straight incised line that is adjacent to a tool punctated-filled zone; this zone may have been triangular in shape, with incised lines creating the triangle that was filled with punctations.

COMPARISIONS AMONG SITES

The three Madison County sites appear to have individual components within the same aboriginal ceramic tradition in the east central and central part of the state of Texas. This tradition is recognized by a preponderance of plain sandy paste pottery (Goose Creek Plain, *var. unspecified*), and this plain sandy paste pottery represents a distinctive aspect of the material culture remains of the inland Mossy Grove Culture defined by Story (1990:258 and Figure 39). These sites are found in the Brazos, Trinity, and Neches-Angelina river basins (Figure 2) in Southeast, East central, and East Texas. Other ceramic traditions to the west and southwest, in the Gulf Coastal Plain, the Balcones Escarpment, and the Edwards Plateau, are dominated by bone-tempered wares in Central and South Texas, bone-tempered sandy paste wares in Central and East central Texas, and sandy paste and grog-tempered wares along the central and upper Texas Coast (Arnn et al. 2010; Aten and Bollich 2011; Ellis 2010).

When during the Mossy Grove Culture period were the Madison County sites likely to have been occupied? Unfortunately, the three Madison County sites do not have any available radiocarbon dates, but there are a series of sites along Gibbons Creek in the Navasota River basin (see Figure 2:No. 4) that do have radiocarbon dates from archeological deposits with sandy paste, bone-tempered sandy paste, and grog-tempered sherds (Rogers 1991, 1993a, 1993b, 1994, 1995).

These calibrated radiocarbon dates from the Gibbons Creek area indicate that plain sandy paste pottery (generally thick and with floated surfaces) was made and used as early as cal 2064 years B.P., or 114 B.C. (calibrated using Reimer et al. 2009), in the Navasota River basin, and it was the most common ceramic ware. This ware continued to be made in this area until at least cal 520 years B.P. or A.D. 1430. Bone-tempered sandy paste pottery has the same chronological parameters as the plain sandy paste ceramic sherds. These dates, thus, bracket in very general terms a 1500 year period when the three Madison County sites were occupied by aboriginal

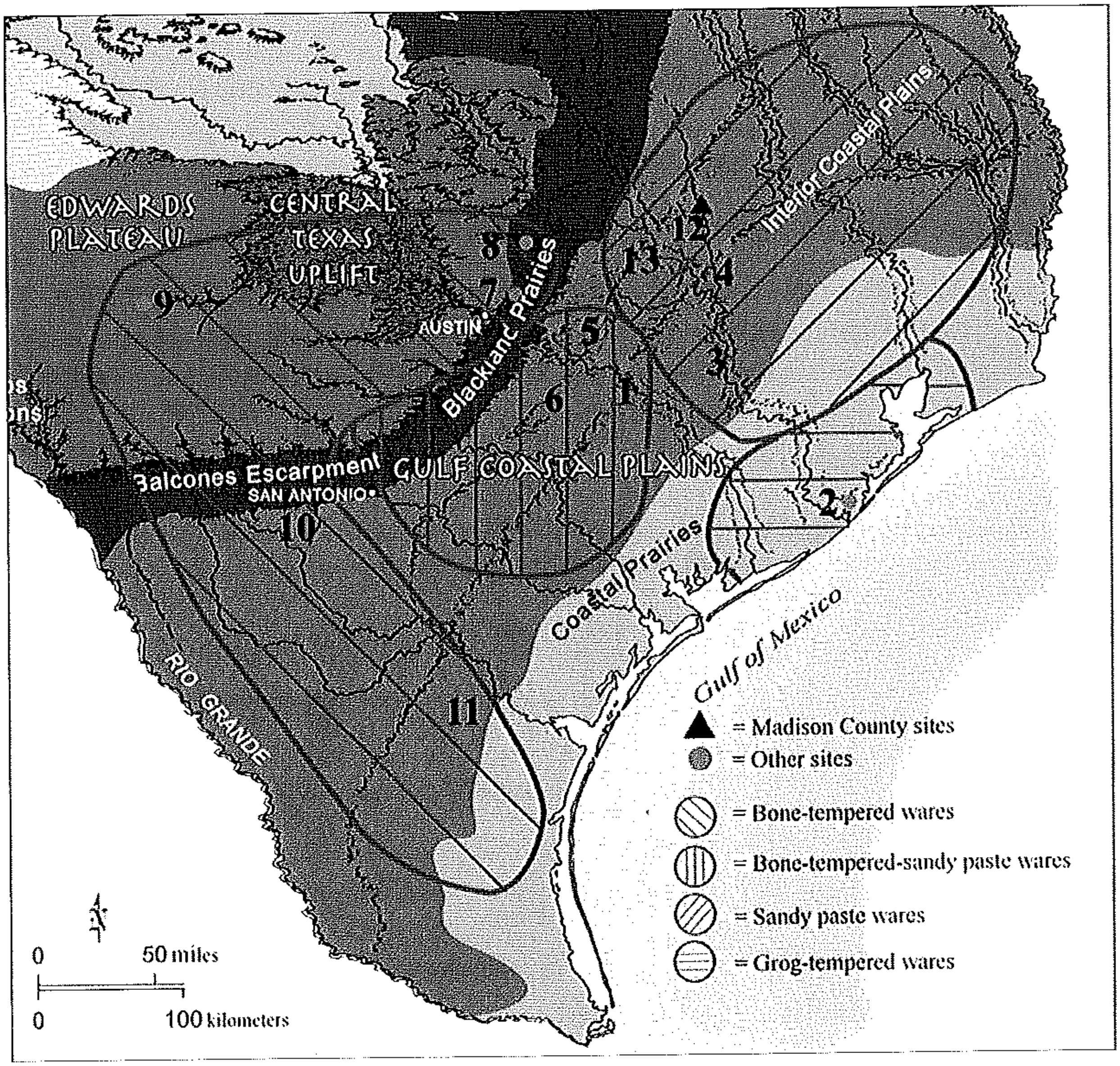

Figure 2. Distribution of regionally distinctive ceramic assemblages in eastern, east central, southeastern, central, and south Texas regions. Sites: 1, Sandbur (41FY135, Kalter et al. 2005); 2, Jones Lake (41BO79, Nash et al. 1996); 3, Allens Creek sites (41AU8, 14, 21, 31, 36, 37, 38, Hall 1981); 4, 41GM281 (Rogers 1995); 5, 41FY74 (Skelton 1977); 6, Mustang Branch, 41HY209, Ricklis and Collins 1994); 7, Rowe Valley (41WM437); 8, Periwinkle (41BL143); 9, Buckhollow (41KM16, Johnson 1994); 10, Panther Springs (41BX228, Black and McGraw 1985); 11, Hinojosa (41JW8, Black 1986); 12, 41RT510 (Perttula 2006a); and 13, 41RT522 (Perttula 2006b). The triangle in the Brazos River basin is the location of the three Madison County sites.

groups. If we examine these same sites for decorated sandy paste and bone-tempered sandy paste sherds, 1 sigma calibrated radiocarbon dates from deposits with these kinds of sherds range from 2122-2036 B.P., 1412-1294 B.P., 1308-1173 B.P., and 1173-957 B.P. (see Rogers 1991, 1993a, 1993b), or from as early as 172 B.C. to A.D. 993. The vast majority of sherds from the three Madison County sites were very likely made and used locally in this ca. 1150 year interval of the Woodland period and early part of the Late Prehistoric period.

The grog- and bone-tempered brushed sherd from 41MA29 represents a second and even later Late Prehistoric use, as well as evidence of the widespread distribution of prehistoric Caddo pottery in parts of the Post Oak Savanna (see Fields 2004:367; Perttula 2008). Engraved, brushed, incised, incised-punctated, and punctated sherds from grog-tempered, bone-tempered, and sandy paste sherds occur in a component at 41GM281 (Rogers 1995) that has calibrated (1 sigma) radiocarbon ages that range from A.D. 1175 to A.D. 1406. The brushed sherd in the 41MA29 collection would not be out of place in an assemblage of decorated and grog-tempered Caddo pottery found in East Texas on sites dating after A.D. 1250 or thereabouts.

CONCLUSIONS

The analysis of a small sample (n=58) of aboriginal ceramic sherds from three archeological sites along the Navasota River in Madison County, Texas, indicates that plain sandy paste ceramic vessels (Goose Creek Plain, *var. unspecified*) and a few decorated sandy paste vessel sherds are the most common ceramic ware on the sites, accounting for almost 80% of the sample. This ware was likely made and used locally. This is followed by lesser amounts of plain grog-tempered sherds (8.6%), plain and decorated bone-tempered sandy paste sherds (6.9%), plain and decorated bone-grog-tempered sherds (3.4%), and a plain grog-tempered and sandy paste sherd (1.7%). The dominance of sandy paste sherds in sites in this part of East central Texas suggests that the three sites represent separate components of the inland Mossy Grove Culture. The analysis of radiocarbon-dated ceramic assemblages at a number of sites on Gibbons Creek in the Navasota River basin suggest that the plain and decorated sandy paste and bone-tempered sandy paste ceramic wares on Madison County sites are the product of occupations that dated from cal 172 B.C. to A.D. 993, while a later occupation with a bone- and grog-tempered brushed sherd at 41MA29 (considered to be a trade ware from an East Texas Caddo group) likely dated from cal A.D. 1175-1406.

ACKNOWLEDGMENTS

I want to thank Bill Moore for the opportunity to analyze the Madison County prehistoric ceramic sherds from these three sites. Lance Trask prepared Figures 1 and 2.

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A Scottsbluff Point from Frio County, Texas

David L. Calame, Sr.

ABSTRACT

A Scottsbluff point found in northern Frio County, Texas is reported and discussed.

THE SITE

The find site of this well made Paleoindian spear point is near Moore, Texas in Frio County (see Figure 1). The locale is atop one of many erosional ridges that extend southward from the Texas hill country across Medina County and dwindle away onto the coastal plain in Frio County. These erosional ridges are capped with Uvalde gravels and often overgrown with several types of scrub brush, including guajillo, whitebrush, and cenizo (purple sage). These ridges provided high ground from which to observe the surrounding countryside and are littered with primary and secondary flakes commonly found at lithic procurement sites. Other signs of prehistoric peoples on these landforms are concentrations of fire cracked limestone, sandstone and chert. High quality chert is still available atop these ridges, if one is willing to do battle with the scrub brush to get to it. The environs of this find site today is best described as a transitional zone between the Texas Hill Country to the north, the coastal plains to the south and the Chihuahuan Biotic province to the west. Rainfall amounts are thought to have been much greater during Scottsbluff times and therefore the environment was probably much different in antiquity.

Scottsbluff points are described by Turner et al. (2011:160-161) as "fairly large points typified by excellent workmanship, fine parallel flaking and a "fat feel" due to the bi-convex cross section. Scottsbluff points in Texas are found in north, central, south and east Texas. Among previous examples published from this county and nearby southern Texas include Chandler and Hindes (1993). The type's distribution actually extends out some distance into the Gulf of Mexico as the Texas coastline was somewhat closer to the continental shelf during Scottsbluff times. Scottsbluff points

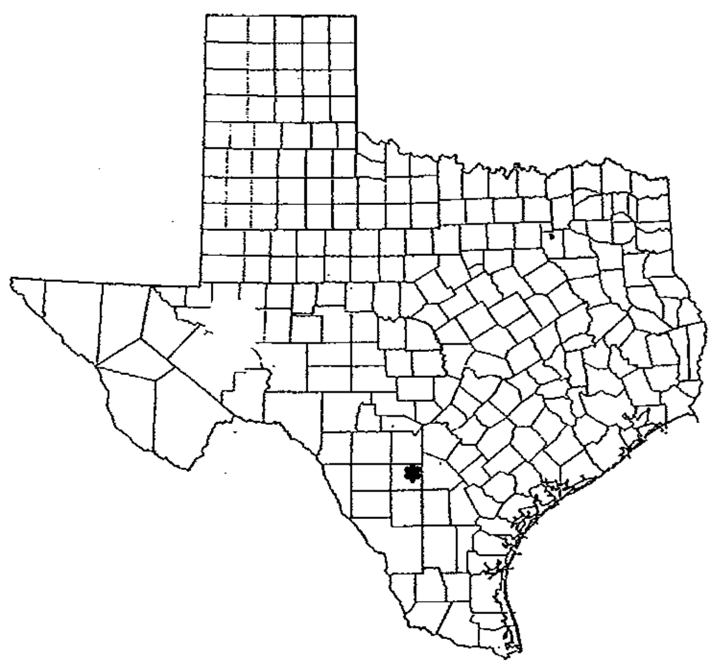

Figure 1. Map of Texas, Showing the General Location of the Scottbluff Point found in Frio Couty.

are distributed across the High Plains as well. Scottsbluff points are dated around 7500 B.C.

THE ARTIFACT

The reported artifact exhibits the excellent workmanship commonly associated with Scottsbluff points. The point is nearly complete (Figure 2) with only minor tip damage, which appears to have

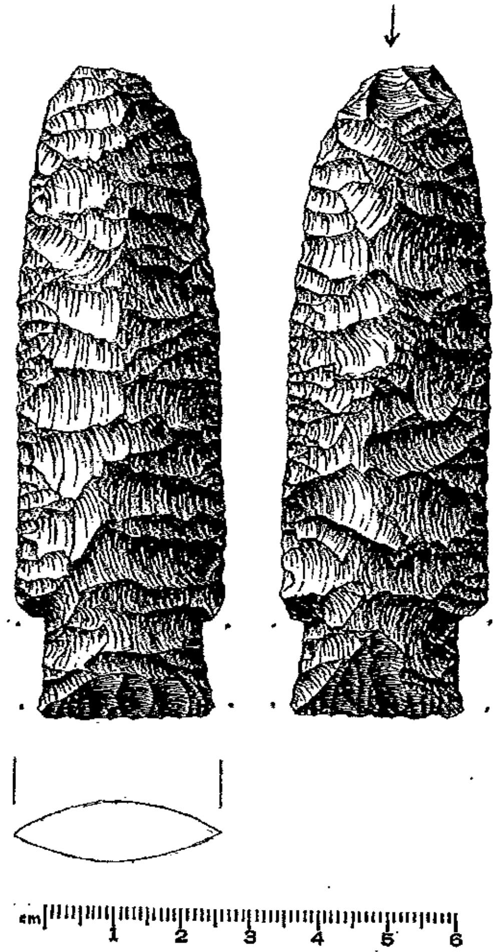

Figure 2. Scottsbluff from Frio County. Both sides of the artifact are shown, as is the transverse cross-section. At the tip of the right face, the arrow indicates the direction of an impact fracture. Illustration by Richard L. McReynolds.

occurred in the more recent past, as the created flake scar appears "fresh" exhibiting no observable patina within the scar itself. Measurements of the specimen are shown in Table 1.

Both artifact faces exhibit patination, but side "A" has significantly more patina than side "B" and therefore appears to have been exposed at the surface for a longer period of time than side "B". Still, patination is minor by south Texas standards, as many Early Archaic, and therefore younger, artifacts in south Texas can be covered by a thick, hard, smooth, white patina. Although many factors affect patination no doubt, one important factor is thought to be exposure to the elements. All of this speculation suggests that the reported artifact was probably buried throughout much of its existence.

This Scottsbluff point is made from very high quality caramel colored chert. Such high quality chert can be found occasionally across much of central and south Texas from the very ridges on which the artifact was found and from Uvalde County in the west to the Brazos River in the east. Large amount of similar chert can be found in tabular form in the bedload of the Pedernales. An occasional tabular example can also be found in the Nueces River.

The lateral edges of this artifact are very straight and the flake scar pattern is very controlled and uniform collateral pressure flaking. The bi-convex long axis profile is extremely consistent. Scottsbluff points were intentionally made with a prominent medial ridge making them a very sturdy point. Heavy grinding is exhibited on the stem base and lateral edges. Ultraviolet light analysis using a Model UVGL-55 Mineralight Lamp in both short and long wave produced a pumpkin orange fluorescence so common amongst Edwards chert.

DISCUSSION

Scottsbluff points are infrequent finds in south Texas including Frio County (Hester and Hill 1971; Chandler and Hindes 1993. The near pristine stage of this artifact condition and rarity made its reporting

Table 1. Dimensions of the Scottsbluff point from Frio County.

Length	Width	Thickness	Base Width	Base Width at Blade	Base Length
96 mm	31 mm	9 mm	26 mm	23 mm	14 mm

important, although it is known that Frio County is already within the Scottsbluff points distribution.

ACKNOWLEDGMENTS

The author wishes to thank Mr. and Mrs. Stevens for their willingness to share information and for the loan of this artifact. Sandra Stevens kindly provided a color print of the specimen. The author is also much indebted to Mr. Richard McReynolds for his very fine illustrations of this artifact. Last but not least, the author thanks the editor, Dr. Thomas Hester.

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J. B. Sollberger, A Bibliography and Final Farewell

Carey D. Weber and Troy H. Herndon

It has been nearly 20 years since J. B. Sollberger passed away. Two previous articles, one prior to his death on May 7, 1995 (Patterson 1988) and one after his death (Callahan 1995) have been written covering the contributions of J. B. Sollberger to archeology, lithic technology, and the art of flint knapping. The primary intent of this paper is to publish a comprehensive bibliography of his written works, as well as to offer some of our personal experiences of his life.

J. B. Sollberger, Solly, had an innate understanding of stress forces in solids, perhaps because of his plumbing trade. Had he had the opportunity to attend college, he would have been a brilliant engineer. He recognized that the basic principles of engineering applied to stone fracture. Using these principles he successfully explained almost every feature of fracture in silicate stone. At his peak in his hobby of flint knapping, he was widely regarded as one of the premier authorities on prehistoric lithic technology.

In the 1920's John Byron Sollberger's boyhood interest in artifact collecting in the Dallas area evolved into questions about how and why artifacts were made. He practiced basic techniques of excavation, albeit somewhat primitive even for those times, at his father-in-law's ranch in Kerr County, Texas, while continuing his forays in the Dallas area and elsewhere. Following the trend of the day, he proposed and described several artifact types and made observations on prehistoric cultural behavior. Many of the published archeological reports during that time were full of speculation and incomplete explanations, and, through the succeeding decades, they left him generally dissatisfied.

Solly determined to apply logic to answer his questions. While it is often called the art of flint knapping, Solly found his answers in experimentation – the science of flint knapping. He taught himself to knap flint and to devise various techniques to accomplish specific lithic reduction objectives. He reasoned that prehistoric Americans were *Homo sapiens sapiens*, the same people that we are. Given the same resources, they could invent anything that we could, and likely better because their survival depended on it. In the spirit of Dee Ann Story and Alex D. Krieger when the *Handbook of Texas Archeology* was first published (Suhm et al. 1954), he not only created typology (Sollberger 1967, 1969, 1970a), he also challenged it (Sollberger 1970b, 1976), as well as contemporary theories of lithic technology. He developed basic principles employed by prehistoric craftsmen to perform certain lithic reduction objectives based on his observations and experiments (e.g., "good Indians like thin flakes; thin the round face first"). He realized that our perceptions of their cultural remains are likely idealistic simplifications of more complex behavior.

Solly, along with William B. Carroll and Leland W. Patterson, assumed the role of the idealist in collaborating to organize the first Texas Knap-In (Patterson 1979), a forum in which professional archeologists, artifact collectors and flintknappers could come together to share ideas and experiences without fear of criticism or penalty. Attendees of those early meetings found that he loved strong coffee any time of day, served with a shot of milk that rose just to the surface. He fried left-handed eggs (that is, he was left-handed, grumpy in the morning, couldn't fry eggs, and we ate those darned eggs without complaint, crust, runny whites and all). He shared his best flint with us, and when asked a question, he said, "Well," and then rubbed his hand through that thick, white, cotton-top hair before he delivered his long, cognitive answer. He was fond of his sleep, once cursing the senior writer at 3:00 a.m. one morning for keeping him awake all night. We have many fond memories of him. Those were great times, but unfortunately, the dynamics of laws, regulations, ethics, careers, families and finances disassociated some of the intended audience from the semi-annual event. Having begun in 1979, it continues even now each fall.

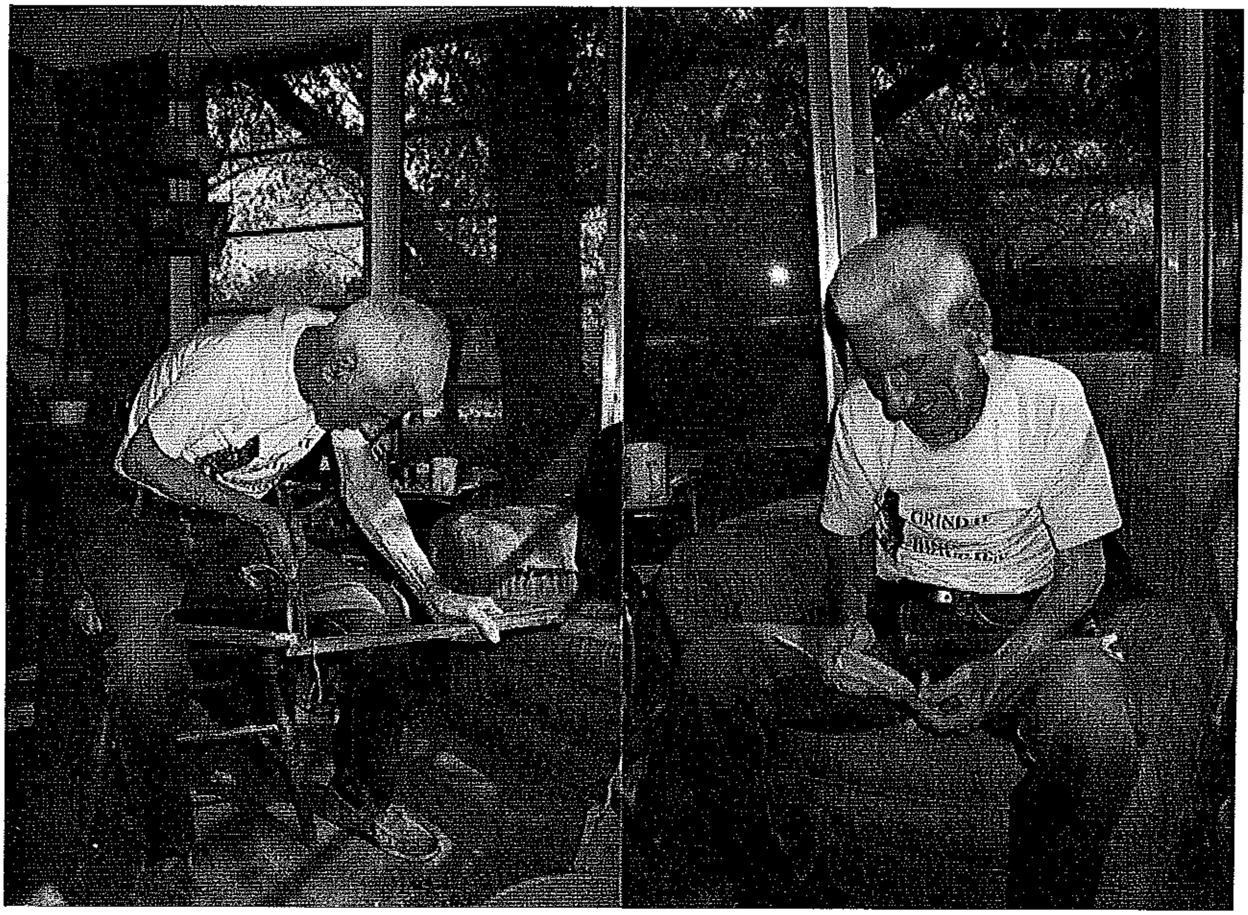

Figure 1. J. B. Sollberger fluting a Barnes, or Eastern Clovis type point at his home.

As his skill and knowledge increased, Solly tackled the problematic replication of some of the most difficult-to-make artifacts in the world, and he succeeded in replicating many of them (Sollberger 1973, 1976, 1980, 1982b, 1983, 1985, 1988). His experiments taught him how to interpret the various features of fracture scars, which led him to explain how and why they were produced. From the late 1970's through the 1990's professional researchers sought him out for his expertise in lithic reduction and fracture mechanics, and perhaps he sought them out as well for opportunities to publish. Aside from his renowned Folsom replication and lever pressure fluting work, his replication of "orange peel" flakes to produce Mayan tranchet bit adzes from Colha, Belize at the behest of Harry J. Shafer (Shafer 1983) stands as one of his most noted achievements. His toolbox was largely made of natural materials available to native craftsmen, and, while he used copper for some tools, he usually had a native alternative.

Solly challenged those who put forth theory without empirical data, particularly on using lever pressure to flute points and replicating Folsom projectile points: "...don't necessarily believe what you read or hear. Believe what you can see and do for yourself. Do not join consensus blindly; open your eyes and demand proof" (Sollberger 1988). As the only person we know who produced Folsom point replicas matching the dimensions of the famed Lindenmeier cast made available by the Denver Museum of Natural History (I would love to have experienced his reaction to the Cooper Site Folsom point), Solly is widely regarded as THE EXPERT on Folsom point replication and lever pressure fluting. Since his death there have been attempts to ignore his work because of his "complex" apparatus, which is merely a different interpretation of the basic elements involved in fluting, namely, a clamp or method of holding, a tip support or anvil, and a means of applying compressive force to detach a flake.

Many sought out J. B. for his knowledge, which he gave generously to anyone who was willing to listen and to learn. He insisted that, if archeology is a science and not an art, then experimentation is an essential element of study. He wholeheartedly encouraged his students to perform lithic replication experiments and to publish them, although few, to his dismay, ever followed his lead. He did, however, manage to inspire the junior writer's replication of Folsom points and the senior writer's 30-year study of Andice/Bell points. Although he marveled at their creativity and ability, he was disappointed in modern flint knappers who, more often than not, produced objects of art, rather than artifact replicas.

His energy in the pursuit of understanding and explaining lithic fracture was unequaled. While he was determined to publish his ideas, he hated sending his written works to editors, maybe not so much for the way that they twisted his words around, as for his own limitations in expressing ideas. He wanted to pass on his understanding of lithic fracture mechanics, and these two writers are the fortunate recipients of a mere fraction of that understanding.

As he aged and grew infirm, his frustration with his failing abilities and waning time on earth, in addition to prodding by his upstart prodigies, sometimes resulted in harsh words. Ability fades, and records are set to be broken. Those of us who knew him well understood, realizing that it will happen to all of us.

Certainly one of the best in the study of lithic fracture as applied to prehistoric flint working, the archeological world is surely a lonelier place without J. B. Sollberger. His determination to achieve excellence, to share knowledge, and his persistence through trial and error made him an icon for all of us. He was a generous host, willing teacher, venerable sage, cherished mentor, grandfather figure, and most of all, dearest friend. We are not afraid to say that we loved him and always will. We know that now all of his questions are answered as he sits with those early craftsmen, and we hope that someday we will sit once again at his side.

The writers researched all sources known to them to compile the following bibliography. While no unknown publications have surfaced during recent years, readers who may find one are encouraged to send a complete copy to the senior writer at the mail or e-mail address in the *La Tierra* membership listing or through the *La Tierra* editor.

J. B. Sollberger authored and co-authored at least 70 known written works, perhaps modest by the standards of some, but he did not publish to see his name in print, to set a record for number of publications or because he was required to do so. He published to present new information, to separate fact from theory, and to set standards for study. His works appear in at least 11 different publications, and they are still referenced in current research. J. B. Sollberger donated his entire collection of artifacts, replicas and flint knapping tools to the Texas Archeological Research Laboratory for the use of future generations. Never underestimate the difference you can make!

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Investigations at Two Prehistoric Sites along Boggy Creek in the Post Oak Savannah of East Central Texas

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ABSTRACT

Investigations in 2010 at Fort Boggy State Park included work at prehistoric archaeological components at 41LN308 and the Black Finger Tip site (41LN325) that have well preserved midden deposits. These middens, which apparently accumulated between A.D. 432-772, and then continued to be occupied in the Late Prehistoric period (e.g., to some time after ca. A.D. 1200/1300), contain animal bone, charred plant remains (*Carya* sp. nutshell and wood charcoal), burned clay pieces, lithic debris, chipped stone tools, and prehistoric ceramic sherds. There are Late Archaic deposits below the midden at the Black Finger Tip site that date from 824-904 B.C. The ceramic sherds from the sites include both sandy paste Goose Creek Plain and later grog- and bone-tempered decorated ceramic wares that share stylistic and technological attributes with East Texas Caddo ceramic wares.

Sites of Woodland period age (ca. 500 B.C.-A.D. 800) are most commonly identified on a variety of landforms across Fort Boggy State Park. The occurrence and preservation of midden deposits of Woodland period age along Boggy Creek indicates that sometime during this period, a more intensive and sustained settlement pattern began to develop among aboriginal peoples in this part of the Post Oak Savannah. Such sites may have seen occupations that were more than seasonal for a number of years, and they should contain other evidence of more permanent settlement, including house structures, storage pits, and small cemeteries. Temporally diagnostic artifacts recovered suggest that much of the Park was perhaps first used by Archaic foragers after about 4000 years ago. It is possible, however, that many of the sites that would date to the Archaic period are deeply buried in alluvial and upland sandy mantle deposits.

INTRODUCTION AND SETTING

In 2010, archaeological investigations were conducted at Fort Boggy State Park by the Center for Archaeological Studies at Texas State University-San Marcos. During that work, the relocation, assessment, and updating information was completed on the 80 previously recorded archaeological sites (Corbin et al. 1994) in the park. The findings from two of the more important prehistoric sites relocated in the park are discussed in this article (see Perttula et al. [2011] for a summary of the investigations in the park).

Fort Boggy State Park is located in Leon County, Texas, and covers 1847 acres. Approximately 10 km south of the town of Centerville, the park is located in the rolling Post Oak Savannah of East Central Texas (Diggs et al. 2006:Figure 2). Boggy Creek, a eastward-flowing tributary stream to the Trinity River, flows through the Park, and originates in the west central part of Leon County. The confluence of Boggy Creek and the Trinity River is ca. 20 km east of the Park.

The Post Oak Savannah is a narrow southwest-northeast trending woodland that marks an ecotone between the more xeric Blackland Prairie to the west and south (Diggs et al. 2006:Figure 2) and the more mesic Pineywoods to the east. The woodlands in the Post Oak Savannah consist of broadleaf deciduous forests, primarily including several species of oak as well as hickory and pecan. Small areas of tall grass prairie were present in this physiographic province, including a narrow strip of tall-grass prairie (the San Antonio Prairie, see Diggs et al. 2006:Figure 5) that ran from the Colorado River on the west to near the Trinity River on the east. In Leon County, this prairie lies just south of Boggy Creek and within 2-3 km of Fort Boggy State Park (see Neitsch et al. 1989). Bottomland communities along the Trinity

River and major tributaries, such as Boggy Creek, had a diverse hardwood and/or swamp forest, including cypress, sweet gum, and other hardwoods that tolerant periodic flood waters, on natural levees and alluvial terraces, point bar deposits, old stream channels and oxbow lakes.

41LN308

This site was recorded as a prehistoric habitation site of Woodland period age on a large alluvial terrace (300-305 feet amsl) that projected east into the Boggy Creek floodplain; the site was estimated to cover a 300 x 100 m area (7.4 acres) (Corbin et al. 1994:88-89 and Figure 22) and had archaeological deposits in sandy sediments more than 1.6 m in thickness. An old road bed (41LN331) ran along the northern and western parts of the site.

A total of 80 shovel tests were excavated at 41LN308 during the initial site recording effort, and 27 of them contained prehistoric artifacts (Corbin et al. 1994:Figure 22). Recovered artifacts included 12 plain sandy paste Goose Creek Plain, *var. unspecified* (cf. Story 1990) sherds—all from shovel tests at the southern end of the ridge—lithic debris (n=76), and two petrified wood lithic tools (a scraper and a chopper, see Corbin et al. 1994:Figures 30d and 32).

41LN308 is one of the larger and more complex of the prehistoric sites at Fort Boggy State Park. It was relocated in 2010 with extensive shovel testing (n=52) on a relatively narrow part of an alluvial terrace overlooking the Boggy Creek floodplain. The terrace landform is covered in high grasses, yucca, and bull nettles, and there are a few hardwood trees on the site; surface visibility is less than 10%. Old and modern roads cut across the main portion of the site as well as an area at its northern end.

During the 2010 archaeological investigations at 41LN308, a total of 28 shovel tests and Unit 308 had prehistoric archaeological deposits in Padina loamy fine sand sediments. The estimated size of 41LN308 is 18,000 m^2 (4.5 acres). These archaeological deposits are thickest at the far southeastern part of the site, with depths ranging from 80-100+ cm bs, with the exception of ST 412 at the far northern end of the site, which also has deposits 100+ cm in depth. Across the remainder of 41LN308, the prehistoric archaeological deposits ranged from only 0-60 cm bs. Prehistoric midden deposits have been identified as a very dark grayish-brown and organically stained loamy fine sand that is about 20 m in diameter at the southern tip of the landform. The midden ranges from 0-59 cm bs in Unit 308, is 79 cm thick in ST 363, and 80 cm thick in ST 403.

Three radiocarbon dates have been obtained from single charred hickory nutshells from the midden deposits at 41LN308 (Table 1). OxCal, version 4.1.7 (Bronk Ramsey 2009) and IntCal 09 (Reimer et al. 2009) were used to calibrate the dates and determine the 2 sigma relative area under the probability distribution for each of the three dates.

The two sigma calibrated age ranges of the hickory shell in the midden at 41LN308 date as early as 1400-1518 B.P. (A.D. 432-550) to as late as 963-1015 B.P. (A.D. 935-987). These calibrated age ranges indicate that much of the midden deposits accumulated during the latter half of the Woodland period, with some use of the midden area in the early part of the Late Prehistoric period.

Including hickory nutshells (n=26), wood charcoal of indeterminate species and not fully carbonized (n=8), and animal bones (n=20), the densities of prehistoric artifacts in the shovel tests is 5.6 per positive shovel test, or ca. 44.8 artifacts per m^2. In Unit 308, the artifact density is 176.0 per m^2. The

Table 1. Radiocarbon dates from 41LN308.

Lab No. (UCIAMS)	Provenience (cm bs)	Conventional Age (B.P.)	1 sigma cal age range (B.P.)	2 sigma cal age range (B.P.)	2 sigma relative area under probability distribution
95417	ST 363, 40-60	1100 ± 15	970-1051	963-1015	57.2%
				1022-1056	38.2%
95418	ST 403, 60-80	1275 ± 15	1182-1263	1178-1270	95.4%
95419	Unit 308, 20-30	1555 ± 15	1406-1513	1400-1518	95.4%

highest densities of artifacts in the shovel tests occur in the midden deposits at the southeastern end of the site; this is particularly so for the shovel tests that contain burned clay, charred nutshells, and pieces of animal bone (Table 2). The most common constituents of the midden deposits are lithic debris, nutshell, and animal bone. The prehistoric ceramic sherds are distributed mainly in the southeastern end of the site, in the Woodland and early Late Prehistoric midden deposits (from 40-60 cm bs), but were also recovered from ST 381 in the south central part of the site as well as ST 409 and ST 411 in the central and northern part of the landform.

There are three chipped stone tools in the 41LN308 lithic assemblage, including two dart points. The first dart point, from ST 398 (0-20 cm

Table 2. Distribution of prehistoric artifacts at 41LN308.

Provenience	DS	PS	DP	T	GS	LD	BC	NS	WC	AB
Surface	–	–	–	–	–	2	–	–	–	–
ST 363	1	1	–	–	–	6	6	2	1	9
ST 364	–	–	–	–	–	2	–	2	–	–
ST 365	1	–	–	–	–	4	–	–	5	–
ST 367	–	–	–	–	–	2	–	–	–	–
ST 368	–	–	–	–	–	1	–	–	–	–
ST 370	–	–	–	1	–	4	–	–	–	–
ST 371	–	–	–	–	–	3	–	–	–	–
ST 372	–	–	–	–	–	3	–	–	–	–
ST 373	–	–	–	–	–	2	–	–	–	–
ST 377	–	–	–	–	–	1	–	–	–	–
ST 378	–	–	–	–	–	5	–	–	–	–
ST 380	–	–	–	–	–	4	–	–	–	–
ST 381	–	2	–	–	–	1	–	–	–	–
ST 383	–	–	–	–	–	2	–	–	–	–
ST 388	–	–	–	–	–	7	–	–	–	–
ST 389	–	–	–	–	–	2	–	–	–	–
ST 390	–	–	–	–	–	3	–	–	–	–
ST 391	–	–	–	–	–	2	–	–	–	–
ST 397	–	–	–	–	–	1	–	–	–	–
ST 398	–	–	1	–	–	2	–	–	–	–
ST 403	–	–	–	–	–	5	1	6	–	2
ST 404	–	–	–	–	–	5	–	6	–	5
ST 405	–	–	–	–	–	3	–	–	–	–
ST 406	–	–	–	–	–	3	–	–	–	–
ST 407	–	–	–	–	1	1	–	–	–	–
ST 409	1	–	–	–	–	–	–	–	–	–
ST 410	–	–	–	–	–	1	–	–	–	–
ST 411	–	–	1	–	–	8	–	–	4	–
ST 412	–	–	–	–	–	1	–	–	1	–
Unit 308	1	2	–	–	–	30	2	10	1	4
Totals	4	5	2	1	1	116	9	26	12	20

DS=decorated sherd; PS=plain sherd; DP=dart point; T=flake tool; GS=ground stone tool; LD=lithic debris; BC=burned clay; NS=nutshell; WC=wood charcoal; AB=animal bone
Does not include fire-cracked rock from ST 363 (n=1, 0.1 kg) and ST 411 (n=1, 0.1 kg)

bs) in the far northwestern part of the site, is a heavily resharpened Early Archaic (ca. 8800-8000 years B.P.) Angostura point (Figure 1). The blade has been reworked into a bifacial drill, and the blade has been broken laterally. It has a slightly contracting stem and a concave base, no barbs, and light grinding along the stem. The point is made from a yellowish-gray chert, possibly a non-local lithic raw material. The Angostura is 34.0+ mm in length, 16.0 mm in width, 7.9 mm thick, and it has a stem width of 14.0 mm.

The second dart point is a Woodland period Godley point (see Turner et al. 2011:109) from ST 411 (20-40 cm bs) in the northern part of the site. The point is made from a local petrified wood, has an expanding stem, a flat base, and small

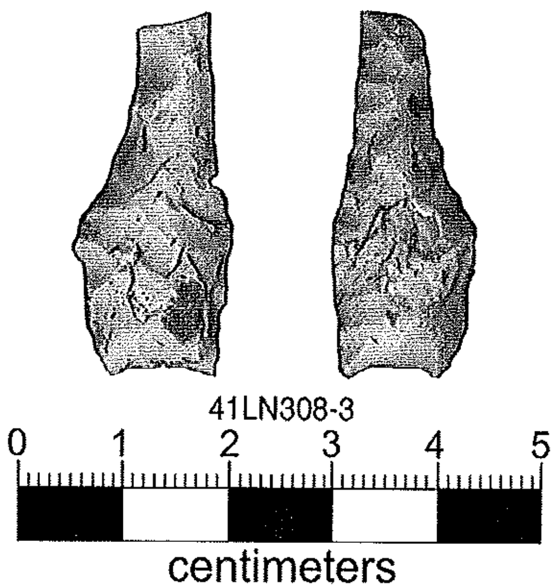

Figure 1. Angostura dart point from 41LN308.

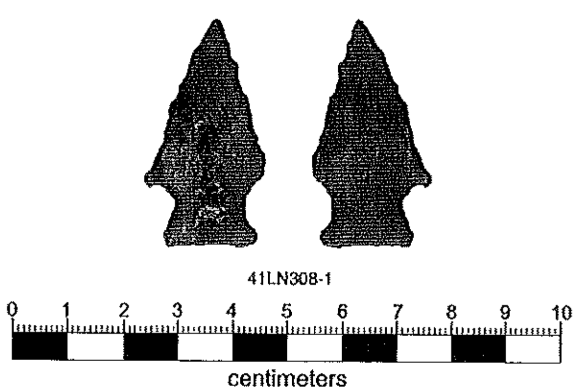

Figure 2. Godley dart point from 41LN308.

outward-pointed barbs (Figure 2). Its measurements are: 41.5 mm in length; 22.8 mm in width; 9.2 mm thick; and the stem width is 12.9 mm.

The last of the chipped stone tools is a bifacially-worked hafted drill fragment from ST 370 (0-20 cm bs). It is made on a gray chert, and has a 6.5 mm thick bit.

The one ground stone tool in the assemblage (see Table 2) is a mano fragment (25.0 mm thick) made from a local quartzite cobble. There are smoothed grinding areas on both surfaces of the mano.

The lithic debris from 41LN308 includes two cores and 114 pieces of lithic debris. The first core (ST 371, 20-40 cm bs) is a multi-platform flake core, with cortical remnants, on a local quartzite (65 mm in length, 73 mm in width, and 52 mm thick). The other core (Unit 308, 0-10 cm) is a bipolar core on a cortex-covered reddish-gray chert. It is 20.8 mm in length, 21.5 mm in width, and 8.6 mm thick. The occurrence of a bipolar core suggests some knapping activities were designed specifically for the reduction of pebbles for flakes.

The lithic debris itself includes pieces of local quartzite (n=11/5 cortical debris), petrified wood (n=46/14 cortical), and chalcedony (n=1/0), as well as a variety of cherts. The cherts, from a probable mixture of local and non-local (Central Texas) source areas, are represented by red chert (n=3/1 cortical), reddish-brown chert (n=1/1 cortical), brown chert (n=6/4 cortical), yellowish-brown chert (n=1/0), yellowish-gray chert (n=3/1 cortical), dark brown chert (n=1/0), dark brown chert with blue inclusions (n=1/0), light gray chert (n=8/0), gray chert (n=14/1 cortical), grayish-brown chert (n=9/1 cortical), brownish-gray chert (n=2/0), dark grayish-brown chert (n=1/0), dark gray chert (n=2/0), dark gray-black chert (n=1/0), and white chert (n=3/1 cortical, including one with a roughened limestone cortex). One of the pieces of lithic debris is wedge-shaped. Shafer (2011:99) has identified wedge-shaped flakes from several Early Caddo period contexts in East Texas, and they are distinctive flakes that were "produced by hard-hammer flaking and retain the striking platform (often of cortex) on the proximal end and a wide, feather, edge on the other."

Nine aboriginal ceramic sherds, eight body sherds and one rim, have been recovered in the 2010 work at 41LN308 (Table 3). Two of the sherds, from Unit 308 in the midden, are plain sandy paste Goose Creek Plain, *var. unspecified* body sherds from two different vessels. These are probably from bowls, based on their body wall thickness (5.1 $\pm$ 0.9 mm);

Table 3. Aboriginal ceramic sherds from 41LN308.

Provenience (cm bs)	Sherd Type	Temper	Paste	Decoration
ST 363, 40-60	body	bone	sandy	plain
	body	bone	sandy	parallel brushed
ST 365, 20-40	body	grog	sandy	opposed and cross-hatched engraved lines
ST 381, 0-20	body	bone	clayey-silty	plain
ST 381, 40-60	body	bone	clayey-silty	plain
ST 409, 0-20	body	grog	sandy	closely-spaced parallel incised lines
Unit 308, 40-50	body	-	sandy	plain
	body	-	sandy	plain
Unit 308, 50-60	rim	grog	clayey-silty	horizontal and diagonal incised lines

one has a smoothed exterior, while the other has been smoothed only on the interior vessel surface. One of the sherds is from a vessel that was fired and cooled in a low oxygen environment, while the other came from a vessel that was fired and cooled in a high oxygen environment.

The other sandy paste sherds from 41LN308 (n=4) are from vessels tempered with either grog (50%) or bone (50%). All four of the sherds are from vessels fired in a reducing environment, and only one sherd (the engraved sherd from ST 365, 20-40 cm bs) has been smoothed (interior surface only). Vessel wall thickness ranges from 6.7-9.5 mm, suggesting some large vessels were in use at the site, and the mean thickness is 7.6 ± 0.95 mm. One of these sherds is plain, but the other three are decorated. The first of the decorated sherds is an engraved fragment from a carinated grog-tempered sandy paste bowl (Figure 3). The design consists of a zone of cross-hatching next to a zone of opposed engraved lines. Similar sherds have been noted from the ca. A.D. 1260-1410 occupation at the McGuire's Garden site (41FT425) at the Jewett Mine (Gadus et al. 2002:Figure 50b-d), also in the Post Oak Savannah in the Trinity River basin. The second decorated sherd is a grog-tempered sandy paste jar with closely-spaced parallel incised lines (Figure 4). It is from a vessel that was fired in a reducing environment, but cooled in the open air (see Teltser 1993:Figure 2f). The third decorated sherd is a parallel brushed jar body sherd. Brushed sherds are present in post-A.D. 1200 Caddo sites in East Texas as well as contemporaneous sites in East Central Texas that likely were not occupied by Caddo peoples. Brushed pottery may have been locally made or obtained in trade with a Caddo community.

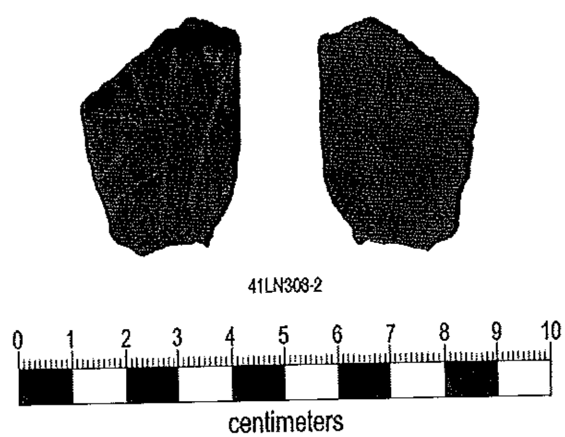

Figure 3. Engraved ceramic sherd from 41LN308.

The last three sherds have a clayey to silty paste and are tempered with either bone or grog (see Table 3). They are from vessels that were fired in a reducing environment, have no surface treatment, and have thin rim (5.1 mm) and body (mean thickness 6.25 ± 0.5 mm) walls. The one decorated sherd (Unit 308, 50-60 cm bs) is a jar rim with a horizontal incised line encircling the vessel, and with at least one diagonal incised line on the rest of the rim; these diagonal lines appear to be widely-spaced on the rim, but no doubt continue around the rim as part of the motif (cf. Dunkin Incised).

Based on the depths of the different temper-paste wares at 41LN308, it is impossible to differentiate any that are stratigraphically earlier or later, although it is suspected that the Goose Creek Plain, *var. unspecified* sandy paste sherds represent the earliest, and Woodland age, ceramics at the site. The sandy paste sherds are found from 40-50 cm bs; the tempered sandy paste wares occur from 0-60 cm bs; and the clayey to silty wares were also recovered from 0-60 cm bs, all in a distinct midden deposit, as well as in non-midden deposits. It is possible that all three wares comprise distinct parts of a single ceramic assemblage, one that likely dates after the 13th century A.D. based on the few decorated sherds that are present, although that is unlikely. It is more probable, based in large measure on the three radiocarbon dates from the midden, that the few recovered sherds from temporally distinct ceramic wares have become mixed in the midden deposits by bioturbation.

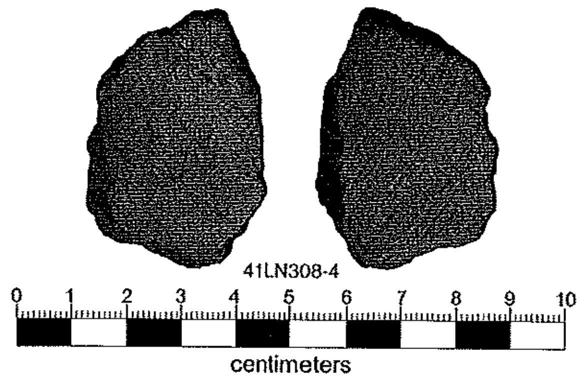

Figure 4. Sherd with closely-spaced parallel incised lines from 41LN308.

41LN325, Black Finger Tip Site

This prehistoric habitation site of Woodland and Late Prehistoric age was reported to have been located on a natural sandy rise on an alluvial terrace or floodplain (265 feet amsl) along the north side of Boggy Creek; an old channel of the creek was 40 m to the south (Corbin et al. 1994:93 and Figure 21). A dark brown organic stain or midden deposit that was ca. 30 m in diameter was present at the southern end of the rise. Site size was estimated at ca. 150 x 80 m (ca. 3.0 acres).

A total of 34 shovel tests were excavated at 41LN325 during the initial site recording effort, and although the number of shovel tests that contained prehistoric artifacts was not noted, lithic debris (n=106), one lithic core, four sandy paste Goose Creek Plain sherds, and three bone-tempered sherds (see Corbin et al. 1994:Tables 3 and 7) were recovered from between 14-120 cm bs; charred nutshells, wood charcoal, and fire-cracked rock were apparently also present, but they were not noted as being collected (Corbin et al. 1994:93 and Table 7). One of the bone-tempered sherds, a rim sherd likely from a carinated bowl, was engraved with opposed lines on either side of an excised triangle element (Corbin et al. 1994:Figure 34). Although it was described as a "Late Caddoan [sic] style" engraved sherd by Corbin et al. (1994:Figure 34), it appears more plausibly on stylistic grounds to be from an Early Caddo style (ca. pre-A.D. 1300) Holly Fine Engraved vessel (see Suhm and Jelks 1962:Plate 39e, g, i) than any specific Late Caddo pottery type.

Extensive shovel testing (n=38) on the alluvial landform on the north side of Boggy Creek, which projected into the Boggy Creek floodplain, led to the relocation of the Black Finger tip site in 2010. The landform has an overstory of hardwoods with a thick understory of yaupon holly and mustang grapevines. Surface visibility across the site is less than 10%.

Shovel testing at the site located a prehistoric midden deposit (very dark grayish-brown to dark brown in color, with organic staining) at the southern tip of the landform. The midden is 20 m in diameter and ranges from 80 cm to more than 100 cm in thickness in ST 608, ST 609, ST 635, and ST 636, and 82 cm in thickness in Unit 325. The primary constituents of the midden are lithic debris, hickory nutshell, acorn nut meat, animal bone, hickory wood charcoal, and burned clay.

Two radiocarbon dates have been obtained from a single charred hickory nutshell from midden deposits (UCIAMS-95420) and a single charred nutshell beneath the midden (UCIAMS-95421) at the

Black Finger Tip site (Table 4). As with the 41LN308 dates, OxCal, version 4.1.7 (Bronk Ramsey 2009) and IntCal 09 (Reimer et al. 2009) were used to calibrate the dates and determine the 2 sigma relative area under the probability distribution for each of the two dates.

The two sigma calibrated age range of the hickory shell from near the top of the midden at the Black Finger tip site range from A.D. 664-720 and A.D. 748-764, during the latter part of the Woodland period, with the highest probability associated with the earlier of the two age ranges. These calibrated age ranges suggest that much of the midden deposits accumulated during the Woodland period. The two sigma calibrated age range of the hickory shell from archaeological deposits below the midden is 824-904 B.C., during the latter part of the Archaic period. Thus, the midden apparently began to accumulate sometime after this calibrated age range.

During the 2010 archaeological investigations at the Black Finger Tip site, a total of 26 shovel tests and Unit 325 were found to contain prehistoric archaeological deposits (Table 5). One of the shovel tests (ST 619) and Unit 325 (0-10 cm bs) also contained historic archaeological material remains. The site is estimated to cover 18,900 m^2 (4.7 acres).

The prehistoric archaeological deposits range from 20 cm to 100 cm+ bs in Rader fine sandy loam sediments, with the deepest deposits found primarily in the southern and northern parts of the site; two shovel tests in the central part of the site (ST 611 and ST 619) also have prehistoric deposits of at least 100 cm thickness. Shovel tests with archaeological deposits that are less than 40 cm thick occur only in the central (ST 628) and northern (ST 630, 631, and 640) parts of the site. The historic artifacts were found from 0-20 cm bs and 60-80 cm bs in ST 619.

The density of prehistoric artifacts, including nutshells (n=75), wood charcoal (n=20), and animal bones (n=36) from the archaeological deposits at the Black Finger Tip site is substantial, and higher than any of the other prehistoric sites/components at Fort Boggy State Park. In the shovel testing, the prehistoric artifact density is 8.8 per positive shovel test or ca. 70.4 artifacts per m^2. The highest artifact densities in the shovel tests occur in ST 608-611, ST 627, ST 635-636, and ST 638-639 in the southern and central parts of the site (see Table 5). In Unit 325, the prehistoric artifact density is a very high 356.0 per m^2 in the midden deposits. Prehistoric artifacts are concentrated in the 10-30 cm bs level as well as in the 40-90 cm bs levels, suggesting the presence of two stratigraphically distinct components; both of these components are likely to be of Woodland period age.

Nutshell and wood charcoal was recovered in shovel tests and Unit 325 in the southern and central parts of the Black Finger Tip site (see Table 5); the highest densities of these paleobotanical remains are in shovel tests near the southern tip of the landform, in prehistoric Woodland period midden deposits. Pieces of animal bone are found in the midden deposits at the southern tip of the landform, in densities ranging between 8-108 pieces per m^2.

There are four chipped stone tools in the Black Finger Tip site lithic assemblage: two arrow point fragments and two expedient flake tools (see Table 5). The two arrow points are from shovel tests (ST 612, 60-80 cm bs and ST 620, 20-40 cm bs) in the central part of the site. The first arrow point may be a contracting stem Perdiz point made from a light gray chert (Figure 5), although the stem is broken. It is bifacially flaked, has serrated blades, and expanding

Table 4. Radiocarbon dates from the Black Finger Tip site (41LN325).

Lab No. (UCIAMS)	Provenience (cm bs)	Conventional Age (B.P.)	1 sigma cal age range (B.P.)	2 sigma cal age range (B.P.)	2 sigma relative area under probability distribution
95420	ST 609, 20-40	1300 ± 15	1186-1281	1230-1286	63.6%
				1186-1202	31.8%
95421	Unit 325, 80-90	2720 ± 15	2784-2845	2774-2854	95.4%

Table 5. Distribution of prehistoric artifacts at the Black Finger Tip site.

Provenience	DS	PS	AP	FT	GS	LD	BC	NS	WC	AB
ST 608	–	2	–	–	–	10	1	2	3	4
ST 609	–	–	–	–	–	4	–	12	4	–
ST 610	1	1	–	–	–	10	–	4	1	–
ST 611	1	–	–	–	–	7	–	7	–	–
ST 612	–	1	1	–	–	6	–	3	–	–
ST 613	–	–	–	–	–	2	–	3	–	–
ST 614	–	–	–	–	–	1	–	2	–	–
ST 616	–	–	–	–	–	3	–	–	–	–
ST 617	–	–	–	–	–	6	–	–	–	–
ST 618	–	1	–	1	–	7	–	2	–	–
ST 619	–	–	–	–	–	6	–	–	–	–
ST 620	–	–	1	–	–	6	–	–	–	–
ST 621	–	2	–	–	1	3	–	–	–	–
ST 624	–	1	–	–	–	2	–	–	–	–
ST 626	1	2	–	–	–	3	–	–	–	–
ST 627	–	1	–	–	–	11	–	–	–	1
ST 628	–	1	–	–	–	2	–	–	–	–
ST 629	–	–	–	–	–	3	–	–	–	–
ST 630	–	–	–	–	–	1	–	–	–	–
ST 631	–	–	–	–	–	1	–	–	–	–
ST 632	–	–	–	–	–	4	–	–	–	–
ST 635	–	–	–	–	–	8	–	10	–	4
ST 636	–	–	–	–	–	6	3	4	–	–
ST 638	1	1	–	–	–	6	–	4	–	–
ST 639	–	–	–	–	–	8	–	5	–	–
ST 642	–	–	–	–	–	2	–	–	–	–
ST 643	–	–	–	–	–	3	–	–	–	–
Unit 325	1	1	–	1	–	18	11	17	12	27
Totals	5	14	2	2	1	149	15	75	20	36

DS=decorated sherds; PS=plain sherds; AP=arrow point; FT=flake tool; GS=ground stone tool; LD=lithic debris; BC=burned clay; NS=nutshells; WC=wood charcoal; AB=animal bone

barbs. The length of the blade is 18.3 mm in length, 17.1 mm in width, 2.9 mm thick, and it has a 4.5 mm stem width. The occurrence of a Perdiz point on the site implies that it was also occupied after ca. A.D. 1200-1300, and this occupation may have lasted into the 17th century (Turner et al. 2011:206). The second arrow point is a tip/blade fragment made from a grayish-brown chert (Figure 6). It has a serrated blade (perhaps suggesting it might also be a Perdiz arrow point) that is 2.1 mm thick.

Both of the chipped stone flake tools are from the southern part of the site, one in the midden deposits at the southern tip of the landform (Unit 325, 90-100 cm bs), and the second from ST 618 (60-80 cm bs). Both are expedient flake tools with unilateral (cortical grayish-brown chert) or bilateral (cortical brown chert) use-wear/retouch. Use-wear lengths range from 7.0-20.0 mm on these flake tools.

The lithic debris (n=149, including one core) from the Black Finger Tip site was derived from

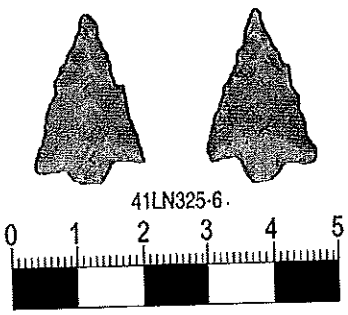

Figure 5. Possible Perdiz arrow point from the Black Finger Tip site (41LN325).

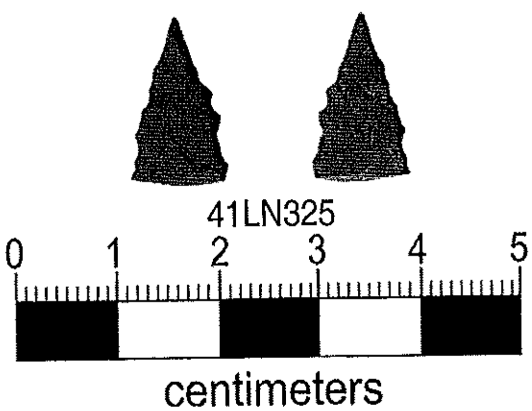

Figure 6. Arrow point tip fragment from the Black Finger Tip site.

the reduction of both locally available quartzite and petrified wood pebbles and cobbles for tool manufacture, as well as a wide variety of cherts, some of local origin, and others likely from Central Texas sources (see Gadus et al. 2002:Table 2). The one core (ST 638, 20-40 cm bs) is a multi-platform flake core with smooth stream-rolled cortical remnants on a light gray chert. The core is 21.2 mm in length, 22.0 mm in width, and 7.8 mm thick.

The frequency of each raw material and the proportion of cortical flakes among the lithic debris is as follows: quartzite (n=17/59% cortical), petrified wood (n=29/31% cortical), chalcedony (n=1/0% cortical), red chert (n=8/25% cortical), dark red chert (n=1/0% cortical), brown chert (n=9/56% cortical), reddish-brown chert (n=1/100% cortical), yellowish-brown chert (n=2/50% cortical), yellowish-gray chert (n=1/0% cortical), brownish-gray chert (n=6/0% cortical), grayish-brown chert (n=2/0% cortical), reddish-gray chert (n=1/0% cortical), dark brown chert (n=4/0% cortical), light gray chert (n=13/8% cortical), gray chert (n=34/12% cortical, one of the cortical flakes is limestone-covered), dark gray chert (n=12/8% cortical), grayish-white chert (n=1/0% cortical), and white chert (n=1/0% cortical). One of the quartzite flakes is wedge-shaped, perhaps derived from a technology seen in Early Caddo knapping (see Shafer 2011).

The most common raw materials employed in chipped stone tool manufacture and maintenance/resharpening at the Black Finger Tip site are gray chert (23%), petrified wood (20%), quartzite (11%), light gray chert (9%), and dark gray chert (8%). Quartzite, petrified wood, and chalcedony together comprise 32% of the debris, while cherts of different colors and origins account for the remaining 68% of the lithic debris sample. In the clearly local raw materials (quartzite, petrified wood, and chalcedony), more than 40% of the debris have cortex, suggesting that these materials were obtained near the site and reduced there for tool production using flakes suitable for arrow points and flake tools. The proportion of cortical flakes in the earth-toned cherts (red, dark red, brown, reddish-brown, and yellowish-brown) is 53%, and these materials were likely also collected from a nearby and local gravel source, and reduced on site during knapping tools. In the other cherts (see above)—mainly gray, dark brown, white, and various combinations, but dominated by the gray chert raw material—cortex-covered lithic debris pieces represent only 8% of the sample. These pieces of lithic debris, accounting for more than 50% of the entire lithic debris assemblage, are most likely from non-local sources, almost certainly of Central Texas derivation.

The one ground stone tool is from ST 621 (0-20 cm bs) in the central part of the site. It is a quartzite mano with one grinding surface, indicating that plant grinding activities took place here. The mano is 54.8 mm in length, 67.0 mm in width, and 46.1 mm thick.

The prehistoric ceramic assemblage from the Black Finger Tip site is the largest (n=19 sherds) of the Fort Boggy State Park sites investigated in 2010 (Table 6). This includes four rim sherds, 12 body sherds, and three base sherds. Given the small size of the ceramic assemblage, there are a number of temper and paste classes represented in these sherds: sandy paste (n=4), grog-tempered-sandy paste (n=4), bone-tempered-sandy paste (n=2), grog-bone-tempered-sandy paste (n=1), grog-hematite-tempered-sandy paste (n=2), no temper-clayey-silty paste (n=1), grog-tempered-clayey-silty paste (n=4), and bone-tempered-clayey-silty paste (n=1). Sherds with a sandy paste (with or without temper) comprise 68% of the assemblage, and the sherds with a clayey-silty paste (with or without temper) account for the remaining 32% of the assemblage. Of those sherds that are tempered (n=14) and that have either one or two kinds of temper, 79% have grog inclusions, 28% have bone inclusions, and 14% have crushed hematite inclusions.

The sandy paste sherds from the Black Finger Tip site are from the central and southern parts of the site, and occur from depths of 0-20 cm to 60-80 cm bs. The sandy paste sherds are from vessels fired in a reducing or low oxygen environment, and have been smoothed on either one or both vessel surfaces. Body sherds are thin-walled, ranging from 5.4-6.3 mm, with a mean thickness of 5.8 ± 0.5 mm. One of the sherds is a rim (8.4 mm thick) that appears to

Table 6. Plain and decorated sherds from the Black Finger Tip site.

Provenience (cm bs)	Sherd Type	Temper	Paste	Decoration
ST 608, 60-80	body	–	sandy	plain
	body	–	sandy	plain
ST 610, 20-40	rim	bone-grog	sandy	plain
ST 610, 40-60	rim	grog	clayey-silty	horizontal incised lines
ST 611, 60-80	body	grog	clayey-silty	parallel incised lines and faint opposed brushing
ST 612, 60-80	body	–	sandy	plain
ST 618, 40-60	body	grog	sandy	plain
ST 621, 40-60	base	bone	sandy	plain
ST 621, 80-100	base	–	clayey/silty	plain
ST 624, 80-100	base	grog-hematite	sandy	plain
ST 626, 0-20	rim	–	sandy	possible lip notched
	body	grog	sandy	plain
	body	grog	sandy	plain
ST 627, 0-20	body	grog-hematite	sandy	plain
ST 628, 0-20	rim	bone	sandy	plain
ST 638, 20-40	body	grog	clayey-silty	parallel incised lines
ST 638, 40-60	body	grog	sandy	plain
Unit 325, 0-10	body	bone	clayey-silty	plain
Unit 325, 20-30	body	grog	clayey-silty	opposed incised lines

have been lip notched, but it is eroded. Lip-notched sandy paste sherds in the Woodland period sandy paste pottery assemblages from Lake Naconiche in East Texas—otherwise dominated by plain vessels, as are all Mossy Grove sites—come from archaeological deposits dated between cal. 2230-1830 years B.P., during the early part of the Woodland period (Perttula 2008). Ellis (2010:45) indicates, however, that lip notched sherds also have been found on Late Prehistoric sites along the Texas Gulf Coast in southeast Texas, particularly on sites in the Middle Coast, so the temporal context of the Black Finger Tip site lip notched rim sherd remains uncertain.

The flat base sherd (11.7 mm thick) from a non-tempered vessel is from ST 621 (80-100 cm bs) in the central part of the site. This base sherd was from a vessel that was fired in a reducing environment and cooled in the open air (see Teltser 1993:Figure 2f).

Almost half of the sherds from the Black Finger Tip site are sandy paste sherds with temper inclusions, either grog, bone, or hematite. The bone-grog-tempered sandy paste sherd is from ST 610 (20-40 cm bs) in the central part of the site. It is a plain rim sherd (with a direct rim profile and a rounded lip) (Figure 7) that has been burnished on its interior surface; the vessel was fired and cooled in a reducing environment (see Teltser 1993:Figure 2b). Rim walls are 8.1 mm in thickness.

The plain bone-tempered sandy paste sherds are from two shovel tests in the central part of the site (ST 621 and ST 628, 0-20 cm bs and 40-60 cm bs). One is a rim with a direct profile and a rounded, exterior folded lip, with 7.6 mm thick walls; it has been smoothed on both interior and exterior surfaces. The other is a flat base sherd (10.5 mm thick). The sherds are from two different vessels fired in a reducing environment. The plain grog-hematite-tempered sandy paste sherds are from the southern part of the site (ST 624 and ST 627, from 0-20 cm bs and 80-100 cm bs). One is a large circular but flat base sherd (Figure 8) that is 8.2 cm in diameter and 11.3 mm thick; it has been smoothed on its exterior surface. It is from a vessel, probably a jar, that was fired in a reducing environment and cooled in the open air. The second grog-hematite-tempered sandy paste sherd is from the body (7.2 mm thick) of a vessel that was incompletely oxidized during firing (see Teltser 1993:Figure 2d).

The grog-tempered sandy paste sherds are from both central (ST 638) and southern (ST 618 and ST 626) parts of the site, and from depths of 0-20 cm bs and 40-60 cm bs (see Table 6). They are plain, and 50% have interior-exterior surface burnishing and/or floating. Based on the firing conditions, each sherd is from a different vessel. Three of the sherds are from vessels fired in a reducing environment, with two of

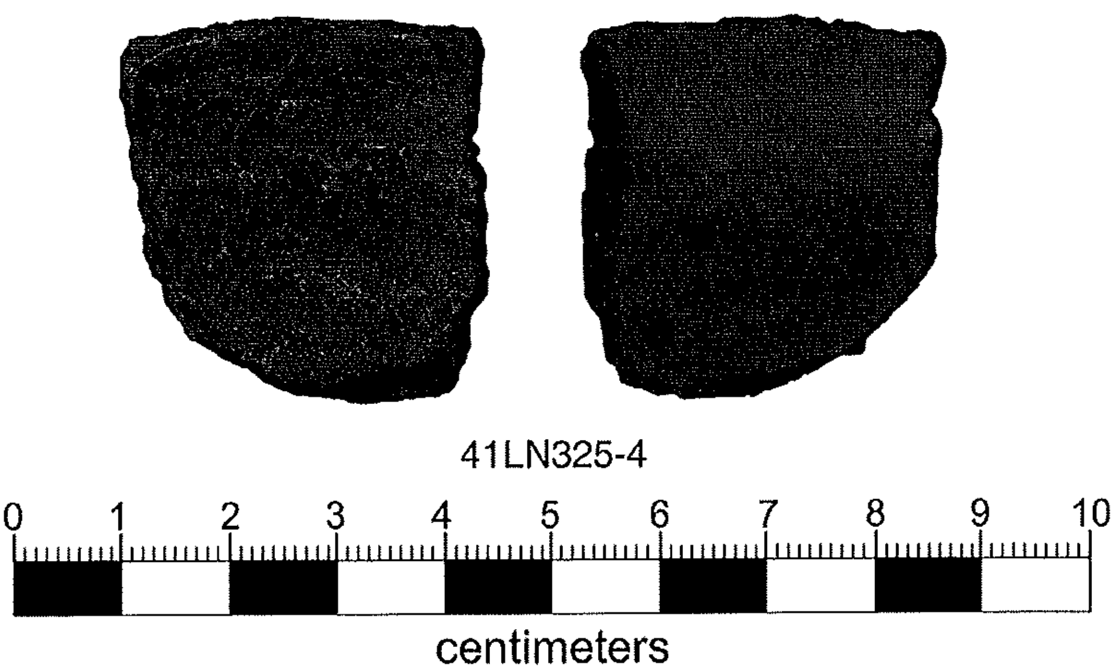

Figure 7. Plain rim sherd from the Black Finger Tip site (41LN325).

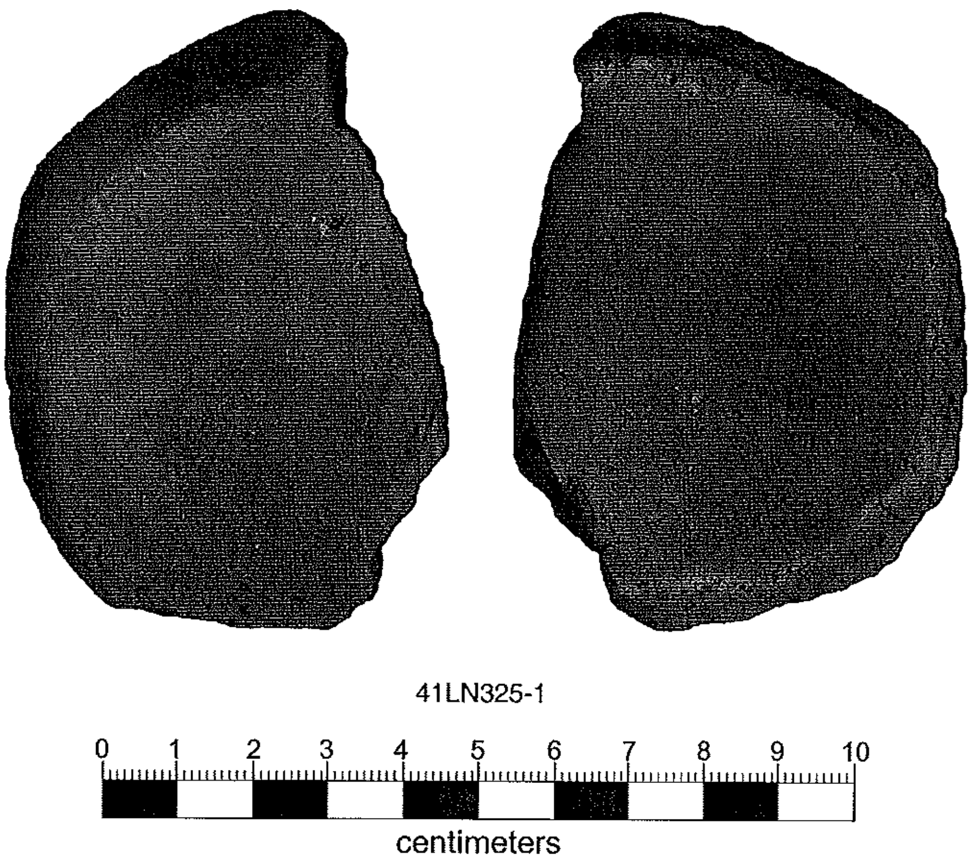

Figure 8. Base sherd from the Black Finger Tip site (41LN325).

them subsequently cooled in the open air. The other sherd was from an incompletely oxidized vessel (see Teltser 1993:Figure 2e). The grog-tempered sandy paste sherds have moderately thick vessel walls, with a mean thickness of 7.43 ± 0.48 mm and a range of 6.9-8.2 mm.

The non-sandy paste and tempered sherds in the Black Finger Tip site ceramic sherds account for only 26% of the assemblage. The plain bone-tempered body sherd (7.0 mm thick), from the southern part of the site (Unit 325, 0-10 cm bs), came from a vessel that was fired in a reducing environment and cooled in the open air (see Teltser 1993:Figure 2g).

The grog-tempered sherds are from both the central (ST 610, ST 611, and ST 638) and southern (Unit 325) parts of the site, and from depths of 20-80 cm bs. All four of the grog-tempered clayey to silty paste sherds are from decorated vessels. Three have incised decorations on the rim and upper body, including an opposed line element (Unit 325, 20-30 cm bs), a horizontal incised rim (Figure 9) from ST 610 (40-60 cm bs), and a sherd with parallel incised lines (Figure 10, ST 638, 20-40 cm bs). The last decorated grog-tempered sherd (ST 611, 60-80 cm) has faint opposed brushed marks on the body, while the lower rim appears to have a series of vertical incised lines. The presence of a brushed sherd in the Black Finger Tip site ceramic assemblage points to at least some use of the site after ca. A. D. 1200/1300, which is in concordance with the previously mentioned Perdiz point also recovered in the archaeological deposits.

Three of the four grog-tempered sherds were from vessels fired and cooled in a reducing environment, while the other was from an incompletely oxidized vessel. Two of the sherds have been either smoothed or burnished on interior surfaces. The one rim sherd (7.2 mm thick) has a direct rim profile and a rounded lip. The three body sherds range from 5.5-7.5 mm in wall thickness, with a mean thickness of 6.7 ± 0.8 mm.

The diversity in temper-paste classes in the ceramics at the Black Finger Tip site is impressive, as is the dominance of Woodland period sandy paste

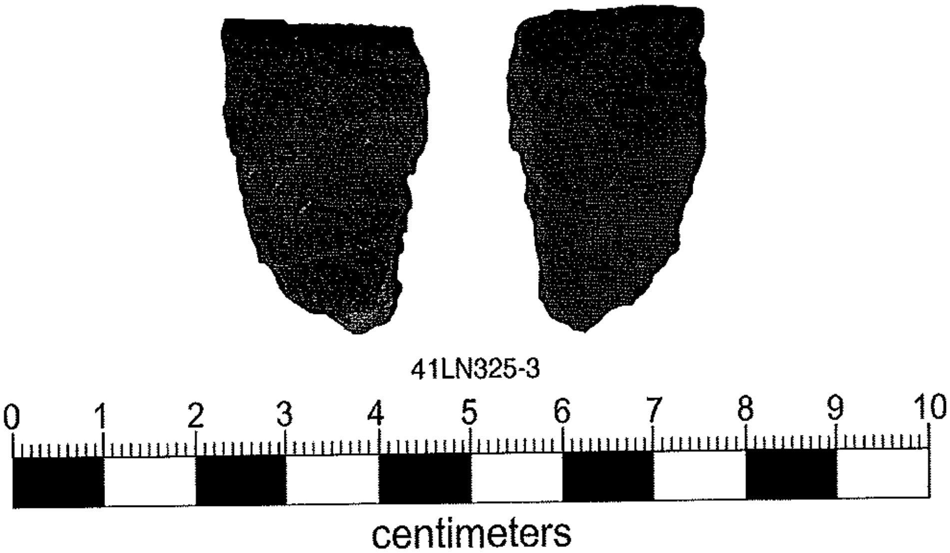

Figure 9. Horizontal incised rim from the Black Finger Tip site.

sherds and non-sandy paste decorated sherds with resemblances to Caddo decorated pottery made in East Texas. The spatial and vertical distribution of the different kinds of wares suggests that there may have been two prehistoric occupations at the site where the peoples made and used pottery vessels. In the southern part of the site, plain sandy paste and plain grog- and grog-hematite-tempered sherds are found between 30-100 cm bs, and this may be the earliest occupation in this area; the one radiocarbon date from the upper part of the midden deposits (20-40 cm bs) suggests that these sherds predate ca. A.D. 800. Possible later ceramics in this area (0-30 cm bs) include an incised grog-tempered and plain bone-tempered sherd, plain grog-tempered sandy paste sherds, and plain grog-hematite-tempered sandy paste sherds, as well as the sandy paste lip notched rim sherd, and may date after ca. A.D. 800. Conversely, in the central part of the site, the deepest and perhaps oldest sherds are from 80-100 cm bs, but this only includes a base sherd with no apparent temper. From 0-80 cm bs in this area, however, there are three decorated grog-tempered sherds that may be part of a component that dates after ca. A.D. 1200/1300 (because one of them has a brushed decoration). This possible component does have bone-tempered sandy paste, grog-bone-tempered sandy paste, grog-bone-tempered sandy paste, and sandy paste (from 60-80 cm bs) sherds. Radiocarbon dates from each of these deposits are warranted to refine the temporal character of the Black Finger Tip ceramic wares and assemblage.

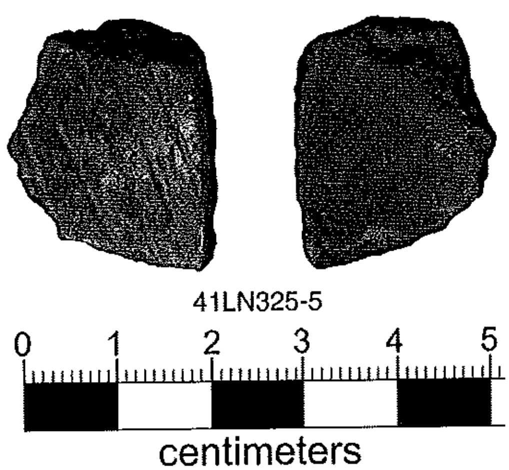

Figure 10. Parallel incised body sherd from the Black Finger Tip site.

SUMMARY AND CONCLUSIONS.

The prehistoric archaeological components at 41LN308 and the Black Finger Tip site (41LN325) have well preserved midden deposits that are ca. 20 m in diameter and between 59-80 cm thick at 41LN308 and 80-100 cm+ thick at the Black Finger

Tip site (41LN325). These middens, which apparently accumulated beginning in the Woodland period, and then continued to be occupied in the Late Prehistoric period (e.g., to some time after ca. A.D. 1200/1300), contain animal bone, charred plant remains (*Carya* sp. nutshell and wood charcoal), burned clay pieces, lithic debris, chipped stone tools, and prehistoric ceramic sherds. These include both sandy paste Goose Creek Plain and later grog- and bone-tempered decorated ceramic wares that share stylistic and technological attributes with East Texas Caddo ceramic wares. Additional investigation of the technological and stylistic character of the artifact assemblages and the nature of any associated features at these two sites would provide important insights into the nature of prehistoric habitation across this part of the Post Oak Savannah cultural landscape during at least a 4000 year prehistoric interval (based on a radiocarbon date beneath the midden at the Black Finger Tip site), as well as the settlement and long-term use of the Boggy Creek locale by prehistoric groups.

Of the prehistoric sites where a specific and temporally-bounded archaeological component can be identified at Fort Boggy State Park, it is sites of Woodland period age (ca. 500 B.C.-A.D. 800) that are most commonly identified on a variety of landforms across Fort Boggy State Park (Perttula et al. 2011:Figure 85). Radiocarbon dates from 41LN308 and the Black Finger Tip site (41LN325) also confirm that two extensive midden deposits at the sites accumulated primarily during this period, between A.D. 432-772. Woodland period sites, or sites with multiple prehistoric components, comprise 55% of the sample of sites where prehistoric components were identified. Archaic and Late Prehistoric components on prehistoric sites account for 23%, respectively, of all the identified prehistoric components; one radiocarbon date from 41LN308 identified use of the site during the early part of the late Prehistoric period (A.D. 935-987). Archaic sites or components are not particularly common at the Park, and temporal diagnostics recovered suggest that much of the Park was only used by Archaic foragers after about 4000 years ago. It is possible, however, that many of the sites that would date to the Archaic period are either deeply buried in alluvial and deep sandy mantle upland settings, or that pre-4000 years B.P. Archaic sites were eroded away during warmer and drier middle to late Holocene period climatic episodes. Late Archaic deposits have been identified beneath the Woodland period midden at the Black Finger Tip site, and these date to 824-904 B.C.

The majority of the Woodland and Late Prehistoric sites at Fort Boggy are situated on landforms that are in proximity to Boggy Creek and the Boggy Creek floodplain, although two of the sites—Clear Cut (41LN317) and Black Walnut House (41LN318)—are found along small tributary streams some distance from Boggy Creek. These sites are on upland toe slopes, alluvial terraces, and low-lying landforms that project into the Boggy Creek floodplain.

Three of these Woodland to Late Prehistoric sites, 41LN308, the Black Finger Tip site (41LN325), and the Last Chance Quarry site (41LN341), have deep midden deposits; two of the middens have been radiocarbon-dated to Woodland period times. Their occurrence and preservation along Boggy Creek indicates that sometime during this period, a more intensive and sustained settlement pattern began to develop among Woodland and Late Prehistoric peoples in this part of the Post Oak Savannah. Such sites may have seen occupations that were more than seasonal for a number of years, and we would expect such sites to contain other evidence of more permanent settlement, including house structures, storage pits, and small cemeteries (cf. Gadus et al. 2002).

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A Clovis Wedge Core from Kerr County, Texas

David L. Calame, Sr.

ABSTRACT

A wedge core of high quality Edwards "rootbeer" chert is reported from the highlands of extreme southwestern Kerr County, Texas. Examination indicates that this artifact is linked to Clovis blade technology.

THE SITE

The site at which this artifact was found is recorded as 41KR689, high on the divide between the drainages of the Guadalupe and Medina rivers . It is best described as a lithic procurement area at which highly quality chert was exploited. The chert outcrops at this location at an elevation of approximately 2000 feet above sea level. The outcrop yields tabular and nodular chert' and the material is a very high quality, reddish-brown banded "rootbeer" chert. The author personally picked up several very thin nodules that can only be described as the very best chert he has ever held! There is extensive lithic reduction debris and finished artifacts diagnostic of Clovis through Late Prehistoric have been found.

THE ARTIFACT

The artifact is of a distinctive form known as a "wedge core," with the core shape likely determined by the knapper's reduction strategy. As seen in Figure 2, the platform surface was exhausted in the effort to remove a maximum number of long blades. The measurements of the blade scars on this core are presented in Table 1. See also Figure 3.

Wedge cores are best known from the Clovis assemblage from the Gault site (cf. Collins 1991). While the large conical polyhedral cores found there and in other parts of the state are the best known Clovis blade cores, Collins (1999:51; Figure 3.13) has described "wedge-shaped cores" also used in blade manufacture. They have an acute angle between the core face and the platform, sometimes with two platforms. Wedge cores were reduced by soft-hammer direct percussion, while the blades from polyhedral cores were detached through the "punch" technique (Collins 1999:63).

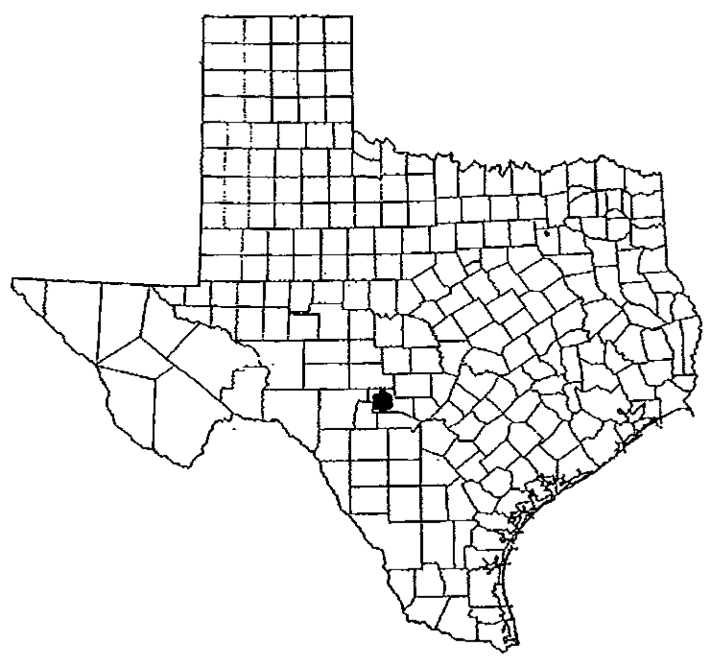

Figure 1. Location of Kerr County, Texas.

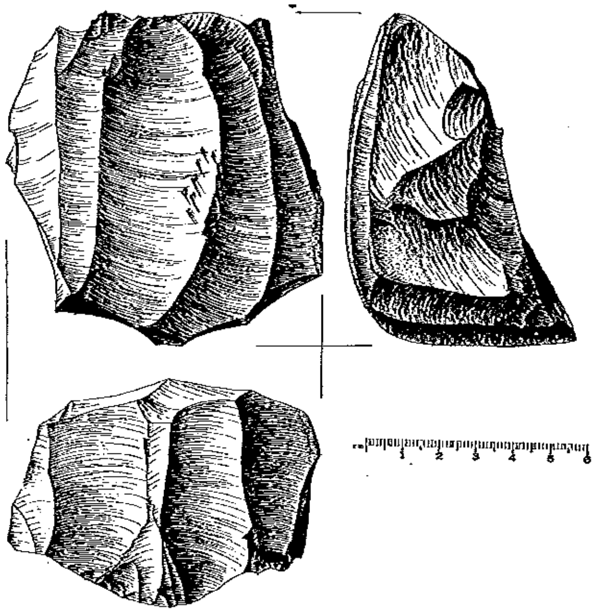

Figure 2. Clovis wedge core from Kerr County, Texas. Face of core, side view, and platform view.

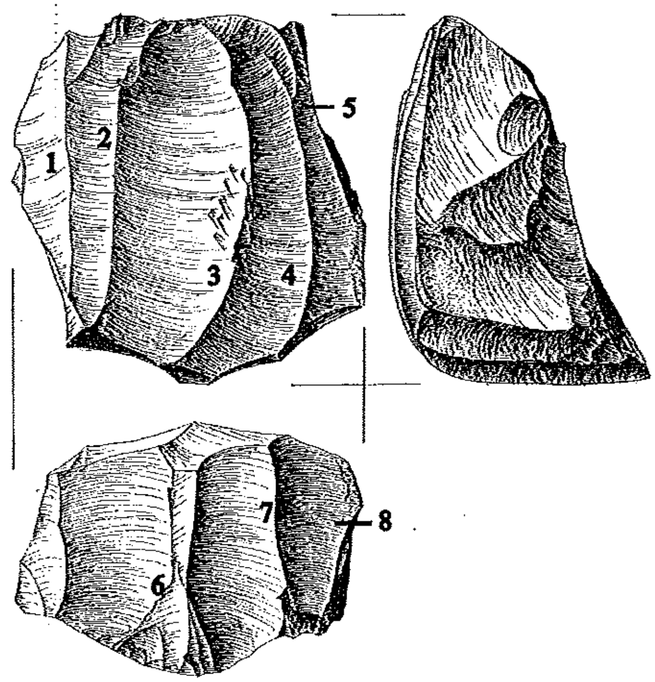

Figure 3. Clovis wedge core from Kerr County, Texas. Blades seen on core are numbered, and the measurements are presented in Table 1.

Table 1. Blade Scar Measurements from the Wedge Core, 41KR689

Blade scar	Length	Width	Description
1	65	22	
2	79	20	
3	86	32	last removal from face overshot blade
4	89	20	
5	77	12	
6	52	27	
7	56	24	
8	49	18	

At least 6 wedge-shaped cores of Clovis affinity are also known from Pavo Real (41BX52) on Leon Creek in northern Bexar County. (Collins et al. 2003) This site lies just over 70 miles to the southeast of 41KR689.

DISCUSSION

Chipped stone artifacts linked to Clovis are exceedingly rare in the western Balcones Escarpment. Site 41KR689 suggests that Clovis sites will be found in association with outcrops of high quality chert. Assemblages at Gault and other Clovis sites often reflect the use of exotic high quality materials.

REFERENCES CITED

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1999 *Clovis Blade Technology*. University of Texas Press, Austin.

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Manuports From Gillespie and Kimble Counties, Texas

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ABSTRACT

Attributes for 39 manuports of exotic materials from Gillespie and Kimble Counties are given. Behaviors suggested by the occurrence of the manuports on prehistoric sites are discussed.

INTRODUCTION

Manuport is defined as "a natural object which has been moved from its original context by human agency but otherwise remains unmodified" (*Wikipedia*). As they are not artifacts, they often go unnoticed in sites or are simply listed among site inventories. Kuzmich (2009) recently reported a hematite fragment found at 41 BX 502 from the Lion Mountain formation in the Llano Uplift. This report describes and discusses 39 rock and mineral manuports, from 13 sites in Gillespie County and one site in Kimble County.

GEOLOGICAL AND ARCHAEOLOGICAL SETTING

Manuports were found on 13 of 40 sites (32.5%) located during site surveys conducted by the writer in the early 1980's. The sites at which the manuports were found (Figures 1 and 2) are located in five different geological formations, Glen Rose Limestone, Edwards Limestone, Hensell Sand, and in the Llano Uplift Town Mountain Granite and Big Branch Gneiss. The materials represented were easily identified as exotic to the locales/geological formations in which they were found. Only one, a relatively large piece of hematite, was not found on an archeological site.

Glen Rose Limestone

35 of the manuports were found on nine sites, 102, 103, 105, 106, 107, 108, 120, and 125 on Meusebach Creek, and one unrecorded site on Honey Creek, that are located in the Glen Rose Limestone formation. In the site areas the Glen Rose formation consists of eroded hills capped by Edwards limestone. The hill slopes have exposed limestone ledges that protect underlying marls (caliche). Top soils are typically shallow and include Brackett-Tarrant Association, Purves, Krum Silty Clay and Tarrant Rock Outcrop (Allison 1975). Minerals are uncommon. Rust colored iron pyrite occurs in some marls of the Brackett-Tarrant Association in the form of irregularly shaped pebbles that resemble chewed gum. Quartz exists in two forms, both of which occur in the Edwards limestone on the hilltops. These include micro-crystal lined cavities that occur inside chert nodules, as well as unusual forms of milky quartz that occur on the exterior cortex faces of chert tabs, which resemble small casts or sculptures of figures and landscapes.

With the exception of GL 106, the sites are very small (in terms of number of artifacts) temporary campsites and quarries, or a combination thereof, with only surface deposits of cultural material. For those sites from which comprehensive surface collections were made the total number of artifacts averaged 129. The cultural deposit at GL 106 was also surface only, but it was relatively larger than deposits at surrounding sites. Only a representative collection was made from GL 106, which totaled 923 artifacts. As shown in Table 1, diagnostic artifacts from almost every prehistoric cultural period are represented by the nine sites in the Glenn Rose Limestone area.

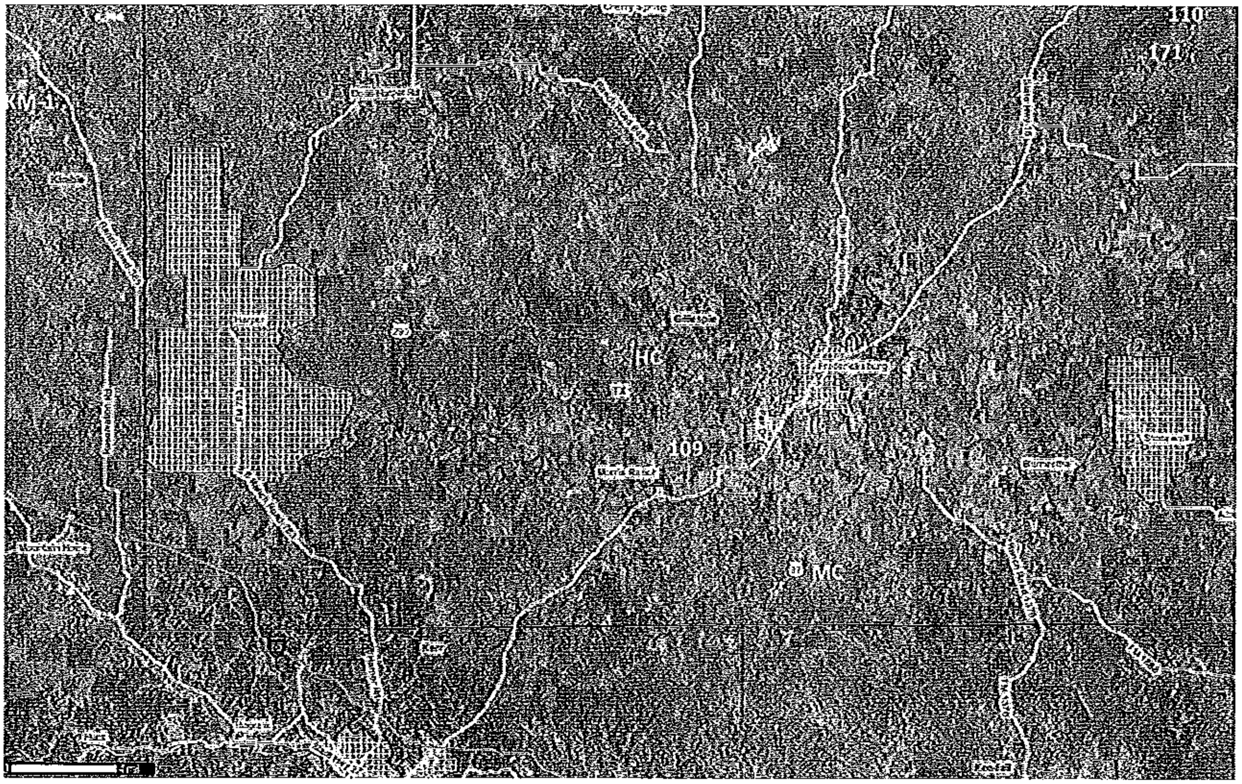

Figure 1. Distribution of sites with manuports. KM-1, Kimble County Dry Cedar Creek site. HC, Honey Creek site. MC, Meusebach Creek cluster.

Figure 2. Distribution of sites with manuports and possible transportation routes, Meusebach Creek cluster. H, location of Hematite Misc-1.

Hensell Sand

The fine sandstone was found at GL 109. GL 109 is situated along Mud Creek on Heatly loamy fine sand, a soil of the Hensell Sand formation. Typically these soils are very flat, 1-5% slopes (Allison 1975), and have no rocks. Cultural material extended to approximately 30 inches, and it was exposed when the local highway department excavated approximately two feet of material from the surface. Artifacts recovered were from the Late Archaic period and included Ensor, Marcos, Castroville, large finished bifaces and manos. This site probably had the highest number of artifacts of any of the sites surveyed, but unfortunately most of them were lost when the material was removed.

Llano Uplift

Two sites, GL 110 and GL 171, are located in the Llano Uplift area of northeast Gillespie County along Coal Creek, known for its unique geology. The calcite was found at GL 171, which is located in the Town Mountain Granite formation on the Keese Rock Outcrop complex (Allison 1975) and consists basically of granite outcrops, boulders and decomposed granite. Other than the parent material, no other types of naturally-occurring rocks are present on the Keese Rock Outcrop complex. Only 64 artifacts were found on this site. Two very small crystal quality pieces of quartz were found at GL 110, which is located in the Big Branch Gneiss formation on Katemcy Clay Loam soil (Allison, et. al., 1973). The Big Branch Gneiss formation includes diorite and schists in addition to various Gneisses. A total 129 artifacts were found at the site. Diagnostic artifacts included one each of Scallorn, Montell, Marshall, Bulverde, Nolan, and a Golondrina/Barber midsection.

Edwards Limestone

A banded quartzite cobble was found on an unrecorded site located in the Edwards Limestone formation in east Kimble County on a high bluff overlooking Dry Cedar Creek. The soil is classified as the Real-Brackett complex (NRCS Web-based Soil Survey). Naturally occurring rocks found in the local area are large angular limestone and chert cobbles. It is a very small quarry site in a small chert nodule deposit. No diagnostic artifacts were found.

DESCRIPTION

Table 1 shows the attributes of the manuports, as well as the geological and archeological contexts in which they were found. Types of rocks and minerals represented in the collection include hematite, six varieties of quartz, quartzite, one pebble of unidentified material, fossilized wood, jasper, very fine sandstone, calcite, schist and black shale. Five pieces, including two of hematite, 1 quartzite pebble, 1 flake-like piece of jasper, and a fine sandstone pebble, while minimally modified by the people who collected them, are considered manuports because they were likely valued for the material itself rather than their value for tool manufacture.

Hematite (5—Figure 3, a-e)

The five examples include two chunks, 105-162 (Figure 3, a) and 106-909 (Figure 3, c), two flakes, 105-161 (Figure 3, b) and 120-13 (Figure 3, d) that were removed from cobbles, and one relatively large, irregularly rounded and smoothed small cobble, Misc-1 (Figure 3, e). All are from Meusebach Creek

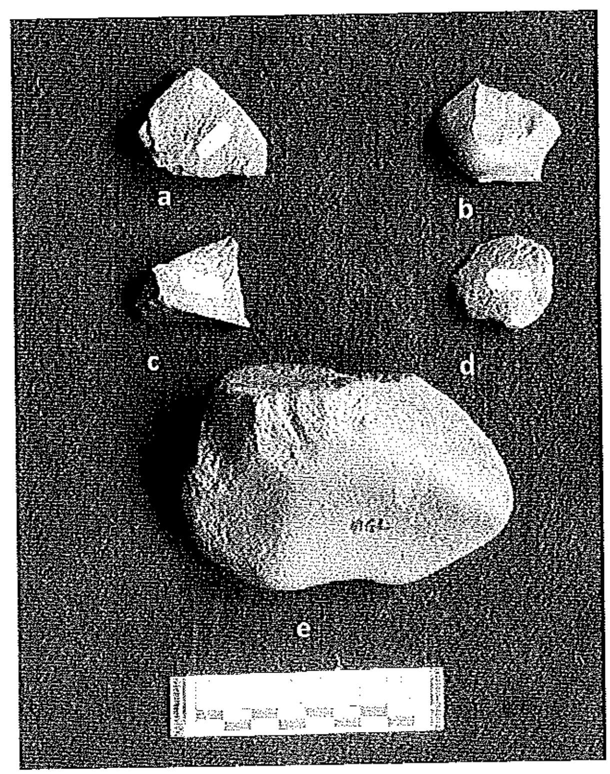

Figure 3. Hematite manuports. a, 105-162.b, 105-161, c, 106-909. d. 120-13. e, Misc-1.

Table 1. Gillespie and Kimble County Manuports

Site	No.	Soil Type	Watershed	Description	Max Length	Max Width	Max Thickness	Weight (g)	Material	Munsell Chart Color	Likely Material Source	Likely Material Match	Use Evidence	Associated Diagnostics	Total Artifacts	Site Type
GL 102	142 Glen Rose Limestone	Purves; Krum silty clay	Meusebach Creek	stream-worn rounded pebble	33.02	27.61	13.80	14.0	schist	2.5 Y 4/ gray to 5/ light gray	Llano Uplift - Packsaddle Schist or Big Valley Gneiss		None	Edwards, Frio, Marcos, Castroville, Shumla, Pedernales, La Jita, Nolan, Uvalde, Gower, Angostura	222	camp
	143			stream-worn rounded pebble	17.04	12.20	8.22	2.3	quartz light gray	2.5 Y 6/ light gray-gray	Llano Uplift	•	None			
GL 103	60 Glen Rose Limestone	Purves	Meusebach Creek	parallel-o-gram shaped chunk	44.07	28.79	14.01	24.7	fossilized wood	10 YR 7/4-8/4 very pale brown w/ 10 YR 3/1 very dark gray-4/1 dark gray crystalline areas	unknown - Lee/Fayette/Gonzales, Live Oak, Webb, Duval, McMullen		None		56	quarry
GL 105	160 Glen Rose Limestone	Denton silty clay	Meusebach Creek	stream-worn rounded cobble	74.40	42.20	26.60	116.4	quartzite	10 YR 5/2 grayish brown-6/2 light brownish gray w/ 6/3 pale brown-7/3 very pale brown discolored area	unknown - Uvalde gravels	@	None	Perdiz, Castroville, Williams, Pedernales, Bulverde, Taylor	244	camp/ quarry
	161			flake from rounded cobble	44.05	38.32	20.09	51.5	hematite	10 YR 3/1 very dark gray	Llano Uplift, Lion Mountain Sandstone	&	None			
	162			chunk	47.26	39.11	22.05	73.6	hematite	10 YR 2/1 black	Llano Uplift, Lion Mountain Sandstone	&	None			
	163			chunk	26.45	15.42	15.35	7.7	quartz crystal	clear	Llano Uplift	^	None			
GL 106	905 Glen Rose Limestone	Purves	Meusebach Creek	flake-like chunk	44.04	38.78	14.41	31.8	jasper	2.5 YR 5/2 to 4/2 weak red	unknown - Brackettville/ Rio Grande		None	Scallorn, Edwards, Frio, Corner Tang, Marcos, Montell, Castroville, Langtry, Pedernales, Nolan, Zorra, Uvalde, Angostura	923	camp/ quarry
	906			chunk	21.01	15.95	8.75	3.2	quartz light gray	2.5 Y 6/ light gray-gray	Llano Uplift	•	None			
	907			chunk	38.95	31.31	21.07	22.5	quartz	5 YR 5/2 reddish gray -7/2 pinkish gray to 7/3 pink to 8/1 white w/ reddish brown stains in voids	Llano Uplift	-	None			
	908			tab	57.47	47.99	13.73	40.4	black shale	7.5 YR 2/ black to 5/ very dark gray	Hensell Sand		None			
	909			triangular chunk	39.34	35.07	20.51	36.3	hematite	7.5 YR 2/ black	Llano Uplift, Lion Mountain Sandstone	&	None			
GL 107	1 Glen Rose Limestone	Association; Purves	Meusebach Creek	stream-worn rounded pebble	25.27	19.25	7.57	5.9	unidentified non-local	7.5 YR 6/ gray - 8/ white	unknown		None		-	camp/ quarry
	2			chunk	25.65	16.28	13.58	8.3	quartz	2.5 3/4 dark reddish brown - 5/4 reddish brown	Llano Uplift	-	None			
GL 108	10 Glen Rose Limestone	Brackett-Tarrant Association	Meusebach Creek	rounded cobble fragment (mano?)	40.15	39.58	27.97	60.8	quartz rose	5 YR 6/2-7/2 pinkish gray	Llano Uplift	+	None	Calf Creek, Laguna, Golondrina/ Barber	158	camp/ quarry
GL 109	20 Hensell Sand	Heatly loamy fine sand	Mudd Creek	rounded cube	41.62	37.55	33.24	79.3	fine sandstone ochre	2.5 YR 4/6-5/6 red	Llano Uplift		abrasion	Ensor, Marcos, Castroville, large bifaces, manos	-	camp
GL 110	1 Big Branch Gneiss	Katemcy clay loam	Coal Creek	small chunk	20.10	16.02	6.26	1.8	quartz crystal	clear	Llano Uplift	^	None	Scallorn, Montell, Marshall, Bulverde, Nolan, Golondrina/ Barber	120	camp
	2			small chunk	13.95	11.62	4.27	0.5	quartz crystal	clear	Llano Uplift	^	None			
GL 120	13 Glen Rose Limestone	Tarrant Rock Outcrop; Krum silty clay	Meusebach Creek	flake from rounded cobble	37.39	35.53	11.06	19.8	hematite	10 YR 2/1 black to 3/1 very dark gray	Llano Uplift, Lion Mountain Sandstone	&	None	Nolan, Zorra, Laguna	161	camp
GL 125	2 Glen Rose Limestone	Brackett-Tarrant Association	Meusebach Creek	stream-worn rounded cobble fragment	54.42	44.61	30.22	71.0	quartz w/ mica	2.5 YR 5/6 red - 7.5 YR 7/ light gray - 8/ white w/ reddish brown stains in voids	Llano Uplift	-	None	Golondrina/Barber	-	camp
GL 171	9 Town Mountain Granite	Keese Rock Outcrop Complex	Coal Creek	Irregular parallel-o-gram	38.55	38.32	18.02	28.4	calcite	5 YR 6/1 to 7/1 gray to 8/1 white; translucent to maximum thickness	Llano Uplift		None	Frio	64	camp
GL Misc	1 Glen Rose Limestone	Purves	Meusebach Creek	Irregularly smoothed, rounded cobble	116.64	87.90	56.27	1133.5	hematite	10 YR 3/1 very dark gray	Llano Uplift	&	None		0	isolated find
GL Honey Crk	1 Glen Rose Limestone	Brackett-Tarrant Association	Honey Creek	stream-worn rounded cobble/ hammer stone	84.95	43.69	32.49	186.3	quartzite	7.5 YR 5/2 pinkish gray	unknown - Uvalde gravels	@	hammer stone	Lange, Angostura, Golondrina/ Barber	-	camp/ quarry
	2			stream-worn rounded pebble	57.27	41.45	35.31	101.4	quartzite	7.5 YR 7/ light gray -7/2 pinkish gray to 8/1 white	Llano Uplift		None			
	3			stream-worn rounded pebble	57.28	35.87	25.72	77.6	quartz, reddish brown voids	7.5 YR 7/2 pinkish gray to 8/ white w/ reddish brown stains in voids	Llano Uplift	#	None			
	4			stream-worn rounded pebble	49.88	44.24	21.96	68.6	quartz rose	5 YR reddish gray to 6/2 pinkish gray	Llano Uplift	+	None			
	5			stream-worn rounded pebble	43.11	33.62	24.69	39.7	quartz, reddish brown voids	7.5 YR 5/2 pinkish gray to 8/2 pinkish white to 8/1 white w/ reddish brown stains in voids	Llano Uplift	-	None			
	6			stream-worn rounded pebble	37.52	33.36	17.44	29.4	quartz, reddish brown voids	7.5 YR 6/2 - 7/2 pinkish gray w/ reddish brown stains in voids	Llano Uplift	#	None			
	7			stream-worn rounded pebble	60.13	35.35	24.21	73.4	quartz light gray	7.5 YR 7/1 light gray - 8/1 white; translucent to maximum thickness	Llano Uplift	•	None			
	8			fragment	45.80	43.51	20.33	45.8	quartz light gray	7.5 YR 5/ gray - 7/ light gray	Llano Uplift	•	None			
	9			stream-worn rounded pebble	59.49	47.39	29.17	84.7	quartz light gray	7.5 YR 5/ gray - 7/ light gray	Llano Uplift	•	None			
	10			stream-worn rounded pebble	28.93	18.76	17.97	13.9	quartz rose	5 YR 5/2 reddish gray - 6/2 pinkish gray	Llano Uplift	+	None			
	11			fragment	36.82	28.18	20.78	19.3	quartz light gray	7.5 YR 6/ gray to 8/ white	Llano Uplift	•	None			
	12			stream-worn rounded pebble	75.65	54.96	46.88	191.5	quartz, reddish brown voids	7.5 YR 7/ light gray to pinkish white and 8/ white w/ reddish brown stains in voids	Llano Uplift	#	None			
	13			stream-worn rounded pebble	30.32	24.84	11.78	11.6	smoky quartz	7.5 YR 4/2 dark brown/brown to 5/2 brown	Llano Uplift		None			
	14			stream-worn rounded pebble	38.44	27.42	23.20	34.6	quartz light gray	7.5 YR 6/ to 7/ light gray	Llano Uplift	•	None			
	15			stream-worn rounded pebble	49.52	39.60	30.27	60.7	quartz light gray	7.5 YR 6/ to 7/ light gray	Llano Uplift	•	None			
	16			fragment	57.93	45.80	24.41	68.5	smoky quartz	7.5 YR 5/ to 6/ gray	Llano Uplift		None			
KM	1 Edwards Limestone	Real-Brackett Complex - Hilly	Dry Cedar Creek	stream-worn rounded cobble	83.79	55.69	29.27	217.6	quartzite	5 YR 5/1 gray to 5/2 reddish gray and 7.5 YR 7/ light gray to 2.5Y 8/ white	Unknown		None		-	quarry
Total	39				1797.7	1373.3	843.0	3158.3	6.95 lbs							
Mean					46.1	35.2	21.6	81.0	0.2 lbs						245	
SD					20.7	14.5	10.7	180.6							276	

sites except for Misc-1, which was found between several of the sites. 105-161 has an eraillure on the ventral face, 120-13 has a definite remnant platform, ring crack and force bulb. It is likely that Misc-1 is the original size and form of the raw material. All of the pieces are "black and heavy", the terms used by Kumpe (2009) to describe hematite artifacts from the lower Rio Grande River area. None of the pieces are magnetic. Misc-1, 105-161 and 120-13 have a sandstone-like exterior appearance. No battering, pecking or grinding is visible. Misc-1 has a concave surface on one face that appears to be smoothed or polished as if abraded to make pigment. At least two parent rocks are represented by the four broken pieces (105-162/106-909, and 105-161/120-13). None of the pieces could be refit.

Quartz Crystal (3—Figure 4, a-c)

Except for size, these three small chunks, 110-1 (Figure 4, a) and 110-2 (Figure 4, b), and 105-163 (Figure 4, c), are identical in color, clarity. They are of crystal quality and show evidence of cleavage or crystal faces as well as concoidal fractures. Found on the same site, it is possible that 110-1 and 110-2 are from the same stone.

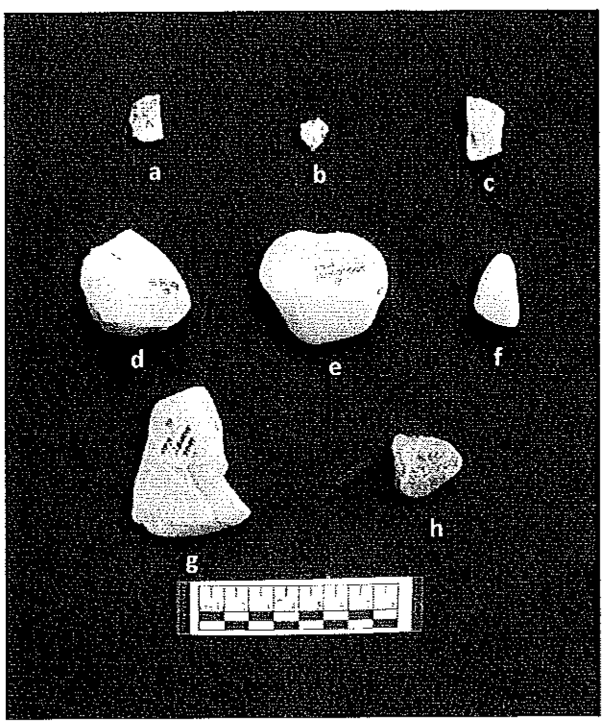

Figure 4. a-c, quartz crystal manuports. a, 110-1. b, 110-2, c, 105-163. d-f, rose quartz pebble manuports. d, 108-10. e, Honey Creek-4. f, Honey Creek-10. g-h, smoky quartz pebble manuports. g, Honey Creek-16. h, Honey Creek-13.

Quartz Pebbles, Rose Colored (3—Figure 4, d-f).

The three examples are identical in color, which is homogeneous throughout each piece. 108-10 (Figure 4, d) is a fragment of a well-rounded and smoothed small cobble. Edges and faces of breaks are sharp and undamaged. Texture of the broken faces shows multi-faceted cleavage or crystal planes. Honey Creek-4 (Figure 4, e) is irregularly rounded, but very well smoothed by stream action. Honey Creek-10 (Figure 4, f) was a chunk that has been somewhat rounded and smoothed by stream action, but still retains more or less flat, angular faces.

Quartz Pebbles, Smoke Colored (2—Figure 4, g-h)

Both examples (Honey Creek-16, Figure 4, g and Honey Creek-13, Figure 4, h) are chunks that show some rounding and smoothing as a result of stream action. Unabraded surfaces show cleavage or crystal planes, and the texture is multi-faceted.

Quartz Pebbles, Light Gray (8—Figure 5, a-h)

All eight examples are pebbles or pebble fragments that range from well-rounded and well-smoothed to somewhat rounded and smoothed by stream action. Except for color, they resemble the rose colored and smoke colored examples.

Quartz Pebbles, White/Red with Mica (5—Figure 6, a-c)

The three examples, 106-907 (Figure 6, a), 107-2 (Figure 6, b) and 125-2 (Figure 6, c), are all from the Meusebach Creek cluster. In form they are broken chunks from stream worn pebbles. The quartz varies in color from areas of opaque white to areas of translucent red and has a fine multi-faceted texture on broken faces. The quartz contains voids which sometimes have mica inclusions. 106-907 and 125-2 are similar enough to have been from the same stone, but could not be refit. 107-2 is likely a part of one of the red areas from a larger piece.

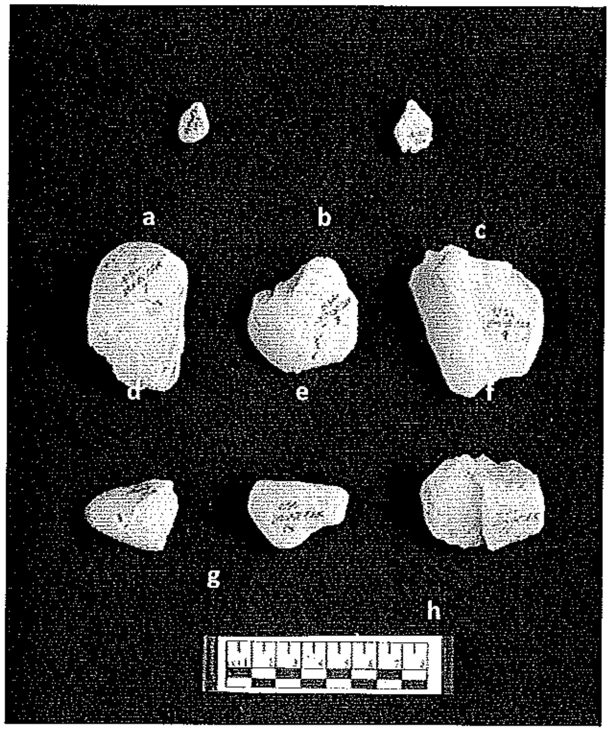

Figure 5. Light gray quartz manuports. a, 102-143. b, 106-906, c, Honey Creek-7. d. Honey Creek-8. e, Honey Creek-9. f, Honey Creek-11. g, Honey Creek-14. h, Honey Creek-15.

Quartz Pebbles, Light Gray with Reddish-Brown Voids (4—Figure 6, e-h)

All are from the Honey Creek site. Two examples, Honey Creek-3 (Figure 6, e) and Honey Creek-12 (Figure 6, h) are pebbles and the other two are pebble fragments. Honey Creek-5 (Figure 6, f) is well rounded, but broken up and not well-smoothed. The remaining three are not well-rounded, but they are smooth and Honey Creek-3 and 12 are polished. The quartz surface has solution cavity-like voids with a reddish brown stain inside. The broken faces are opaque and resemble the white areas of the mica quartz in texture.

Quartzite (4—Figure 6d; 7, a-b, d)

All four examples are well rounded, and all except 105-160 (Figure 7, a)are well rounded and polished by stream action. Battering at one end of Honey Creek 1 (Figure 7, b) indicate that it was used at least once as a hammer stone, otherwise the stones are unaltered. The largest, KM-1 (Figure 7, d), from Dry Cedar Creek in Kimble County, is marble-like in color, reddish gray with light gray bands, but it did not react to acid.

Unknown Pebble (1—107-1; Figure 7, c)

This small, flat, sub-triangular rounded pebble is well smoothed, but not polished. The exterior has numerous small pits on the faces, particularly on the flatter face. It is as hard as chert and quartzite.

Fossilized Wood (1—103-60; Figure 8, a)

The single example is a flattish chunk that is basically the shape of a parallel-o-gram. It has well-formed wood grains on one face, and both faces have patches of dark colored crystals. The edges are sharp, with no traces of flaking, battering, smoothing or rounding.

Jasper (1—106-905; Figure 8, b)

The single example is a flattish chunk that resembles a flake, but it has no clearly distinguishable

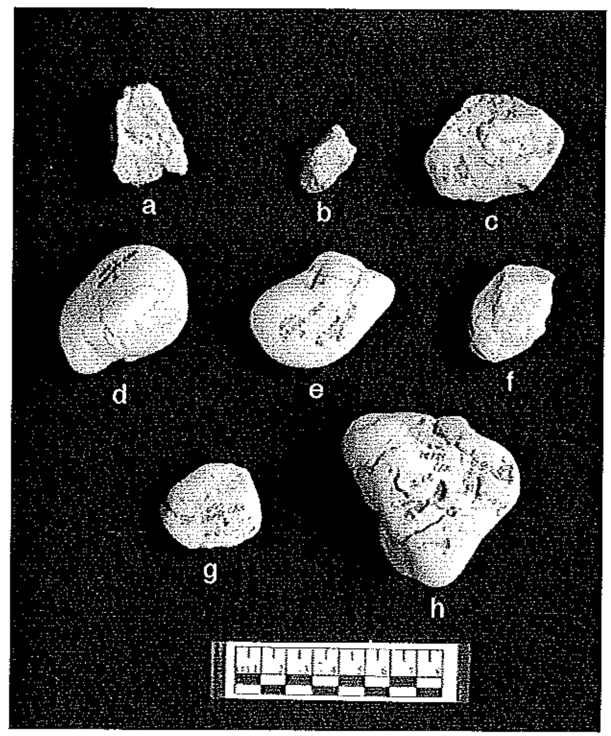

Figure 6. Quartz pebble manuports. a-c, white/red quartz with mica. a, 106-907. b, 107-2, c, 125-2. d, quartzite pebble, Honey Creek-2. e-h, light gray quartz with reddish brown voids. e, Honey Creek-3. f, Honey Creek-5. g, Honey Creek-6. h, Honey Creek-12.

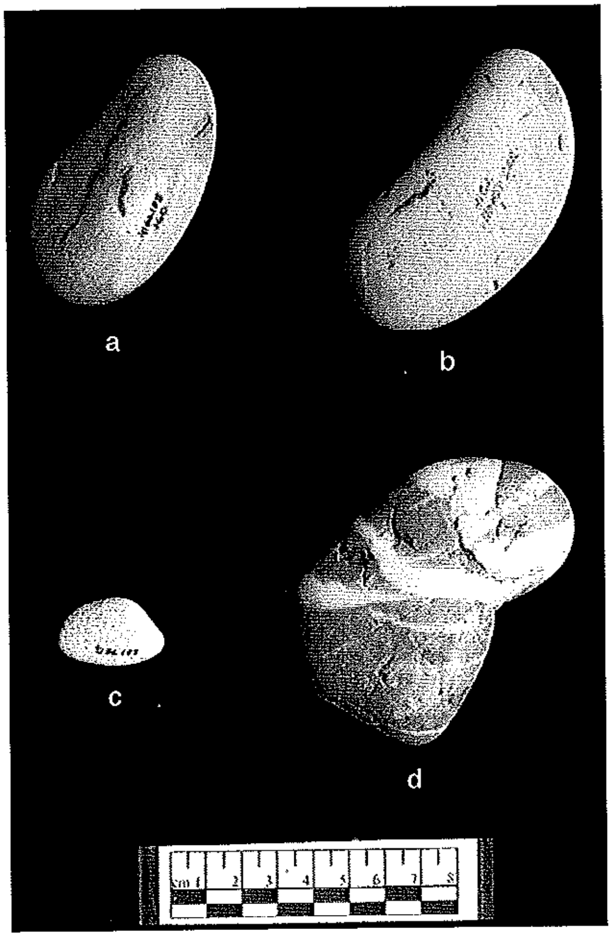

Figure 7. Pebble and small cobble manuports. a, quartzite, 105-160. b, quartzite Honey Creek-1, c, unknown material, 107-1. d, quartzite, KM-1.

platform remnant or force bulb. Both the proximal and distal ends are weathered fracture surfaces, while both faces are more recent fractures which show the true color of the material. One face has multiple flakes removed from the proximal end which resemble repeated strikes with a hammer stone.

Sandstone (1—109-20; Figure 8, c)

The single example is a 7-sided rounded pebble that is more or less cubical in shape. The material is very fine sandstone. It is friable to the degree that particles rub off both with and without water, but is fine-grained and homogeneous enough to be used as a high quality red pigment. The surface appears to have been rubbed on a soft surface, but it also retains nicks and shallow cracks on some faces.

Calcite (1—171-9; Figure 8, d)

The single example is a small, flattish chunk of crystal that shows numerous parallel cleavage lines and surface fractures. It is not modified in any way.

Schist (1—102-142; Figure 9, a)

102-142 has rounded edges on three sides and is graphite gray with sparkly mica particles.

Black Shale (1—106-908; Figure 9, b)

106-908 shows fracture along lamination lines, particularly near the edges where it appears to be stream damage. Although it appears to be gray in the photo, the stone is flat very dark gray to black on the Munsell color chart (Table 1). It has occasional very small dark crystals embedded in the layers.

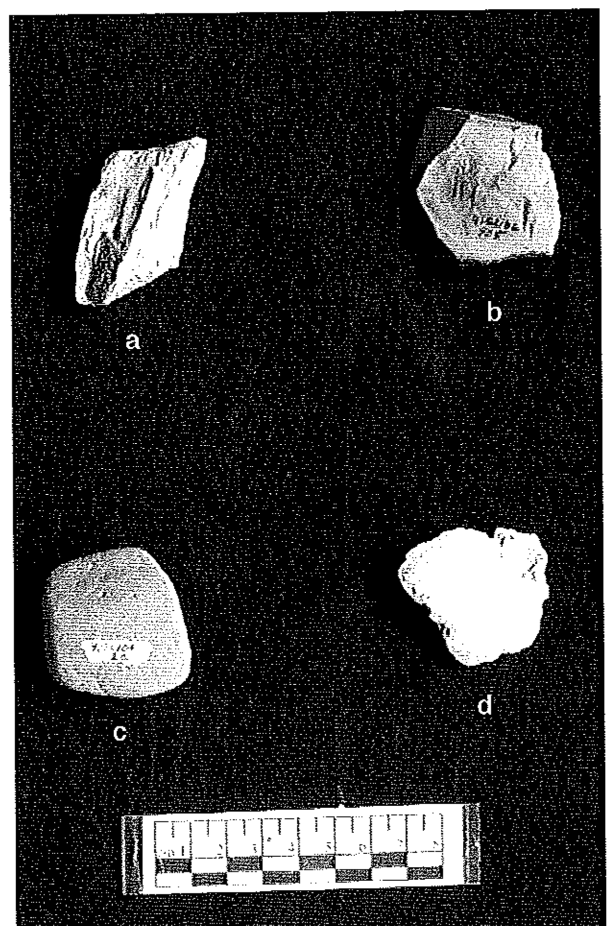

Figure 8. Miscellaneous manuports. a, fossilized wood, 103-60. b, jasper, 106-905. c, fine sandstone pigment, 109-20. d, calcite crystal, 171-9.

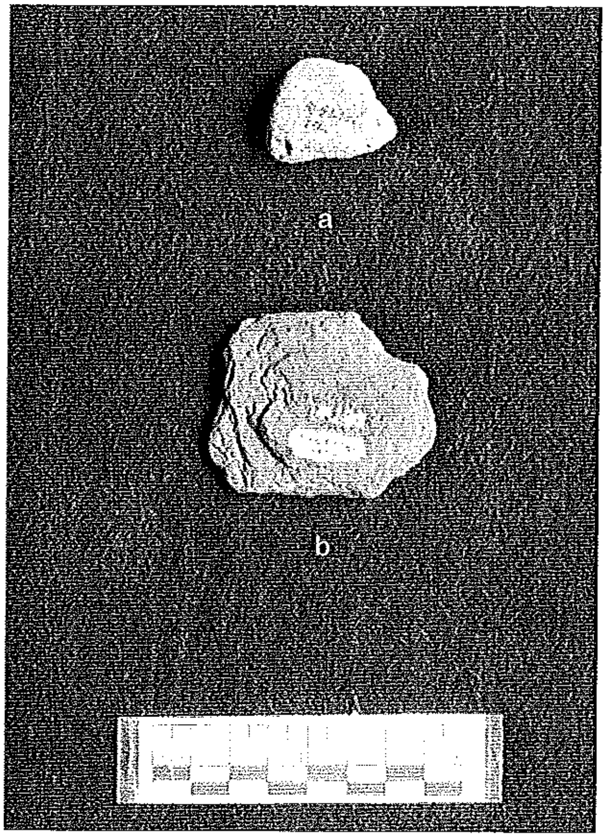

Figure 9. Miscellaneous manuports. a, schist, 102-142. b, black shale, 106-909.

MATERIAL SOURCES

The black shale from GL 106 is likely from a source no more than 7.5 miles away, as it is present in the Hensell Sand formation (U.S. Geological Survey Mineral Spatial Data On-line) in which GL 109 is located and could possibly have been found in gravel bars along the Pedernales River or one of its tributary streams.

The nearest and most likely source for the hematite, quartz, schist and fine sandstone manuports is the Llano Uplift, which is well known as an area rich in diverse rock and mineral resources. The southern edge of this area is about 25 miles north of the Honey Creek and Meusebach Creek sites.

Kuzmich (2009) identified the Lion Mountain formation as the probable source for a piece of hematite found at 41 BX 502. The unbroken form of the hematite found at the Meusebach Creek sites is potato-sized irregularly rounded cobbles. The whole piece found in a non-site area between sites GL 105, 106 and 107 is also polished on some faces. The same raw material form was given by Barnes, et. al.(1949) for hematite from the Lion Mountain formation. Without further examination, the Lion Mountain formation appears to be the source of the hematite found at the Meusebach Creek sites.

Crystal quality quartz was found at one site in the Llano Uplift, GL 110, as well as at GL 105, 25 miles away. While the exact source of the quartz within the Llano Uplift is not known, it is not native to the Big Branch Gneiss in which GL 110 is located. Similarly, while exact sources for fine sandstone and quartzite are not known, it is likely that the examples of fine sandstone (GL 109-20) and quartzite (Honey Creek-2 and KM-1) are from the Llano Uplift as well.

Twenty pebbles/small cobble fragments of lower quality quartz were found at six sites, GL 102 (1), 106 (2), GL 107 (1), GL 108 (1), GL 125 (1) and Honey Creek (14). 13 of these, classified by color as rose, smoky and light gray, are otherwise similar in form and texture, which resemble that of quartz cobbles that occur near Granite Shoals and other surrounding areas. Unbroken, they are well-rounded and smooth. When broken, the texture glistens with multi-faceted crystalline cleavage plains.

Two other pebble forms of quartz, a white and red form with voids containing mica and a light gray to white form with reddish brown stained voids were found. The former was found at three sites, GL 106, GL 107 and GL 125, in the Meusebach Creek group, while the latter was found exclusively at the Honey Creek site. As with the hematite, the nearest likely source for the quartz pebbles is the Llano Uplift, although a specific formation or geographical location is not known. Topographically the likely source for the quartz pebbles and cobbles is stream beds and gravel bars.

The schist from GL 102 matches the description of some schists from the Packsaddle Schist and the Big Branch Gneiss formations. Both of these are about 25 miles distant in northeast Gillespie County in the vicinity of GL 110.

Two quartzite pebbles, Honey Creek-1 and 105-160, resemble quartzite pebbles found by the writer in Uvalde gravels in east Williamson County in form, color, texture and cortex. The nearest Uvalde gravels are at least 50 miles southeast of southern Gillespie County.

The calcite crystal found on GL 171 are obviously from a sedimentary source, but were found on a site in a granite outcrop. The writer is unaware of a specific source for calcite crystals like the one found at GL 171.

The nearest possible geographic sources for the fossilized wood from GL 103 are the Tertiary deposits that stretch from Duval to Brazos counties (Renfro 1973). The writer has found some rare pieces in Uvalde gravels in east Williamson County. All are at least 120 miles from the Meusebach Creek sites.

Renfro (1973) indicates sources of jasper north of Brackettville, Texas and southeast in the Rio Grande River valley. The closest of these, north of Brackettville, are at least 120 miles distant.

CULTURAL AFFILIATION

Only one of the manuports, the fine sandstone at 41 GL 109 could definitely be associated with a specific prehistoric cultural period, as it was found with Late Archaic materials including Ensor, Marcos and Castroville points, manos and large bifaces in a buried context. The remainder of the manuports was found on sites with only surface deposits of cultural materials. Cumulative diagnostic materials from these sites ranged in time period from Paleo-Indian through late prehistoric. Kuzmich (2009) mentions that the hematite from 41 BX 502 was found in an early context, but he gives no further information. The writer also found crystal quality quartz at 41 WM 82, a series of burned rock middens in Williamson County.

DISCUSSION

All of the manuports are made of materials that do not occur in the immediate area of the sites in which they were found, and they comprise an unusual and diverse assortment of materials. At least one, the fine sandstone, was likely a consumable resource that was used for pigment. As time and energy was expended to acquire them, it is apparent that some value is attached to them, whether simply as curios or souvenirs of exploits, trade items, gaming pieces or medicine pouch charms. It is also clear that they were valued in their natural state, as they are mostly unmodified in form. With the exception of the sandstone and one quartzite pebble from Honey Creek that had been casually used as a hammer stone, the manuports showed no modification except perhaps to reduce them into a smaller size, as evidenced broken quartz cobble fragments, two hematite flakes and a possible jasper flake.

The sources from which they were procured ranged from seven to at least 120 miles from the sites at which they were found. The entire collection of manuports weighs only a little over three kilograms and could easily have been carried by one person. However, it is likely the result of several procurement episodes involving several people.

The manuports were well distributed among sites surveyed, including 32.5% (13 of 40) of sites surveyed. Intuitively one might expect more manuports of exotic materials in larger, longer term camps, and that did seem to be the case with GL 106, which had the second highest number (5) and most diverse assortment. Surprisingly, however, most of the manuports were found on very small sites that appear to have served as temporary campsites and quarries. The very small Honey Creek site had 16 exotic stone manuports which may have been a cache, whether or not it was intended to be retrieved, which were found in a very small area of about 20 sq. meters, while nearby GL 169, a multicomponent site comparable in size and cultural affiliation to GL 106 had none.

A comprehensive survey and collection of the upper Meusebach Creek watershed revealed eight of 28 sites (29%) with manuports of exotic materials. Those eight sites are spread over an area of approximately 356 acres. Of them, GL 106 had the highest number and most diverse assemblage of manuports. GL 106 was also the largest site and is centrally located relative to the other sites. It is likely that the manuports were spread to upstream and adjoining sites from there. The other sites average approximately 2070 feet apart with GL 120, the farthest, about 1.5 miles straight line distance from GL 106. The five pieces of hematite in the Meusebach Creek cluster may represent a single procurement which was spread among adjoining sites. Interestingly, the largest piece was abandoned in a non-site area.

The nature of trips to small temporary campsites and quarries seems likely to have been for the purpose of resource procurement. It is curious that manuports of exotic stone, valuable enough to have been acquired through long distance procurement forays or trade, should be carried to such sites and abandoned.

CONCLUSIONS

Prehistoric people in the Gillespie County area had at least a casual, if not an organized system for collecting and transporting of exotic lithic materials for non-utilitarian use. This system reached into other natural and cultural areas of Texas.

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