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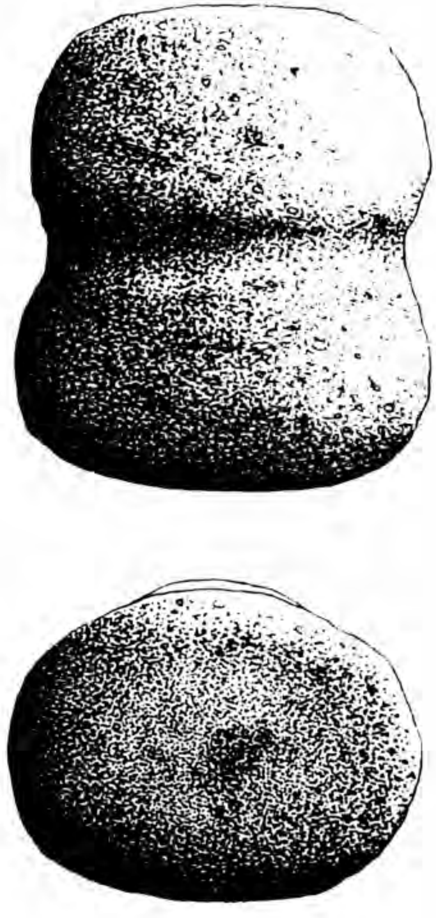

VOLUME 23, No. 2
APRIL, 1996

JOURNAL OF THE
SOUTHERN TEXAS
ARCHAEOLOGICAL
ASSOCIATION

LA TIERRA
QUARTERLY JOURNAL OF THE SOUTHERN TEXAS ARCHAEOLOGICAL ASSOCIATION

Volume 23, No. 2 — Evelyn Lewis
April, 1996 — Editor

About the Cover: Two views of a basalt pestle from Mission San Francisco de la Espada in San Antonio, Texas. See report starting on Page 41. Illustrations by Richard McReynolds are found on pages 4, 5, 6, 7, 9, 42, 45 and 46, as well as the cover.

Manuscripts for the Journal should be sent to: Evelyn Lewis, Editor, *La Tierra*, 9219 Lasater, San Antonio, Texas 78250. Past issues of the Journal and Special Publications available by requesting an order form from STAA (Jim Mitchell), P. O. Box 791032, San Antonio, Texas 78279. Dr. T. R. Hester may be contacted at the Texas Archeological Research Laboratory, Pickle Research Center, Building 5, 10100 Burnet Rd, Austin, Texas, 78712-1100.

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All articles in *La Tierra* are now summarized in *Abstracts in Anthropology* published by the Baywood Publishing Company.

La Tierra is now printed on acid-free paper.

Library of Congress Catalog No. 76-649774.

All contributions to this Non-Profit organization are tax deductible.

Printed by LEBCO GRAPHICS INC., Boerne, Texas

NOTES ON SOUTH TEXAS ARCHAEOLOGY 1996-2
Site Destruction at Falcon Reservoir, Southern Texas

Thomas R. Hester

Falcon Reservoir was built on the Rio Grande, in Zapata and Starr Counties (and the Mexican state of Tamaulipas on the opposite shore) in the early 1950s. This followed a River Basins Survey salvage program in 1952-1953 that investigated a small number of sites, both prehistoric and historic (Cason 1952). Studies of the Rio Grande terraces were done (Evans 1962) and a number of historic buildings were documented. However, no comprehensive report was ever prepared, though extensive notes by Jack Hughes and historical research by Alex Krieger are in the Texas Archeological Research Laboratory (TARL) files. And, by today's standards, the survey and excavation effort was quite meager. After reservoir construction was completed, Falcon Reservoir became the jurisdiction of the International Boundary and Water Commission (IBWC). Scientific field research at Falcon has been extremely limited since the River Basin Surveys program. Kotter (1980) assessed site 41ZP73, in an area where a boat-launching ramp was to be built at Falcon State Recreation Area. In 1991, when the lake was full, O'Neill et al. (1992), recorded 15 sites between 301 feet MSL and the IBWC property line at 307 feet MSL. The work was done by Mariah Associates, Inc. for the IBWC and several STAA members assisted as volunteers in this survey. There have also been several well-pad and pipeline surveys, along with other related small-scale studies done for cultural resource management purposes by James Warren.

Over the decades, the maximum flood pool at Falcon (301 feet above mean sea level/ MSL; Saunders 1985) has fluctuated in time of drought and heavy demands for irrigation waters downstream. In the 1980s, the lake levels dropped more frequently. STAA member R. K. (Pete) Saunders documented 21 sites in Spring 1984, when the lake level dropped to 277 feet MSL, and placed the resulting collections at The University of Texas at San Antonio, and extensive records and photos at TARL. He then published a summary of his studies at Falcon (Saunders 1985). In addition, Saunders photodocumented several collections that came from the lakeshores during that time. In the late 1980s, the lake level dropped even more, exposing "islands" in the middle of the lake and revealing more and more sites on both the Texas and Mexico shorelines. The pace of artifact-collecting (unfortunately, not accompanied by site recording) greatly accelerated, and many of the artifacts were bought and sold, making Falcon a center of commercial artifact activity. A concerned individual in McAllen brought to my attention a number of collections and looted sites during this period. The materials ranged from the discovery of Paleoindian (Clovis and later) and Archaic points to a burial with numerous triangular points, a sandstone pipe, and other grave goods (reminiscent of the Loma Sandia burials at 41LK28). The grave goods were destined for sale at flea markets until the gentleman from McAllen intervened to save a portion of the materials. Subsequently, Rochelle Leneave photodocumented the assemblage (notes on file at TARL).

The 1990s saw even more dramatic drops in lake level (in June 1996, the lake level is more than 48 feet below normal elevation). Collecting intensified even further, and damage to sites on the Mexican side of the river (especially burial sites) became especially pronounced. STAA members C. K. Chandler and Don Kumpe began a long-term effort to document many of the artifacts that were coming from sites at the lake, and published a number of papers in *La Tierra* (see also this issue). In 1994, STAA member James B. Boyd began to record sites at TARL and to loan important collections for recording and photography. He, too, has a series of papers published, or to be published, in *La Tierra* and in *The Cache* of the Office of the State Archeologist's (OSA) Stewards Network. Boyd is also assisting the author in prehistoric and historic site recording and documentation efforts under the terms of an ARPA permit (#0001; Archeological Resources Protection Act) from the IBWC. We are attempting to look at the "big picture" in terms of synthesizing data from the sites (e.g., a manuscript currently in preparation by Boyd and

Diane Wilson on five known prehistoric cemeteries at the reservoir).

At present, and over the past couple of years, the destruction of sites at Falcon has been ongoing (Hester 1995). There are "commercial looters" digging sites (prehistoric and historic), including a cemetery site on the Mexican side, guided boat-tours that provide visitors to the lake with arrowhead-collecting trips, for a fee, of course, and the continuing natural destruction caused by wave erosion. Artifacts are on sale at service stations, at motels, in rock shops; it seems if you're visiting Zapata, then you must be "collecting arrowheads" at the lake!

In April, 1996, shoreline erosion exposed, at 265 feet MSL, a human burial at site 41ZP7. It was found by STAA member James Warren during a survey his consulting firm was doing at Falcon. After consultation with the Texas Historical Commission (THC) and the IBWC, and a visit to the site by Sergio Iruegas (THC) and Dan Potter (OSA), a team from TARL, led by Diane Wilson, excavated the burial (and salvaged it from certain destruction; the skull had already been stepped on and crushed). The individual was an adult female Native American, with no accompanying grave offerings. Age of the interment is not known at this time. Upslope, at a higher elevation, several other burials have been documented, at least one of them of Late Prehistoric age (Caracara points were associated). A report on this burial is presently being completed for IBWC by Wilson and Hester.

Unless the current drought ends soon, with rains that fill the lake, the amount of archaeological information lost at Falcon Reservoir will be incalculable. The THC has been active in seeking to stem the looting and continues to press the IBWC to take a more aggressive role in the situation.

References Cited

Cason, J. F.

1952 Report on Archeological Salvage in Falcon Reservoir, Season of 1952. *Bulletin of the Texas Archeological and Paleontological Society* 23:218-259.

Evans, G. L.

1962 Notes on Terraces of the Rio Grande, Falcon-Zapata Area, Texas. *Bulletin of the Texas Archeological Society* 32 (for 1961):33-45.

Hester, T. R.

1995 The Prehistory of South Texas. *Bulletin of the Texas Archeological Society* 66:427-459.

Kotter, S. M.

1980 *Archeological Assessments at Site 41ZP73, Falcon State Recreation Area, Zapata County, Texas*. Reports of Investigations 9. Prewitt and Associates, Inc., Austin.

O'Neill, P. L., F. M. Oglesby, W. N. Trierweiler and C. Lintz

1992 *A Cultural Resource Survey at Falcon Reservoir, Zapata County, Texas*. Mariah Associates, Inc., Austin.

Saunders, R. K.

1985 Recovery of Drowned Rio Grande Artifacts, Starr and Zapata Counties. *La Tierra* 12(2):6-20.

BUTTED BIFACES AND THEIR USE

C. K. Chandler and Michael Marchbanks

ABSTRACT

Five butted bifaces from Kendall County, Texas containing microscopic residue are illustrated and the residue analyzed. The senior author provides description of the artifacts and their recovery, and the coauthor performed the microscopic analysis of residues and discusses his findings.

INTRODUCTION

Five butted bifaces were recovered from site 41KE92 by Cecil and Dortha Peel from a burned rock midden adjacent to their home in Kendall County and are illustrated with drawings by Richard McReynolds. Each illustration presents both faces and a cross section edge profile of each artifact.

THE ARTIFACTS

Figure 1, Specimen 1, is a flat chert cobble with a rectangular proximal end that retains cortex on all surfaces to about mid-length. The distal end is bifacially worked with percussion flaking to a thin convex edge that is retouched mostly toward one face about 2.8 cm along this convex edge. There is light edge rounding and polish extending on to flake scars and arrises with striations. Striations on the distal tip are in line with the long axis of the stone and are at an oblique angle along the lateral edges. Both faces and edges exhibit high polish.

Under 18X magnification hair-like fibers caught under the edge of flake scar hinge fractures are visible. Under 36X there are several areas of milky white deposits with some of these fine fibers near the blade edge.

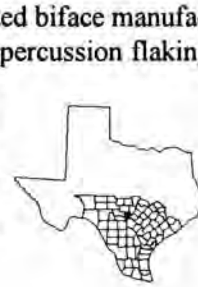
This specimen is 12.5 cm in length with a maximum width of 6.7 cm near the proximal end and is 3.2 cm thick. Weight is 296 grams.

Figure 2, Specimen 2, is a triangular-shaped butted biface 11.9 cm long, 8.2 cm maximum width with a smooth cortex, rounded proximal end that fits well in the hand. The distal end is convex and curves slightly toward one face. It is coated with nearly white patina over both flaked faces that exhibit high polish and prominent striations. There is a glossy clear deposit and a white waxy fibrous substance 4.5 cm along the distal edges. It is percussion flaked on both faces with minimal alternate edge retouch that terminates 4.5 cm from the distal end at a small chip in each edge. Both faces are highly polished and have numerous prominent striations. One face has intermittent deposits of a white waxy fibrous substance that appears to be a vegetal-like sotol. The alternately retouched edges have little to no edge rounding or polish, probably due to the retouch; however, the high polish and glossy clear deposit extends to the retouched edges. All flaked areas are coated with nearly white patina. It weighs 256 grams.

Figure 3, Specimen 3, is a small, subtriangular butted biface with almost no cortex. Both faces are neatly percussion-flaked with mostly parallel flaking. The distal end is pointed and the blade edges are lightly concave. The proximal end is nearly flat to lightly rounded and forms a strong angle to the pointed distal end. There is a thin waxy coating and heavy rounding of all edges and arrises, even on to the small cortex areas. Polish is unusually heavy and striations are prominent over all surfaces on both faces. These striations are at right angles to both edges and to the distal tip. They overlap across the central areas of the blade and converge in three directions about 2.5 cm of the distal tip. The heavy edge rounding and polish diminish toward the butted end. Blade edges are retouched alternately toward the opposite face and these resharpening scars have less polish and striations than interior areas.

This specimen is 11.2 cm long, 8.8 cm wide and 2.9 cm thick. It weighs 161 grams.

Figure 4, Specimen 4, is a butted biface manufactured on a thick chert cobble by percussion flaking. Flaking is mostly broad parallel, some of which extends beyond center line. Dimensions are 12.6 cm in length, 9.6 cm maximum width, 5.7 cm thick in the cortex area and it weighs 448 grams.



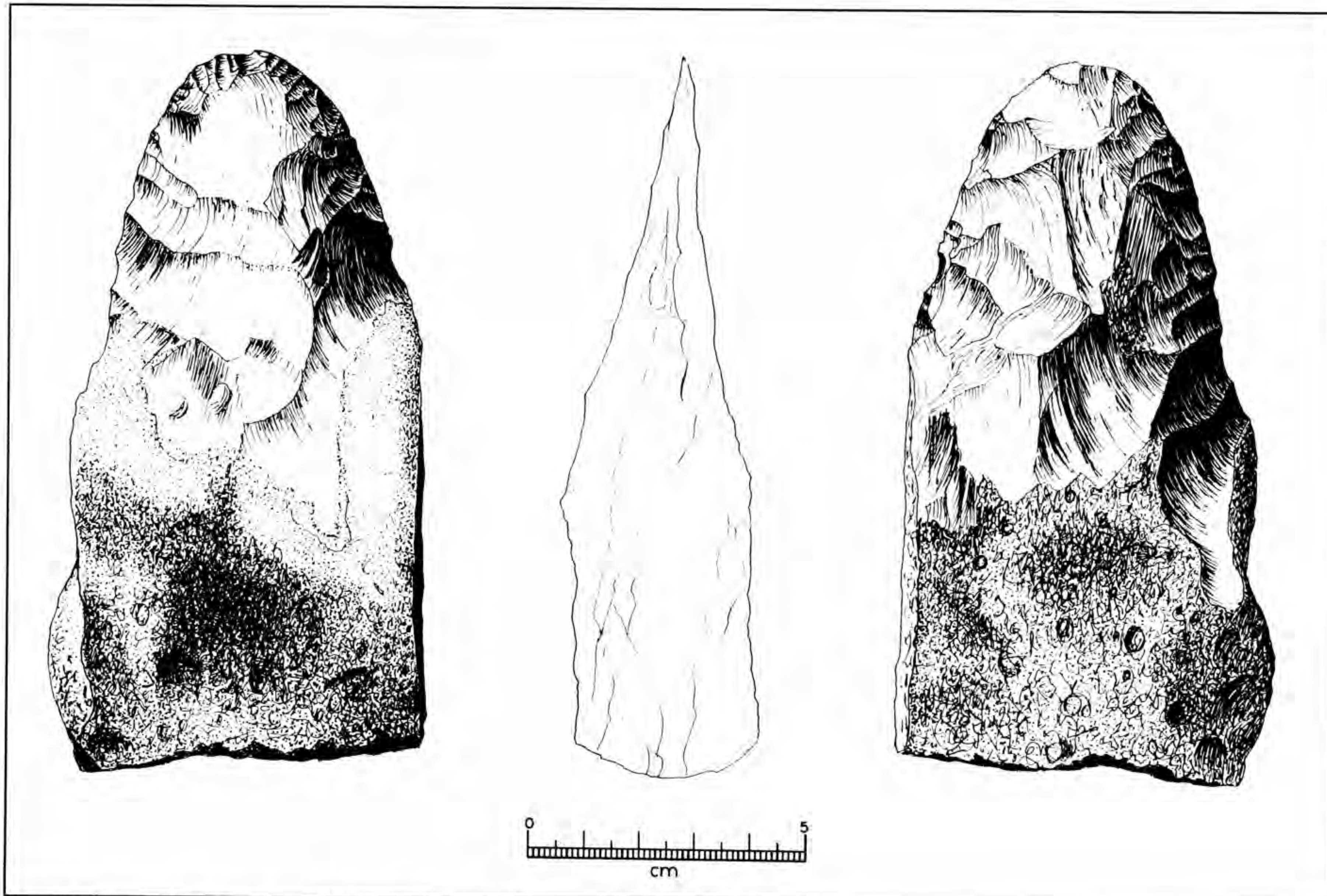


Figure 1. Butted Biface, Specimen 1 (obverse, reverse and cross section). Kendall County, Texas.

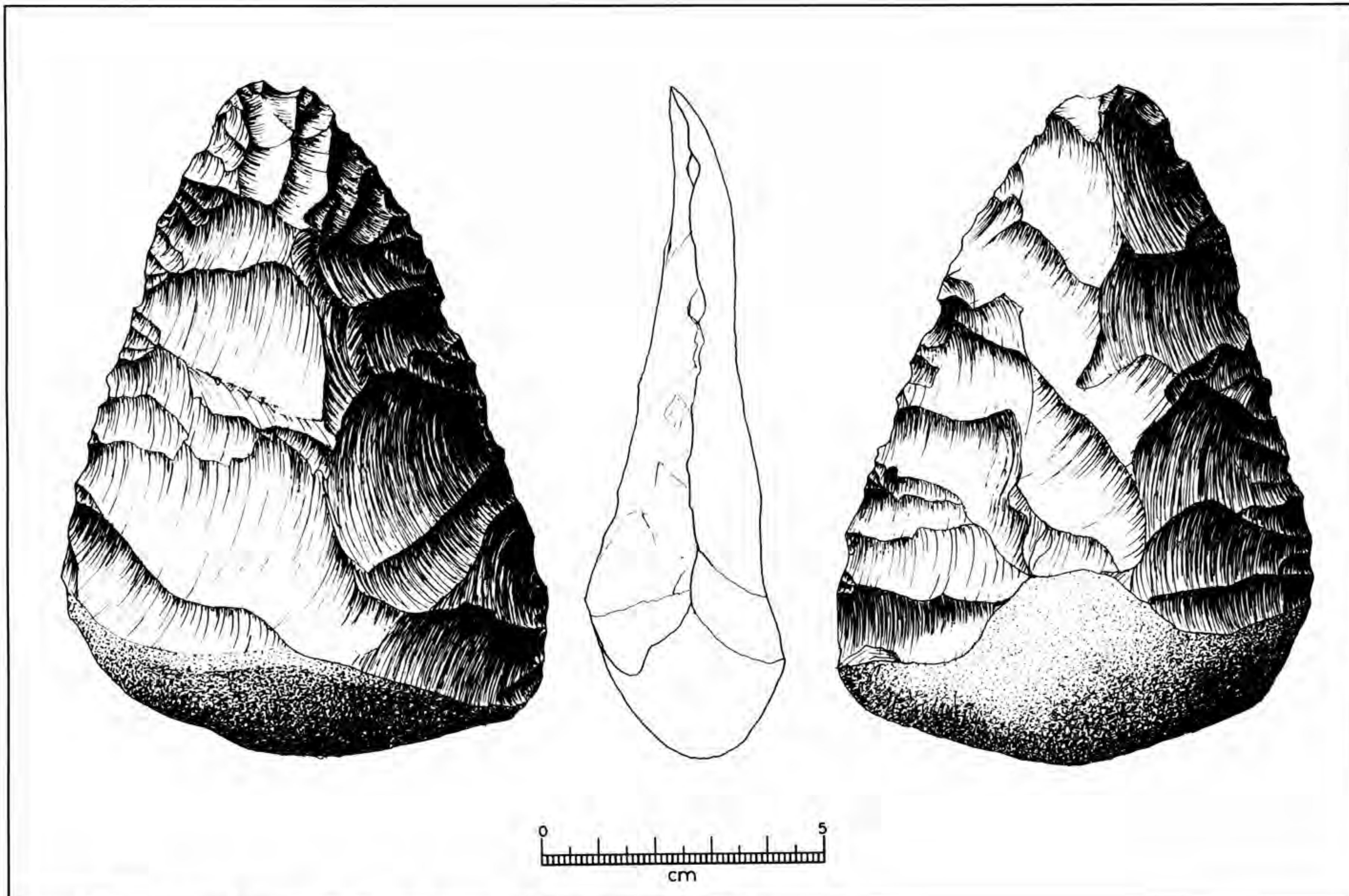


Figure 2. Butted Biface, Specimen 2 (obverse, reverse and cross section). Kendall County, Texas.

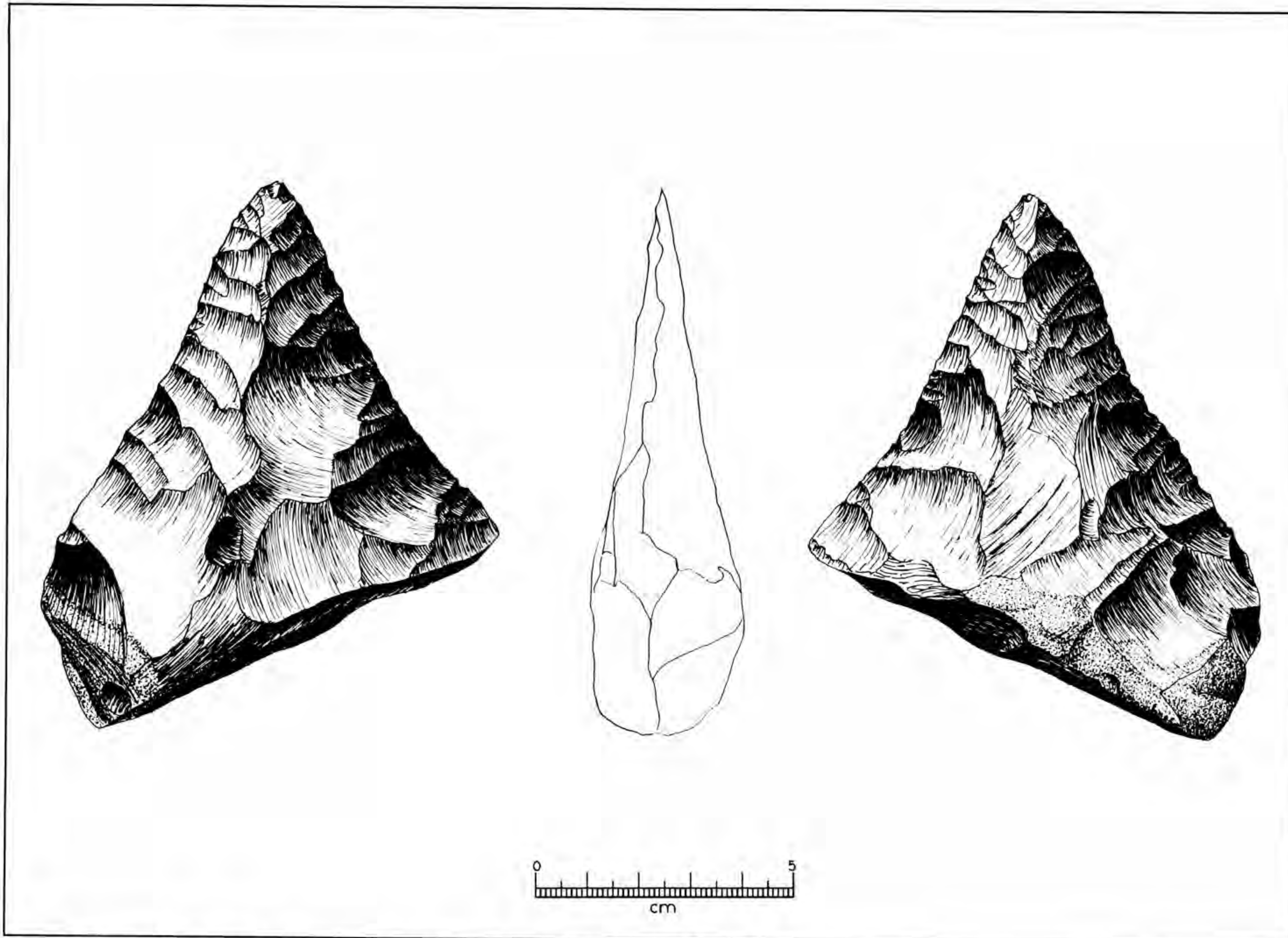


Figure 3. Butted Biface, Specimen 3 (obverse, reverse and cross section), Kendall County, Texas.

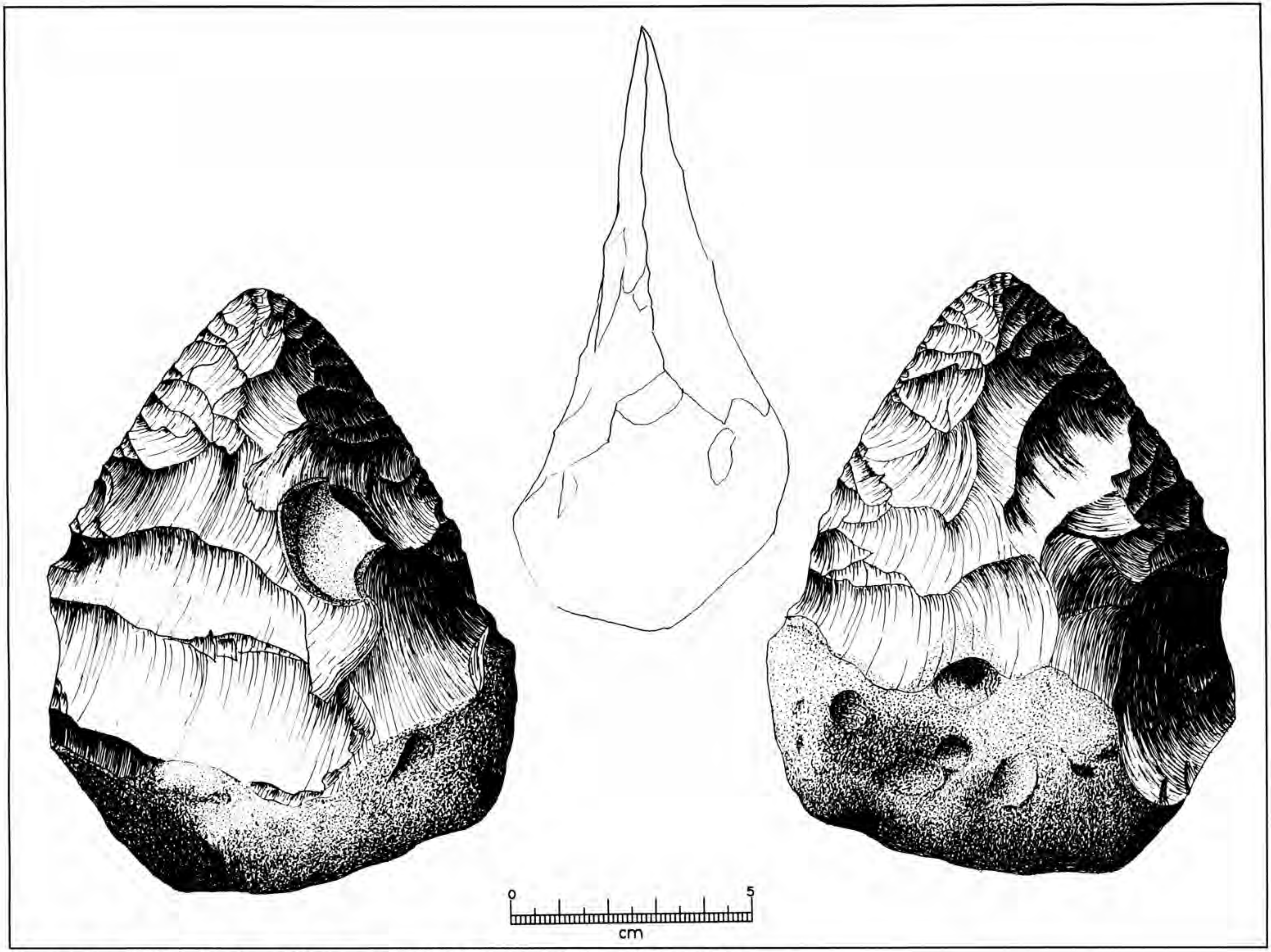


Figure 4. Butted Biface, Specimen 4 (obverse, reverse and cross section), Kendall County, Texas.

All flaked surfaces have heavy polish and reduction of flake arrises. Under magnification (36X) there are prominent striations in the distal area that are parallel with the long axis. The striations in this area are finer than those on the other specimens from this site. The distal edges are rounded and heavily polished and flake arrises are reduced and rounded. There is light patina on both faces, mostly on the central areas. The butt end is coated with cortex that extends 4.5 cm on one side and 2 cm on the other. This end is rounded and fits well in a cupped hand.

Figure 5, Specimen 5, is a butted biface made on a chert cobble by percussion flaking. Flaking is mostly broad parallel with minimal retouch. Some of the flakes extend nearly to the opposite edge. It is 10.3 cm in length, 8.6 cm maximum width, 4.6 cm thick and weighs 303 grams. Both edges are retouched toward the same face which has removed edge rounding and polish. Reuse after the resharpening appears to be confined to the distal tip in a straight forward motion. Both faces have light to medium polish and rounding of arrises. The distal end has heavy edge polish that extends on to flake scars and arrises about 3 cm, then decreases over the rest of the faces. Striations begin at the edges and extend about 2 cm on to the faces. These striations do not extend on to the blade edges. The butt is rounded and coated with cortex.

DISCUSSION

Upon obtaining these artifacts they were immediately subjected to examination with low power binocular microscope. Specimen 1 was the first examined and tiny hair-like fibers were immediately evident with deposits of a firm white substance that had the appearance of beef tallow. I had not seen this kind of residue on any previously examined lithics and it became mandatory to me that an effort to determine what it was must be made. This led me to Michael Marchbanks.

Subsequent analysis by Marchbanks revealed the residue on Specimen 1 was probably from the processing of sotol. Analysis of the residue on Specimen 2 determined this artifact had been utilized to process unidentified floral and faunal materials. The residue on Specimen 3 was identified as from processing of fish. There was insufficient organic residue on Artifact 4 to determine what it had been used for. Artifact 5 had residue very similar to those on Artifact 1 and it is considered as having been used in processing the same materials: namely sotol.

For many years these artifacts were called "Fist Axes" but more recently have become known as "Butted Knife" bifaces (Sorrow 1987; Turner and Hester 1985). They are most often found in or on the surface of burned rock middens in central and south central Texas and the lower Pecos (Priour 1987). They date in the Late Archaic time periods from 650 B.C. to 300 B.C. (Turner and Hester 1985:243).

One thing to be learned from this report is: do not vigorously scrub any artifact that might be considered for microscopic examination in search for evidence to determine just what the artifact was used for. Artifacts that appear to have glossy use wear polish just might have coatings or deposits of organic residue that, under proper examination, can reveal what the artifact was used for.

USE ANALYSIS

Microscopic residue on objects can provide valuable information about the function of artifact(s) in, and the subsistence strategies of, past cultures. These residues on objects can include fibers, scales, phytoliths, or organic materials such as plant or animal tissues. Some components of organic residues can survive for thousands of years with few or relatively minor alterations, such that their chemical analysis can help identify the parent materials that left the residue. This information, in turn, can be used to infer the function of the artifact.

Lipids, the organic materials that were extracted and analyzed from the chipped stone tools discussed here, are substances that are: (1) insoluble in water; (2) soluble in organic solvents such as chloroform; (3) contain longchain hydrocarbon groups in their molecules; and (4) are present in or derived from living organisms (Kate 1986:1). There are many different types of lipids, including alcohols, aldehydes, fatty acids, hydrocarbons, and sterols. This analysis utilized sterols and fatty acids as they provide the greatest potential of identifying taxonomic family or, possibly, species of the parent materials of organic residues (Hilditch 1956; Marchbanks 1989).

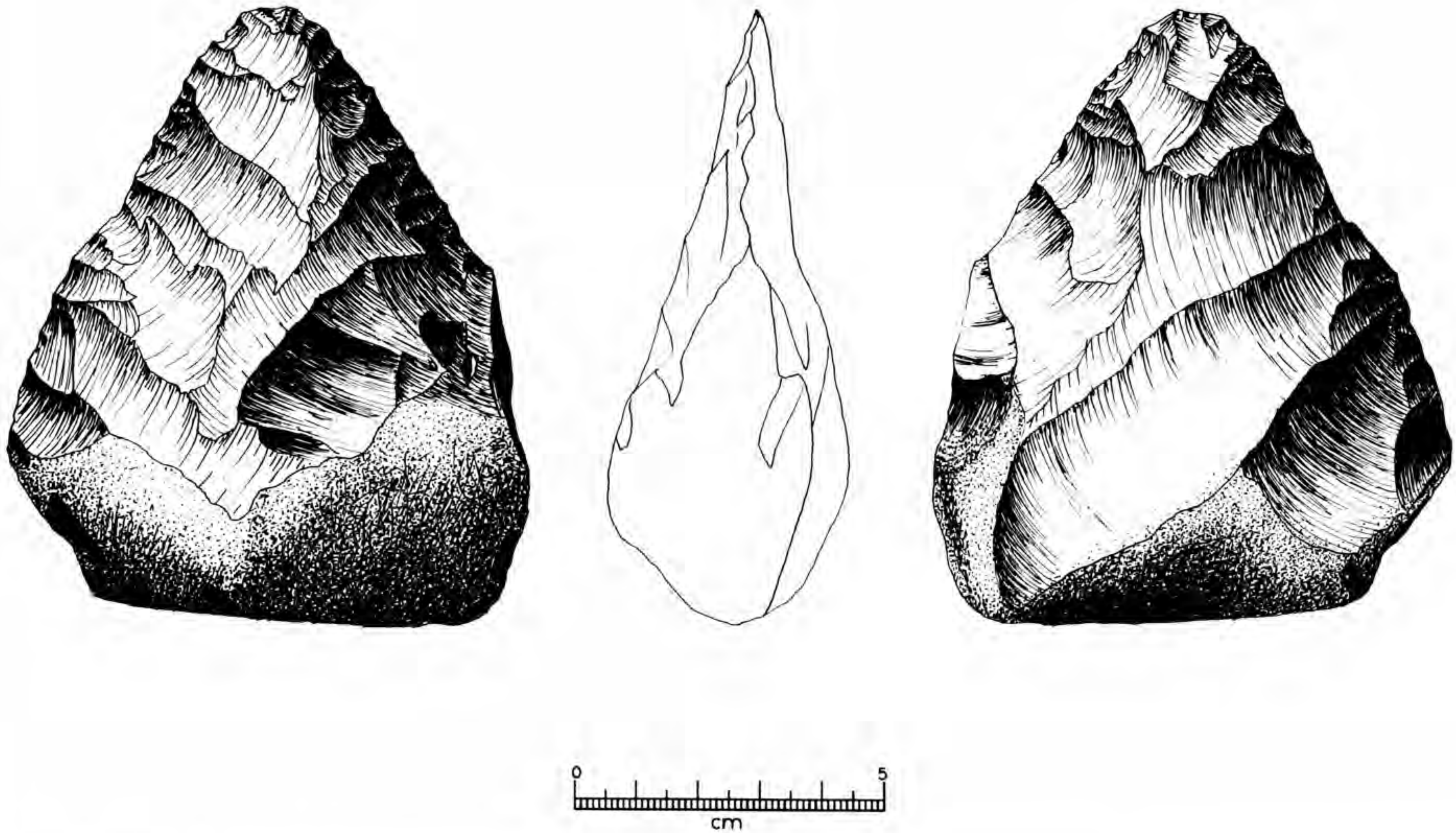


Figure 5. Butted Biface, Specimen 5 (obverse, reverse and cross section), Kendall County, Texas.

Previous Research

There are thousands of articles dealing with lipid analysis in many disciplines, including food science, biology, geology, and medicine. Therefore, in spite of the relatively few published examples dealing with archaeological analysis (see Marchbanks 1989 for a partial listing), lipid analysis had been utilized to answer many different questions. In food sciences, for example, lipid analysis is used extensively to detect the presence of foreign fats in food products and to evaluate food preservation techniques and the reliability of added antioxidants. In nutritional and medical studies, lipid research is used to examine the relationships (if any) between lipids and various diseases and biological problems.

Fatty acids, one of the lipid classes analyzed from these artifacts, have been investigated from a taxonomic standpoint since the nineteenth century. In 1934 (Hilditch 1934 in Hamilton and Bhati 1987) Hilditch proposed that fats could be used for a chemically based taxonomy of plants and began to show that fatty acid compositions could be useful. However, Shorland (1963, in Hamilton and Bhati 1987) wrote:

> that although the data on the types and distributions of fatty acids do not provide an unequivocal guide to the classification of plants, many correlations of taxonomic significance have been apparent in spite of the small number of species examined up to now.

Even though fatty acids do not provide an "unequivocal guide" to plant (or animal) classification, characteristic values and identifications can be obtained and some fatty acids are diagnostic of specific parent materials.

The second type of lipids analyzed from these artifacts are sterols. These lipid classes are distributed throughout the plant (Phytosterols) and animal (zoosterols) kingdoms, but have diagnostic patterns among and between different plant and animal classes. One of the advantages of sterol analysis is the ease in which plant and animal residues can be separated. Other than cholesterol (a major component in animals and a minor one in plants), there are no major, and very few minor, sterols present in both plants and animals. This allows for easier separation of residues from artifacts that were used to process or store many different types of organic materials. However, the amount of sterols present in plants and animals is significantly less than that of fatty acids, such that detection of them in archaeological materials is sometimes difficult or impossible.

Theory

The fatty acids (Table 1) in this analysis are identified by either their retention time or nomenclature. The retention time is the length of time, in minutes, it took the fatty acid to pass through the column. Specific nomenclature is used for the fatty acids that have been identified, reflecting their structure. For example, the fatty acid C16:0 has 16 carbons in the chain with no double bonds, while C18:2 has 18 carbons and two double bonds. Fatty acids are generally grouped into three sets: (1) saturated fatty acids; (2) monounsaturated fatty acids; and (3) polyunsaturated fatty acids. Saturated fatty acids have no double bonds within their carbon chain (e.g., C12:0), monounsaturated fatty acids have one double bond (e.g., C18:1), and polyunsaturated fatty acids have two or more double bonds (e.g., C18:2, C18:3).

One way in which the results of fatty acid analyses are examined is by characterizing the residue. Plants tend to have a higher percentage of polyunsaturated than saturated fatty acids (Figure 6). Therefore, by calculating the percent of saturated fatty acids (%S) the residue from archaeological samples can be characterized easily. The higher the %S values, the more likely it is that the residue resulted from faunal parent materials, while the lower %S values indicate more vegetal parent materials. The %S is calculated utilizing C12:0 and C14:0 for the saturated and C18:2 and C18:3 for the unsaturated fatty acids (for detailed discussion see Marchbanks 1989; Marchbanks and Quigg 1990).

In addition to characterizing residues, individual fatty acids present (or absent) within the sample were compared with modern reference collections. This allows for a closer approximation of what the parent material(s) may have been and can lead to the identification of the taxonomic family or individual species of certain parent materials.

Microscopic Examination

Artifacts 1-3 were examined under a binocular microscope (400X) to look for use-wear, fibers,

Table 1. Raw data and Area Percent from Fatty Acid Analysis

Fatty Acid Identity or Retention Time	Artifact I Area	Artifact 1 Area Percent	Artifact 2 Area	Artifact 2 Area Percent	Artifact 3 Area	Artifact 3 Area Percent	Artifact 4 Area	Artifact 4 Area Percent	Artifact 5 Area	Artifact 5 Area Percent
3.02	tr	0.00	58.00	0.00		0.00		0.00		0.00
C12:0	225.00	0.17	6178.00	0.38	187.00	0.20	50.00	0.43	768.00	0.63
3.45		0.00	644.00	0.04		0.00		0.00		0.00
C13:0		0.00		0.00		0.00	tr	0.00		0.00
3.73		0.00		0.00	298.00	0.33		0.00		0.00
C14:0	233.00	0.18	12442.00	0.76	2375.00	2.59	721.00	6.27	563.00	0.46
4.31		0.00	758.00	0.05		0.00	tr	0.00		0.00
C15:0		0.00	127.00	0.01		0.00		0.00	tr	0.00
C16:0	17386.00	13.40	635810.00	38.71	4567.00	4.99	2189.00	19.04	14971.00	12.25
C16:1	1436.00	1.11	3178.00	0.19		0.00		0.00	1244.00	1.02
5.88		0.00		0.00	1480.00	1.62		0.00		0.00
6.14		0.00	523.00	0.03		0.00		0.0	76.00	0.06
C17:0		0.00		0.00		0.00	tr	0.00		0.00
C18:0	5670.00	4.37	120155.00	7.32	4570.00	4.99	5412.00	47.07	3568.00	2.92
8.59		0.00	98711.00	6.01		0.00		0.00		0.00
C18:1	66544.00	51.29	741676.00	45.16	46396.00	50.67	2156.00	18.75	60125.00	49.18
C19:0		0.00	786.00	0.05		0.00		0.00		0.00
C18:2	36120.00	27.84	6569.00	0.40	19672.00	21.48	853.00	7.42	39513.00	32.32
C18:3	936.00	0.72	1780.00	0.11	1431.00	1.56	117.00	1.02	451.00	0.37
14.69		0.00		0.00		0.00		0.00		0.00
C20:0	1180	0.91	13109.00	0.80	1718.00	1.88		0.00	977.00	0.80
C22:0		0.00		0.00	6542.00	7.14		0.00		0.00
C20:1		0.00		0.00		0.00		0.00		0.00
C22:1		0.00		0.00	176.00	0.19		0.00		0.00
24.38		0.00		0.00	2156.00	2.35		0.00		0.00
Total Area:		129730.00		1642504.00		9168.00		11498.00		122256.00
Percent S:		1.22		69.04		10.83		44.83		3.22

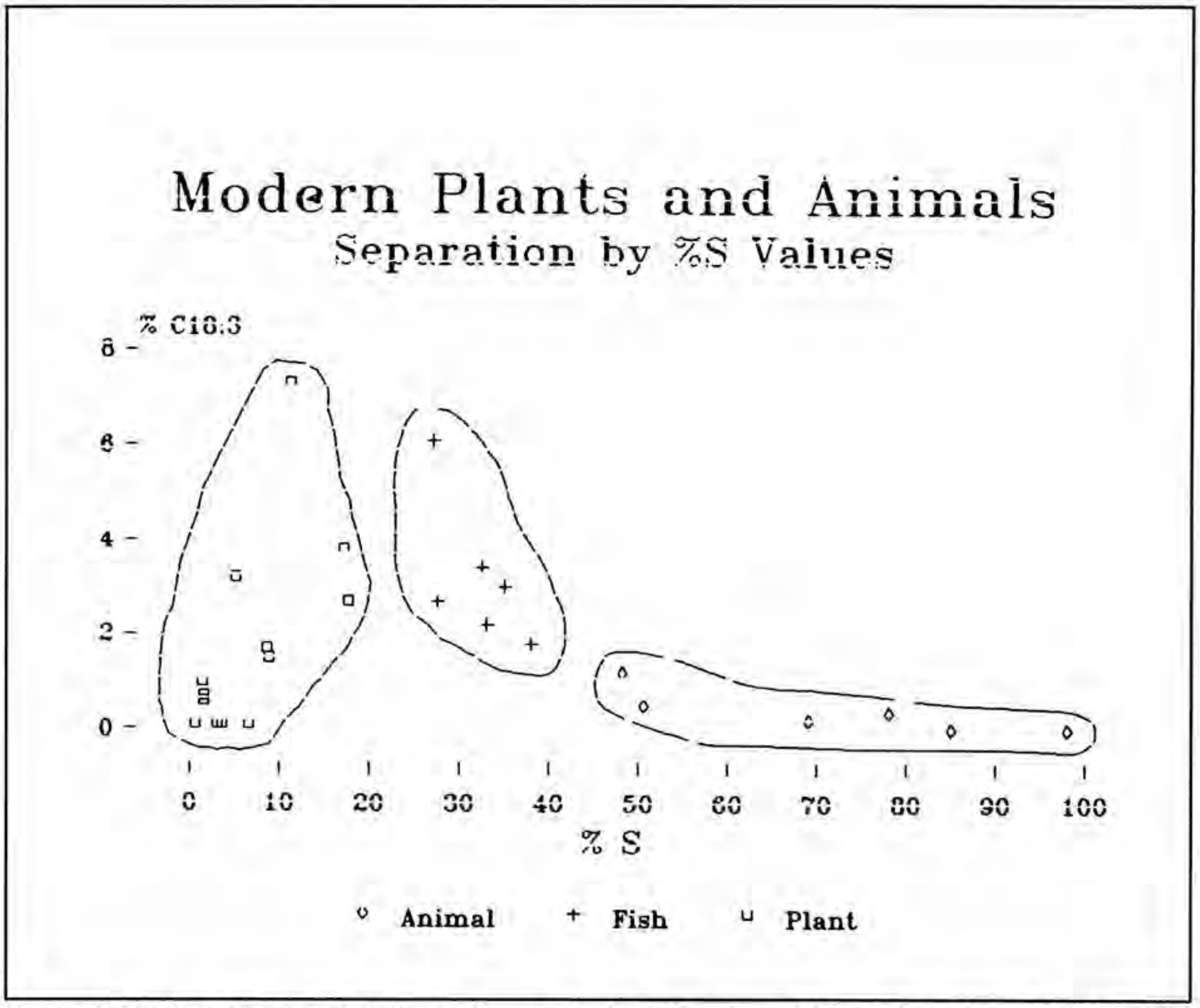


Figure 6. Modern Plants and Animals: Separation by %S values. Adapted from Marchbanks 1990.

scales, phytoliths, and the organic residues which C. K. Chandler had noticed. All three of the artifacts had light to heavy coatings of organic residues; however, it was not possible to distinguish what their parent materials were by normal microscopic examination. Artifact 1 had the most obvious residues on it, a heavy coating (that was peeling off in places), along the worked face of the tool. Artifact 2 had a similar coating of organic material, although it was not as concentrated as on Artifact 1, with the greatest concentration along the pointed end of the worked section. The organic residue on Artifact 3, however, was different than that on the other two, appearing as a "clear" shiny coating with striations along the edge which looked as though they were cut into the residue. However, since all of these tools had been scrubbed prior to submission for analysis, it was impossible to tell whether the striations were formed during utilization of the tool or by post-depositional processes.

Lipid Analysis: Methods

Several steps were taken to reduce possible contamination from handling and post-depositional alterations of the organic residues: (1) sterile surgeon's gloves were used to handle all the tools; (2) the tools were washed in distilled water and cleaned with sterile laboratory tissues; and (3) the organic residues were extracted from only one of the "working edges" —the one that appeared to have the most residues preserved.

The lipids, both fatty acids and sterols, were extracted by soaking the artifact in a chloroform/ methanol (2:1) solvent for seven hours in a sealed glass container with a nitrogen atmosphere to prevent oxidation. The glass containers were positioned such that only a small section of the working edge of the artifact was exposed to the solvent. The fatty acids and sterols were separated from the total lipid extract by thin-layer chromatography, which also helps remove some of the contaminates. The fatty acids were derivatized into their trimethlsilyl (TMS) form to make them more volatile, less polar and more thermally stable — allowing for better resolution in the analysis. The sterols, on the other hand, were not derivatized, but added to a methanol:water (98:2) mobile phase for analysis by High Performance Liquid Chromatography (HPLC) (see Marchbanks 1989 for complete details of the methods).

One microliter of each sample was injected into a Varian gas chromatograph (GC) with a 25-meter, 0.25 micron ID capillary column (SP 2330) for separation of the different fatty acids The peaks were identified by both the comparison of retention times with known standards and by analyzing one sample (Artifact 2) with a gas chromatograph/mass spectrometer which separates the different compounds and provides a mass spectra which can be utilized to identify them positively.

RESULTS

The samples from four of the five artifacts had much larger concentrations of fatty acids (Table 1, Figure 7) than are typically present in non-culturally altered rock and soil materials (Marchbanks 1989; Marchbanks and Quigg 1990). Additionally, the detection of sterols from fairly small sample sizes indicates a concentrated organic residue, substantially higher than is generally found in soils (even samples with much higher volume) or adhering to chert or limestone rock faces.

The residues on Artifact 1 derive from floral parent materials. This is supported by a very low %S value of 1.22 and the presence of two phytosterols: sitosterol and ergosterol. The fatty acids present, and their relative abundance, are very similar to those of sotol, although handling of the artifact and natural degradation of the organic residues may have altered the ratios of the different fatty acids. Unfortunately, the concentration of the sterols is not high enough to aid in the positive identification of the parent material of this residue.

Artifact 2 was utilized to process both floral and faunal materials. This is supported by the presence of several low weight (low retention times) and branched fatty acids and a %S value of 69.04. In addition, there was a fairly large cholesterol peak (zoosterol), the phytosterols sitosterol and ergosterol, and several sterols in quantities too low for positive identification. Unfortunately, without the more diagnostic sterols it is impossible, at this time, to identify the parent materials of this residue. It is interesting to note that this artifact had the greatest concentration of extracted residues although Artifact 1 appeared to have more when examined by binocular microscope. This corresponds with other work (Marchbanks 1990; Marchbanks and Quigg 1990) in which high concentrations of organic residues could be extracted from the tools even when they were not visible under microscopic examination.

The residue on Artifact 3 came from fish parent materials. This is supported by the presence of a low %S value of 10.83 coupled with a fairly diagnostic fatty acid pattern (Table 1) which consists of several long-chain fatty acids, a high percentage of C18:3, and a few low-weight branched fatty acids. This interpretation is further supported by the presence of cholesterol without any phytosterols present, except a possible trace of ergosterol which was less than one-thousandth the concentration of the cholesterol. The most diagnostic fatty acid for fish (C22:4) is not present; however, this is not surprising as it is naturally very unstable and could easily have been degraded by time, washing, or other post-depositional processes.

Artifact 4 had very little organic residue on it. With a total area under the curve of 11498 it has approximately two times the signal which is expected from a natural source of this nature. In addition, there were no sterols detected by HPLC analysis. Because of the low concentration of lipids, this artifact is not considered to have enough residue to provide a good interpretation of what it may have been utilized for.

The organic residues from Artifact 5 are very similar to those of Artifact 1 although there are some slight differences in the percentages of the different fatty acids present which may be the result of degradation processes, multiple artifact uses (although not of very different materials or much of the overall use) or just instrumental variation. The HPLC analysis also indicates that the artifacts were utilized for processing similar materials: the two phytosterols sitosterol and ergosterol were present along with some traces of other sterols which were not concentrated enough to be confidently identified. Even though the

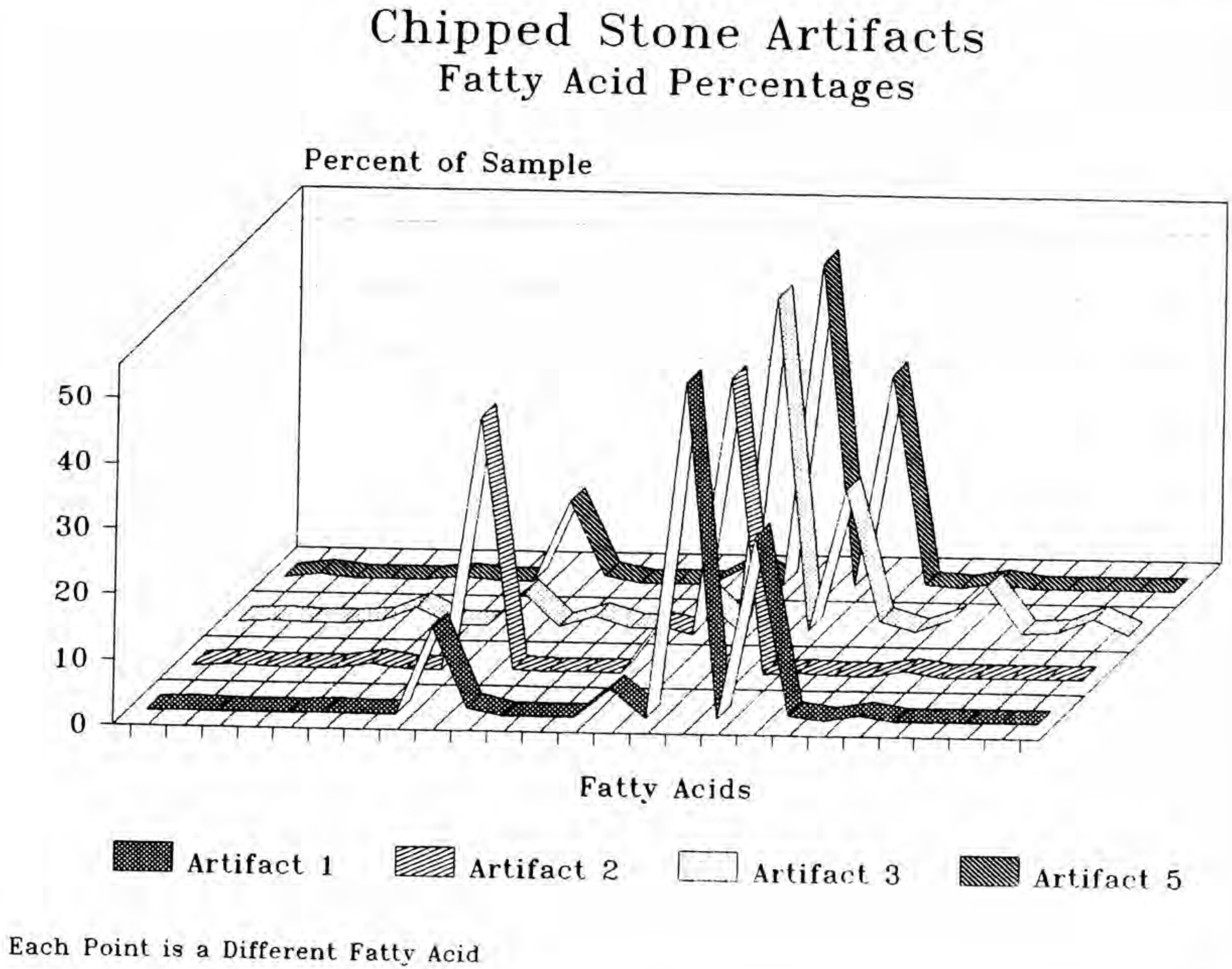


Figure 7. Graphic representation of Fatty Acid percent concentrations.

exact species of the residue's parent material could not be identified at present, artifacts 1 and 5 were probably utilized for processing the same parent materials — a floral material very similar to, if not, sotol.

CONCLUSIONS

In spite of previous handling and washing of the artifacts, the preservation of organic residues on their surfaces was significant enough to allow both visual examination, through binocular microscope, and chemical analysis of the lipid components. However, potential diagnostic information such as blood, hair, phytoliths, and fibers could have been, and probably was, lost due to post-excavation treatment, making identification of parent materials with microscopic examination impossible. Artifact treatments, such as washing, also reduce the amount of preserved lipids on the surface, which, especially in the case of sterols, may inhibit the identification of parent materials of organic residues by reducing the concentration below the detection limits of gas chromatography or high performance liquid chromatography, as appears to be the case with these artifacts. Regardless of this problem, much information can be, and has been, gained about artifact utilization using lipid analysis.

Even with problems of artifact handling, multiple tool use was evident. Two of the artifacts (1 and 5) indicate the exploitation of floral material similar to, if not, sotol. In addition, the presence of fish residues on Artifact 3 suggests the utilization of aquatic resources, and faunal resources are evident from the residues on Artifact 2. This information raises new questions concerning tool and site utilization such as: (1) are some tools designed (such as Artifact 1 and 5) for specific purposes — and can we determine what they were? (2) can the seasonality of site occupation be determined by the presence and absence of specific resources? Although these questions, and others, can not be answered with such a small sample size the potential of organic residue analysis can be demonstrated.

ACKNOWLEDGMENTS

The original developmental research for the fatty acid analysis was largely supported by a grant to Dr. Thomas R. Hester from the Advanced Research Program of the Texas Higher Education Coordinating Board (Project No. 4137, "Scientific Approaches to the Prehistoric Economies of Texas Indians"). Special thanks to Dr. Matt Sanders and David Snyder for permitting me the use of their instruments and Dr. Donald R. Lewis who has advised and supported me through this and other projects. Special thanks to Anne Helsley-Marchbanks for her support and editing skills.

Sincere appreciation is extended to Cecil and Dortha Peel for the loan of these artifacts for study and documentation and to Richard McReynolds who prepared the illustrations.

References Cited

Hamilton, R. J. and A.Bhati
1987 *Recent Advances in Chemistry and Technology of Fats and Oils*. Elsevier Science Publishing Co., Inc., New York

Hilditch, T. D.
1934 Characteristic Fatty Acids of Vegetable and Animal Fats with Reference to the Biological Families in Which They Occur. *Chemical and Industrial Review* 54:139-184.

1956 *The Chemical Constitution of Natural Fats*. Third Edition. Chapman and Hall, London.

Kates, M.
1986 *Techniques of Lipidology: Isolation, Analysis, and Identification of Lipids*. Elsevier, New York: Oxford.

Marchbanks, M. L.
1989 Lipid Analysis in Archaeology: An Initial Study of Ceramics and Subsistence at the George C. Davis Site. MA Thesis, The University of Texas at Austin.

1990 Data from Organic Residue Analysis. Appendix 3 to *Excavations at the Camp Pearl Wheat Site (41KR243): An Early Archaic Campsite on Town Creek, Kerr County, Texas*, by Michael B. Collins, Bruce Ellis, and Cathy Dodt-Ellis, pp. 125-128. Studies in Archeology 6. Texas Archeological Research Laboratory, The University of Texas at Austin.

Marchbanks, M. L. and M. Quigg
1990 Organic Residue and Phytolith Analysis. In: *Phase II Investigations at Prehistoric and Rock Art Sites, Justiceburg Reservoir, Garza and Kent Counties, Texas, Appendix G.* Prewitt and Associates No. 71(2). Austin.

Priour, Donald James
1987 A Preliminary Report on the Butted Knife Biface Survey. *La Tierra* 14(2):5-18.

Shorland, F. B.
1963 The Distributions of Fatty Acids in Plant Lipids. In: *Chemical Plant Taxonomy* edited by T. Swain. Academic Press, London. Pages 253-311.

Sorrow, William M.
1968 *The Devils Mouth Site, The Third Season-1967.* Papers of the Texas Archeological Salvage Project, No. 11.

Turner, Ellen Sue and Thomas R. Hester
1985 *A Field Guide to Stone Artifacts of Texas Indians.* Texas Monthly Press.

NEWS ITEM:

RARE TOMBS DISCOVERED

Egyptian archeologists have found eight rare tombs from the little known Hyksos period, including probably the earliest intact skeleton of a horse, an animal introduced to Egypt by Hyksos invaders about 1750 B.C. The tombs are buried in the desert sand near Tell al-Kebir, about 50 miles northeast of Cairo. They are close to the probable site of the Hyksos capitol Avaris, in the east of the Nile Delta.

Archeologists opened one of the tombs and found four human skeletons, one of them bandaged, earthenware and alabaster jars, and four scarabs—stone seals or amulets carved in the shape of dung-beetles. The horse's skeleton was buried a few yards from the tomb itself.

Origins of the Hyksos are obscure but it is accepted that they were a race of Indo-Germanic type, related to the Hittites of Asia Minor. They invaded northern Egypt from Asia and ruled for about 180 years until indigenous rulers based in the southern capitol of Thebes drove them out about 1570 B.C.

Houston Chronicle
Quoted in May 1994 *Profile, Newsletter of the Houston Archeological Society*

A BEDROCK MORTAR AND METATE SITE ON THE RIO GRANDE, TAMAULIPAS, MEXICO

James Bryan Boyd

ABSTRACT

A previously unreported site with numerous bedrock mortar and metate features is discussed. The site is located in the state of Tamaulipas in northeastern Mexico, on the shoreline of Falcon Reservoir. A description is given of the site and the features located there.

SITE LOCATION

The site is located in the northwestern part of the state of Tamaulipas, Mexico, within the conservation pool of Falcon Reservoir which was formed following the construction of Falcon Dam in the early 1950s. The site is located in the northern portion of the lake, approximately seven kilometers west-southwest of the town of Zapata, Texas.

The site lies northwest of the confluence of the Rio Salado and the Rio Grande (see inset map). Falcon Dam was built on the Rio Grande, thereby forming the lake. The Rio Salado originates several kilometers to the northwest of the city of Nueva Rosita, Coahuila (Mexico), and flows generally southeastward through the states of Coahuila, Nuevo León, and Tamaulipas, eventually flowing into Falcon Reservoir.

The site is normally submerged in the lake and is accessible only when the water level is very low. The normal pool elevation of the lake is 301.2 feet above mean sea level (I.B.W.C. 1975). The bedrock mortar site lies primarily between the elevation of 267 feet and 272 feet above mean sea level, therefore it becomes visible only when the lake is at least 30 feet low.

The site lies within the vega zone as described by Nunley (1989:194-195), and within the Tertiary bedrock base of the Zapata terrace as described by Penrose in 1889, and later by Evans (1962:39-40). This sandstone bedrock base is evident only in a small area and is the medium in which the mortar and metate features are located.

The dimensions of the site are approximately 60 meters in length and 15 meters in width. The site is oriented from the north-northwest to the south-southeast. Two mortar features (Figure 1, #3 and #4) are located well to the east of the main part of the site. There is an elevation differential of about 1.5 meters, creating a gentle slope of approximately 4° toward the original river channel which lies about 250 meters to the east.

Nearby creeks include the Arroyo La Hedionda, which is just north of the bedrock mortar site. Translated from Spanish into English, this name literally means "stinking [or foul smelling] creek." Lott and Martinez (1953:226-228) relate an interesting account of the former landowner of the area around the site and the Arroyo La Hedionda. Said to have been the daughter of the last full-blood chief of the Carrizo Indian tribe who once inhabited the area, Doña Pancita is reported to have been a recluse who died in 1930. The same account relates that there was a sulphur spring in the arroyo (probably accounting for its name), which was used for a long period of time by countless numbers of Indians and people from all over northern Mexico who believed it to be a

Area of South Texas and northeastern Mexico referred to in text. Falcon Reservoir is near the center of the map.

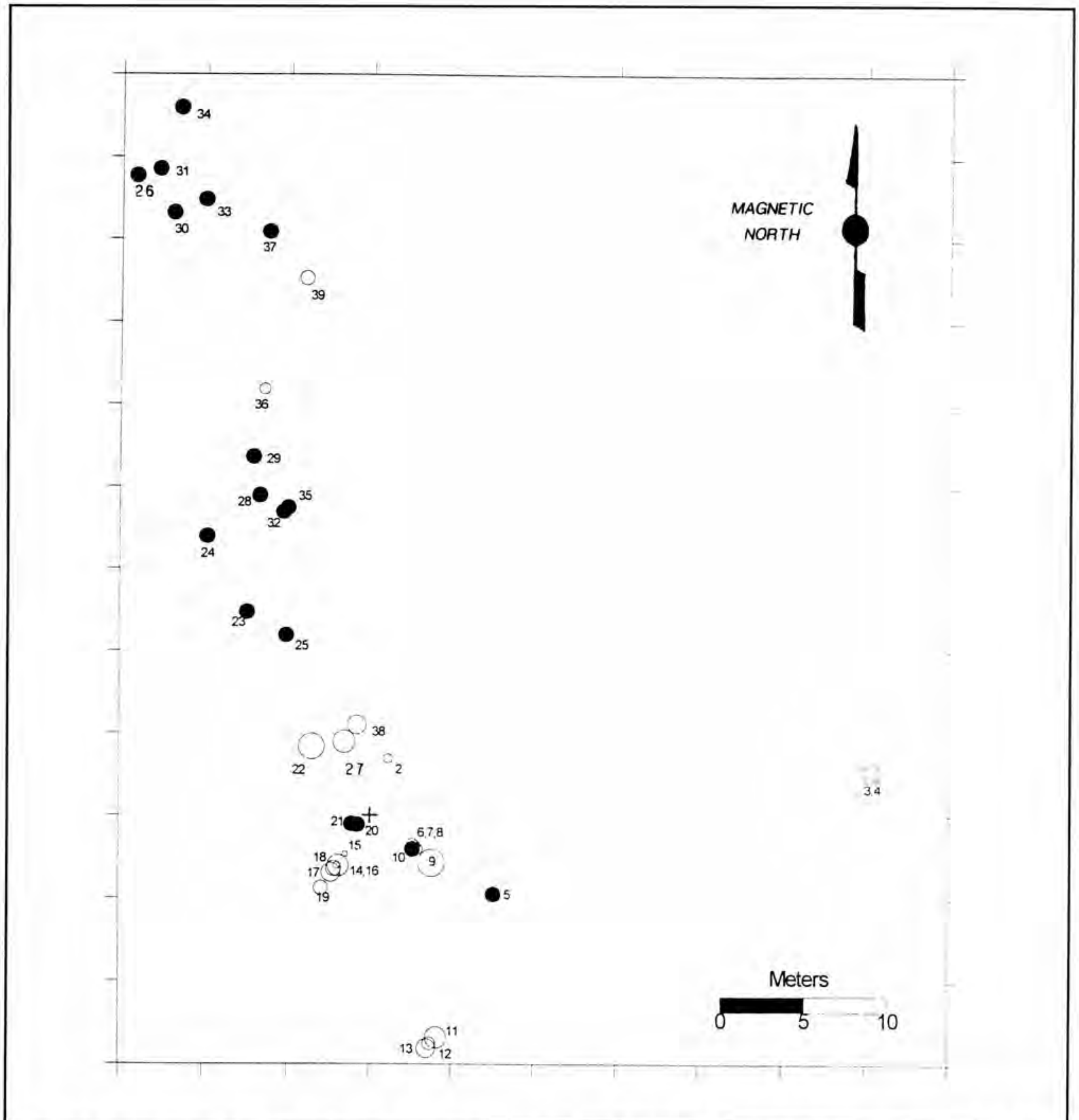


Figure 1. Plan view of site. Numbered features correlate with Table 1. Circles indicate mortars. Solid circles indicate metates. Cross indicates datum.

source of miraculous cures for skin diseases and disorders. It is also said that in the same arroyo various minerals such as iron, iron pyrites, and lignite (ibid.:159) could be found, as well as deposits of pure salt.

A number of significant archaeological sites are present in the area. Immediately adjacent to the mortar site is an occupation site with a moderate amount of eroded lithic debris, including chert flakes and burned rock. The bed of a small tributary arroyo lies 90 meters to the west.

On the opposite bank of this arroyo is a large and significant occupation site where the author has documented numerous projectile point styles which range in age from the Early Archaic period to the Late Prehistoric period. This site lies on the north bank of the arroyo, and is located about 160 meters west-southwest of the mortar site. Another occupation site lies on the south bank of the same arroyo, about 100 meters to the south-southwest. Several large, eroded occupation sites are located 1-2 kilometers to the northwest, including the area of the Arroyo La Hedionda. There is also a very large occupation site approximately 750 meters to the south. This last site has yielded projectile point styles ranging from Plainview to Toyah, as well as at least four burials (Boyd 1996; T. R. Hester, n.d.; Erick Kruger, personal communication 1984; Cynthia Scott, personal communication 1995).

METHOD OF SURVEY

The site was visited twice in November, 1995. A survey was conducted and the location of each mortar and metate feature was plotted. Other pertinent data, including the dimensions of each feature, was also collected.

A nonimpacting site datum point was selected. The datum point used was an aberrant mortar hole, located in the south-central portion of the site. This datum point is easily recognizable and can be readily located in the future. The selected mortar appears to have been initially ground with a large pestle, then later with a smaller one, creating a small oval-shaped depression on the bottom of the original mortar. None of the other mortars in the site exhibit this characteristic.

Initially, all observable features were located and flagged. An azimuth template measuring 35 centimeters in diameter was centered over the datum point. The template was marked along its circumference in 10° increments, and the 0° mark was aligned with magnetic north. A *SILVA* compass was used to determine magnetic north, and a second *SILVA* compass was used to confirm the alignment. The position of each mortar and metate was then determined relative to this point. An orange nylon string was tautly stretched from the datum point to the center of each feature, and the corresponding bearing was read from the template and recorded. The distance of each feature from the datum point was also measured using a *KESON* 60-meter fiberglass tape. A *SONIN* infrared/ultrasonic measuring device was used to determine the distance of several nearby reference points. In addition, a *MAGELLAN* Global Positioning System (GPS) was used to determine the location of the datum point (coordinates on file at TARL).

Utilizing the specified equipment and methods, an accurate survey was effected. The author was assisted by Mike Krzywonski, of Laguna Vista, Texas, whose primary emphasis was site photography.

DESCRIPTION OF FEATURES

The primary features recorded in the site were, as mentioned, mortars, presumably formed when pestles were used to grind and pound some sort of plant material (see Figure 2), and metates, which were probably formed when mano stones were used on the bedrock surface in a circular fashion, presumably for the same purpose. These features are located in and along a small exposed area of Tertiary bedrock situated at the base of the Zapata terrace. The Zapata terrace is believed to date to the late Quaternary age (O'Neill et al. 1992:3). Most of the adjacent area is covered with a light grayish-tan silt which is characteristic of the Zapata terrace (Evans 1962:39).

When the November 1995 survey was conducted, the site had already been exposed for about seven months, and small trees (mainly acacia [huisache]) and grass had grown in the site. The grass, which had grown in cracks in the bedrock and in silty areas, proved not to be a hindrance, but all trees and shrubs which had grown were cleared to facilitate the survey.

A total of 42 features was recorded, 22 being mortars, and 20 metate depressions. Two of the features (Table 1, #34 and #37) consist of overlapping (or nearly so) metates which are listed as single features. Feature #34 consists of two metates, while Feature #37 consists of three metates. The data shown

Table 1. List of features recorded in the bedrock mortar/metate site. All features are listed, showing type of feature (1=mortar, 2=metate), bearing from magnetic north relative to the datum point, distance from the datum point in meters, diameter of each feature in centimeters, and depth in centimeters.

Feature	Type	(degrees) Bearing	(meters) Distance	(cm) Diameter	(cm) Depth
01	1	Datum	----	13.7	7.6
02	1	18	3.66	6.1	4.6
03	1	85	30.54	9.1	7.0
04	1	85	30.51	12.8	4.0
05	2	122	8.93	6.1	1.5
06	1	123	3.14	6.7	6.1
07	1	124	3.32	7.6	2.4
08	1	125	3.54	7.6	6.1
09	1	127	4.75	17.4	3.0
10	2	128	3.32	21.3 x 13.7	3.0
11	1	163	14.02	13.7	22.9
12	1	165	14.23	8.5	5.5
13	1	166	14.48	12.2	16.8
14	1	212	3.57	13.7	10.7
15	1	212	2.77	4.0	0.9
16	1	213	3.60	4.6	0.9
17	1	214	3.87	9.8	1.5
18	1	214	4.15	12.2	15.2
19	1	214	5.27	9.1	6.1
20	2	233	0.91	15.2 x 7.6	1.5
21	2	245	1.22	18.3 x 12.2	0.3
22	1	320	5.49	16.8	13.1
23	2	329	14.45	27.4 x 6.1	1.2
24	2	330	19.60	15.2 x 9.1	1.2
25	2	335	12.10	16.8	0.9
26	2	340	41.36	24.4 x 18.3	0.9
27	1	341	4.75	14.6	15.2
28	2	341	20.60	30.5 x 16.8	4.6
29	2	342	22.95	12.2 x 9.1	0.6
30	2	342	38.50	21.3 x 12.2	3.7
31	2	342	41.30	10.7 x 7.6	1.5
32	2	344	19.20	10.7 x 4.6	1.2
33	2	345	38.74	15.2 x 9.1	0.9
34	2	345	44.50	29.0 x 18.3	0.3
35	2	345	19.39	18.3	0.9
36	1	346	26.70	7.0	12.2
37	2	350	36.00	29.0 x 10.7	1.8
38	1	352	5.58	12.2	4.6
39	1	353	32.89	9.1	1.2

Figure 2. Mortar features #14, #16, and #18 (right to left; see Table 1). Pestle shown measures 37 cm in length and was recovered from a nearby site. North is to the top.

for these two features in Table 1 is for the most apparent or largest feature only. Therefore Table 1 lists only 39 of the 42 features observed during the survey.

Feature #28 (Table 1) appears to be a large, repeatedly used metate which may have also been used as a mortar. Numerous smaller metates were noted in the immediate area, as were a large number of abrading marks.

The inner walls of one of the mortars, Feature #36, were quite rough and irregular, and it was indeterminable whether it was in fact a mortar or a natural formation. The inner wall surface of all other recorded mortar features was relatively smooth.

The features are aligned in a north-northwest to south-southeast direction (Figure 1). Most of the mortars, 20 in number, are located in the southern half of the site. Only two mortars occur in the northern half of the site. Eleven of the 17 recorded metate features occur in the northern half of the site, with six occurring in the southern half.

The average diameter of the mortars was determined to be 10.4 centimeters, while the average depth was measured at 7.6 centimeters. The widest mortar was measured at 17.3 centimeters, while the deepest was measured at 22.9 centimeters. The average diameter of the metate depressions was determined to be 18.9 centimeters, while the average depth was measured at only 1.5 centimeters. The overall horizontal cross section of the mortars is circular in outline, while the outline of the metate depressions is generally oval in shape.

In addition to the mortars and metates, numerous abrading marks of various diameters and lengths were noted in the site but were not recorded. These abrading marks were more prevalent in the northern half of the site.

Additionally, light amounts of chert flakes were noted, and a thin, broken bifacial chert specimen was observed a few feet northwest of the datum. Much larger amounts of chert flakes and other debitage were evident in the silty areas and occupation sites in the vicinity of the bedrock mortar site.

PREVIOUS INVESTIGATION

The bedrock mortar site was previously visited by Don Kumpe and Larry Hess, who conducted a preliminary survey. They had been referred to the site by T. L. Donohoo, of Mission, Texas. Their preliminary survey was conducted in May 1995. Less stringent controls were utilized during this survey and substantially fewer features were recorded. However, the earlier survey did reveal a significant mortar which was not recorded during the author's November 1995 survey. This mortar was eventually located and recorded by the author in March 1996. It had been filled with dirt and was being colonized by ants, making it difficult to locate. This mortar is significant as it is the deepest such feature recorded in the site, measuring 30.5 centimeters in depth. It is 14.8 centimeters in diameter and is located 19.5 meters from the datum point at bearing 125°. This feature is not listed in Table 1 or shown in Figure 1.

The bedrock mortar site has been exposed by fluctuating water levels at Falcon Reservoir several times over the years. It was exposed for short periods in 1964, 1971, 1984, and 1986, but it apparently went unrecorded during those years.

OTHER NEARBY MORTAR SITES

The site is one of the few such sites documented in South Texas or northeastern Mexico. The author has investigated many locales in the area of Falcon Reservoir with exposed sandstone ledges which show no sign of utilization by the former inhabitants of the region. Specialized sites such as this one appear to be the exception rather than the rule.

In recent years the author has visited a few mortar sites in adjacent areas of South Texas and northeastern Mexico, including a complex site on the Rio Salado about nine kilometers south of the site being discussed. The site exhibits multiple mortars which are located in large boulders and is located on the south bank of the Rio Salado approximately 2.5 kilometers northeast of the mostly abandoned town of Guerrero (Viejo), Tamaulipas. A second bedrock mortar site is located a few kilometers further up the Rio Salado. This site is unique in that there is only one mortar present, located in a flat sandstone ledge near the river bottom (Boyd, in press). A third mortar site is located in the Arroyo Salinillas on the south end of Falcon Reservoir, approximately 26 kilometers south of the site at the focus of this report. The Arroyo Salinillas site consists of several deep mortars which are located in a thick sandstone ledge which lies along the arroyo. A fourth site is located near the crest of a mesa-like hill a few kilometers southwest of the confluence of the Rio Salado and the Rio Sabinas in the state of Nuevo León. The site consists of several mortars on a rocky outcropping at the top of the mesa, and is located approximately 32 kilometers to the west-southwest. A fifth site, 41WB356, is located just east of Laredo, Texas in Webb County, approximately 85 kilometers north. Still another site, 41WB58, lies in a remote area between Laredo and Eagle Pass, in northwestern Webb County (Dr. Thomas R. Hester, personal communication 1996). There are undoubtedly many more such sites in the intervening areas.

PESTLES AND MANO STONES

The artifacts which produced the mortars and metates, namely pestles and manos, are commonly found in the area of Falcon Reservoir as well as the adjacent areas of Texas and Mexico. Manos in this area are usually made of sandstone, and were used in conjunction with metates to process and grind seeds and wild plant foods, and are dated from the Archaic to the Late Prehistoric (Turner and Hester 1993:301). Pestles, which are essentially long cylindrical "pounding tools," usually are rounded at one or both ends, and were used in conjunction with mortars for plant processing and date from the same period(s) (ibid.:307). Hester (1979:24-25) has previously reported a large stone pestle from a site in Dimmit County in southern Texas. According to ethnohistoric reports from northeastern Mexico in the 18th century, stone pestles were often used with wooden mortars (Thomas R. Hester, personal communication 1996).

Over a period of about 13 years the author has salvaged a total of 62 mano stones and 28 complete pestles (as well as many broken specimens) from sites in the Falcon Reservoir area. Some of these were collected from sites adjacent to the site being discussed. However, in many instances manos or pestles have been recovered in sites many kilometers from the nearest known bedrock mortar and metate site. Although small "portable" metates are commonly found in occupation sites in the area, which would account for the presence of the mano stones, portable stone mortars are not a diagnostic artifact of this region. The use of pestles with wooden mortars, long since decayed, would account for the presence of pestles in sites far removed from the known bedrock mortar sites.

CONCLUSION

Further detailed surveys should be conducted at the other mortar sites referred to in this report, as well as other such sites located or reported in the future. The cumulative data may enhance our understanding about the daily activities of the former nomadic hunters and gatherers who inhabited this fascinating region that we know so little about.

ACKNOWLEDGMENTS

The author wishes to thank Dr. Thomas R. Hester, Director of the Texas Archeological Research Laboratory, The University of Texas at Austin, for providing some of the literature used in the preparation of this report, as well as his helpful review of an earlier draft. Also thanks to Jason Lucas, graduate student at The University of Texas, for the excellent site map he produced which was used for Figure 1. The survey of the site would have been difficult without the assistance of Mike Krzywonski, who also supplied the photograph used in Figure 2.

References Cited

Boyd, James Bryan
1996 A Prehistoric Burial from the Rio Grande Drainage, Tamaulipas, Mexico. Ms. on file at the Texas Archeological Research Laboratory, The University of Texas, Austin.

Boyd, James Bryan
in press A Bedrock Mortar on the Rio Salado, Tamaulipas, Mexico. *The Cache: Collected Papers on Texas Archeology* Vol. 3. Texas Historical Commission, Austin.

Evans, Glen L.
1962 Notes on Terraces of the Rio Grande, Falcon-Zapata Area, Texas. *Bulletin of the Texas Archeological Society* 32.

Hester, Thomas R.
1979 A Stone Pestle from Dimmit County, Southern Texas. *La Tierra* 6(3).

n.d. The Rio Salado Burial, Presa Falcon, Northeastern Mexico. Notes on file with the author.

International Boundary and Water Commission, United States Section
1975 *Falcon Dam and Power Plant*. Brochure and map #15865, El Paso, Texas.

Lott, Virgil N. and Mercurio Martinez
1953 *The Kingdom of Zapata*. Eakin Press, Austin.

Nunley, Parker
1989 *A Field Guide to Archeological Sites of Texas*. Texas Monthly Press, Austin.

O'Neill, Patrick L., Fred M. Oglesby, W. Nicholas Trierweiler, and Christopher Lintz
1992 *A Cultural Resource Survey at Falcon Reservoir*. Mariah Associates, Inc., Austin.

Turner, Ellen Sue and Thomas R. Hester
1993 *A Field Guide to Stone Artifacts of Texas Indians*. Second Edition. Gulf Publishing Company, Houston.

STONE PESTLES FROM THE LOWER RIO GRANDE, TEXAS

C. K. Chandler and Don Kumpe

ABSTRACT

This paper reports and describes a large group of stone pestles recovered in the Falcon Lake area of the Lower Rio Grande.

INTRODUCTION

Stone pestles reportedly occur throughout Texas (Turner and Hester 1993), but they are decidedly rare in South Texas. In twenty plus years of publication *La Tierra* has published and illustrated only one stone pestle. It is from Dimmit County (Hester 1979) in southwest Texas. It is 55 cm long (21½ inches), and 7 cm (2 ¾ inches) in diameter and is made of hard, fine-grained sandstone. Hester also tells of a stone mortar and pestle from Hidalgo County but provenience of this specimen was not confirmed at the time of publication.

One other stone pestle has been mentioned in *La Tierra* (Parker 1978) but not illustrated. This specimen is from Zapata County near Falcon Lake and is 12.7 cm long (5 inches) and 3.8 cm (1½ inches in diameter.

The 44 pestles reported in this paper were recovered by several individuals along the Lower Rio Grande in the Falcon Lake area (see insert map). Most were recovered in recent years. As the great variety of collected materials from the lake area became known the authors of this paper were moved to document as many artifact types as we could. Fortunately we have had the gracious cooperation of several collectors who have loaned specimens for documentation and study.

DESCRIPTION OF THE ARTIFACTS

Figure 1, A is a complete large stone pestle made of light brown fine-grained sandstone. It has been fashioned from a flat, long rock slab that is slightly curved at one end and is flattish on the concave side. In an effort to straighten and shape it, it has been heavily pecked along both edges and about two-thirds of the convex side. Its greatest diameter is at center tapering to smaller rounded ends. Both ends are smoothed from use with most of the smoothing on the straight end. This specimen appears to be a naturally formed rock slab that has been pecked to a subround configuration. Both ends have been hammered and reduced to roughly flat areas after they were shaped and smoothed.

Figure 1, B is a complete stone pestle of light gray, hard, fine-grained sandstone. It is shaped by heavy pecking over all surfaces to a nearly perfect cylinder with minimal taper at the rounded ends. The ends are heavily smoothed and are of unequal diameter.

Figure 1, C is a complete (reconstructed) large diameter stone pestle fashioned of light gray, fine-grained sandstone. It is heavily pecked over all surfaces to a cylindrical shape with a very rough exterior. The heavy pecking extends on to the ends which show no evidence of grinding or smoothing. The ends are not well rounded and still have irregular surfaces that appear to be part of the original shape. This specimen is broken near the center into two pieces that fit closely and are now glued back together.

Figure 1, D is a fragmentary stone pestle that appears to be about one-half the original length. It is made of reddish brown to grayish brown fine-grained,

Lower Rio Grande Area discussed in text

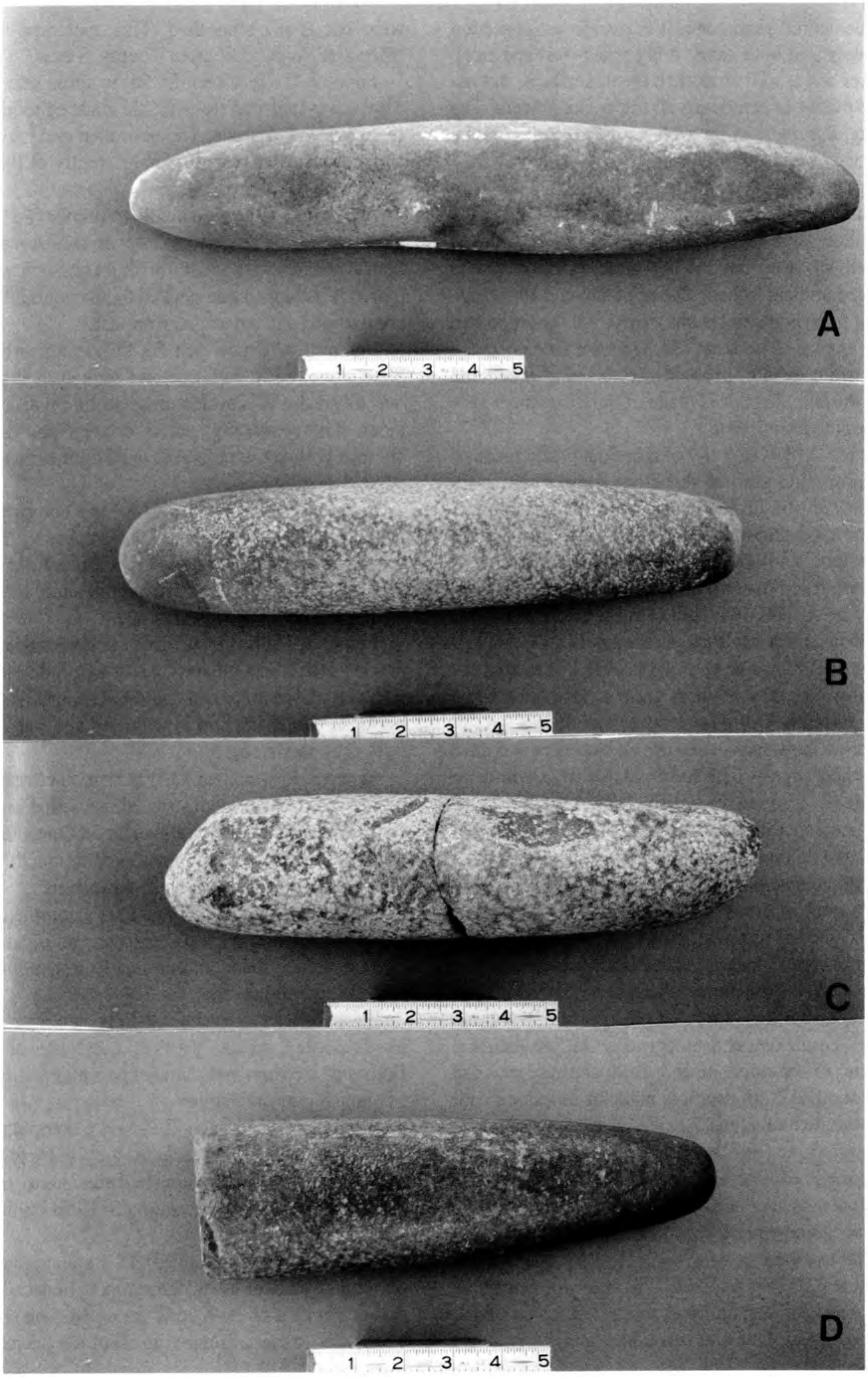


Figure 1. Stone pestles from the Lower Rio Grande, Falcon Lake area. Scales are in inches.

well cemented sandstone. It is oval in cross section and flattish on both sides. It is pecked to shape on all surfaces and is well smoothed on all surfaces, but not to the extent of removing all the pecking scars. The one remaining end is well rounded and exhibits evidence of considerable use.

Figure 2, A is a complete flattish pestle with irregular surfaces showing percussion flaking along both faces and edges. The edges have been pecked and all surfaces have some grinding. One end is rounded and smoothed. The opposite end is narrow, similar to an edge and is smoothed. All the smoothed areas appear to be from use. One flat face is coated with white calcite, probably from being inundated along the lake shore. It is made of dark brownish gray fine-grained sandstone.

Figure 2, B is one end of a broken pestle made of light gray, fine-grained sandstone. It is oval in cross section and the broken end has an oval cavity that appears to be man-made. The opposite end is rounded by pecking and has minimal evidence of use. It is heavily pecked over all surfaces but is not smoothed in any area. The oval cavity in the broken end has striations as if it has been scraped out.

Figure 2, C is one end of a broken pestle made of light brownish gray, medium grain sandstone. It is the most perfectly cylindrical specimen in this group. Both ends show evidence of use as hammers and have flakes and chunks broken off each end. There is no evidence of grinding or polish.

Figure 3, A (Specimen ANTEX) is a broken end of a stone pestle that appears to be less than one-half of the original size pestle. It is pecked over all surfaces and is oval in cross section. This one end is well rounded and has use wear, but is not heavily polished. It is of brown sandstone with rusty red stains.

Figure 3, B (Specimen EX59) is a complete cylindrical stone pestle pecked over all surfaces. Beginning at mid-length one end tapers to about one-half the diameter of the opposite end. Both ends are rounded and smoothed from use. It is made of limestone with some calcite inclusions.

Figure 3, C (Specimen FL) is a complete stone pestle made of limestone (with calcite and iron content). It is oval in cross section with two flattish sides. The edges and ends are pecked and the ends display minimal use wear.

Figure 3, D (Specimen EX53) is a complete stone pestle pecked to a cylindrical shape with much of one side being flat. One end is rounded and exhibits use wear but is not smoothed. This specimen is from "Paradise Point" in Zapata County, Texas.

Figure 3, E (Specimen EC65) is about one-half of a broken cylindrical stone pestle made of reddish tan fossil oyster limestone. The unbroken end is rounded and exhibits use wear. It is consistently of the same diameter throughout.

Figure 3, F (Specimen with no number) is a complete pestle made of light brown sandstone. It is flattish oval in cross section with its greatest width at center. It is chipped and pecked to shape and the ends are rounded and smoothed from use.

Figure 3, G (Specimen EX252) is a nearly complete stone pestle with one end broken. It is pecked over all areas and is oval in cross section with two flat sides. The remaining end is convex and is worn smooth with some polish. It is of light brown sandstone.

Figure 3, H (Specimen EX450) is a complete rectangular stone pestle chipped and pecked on all surfaces with little alteration of the rectangular shape. One end is ground to a point and polished. It is made of mottled dark brown sandstone.

Figure 3, I (Specimen FLGI) is a complete stone pestle pecked over all surfaces to a cylindrical shape with one well rounded end that displays use wear. The opposite end is flat and is without use wear. It is of light gray sandstone.

Figure 3, J (Specimen 534) is a small cone-shaped pestle made of tannish gray sandstone with a high iron content. It is pecked over all surfaces. One end is flat and wide; the other smaller and well rounded. This is the only cone-shaped pestle in this group.

Figure 3, K (Specimen PC-1) is a complete stone pestle pecked over all surfaces to a cylindrical shape. Both ends are rounded, one nearly to a point. It is made of gray limestone.

Figure 3, L (Specimen FLP-6) is a complete stone pestle pecked over all areas to a cylindrical shape. Both ends are worn and rounded to a point. It is made of tannish gray sandstone.

Figure 3, M (Specimen FLP-5) is a complete stone pestle pecked over all areas to a cylindrical shape. Made of yellowish clay cemented sandstone, one end is rounded and the other pointed. Both exhibit use wear.

Figure 3, N (Specimen FLP-4) is a complete stone pestle pecked over all surfaces to a cylindrical shape and is rounded on both ends from use. The ends are worn to the extent of removing all of the pecking and

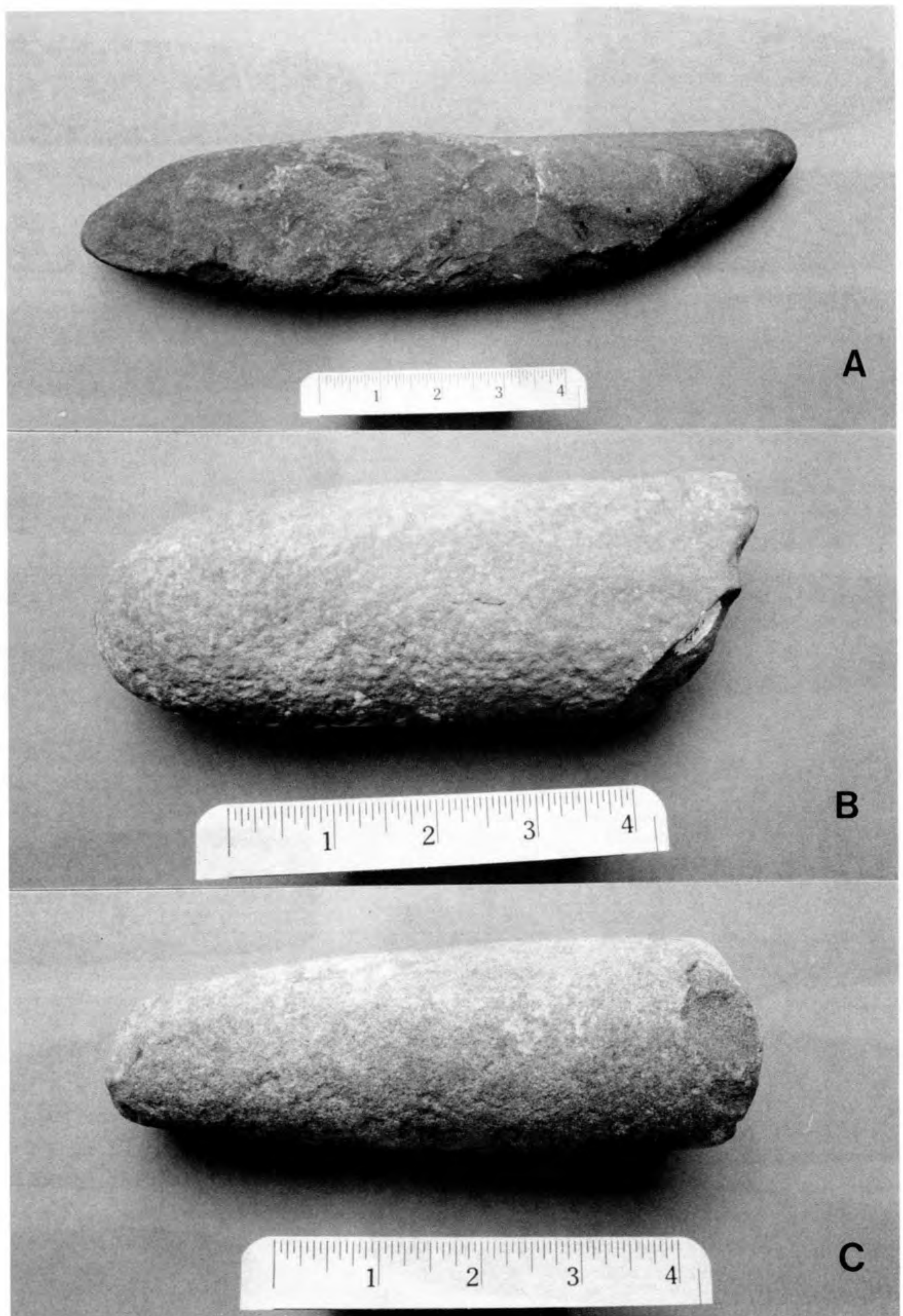


Figure 2. Stone pestles from the Lower Rio Grande, Falcon Lake area. Scales are in inches.

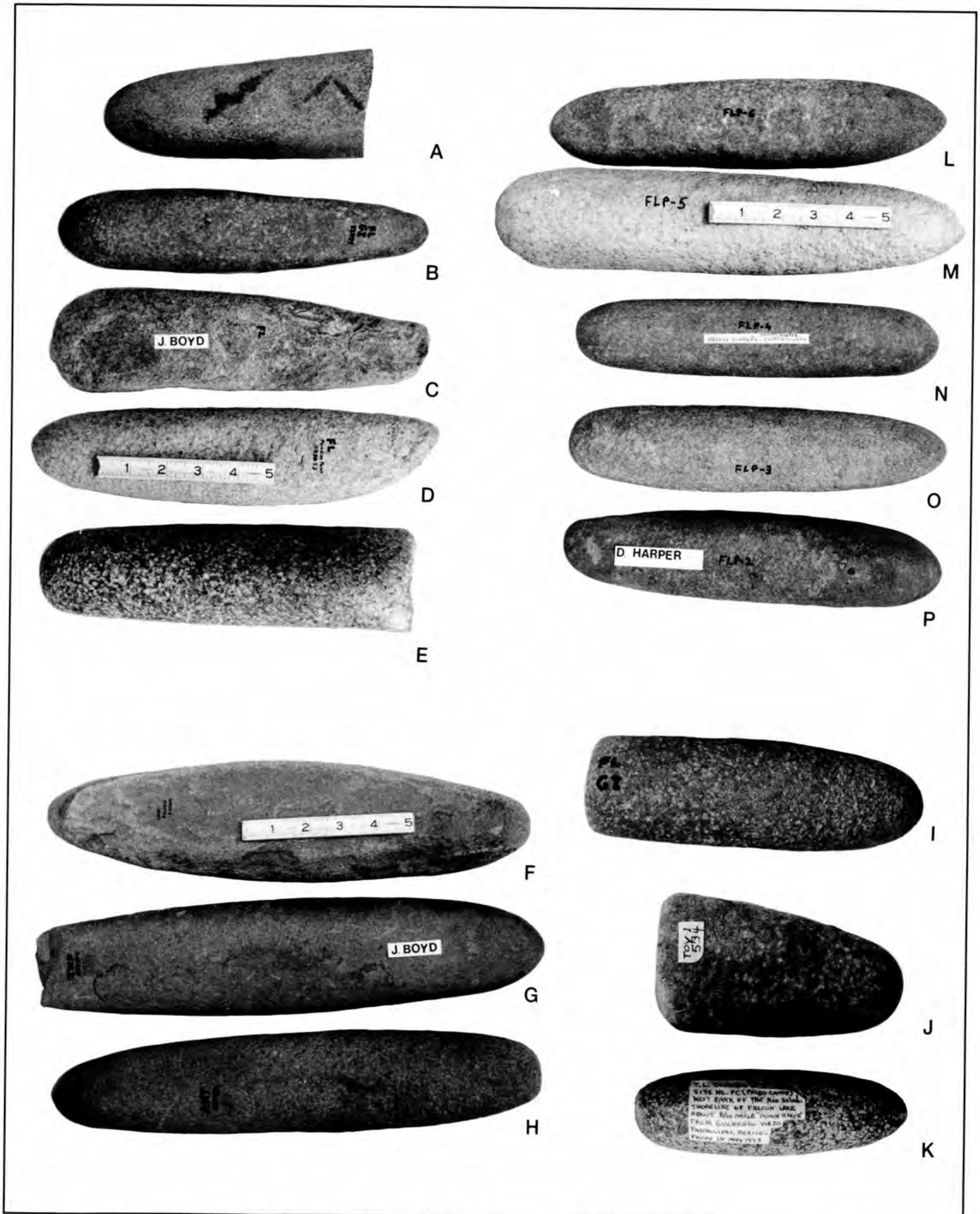


Figure 3. Stone pestles from the Lower Rio Grande, Falcon Lake Area. Scales are in inches.

reducing all surfaces to a smooth feel with pecking still visible. It is made of light tannish gray sandstone. This specimen is from Arroyo Clareno in Zapata County, Texas.

Figure 3, O (Specimen FLP-3) is a complete stone pestle pecked over all surfaces to a cylindrical shape. It is made of tan sandstone and both ends are rounded and worn from use.

Figure 3, P (Specimen FLP-2) is a complete stone pestle pecked over all surfaces to a nearly cylindrical shape. One side is flattish about two-thirds its length. Both ends are well rounded and smoothed from use. It is made of tannish gray sandstone.

Figure 4, A (Specimen EX121) is a long, complete, cylindrical stone pestle in two pieces that are joined together with glue. It is pecked over all surfaces and both ends exhibit use wear. One end is slightly larger than the other and is rounded to a point and smoothed. The smaller end is rounded but not smoothed. It is of fine-grained tannish gray sandstone.

Figure 4, B (Specimen EX60) is a long stone pestle found in two pieces and joined with glue. It is pecked over all surfaces to an oval shape and has two nearly flat sides. It is made of gray sandstone. Both ends are rounded and smoothed from use. One end has been pecked flat after it was worn smooth.

Figure 4, C (Specimen 501) is a complete, long, rectangular stone pestle that is totally coated with nearly white calcite, obscuring the color and identification of the parent material, and is believed to be of sandstone. It has not been pecked or abraded to shape it. There are a few chips along the edges of one thin side. Both ends have minimal rounding of the corners from use as pestles.

Figure 4, D (Specimen EX450) is a complete, rectangular stone pestle made of flat brown sandstone. The long corners are chipped with some pecking. Only one end is rounded to a point. This end is shaped from use as a pestle.

Figure 4, E (Specimen MAS252) is a long stone pestle in two pieces that has been chipped and pecked but remains quite rectangular in shape. One end is slightly rounded but shows no evidence of use as a pestle. The opposite end is rectangular and the corners and edges are lightly rounded from use as a pestle. It is made of dark brown sandstone.

Figure 4, F (Specimen EX303) is a complete, long, rectangular stone pestle made of a yellowish brown sandstone. It has little evidence of having been shaped, but appears more as a stream-tumbled flat rock. One end is somewhat rounded and does exhibit some use as a pestle.

Figure 4, G (Specimen EX171) is a complete, long, rectangular stone pestle made of dark brown sandstone. It is not shaped in any manner but does have a few chips removed by percussion from a long corner that did not alter the shape. One end has been used as a pestle and the corners of this end have been lightly rounded and smoothed from use.

Figure 4, H (Specimen EX424) is a complete cylindrical stone pestle in two pieces that are joined together with glue. It is pecked over all surfaces and both ends are rounded and smoothed from use. It is of tan sandstone.

Figure 4, I (Specimen EX416) is a complete cylindrical stone pestle made of brown, fine-grained silica sandstone layered with hematite. It is pecked on all surfaces and both ends are rounded and taper to a point.

Figure 4, J (Specimen EX212) is a long stone pestle in two pieces that have been joined together with glue. It has been pecked to an oval shape that has two nearly flat sides and is made of dark gray to black sandstone with several large tan inclusions. Both ends are well rounded and smoothed from use as a pestle. This is the longest of all the pestles in this group.

Figure 4, K (Specimen FLP1) is from Zapata County. All surfaces have been shaped by pecking and are smoothed but not to the extent of obliterating the peckmarks. It is cylindrical and both ends show extensive use as pestles. It is made of fine-grained tannish gray, well indurated sandstone.

Figure 4, L (Specimen FLN-2) is a complete stone pestle pecked over all surfaces with nearly parallel sides and two rounded ends that are worn smooth. It is cylindrical with a slight curve from end to end and is made of dark gray sandstone.

Figure 4, M (Specimen BC) is a long rectangular pestle from the Falcon Lake shoreline in Zapata County, Texas. It is made of sandstone and is bluish white in color from having absorbed considerable calcite. Three sides are flat and straight and one side is irregular. One end is slightly enlarged and rounded like a ball from extensive use as a pestle. It shows no evidence of having been chipped or pecked to shape it.

Figure 5, A (Specimen SAL) is a complete cylindrical stone pestle pecked over all surfaces. Both ends are rounded with one end smooth from wear. It is made of gray sandstone.

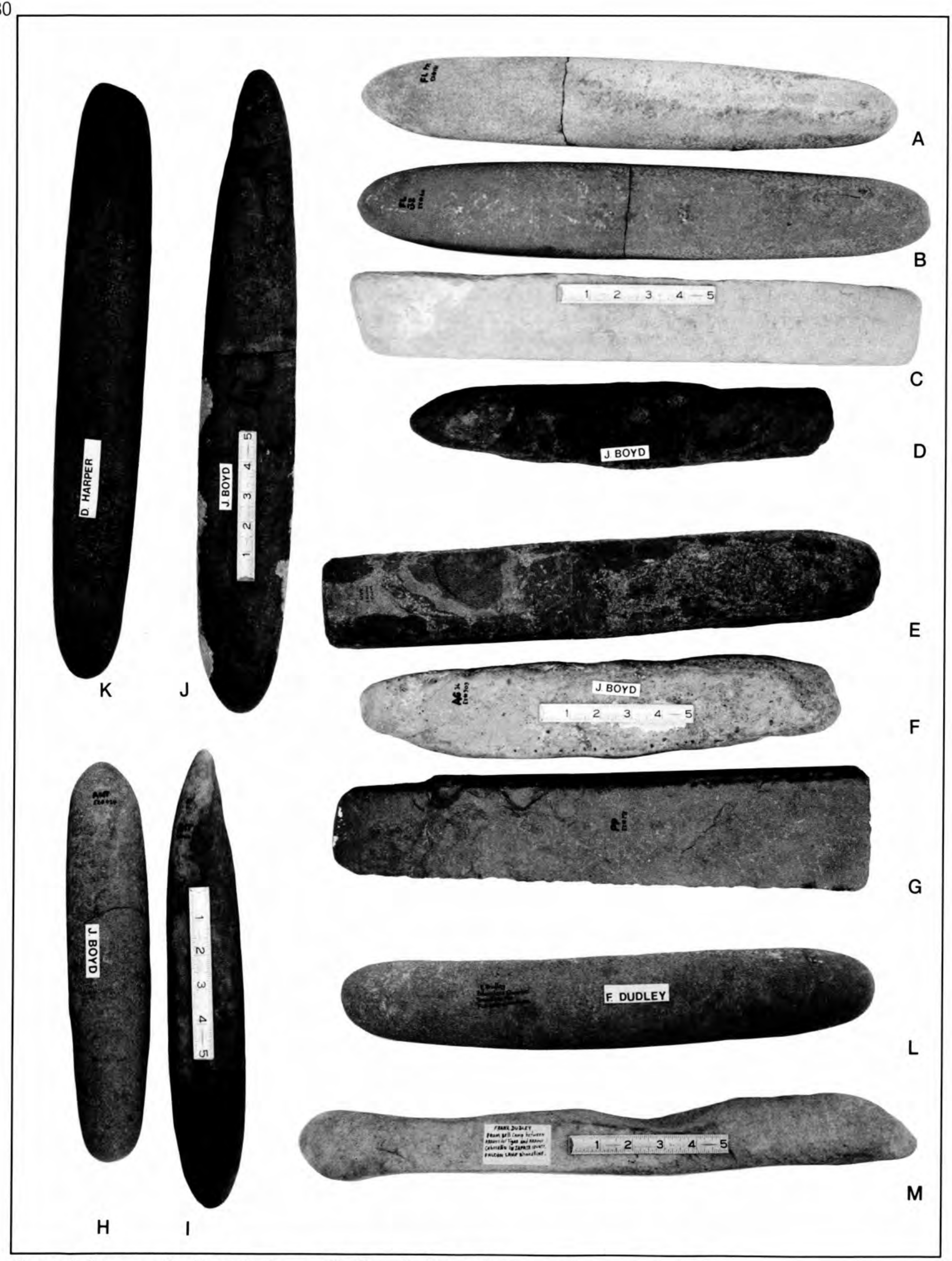


Figure 4. Stone pestles from the Lower Rio Grande, Falcon Lake area. Scales are in inches.

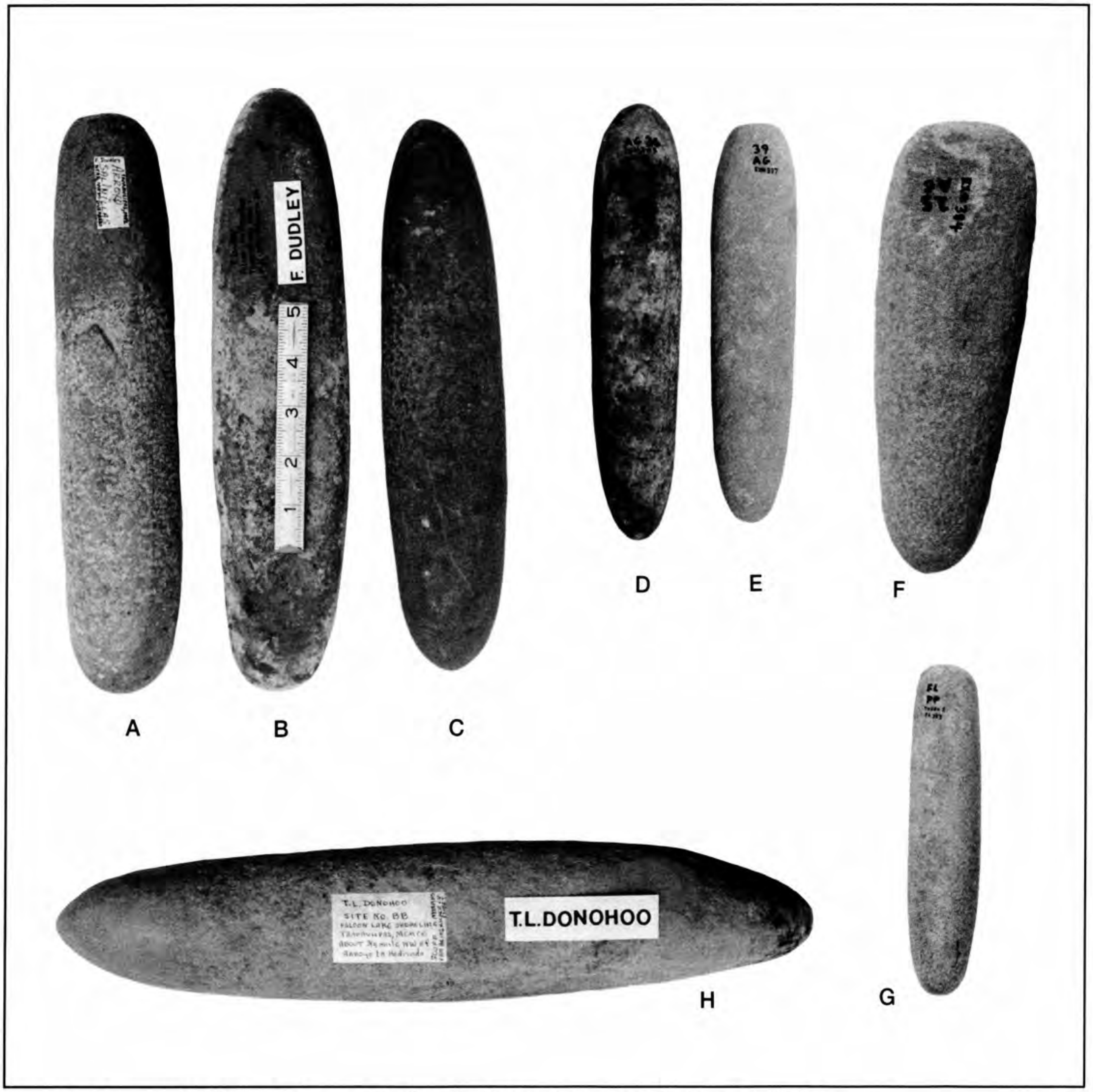


Figure 5. Stone pestles from the Lower Rio Grande, Falcon Lake area. Scales are in inches.

Figure 5, B (Specimen FLN-1) is a complete stone pestle pecked to an oval cross section with two flat sides and most of the pecking along the other edges. It is widest in the middle area tapering to rounded ends that show use as pestles. It is made of gray sandstone.

Figure 5, C (Specimen SA-3) is a complete stone pestle pecked over all surfaces with both ends rounded and smoothed. It is made of dark brown sandstone and is cylindrical in shape. The central area is parallel with a gentle taper toward both ends.

Figure 5, D (Specimen EX303) is a complete cylindrical stone pestle pecked over all surfaces. Both ends are rounded and smoothed from use. It is made of mottled, rusty brown, iron-stained silica sandstone.

Figure 5, E (Specimen EX337). Dimensions and description are no longer available.

Figure 5, F (Specimen EX384) is a complete stone pestle pecked over all surfaces to an oval cross section. It has one well rounded and use worn end. The opposite end is also rounded; it is much larger and is without use wear. It is of tan, clay-cemented sandstone.

Figure 5, G (Specimen EX353) is a complete stone pestle made of light gray limestone pecked over all surfaces to an oval shape with two flattish sides. Both ends are rounded and show use wear and polish.

Figure 5, H (Specimen PC-2) is a complete stone pestle pecked in all areas to an oval shape. Both ends are rounded to a point. One end is well smoothed from use wear. It is made of fine-grained tan sandstone.

This group of pestles vary considerably in size. They are 9.6 to 57.7 cm in length; 4.5 to 10 cm in maximum diameter and width. The one of greatest length (EX212) is not the heaviest. Specimen MAS252 at 4,984 grams is the heaviest. Weights vary from 325 grams to 4,984 grams.

They also vary in shape. Specimens in Figure 4-C, D, E, F, G, M are rectangular in shape and exhibit minimal effort to shape them to a cylindrical outline. However, all of these have evidence on one or both ends of use as pestles. Specimens of Figure 4-C through G have been chipped on the long edges but have not been pecked.

Twenty-seven are cylindrical in shape and have two rounded and tapered ends. Ten are broken in half. Five of these have both pieces found and reconstructed. The others are illustrated as one-half sections.

Some of the oval specimens have two flat sides. These apparently originated as rectangular shapes that have been extensively pecked to more desirable shapes. It seems probable many of the longer pestles were fashioned from long stone slabs that broke off of the series of low bluffs along the stream channel (Evans 1961).

Dimensions of these pestles are presented in centimeters and weights in grams. See Table 1.

The large number of recovered pestles raised the question: are there any known bedrock mortars in the collection areas? None had been reported. Don Kumpe and Larry Hess relocated a mortar hole site that had been found earlier by T. L. Donohoo. Fifteen mortar holes were identified. They varied from 10.2 to 16.5 cm in diameter and up to 28 cm in depth and tapered to a point at the bottom. The site was photographed and the mortar holes drawn in a pattern of their layout.

Other mortar hole sites around the lake area are known and may be published. This research and publication is encouraged. It will add to the growing knowledge of the archaeology of the Lower Rio Grande.

Where mortar holes occur in low level rock outcrops along streams and lakes, they are often lost to sight by being filled with silt, which sometimes supports small clumps of grass that stand alone where no grass grows in the surrounding bare bedrock. This has been observed by the senior author along the first rock terrace above low water stream flow of the Pecos River above Amistad Lake when he examined several isolated grass clumps near the Lewis Canyon petroglyph site. These posthole mortars with their grass clumps appeared like flower pots in the bare landscape. When dry they easily lift out and with their binding root system are easily replaced. They can also be explored by use of a small diameter metal rod without removing the grass clump. This Pecos River mortar hole site has been recorded at The Texas Archeological Research Laboratory (TARL) as 41VV1305.

DISCUSSION

Most of the pestles in this report are cylindrical as are many of those reported by MacNeish et al. (1967) from the Tehuacan Valley in southeastern Mexico. MacNeish stated that Tamaulipas was the only other place in Mexico where cylindrical pestles were found. Several other types of pestles were reported (ibid.),

Table 1. Dimensions and weights of pestles (in centimeters and grams).

Figure Number	Artifact Number	Length cm.	Max. Dia. cm.	Min. Dia. cm.	Weight gm.
1A	1A	43	7.8	5.9	3081
1B	1B	34	7		2266
1C	1C	32.5	8		2946
1D	1D	28	8.5	5.4	1812
2A	2A	32	7.3	4	1357
2B	2B	17	6.7	5	1010
2C	2C	17	5.7	5.5	883
3A	ANTEX	23	8	6.5	1812
3B	EX59	28	5.9	3	1359
3C	FL	28.8	8	4.9	1812
3D	EX53	30.8	7.3	5.8	2266
3E	EC65	27.8	7.4	7.3	2719
3F	NO #	37.6	9.5	3.7	1912
3G	EX252	40	9	4.9	2495
3H	EX450*	37.4	7.6	6	3081
3I	FLGI	13	4.5	4.1	388
3J	#534	9.6	5	3.1	325
3K	PC1	15	5	5	453
3L	FLP6	30	7	6	2266
3M	FLP5	35	8	6	2719
3N	FLP4	27	6	6	1812
3O	FLP3	28	6	6	1812
3P	FLP2	28	7	6	1359
4A	EX121	45	7.3	7.3	4078
4B	EX60	49	8.1	5.1	3625
4C	#501	48.5	7.3	3.7	3625
4D	EX450*	36	7.2	3.2	1812
4E	MAS252	46.8	8.1	6.2	4984
4F	EX303**	41.3	8.5	3.3	2175
4G	EX171	45	10	4.3	4078
4H	EX424	31.2	6.6	6.5	1812
4I	EX416	36.5	6	5.6	1812
4J	EX212	57.5	8.4	4.3	3625
4K	FLP1	53	8	7	4531
4L	FLN2	46	8	6	4078
4M	BC	52	6	6	3172
5A	SAL	31	6	6	2266
5B	FLN1	32	8	4	2266
5C	SA3	30	6	6	1812
5D	EX303**	29.2	6.2	6	1812
5E	EX337***				
5F	EX384	15.9	5.3	4.2	524
5G	EX353	23.1	5	3.8	793
5H	PC2	36	7.4	6	2266

* different artifacts, same ID number
** different artifacts, same ID number
*** dimensions and weight no longer available

including long rectangular types made from rectangular river pebbles pecked and chipped to shape. Post-hole bedrock mortars were not mentioned. All of the mortars mentioned and illustrated were portable types.

In some areas of Texas wooden mortars and pestles have been reported (Collins and Hester 1968; Prewitt 1981). These were from dry caves in West Texas. Cactus seeds were found in the Val Verde County mortar (41VV425) suggesting that one function of these implements was the preparation of plant foods. The Dryden Cave (41TE170) mortar was without an identifiable pestle. While it is highly probable a wooden pestle was used with the wooden mortar, a stone pestle could have been used.

Both bedrock and portable mortars and stone pestles are widely known throughout the southwestern United States (Bell and Castetter 1937, from Boyd 1995), and in some areas they are considered to be tools for grinding mesquite beans. Stone pestles occur in abundance at Mesilla phase sites in the Tularosa Basin in New Mexico. They are considered to be evidence of mesquite bean processing (Carmichael 1986:220, from Boyd 1995). Bedrock mortars are common in the Caprock Canyonlands in the Texas Panhandle and these may have been used in a similar fashion (Boyd 1995).

The stone pestles from Falcon Lake were most likely used in the processing of plant foods. Salinas (1990) states: "In a rancheria of seventy or eighty huts south of the Rio Grande, Indians gave Cabeza de Vaca twenty loaves of bread made of mesquite bean flour." A list of other wild plants used for food included the fruit and pads of prickly pear, Maguey root crowns, the bulbs of garlic and onions, flower buds of yucca, unspecified roots, fruits and herbs. How these foods were prepared for human consumption was not specified, but it is highly probable some were processed with stone pestles and bedrock mortars.

ACKNOWLEDGMENTS

This group of pestles was collected by several individuals. We thank them all for their kind consideration in loaning them to the authors for documentation and study and for sharing their knowledge of the archaeology of the Lower Rio Grande.

References Cited

Bell, S. H. and E. F. Castetter
1937 *The Utilization of Mesquite and Screwbean by the Aborigines in the American Southwest.* University of New Mexico Bulletin No. 314, Ethnobiological Studies in the American Southwest, Biology Series 5(2). University of New Mexico Press, Albuquerque.

Boyd, Douglas K.
1995 The Palo Duro Complex: Redefining the Early Ceramic Period in the Caprock Canyonlands. *Bulletin of the Texas Archeological Society* 66:461-518.

Carmichael, D. L.
1986 *Archaeological Survey in the Southern Tularosa Basin of New Mexico.* Historical and Natural Resources Report No. 3. Environmental Management Office, Directorate of Engineering and Housing. United States Army Air Defense Artillery Center, Fort Bliss, Texas.

Collins, Michael B. and Thomas R. Hester
1968 A Wooden Mortar and Pestle from Val Verde County, Texas. *Bulletin of the Texas Archeological Society* 39:1-8.

Evans, Glen L.
1961 Notes on Terraces of the Rio Grande, Falcon-Zapata Area, Texas. *Bulletin of the Texas Archeological Society* 32:33-46.

Hester, Thomas R.
1979 A Stone Pestle from Dimmit County, Southern Texas. *La Tierra* 6(3):17-19.

MacNeish, R. S, A. Nelken-Terner and Irmgard W. Johnson
1967 *The Prehistory of the Tehuacan Valley, Vol. II: The Non-Ceramic Artifacts.* University of Texas, Austin. pp. 101-121.

Parker, Wayne
1978 Notes on Two Early Man Dart Points from Zapata County, Southern Texas. *La Tierra* 5(3):17-19.

Prewitt, Elton R.
1981 A Wooden Mortar from the Stockton Plateau of Texas. *Journal of Field Archaeology* 8:111-117.

Salinas, Martin
1990 *Indians of the Rio Grande Delta*. University of Texas Press, Austin. pp. 118-119.

Turner, Ellen Sue and Thomas R. Hester
1993 *A Field Guide to Stone Artifacts of Texas Indians*. Second Edition, Gulf Publishing Company, Houston, Texas. p. 307.

NEW TARL PUBLICATIONS*

Two major new TARL publications have just appeared. Both are 2-volume works that provide a great deal of new information on Texas archeology. Both are in TARL's *Studies in Archeology* series.

Robert Ricklis (TARL Research Fellow) and Michael B. Collins (TARL Associate Director) are the authors of *Archaic and Late Prehistoric Human Ecology in the Middle Onion Creek Valley, Hays County, Texas* (Studies No. 19, a 2-volume, 651-page report (with 275 figures and 161 tables, and covers designed by Ken Brown of TARL) that details the excavations of several sites near Buda in 1989-1990 under contract with the Texas Department of Transportation.

Volume 1 provides details on the components found at the Barton site (Early Archaic: Bell/ Andice/ Calf Creek), the Mustang Branch (Bluff) site (a Late Archaic burned rock midden), and the Mustang Branch (Terrace) site (a Toyah campsite). ... In Volume 2, there are numerous topical studies. They include the study of a historic site, geomorphic studies in the middle Onion Creek valley, vegetational analyses, paleobotanical research, faunal analysis, molluscan studies, reports on radiocarbon dates (and thermoluminescence and archeomagnetic research), archeomagnetism, the use of a magnetometer at the Barton site, ceramic paste analysis, stable isotope research, use-wear studies, residue analysis of burned rocks and artifacts, and a replicative study of Andice/Bell points.

The Loma Sandia Archaic cemetery in Live Oak County, southern Texas (41LK28) is fully published in Studies No. 20, *Archeological Investigations at the Loma Sandia Site (41LK28), A Prehistoric Cemetery and Campsite in Live Oak County, Texas*, authored by Anna Jean Taylor and Cheryl Lynn Highley. The 2-volume, 856-page report, with 399 figures and 123 tables, features original cover art by Dr. Frank A. Weir, and is accompanied by a map packet containing large plans of the cemetery, drawn by Kathy Dodt-Ellis, Bruce Ellis and Frances Meskill. ... These 2 volumes contain the work of many collaborators, including an archeological and ethnohistorical background by Dr. Stephen L. Black of TARL, detailed reviews of prehistoric cemeteries in Texas by Dr. Grant D. Hall of Texas Tech, analysis of the shell artifacts by Meredith L. Driess, along with numerous other special studies including bone and antler artifacts, ceramics, a late Paleoindian/Early Archaic lithic cache, use-wear analysis of Tortugas points, fluoride dating of the burials, etc.

* Exerpted from *The Newsletter of The Friends of the Texas Archeological Research Laboratory* (Vol. 3, No. 2, October 1995).

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THE ALAMO WELLS PROJECT: A RETROSPECTIVE

Thomas H. Guderjan

INTRODUCTION

Controversial from its inception, the "Alamo Wells" excavation in the spring of 1995 may have been the single most publicized archaeological project in history. Daily local and national news and media coverage placed the project under the microscope of public attention unlike any other experience of my life or even of my knowledge. As a consequence, vast amounts of information both correct and incorrect were disseminated to the public and the archaeological community. The purpose of writing this paper is to clarify the record regarding our goals, actions and the consequences of the project.

BACKGROUND AND ACTIVITIES

The initial concept for the excavation came from Mr. Frank Buschbacker, an amateur historian, who believes that the defense of the Alamo in 1836 was an act based on protecting a treasure rather than the more patriotic reasons normally cited. While this idea is an extremely implausible proposition, it is clear that the excavation could not have occurred without Mr. Buschbacker's three-year campaign promoting his ideas.

By the time St. Mary's University agreed to participate in the project, it had already become an item of public controversy. In addition, the original archaeological contractors, The Center for Archaeological Research at The University of Texas at San Antonio (CAR-UTSA), withdrew because of management disagreements with Buschbacker and his associates. To complicate matters, the City of San Antonio was approached by the "National Underwater and Marine Agency" (NUMA) to undertake a similar project.

Consequently, when I was introduced to Frank Buschbacker to discuss our possible involvement in the project, I was extremely skeptical and fully prepared to simply dismiss him and his ideas. What I found surprised me. While I certainly could not concur with Frank's view of the Alamo battle, I did find that I was dealing with a reasonable person who really simply wanted to know what happened. And he was willing to work hard to find out. We eventually entered into an agreement to go ahead if funding, permission and permits could be obtained. However, I took the position from the beginning that I did not believe Frank's story and could not subscribe to it. However, the truth would be told in the ground.

From that time onward, I undertook the project, not with the expectation of proving Buschbacker right, but of proving him wrong. At the same time, my willingness to go ahead was based on the very real possibility that, should we find a well which was open during the Battle of the Alamo, there was a good chance that battle related artifacts and information would be found in it. It could be, as I said repeatedly during the excavation, a "time capsule" of information from the battle. It was one of those questions that, once presented, made me wonder why no one had thought of looking for wells before.

Previously, Buschbacker had contracted with Earth Measurement Systems of Houston to do a Ground Penetrating Radar (GPR) survey of Alamo Plaza. Despite the overburden of several layers of public street, they had found four anomalies in the survey, three of which could have been wells. Our excavation targeted the most promising of these, Anomaly A.

Not surprisingly to anyone, anything which occurs at the Alamo necessarily involves a long list of public agencies: The City of San Antonio, Department of Parks and Recreation, the Mayor's Office; the Texas Historical Commission, and special interest groups: Daughters of the Republic of Texas, Sons of the Republic of Texas, Granaderos de Galvan, the Battle of Flowers Association, a number of living history groups, and most pertinently in our case, a pan-tribal Indian group and a group of descendants of the Indians who lived and died at the mission in the 18th century. From the outset, we knew that our relationships with these groups and the press would define the success and actually the ability to proceed on the project.

When the field work began, ably headed by Herb Uecker, we removed a 15'x15' section of the street to accommodate the excavation. Then a smaller section of materials were carefully removed by hand. An interim report on the work is currently available by request (Uecker 1995) and a more complete report is in preparation . As everyone probably knows, the anomaly in the GPR survey was never identified archaeologically. We excavated through a series of post-battle deposits and then encountered an intact mid-18th century deposit which consists of aboriginal stone tools and pottery

(Goliad ware) and Colonial majolicas. These were mixed with a large deposit of butchered bones, mostly cattle and pigs. Backhoe excavations into the caliche bed material did not locate a geological feature to explain the anomaly either.

In a sense then, the excavation was a failure. We did not shed any light on Buschbacker's avowed purpose in the excavation and we had not found any "time capsule" related to the battle. Nevertheless, we had found important archaeological materials and the consequences of the excavation transcended the archaeology itself.

Archaeological Consequences

Our archaeological information relates to what we found and where we found it. The mid-18th century artifact complex includes large collections of Goliad ware and stone artifacts related to mission period Indian activities. The analysis of these materials will shed light on resident life at Mission San Antonio de Valero at that very moment that the cultural identity of today's city was being formed. The Spanish and the Indians came together to form a new society, different from either, yet with elements of both.

Equally important is the clear demonstration that intact cultural materials do exist under today's Alamo Plaza. Any of us who have seen early photos of ruts from horse drawn wagons in the mud in front of the chapel would have doubted that. However, it is true and the potential data which still remains buried under Alamo Street East is vast. In the future archaeologists, historians and public works planners will need to take this into account.

Political and Public Relations Consequences

As important as the archaeological results of the project are, the non-archaeological consequences have been greater. There is no question that our project was a pawn on a much larger chessboard, being pushed by a number of groups, each with their own agenda. While the field team did their job, much of my energy was aimed at working with these groups.

For instance, a strong faction in the city government was, and still is, deeply invested in massive reconstruction and redesign of Alamo Plaza. That group saw our work as the opportunity to identify and restore a well, thus opening the door for its agenda. Not coincidentally, this act would have *de facto* closed Alamo Street East permanently; an action which would be condemned by some groups and praised by others.

It is also no secret that funding issues occurred during the project. Much of the reason for this was the approach to the excavation dictated by the vocal opposition of the descendants of the people buried in the Camposanto near the chapel (see Hard 1994). These people have been extreme in their positions with the full knowledge that such extremism would bring further attention to their cause. Such positions effectively denied us the opportunity to use coring techniques to inexpensively and quickly determine whether the GPR anomalies were, indeed, wells. So, when we encountered the delicate and complex Colonial deposit across the entire excavation, we were obligated to expend the time and money required to remove it with appropriate care. Consequently our costs were considerably higher than predicted.

It is no accident though, that the Texas Historical Commission later gave us permission to use coring techniques elsewhere on the plaza to determine the nature of the other anomalies prior to excavation. While fiscal reasons prohibited this from occurring, we were supported in this request by letters from both the pan-tribal groups and the descendants group. We worked intensively with these individuals throughout the excavation. The descendants group ended up placing a full-time monitor on site with our team. This individual quit taking notes in a few days and began assisting the excavation. The pan-tribal group visited nearly every day to observe the progress of the work. The process began with us being adversaries and ended with us being friends and supporters of our mutual agendas. There is no question in my mind that the excavation would not have occurred without this relationship and that the bridges which we built will benefit all parties, including other archaeologists working at the Alamo and other missions in the future.

Previous excavations at the Alamo have been based upon necessity; that is, archaeological work has been required by the activities of the State of Texas and the Daughters of the Republic. While the work we conducted was initiated by a determined individual with a wild idea, it was done to test that and related ideas. I believe that we have opened the door to further such research in the future. If we are to truly understand the archaeology of Colonial Texas, we cannot rely solely upon the legal requirements placed upon our public agencies to provide a framework of understanding. In San Diego, important excavation of a Colonial mission is providing hugely greater insight into the past. This can happen in San Antonio as well.

The "Alamo Wells" project attracted enormous public interest in archaeology and the origins of San Antonio. We all know that the media coverage of the project was overpowering. But that was due to the high public interest in the past. No one was as shocked as I to find that men building San Antonio's new public library were following daily reports as though it was a daily, afternoon soap opera. (Not a bad analogy, by the way.) Many would argue that the media and the funders created a "circus" atmosphere to the project. In a sense this is true. Many would also argue that the "Indiana Jones" films portrayed archaeology in a less than appropriate light. However, class enrollments rose, new archaeological programs and funding were created, and public support for Cultural Resource Management work increased. A new generation of archaeologists view the public, not as adversaries, but as the source of our financial sustenance. The education and involvement of the same public is a high priority goal for our discipline.

References Cited

Hard, Robert (editor)
1994 *A Historical Overview of Alamo Plaza and Camposanto*. Center for Archaeological Research, University of Texas at San Antonio.

Uecker, Herbert
1995 Interim Report of the Alamo Wells Project. Ms. on file, Archaeology Program, St. Mary's University.

TWO MID-BACK TANG SCRAPERS FROM KERR COUNTY, TEXAS

Bryant Saner, Jr.

ABSTRACT

This report is to document and discuss two mid-back tank scrapers found in Kerr County, Texas.

INTRODUCTION

Recently, while documenting the Saner family artifact collection, many interesting items were noticed. Two of these were mid-back tang scrapers (Figure 1). In searching the literature, one reference was located. This was in J. T. Patterson's 1936 report on corner-tang flint artifacts. In this report only several short paragraphs and three pictures are devoted to the mid-back tang scraper (Patterson 1936). It is interesting that this type of artifact is presented in a report on corner tang knives. Is this a coincidence or is there a correlation?

THE ARTIFACTS

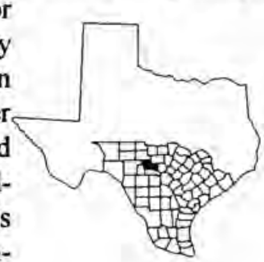
Specimen A was recovered from site 41KR71 located southeast of Mountain Home, Texas. It was recovered in the mid-1960s by the author's father, Bryant Saner, Sr. This artifact is made from an interior flake (Hemion 1988). Side A has one medium size chip to the left of the notch, several small chips at the notches and a few small chips along the bottom center to the right end. Side A-1 is chipped around the perimeter, with the exception of a small space on the right upper edge. The border is steeply flaked from the extreme left end, along the bottom, to the far right edge. The center of side A-1 is smooth. The color of this artifact is light brown. The length is 64 mm, the width at the stem is 27 mm, maximum thickness is 4 mm, the stem length is 5 mm, the width at the stem base is 6 mm, the width at the top of the stem is 7 mm and the thickness at the base of the stem is 3 mm. This specimen is somewhat concave on side A and flat on side A-1, with the working edge being convex.

Specimen B was found by the author in the spring of 1963 at site 41KR521. This site is located in the eastern part of the city of Kerrville, Texas. This artifact appears to have been made from a primary cortex flake (Hemion 1988). Side B has a few small flakes on the edge, several flakes toward the left side and some small flakes around the notches. Side B-1 has steep flaking along the bottom from the lower left corner to the right lower border. There are several flakes on the right edge, a few small flakes at the top of the stem and small flakes around the notches. The remainder of side B-1 has limestone on it. No smoothing of the limestone is noted. There is a small shell-like fossil in the lower center portion of the limestone. The flint is brown and the limestone is yellowish to white. This artifact (Figure 2, B-1) is broken at the left edge and on the left lower corner. The length is not determined due to this breakage. The width at the stem is 55 mm, maximum thickness is 7 mm, length of the stem is 9 mm, width at the base of the stem is 10 mm, width at the top of the stem is 14 mm and thickness at the base of the stem is 3 mm. This specimen is slightly convex on side B and flat on side B-1, with the working edge being convex.

DISCUSSION

These two artifacts do not appear to be preforms. If Specimen A was a preform the stem would probably be on the round, larger end instead of the center top. If Specimen B was a preform the bottom should have more of a point and the lateral edges should be chipped in a manner to facilitate the creation of this point. These artifacts have many characteristics of scrapers. They are unifacially chipped, made from large flakes and have steep flaking on the working edge. Without the notches Specimen A would be a side scraper and Specimen B would most likely be an end scraper (Turner and Hester 1993). So if it looks like a scraper, feels like a scraper and smells like a scraper, then it must be a scraper!

Patterson describes the mid-back tang scraper being hafted and used for skinning or fleshing hides by employing a pushing motion (Patterson 1936). Another possible use for a hafted scraper could be a back-and-forth motion. The drawback is the ability of the stem to with-



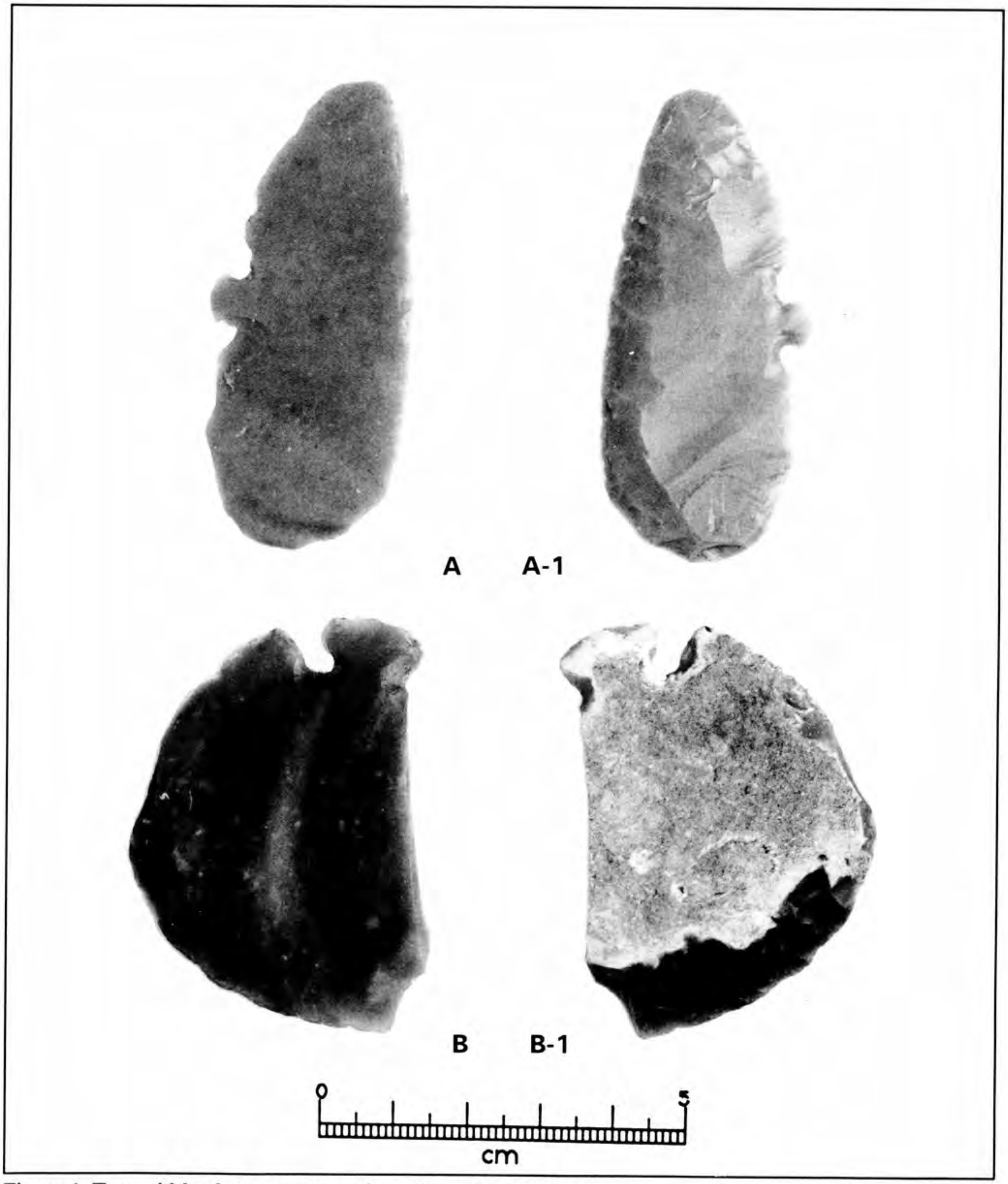


Figure 1. Two mid-back tang scrapers from Kerr County, Texas.

stand lateral pressure. If the hafted tool accidentally went a direction other than the intended one, lateral pressure on the stem would increase. The thickness at the base of both stems is 3 mm. Not much lateral pressure would be required to snap the stem off at this thickness. A more feasible method of using the stem would be to attach a cord of leather or fiber to it. This cord would then be attached to the wrist making the artifact very accessible for use as a hand-held tool (McReynolds 1984). The mid-back tang scraper could also be worn around the neck. This tool would also serve the user well without anything attached to the stem.

The distribution for mid-back tank scrapers in Texas shows Kerr County with two, while Bastrop, Hamilton and Travis Counties with one each. All of the above counties also have documented corner-tang knife finds (Patterson 1936). These counties are also located in the major distribution area for corner-tang knives (Mitchell et al. 1984). Mid-back tang scrapers may not be limited just to this major distribution area. They could have been produced here and transported to other sites, similar to the corner-tang knives in the Allens Creek Study (Hall 1981). Both specimens discussed in this report came from sites that yielded corner-tang knives. A diagonal corner-tang knife was also found at site 41KR71 by the author's father. At site 41KR521 the author witnessed the find of two corner-tang knives. It is not known what diagnostic artifacts were found with specimens A or B.

The evidence presented here shows there may be a correlation between mid-back tang scrapers and corner-tang knives. More research and information is needed before any validity can be given to this theory.

It would be appreciated if anyone having artifacts like the ones described in this report would send information about them. The information desired is: a drawing or an outline of the artifact, dimensions, county found in, diagnostic artifacts found in the same level and, if corner-tang artifacts, where found at the site. Send the information in care of the author at: 501 Fawn Drive, Kerrville, Texas, 78028.

ACKNOWLEDGMENTS

A thank you goes to Richards Folger for the use of his reference material. Thank you to Ellen Sue Turner for her review and suggestions. Thanks go to James Partain for the great photographs. A big thanks to my wife, Karyn, for the numerous proof readings of this report.

References Cited

Hall, Grant D.
1981 *Allens Creek: A Study in the Cultural Prehistory of the Lower Brazos River Valley, Texas*. Texas Archeological Survey, The University of Texas at Austin, Research Report No. 61.

Hemion, Roger H.
1988 *Field and Laboratory Handbook*. Special Publication No. 2, Southern Texas Archaeological Association. Published by the Association at San Antonio, Texas.

McReynolds, Richard L.
1984 Two Tanged Knife Forms from Val Verde County, Texas. *La Tierra* 11(2):6-11.

Mitchell, J. L., C. K. Chandler and T. C. Kelly
1984 The Rudy Haiduk Site (41KA23): A Late Archaic Burial in Karnes County, Texas. *La Tierra* 11(2):12-39.

Patterson, J. T.
1936 *The Corner-Tang Flint Artifacts of Texas*. The University of Texas Bulletin, Number 3618; Anthropological Papers Vol. 1 No. 4, Austin, Texas.

Turner, Ellen Sue and Thomas R. Hester
1993 *A Field Guide to Stone Artifacts of Texas Indians*. Second Edition. Gulf Publishing Company, Houston, Texas.

A BASALT PESTLE FROM MISSION SAN FRANCISCO DE LA ESPADA IN SAN ANTONIO, TEXAS

C. K. Chandler

ABSTRACT

This brief paper documents and illustrates a small basalt pestle from Mission San Francisco de la Espada in San Antonio, Texas. It is the only artifact made of basalt known to be recovered at this mission.

DESCRIPTION OF THE ARTIFACT

This small stone pestle is made of uniformly light gray basalt. It is pecked to an oval shape in cross section with maximum dimensions of 63 mm in length and 53 mm in diameter with a minimum diameter of 40 mm. It has a broad circumferential groove around its midsection that may have been intended for hafting purposes; however it is believed to have been held in the hand when used. Both ends are lightly convex and one end exhibits evidence of smoothing and polish from use in grinding. It weighs 212 grams.

This pestle is a surface find by the author in June of 1965 from the river side of the stone wall between Espada Mission and the San Antonio River. It is illustrated in Figure 1 with drawings by Richard McReynolds.

Mission Espada was built in 1731 and is the southernmost of the five early Spanish missions established along the San Antonio River in the early 1700s.

There have been three minor archaeological excavations at Mission Espada (Fox and Hester 1976; Fox 1981, and Meskill 1992) but there have been no basalt artifacts or basalt fragments reported from this mission. Archaeological excavations at the other four early missions in San Antonio have yielded fragments of basalt that are mostly of broken metates.

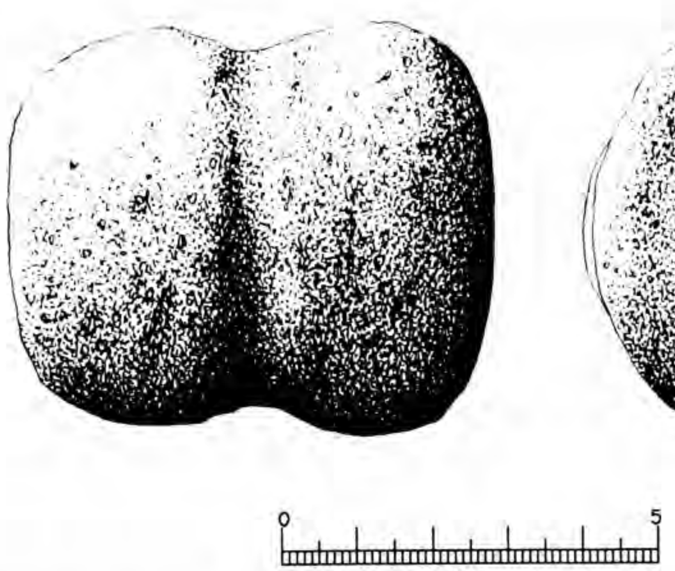


Figure 1. Side and end views of a basalt pestle from Mission San Francisco de la Espada in San Antonio, Texas.

References Cited

Fox, Anne A. and Thomas R. Hester
1976 *Archaeological Test Excavations at Mission San Francisco de la Espada.* Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 22.

Fox, Anne A.
1981 *Test Excavations at Mission San Francisco de la Espada.* Center for Archaeological Research, the University of Texas at San Antonio, Archaeological Survey Report 108.

Meskill, Frances K.
1992 *Archaeological Testing Within the Southeast Corner of the Plaza at Mission Espada, San Antonio, Bexar County, Texas.* Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 208.

STONE PIPES FROM FALCON RESERVOIR

C. K. Chandler

ABSTRACT

Two stone pipes from Falcon Reservoir on the Lower Rio Grande in South Texas and north Tamaulipas, Mexico are described and illustrated.

INTRODUCTION

Tubular stone pipes have a wide distribution in Texas (Jackson 1940) but there are still areas of the state where none have been reported. Recent information (Chandler and Kumpe 1994) reveals a larger presence of stone pipes on the Mexican side of the Lower Rio Grande in the Falcon Reservoir area (see inset map) than on the Texas side.

Most stone pipes are without decoration, as is the case with these two. Bone mouthpieces for use with stone pipes are rare but one such bone piece was found with one of these pipes.

THE ARTIFACTS

Figure 1 illustrates Specimen 1 with five drawings of the pipe and a drawing of a tubular bone that is believed to be the stem for this pipe. The pipe and bone stem were with several other artifacts recovered with a juvenile burial found eroding in the shallow waters of Falcon Reservoir in early 1995. The bone stem was not attached to the pipe but was very close to it, and it has one end that has been rounded and smoothed to where it fits well in the stem opening of the pipe. There were no other tubular bones with the burial. The area where this burial and grave goods were recovered is on the Tamaulipas side of the reservoir under two or so inches of water and was being scattered by wave action. The water was at its lowest level since the reservoir was built in the early 1950s.

This pipe is oval in cross section and is 79 mm long. It has a maximum diameter of 43 mm at the bowl end with a minimum diameter at the rim of 34 mm. It tapers to a maximum diameter of 36 mm at the stem end which has a minimum diameter of 25 mm. The stone is of very fine silt-size sand of a light tan (almost white) color with tiny black hematite grains that are visible only under magnification. These tiny grains coated with hematite are common inclusions in sandstone artifacts along the Lower Rio Grande (Chandler and Kumpe 1994).

The bowl walls are unusually thin and vary from three to six mm in thickness. The bowl interior varies from 26 to 31 mm in diameter at the rim and tapers to nine mm at the bottom. There are a few shallow vertical marks on the bowl interior that appear to be from scraping the bowl out instead of reaming it. The bowl interior is partially coated with a black flaky material that flakes off as the pipe continues to dry. This material was collected as it flaked off and some of it has been submitted to the University of Texas at San Antonio for analysis.

Figure 2 illustrates Specimen 2 which is an unfinished stone pipe from the Texas side of Falcon Reservoir below the town of Zapata in Zapata County. It is made of coarse, loosely cemented grains of many kinds of minerals and colors from rectangular clear quartz to tiny round black grains identical to the black hematite coated grains in Specimen 1, Figure 1.

The bowl end has been gouged out to a diameter of 40 mm and a depth of 32 mm. There is a small drilled hole in the stem end nine mm in diameter at the surface and 15 mm deep. There is no evidence of any effort to enlarge either end. Portions of the bowl end

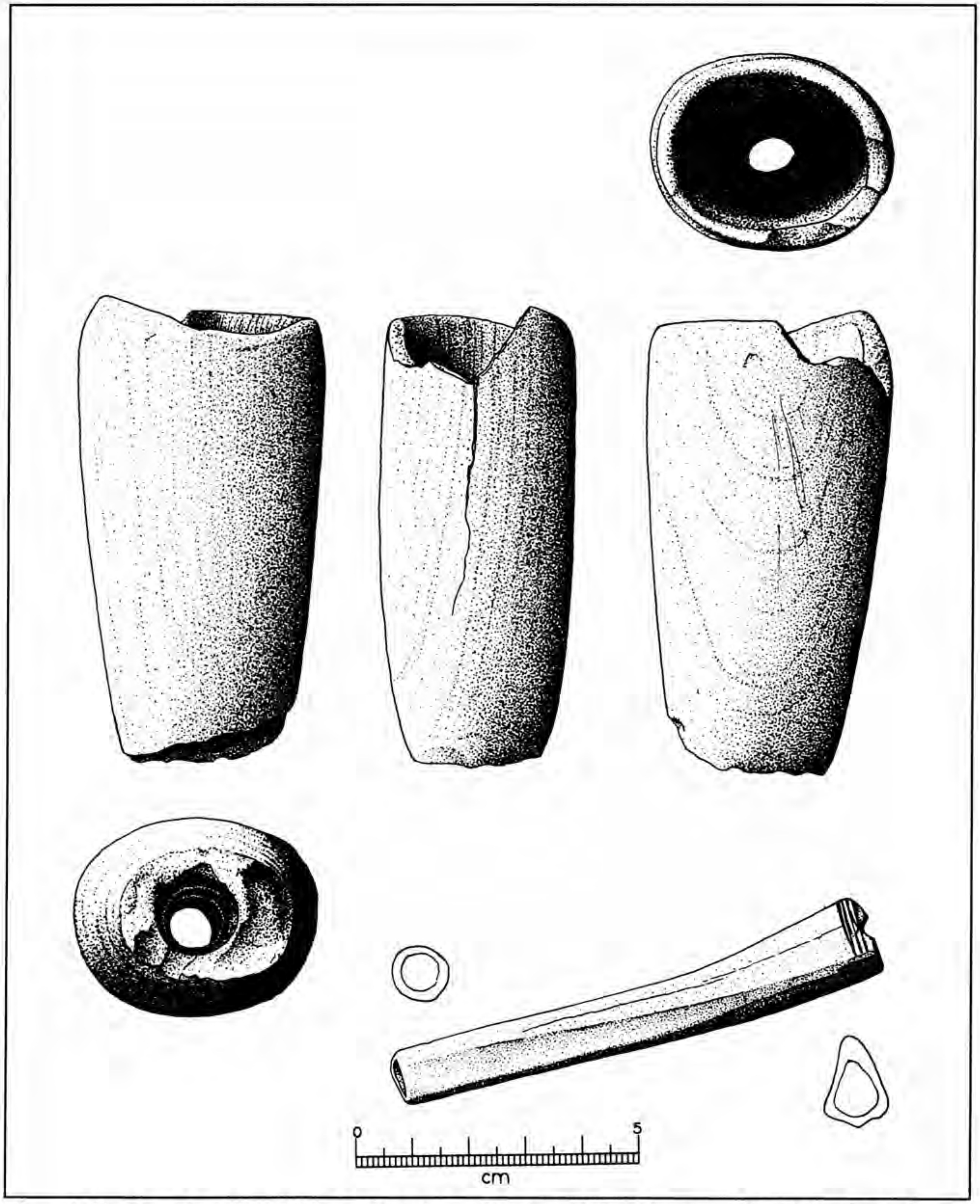


Figure 1. Specimen 1. A stone pipe and bone stem with a juvenile burial recovered in Falcon Lake, Lower Grande Area.

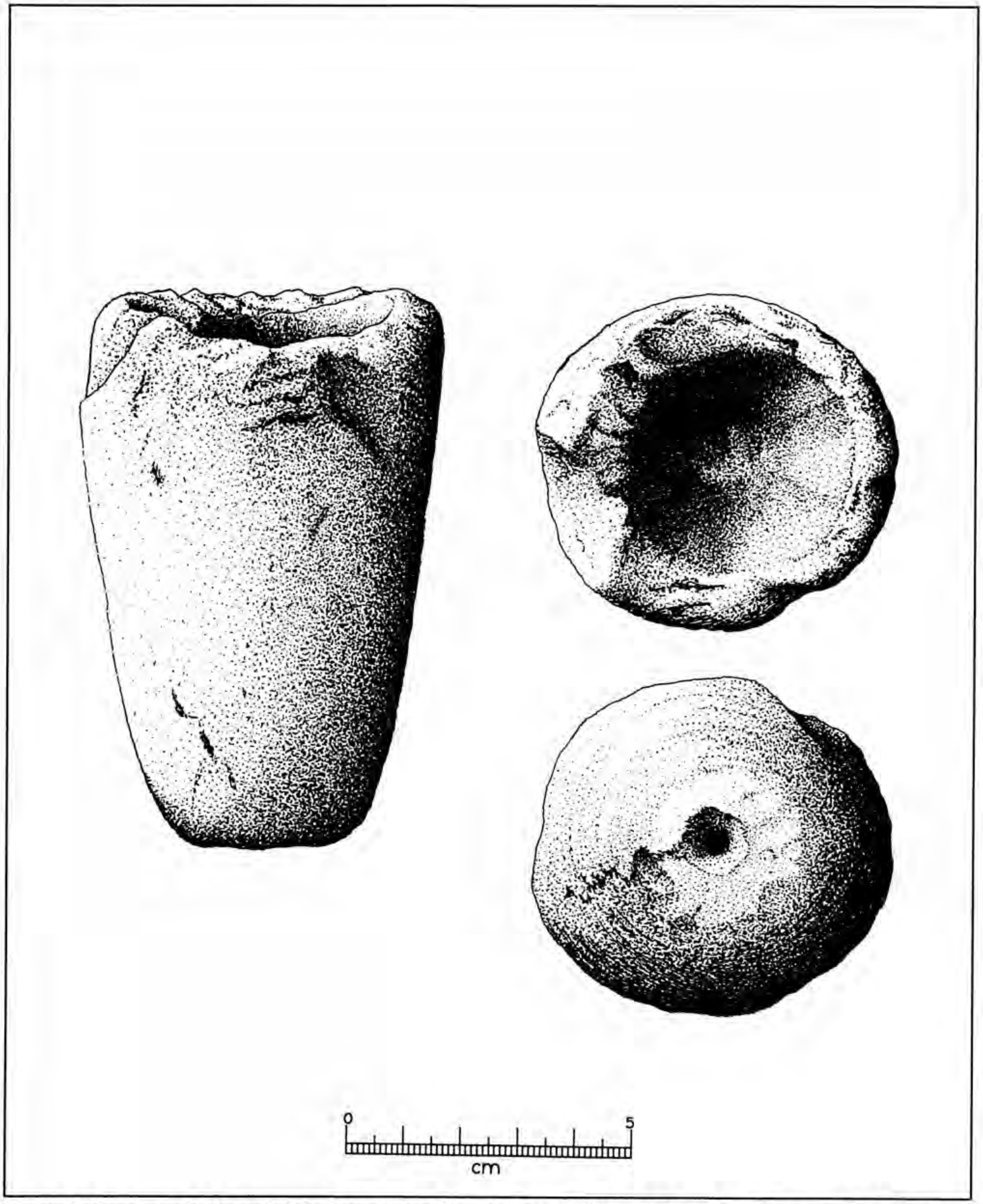


Figure 2. Specimen 2. An unfinished stone pipe from the Texas side of Falcon Reservoir south of the town of Zapata in Zapata County.

have crumbled from the gouging efforts and there is a longitudinal crack in the outer wall from the stem end that is visible in the bottom of the incomplete bowl.

This material appears to be of such poor quality it probably would not have survived intact to complete it as a finished pipe. It is probable the artisan working on it recognized this fact and discarded this piece to devote his efforts to something of better quality.

Unfinished stone pipes are not common and are rarely reported or illustrated in the literature. Their description and illustration do aid in the interpretation of the technology of their manufacture. A somewhat similar unfinished stone pipe from near the mouth of the Salado River at Falcon Reservoir on the Tamaulipas side is previously reported (Chandler and Kumpe 1994).

Almost all stone pipes are pecked, or pecked and ground, to shape; then the ends are drilled a short distance to provide a starting place for the gouging out of the bowl. The bowl is almost always finished by reaming, which usually leaves some of the gouge marks visible. When the finished bowl is oval in cross section it may be drilled or reamed, then finished with some scraping, as in the case with Specimen 1 in this report.

ACKNOWLEDGMENTS

These two pipes were recovered by James B. Boyd and I thank him for their loan for study and documentation, and for his help with information needed to get them on record. I also give special thanks to Richard McReynolds who prepared the drawings.

References Cited

Chandler, C. K. and Don Kumpe
1994 Tubular Stone Pipes from the Lower Rio Grande Valley. *La Tierra* 21(3):14-21.

Jackson, A. T.
1940 Tubular Pipes and Other Tubes in Texas. *Bulletin of the Texas Archeological and Paleontological Society* 12:69-86.

PUBLICATION NOTICE

Southeast Texas Archeology, 1996, by Leland W. Patterson, Houston Archeological Society, Report No. 12.

A synthesis of Southeast Texas archeology is presented for all geographic areas and time periods of this 21-county region. This report contains many data and details that were not possible to include in the limited space of the author's 1995 paper on this subject in TAS Bulletin 66:239-264. The price of this report is $10.00 postpaid. Orders may be sent to the Houston Archeological Society, P.O. Box 6751, Houston, Texas 77265-6751.

AUTHORS

JAMES BRYAN BOYD is a police officer and is a Regional Steward assisting the Office of the State Archeologist along the borderlands area of Texas. His interest in archaeology extends into the states of Tamaulipas, Nuevo León, and Coahuila, Mexico. The area which he is most interested in is the area round Falcon Reservoir, where he is currently recording numerous sites with the Texas Archeological Research Laboratory (TARL) at Austin. Mr. Boyd currently has several ongoing projects with TARL, and has made nearly 600 expeditions into the field.

C. K. CHANDLER, Documentation Chairman of STAA, is a retired railroad management official and engineering consultant with an insatiable interest in Texas archaeology. He is Past President of the Texas Archeological Society and a member of the Coastal Bend Archeological Society. C. K. was the 1985 Robert F. Heizer Award winner for his extensive work in south Texas archaeology (see Vol. 13, No. 1). Also, in 1985, he recorded more archaeological sites with the Texas Archeological Research Laboratory than any other individual. C. K. is a valued contributor of manuscripts to *La Tierra* and the *Bulletin of the Texas Archeological Society*, covering such varied subjects as metal points, rock art, and hearthfield sites in Terrell County. He has been honored by being named a TAS Fellow, and was also appointed as a steward for the Office of the State Archeologist. The Chandlers reside in northern San Antonio.

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DON KUMPE is a lifelong native of the Lower Rio Grande Valley. He and his wife, Mary, own and operate a jewelry store on South Padre Island. The store's specialty is jewelry that is designed and finished "while-u-wait." Don is a member of STAA. As a teenager he began collecting artifacts while on camping trips in Starr County. This led to his 30 years of continuous interest in the archaeology of the Lower Rio Grande River. His collaboration with C. K. Chandler on several articles in *La Tierra* has led to some very interesting documentation of artifacts.

MARCHBANKS received his Bachelor's degree in Anthropology at the University of Texas at San Antonio and his MA at the University of Texas at Austin. He has made archaeological field studies in Texas and Bolivia, using chemical analysis of skeletal remains to determine burial sequence, and pottery utilization by lipid analysis. He is currently completing his PhD in Archaeology at the University of Wisconsin, Madison.

BRYANT SANER, JR. grew up in the Kerr County area and presently lives in Kerrville. He developed an interest in archaeology at an early age, first hunting "Indian relics" when he was six or seven years old. In 1968 he was a charter member of the Hill Country Archeological Society, serving as publicity secretary. Bryant is presently a member of STAA and TAS. We are glad he is staying with *La Tierra* as a contributor.

THE SOUTHERN TEXAS ARCHAEOLOGICAL ASSOCIATION

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

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