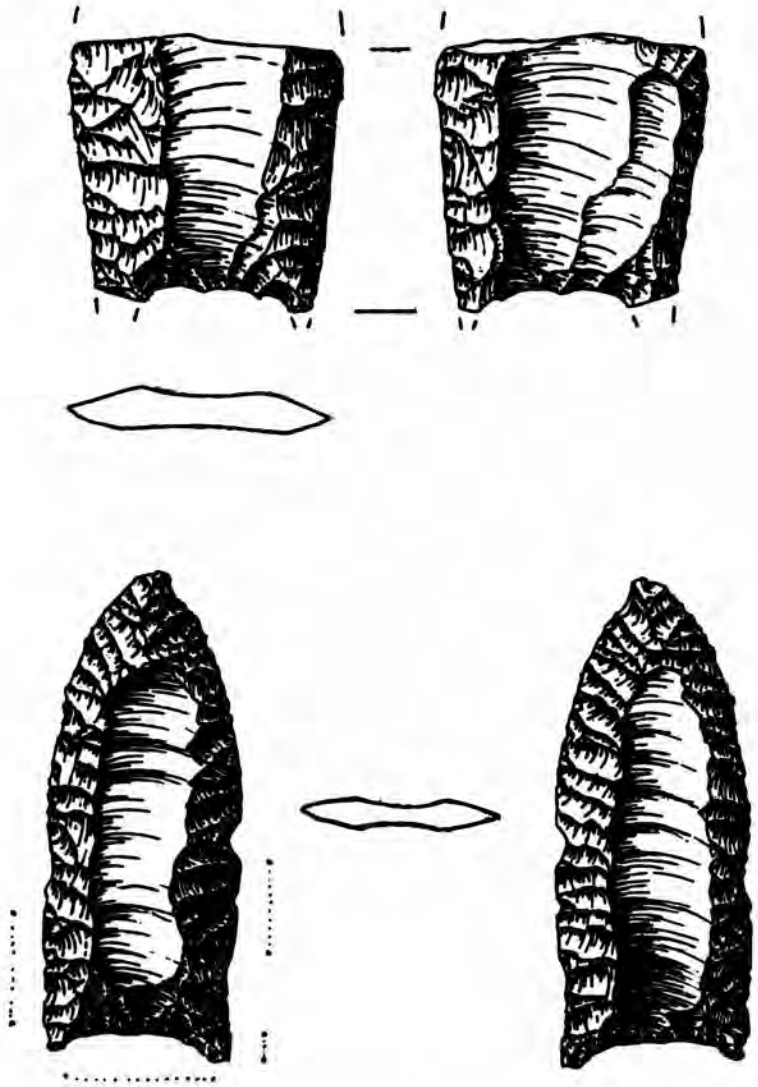
La Tierra



Volume 30
No. 1 & 2
2003

Journal of the Southern Texas Archaeological Association

Contents

Notes on South Texas Archaeology 2003: 1 & 2,
Trace Element Analysis of an Obsidian Artifact from Mission San Juan Capistrano, Bexar County, Texas

Thomas R. Hester, Frank Asaro, Fred H. Stross, Robert Giauque, and Robert J. Hard

The Center for Archaeological Research at The University of Texas at San Antonio (CAR) carried out testing in the area of a proposed service drive at Mission San Juan Capistrano (41BX5) in November 1997. The results of this research, and additional excavations in 1999, have been reported by Cargill and Robinson (2000). Appendix III in their report (authored by Hester, Asaro, Stross, and Giauque) contains the details of a geologic source analysis of an obsidian flake found during their fieldwork. Since reports published through cultural resource management studies typically do not reach a very large audience, we felt that it was appropriate to summarize the findings here, particularly in the context of the Texas Obsidian Project (TOP), the results of which have often appeared in the pages of *La Tierra.* Furthermore, as far as the senior author knows, no obsidian artifacts have previously been found in 18th century Spanish Colonial sites in Texas or northeastern Mexico. Arnold and Weddle (1978) report obsidian blades from the 1554 shipwrecks off Padre Island, but these specimens are made of the distinctive green obsidian from the source of Sierra de las Navajas (Pachuca) in central Mexico.

The specimen from San Juan Capistrano (Figure 1) is the proximal section of a small blade-like flake. While it resembles a fragment of a Mesoamerican blade, closer examination revealed that the bulb of percussion is at one corner of the ventral surface and that the artifact had been detached as a flake. Moreover, half of the dorsal surface is covered in cortex (note the stippled area in Figure 1). The flake is 19.5 mm long, 17 mm wide, and 5 mm thick. It weighs 2 g.

The obsidian flake was found in the excavation of Unit 2 at San Juan Capistrano in November 1997. It came from level 4 at 18-24 inches below the surface and was cataloged at CAR as Lot 6. According to an excavation summary provided by CAR director Dr. Steve Tomka, levels 1-3 in Unit 2 contained indications of disturbance and the mixing of Spanish Colonial and post-Colonial materials. Indeed, in Level 4 (the provenience of the obsidian flake), there was a chunk of concrete which appeared to have been poured in place, perhaps the footing for a relatively recent post. Thus, Tomka suggests that the disturbances noted in Unit 2 may have been fairly localized.

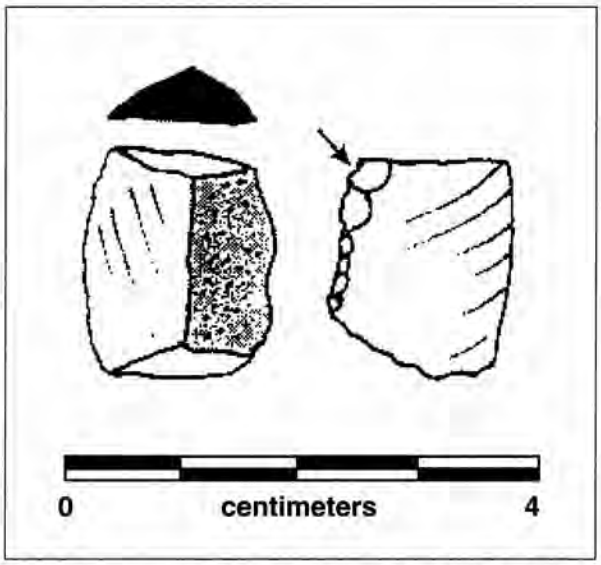


Figure 1. Drawing of the obsidian flake (TOP-203) from Mission San Juan Capistrano. The stippled area represents cortex.

When the senior author first examined the artifact, it appeared to be made from a smoky blue-gray obsidian. While visual identification of obsidian sources is highly risky, it was suggested that the artifact might be from the Malad, Idaho source. Obsidian from that source has been found in numerous Texas sites, is typically of blue-gray obsidian, and is usually Late Prehistoric in age. It would have not been surprising, therefore, if a member of an early 18th century mission Indian group might have had some obsidian traded into the area in Late Prehistoric times, since some of the contexts for Malad obsidian in Texas are quite late in the Late Prehistoric or perhaps even of Protohistoric age.

However, it was fortunate that the identification of the obsidian was not based on "visual traits" or on "experience in looking at obsidian artifacts," since it turned out that the senior author's guess was wholly wrong! Through the courtesy of Dr. Robert J. Hard, then the director of CAR, the obsidian specimen was sent to the Lawrence Berkeley National Laboratory for non-destructive trace element analysis. Frank Asaro, Fred Stross, and Robert Giauque, longtime colleagues in the TOP, carried out the research. The artifact was assigned the designation of TOP-203. Precise x-ray fluorescence (PXRF) was conducted by Giauque using previously published techniques (Giauque et al. 1993). As the name of the technique implies, it is able to provide more detailed trace element data than traditional XRF approaches, and it rivals the precision of neutron activation analysis (INAA), which is a destructive, and usually much more expensive, process.

The PXRF analysis revealed that eight trace elements had the precision and reliability for determining the geologic source of the obsidian artifact (see Figure 3 for details). These data were used to make a preliminary source determination, and were then compared to 24 published reference specimens from that region (all having trace element information obtained either through INAA or XRF analyses done at the Lawrence Berkeley National Laboratory). Particularly distinctive was the Barium content, and when combined with other trace element minerals found in TOP-203, the specimen could be conclusively linked to reference samples from the Ucareo obsidian source in western Mexico (see Figure 3).

The Ucareo source was originally recognized as an important Mesoamerican obsidian outcrop by Hester et al. (1973). However, the most comprehensive studies of the source have been done by Dan Healan (e.g., Healan 1997). His research is critical, because there is some internal trace element variability within the Ucareo source. Additionally, it has a nearby "twin" source known as Zinapecuaro, heavily exploited by the peoples of the ancient Mexican center at Tula (see Figure 2). Healan graciously sent detailed trace element analysis from his studies to Asaro and Stross; these included data obtained both by INAA and by XRF at other institutions. Utilizing

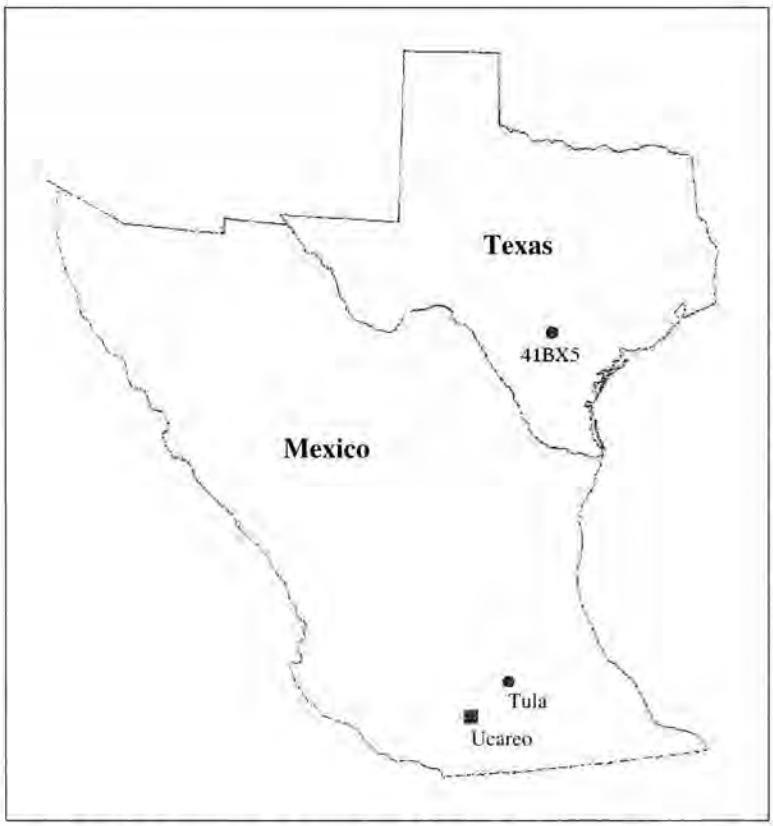


Figure 2. Map showing the locations of San Juan Capistrano (41BX5), the Ucareo obsidian source, and the Mexican site of Tula.

Element abundances and ratios for TOP-203 and Ucareo Chemical Group II[1]

		LBNL Ucareo Chemical Group II						
	TOP-203 PXRF	LBNL[2] INAA	Joyce[3] INAA	UCAR-IA (LBNL)[4] INAA	UCAR-IA (LBNL)[4] PXRF	LBNL[5] XRF	Mean and RMSD of N values[6]	Dev.[7] %
N→	1	5	5	1	1	8	(N)	
Element abundances								
Fe, %	0.757 ± .015	0.788 ± .018	----------	0.760 ± .010	0.773 ± .015	----------	0.782 ± .018 (7)	-3.2
Rb	150 ± 3	157 ± 8	----------	153 ± 4	150 ± 3	----------	152 ± 4 (2)	-1.3
Y	24.8 ± .5	----------	----------	----------	24.0 ± .5	----------	24.0 ± .5 (1)	+3.3
Zr	120 ± 2	----------	----------	----------	118 ± 2	----------	118 ± 2 (1)	+1.7
Nb	13.0 ± .3	----------	----------	----------	12.9 ± .3	----------	12.9 ± .3 (1)	+0.8
Th	15.4 ± .7	14.8 ± 0.2	----------	14.9 ± 0.2	15.5 ± .6	----------	14.8 ± 0.2 (6)	+4.1
Sr	14.8 ± .8	----------	----------	----------	14.3 ± .8	----------	14.3 ± .8 (1)	+3.5
Ba	172 ± 5	163 ± 10	166 ± 9	166 ± 12	162 ± 5	177 ± 11	169 ± 11 (20)	+1.8
Average deviation for 8 element abundances = 2.5%								
Element abundance ratios from PXRF or XRF measurements								
Sr/Zr	0.124 ± .003	----------	----------	----------	0.121 ± .003	0.137 ± .032	0.121 ± .003 (1)	+2.5
Rb/Zr	1.258 ± .009	----------	----------	----------	1.269 ± .009	1.231 ± .041	1.269 ± .009 (1)	-0.9
Average deviation for 2 element abundance ratios = 1.7%								

[1] Abundances are expressed in parts-per-million except for those of Fe, which are expressed in per cent (%). Generally, errors are the larger of the counting errors or, for multiple samples, the Standard Deviations. If PXRF measurements have counting errors below 2%, the latter is taken as the precision of measurement. If ratios of abundances are taken, however, between Rb, Sr and Zr, some systematic uncertainties cancel out and the errors are taken as the counting errors. When LBNL INAA measurements have counting errors below 1%, the latter is taken as the precision of measurement..

[2] Three artifacts (Cert-3, -9, -25) from Andrews et al. 1989, one artifact (Tikal-4) from Moholy-Nagy et al. 1984 and one artifact (786-T) received from N. Hammond and referred to in Stross et al. 1978.

[3] Joyce et al. 1995. Of the nine artifacts assigned to Ucareo by Joyce et al., we assigned RV013 and RVO61 to our subgroup I and RVO12, RVO44, RVO57, RVO58 and RVO60 to our Subgroup II

[4] One of two blades collected by Terence Stocker from Ucareo

[5] Six artifacts (Cert-3, -5, -9, -11, -25 and Cert-34) from Andrews et al. 1989. One (Juan-17) from Guderjan et al. 1989 and one (Tikal-4) from Moholy-Nagy et al. 1984

[6] RMSD is the larger of the average measurement error or the root-mean-square deviation of the N samples

[7] Dev. = Deviation = 100 x ((TOP-203 abundance / Mean) – 1)

Figure 3. Comparative trace element values showing the link between the San Juan Capistrano artifact (TOP-203) and the Ucareo obsidian source.

this information, Asaro and Stross were able to find excellent agreement with Ucareo and are confident that it is the source of the San Juan Capistrano obsidian specimen.

How did the TOP-203 artifact get from Ucareo, 800 miles to the southwest, to San Juan Capistrano? Could it have been a modern "tourist discard?" Archaeologists working in Texas are familiar with the pattern of figurines and other Mexican artifacts (including obsidian specimens that have come to the attention of the TOP) that have been brought into Texas in modern times. These get discarded, in any conceivable number of ways, and sometimes incorporated in to what appear to be archaeological contexts. Given the disturbance noted in Unit 4 in the 1997 excavations at San Juan Capistrano, the possibility of modern introduction cannot be ruled out. However, it is unlikely, as the Ucareo source is not widely used for tourist artifacts, such as the garish green obsidian points that are often brought back from central Mexico! Furthermore, there is a rich material culture record for the mission and its Indian inhabitants (cf. Schuetz 1969).

If the obsidian reached the mission during Spanish Colonial times, as we assume, it does not appear to be linked to the territorial range(s) of any of the mission Indian groups documented at San Juan Capistrano by Campbell and Campbell (1983). It is also unlikely that the obsidian could have been associated with any of the Indian groups who came with the Spanish to the frontier region. The Tlaxcalan (or Tlaxcaltecan) Indians were allies of the Spanish and were sent to the frontier to establish agricultural communities and to help "civilize" the hunters and gatherers of the region. We do not know if they were still making stone tools as late as the 18th century (although the mission Indians certainly were; see Hester [1998]). Studies such as those by E. Butzer (1990; see also Crawford 1976) of Tlaxcalan communities in northeast Mexico in the late 17th century indicate Tlaxcalan settlers who had long been acculturated into the Spanish lifeway. Though they were known

as excellent potters, weavers, and stone masons (Davila Aguirre 1976), it is hard to imagine that they were still making chipped stone tools, particularly of obsidian obtained from distant sources. On the other hand, it is well documented that central Mexican Indian groups continued their lithic technologies well into Historic times (Michels 1971). While much is written about the Tlaxcalans and their role in the colonization of northeastern Mexico, we are unaware of any detailed studies of excavated material culture from any of their frontier settlements.

Finally, the specimen from San Juan Capistrano is a small flake. It could have come from a larger artifact whose form might be culturally or typologically distinctive. The continuing manufacture of stone tools by the Indians in the missions could have led to the incidental acquisition of a piece of obsidian (however it got there from Michoacan!) which was reduced, generating this and other flakes. Co-author Hard notes that the Tarahumara of northern Mexico will boil obsidian flakes, collected from prehistoric sites, in water, and use the water as a treatment for respiratory ailments. While there is no evidence of the medicinal involvement of obsidian in the missions, this example is illustrative of the many non-utilitarian uses of items of material culture.

In conclusion, while this first obsidian artifact from a Spanish Colonial mission in the south Texas-northeast Mexico region has been linked to its geologic source, little is known about it otherwise. It derives from Ucareo in distant Michoacan, but we can offer no meaningful insights as to how the flake (or likely, a larger artifact) reached San Juan Capistrano. The trade routes coming into Texas from Saltillo brought manos and metates made of vesicular basalt (a volcanic material) and a wide range, of course, of other goods. It seems highly unlikely that obsidian would have been included in 18th century trade. It is not mentioned in lists of goods obtained from Mexico, and it has, with this one exception, never shown up in the extensive excavations conducted at the many missions in this region.

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Fluted Points from Comal, Kendall, and Travis Counties, Texas

Richard McReynolds

ABSTRACT

This paper describes Clovis and Folsom points from three south and south central Texas counties.

The base of a Clovis point from Comal County, Texas, and Folsom points from Travis and Kendall counties are documented in this short paper. Figure 1 illustrates the basal portion of a much abused Clovis point. It was a surface find from near a construction site on the Knibbe Ranch in western Comal County. The finder allowed the point to be documented, and the artifact is now in the ranch owner's permanent collection.

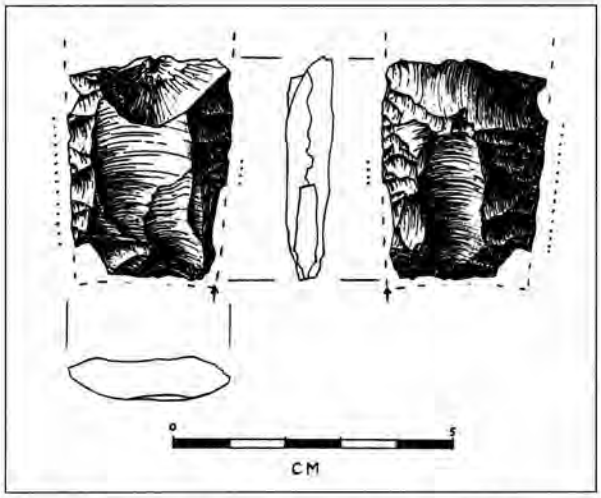

Figure 1. Clovis point from Comal County, Texas.

The maximum length of the existing Clovis fragment is 39.5 mm and the maximum width is 29.5 mm at 32 mm above the base line. The maximum thickness is 8 mm at 28 mm above base line. The artifact is made from Edwards chert, and it is very heavily patinated over all surfaces except two areas that have been altered by heat-induced pot lids. The larger pot lid removed most of the end surface at the original fracture and a large chunk of the upper obverse face. The second pot lid removed the right corner of the base on the reverse side. Pot lid damage occurred after the acquisition of the patina.

The obverse face has two fluting scars (see Figure 1), the larger of which extended well into the missing pot-lidded area. The maximum width of this larger flute is 18 mm. The second flute scar is 19 mm long, 8 mm wide, and extends up the lower right side of the larger flute. The reverse side has only a single flute, which extends 25 mm from the base line and has a maximum width of 12 mm. Thickness between the flutes is 6 mm.

A burin spall was removed from the lower right corner (as viewed from the obverse face) and the scar extends 17 mm up the lateral edge (see Figure 1). The left corner has a scar that is partly obliterated by the pot lid on the opposite side. It was a failure of either base thinning or burin removal. Both lateral edges of the point are ground.

Figure 2 is the basal part of a broken Folsom point found several years ago in Travis County, Texas. It was found on the mostly bare surface of a terrace above a small spring, about 2 km south of Lake Travis on the Colorado River. No other artifacts were found with it.

The artifact is made from a completely patinated Edwards chert that is a light cream color and retains a glossy luster. It was initially broken at or just below the midpoint, which would make it fairly large for the Folsom type. The existing length is 25.1 mm and the width is 25.2 mm. The maximum thickness is 4.0 mm at 17.5 mm above the baseline and the maximum thickness within the flutes is 3 mm. It weighs

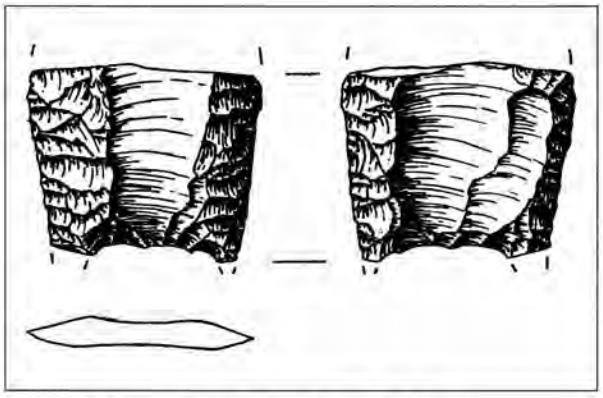

Figure 2. Folsom point, Travis County, Texas.

3.5 grams. The basal width is 20.2 mm. A remnant of the nipple remains in the center of the base (see Figure 2), but both basal ears are partly missing. The obverse face has a single flute scar with a maximum width of 12.5 mm and the flute terminates at the break. The reverse side has two flute scars. The largest is 12 mm wide and also terminates at the break. The second flute ends at 22 mm above the baseline with a maximum width of 6.5 mm. Both lateral edges are ground for 20 mm and 23 mm, respectively.

Figure 3 is a complete Folsom point made from a translucent coffee-brown Edwards chert. This point was found in southeastern Kendall County by Hue Fadal and is in his collection.

The Folsom point is 46.5 mm long and 18.5 mm wide when measured at 24 mm above the baseline. The maximum thickness is 3.0 mm and it weighs 5 grams. The base width is 17.5 mm. The depth of the basal concavity is 2.0 mm and has some light grinding. The lateral edges are ground for a length of 13 mm and 19 mm. There is a single flute on the obverse side that is 35 mm long and 9 mm wide. The single reverse flute is 36 mm long and 10 mm wide. Thickness of the point from within the flutes is 1.9 mm.

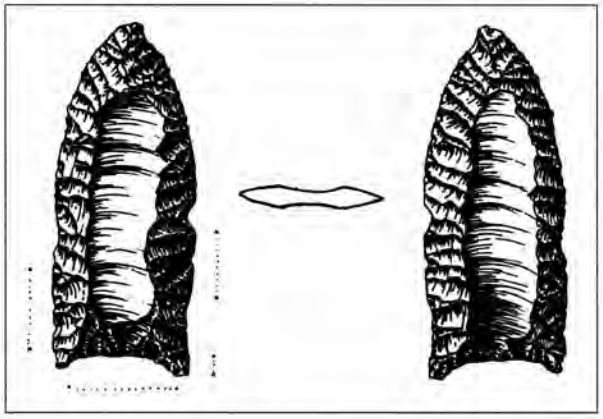

Figure 3. Folsom point, Kendall County, Texas.

Information within the 1995 update on the Texas Clovis Fluted Point Survey (TCFPS) (Meltzer and Bever 1995) mentions the arc of counties along the eastern edge of the Balcones Fault line that have produced Clovis points. The limestone of the Edwards formation provided abundant water, shelter, and chert for making tools. Clovis point counts in each of these counties as of 1995 were seven in Uvalde County; five in Hays County; four in Travis County; three each in Medina, Bexar, and Bell counties; two in Williamson County; and one in Comal County. The commonality of attractions in each of these counties should make them equally habitable, so it is very possible that Clovis artifacts are being found and not reported in some areas. This article adds another Clovis point to the TCFPS for Comal County, Texas.

The Folsom Point Database update (Largent 1995) indicated that no Folsom points had been found in either Kendall or Travis counties. If that information is still valid, the Folsom points in this article will represent the first such points found for these counties.

ACKNOWLEDGMENTS

My thanks to Joe Guillory and Hue Fadal for making these artifacts available and providing information that would otherwise be lost.

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An Informal Burned Clay Experiment at Fort Saint Louis (41VT4), Victoria County, Texas

Bryant Saner, Jr.

ABSTRACT

This article discusses an experiment I carried out on burned clay to evaluate whether color changes in clay can be used as a method for identifying the location of structures at Fort Saint Louis (41VT4), founded in 1685 by Rene-Robert Cavelier de La Salle, and burned by the Spanish in 1690. In the early 1720s, the Spanish built a fort on the same locale. Both French and Spanish forts had wooden, mud-covered structures that were burned.

When clay is burned at between 225 to 900° C, the iron oxides present in the clay will turn various shades of red and orange. These characteristics may be used to help identify the locations of structures, more specifically post molds and wall trenches that are difficult to distinguish in the black and gray clays on the site. Concentrations of red and orange burned clay may be evidence of features in the gray clay.

INTRODUCTION

Structures known as *jacales* were used starting in the Spanish colonial period in Texas. Archaeological evidence indicates *jacales* were common in Spanish Colonial sites. It is likely that such structures are a combination of Spanish and Indian building styles. *Jacales* are built by placing posts in the ground and then covering them with sticks, poles, cane, and grass. The outer layers are covered with a wet clay, and the grass may be mixed with the clay before it is applied to the structure walls. These structures were expedient and easy to construct, and served as housing and storage buildings (Tunnell 2000).

When *jacales* burned, the clay turned into pieces of daub and burned clay. Daub is burned clay with imprints of grass, sticks, and poles in it. The fire-hardened clay without imprints of construction materials is called "burned clay." Daub and burned clay are found together on sites where *jacales* were burned.

SITE HISTORY

On July 24, 1684, French explorer Rene-Robert Cavelier de La Salle departed La Rochelle, France, bound for the New World. Two years earlier he had traveled from Canada to the Mississippi River and on to its mouth. History credits him with being the first European to see the mouth of the river. He claimed all the land drained by the Mississippi for the king of France, Louis XIV (Weddle 1999). La Salle's goal for the 1684 expedition was to find the mouth of the Mississippi River via the Gulf of Mexico. He intended to establish a settlement to trade with Indians and strengthen France's hold on this portion of the New World (Weddle 1999).

The La Salle expeditionary force was made up of approximately 280 people, including four women. His equipment, supplies, and domestic animals for establishing a settlement were on board four ships. The fleet consisted of the Le Joly (man-of-war), L'Aimble (cargo vessel), La Belle (small frigate), and the Saint Francois (ketch); the latter was pirated near Hispaniola as the expedition was sailing to the New World.

In January 1685, landfall was made on the Texas coast near Cavallo Pass, the entrance to Matagorda Bay. La Salle thought this to be the Mississippi River. A temporary camp was set up there. The L'Aimble ran aground while attempting to navigate the pass. In March, the Le Joly returned to France, taking 100 colonists that chose not to stay in the

New World. In June 1685 the 180 people who remained established the permanent settlement of Fort Saint Louis overlooking Garcitas Creek, approximately 6 km upstream from Lavaca Bay. This site is in the southeast portion of present-day Victoria County, Texas.

Two structures were built there with logs, ship timbers, and planks. Structures made of sticks and mud were constructed around the main buildings. In December 1688 or early 1689 approximately 20 people still remained at Fort Saint Louis when the Karankawa Indians attacked the fort, killing most of the occupants and kidnapping several children. A small number of the fort's inhabitants were away from the settlement during the attack. Upon returning, they discovered the mutilated bodies of their comrades around the fort. The corpses were buried and the remaining settlers abandoned Fort Saint Louis (Foster 1998). In 1689, Spanish explorer Alonso De Leon discovered the French fort. He described the main house as a two story structure made of ship's timbers. The other houses were said to be less sturdy and made of stakes and mud inside and out, and they resembled *jacales* (O'Donnell 1936). In 1690, De Leon returned to Fort Saint Louis and burned all the buildings (Bolton 1963).

The construction of Presidio Nuestra Señora de Loreto (La Bahía) was initiated by Marques de San Miguel de Aguayo in April 1722 (Chipman and Joseph 2001). *Jacales* were constructed at La Bahia, and in a written report on the attack and death of Captain Domingo Ramon, the term *jacale* was used to describe the structure where the murderous perpetrators were placed after being captured (Almazan 1724). The large amount of daub and burned clay found during the 1999-2002 excavation at Fort Saint Louis where living and working areas are believed to be located is good evidence that *jacales* were present and were burned (Bruseth and Durst 2002). The presidio was moved about 40 km to the north in 1726 due to Karankawa Indian hostilities (Foster 1995).

METHODOLOGY

Red, orange, brown, gray, and black daub and burned clay were recovered during recent excavation at Fort Saint Louis. In examining these burned materials, I wondered how much heat does it take to change the natural clay used on the *jacales* to the colors listed above, and then I devised an experiment to determine such color and temperature changes. When clay is burned at between 225 to 900° C, the iron oxides present in the clay will turn various shades of red and orange, and these characteristics may be important in helping to identify the locations of structures, more specifically post molds and wall trenches that are otherwise difficult to distinguish in the black and gray clays on the site.

Three colors of dry natural clay were collected at Fort Saint Louis for this experiment. Black clay (7.5YR 2/0) was collected from mechanical trench 1 near the northwest corner of the site. Gray clay (10YR 5/1) was recovered from the remnants of an auger test core sample from near the end of mechanical trench 4. A light yellowish-brown clay (10YR 6/4) was collected from mechanical trench 13 on the eastern end of the site. The black clay came from 0-1 m bs; the light yellowish brown clay was collected from the bottom portion of the trench (0.5-1.0 m bs); and the gray clay was retrieved from at least 0.7 m bs (Wesley Miller, 2002 personal communication).

The black and gray clays are typical of the Lake Charles soils. The black clay is usually found from the surface to about 30 cm bs. The gray clay is found between 115-135 cm bs. The light yellowish-brown clay is most likely part of the Contee soils. It is usually found between 140-200 cm bs. However, the area of mechanical trench 13 has surface soil erosion (Miller 1982). This particular clay may be part of the Beaumont Formation, and erosion may have exposed or at least brought Beaumont Formation soils closer to the surface (Wesley Miller, 2002 personal communication).

Seven techniques were used to expose the specimens to heat to observe any color changes, and the specimens were placed in groups by the type of technique. An identification number was assigned to each specimen and a map was made of where each specimen was placed in the fire. When the specimens were withdrawn from the heat source they were allowed to cool, identification number verified, and then they were stored separately in plastic bags with identification tags.

Some of the clay was soaked in water for one hour and placed in muffin pans that were allowed to dry for 12 hours. The result was a piece of clay

resembling a hockey puck, except the side contracted from top to bottom. The dimensions of these pieces are 60 x 50 x 20 mm in length, width, and thickness. Unmodified, raw, dry chunks of clay were also used; these are pieces of clay collected at the site and not altered in any way from the time they were collected until they were placed in the heat source.

An electric kitchen oven was used as the heat source for some of the specimens. The oven thermostat was set at the temperatures noted in Table 1. The firing pit used in the experiment is made of rock and cement, with fire brick on the floor; the pit measured 153 x 140 x 92 cm in length, width, and height; wall thickness is 25 cm and it has a 3 mm metal lid.

The color of the surface of each dry specimen prior to heat exposure was determined by comparing them to a Munsell (1975) color chart. The dry surface and interior color of each specimen was also recorded after heat exposure (see Table 1). All specimens were dry when the data were gathered. Finally, the color of the burned clay after heat exposure was compared to the different heat exposure techniques.

SPECIMEN DESCRIPTIONS BEFORE FIRING

Different types of heat sources were used to produce a range of temperatures to observe various effects on the clays. The thickness of the clay placed on the walls of the *jacales* is unknown at Fort Saint Louis, but the dimensions of the experimental specimens varied to see if this affected the change in color.

Group I (Specimens 1-3)

Specimen 1 was black clay soaked in water for one hour. Specimen 2 was a gray clay soaked in water for one hour. Specimen 3 was a mixture of equal amounts of water-soaked black and gray clays. All the specimens were placed for 45 minutes in a small fire made of leaves and small sticks.

Group II (Specimens 4-7)

All specimens were black clay, and they were placed in the oven on bake at 260° C. Specimen 4 was in the oven for two hours; specimen 5 for three hours; specimen 6 for four hours; and specimen 7 for nine hours.

Group III (Specimens 8-10)

All specimens were black clay "pucks;" one crumbled prior to firing. The remnants were soaked in water and made into a patty. A large, hot fire was built of 10-13 cm diameter cedar and oak logs in the firing pit and the clay "pucks" were placed in the fire. Specimen 8 was placed on the edge of the fire and removed in 16 hours. Specimen 9 was placed in the center of the fire and removed in four hours. Specimen 10 was placed one-quarter of the way in the fire from the outer edge and removed in four hours.

Group IV (Specimens 11-14)

In this group, each specimen was an unmodified raw, dry clay chunk. Specimen 11 was black clay, specimen 12 was gray clay, and specimens 13 and 14 were light yellowish-brown clay. All specimens were placed in an oven on bake at 149° C for one hour.

Group V (Specimens 15, 17, 19, and 20)

All specimens in this group were unmodified raw, dry chunks of clay. Specimen 15 was gray, 17 and 19 were light yellowish-brown, and 20 was black clay. A large fire was built in the firing pit using leaves and small twigs. Cedar and live oak logs up to 8-10 cm diameter were added, and a bed of coal was allowed to form; the specimens were put on or near to large, hot coals. All specimens remained in the coals for one hour.

Group VI (Specimens 16, 18, and 21)

All specimens in this group were unmodified raw, dry chunks of clay. Specimen 16 was gray clay, specimen 18 was a light yellowish-brown clay, and 21 was a black clay. The same bed of coal used in Group V was used for this group. A hair dryer/blower set on high was directed at each specimen for five minutes. At the end of the blow-drying, each specimen remained in the coals for an additional 15 minutes.

Table 1. Specimen description after heat exposure.

Spec. #	Group	Dimensions in mm	Heat Source	Surface Color	Interior Color
1	I	34 x 30 x 2	Small fire	Black	Light Black
2	I	46 x 41 x 15	Small fire	Black Light Grayish-Brown	Pale Brown
3	I	61 x 32 x 10	Small fire	Black	Tan Pink
4	II	60 x 45 x 20	260° oven	Very Dark Gray	Very Dark Gray
5	II	60 x 45 x 20	260° oven	Very Dark Gray	Very Dark Gray
6	II	60 x 45 x 20	260° oven	Very Dark Gray	Very Dark Gray
7	II	60 x 45 x 20	260° oven	Very Dark Gray	Very Dark Gray
8	III	60 x 45 x 20	Large fire	Dark Gray Light Brown	Dark Gray Gray Reddish-Yellow
9	III	60 x 45 x 20	Large fire	Black	Light Reddish-Tan
10	III	54 x 50 x 26	Large fire	Black Pale Brown	Light Reddish-Brown
11	IV	43 x 35 x 24	149° oven	Very Dark Gray Dark Gray	Very Dark Gray Dark Gray
12	IV	56 x 35 x 24	149° oven	Very Dark Gray Dark Gray	Very Dark Gray Dark Gray
13	IV	52 x 28 x 18	149° oven	Light Gray Dark Gray	Light Gray Dark Gray
14	IV	29 x 24 x 18	149° oven	Light Gray Light Yellowish-Brown	Light Gray Light Yellowish-Brown
15	V	57 x 45 x 23	Large fire	Black Very Pale Brown	Very Pale Brown
17	V	60 x 45 x 17	Large fire	Black Very Pale Brown	Very Pale Brown
19	V	45 x 26 x 21	Large fire	Dark Gray Light Reddish-Brown	Reddish-Yellow
20	V	60 x 46 x 38	Large fire	Gray Reddish-Yellow Light Brown	Light Brown
16	VI	51 x 48 x 26	Large fire with blower	Black	Pink
18	VI	70 x 40 x 30	Large fire with blower	Black Gray	Very Pale Brown Very Pale Brown

Table 1. *(Continued)*

Spec. #	Group	Dimensions in mm	Heat Source	Surface Color	Interior Color
21	VI	71 x 44 x 41	Large fire with blower	Dark Gray Gray	Reddish-Yellow Light Red Reddish-Black
22	VII	36 x 26 x 20	Large fire hot coals	Dark Gray Light Yellowish-Brown	Light Yellowish-Brown
23	VII	44 x 35 x 29	Large fire hot coals	Very Dark Gray Reddish-Yellow	Reddish-Yellow
24	VII	42 x 40 x 20	Large fire hot coals	Gray Reddish-Yellow	Reddish-Yellow Red
25	VII	50 x 46 x 23	Large fire hot coals	Dark Gray Very Pale Brown	Very Pale Brown

Group VII (Specimen 22-25)

All specimens in this group were unmodified raw, dry chunks of clay. Specimen 22 was gray, nos. 23 and 24 were light yellowish-brown, and specimen 25 was black. The clay chunks were placed on the floor of a brick-lined firing pit and hot coals placed on top of them for 15 minutes.

DISCUSSION

The purpose of this experiment is to observe changes in the color of clay when exposed to different temperatures. These data may be useful in examining the daub and burned clay excavated at Fort Saint Louis for evidence of post molds and other features in the gray clay beneath the black clay found in the excavation units.

The organic material and iron compounds in raw clay will affect their color. Organic material in various amounts will cause the raw clay to be gray or black. The amount and composition of iron compounds is responsible for the red, brown, buff, and/or yellow colors of the raw clay, but the color of raw clay is a poor guide to the color after firing, because this is dependent on the amount and kind of minerals in the clay, the presence of organic materials, and firing conditions.

Dehydration is the first effect heating has on clay. The water begins to be driven out when the clay reaches 100° C in temperature. Oxidation occurs when heat is applied to raw clay, creating chemical changes in some of the minerals as they combine with oxygen. It can start at temperatures as low as 225° C, but is most pronounced between 850-900° C. Vitrification occurs when the temperature is high enough to change the silica in the clay to glass. This can begin at 950° C. At 1050-1150° C, the vitrification process is optimal. At 1300-1400° C, most of the silica in the clay is converted to glass. Dehydration, oxidation, and vitrification usually overlap during firing. No vitrification was noted in the clay used in this experiment, and none was noted in any of the daub or burned clay recovered from the excavations at Fort Saint Louis. This indicates temperatures were not hot enough for vitrification to take place in the specimens used in this experiment or in the daub and burned clay from Fort Saint Louis.

Organic material is present in the black clay at Fort Saint Louis (Wesley Miller, 2002 personal communication). Clay that is black because it has organic material generally turns cream to red-brown in color,

and may even turn white when completely oxidized during firing. Clays that are incompletely oxidized are usually gray in color. Clay with organic material that is fired at low temperatures is usually black after firing. Iron oxide is the mineral most commonly known to affect the color of fired clay, turning it shades of red when oxidized (Shepard 1968). Such colors in the daub and burned clay indicates that iron oxides are present in the soil at Fort Saint Louis.

Various shades of black, gray, brown, and red are seen in the heated clay from Fort Saint Louis (see Table 1). The hot fire was associated with reds and browns after firing. The red to brown colors may have been caused by the organic material and/or by the iron oxides in the clay. That these colors were noted after firing indicates the presence of organic material in the clay and/or the fact that temperatures, high enough for oxidation, were achieved during the burning of the structures. The abundance of leaves and grass on the site is the most likely source of the organic material in the clay. The lower the firing temperature of the clay, the more gray that is obtained in the burned clay pieces. Gray is common in the oven-controlled heat source, but only one brown and no reds were produced in the oven heating (see Table 1). The temperature was not hot enough for oxidation to take place in the experimental range of 149-260° C. Grays were produced at high firing temperatures. This gray may be from incomplete oxidation caused by a greater distance from the heat source. Those specimens farthest from the fire or facing away from it were not hot enough for oxidation or else the oxidation of the clay was incomplete.

This experimental study allows limited interpretation of the daub and burned clay colors and the relative temperatures produced by fires during the burning of structures at Fort Saint Louis. Iron oxides must be present, and temperature high enough for oxidation to take place, to obtain shades of red and browns found in the specimens in the experiment.

The presence of red and brown colors in the daub and burned clay found at Fort Saint Louis indicate that fires were hot enough to oxidize the clay on the *jacales* when they were burned. The reddish daub and burned clay indicates areas where *jacales* once stood at the site. They were torched and as they burned and collapsed to the ground, the hottest fires turned the clay on the structures and adjacent ground primarily shades of red and brown, and less commonly black and gray.

Identification of features in the upper 30 to 70 cm of the soil at Fort Saint Louis is problematic because they do not show as different colors of soil in the black clay layer. Beneath the black clay is a gray clay, and post molds and wall trenches are more readily identifiable in this soil. I thought that excavation areas with concentrations of red and orange burned clay and daub material in the black clay zone may be indicative of post molds from burned structures in the gray clay zone. Accordingly, eight 1 x 1 m units containing red and orange burned clay or daub were photographed and recorded as part of this experimental study.

Only one of the eight (12.5%) units had a post mold visible in the gray clay. Thus, the red and orange burned clay and daub in the black clay is not good evidence for the presence of post molds in the deeper gray clay. This archaeological evidence more likely suggests that fires, possibly from the larger wood in the *jacales*, burned where the red and orange material is found in the archaeological deposits. Nevertheless, the presence of daub and burned clay is indicative of structures.

In the experiment discussed in this article, the hottest temperatures were obtained where the largest pieces of wood were burned. This suggest how some of the clay used on the *jacales* and on the ground turned shades of red and orange. The areas where concentrations of red and orange daub and burned clay are found indicates the probable locations of structures, and can be useful in site structural analysis of other classes of remains at Fort Saint Louis.

ACKNOWLEDGMENTS

A great debt of gratitude is owed to Jim Bruseth and Mike Davis for giving me the opportunity to conduct this experiment and for allowing the use of the Fort Saint Louis Archeological Project lab for analysis of the specimens. Bill Pierson deserves many thanks for his assistance with the photography. Thanks also to the late Curtis Tunnell for his suggestions and encouragement during the experiment.

The Fort Saint Louis Archeological Project crew are thanked for the assistance they provided. Wes Miller provided soil identifications. I am grateful to Rusty Greaves for his review, suggestions, and encouragement provided during the writing of this paper. Thanks to my wife, Karyn, for the initial editing of this article, and thanks to Timothy K. Perttula for the final editing.

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Shovel Testing at the Parker Site (41GL283), Gillespie County, Texas

Bryant Saner, Jr.

ABSTRACT

The Parker site is on private land that is contiguous to a state highway. The work was done to determine what kind of archaeological materials are present on the site and what archaeological deposits may be expected in the adjacent Texas Department of Transportation right-of-way.

INTRODUCTION

The Parker site (41GL283) is located in a plowed field on private land adjacent to a state highway in south central Gillespie County, Texas (Figure 1). This site is on an alluvial terrace approximately 70 m from the Pedernales River. It is highly likely that a small portion of this site extends onto Texas Department of Transportation (TxDOT) right-of-way (ROW). I felt it would be advantageous to TxDOT to have knowledge of the cultural materials on a ROW of a major highway. This may save time and perhaps taxpayer's money should a situation arise that requires construction or repair on this part of the highway ROW.

THE SITE

The Parker site is a burned rock midden located in a field that has been plowed for many years. Fire-cracked rock is scattered over a large area in the southwestern corner of the field. A heavy concentration of fire-cracked rock about 65 x 30 m in size is near the center of the scatter, although the boundaries of the midden are ephemeral due to years of plowing. The soil below the plowed level appears to be intact.

The Parker's purchased approximately 75 acres, including this field, in the mid-1990s. The site was first visited and recorded in 1997 (Saner 1997). It has been surface collected for many years and the owners have surface collected occasionally during their ownership of the land. However, a collector was allowed to dig a pit in the fire-cracked rock concentration about a year ago. Bulverde, Lange, Marshall, and Nolan dart points were found on the surface by the Parkers'. The artifacts from the pit shown to me were Pedernales, Bulverde, and Nolan dart points (see Turner and Hester 1999). A nodular cobble with one end removed, along with many tabular cobbles of flint, was also seen on the surface of the site, along with lithic flakes.

SOILS

The soils here are classified as the Frio soil, which are found in fossil floodplains close to streams. The soil is a dark grayish-brown, moderately alkaline, silty clay loam from the surface to about 61 cm bs. Below this is a grayish-brown, moderately alkaline, silt clay from 61-119 cm bs, followed by a brown, moderately alkaline silty clay from 119-155 cm bs (Allison et al. 1975).

METHODOLOGY

Five shovel tests were placed near the fence between the field and the TxDOT ROW (see Figure 1). The shovel tests were placed 2-4 m north of the fence, and excavated in 10 cm levels. The shovel testing was done in early September 2000 after a long, hot, and very dry summer; consequently, the soil in this area was difficult to break apart, and the sediments got harder as the shovel tests went deeper.

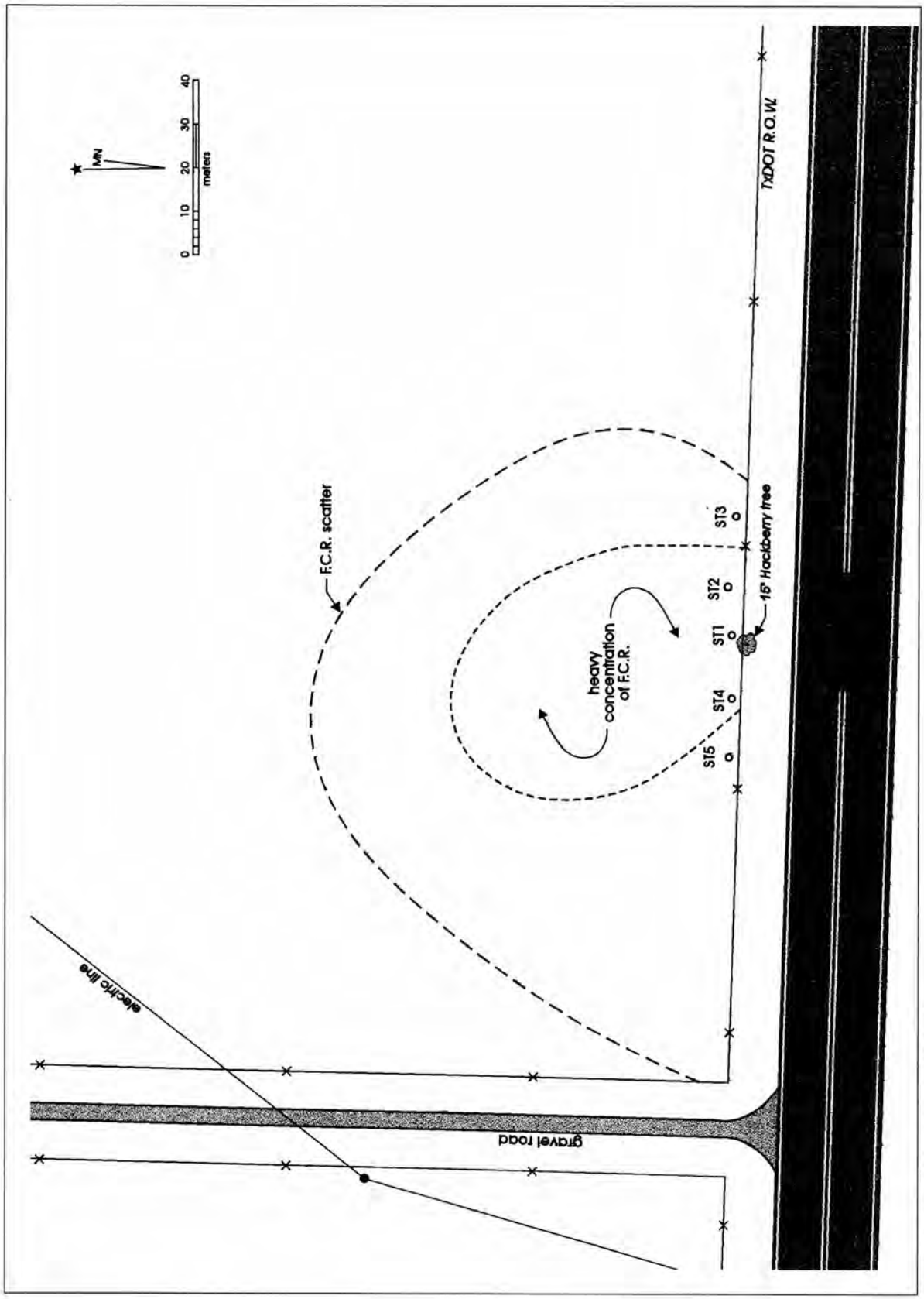

Figure 1. The Parker site (41GL283).

All artifacts, except fire-cracked rock, were collected in a level bag and marked by site number, shovel test number, level, and date. The artifacts were analyzed and returned to the owner. One day was all the time available for the work so the shovel tests were terminated between 40 and 60 cm bs, even when artifacts were recovered in the bottom level.

DISCUSSION

Both prehistoric and historic artifacts were found in the shovel testing at the Parker site. A fragment of thin, clear amber glass was found in shovel test 1 (ST 1), level 3, that closely resembles modern beer bottle glass (Table 1). A fragment of modern clear bottle glass was also recovered in ST 3, level 1. Gravel with road tar on it was found in ST 2 and ST 3 in levels 1 and 2. These finds indicate that the upper part (0-30 cm) of the Frio soil has been disturbed in modern times.

Fire-cracked rock was most common in ST 1 and ST 2, while ST 4 had some and in ST 3 and ST 5 it was rare; actual counts of the fire-cracked rock were not obtained during the work. No fire-cracked rock was noted from 30-60 cm bs. It is very doubtful if any of the fire-cracked rock in the upper levels of the shovel tests are in situ.

No diagnostics artifacts were recovered during the shovel testing. However, the diagnostics recovered at the site during the Parker's ownership include Bulverde, Lange, Marshall, Nolan, and Pedernales dart points. Bulverde and Nolan dart points represent a time period from ca. 4000 B.C. to 2500 B.C., and the Marshall and Pedernales dart points were made between 2500 B.C. and 1000 B.C. The Lange dart point was apparently made from ca. 1000 B.C. to 300 B.C. (Turner and Hester 1999). The site was used for nearly 4,000 years.

The many tabular cobbles present at the site are similar to those I have noted in the nearby Pedernales River bottom. A large pile of new flakes was seen near the river bank. Charles Wanner (2001 personal communication), a local flint knapper, stated this area is well known by knappers as a place to find quality chert. The river area was also used by the prehistoric inhabitants as a source of material to make chert tools.

A total of 503 lithics were recovered from the shovel testing (see Table 1): 385 (76.6%) are tertiary flakes, 107 (21.3%) are secondary cortex flakes, six (1.2%) are primary cortex flakes, four (0.8%) are utilized flakes, and one (0.2%) is a thin biface fragment. Most of these were recovered in the upper three levels of ST 1-3. Shovel test 4 had more artifacts in the lower levels (see Table 1). Late stage chert tool manufacturing and resharpening is indicated by the many tertiary flakes and very few primary cortical flakes.

The four utilized flakes were recovered in the disturbed sediments. Is their apparent use caused by plow damage? Under 10X magnification, no rust marks were seen. A rust mark is the result of a steel object, such as a plow blade, hitting the artifact and depositing a small amount of metal on the surface. Since no rust is noted on the utilized flakes, it is highly likely that the utilized flakes were made as a result of use by prehistoric inhabitants.

In summary, the shovel testing at the Parker site indicates that the soil is disturbed to about 30 cm bs. This was caused by plowing over many years. The shovel testing was done close to the TxDOT ROW so it is possible that some of the disturbance could be associated with road construction and road ditches. The surface of the field had a concentration of fire-cracked rock, but there was little fire-cracked rock below 30 cm bs. This indicates that the fire-cracked rock on the surface in the shovel testing area had probably been moved there by plowing. It is likely that this area was part of the occupational zone around the burned rock midden. The site was used for almost 4000 years (ca. 4000-300 B.C.). Tool manufacturing took place there, especially late stage manufacture. The source for the chert used to make many of the tools was the nearby Pedernales River.

ACKNOWLEDGMENTS

A debt of gratitude is owed to the Parker Family for allowing this investigation to be conducted on their property. Thanks go to Stan Parker and Cathy Welliver for assisting with the shovel testing. Bruce Moses produced Figure 1. I thank Thomas R. Hester and Timothy K. Perttula for their review of this manuscript.

Table 1. Artifact Counts by Shovel Test and Level.

	Prim. Cortex Flakes	Sec. Cortex Flakes	Tert. Flakes	Util. Flakes	Thin Biface Frag.	Thin Amber Glass	Clear Glass	Cement Frag.	Tar on Gravel	Mussel Shell Frag.
ST 1										
Lv. 1	1	2	12							
Lv. 2		32								
Lv. 3		1	48	3		1		1		
Lv. 4		6	38							
Lv. 5			1							
Subtotal	**1**	**41**	**99**	**3**	**0**	**1**	**0**	**1**	**0**	**0**
ST 2										
Lv. 1	2	13	41	1					1	
Lv. 2		4	33						1	
Lv. 3	2	3	28							
Lv. 4		3	2					1		
Lv. 5		1	5							1
Subtotal	**4**	**24**	**109**	**1**	**0**	**0**	**0**	**1**	**2**	**1**
ST 3										
Lv. 1		10	41				1		1	
Lv. 2		11	20							
Lv. 3		1	16							
Lv. 4		5	13							
Subtotal	**0**	**27**	**90**	**0**	**0**	**0**	**1**	**0**	**1**	**0**
ST 4										
Lv. 1			7							
Lv. 2		1	7							
Lv. 3		1	3							
Lv. 4		4	29							
Lv. 5		5	24		1					
Lv. 6	1		4							
Subtotal	**1**	**11**	**74**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
ST 5										
Lv. 1		1	5							
Lv. 2		3	3							
Lv. 3			5							
Lv. 4										
Subtotal	**0**	**4**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total	**6**	**107**	**385**	**4**	**1**	**1**	**1**	**2**	**3**	**1**

The landowner's son, Travis Parker, was a Boy Scout at the time of the investigation. The field work described here gave this young man the opportunity to meet the requirements for his Archeology Merit Badge. This merit badge helped Travis meet one of the requirements for the rank of Eagle Scout. Thanks and congratulations go to Travis Parker for his interest in archaeology and for earning the highest rank obtainable in the Boys Scouts of America.

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Indian Mound Ranch (41WM142) Cache, Liberty Hill, Williamson County, Texas

Kay E. Clarke

ABSTRACT

The original discovery of this cache included 14 large bifaces. Presently there are seven that remain in the possession of the landowners. and these are part of a documented collection of over 2000 artifacts from the Indian Mound Ranch (41WM142).

INTRODUCTION

The Indian Mound Ranch is near Liberty Hill, Texas, in western Williamson County. Clarence and Patrica Jones have lived there since 1975. Pat inherited the ranch from her grandmother, Allye Bell, and it has been in the Whitehead family for 130 years. The ranch is 567 acres that is bisected by the south San Gabriel River, which flows most of the year. Wildlife is plentiful, including white-tailed deer, turkey, gray fox, and raccoon. The abundance of game, vegetation, and water has attracted people to this area for thousands of years.

On the west bank of the river, on a hillside, is a large field of burned rock middens covering approximately 5 acres; this is the Indian Mound Ranch site (41WM142). Several thousand artifacts have been found here, mainly projectile points, over the last 50 years by the landowners. Clarence and Pat Jones have allowed this collection to be documented. The identified points range from a Paleoindian Angostura point to a Late Prehistoric Scallorn arrow point (Turner and Hester 1999). The cache of 14 large bifaces reported on in this article was discovered a few meters from the burned rock middens, although the exact location is unknown. The Jones lease a portion of their ranch for deer hunting. The hunters that found the cache noted that some portion of the cache was sticking out of the ground; they dug them up and brought them to Clarence and Pat. The Jones then gave seven of the bifaces in trade for labor on the ranch.

LARGE BIFACES

None of the seven remaining pieces in the cache have been heat-treated, basally thinned, or beveled. They have been shaped by percussion flaking, and range from 109-161.89 mm in length, 52-82.16 mm in width, 12-19.96 mm in thickness, and weigh between 88-251 grams (Table 1). Their color is gray to brown Edwards chert (Dan Potter, 2003 personal communication). Short wave fluorescence examinations of the seven bifaces were made, and they emitted a pumpkin-orange hue. There is little fluorescence color difference between the pieces due to a lack of development of patina because they were apparently buried shortly after manufacture (Michael B. Collins, 2003 personal communication).

Artifact 4000 (Figure 1e) has a straight base. The right and left edges on the obverse side are convex and very jagged. The biface is also asymmetrical because the left edge of the distal point draws to the right. The reverse side has a deep gouge that begins at the base and extends into the body of the biface. The break measures 46.56 x 16.04 x 11.29 mm in length, width, and depth, almost penetrating into the obverse side.

Artifact 4001 (see Figure 1c) has a straight base. The obverse side has light-colored blotches that contrast with the dark gray color across the face. Near the base is a patch of cortex. The biface is symmetrical, although both edges are rough and jagged. Near the distal point is a V-shaped break that extends 16.3 mm into the body; this break penetrates 8.64 mm

Table 1. Measurements of the Indian Mound Ranch cache (41WM142).

Artifact No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
4000	116.68	55.93	17.46	95.0
4001	109.83	55.40	13.97	95.0
4002	161.89	82.16	19.86	251.0
4003	120.86	63.25	12.01	108.0
4004	124.24	52.73	15.45	118.0
4005	111.68	54.18	14.24	88.0
4006	112.81	53.02	14.33	88.0

into the reverse side. This break (and the breaks on Artifacts 4000 and 4005) may have been caused when the cache was pulled from the ground. The reverse side also has a small amount of cortex near the base.

The third biface (Artifact 4002) is the largest one in the cache (see Figure 1f). The base is strongly convex. There is a narrow band of cortex on the obverse side near the distal end. The biface is a dark gray to black in color, with lighter bands from the point to the base.

The base is irregular in shape on both faces, and both sides have breaks or damage, probably caused by flaking. One large flake (25.04 x 24.74 mm) was removed that encountered a thick knot of material, and rings of percussion radiate outward from that point towards the right edge of the biface.

Artifact 4003 has a poorly defined base (see Figure 1b), and is a dark gray color. The obverse edges of the biface along the body are convex, and the right edge is very jagged. The distal point is not sharp, and the tip itself is broken. The reverse face has larger flake scars, and some of them run diagonally from edge to edge across the body.

Artifact 4004 has a rounded base and a thin layer of cortex (see Figure 1g). Other than a band of light gray chert on the obverse side, the remainder of the biface is a dark gray color. The left edge of this piece is convex, while the right edge is straight from the distal tip to near the base. The reverse side has deep flake scars.

The sixth biface (Artifact 4005) is symmetrical, with a rounded base (see Figure 1d). There is a small amount of cortex on both sides near the distal point. The flaking is very smooth across the piece. The chert is gray, except for a narrow black band running down the middle of the blade. The reverse side has light-colored flake scars that have produced a curved ridge or knot of material between the base and distal tip.

Artifact 4006 has a flat and straight base, and a symmetrical body (see Figure 1a). The face of this piece is smooth and the flaking has produced no ridges or gouges. A very large flake covers most of the right edge and center of the biface, and has left a high ridge. As a result, the right side of the biface is thinner (9.70 mm) than the left side (14.08 mm).

DISCUSSION

Clarence and Pat Jones have taken steps to preserve significant archeological sites (prehistoric as well as those of their family) on their ranch. The Indian Mound Ranch site (41WM142) has been known locally for years, but we will never know how many artifacts have been removed from the site. Since Clarence and Pat have over 2000 artifacts in their collection, how many thousands more had been removed before they became heirs of Indian Mound Ranch?

In February 2003, the Indian Mound Ranch site became a State Archeological Landmark. Other sites are now also being recorded and documented on their property, and they are to be commended for their efforts to preserve bits of Williamson County prehistory and history for future generations.

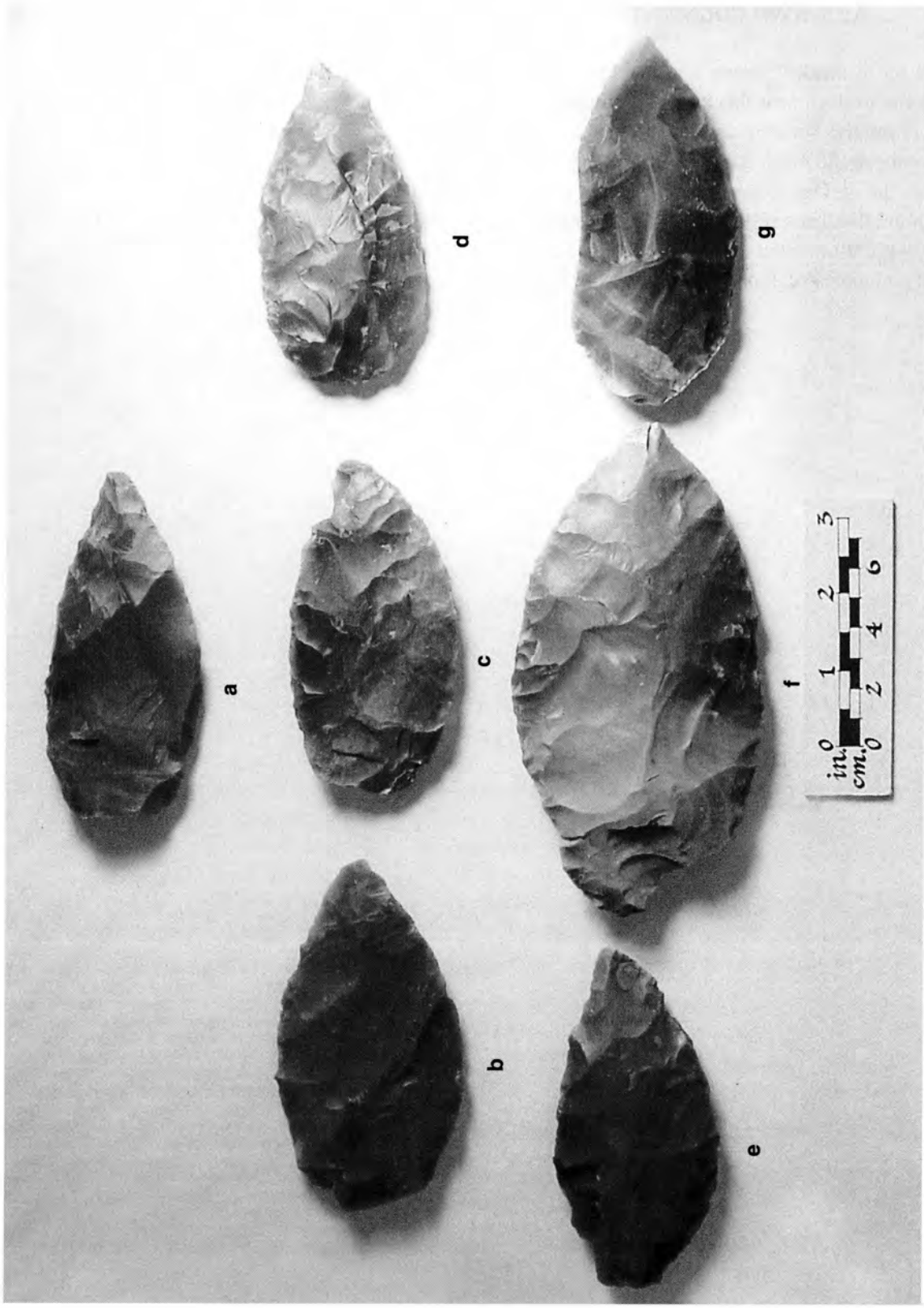

Figure 1. Indian Mound Ranch cache: a, Artifact 4006; b, Artifact 4003; c, Artifact 4001; d, Artifact 4005; e, Artifact 4000; f, Artifact 4002; g, Artifact 4004.

ACKNOWLEDGMENTS

I want to thank Clarence and Pat Jones for allowing me to document this cache. I intruded upon them constantly, but they always had the collection and their beautiful ranch at my disposal at any time. I am grateful to Dan Potter for giving his time to photograph the Jones collection, and always providing me with information and patience to get the task at hand accomplished. Finally, thanks to Mike Collins for the conversations that helped me to understand the methods of chert fluorescence.

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The Young Site (41BX1428): A Burned Rock Midden and Archaic/Late Prehistoric Occupation Along the Southeastern Edge of the Edwards Plateau

David L. Nickels, Richard Young, and Rita Young

ABSTRACT

Preliminary testing at the Young site (41BX1428) along Potranco Creek in western Bexar County indicates that Native Americans used the local limestone cobbles as heating elements, forming extensive ovens. Diagnostic projectile points at the site suggest it may have been occupied as early as 9000 years ago.

INTRODUCTION

When the junior authors of this article purchased their 1.5 acres on Potranco Creek over 20 years ago (Figure 1), they had no idea that they had purchased a parcel that had been occupied by hunters and gatherers seeking the same sense of solitude and communal security thousands of years before them. The Young's knew something was different about their property when landscaping activities continued to bring up thousands of "funny-shaped and gray rocks" along with rocks that appeared to be chipped by humans. Rick Young meticulously screened some of the backdirt from sewer and water line ditches dug on the property, and collected several chipped bifaces. In the meantime, the Young family collected several expedient and formal tools, including a few diagnostics, from the surface. It was when Rita Young decided to ask archaeologists Dave Nickels and Steve Tomka about their collections that the investigation described in this article began in earnest.

SITE AND AREA DESCRIPTION

The Young site site is on an alluvial terrace made up of Patrick clay loam, approximately 3 m above the edge of Potranco Creek, and covers a ca. 40 x 50 m area (Figure 2). A secondary tributary stream 16 km long, Potranco Creek drains an area of gently rolling, and sometimes rugged, topography, on the Edwards Plateau. With its headwaters on the plateau east of Riomedina in eastern Medina County, it eventually empties into the Medina River in southwestern Bexar County (Potranco Creek 2001). Patrick soils are generally underlain by a chert gravel layer eroded

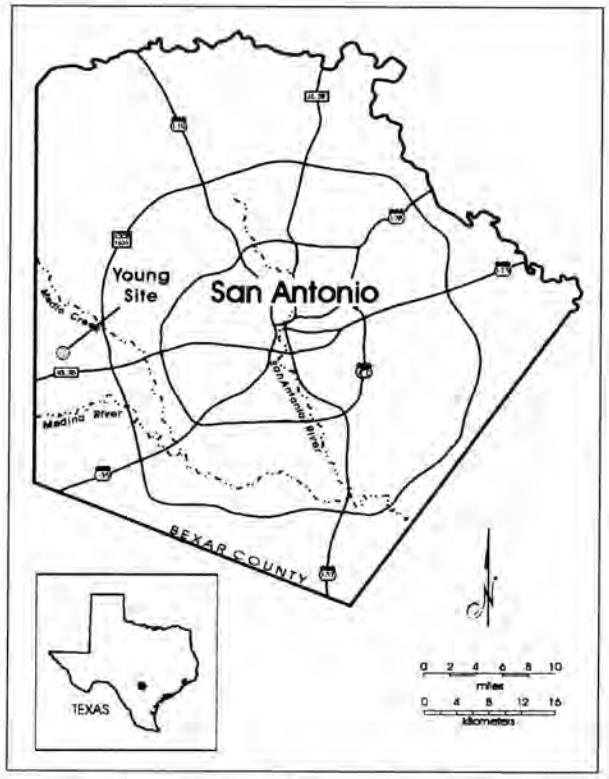

Figure 1. Location of the Young site in Bexar County and Texas.

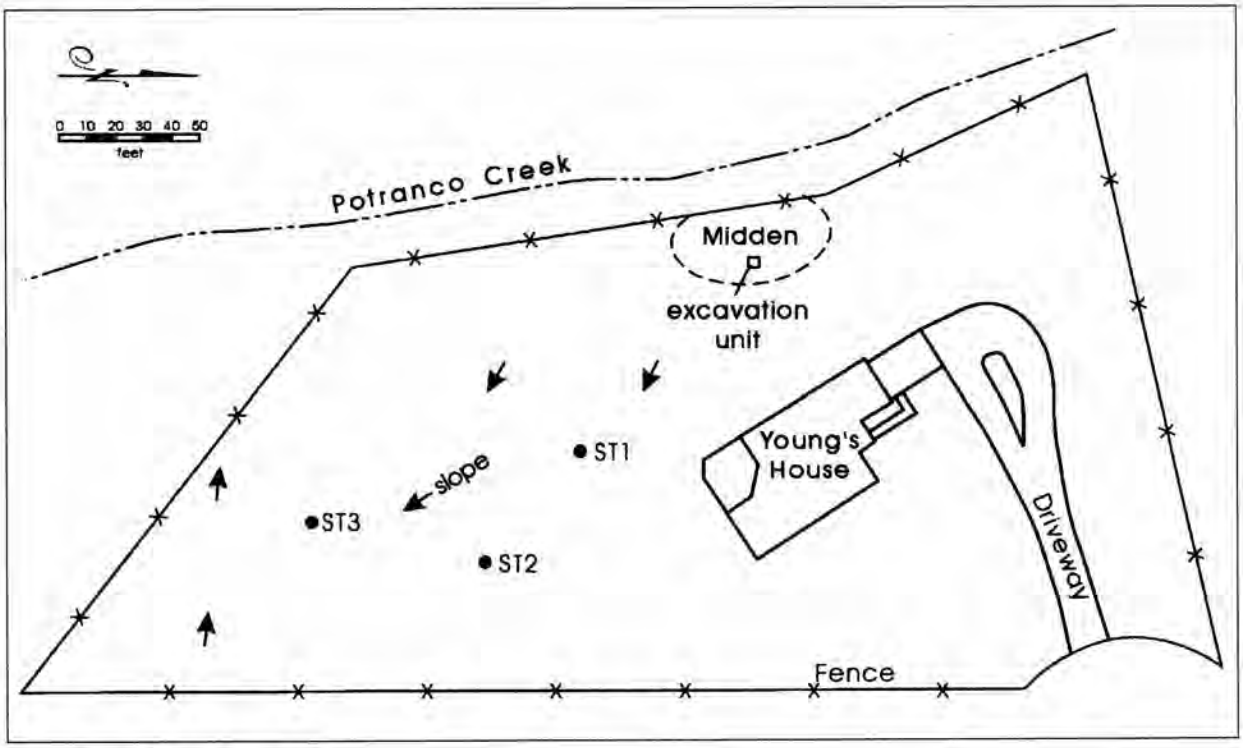

Figure 2. Map of the Young site.

from the Edwards Formation limestone, and they are generally dark grayish-brown in color, with a weak, blocky structure that tends to crack and shift with episodes of wetting and drying (Taylor et al. 1991). Modern-day vegetation consists of mesquite, live oak, and persimmon trees, along with assorted invasive herbaceous weeds and grasses and cacti. Although the home and septic system constructed by the Young's have disturbed a portion of the site, approximately 60% of it appears to be undisturbed.

Rich sources of chert outcrops are present in the Edwards Plateau region. Nodules and cobbles of high-quality Edwards chert gravels are commonly found eroding out of the limestone on the plateau itself, and in creek bed gravels originating in the plateau (e.g., Black and McGraw 1985; Potter et al. 1992). No doubt Potranco Creek contains fluvial deposits of the fine- to coarse-grained, medium to grayish-brown, abundant cherts eroding out of the plateau (Barnes 1983).

Many archaeological surveys conducted in north and western Bexar County (see Gerstle et al. 1978; McGraw 1977; McGraw and Hindes 1987; Nickels et al. 1997) have documented numerous burned rock middens and open campsites very much like that of the Young site. One of the more significant excavations of a Late Archaic burned rock midden and open campsite with physiography, vegetation, soils, and geologic formations similar to that of the Young site occurred on Culebra Creek (41BX126), approximately 8 km northeast of the Young site (Nickels et al. 1998).

FIELD METHODS

A single 1 x 1 m unit was excavated in the midden's core, and dug to the midden's base at 40 cm bs. In addition, three shovel tests were dug away from the midden to assess the site's horizontal extent and vertical integrity (see Figure 2). All excavations were conducted in 10 cm levels, and all sediments were screened through 1/4-inch wire mesh. The unit level forms, shovel test forms, and other field notes are on file at the Southern Texas Archaeological Association (STAA) desk at the Center for Archaeological Research, The University of Texas at San Antonio (CAR).

LABORATORY METHODS

Faunal Remains, Charcoal, and Flotation Samples

Macrobotanical, faunal, and charcoal preservation appears to be good at the site. We collected 99 pieces of faunal remains (65.2 g), one large tooth (29.3 g), one flotation sample, and four charcoal samples during our limited excavations. All will be curated on the STAA shelves at CAR until funds become available for further analyses.

A 3 liter flotation sample was taken from what we believe to the base of the midden, represented by several large limestone rocks and an abundance of charcoal. The sediments were poured into a plastic bucket, clean water added, and the mixture gently stirred by hand to bring the light fraction to the water's surface. The floated material was then gently skimmed off the surface or poured through a tightly woven chiffon cloth fitted into a wire mesh kitchen colander. The cloth with the light fraction was then removed and allowed to dry in the lab. After drying, the light fraction was sequentially filtered through graduated nested screens of 2 mm, 1 mm, and 0.5 mm, respectively. A catchment pan was placed at the very bottom to catch any remains finer than 0.5 mm in size.

RESULTS AND ANALYSIS

The placement of the single 1 x 1 m unit (see Figure 2) proved to be extremely productive. Fire-cracked rock, ashy gray soil, charcoal, lithic artifacts, and faunal remains were encountered immediately below the surface. The angular and blackened fire-cracked rocks in the first three levels were relatively small (ca. 5-10 cm) compared to the much larger (ca. 15-40 cm) and generally unbroken limestone chunks found between 30-40 cm bs at the base of the midden (Figure 3). These larger rocks appear to represent the midden's core and perhaps its last firing event, with the larger rocks likely being exposed to one heating event compared to the smaller fire-cracked rocks, which have been cleaned out and "pitched" away from the oven's central area (see Leach and Bousman 1998; Leach et al. 1998). Diagnostic artifacts recovered from the midden's core include an Ensor dart point.

The results of the three shovel tests (see Figure 2) suggest that the area around the midden was also intensively occupied, and that there are also intact, buried cultural deposits. In ST 1, cultural remains were recovered from 20-70 cm bs; they were between 0-40 cm bs in ST 2, and between 0-20 cm in ST 3 (Table 1).

A total of 884 pieces of chipped stone (including six projectile points), 99 pieces of animal bone, one bison tooth, four tiny fragments of mussel shell, two pieces of ocher, 630 snails, as well as archaeobotanical and charcoal samples, were recovered during the excavations. In addition, the artifact assemblage includes projectile points (Figure 4) and tools exposed on the surface during construction, while planting trees, or from just general yard work.

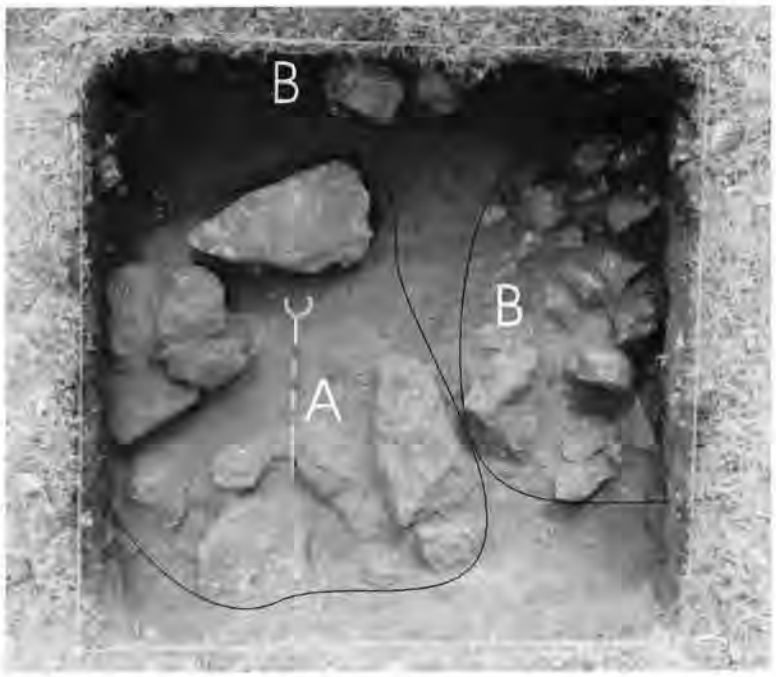

Figure 3. Fire-cracked rocks at the base of the midden's core. Presumably the larger rocks (A) represent those placed in the bottom of the midden's core, and because they are not broken into smaller pieces, may represent the midden's last cooking event. These smaller angular rocks (B) presumably are either (1) the "pitchout" waste from preceding cooking events in this small area, or (2) may represent individual central oven cooking features.

Table 1. Cultural remains recovered from the Young site (41BX1428).

		Projectile Points												Chipped Stone						Faunal Remains				Snails					
Unit	Level	Perdiz	Edwards	Ensor	Frio	Fairland	Montell	Castroville	Marshall	Pedernales	Nolan	Angostura-like	Untypable	Bifaces	Unifaces	Incomplete Flakes	Complete Flakes	Cores	Chipped Stone Total	Fire Cracked Rock	# Pieces	Weight (grams)	Mean Weight (grams)	Helecina	Rabdotus	Polygyra	Total Snails	Mussel Shells	Ocher
1	1													10	6	270	60	1	347	X	33	14	0.42	79	98		177	X	X
	2													3	3	131	34		171	X	3	2.2	0.73						
	3			2									4	2	3	114	33	1	159	X	26	6.3	0.24	153	11	1	165	X	
	4															55	17		72	X	33	24	0.73	114	125	1	240	X	
	4																				1*	29.3*	29.3*						
ST1	1													1		16	2		19	X	1	2.1	2.1	14	9		23		
	2															0	0		0										
	3														1	6	2		9	X				8			8		
	4													1		4	1		6	X				2			2		
	5															6	1		8	X	1	14.5	14.5	2			2		
	6															8	1		9	X				3			3		
	7															4	2		6	X	1	1.2	1.2	3			3		
ST2	1														1	17	3		21	X									
	2														4	19	5		28	X				3	3		6		
	3															7	6		13	X					1		1		
	4															3	1		4	X	1	0.9	0.9						
	5															0	0		0										
ST3	1															5	0		5										
	2															6	0		6	X									
Surface	-	1	4		13	6	4	4	1	1	1	1							36										
Totals		1	4	2	13	6	4	4	1	1	1	1	4	17	18	673	168	2	920		99	65.2	20.82	381	247	2	630		

*Bison Tooth

x=present

Chipped Stone

During the analysis, the stone artifacts were subdivided into the following classes: projectile points (n=42, see Figures 4 and 5), bifaces (n=17), unifaces (n=18), cores (n=2), and unmodified debitage (n=841). After artifacts were catalogued, the different classes were analyzed according to a variety of attributes; these attributes provided a technological and morphological characterization of the lithic assemblage at the Young site.

A total of 42 projectile points were collected from the surface and single excavation unit. A possible Angostura is the only point that may represent an Early Archaic occupation at the site. Otherwise, aside from a Middle Archaic Nolan point, the assemblage predominately represents the Late Archaic (i.e., Pedernales, Castroville, Montell, Fairland, Ensor, and Frio) and Late Prehistoric (i.e., Edwards and Perdiz) periods. As with other pieces of chipped stone, all the points were made from good quality gray, brown, and dark brown chert. Interestingly, evidence of reworking was found on 10 of the 13 Frio points (77%), five of the six Fairland points (83%), on one of the four Edwards points (25%), on 50% of the four Montell points, on each of the four Castroville points, and on the single Nolan point (Tomka 1998). Nineteen of the points were broken from impact or use; the remainder were broken either during manufacture or it could not be determined how they were broken.

The bifaces recovered were made from cherts varying in color from light gray to brown, to very dark grayish-brown, with no color predominant in the sample. Of the 17 bifaces, 14 had no remaining cortex, two had 10% or less, and the last biface had approximately 40% of its cortex remaining. Thirteen (76%) bifaces were manufactured from flake blanks. Although 82.4% of the bifaces were made from fine-grained chert, there was evidence of heat-treating to make the stone more workable (Luedtke 1992:99-112) on 94.1% of the specimens. Six of the bifaces exhibited flaking that suggests they were worked minimally, to an early stage in the reduction process.

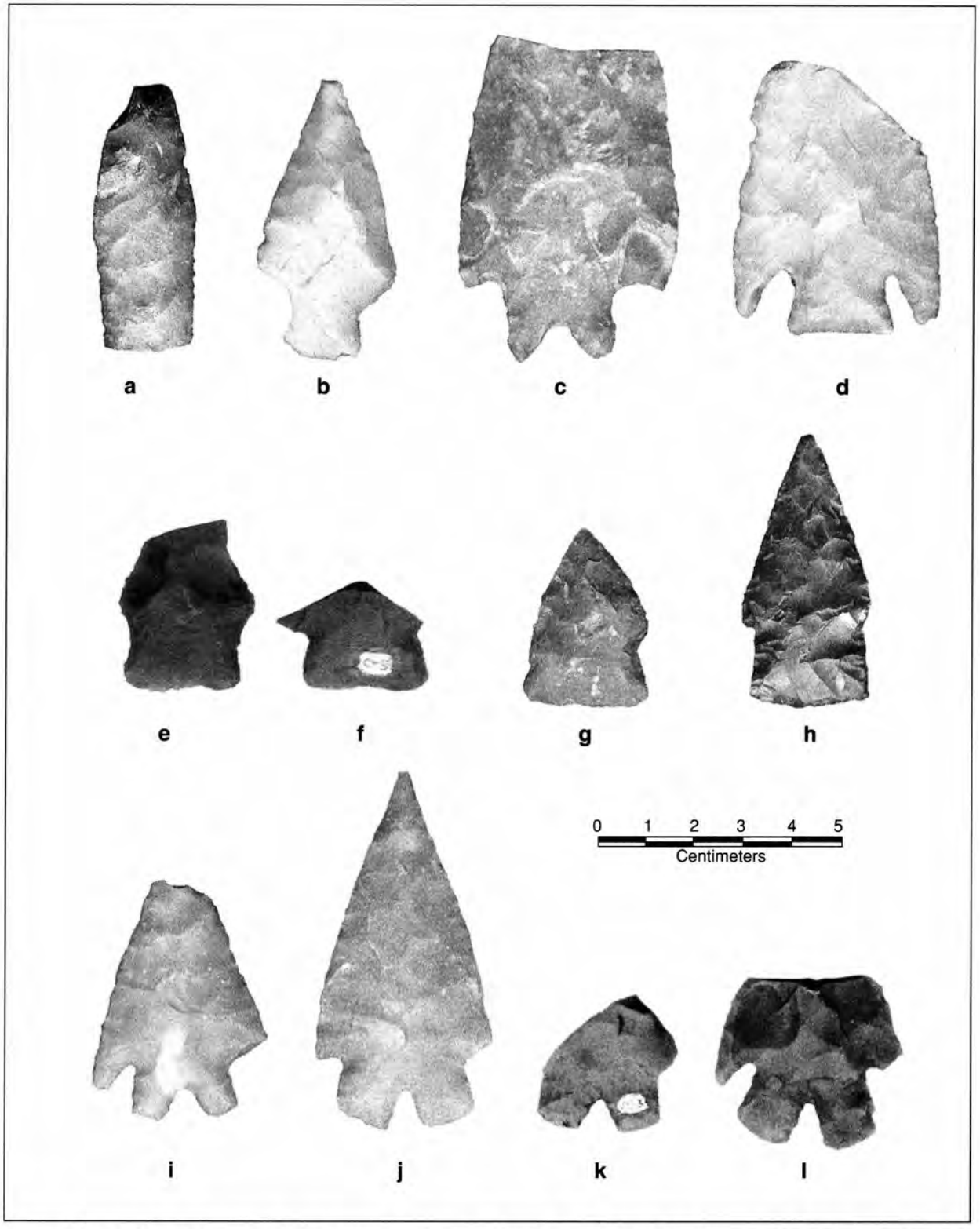

Figure 4. Projectile points recovered during construction, tree planting, etc.: a, possible Angostura; b, Nolan; c, Pedernales; d, Marshall; e-h, Castroville; i-l, Montell.

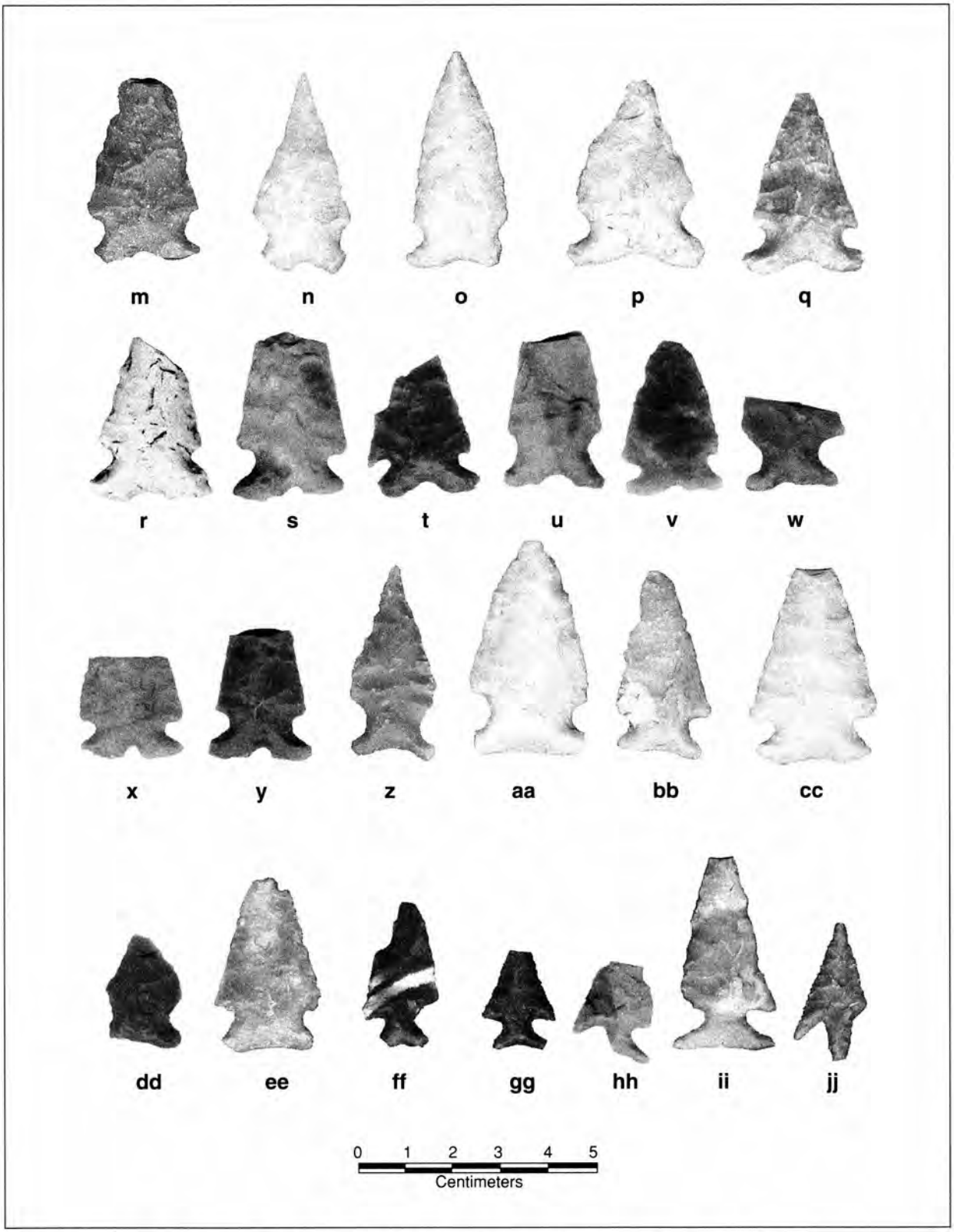

Figure 4, continued. m-y, Frio; z-ee, Fairland; ff-hh, Edwards; ii, possible Edwards preform; jj, Perdiz.

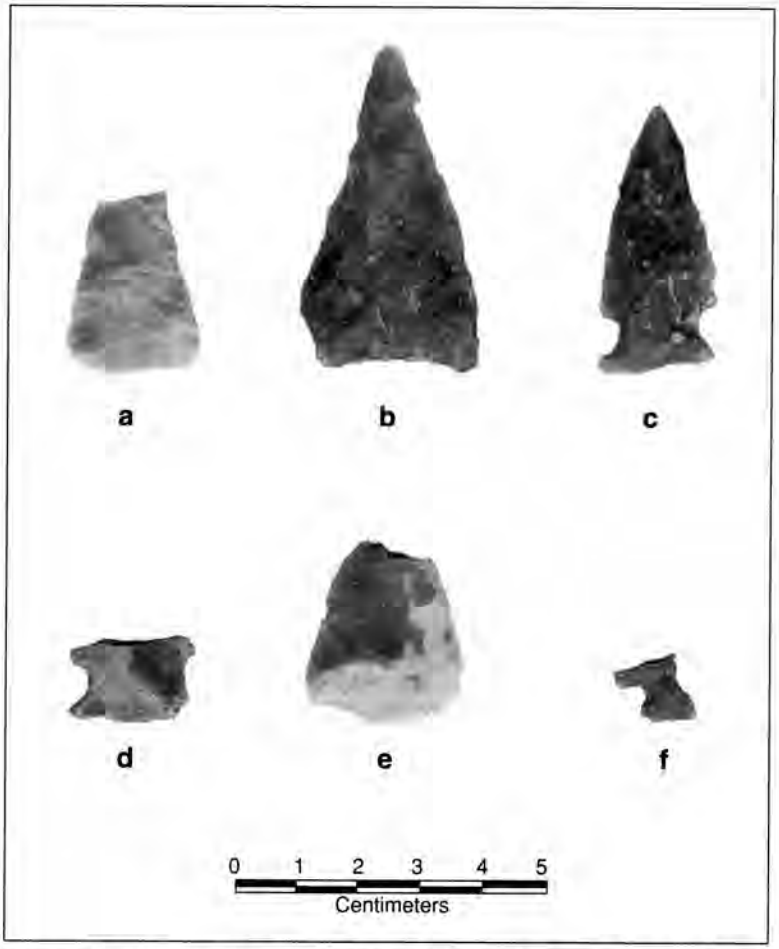

Figure 5. Projectile points recovered from the 1 x 1 m excavation unit: a-b, e-f, untypeable; c, Ensor; d, possible Ensor.

Another six were worked to a middle stage, and the remaining five were worked to a late stage (see Collins 1975).

Only four bifaces were complete, with an average length of 62.9 mm, width of 40.2 mm, and thickness of 18.3 mm. Of the other 13, five were broken during the manufacturing process; two were broken during use; three were broken after they were discarded; and one was broken from intense heat. The cause of breakage could not be determined on the other three bifaces.

The unifaces were made from cherts varying in color from light gray to brown and very dark grayish-brown, with light and dark brown accounting for 11 of the 18 pieces. Fourteen had no cortex. All had been heat-treated and were being manufactured from flake blanks. All but one of the unifaces was made from fine-grained chert; the remainder was also fine-grained, but contained some coarse-grained inclusions. Eleven unifaces were complete, with an average length of 39.9 mm, width of 24.2 mm, and thickness of 7.6 mm.

Using only a hand-held 10X Loupe magnifier, an examination of the degree of utilization and retouched edges on each specimen indicated that four has been utilized only, nine had been only minimally retouched, and five had been intentionally shaped. The edge shape on these pieces was either straight (n=7), concave (n=3), convex (n=6), pointed (n=1), or multiple (n=1). Eleven unifaces had been modified on one lateral edge; four on their distal edge; one on both lateral edges; one on a lateral and distal edge; and one on multiple edges. Only one of the specimens would fit into a formally fashioned and functional "scraper" category.

The two cores were made from fine-grained gray and light brownish-gray chert, with one showing evidence of heat-treating. One core was 50 mm long, and the other was 60 mm in length. Both had multi-directional flake scars, but still had over 50% of their cortex.

An analysis of the complete flakes (n=168) indicate that 43.5% resulted from core preparation, and 40.4% were products of biface manufacturing. In addition, 80.9% were interior (tertiary) and had no cortex; 81.4% were less than 3 cm in length; 98.2% were made from fine-grained chert, and 66.1% of the chert was either grayish-brown, gray, or yellowish-brown; and 98.2% of the assemblage had been heat-treated.

Snails

Three species of snails were identified: *Helicina orbiculata tropica* (n=381), *Rabdotus Mooreanus* (n=247), and *Polygra texasiana* (n=2). Because of its high tolerance for periods of drought, *Helicina orbiculata tropica* is sometimes found in semi-arid, open country, but most often is found in wooded areas. *Rabdotus Mooreanus* has a general tolerance

for periods of drought, and is commonly found in either woodlands or grasslands (Fullington and Pratt 1974; see also Neck and Shaw 1998). *Polygra texasiana* is probably the most hardy of the three snail species, and is thus likely to thrive in both open fields or woodlands (Allen and Cheatum 1961). In addition to providing information about the environment, arguments have been made that snails may have been a part of the Native American diet (e.g., Brown 1999; Malof 2001; Neck 1981, 1994; but see also Neck and Shaw 1998:1571).

Mussel Shells

Although this testing project was limited in scope, the paucity of mussel shells recovered relative to the frequency of mussel shell at other open campsites along streams (see Nickels 2000) suggests that during periods of human occupation, the water in Potranco Creek was likely swift moving, or otherwise shallow, with little mud substrate (Warren 1991; Shaw 1998). Given the low density of shell, mussels were probably an insignificant part of the subsistence base at the Young site.

CONCLUSIONS

Limited testing has indicated that much of the Young site (41BX1428) is intact. It has yielded diagnostic projectile points, possibly intact fire-cracked rock features, and the preservation of faunal remains and charcoal is good. Thus, it appears that the site has the potential to provide significant information about the subsistence and mobility patterns of Native Americans along streams emanating from the Edwards Plateau of Central Texas during the Late Archaic and Late Prehistoric intervals. Additional investigations at the Young site should include analysis of archaeomagnetic samples, snails, charcoal, and ethnobotanical remains.

ACKNOWLEDGMENTS

This article on the Young site is a revised version of a report originally published by Tierra Antiquas, and it is published with their permission. We also thank Dr. Steve Tomka for analyzing the projectile points from the site.

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An Analysis of the Projectile Points from the Chytka Site (41JK66), Jackson County, Texas

Matthew Peeples

ABSTRACT

I provide a reevaluation of the projectile point assemblage from the Chytka site (41JK66), an Early Archaic to Late Prehistoric occupation that was excavated more than 25 years ago during the Palmetto Bend Reservoir project on the Navidad River.

INTRODUCTION

The purpose of this article is to reevaluate the projectile point assemblage recovered from the Chytka site (41JK66) during data recovery excavations of important archaeological sites in the Palmetto Bend Reservoir area in Jackson County, Texas. This reevaluation stems from the recent discovery of several irregularities within the original site notes and the final published report of the Palmetto Bend Reservoir project. For reasons that will be discussed below, only a small portion of the recovered artifacts from the Chytka site were examined and included in the site report by the Texas Archeological Survey (1981). In addition to an examination of the complete projectile point collection from the site, I also provide a more accurate assessment of other artifact categories and their research potential.

SITE ENVIRONMENT

The Chytka site is a small open midden site in northern Jackson County, lying on a low ridge approximately 100 m north of Mustang Creek (Figure 1). Mustang Creek is the southernmost tributary of the Navidad River, before its confluence with the Lavaca River and subsequent entrance into Matagorda Bay. Lake Texana, formally called the Palmetto Bend Reservoir, is formed by a large dam on the southern portion of the Navidad River and it currently inundates the lower Navidad and Mustang Creek.

The Palmetto Bend Dam region is characterized as an area of great environmental variability. The Lavaca and Navidad river drainage areas support a wide array of vegetation including numerous hardwoods, vines, and expanses of grasses. The meandering channel of the Navidad River creates many oxbow lakes and low swampy depressions characterized by stands of reeds, rushes, and palmetto. The transition to the upland prairie to the north of the river system is marked by the appearance of stands of high grasses, mesquites, large oaks, and other hardwoods (Mallouf et al. 1973:16-20).

In addition to being within the transitional zone between the riverine environment and the upland prairie, the Chytka site is also located near the convergence of freshwater and marine environments. Both the Lavaca and the Navidad River channels are presently entrenched below sea level, thus leaving them open to the influence of tidal surges. Geological investigations of the Matagorda Bay region suggest that the formation of the Matagorda Peninsula was a recent geologic event taking place after 1000 B.C. (McGowen and Brewton 1975:10). Owing to this, brackish water conditions may have extended as far north as Mustang Creek in prehistoric times (Mallouf et al. 1973:13-14). The presence of deer and turtle remains from the upland prairie, freshwater mussel shells, and smaller numbers of brackish water and marine invertebrates at the Chytka site and contemporaneous sites in the reservoir suggest the prehistoric exploitation of a wide variety of environmental zones.

Lithic resources in the Texas Coastal Plain are markedly scarce. Small chert cobbles are known, however, from the northern expanses of the reservoir. It is likely that during flood stages, these chert gravels could be moved downstream into the southern reaches of the river systems and deposited as the flood waters receded (Mallouf et al. 1973:130). Tested cobbles have been found at several sites in the northern reservoir area along the Lavaca River (Mallouf et al. 1973:131). Additionally, the presence of Central Texas chert has been noted at sites in the reservoir area, suggesting trade between the regions. A sample of chert gravels from the northern portion of the reservoir, however, has shown that locally available materials often are similar in color and texture to those from Central Texas. The cobles used in this same study were representative of the coloration of chert recovered from the Palmetto Bend area (Mallouf et al. 1973:131).

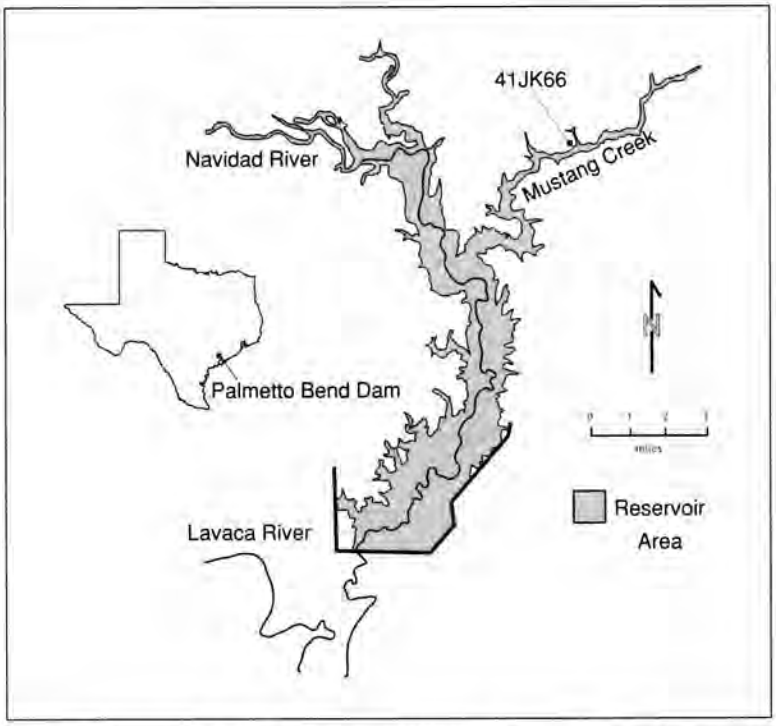

Figure 1. Location of the Chytka site (41JK66) at Palmetto Bend Reservoir, Jackson County, Texas.

A Brief History of Archaeological Investigations at the Chytka Site

The Palmetto Bend Reservoir project began in July 1967 with an initial survey of a proposed dam site at the confluence of the Lavaca and Navidad rivers. This survey, carried out by Walter Wakefield of the Texas Archeological Salvage Project, was the first major archaeological project in the reservoir area, recording 22 sites (Wakefield 1967:1-2). In 1972, the Texas Historical Commission (THC) carried out a second survey and testing project of the areas to be inundated by the first stage of dam construction. One of the many sites recorded and tested by the THC crew was the Chytka site (41JK66).

During the 1972 season, a small 2 x 1.5 m test pit was excavated by the survey team, and the pit contained a varied assemblage of artifacts dating from the Late Prehistoric period (Mallouf et al. 1973:101-115). An examination of a private collection of artifacts from the site further confirmed an Archaic component (Mallouf et al. 1973:53, 115). In March 1976, the Texas Archeological Survey (TAS), working in conjunction with the U.S. Bureau of Reclamation, returned to the Chytka site and made another small collection. The TAS crew recommended the site as a candidate for further investigation during the final phase of the Palmetto Bend Reservoir Project (McGuff and Fawcett 1978:16-17). Between November 1976 and March 1977, the Chytka site was one of six sites within the reservoir area selected for full scale mitigation (RSTAS 1981:49). The results of the excavations were briefly reported in *Phase III: Prehistoric Archeological Research within Palmetto Bend Reservoir, Jackson County, Texas*, authored by the research staff of the Texas Archeological Survey (RSTAS 1981).

Between the end of excavations in the Palmetto Bend Reservoir area and the publication of the final report, many of the original investigators left the TAS team. Because of this, the remaining TAS staff was given the daunting task of writing a report based on the notes which were left behind. No draft of the Phase III report exists, so it is impossible to compare

the final product to the original. A re-evaluative inventory of the artifact assemblage carried out by the author as part of an internship for the Bureau of Reclamation between May and July 2002, however, revealed many discrepancies between the Phase III report and the actual artifact assemblage from the site. Apparently, working from a partially complete specimen inventory, the TAS staff unknowingly based their analysis on only a small portion of the recovered artifacts from the Chytka site. Because of this the report does not do justice to the actual collection and its research potential.

ANALYTICAL TECHNIQUES

This analysis began with a visual sorting of all formal lithic tools recovered from the Chytka site. All artifacts which could be conservatively identified as projectile points or fragments were separated for further analysis. The maximum height, the maximum width, and the maximum thickness were measured for each complete projectile point in centimeters. Incomplete and fragmentary materials were measured in as many dimensions as was practical. All artifacts were weighed in grams and the raw material was also determined. Metric and provenience data for dart points are provided in Table 1.

The projectile points were further divided into two major categories: dart points and arrow points. Although it is possible that small projectile points were used as atlatl darts and large projectile points were used with a bow and arrow, there is a general correlation between projectile point size and function (Thomas 1978:461-472). For this study, lacking the time for complicated multivariate statistical analyses, an inference was made based generally on size and weight.

The primary goal here is to thoroughly characterize the projectile points recovered from the Chytka site, particularly their typological, morphological, and technological attributes. Many of these categories represent established typological groupings with temporal relevance. For each of these type groups, their general characteristics are given, along with their accepted geographical and temporal ranges. The complete projectile points and fragments that do not conform to any typological category are "Untyped," but grouped together when possible and further described. These groupings should not, however, be confused with the true typological categories, but are merely of analytical convenience and have no temporal or functional meaning. Extremely fragmentary materials were not treated beyond a simple count.

The original report on the Chytka site stated that an analysis of the projectile points suggested significant post-depositional disturbance (RSTAS 1981). With an increased sample size and reexamination of the projectile point assemblage, the stratigraphic integrity of the site can also be reconsidered.

DART POINTS

Bell

One proximal fragment (1253; Figure 2a) has attributes typical of the Bell dart point type. This fragment has one straight stem edge leading to a squared basal edge. The stem is fractured laterally and the remaining stem margin is well-ground. Wide, round flake scars indicative of deep basal notching are present at the remaining shoulder. Bell points are primarily a Central Texas type, but are known from the South Texas coast. Turner and Hester (1999:80) date this type to the first part of the Early Archaic period, ca. 6000-3500 B.C.

Bulverde

Three dart points (1169, 1231, 1237; see Figure 2b-c) are typed as Bulverde. Specimen 1231 is a large dart point with slightly recurved lateral blade edges, and the blade is thin throughout. The stem edges are parallel, leading to a square base. This point has short, thin barbs, and one barb has evidence of a break, indicating that it may have originally extended further. The stem is wedge-shaped in cross-section.

Specimen 1237 has straight lateral edges and weak, squared shoulders leading to a short triangular blade. The stem edges are parallel and the basal edge is straight. In the original report, this specimen was typed as Morrill, but it exhibits the wedge-shaped basal cross-section typical of Bulverde (RSTAS 1981:57; Turner and Hester 1999:82). This point appears to have been

Table 1. Dart points.

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Bell	1253	N13 E12	3	8.4	*	*	*	Chert	proximal fragment
Bulverde	1169	N16 E9	3	9.3	*	*	*	Chert	proximal fragment
Bulverde	1231	N19 E16	4	13.7	6.4	3.4	0.8	Chert	
Bulverde	1237	N15 E6	1, 2	8.2	4.2	2.3	0.9	Chert	
Darl	1242	N14 E11	3	4.2	4.1	1.5	0.8	Chert	
Darl	1258	N17 E15	3A	4.0	*	*	*	Chert	proximal fragment
Edgewood	1248	N17 E17	Unknown	6.6	4.2	2.1	0.7	Chert	
Ellis	1240	N12 E13	3A	2.7	3.9	2.1	0.5	Chert	
Ellis	1241	N15 E7	3	4.9	4.1	2.2	0.6	Chert	
Ellis	1247	N12 E14	3A	4.2	3.2	2.4	0.6	Chert	
Ensor	1197	N14 E14	3A	7.3	5.5	2.2	0.7	Chert	
Ensor	1232	N12 E12	3	7.0	5.3	2.7	0.5	Chert	
Ensor	1234	N12 E13	3A	7.5	5.4	2.4	0.7	Chert	
Ensor	1238	N16 E13	3	9.3	5.1	2.7	0.7	Chert	
Ensor	1244	N15 E15	3B	5.5	4.0	2.5	0.5	Chert	
Marcos	1177	Surface	Surface	8.5	*	*	*	Chert	broken tip, broken barb
Marcos	1230	N12 E4	3	7.8	5.9	2.9	0.5	Chert	
Pedernales	1233	N18 E10	3	18.4	7.1	3.4	0.9	Chert	
Pedernales	1235	N13 E5	3	10.3	6.7	2.3	0.7	Chert	
Untyped, form 1	1654	N19 E4	3	6.1	4.3	1.9	0.9	Chert	
Untyped, form 2	1239	N16 E9	4	10.1	5.6	2.5	0.9	Chert	
Untyped, form 2	1145	N13 E11	3	4.1	4.2	2.1	0.6	Chert	
Untyped, form 2	1245	N12 E7	3	5.2	5.0	2.1	0.6	Chert	
Untyped, form 3	1335	N12 E7	3	5.9	3.9	2.2	0.6	Chert	

Table 1. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Untyped, form 4	1172	N15 E9	3	7.0	*	*	*	Chert	proximal fragment
Untyped, form 4	1176	N15 E15	3C	7.0	*	*	*	Chert	proximal fragment
Untyped, form 4	1267	N16/15 E4	1, 2, 3	4.5	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1223	N12 E15	1, 2	3.1	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1249	N13 E16	3A	8.8	*	3.0	0.6	Chert	broken base
Untyped, misc. expanding stem	1251	N15 E17	9-3	6.4	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1252	N14 E16	3B	4.8	*	*	*	Chert	proximal fragment, asphaltum on stem
Untyped, misc. expanding stem	1261	N14 E13	3B	3.1	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1393	N12 E14	4	1.0	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1396	N15 E8	3	1.1	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1660	N14 E14	3B	1.7	*	2.7	0.6	Chert	broken tip
Untyped, misc. expanding stem	1663	N19 E17	3A	1.4	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1670	N12 E5	3	1.8	*	*	*	Chert	proximal fragment
Untyped, misc. expanding stem	1709	N12 E14	1, 2	0.9	*	*	*	Chert	proximal fragment
Untyped, misc. straight stem	1256	N17 E12	3	5.6	*	*	*	Chert	proximal fragment

Table 1. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Untyped, misc. straight stem	1693	N16 E15	1, 2	2.5	*	*	*	Chert	proximal fragment
Unidentified fragment	1170	N18 E10	3	5.3	*	*	*	Chert	distal fragment
Unidentified fragment	1174	N13 E9	3	3.6	*	*	*	Chert	distal fragment
Unidentified fragment	1178	N18 E6	1, 2	2.4	*	*	*	Chert	proximal fragment
Unidentified fragment	1194	N13 E15	3C	6.6	*	*	*	Chert	proximal fragment
Unidentified fragment	1206	N19 E18	9-4	3.6	*	*	*	Chert	distal fragment
Unidentified fragment	1254	N17 E6	3	5.4	*	*	*	Chert	broken base
Unidentified fragment	1259	N19 E17	3A	4.9	*	*	*	Chert	medial fragment
Unidentified fragment	1260	N15 E15	3A	3.4	*	*	*	Chert	proximal fragment
Unidentified fragment	1262	N18 E17	3C	3.8	*	*	*	Chert	distal fragment
Unidentified fragment	1268	N19 E8	4	2.5	*	*	*	Chert	proximal fragment
Unidentified fragment	1399	N17 E6	1, 2	1.4	*	*	*	Chert	proximal fragment
Unidentified fragment	1405	N18 E10	3	4.3	*	*	*	Chert	medial fragment
Unidentified fragment	1406	N16 E17	9-1	3.3	*	*	*	Chert	distal fragment
Unidentified fragment	1407	N19 E9	1, 2	3.1	*	*	*	Chert	distal fragment
Unidentified fragment	1410	N14 E5	3	1.1	*	*	*	Chert	distal fragment
Unidentified fragment	1412	N16 E6	4	2.0	*	*	*	Chert	distal fragment
Unidentified fragment	1414	N19 E18	9-3	1.4	*	*	*	Chert	distal fragment
Unidentified fragment	1416	N15 E17	9-1	1.2	*	*	*	Chert	distal fragment
Unidentified fragment	1436	N15 E15	3A	1.2	*	*	*	Chert	distal fragment
Unidentified fragment	1657	N13 E14	3A	1.3	*	*	*	Chert	distal fragment
Unidentified fragment	1658	N18 E13	3	2.2	*	*	*	Chert	distal fragment
Unidentified fragment	1661	N16 E9	3B	3.3	*	*	*	Chert	proximal fragment

Table 1. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Unidentified fragment	1662	N12 E6	4	2.2	*	*	*	Chert	proximal fragment
Unidentified fragment	1665	N18 E4	3	0.9	*	*	*	Chert	proximal fragment
Unidentified fragment	1666	N12 E9	3	0.6	*	*	*	Chert	proximal fragment
Unidentified fragment	1667	N12 E9	3	4.4	*	*	*	Chert	distal fragment
Unidentified fragment	1668	N18 E16	3A	1.4	*	*	*	Chert	distal fragment
Unidentified fragment	1669	N15 E9	3	4.0	*	*	*	Chert	distal fragment
Unidentified fragment	1671	Unknown	Unknown	0.5	*	*	*	Chert	proximal fragment
Unidentified fragment	1672	N19 E11	4	6.9	*	*	*	Chert	medial fragment

*Information not available

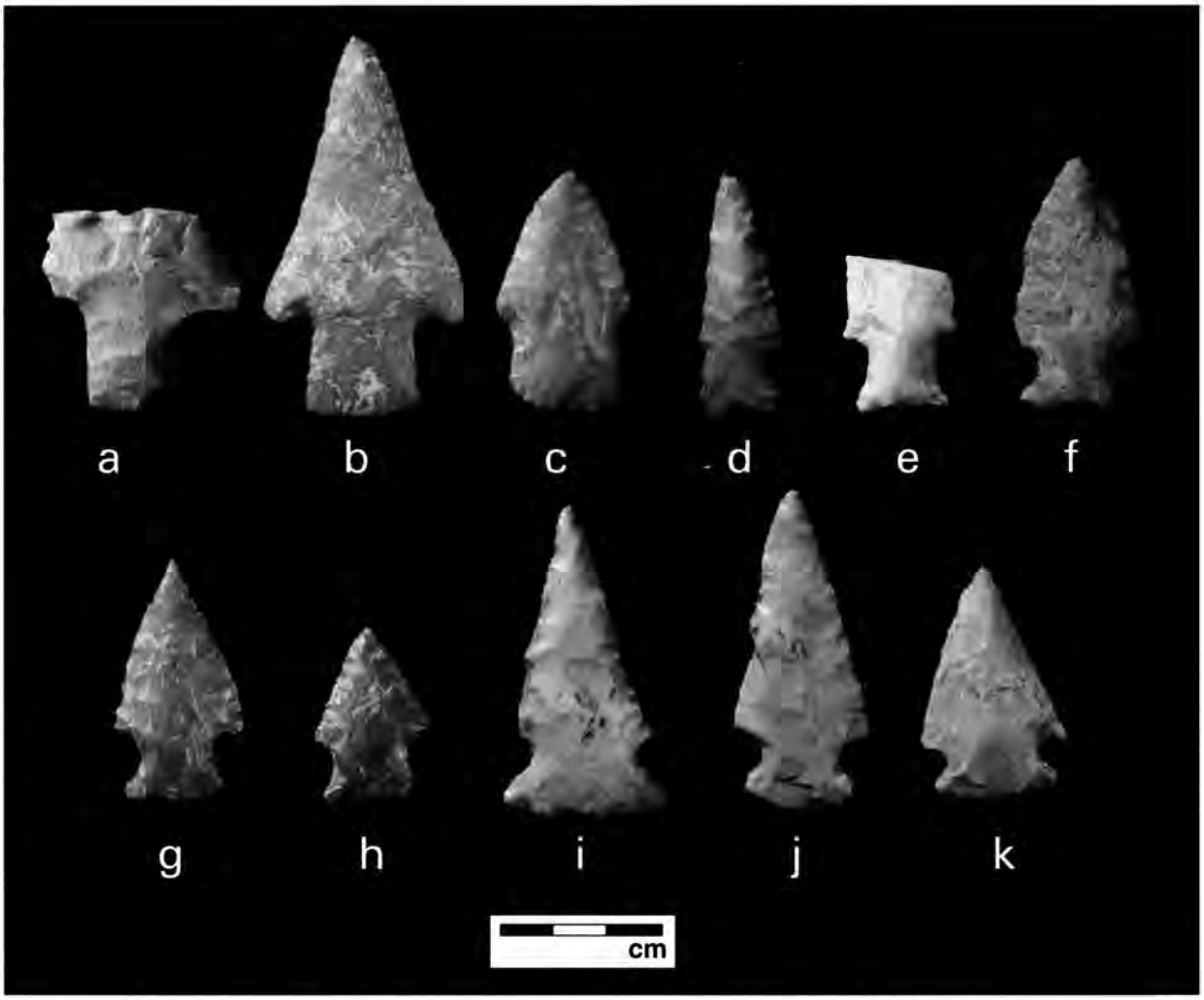

Figure 2. Selected dart points: a, Bell; b-c, Bulverde; d-e, Darl; f, Edgewood; g-h, Ellis; i-k, Ensor.

extensively reworked along the blade and was probably much larger when originally made. The fragmentary example (specimen 1169) is a rectangular proximal fragment with a wedge-shaped cross-section and small shoulders. The Bulverde is primarily a Central Texas type, but is known from South and East Texas. Turner and Hester (1999:82) date Bulverde to the later part of the Early Archaic, ca. 3000-2500 B.C. Collins (1998:59), in the report from the Wilson-Leonard site in Williamson County, Texas, however, provides a significantly later range of dates within the first part of the Late Archaic, ca. 2000-1500 B.C.

Darl

One complete dart point and one fragment from the Chytka site are typed as Darl. The complete specimen (1242; see Figure 2d) is a small point with straight lateral edges. The blade is narrow and is weakly shouldered. The stem edges are straight, with a slightly concave basal edge. This small Darl point appears to have been extensively resharpened. The second example (1258; see Figure 2e) is a proximal fragment. The fragment retains small shoulders and a small portion of the narrow blade. The stem edges are expanding, leading to a concave basal edge. The Darl type has a wide geographic range in Central Texas, the Lower Pecos, and the Texas coast. Turner and Hester (1999:101) date this type to the Transitional Archaic period, ca. A.D. 200.

Edgewood

A single point (1248; see Figure 2f) is classified as an Edgewood. This point has convex lateral

edges and a triangular blade, as well as wide, shallow corner notches that create prominent shoulders. The stem is broken, but the remaining portion is as wide as the shoulders. The basal edge is strongly recurved. This type is very similar to both Ellis and Fairland, but the convex blade margin and roughly worked recurved base are typical of the Edgewood type (Suhm and Jelks 1962:183). This type is most common in Northeast Texas but is also found on sites in South and Central Texas. Turner and Hester (1999:111) date Edgewood points to the Transitional Archaic period.

Ellis

This category consists of three dart points (1240, 1241, 1247; see Figure 2g-h). These small points are short with straight lateral edges and a triangular blade, in addition to shallow corner notches that create prominent shoulders. Specimen 1241 retains one small barb. Stems are widely expanding, but are smaller than the shoulders. The stem lengths range from about 25-33% of the maximum length of these points. The basal edges of all three are straight. Ellis is a geographically widespread type that is most common in East Texas, but is also known from sites in South and Central Texas, Louisiana, and Arkansas. Turner and Hester (1999:113) date this type from the Middle to Transitional Archaic (ca. 2000 B.C.-A.D. 700) periods. In South Texas, however, Ellis is generally associated with the Late Archaic period and may even persist into the Late Prehistoric period (Hester 1980:101).

Ensor

Five complete dart points (1197, 1232, 1234, 1238, 1244; see Figure 2i-k) are classified as Ensor. These points have long, straight, to slightly convex lateral blade edges and shallow, broad side notches that are angled slightly toward the distal end. On three specimens (1197, 1238, 1244), the extremely wide side notches approach corner-notching. All specimens are well-shouldered and one (1244) retains a short barb. The widely expanding stems are extremely broad, approaching the width of the shoulders, and the stem of specimen 1232 extends past the shoulders. The size and the blade length to stem length ratios are typical of the Ensor type (Suhm and Jelks 1962:189).

Ensor points are geographically widespread throughout Central and South Texas. They are generally found on Transitional Archaic period sites that date from ca. 200 B.C.-A.D. 600 (Turner and Hester 1999:114).

Marcos

Two dart points (1177, 1230; Figure 3a) can be confidently identified as Marcos. This type has generally straight lateral edges and an elongated triangular blade. They are deeply corner-notched with widely expanding stems and prominent barbs; basal edges are straight. The complete Marcos dart point (1230) has parallel oblique flaking across the blade on both faces, and many of these flake scars extend nearly across the entire blade surface. It is extremely well-made. The second example (1177) was a surface find, distally fractured and missing one barb. This type is principally a Central Texas type, but has been recovered from South Texas and the central Coastal Plain. Turner and Hester (1999:147) date this type to the Transitional Archaic period, ca. 600 B.C.-A.D. 200.

Pedernales

There are two complete Pedernales dart points (1233, 1235; see Figure 3b-c). They are characterized by parallel stem edges leading to prominent shoulders, and the blades are roughly triangular with straight lateral edges. The basal edges are bifurcated. Specimen 1233 has narrow thinning flakes running up from the base on both sides. Specimen 1235 is basally thinned from one side only. This type is common in Central Texas, but is also known from South Texas and the Lower Pecos region. Turner and Hester (1999:171) date this type to the Middle Archaic, ca. 2000-1200 B.C.

Untyped, Form 1

This category consists of a single contracting stem projectile point (1654; see Figure 3d), the only one of this form recovered from the site. This small, poorly made dart point has generally straight lateral edges. It is weakly shouldered with a slightly

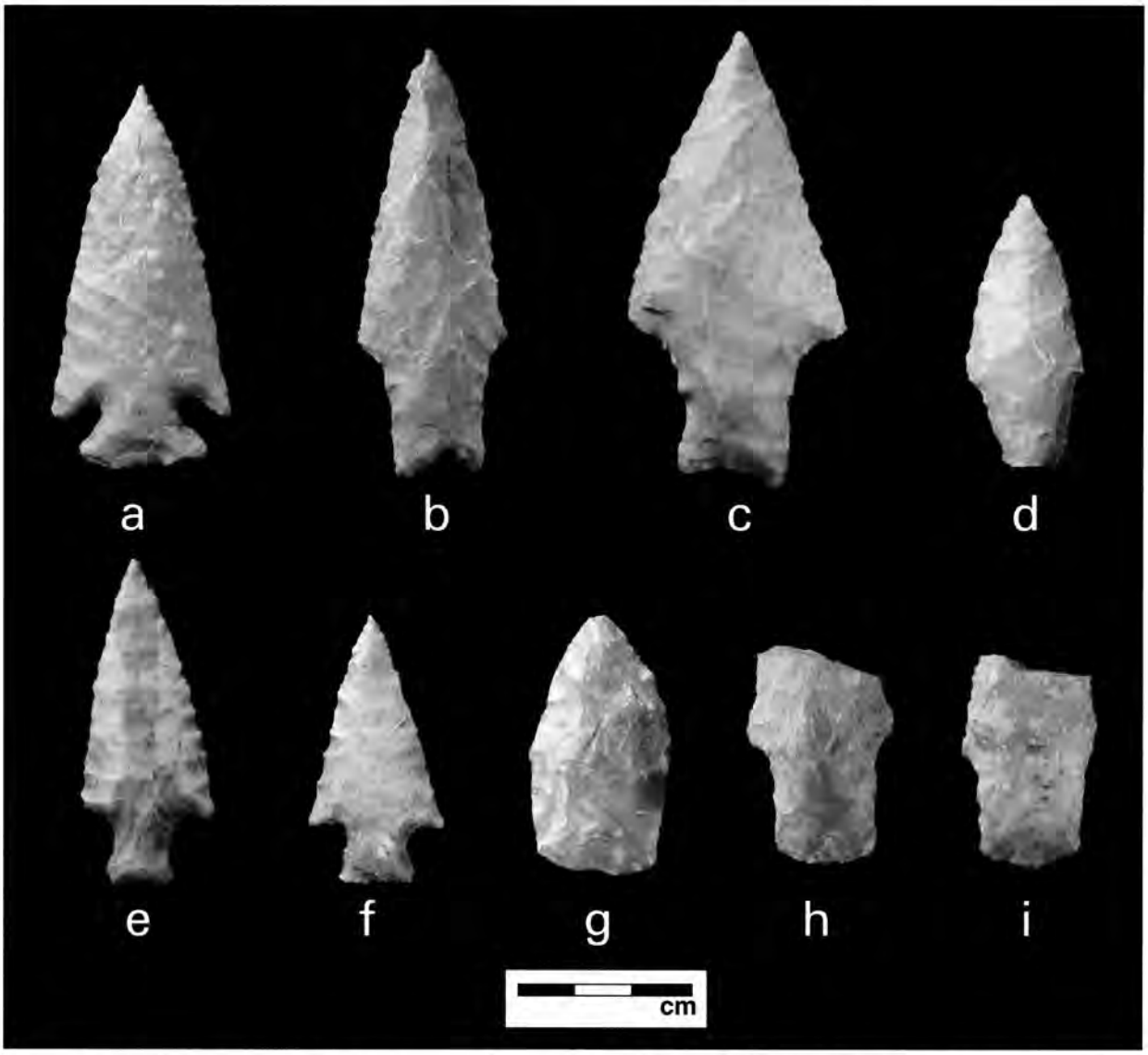

Figure 3. Other dart points from the Chytka site: a, Marcos; b-c, Pedernales; d, Untyped, Form 1; e-f, Untyped, Form 2; g, Untyped, Form 3; h-i, Untyped, Form 4.

contracting stem. A snap fracture at the proximal end makes the basal edge shape indeterminate. The point has an extremely thick, asymmetrical cross-section. The degree of sharpening along the blade margins, however, indicates that it was most likely a finished projectile point.

Untyped, Form 2

This category is comprised of three morphologically similar dart points (1145, 1245, 1239; see Figure 3e-f). They are characterized by a narrow triangular blade with straight lateral margins. They are well-shouldered and two specimens (1145, 1245) have slight barbs. The stems are long and thin with straight to slightly expanding margins. The basal edges are straight. Specimen 1245 was originally typed as a Palmillas, but it lacks the convex basal edge characteristic of that type. Specimen 1239 was called Pedernales in the 1981 TAS report, but does not exhibit the typical bifurcated basal edge.

Untyped, Form 3

This single, complete straight stemmed dart point (1335; see Figure 3g) has parallel stem edges and a

squared basal edge. A short, shoulder-less, triangular blade extends abruptly from the base. Thin, parallel flake scars are visible, beginning at the blade on one lateral edge. This point may be an incomplete specimen, or may have been reworked from a much larger dart point.

Untyped, Form 4

The three specimens that make up this category (1172, 1176, 1267; see Figure 3h-i) have long, broad stems with parallel edges. The bases are roughly rectangular with slightly rounded edges. These points have weak shoulders and the portions of the lateral edges remaining are narrow.

Untyped, Miscellaneous Expanding Stem

Specimens in this category are 13 fragments of expanding stem dart points that are unlike any of the other dart points from the site. A brief description of each is given below, and when pertinent, morphologically similar examples will be discussed together.

Specimen 1249 is a large dart point with straight lateral edges, a broad triangular blade, and prominent barbs. The stem is fractured on both sides, but the remaining portion is typical of a widely expanding stem. This fragment is morphologically similar to the Marcos type.

Specimen 1396 is a small stem fragment that is broad and widely expanding. The basal edge is recurved. Thin, parallel flakes run up from the basal edge on both sides of the stem. This finely flaked fragment is morphologically similar to the Pedernales type.

Specimen 1663 is a proximal fragment of a small, corner-notched dart point. The only remaining shoulder is prominent. The short stem expands widely, extending past the shoulders, and the basal edge is recurved. This fragment resembles the Fairland type.

Specimen 1660 is a small, poorly-made dart point with a broken tip. The remaining lateral edges are straight and the point is well-barbed. Deep corner notches form a widely expanding base with a generally straight basal edge.

Specimen 1393 is a small dart point fragment that retains one deep corner notch. The remaining barb is extremely long and thin, and the basal edge is slightly concave.

Specimen 1223 is a proximal fragment with a slightly expanding stem, with one remaining short barb. The basal edge is straight.

Specimen 1251 is a proximal fragment with small side to corner notches. The shoulders are prominent with weak barbs, and the basal edge is slightly concave.

Specimens 1261, 1670, and 1709 are three expanding stem proximal fragments with portions of shallow corner notches. Specimen 1261 has one slightly barbed shoulder. The basal edges of all three are strongly convex.

Specimen 1252 (Figure 4) is a badly fractured proximal dart point fragment. The thin stem is round in cross-section, expanding slightly, and the basal edge is fractured. The one remaining shoulder is weak and rounded. This point retains traces of asphaltum around the stem. Asphaltum is a petroleum-based, tar-like substance that was often used by prehistoric inhabitants of the Texas coast to haft projectile points. The likely source of this material will be discussed below. The asphaltum is contained in a well-defined area around the stem and trailing up the remaining lateral edge. The fractured basal edge also has traces of asphaltum. It is likely that this point was rehafted after the basal fracture occurred.

Figure 4. Dart point fragment with traces of asphaltum around the stem.

Untyped, Miscellaneous Straight Stem

The first miscellaneous straight stem point (specimen 1256) is a proximal fragment with a broad, short, parallel-sided stem, and the basal edge is convex. This fragment is well-shouldered. The second (specimen 1693) is a very small proximal fragment with a short, narrow stem. The basal edge is squared with small thinning flakes running up one side of the stem. This point is well-shouldered and retains a small portion of a narrow blade.

Unidentified Dart Point Fragments

This category consists of 30 small proximal, distal, and medial fragments that are recognizable as dart points, but do not fit into any of the previous categories (see Table 1).

ARROW POINTS

Scallorn

Scallorn is the most common projectile point type recovered from the Chytka site (Figure 5a-f), as there are 48 complete arrow points and 50 fragments from the excavations. A single complete Scallorn point (1446) has been made from chalcedony (Table 2), and all the others are made of chert.

This type has straight lateral edges and a long, triangular blade. They are deeply corner-notched at an angle of approximately 45 degrees, creating prominent barbs. The basal edges are straight, slightly convex, or slightly concave. Stems vary from slightly expanding to as wide as the shoulders.

A small number of the Scallorn points (1460, 1463, 1471, 1538, 1728) have extremely thin necks and recurved basal edges similar to the Edwards type, but Turner and Hester (1999:212) do not extend the distribution of Edwards arrow points into the Texas central coastal plain. Two of the points (1456, 1472) have the deep edge serrations that typify a common Scallorn variant from McMullen County, Texas (Hester 1980:107).

The complete specimens of this type range in length from 1.4-4.4 cm. The average length is 2.1 cm and a majority of these points appear to have been extensively resharpened. Scallorn points have a wide geographic range and have been recovered throughout Texas. Turner and Hester (1999:230) date this type to the Late Prehistoric period, ca. A.D. 700-1200. Hall et al. (1986:403) provide a slightly later range for this type, ca. A.D. 900-1400. Leland Patterson (1991:8) notes that in Southeast Texas, the Scallorn type appears throughout the Late Prehistoric period and well into the Historic Indian period.

Perdiz

Six arrow points and fragments are Perdiz points (see Figure 5g-j). They have straight to convex lateral edges and roughly triangular blades. The shoulders of the complete points are extremely well-barbed and the stems contract abruptly from the body. Four specimens (1395, 1397, 1736, 1737) have a squared basal edge and on the remaining two (1211, 1735), the stem contracts to a sharp point.

Perdiz points have been recovered from throughout most of Texas and Louisiana (Turner and Hester 1999:227), and Turner and Hester (1999:227) date this type to the Late Prehistoric period, ca. A.D. 1200-1500. Hall et al. (1986:403), in the Phase II report of excavations from the Choke Canyon reservoir area on the Nueces River, suggest a slightly later range for the Perdiz type, ca. A.D. 1400-1650. In Central Texas, this type is thought to date later than the Scallorn type, but Scallorn and Perdiz often appear to be in contemporaneous contexts in South Texas (Hester 1980:107). In Southeast Texas, Patterson (1989) notes associated radiocarbon dates for Perdiz points on the coastal margin that range from A.D. 640-1560. Although fewer dates exist for inland sites in Southeast Texas, the Perdiz type appears to extend throughout the entire Late Prehistoric period into the Historic Indian period (Patterson 1991:7). Patterson (1991:9) further hypothesizes that the four major arrow point types found in Southeast Texas (Alba, Catahoula, Scallorn, and Perdiz) co-occurred throughout most of the Late Prehistoric period and thus, are not practical temporal markers. Contrary to this viewpoint, excavations from two Late Prehistoric sites in Bandera and Kerr counties recovered both the Edwards and Scallorn types, but lacked a Perdiz component. It is therefore feasible

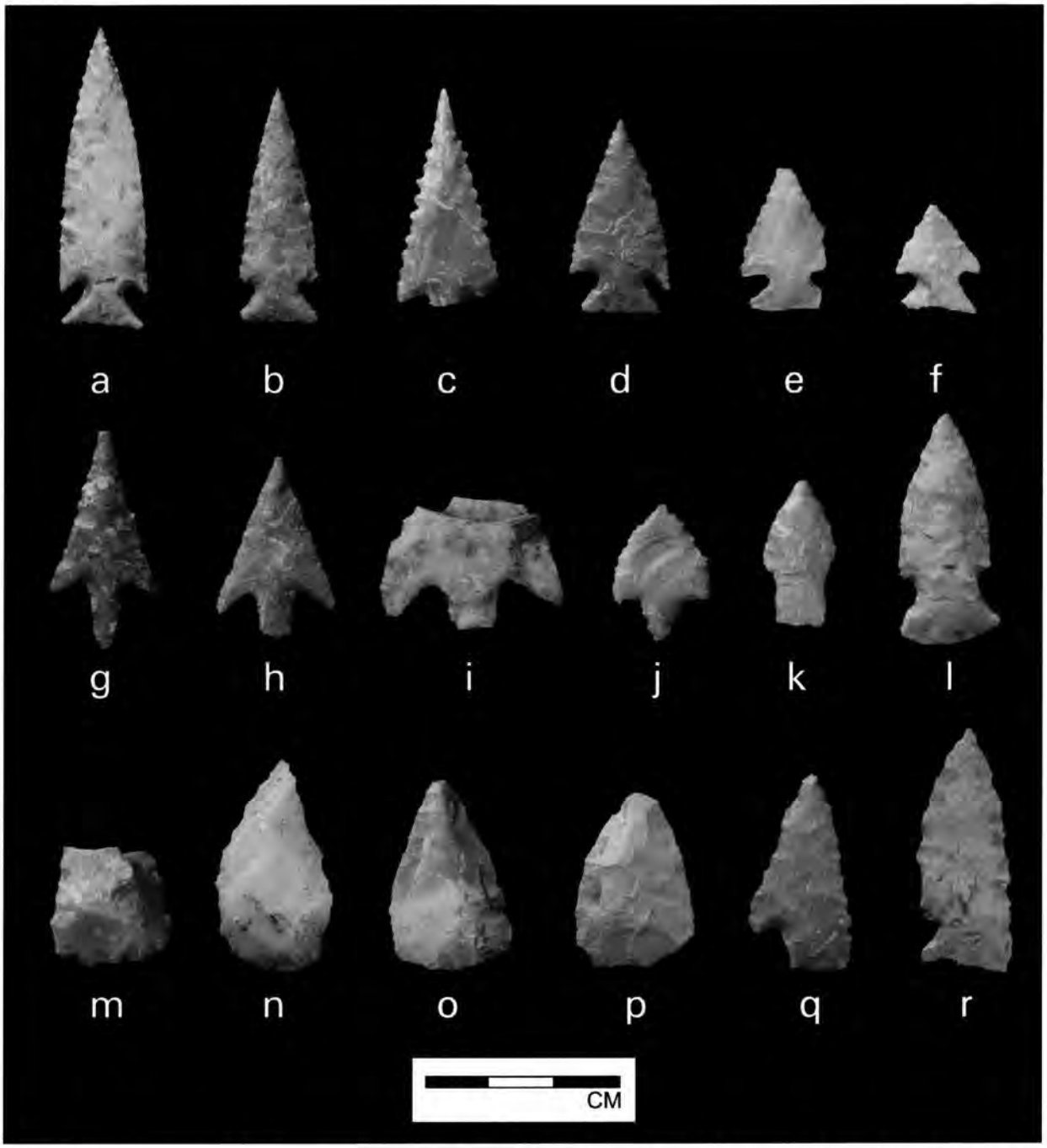

Figure 5. Arrowpoints: a-f, Scallorn; g-j, Perdiz; k, Untyped Arrow Point, Form 1; l, Untyped Arrow Point, Form 2; m-r, arrow point preforms.

that these locations were utilized only prior to the introduction of the Perdiz type into the region. This bolsters the suggestion that the Perdiz arrow point does characterize a temporally distinct component of the Late Prehistoric period in South Texas (Mitchell 2001:37-38).

Untyped Arrow Point, Form 1

Specimen 1484 (see Figure 5k) is an extremely small arrow point-sized artifact that is worked primarily on one face, with minimal beveling across the opposite face. The stem is parallel-sided, with a rectangular basal edge. Fractures along the margins

Table 2. Arrow points.

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Scallorn	1141	N15 E17	1, 2	1.0	*	1.3	0.3	Chert	broken tip
Scallorn	1143	Unknown	Unknown	0.4	2.0	1.1	0.3	Chert	
Scallorn	1154	N15 E14	3A	1.4	*	*	*	Chert	proximal fragment
Scallorn	1180	N17 E12	4	1.1	2.5	1.3	0.3	Chert	
Scallorn	1184	N14 E17	9-2	0.3	*	*	*	Chert	proximal fragment
Scallorn	1190	N17 E17	9-3	1.1	*	1.3	0.3	Chert	broken tip
Scallorn	1198	N14 E14	3A	1.0	*	1.4	0.3	Chert	broken base
Scallorn	1205	N19 E18	9-4	1.5	*	1.3	0.3	Chert	broken tip
Scallorn	1208	N14 E15	1, 2	0.4	1.7	1.0	0.2	Chert	
Scallorn	1209	N14 E15	1, 2	0.4	*	*	*	Chert	proximal fragment
Scallorn	1210	N12 E13	1, 2	0.7	1.7	1.3	0.3	Chert	
Scallorn	1212	N13 E15	1, 2	1.0	*	1.6	0.3	Chert	broken tip, serrated
Scallorn	1217	N14 E15	3C	1.8	*	*	*	Chert	proximal fragment
Scallorn	1219	N19 E14	1, 2	1.0	2.2	1.6	0.3	Chert	
Scallorn	1229	N19 E15	1, 2	0.8	*	*	*	Chert	proximal fragment
Scallorn	1243	N19 E6	3	2.0	*	1.3	0.4	Chert	broken tip
Scallorn	1446	N18 E13	3	0.9	2.2	1.4	0.3	Chalcedony	
Scallorn	1447	N13 E 14	3B	1.6	3.7	1.6	0.3	Chert	
Scallorn	1448	N18 E13	3	1.3	*	1.4	0.3	Chert	broken tip
Scallorn	1449	N12 E8	1, 2	1.5	*	1.5	0.4	Chert	broken tip, serrated
Scallorn	1450	N14 E10	3	1.3	*	*	*	Chert	proximal fragment, serrated
Scallorn	1453	N14 E10	3	1.5	*	1.3	0.3	Chert	broken base
Scallorn	1454	N13 E9	3	1.5	*	1.3	0.4	Chert	broken tip
Scallorn	1455	N13 E14	3A	0.8	2.4	1.2	0.4	Chert	

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Scallorn	1456	N17 E14	3A	1.1	*	1.5	0.3	Chert	broken base, deeply serrated
Scallorn	1457	N16 E5	1, 2	1.4	*	1.4	0.4	Chert	broken tip
Scallorn	1458	N15 E11	3	1.5	*	1.5	0.4	Chert	broken tip
Scallorn	1459	N15 E16	3A	1.2	*	1.6	0.3	Chert	broken base
Scallorn	1460	N17 E17	9-2	1.1	2.6	1.4	0.5	Chert	
Scallorn	1462	N14 E14	1, 2	0.8	2.6	1.2	0.3	Chert	
Scallorn	1463	N17 E7	1, 2	1.0	2.5	1.3	0.3	Chert	
Scallorn	1464	N13 E10	3A	1.1	*	*	*	Chert	broken tip and barb
Scallorn	1465	N17 E5	1, 2	0.5	*	*	*	Chert	broken tip and barb
Scallorn	1466	N13 E7	3	0.3	*	*	*	Chert	proximal fragment
Scallorn	1467	N18 E12	3	0.3	*	*	*	Chert	broken tip and barb
Scallorn	1471	N18 E17	3A	1.4	*	1.4	0.3	Chert	broken base
Scallorn	1472	N15 E17	9-1	0.9	*	1.3	0.3	Chert	broken base, deeply serrated
Scallorn	1473	N16 E17	9-1	0.7	2.3	1.5	0.3	Chert	
Scallorn	1475	N17 E6	3	0.9	2.1	1.2	0.3	Chert	
Scallorn	1476	N12 E5	1, 2	0.9	*	*	*	Chert	proximal fragment
Scallorn	1478	N15 E7	3	0.4	1.5	1.3	0.3	Chert	
Scallorn	1479	N15 E8	4B	0.9	2.2	1.5	0.3	Chert	
Scallorn	1480	N19 E9	3	1.0	2.9	1.3	0.3	Chert	
Scallorn	1481	N13 E13	3B	0.5	1.9	1.1	0.3	Chert	
Scallorn	1483	N16 E11	1, 2	0.4	1.6	1.2	0.3	Chert	
Scallorn	1485	N17 E17	Unknown	0.9	*	*	*	Chert	proximal fragment
Scallorn	1486	Unknown	Unknown	1.2	*	1.3	0.4	Chert	broken tip

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Scallorn	1490	N12 E17	3A	0.8	*	1.5	0.5	Chert	broken tip
Scallorn	1491	N13 E14	3A	0.3	*	*	*	Chert	proximal fragment
Scallorn	1492	N13 E4	1, 2	0.6	*	*	*	Chert	proximal fragment
Scallorn	1493	N17 E17	Unknown	1.3	*	*	*	Chert	proximal fragment
Scallorn	1494	N13 E15	3A	0.6	*	1.0	0.2	Chert	broken tip
Scallorn	1495	N19 E8	3	0.5	1.4	1.4	0.3	Chert	
Scallorn	1496	N12 E7	1, 2	0.8	*	*	*	Chert	proximal fragment
Scallorn	1497	N14 E8	1, 2	0.5	1.6	1.2	0.3	Chert	
Scallorn	1498	N18 E9	3	0.3	1.8	*	0.3	Chert	broken barb
Scallorn	1499	N14 E15	3A	0.7	*	1.3	0.3	Chert	broken tip
Scallorn	1500	N14 E8	3	0.6	*	*	*	Chert	proximal fragment
Scallorn	1501	N12 E7	3	0.6	2.0	1.2	0.3	Chert	
Scallorn	1502	N19 E9	1, 2	0.6	1.5	1.2	0.3	Chert	
Scallorn	1503	N15 E6	3	0.7	*	1.3	0.3	Chert	broken tip
Scallorn	1505	N14 E10	3	0.6	2.1	1.2	0.3	Chert	
Scallorn	1506	N17 E8	1C	0.6	1.7	*	0.3	Chert	broken barb
Scallorn	1508	N15 E8	4	0.7	2.1	1.2	0.3	Chert	
Scallorn	1509	N14 E9	3	0.4	1.7	1.1	0.2	Chert	
Scallorn	1514	N14 E10	3	0.9	*	*	*	Chert	medial fragment
Scallorn	1515	N14 E8	3	0.5	1.8	1.2	0.3	Chert	
Scallorn	1516	N14 E6	1, 2	0.8	2.1	1.2	0.4	Chert	
Scallorn	1517	N14 E8	3	0.6	1.8	1.4	0.3	Chert	
Scallorn	1518	N17 E15	3A	0.6	1.6	1.4	0.3	Chert	
Scallorn	1519	N16 E13	3	0.5	*	1.2	0.3	Chert	broken tip

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Scallorn	1520	N15 E9	1, 2	0.4	1.6	1.2	0.2	Chert	
Scallorn	1521	N18 E16	3A	0.3	1.5	0.9	0.2	Chert	burned
Scallorn	1524	N14 E14	3A	0.3	1.4	0.9	0.2	Chert	
Scallorn	1525	N18 E4	3	0.5	1.9	1.2	0.2	Chert	
Scallorn	1526	N14 E8	3	1.0	*	*	*	Chert	broken tip and barb
Scallorn	1527	N14 E8	3	0.7	*	*	*	Chert	proximal fragment
Scallorn	1529	N15 E16	3A	0.5	*	1.3	0.3	Chert	broken tip
Scallorn	1533	N17 E17	4	0.3	*	*	*	Chert	barb and partial base
Scallorn	1538	N16 E10	1, 2	0.3	1.4	0.9	0.3	Chert	
Scallorn	1539	N12 E11	3	0.5	1.7	1.1	0.3	Chert	
Scallorn	1540	N16 E16	1, 2	0.5	1.9	1.4	0.2	Chert	
Scallorn	1541	N15 E11	3	0.4	1.8	1.1	0.2	Chert	
Scallorn	1697	N14 E12	1, 2	0.7	*	1.2	0.3	Chert	broken tip
Scallorn	1700	N19 E17	1, 2	0.7	*	1.4	0.3	Chert	broken tip
Scallorn	1702	N19 E17	1, 2	0.5	*	1.3	0.3	Chert	broken tip
Scallorn	1708	N12 E15	3B	1.6	*	*	*	Chert	proximal fragment
Scallorn	1719	N18 E16	1, 2	0.7	2.0	*	0.3	Chert	broken barb
Scallorn	1724	N12 E7	3	2.0	4.4	1.3	0.4	Chert	
Scallorn	1725	N13 E13	3A	1.4	3.4	1.2	0.5	Chert	
Scallorn	1726	N13 E9	3	1.2	2.9	1.5	0.4	Chert	
Scallorn	1727	N14 E11	3	0.7	2.1	1.4	0.4	Chert	
Scallorn	1728	N17 E5	3	0.6	2.0	1.2	0.3	Chert	
Scallorn	1729	N15 E11	3	0.8	2.4	1.3	0.4	Chert	
Scallorn	1730	N18 E5	3	0.5	1.6	1.3	0.3	Chert	

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Scallorn	1731	N15 E9	3	0.7	2.4	1.3	0.3	Chert	
Scallorn	1732	N13 E14	3C	0.9	2.6	1.4	0.3	Chert	
Scallorn	1733	N12 E12	3	0.7	2.0	1.5	0.3	Chert	
Scallorn	1734	N14 E7	3	0.5	1.8	1.2	0.3	Chert	
Perdiz	1211	N16 E17	1, 2	0.9	3.1	1.6	0.3	Chert	
Perdiz	1395	N14 E8	1, 2	1.7	*	*	*	Chert	proximal fragment
Perdiz	1397	N15 E8	3	1.3	*	*	*	Chert	proximal fragment
Perdiz	1735	N16 E9	1, 2	0.4	2.0	1.4	0.2	Chert	
Perdiz	1736	N17 E8	1C	0.8	2.6	1.7	0.3	Chert	
Perdiz	1737	N16 E8	3	1.1	*	*	*	Chert	proximal fragment
Untyped arrow point, form 1	1484	N19 E13	1, 2	0.9	2.2	1.1	0.3	Chert	
Untyped arrow point, form 2	1246	N16 E9	3	2.8	3.4	1.4	0.6	Chert	
Arrow point preform	1187	N14 E14	1, 2	0.9	1.8	1.5	0.3	Chert	
Arrow point preform	1203	N15 E14	3B	0.8	*	1.6	0.3	Chert	broken tip, burned
Arrow point preform	1214	N14 E16	1, 2	1.7	2.8	1.7	0.3	Chert	
Arrow point preform	1332	N15 E11	3	1.7	3.2	1.7	0.4	Chalcedony	
Arrow point preform	1337	N16 E17	1, 2	3.7	3.5	2.2	0.4	Chert	
Arrow point preform	1346	N13 E13	3C	1.9	*	1.9	0.3	Chert	broken tip
Arrow point preform	1347	N14 E17	9-1	1.3	2.6	1.5	0.4	Chert	
Arrow point preform	1348	N18 E11	1, 2	1.8	3.2	1.4	0.3	Chert	
Arrow point preform	1349	N12 E8	3	1.1	2.8	1.4	0.2	Chert	
Arrow point preform	1350	N18 E7	3	1.5	2.7	1.8	0.3	Chert	
Arrow point preform	1351	N14 E11	3	1.1	2.5	1.7	0.3	Chert	
Arrow point preform	1352	N16 E15	3B	1.5	2.8	1.6	0.3	Chert	cortex on one side

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Arrow point preform	1357	N14 E16	3A	1.6	*	*	*	Chert	proximal fragment
Arrow point preform	1358	N14 E5	3	1.6	*	1.7	0.4	Chert	broken tip
Arrow point preform	1363	N17 E17	4	1.5	2.3	1.5	0.4	Chert	
Arrow point preform	1364	N18 E9	1, 2	1.1	*	*	*	Chert	proximal fragment
Arrow point preform	1365	N14 E12	3	2.2	2.9	1.7	0.5	Chert	
Arrow point preform	1369	N17 E6	1, 2	0.8	*	*	*	Chert	proximal fragment
Arrow point preform	1370	N14 E10	3	0.9	*	1.7	0.3	Chert	broken tip
Arrow point preform	1371	N15 E16	3B	0.7	*	*	*	Chert	proximal fragment
Arrow point preform	1372	N19 E10	1, 2	1.0	*	*	*	Chert	broken tip, one partial notch
Arrow point preform	1373	N18 E14	1, 2	0.9	*	1.4	0.3	Chert	broken tip
Arrow point preform	1379	N17 E8	1C	1.2	1.8	1.5	0.3	Chert	one notch
Arrow point preform	1427	N14 E6	3	0.8	2.4	1.3	0.4	Chert	one notch
Arrow point preform	1428	N12 E10	3	0.7	2.1	1.1	0.3	Chert	
Arrow point preform	1432	N13 E9	3	0.9	2.1	1.5	0.3	Chert	one partial notch
Arrow point preform	1451	N16 E16	1, 2	1.3	2.9	1.5	0.4	Chert	one notch
Arrow point preform	1452	N13 E5	3	1.6	3.5	1.3	0.3	Chert	
Arrow point preform	1482	N17 E4	3	0.7	2.1	1.3	0.3	Chert	
Arrow point preform	1656	N16 E9	3	1.1	*	*	*	Chert	proximal fragment
Arrow point preform	1676	N15 E16	3A	1.2	*	1.7	0.3	Chert	broken tip
Arrow point preform	1713	N12 E16	1, 2	1.6	*	*	*	Chert	proximal fragment, one partial notch
Arrow point preform	1718	N18 E16	1, 2	1.5	*	*	*	Chert	medial fragment, serrated
Unidentified fragment	700	N19 E4	3	0.3	*	*	*	Chert	medial fragment, serrated

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Unidentified fragment	701	N15 E4	1, 2	0.2	*	*	*	Chert	broken base
Unidentified fragment	1142	Unknown	Unknown	1.1	*	*	*	Chert	distal fragment
Unidentified fragment	1144	Unknown	Unknown	0.6	*	*	*	Chert	broken base, serrated
Unidentified fragment	1146	N13 E11	3	0.6	*	*	*	Chert	distal fragment
Unidentified fragment	1147	N13 E11	3	0.4	*	*	*	Chert	broken base
Unidentified fragment	1151	N19 E16	3A	0.7	*	*	*	Chert	lateral fragment, serrated
Unidentified fragment	1152	N15 E14	3A	0.7	*	*	*	Chert	distal fragment
Unidentified fragment	1166	N16 E9	3	0.4	*	*	*	Chert	distal fragment
Unidentified fragment	1167	N15 E9	3	0.6	*	*	*	Chert	distal fragment
Unidentified fragment	1183	N14 E17	9-2	1.0	*	*	*	Chert	lateral fragment
Unidentified fragment	1191	N16 E16	3A	0.5	*	*	*	Chert	medial fragment
Unidentified fragment	1196	N12 E14	3B	1.0	*	*	*	Chert	distal fragment
Unidentified fragment	1199	N14 E14	3A	1.2	*	*	*	Chert	distal fragment
Unidentified fragment	1200	N14 E14	3A	0.6	*	*	*	Chert	distal fragment
Unidentified fragment	1213	N17 E16	3B	0.2	*	*	*	Chert	distal fragment
Unidentified fragment	1216	N12 E17	1, 2	0.5	*	*	*	Chert	distal fragment
Unidentified fragment	1228	N19 E15	1, 2	0.6	*	*	*	Chert	broken base
Unidentified fragment	1292	N14 E7	1, 2	0.6	*	*	*	Chert	proximal fragment
Unidentified fragment	1299	N12 E14	3C	0.4	*	*	*	Chert	distal fragment
Unidentified fragment	1302	N15 E8	3	0.3	*	*	*	Chert	proximal fragment
Unidentified fragment	1321	N15 E11	3	0.2	*	*	*	Chert	proximal fragment
Unidentified fragment	1326	Unknown	Unknown	0.2	*	*	*	Chert	proximal fragment
Unidentified fragment	1327	N14 E11	3	0.2	*	*	*	Chert	broken base

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Unidentified fragment	1356	N17 E8	1C	1.1	*	*	*	Chert	medial fragment
Unidentified fragment	1377	N13 E9	1, 2	0.9	*	*	*	Chert	distal fragment
Unidentified fragment	1381	N19 E10	1, 2	0.7	*	*	*	Chert	medial fragment
Unidentified fragment	1386	N15 E13	3	0.6	*	*	*	Chert	broken base, burned
Unidentified fragment	1387	N15 E15	3A	0.4	*	*	*	Chert	proximal fragment
Unidentified fragment	1390	N16 E10	1, 2	0.2	*	*	*	Chert	proximal fragment
Unidentified fragment	1392	N14 E15	3A	1.0	*	*	*	Chert	broken base and tip
Unidentified fragment	1394	N15 E16	3A	1.5	*	*	*	Chert	proximal fragment
Unidentified fragment	1398	N15 E13	3	0.4	*	*	*	Chert	medial fragment, serrated
Unidentified fragment	1400	N19 E8	3	0.9	*	*	*	Chert	medial fragment
Unidentified fragment	1401	N17 E8	1B	1.1	*	*	*	Chert	medial fragment
Unidentified fragment	1402	N15 E8	3	1.3	*	*	*	Chert	medial fragment
Unidentified fragment	1404	N19 E12	1, 2	1.1	*	*	*	Chert	distal fragment
Unidentified fragment	1408	N18 E10	3	0.5	*	*	*	Chert	barb fragment
Unidentified fragment	1409	N13 E10	3	0.6	*	*	*	Chert	broken base
Unidentified fragment	1411	N17 E5	1, 2	1.4	*	*	*	Chert	lateral fragment
Unidentified fragment	1413	N14 E16	3A	1.4	*	*	*	Chert	broken base, broken tip, serrated
Unidentified fragment	1415	N16 E7	1, 2	1.2	*	*	*	Chert	distal fragment
Unidentified fragment	1417	N14 E17	9-1	0.6	*	*	*	Chert	distal fragment
Unidentified fragment	1418	N14 E9	3	0.5	*	*	*	Chert	distal fragment
Unidentified fragment	1419	N16 E8	3	0.9	*	*	*	Chert	distal fragment
Unidentified fragment	1420	N17 E4	3	0.7	*	*	*	Chert	serrated tip fragment
Unidentified fragment	1421	N14 E15	3B	0.5	*	*	*	Chert	distal fragment

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Unidentified fragment	1422	N17 E15	3A	0.8	*	*	*	Chert	distal fragment
Unidentified fragment	1423	N18 E13	1, 2	0.2	*	*	*	Chert	distal fragment
Unidentified fragment	1424	N16 E12	3	0.5	*	*	*	Chert	distal fragment
Unidentified fragment	1425	N15 E8	3	0.4	*	*	*	Chert	serrated tip fragment
Unidentified fragment	1426	N17 E11	3	0.3	*	*	*	Chert	distal fragment
Unidentified fragment	1429	N12 E11	3	0.9	*	*	*	Chert	distal fragment
Unidentified fragment	1430	N19 E12	1, 2	0.5	*	*	*	Chert	broken base, broken tip
Unidentified fragment	1431	N14 E10	3	0.7	*	*	*	Chert	distal fragment
Unidentified fragment	1433	N18 E14	1, 2	1.1	*	*	*	Chert	distal fragment
Unidentified fragment	1434	N14 E7	3	0.6	*	*	*	Chert	distal fragment
Unidentified fragment	1435	N14 E9	3	0.4	*	*	*	Chert	distal fragment
Unidentified fragment	1437	N18 E4	4	0.4	*	*	*	Chert	distal fragment
Unidentified fragment	1438	N16 E15	3B	0.5	*	*	*	Chert	distal fragment
Unidentified fragment	1441	N14 E10	3	0.2	*	*	*	Chert	distal fragment
Unidentified fragment	1442	N14 E17	9-1	0.3	*	*	*	Chert	distal fragment
Unidentified fragment	1444	N13 E12	3	0.3	*	*	*	Chert	distal fragment
Unidentified fragment	1445	N16 E7	1, 2	0.2	*	*	*	Chert	broken base
Unidentified fragment	1461	N13 E10	1, 2	1.0	*	*	*	Chert	medial fragment
Unidentified fragment	1468	N13 E6	3	0.3	*	*	*	Chert	broken base
Unidentified fragment	1469	N15 E7	1, 2	1.1	*	*	*	Chert	broken base
Unidentified fragment	1470	N13 E15	3A	1.1	*	*	*	Chert	proximal fragment
Unidentified fragment	1474	N13 E15	3A	0.9	*	*	*	Chert	broken base
Unidentified fragment	1487	N18 E5	3	0.7	*	*	*	Chert	medial fragment

Table 2. *(Continued)*

Type	Specimen No.	Unit	Zone	Weight	Length	Width	Thickness	Material	Additional Info.
Unidentified fragment	1488	N14 E11	1, 2	0.9	*	*	*	Chert	broken base
Unidentified fragment	1489	N14 E16	3A	0.5	*	*	*	Chert	medial fragment
Unidentified fragment	1504	N13 E6	1, 2	0.9	*	*	*	Chert	broken base
Unidentified fragment	1507	N17 E12	3	0.9	*	*	*	Chert	barb fragment
Unidentified fragment	1510	N18 E10	3	0.3	*	*	*	Chert	proximal fragment
Unidentified fragment	1511	N13 E4	3	0.3	*	*	*	Chert	medial fragment, serrated
Unidentified fragment	1512	N16 E10	3	0.4	*	*	*	Chert	broken base, serrated
Unidentified fragment	1513	N14 E9	3	0.8	*	*	*	Chert	barb and partial base
Unidentified fragment	1522	N14 E16	3A	0.4	*	*	*	Chert	broken base
Unidentified fragment	1523	N15 E17	1, 2	0.6	*	*	*	Chert	proximal fragment
Unidentified fragment	1528	N15 E16	3A	0.3	*	*	*	Chert	barb fragment
Unidentified fragment	1530	N15 E16	3A	0.3	*	*	*	Chert	distal fragment
Unidentified fragment	1531	N12 E12	3C	0.3	*	*	*	Chert	broken barb
Unidentified fragment	1532	N15 E12	3	0.6	*	*	*	Chert	medial fragment
Unidentified fragment	1535	N15 E15	3A	0.7	*	*	*	Chert	broken base
Unidentified fragment	1536	N15 E15	3A	0.6	*	*	*	Chert	distal fragment
Unidentified fragment	1537	N12 E12	3	0.5	*	*	*	Chert	barb and partial base
Unidentified fragment	1701	N19 E17	1, 2	0.5	*	*	*	Chert	medial fragment
Unidentified fragment	1717	N18 E16	1, 2	1.0	*	*	*	Chert	distal fragment
Unidentified fragment	1722	N18 E17	1, 2	0.4	*	*	*	Chert	distal fragment
Unidentified fragment	1723	N18 E17	1, 2	1.0	*	*	*	Chert	distal fragment

*Information not available

of the stem make it difficult to determine if the current form was the original shape of the stem and basal edge. The blade is teardrop-shaped, tapering to a point.

Untyped Arrow Point, Form 2

Specimen 1246 (see Figure 5l) is an arrow point-sized projectile point with slightly convex lateral edges. It has shallow side notches and is well-shouldered. The basal edge is convex. This point resembles the Ensor dart point type, but is much smaller. Similar artifacts have been described in Late Prehistoric contexts from the Loeve-Fox and Panther Springs Creek sites (Prewitt 1974:84; Black and McGraw 1985:101-102).

Arrow Point Preforms

Thirty-three artifacts and fragments have been classified as probable arrow point performs (see Figure 5m-r). They are roughly triangular-shaped with straight to convex lateral and basal edges, and they are bifacially worked; most have a significant flat surface on one side, but a few have pronounced curvature. A single preform (1352) has cortex on one face. Specimen 1332 is made from chalcedony (see Table 2).

Similar bifaces, in the past, have been typed as Granbury arrow points (Fritz 1975:122-123; Jelks 1962:35-36). Recent investigations at a number of Late Prehistoric sites, however, suggest that these artifacts are indeed preforms (Black and McGraw 1985:98; Black 1986:76; Taylor and Highley 1995:453). Three of these specimens from this site have one deep corner notch (1427, 1428, 1452) and another three have a partial corner notch (1379, 1451, 1718). These triangular, corner-notched artifacts are similar in proportions to the Scallorn arrow points and most likely represent a stage of Scallorn production.

Unidentified Arrow Point Fragments

This category consists of 93 proximal, distal, and lateral fragments from indeterminate arrow point forms.

CONCLUSIONS

As mentioned earlier in this article, one of the main goals of this analysis project is a reevaluation of the stratigraphic integrity of the Chytka site (41JK66). Unfortunately, an examination of the distributions of many of the projectile points, as well as pottery fragments from the site, suggests that the original investigators' inferences hold true; that is, artifacts dated through the entire Archaic to Late Prehistoric occupation are found in all levels and over a wide area throughout the site. This is not surprising considering the high numbers of burrowing rodent bones recovered in the excavations (RSTAS 1981:141). The lack of discrete stratigraphic zones does not, however, entirely stifle this analysis. The increased sample size allows a few additional comments to be made on the Chytka site's occupation and lithic technology in the area.

Previous investigations of the Chytka site have noted temporally significant artifact types associated with the later half of the Early Archaic through the Late Prehistoric periods (Mallouf et al. 1973; RSTAS 1981). The identification of the Early Archaic Bell dart point suggests the utilization of this locality may have begun as early as ca. 6000 years ago, if not earlier. Evidence of Early Archaic occupations in the reservoir area is scarce, but two other sites investigated during the final phase of the Palmetto Bend Reservoir project hint that the coastal inland adaptive strategy may have begun as far back as the Early Archaic and continued through the Late Prehistoric (RSTAS 1981:79). Additionally, a small number of Late Paleoindian sites have been identified in Jackson County in and near Palmetto Bend Reservoir (Birmingham et al. 1976; Mallouf et al. 1973).

Previously unknown from the Chytka site and the reservoir area was the presence of asphaltum. Asphaltum is a tar-like, sticky petroleum residue often associated with offshore oil seeps. This residue washes ashore in small clumps where it can be collected along beaches. It is likely that prehistoric inhabitants of the Texas coastal plain obtained asphaltum in this way from the Gulf shore (Corbin 1963:29). In the coastal region and in a smaller number of inland sites, asphaltum was used as an adhesive for hafting projectile points. This practice is

often associated with the Morhiss dart point type (Campbell 1976; Hester 1980:102). Additionally, asphaltum was used prehistorically to both decorate and waterproof ceramics (Corbin 1963:28). The presence of asphaltum on the stem of specimen 1252 (see Figure 4) suggests that the inhabitants of the Palmetto Bend region may have traveled as far as the open Gulf to obtain this substance.

The relative scarcity of lithic resources in the Palmetto Bend Reservoir area is readily apparent in the projectile points from the Chytka site. As can be seen throughout this analysis, a great number of the projectile points appear to have been extensively resharpened. The conservation of lithic material may also be partially responsible for some of the similarities between certain projectile point types. As Leland Patterson (1990:2) notes, in Southeast Texas, many notched dart points associated with the Late Archaic and subsequent periods are morphologically very similar. Further, he noted that Ellis, Ensor, and Palmillas points often co-occur in the region, which suggests a general technological tradition of notched points containing all these types. In this study, Ensor and Ellis types were often very difficult to discern. Distinctions, in many cases, could only be made based on the stem length to blade length ratios. It may be, however, that in a lithic impoverished area, the constant reworking of the notched points are responsible for the subtle changes in proportions, rather than the existence of discrete types. This possibility, of course, can only be fully addressed with a much larger sample size.

Future Research of the Chytka Site Collection?

The problems associated with the reporting of the excavations of the Chytka site were first discovered by the author during a summer 2002 inventory project of several sites within the Palmetto Bend Reservoir area. A complete inventory of the modified lithic materials and a partial inventory of other artifact categories differed drastically from those reported by the research staff at TAS (1981).

In addition to the projectile points, several hundred other lithic tools were recovered from the Chytka site. The original report claims there were 238 modified lithic materials (including projectile points), 1198 pieces of debitage, and 73 cores (RSTAS 1981:58). In actuality, lithic tools number at least 500, there are over 6000 pieces of debitage, and a great many more cores. Although the proportions are lower, the categories given in the original report can be seen as representative of the actual sample. No ground stone tools were mentioned in the original report, but included in the inventoried collections, however, are two small, round sandstone manos and two sandstone slabs with grinding impressions. Additionally, two small pieces of sandstone with small, straight grooves along the flat surfaces most likely represent abraders.

The original site report for the Chytka site stated that there were 126 bone tools recovered from the site that consisted of spirally-fractured long bones with one or more points (RSTAS 1981:59). This conflicts with the faunal analysis appendix at the end of the report, as it mentions the recovery of several possible awls, bone beads, and other bone artifacts (RSTAS 1981:141). The partial inventory of the faunal materials from the site confirms the presence of many fragments of modified antler, at least 50 modified bone specimens that could be classified as awls, and another few that resemble the "ulna-flakers" described from many Late Prehistoric sites. Additionally, at least four round bone beads and several other pieces of smooth, squared bone were recovered, many with patterns engraved in them.

The 1981 report of the Chytka site gives a general outline of the species of mussel shell and snail shell recovered from the site. The small number of shell artifacts inventoried suggests that the species listed are present in similar proportions to those reported by RSTAS (1981). In addition to the modified shell categories covered in the report, five small shell pendants have been cataloged. Little can be said about this category of artifacts because a majority has yet to be inventoried.

Perhaps the most useful category of artifacts recovered from the site is the ceramic assemblage. The original site report stated that excavations at the Chytka site recovered 69 sherds of undecorated sandy paste pottery (RSTAS 1981:60). Those interested in coastal ceramic types should note, however, that a partial inventory of the ceramic materials revealed

over 1,000 ceramic sherds, including many rim sherds, decorated sherds, and identifiable vessel forms. Additionally, several boxes of ceramic artifacts were not inventoried that contained similar materials.

Anyone wishing to work with the materials from the Chytka site should examine the Jackson County general site files at the Texas Archeological Research Laboratory (TARL), The University of Texas at Austin. Included in the files are the author's personal notes from the 2002 inventory project, as well as several documents explaining, in detail, the problems with site recording and reporting within the Palmetto Bend region. The results of the inventory project are available there as well, or an electronic copy can be obtained from TARL head of collections, Laura Nightengale. Investigators should note that the database contains the excavators' original categories, many of which differ from those assigned in this article.

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Archaeological Excavations at the Fassel-Roeder Wheelwright/Blacksmith Shop on the Grounds of the Gillespie County Historical Society's Pioneer Museum, Fredericksburg, Texas

David L. Nickels, Kristi Miller, Ruth Matthews, Clemente Murguia, and Anne A. Fox

ABSTRACT

In late 1997 and early 1998, members of the Southern Texas Archaeological Association conducted excavations around the foundation of a wheelwright and blacksmith shop operated in Fredericksburg, Texas, by Mathias Fassel from around 1875 to 1938. Coupled with limited archival research, the excavations recovered evidence of the outline of the building. Materials dating to that time period and earlier provide information about how the building was constructed, and about the people who occupied it.

INTRODUCTION

Smith: a worker in metals; *blacksmith*: a smith who forges iron; *wheelwright*: a man whose occupation is the making or repairing of wheels and wheeled vehicles (Webster 1972:191, 1714, 2082). Seems like a natural progression, doesn't it? Such was the investigation at the Fassel-Roeder Wheelwright/Blacksmith Shop in Fredericksburg, Texas. Members of the Southern Texas Archaeological Association (STAA) conducted limited archival research in conjunction with excavations at the site. This article discusses the methodology, results, and analysis of those investigations. The intent is to build on their findings and the archival resources of the community to address pertinent historical research issues in future projects near the site.

The Gillespie County Historical Society (GCHS) board members, and particularly Director Paul Camfield, realizing the irreplaceable historic value of the grounds and buildings entrusted to them by the concerned citizens of Gillespie County, and desiring to expand their knowledge of early pioneer activities and the economy of the county, invited the STAA to conduct limited archaeological investigations on the suspected location of the Fassel-Roeder Wheelwright/Blacksmith Shop. The shop was located on what is now the grounds of the Pioneer Museum in Fredericksburg, between the currently standing Fassel House and the main east-west thoroughfare through the city of Fredericksburg (Figure 1).

The relationship between the GCHS and the STAA was nurtured when the GCHS agreed to host the STAA quarterly meeting and annual barbecue on the Pioneer Museum grounds in October 1997. At that time Mr. Camfield took the opportunity to introduce STAA members to the historic treasures that possibly existed beneath the surface of the grounds, for which written documents were either not available, or simply did not exist. STAA members agreed that archaeological investigations were merited and could provide valuable information about Texas history. In October 1997, and again in November 1997, STAA representatives Anne Fox and David Nickels revisited the grounds, reviewed available photographs and maps, and in joint agreement with Mr. Camfield, decided the most productive plan of initial subsurface investigations on the grounds should involve the Fassel 1870s-1930s wheelwright/blacksmith shop.

Members of the STAA with extensive experience in excavating historical structures throughout South Texas met at the site on November 22, 1997, and January 24, 1998. Four 3 x 3 foot, hand-excavated units exposed not only the corners of the shop, but

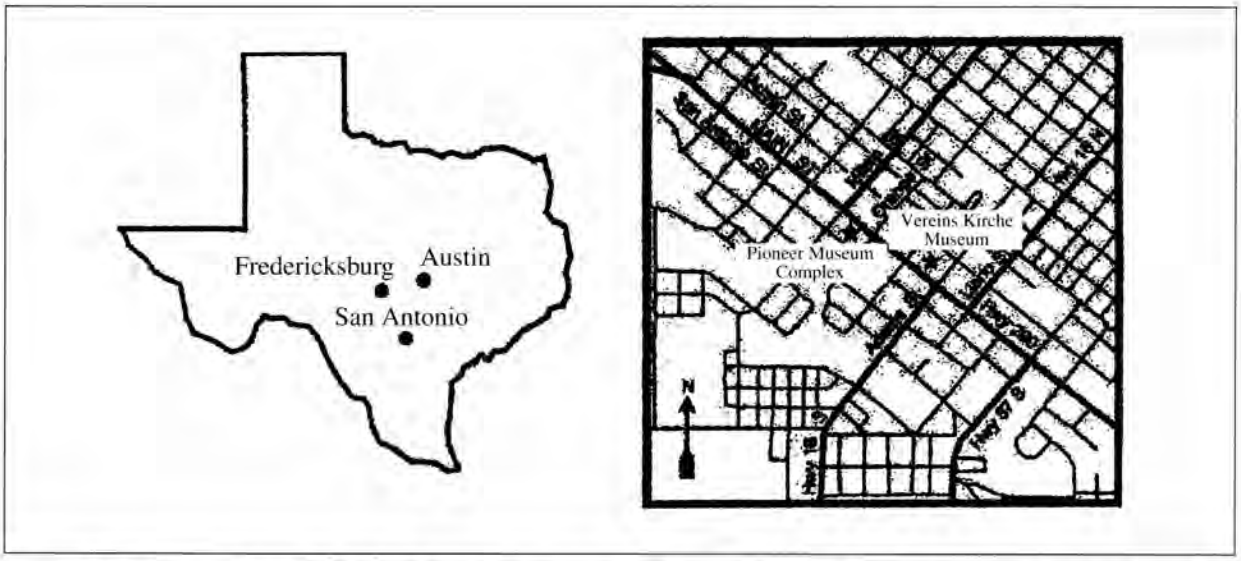

Figure 1. The Pioneer Grounds Museum is located in downtown Fredericksburg. Its central location makes it well worth the trip from just about anywhere in Texas (adapted from the Gillespie County Historical Society website [http://www.ktc.gchs/where.htm]).

also produced an array of artifacts allowing us to partially reconstruct the architecture and chronology of the shop's operation.

HISTORICAL BACKGROUND

Settling the Frontier

Upon winning its independence from Mexico in 1836, a struggling young Republic of Texas continued the empresario (colonization) system as a means of bringing new families to settle and develop the land. Earlier grants of huge tracts of land to empresarios such as Stephen F. Austin, Green DeWitt, Haden Edwards, Sterling Robertson, John McMullen, and others proved successful in establishing communities in South and East Texas. Around 1840 settlers from Germany and Alsace-Lorraine, and from other regions of the United States, began to flood into San Antonio and New Braunfels. Many of the Germans moved into the Hill Country to the north, settling into communities, and raised sheep or cattle (Freeman 1994:5-9). As the sheep and cattle markets emerged in the 1880s, ranchers and farmers settled farther away from the established settlements (Flanagan 1974; Lehmann 1969; Nickels et al. 1997).

Under President Sam Houston's second term in 1842, Henry Fisher, Burchard Miller, and Joseph Baker petitioned the Republic of Texas for authorization to establish 1,000 families in an area consisting of over 3 million acres of land between the Colorado and Llano rivers. Permission was granted to Fisher and Miller to begin recruiting 600 immigrant families who would be given 640 acres per family, provided they build a cabin and farm 15 acres of fenced land. However, settlement in the western portion of the grant, which included the Fredericksburg area, did not come easy. The objective of luring 600 families (later increased to 6,000 by the Republic of Texas) could not be accomplished for two principal reasons: (1) portions of the tract encompassed the hunting grounds of the Comanches, who were not about to relinquish their domain without a fight, and (2) the area was well west of the main San Antonio to Mexico trade routes (Biesele 1987:76-110).

Following a chain of events that led to the Fisher-Miller Grant being acquired by the Adelsverein (the Society for the Protection of German Immigrants in Texas), John O. Muesebach as Commissioner-General of the organization sent a survey party to the San Saba River area near Menard to investigate the possibilities of mineral wealth and tillable farmland available within the western portion of the grant.

Well aware that he would be encroaching upon Comanche territory, he met with a group of Comanche chiefs for three days in March 1847 and negotiated a treaty of peaceful coexistence with them (King 1967:111-118). Speaking through an interpreter, Muesebach's treaty proposal to the Comanche chiefs (Tiling 1913:100) was as follows:

1. "My countrymen have the permission to go and travel where they please, and no harm must be done to them, but you must protect them everywhere. On the other hand, your people can come to our wigwams and cities without fear and can go wherever they please and shall be protected."
2. "You the chiefs, and your people will assist us and report to us, when bad men and redfaces of other tribes steal our horses or intend other felonies, and we shall do the same, when you are attacked."
3. "I am going to send men with the thing that steals the land (compasses), as the red men call it, and will survey the whole country of the San Saba as far as the Concho and other waters, so that we may know the boundaries where we can go and till the soil. And if you are willing after consultation with your warriors, to make this treaty, then I will give you and your squaws many presents, that we call dollars, and give you as many as one thousand and more of them."

The following May, the chiefs finalized the agreement by coming into Fredericksburg to sign the treaty and collect the money promised them (King 1967:118).

Thus, German immigration into the lands west of San Antonio and Austin began in the 1830s and is fairly well documented. By the 1840s new routes and trails were being established through the largely unsettled area, due in part to the desire to reach the gold fields of California. Leiding (1992) provides an account of 218 Germans attempting to settle in Texas by 1836, but increasing to 30,000 by 1860. The Fredericksburg area was infiltrated by German settlers in the 1840s and 1850s, and the Fisher-Miller Grant to the northwest was inhabited primarily between 1875 and 1880.

Fredericksburg

A professional wheelwright in Fredericksburg in the 1860s, 1870s, and 1880s must have been much in demand. Besides the demand for service from the local populace, soon after the Civil War the U.S. Army sought to construct and strengthen its chain of forts westward across Texas to protect immigrants and ranchers. The army hired several masons and journeymen from Fredericksburg to help build Fort Concho, at present-day San Angelo. To sustain operations, the fort employed 123 civilians in 1869, including two blacksmiths and three wheelwrights. By 1871, only blacksmiths were on the Fort Concho payroll. Two years later the fort had one wheelwright on its payroll. By 1875, there was a wheelwright, blacksmith, and forage master for the horse herd on the payroll: $179/month for all three (Brown et al. 1998).

The need for blacksmiths and wheelwrights apparently declined in and around Fredericksburg toward the turn of the 20th century. Tables 1 and 2 list the businesses in operation in Fredericksburg and Gillespie County at the beginning of the 1860s and 1880s. Although there were eight blacksmiths and six wheelwrights doing business in Fredericksburg in 1860, by 1880 the number of blacksmiths had declined to six, and the only wheelwright in operation was Mathias Fassel (Fascil).

The general need for blacksmiths further waned by the 1930s. For example, a fellow German immigrant in San Antonio, Mr. Peter Schiffer, began his business before the turn of the 20th century but closed his shop in 1938. From a heyday of over 300 blacksmith shops existing in San Antonio around 1900, his was one of only five or six that existed prior to his closing in 1938 (SAE 1938).

Mathias successfully adjusted to the transition from horse-drawn wagons and farm machinery to steam- and fossil fuel-powered machinery. Copies of invoices and advertisements that can be seen in the Fassel house today indicate his flexibility and good business sense (Figure 2).

While dealing in wagon parts earlier (Figure 3), by the 1900s Mathias was working as an agent for the Rock Island Plow Company, selling more "modern" machinery (Figure 4). The following ad

Table 1. Businesses in operation in Fredericksburg and Gillespie County in 1860 (Agricultural and Manufacturing Census Records).

1860 Business	Name	Material	Product	Capital Invested	# of Employees	Monthly Wage	Total Annual Wages Paid	Value of Materials	Value of Product
Beer Brewer	Nimitz, Carl	Malt & Hops	Beer	$1,450	3	$43	$1,560	$4,500	$13,000
Blacksmith	Fritz, John	450 Bushels of Coal; Iron	All Kinds of Blacksmithing	$400	2	$40	$960	$400	$2,000
Blacksmith	Homan, Valentin	850 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$400	3	$40	$1,440	$500	$4,000
Blacksmith	Kaiser, Michael	350 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$300	1	$40	$480	$300	$900
Blacksmith	Lineweber, George	250 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$250	1	$40	$480	$250	$800
Blacksmith	Sanger, William	450 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$350	2	$40	$960	$500	$2,500
Blacksmith	Seiter, George	450 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$500	2	$40	$960	$500	$2,500
Blacksmith	Wilke, Fredrich	600 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$550	2	$40	$960	$800	$3,500
Blacksmith	Zrbill(?), William	250 Bushels of Coal; Iron	All Kinds of Blacksmith Work	$250	1	$40	$480	$250	$800
Cabinet Maker	Genteman, Friedrich	All Kinds of Timber	All Kinds of Furniture	$250	1	$40	$480	$300	$900
Cabinet Maker	Kunz, John	All Kinds of Timber	All Kinds of Furniture	$400	1	$40	$480	$500	$1,500
Cabinet Maker	Laeffler, John	All Kinds of Timber	All Kinds of Furniture	$300	1	$40	$480	$300	$800
Cabinet Maker	Schafren, Christof	All Kinds of Timber	All Kinds of Furniture	$300	1	$40	$480	$250	$700
Cabinet Maker	Schneider, Jacob	All Kinds of Timber	All Kinds of Furniture	$400	1	$40	$480	$400	$1,500
Cabinet Maker	Seilich, William	Fancy Timber	All Kinds of Furniture	$400	1	$40	$480	$350	$1,200
Cabinet Maker	Staats, Christian	All Kinds of Timber	All Kinds of Furniture	$400	1	$40	$480	$500	$1,500
Cabinet Maker	Wenspeler, Carl	All Kinds of Timber	All Kinds of Furniture	$250	1	$40	$480	$250	$700
Cooper	Meckel, Bernhard	All Kinds of Timber	All Kinds of Kegs	$300	1	$40	$480	$280	$800
Gristmill	Wrede & Companies	Wood; Corn; Wheat	Flour & Corn Meal	$7,000	5	$45	$2,700	$81,200	$90,000
Gristmill	Zink, Nicolaus	Indian Corn; Wheat	Meal	$1,200	1	$40	$480	$2,500	$3,000
Gristmill & Sawmill	Doss, Thome and John	Indian Corn; Saw Stock	Meal & Planks	$900	3	$40	$1,440	$4,000	$6,000
Gristmill & Sawmill	Pape, Fritz	Corn; Saw Stock	Meal & Planks	$3,000	3	$30	$1,080	$3,500	$6,000
Saddler	Starke, Frederich	Leather	All Kinds of Harness	$200	1	$26	$312	$250	$600
Saddler	Stoffers, Franz	Corn; Saw Stock	Meal & Planks	$480	2	$30	$720	$450	$1,200
Saddler	Weber, John	Leather	All Kinds of Harness	$500	2	$40	$960	$600	$4,000
Soap Boiler	Koth, August	All Kinds of Fats	Soaps & Candles	$300	1	$40	$480	$280	$900
Tinman	Lungquitz, Adolph	Tin; Zinc	All Kinds of Tinnery	$600	1	$40	$480	$500	$1,200
Tinman	Weiss, Louis	Tin; Zinc	All Kinds of Tinnery	$700	2	$45	$1,080	$1,000	$2,500
Turner	Fatich, Peter	All Kinds of Timber	All Kinds of Furniture	$200	1	$40	$480	$150	$700
Turner	Petri, John	All Kinds of Timber	All Kinds of Furniture	$200	1	$40	$480	$150	$600
Wheelwright	Boos, Michael	All Kinds of Timber	Wagons & Repairing	$250	1	$40	$480	$250	$800
Wheelwright	Dannenburg, Henry	All Kinds of Timber	Wagons & Repairing	$300	1	$40	$480	$300	$1,200
Wheelwright	Graff, Carl	All Kinds of Timber	Wagons & Repairing	$500	2	$40	$960	$500	$3,500
Wheelwright	Meckel, Conrad	All Kinds of Timber	Wagons & Repairing	$600	2	$40	$960	$600	$3,500
Wheelwright	Moellering, Andreas	All Kinds of Timber	Wagons & Repairng	$300	1	$40	$480	$250	$660
Wheelwright	Wilke, Henry	All Kinds of Timber	Wagons & Repairing	$500	2	$40	$960	$500	$3,200
			Totals	$25,180	58	Ave. $39.41	$27,612	$108,110	$169,160

Table 2. Businesses in operation in Fredericksburg and Gillespie County in 1880 (Agricultural and Manufacturing Records).

1880 Business	Name	Capital Invested	Greatest # of Hands Employed*	# of Males Employed >16 Yrs old	# of Females Employed >15 Yrs old	Daily Hours May-Nov	Daily Hours Nov-May	Daily Wages Skilled	Daily Wages Laborer	Total Annual Wages	# of Months in Operation	Value of Materials	Value of Product
Bakery	Wehmeier, Vincens	$500	1	1		8	8				10 - F; 2 - I	$300	$500
Blacksmithing	Pfeil, Adolph	$400	2	1		12	10	$1.25	$1.00	$100	12 - F	$400	$700
Blacksmithing	Ramsteuben, Charles	$500	5	1		12	10	$2.50	$1.00	$50	12 - F	$300	$600
Blacksmithing	Schlondt, John	$200	2	1		10	9	$1.25	$1.00	$90	10 -F; 2 - I	$250	$500
Blacksmithing	Scuch, Peter	$450	2	1		10	8	$1.25	$1.00	$30	10 - F; 2 - I	$275	$575
Blacksmithing	Segner, John	$200	2	1		10	8	$1.25	$1.00	$100	12 - F	$250	$500
Blacksmithing	Weymiller, Fred	$500	3	1		12	10	$1.25	$1.00	$80	12 - F	$400	$700
Brewery	Mauer, John	$1,400	1	1		10	8				10 - F; 2 - 1/3	$1,400	$2,000
Brewery	Probst, Frederick	$2,000	2	1		10	8				6 - F; 6 - I	$2,000	$3,785
Cigar Maker	Koeppen, Ferdinand	$300	2	1		10	8	$2.00	$1.00	$50	12 - 1/2	$550	$800
Cotton Gin	Arlt(?), August	$2,500	4	4		10		$0.75	$0.50	$150	2 - F; 10 - I	$275	$675
Cotton Gin	Buccholz, Theodore	$1,000	7	1	1	10		$1.00	$0.50	$100	3 - F; 9 - I	$300	$900
Cotton Gin	Maier, Edward	$4,500	6	6		10	10	$1.25	$1.00	$900	10 - F; 2 - 1/3	$4,500	$7,500
Cotton Gin	Ricks & Company	$1,800	4	4		9		$1.00	$0.50	$400	4 - F; 8 - I	$8,300	$1,500
Flour & Grist Mill	Henke, Henry	$7,800	5	4		12	10	$1.50	$1.25	$1,000	7 - F; 5 - I	$9,600	$15,400
Flour & Grist Mill	Lange, Frederick	$1,400	2	1		10	10	$2.00	$1.00	$100	6 - F; 6 - I	$2,400	$2,800
Flour & Grist Mill	Maier, Edward	$4,500	3	3		10	10	$1.50	$1.00	$750	8 - F; 4 - 1/2	$13,500	$18,474
Flour & Grist Mill	Stucken, V. D.	$10,000	4	4		12	12	$1.50	$1.00	$900	6 - F; 6 - I	$16,300	$18,000
Gun & Blacksmith	Weyrich & Brother	$1,000	2	1		10	8	$1.50	$1.00		12 - F	$400	$800
Lumber and Saw Mill	Henke, Henry	$200	2	1		12	10	$1.25		$300	8 - F; 4 - I	$750	$800
Saddletree Maker	Schuetten, Henry	$700	3	1		10	9	$1.50	$1.00	$147	6 - F; 6 - 1/3	$350	$700
Shoe Maker	Ludwig, Daniel	$200	3	1		10	10	$2.00	$1.00	$10	4 - F; 1 - I	$250	$500
Shoe Maker	Weber, Gustav	$150	2	2		10	9	$1.50	$1.00	$150	12 - 1/3	$262	$525
Tailor	Wahl, Vincens	$200	2	1		9	8				12 - 1/3	$350	$500
Tin Smith	Patton, A. L.	$3,000	3	1		10	10	$2.50	$1.50	$300	10 -F; 2 - I	$2,000	$3,000
Tin Ware	Lungkwitz, A.	$3,000	2	1		10	9	$1.50	$1.00	$50	12 - F	$300	$550
Wheelwrighting	Fascil, Mathias	$300	1	1		10	8	$1.25	$1.00		11 - F; 1 - I	$250	$500
	Totals	**$48,700**	**77**	**47**	**1**	**Average**	**Average**	**Average**	**Average**	**$5,757**		**$66,212**	**$83,784**
						10.3	**9.2**	**$1.49**	**$0.97**				

*No children listed as employees.

F - Full Time
I - Idle
1/2 - One Half Time
1/3 - One Third Time

Figure 2. This is an invoice from an Austin, Texas, supplier that furnished Mathias Fassel with wagon wheel parts near the turn of the 20th century.

promoting Mr. Fassel's Rock Island machinery appeared in the *Gillespie County News*, ca. July 1904:

ATTENTION FARMERS

> I am an agent for the celebrated Rock Island Plows, Harrows, Mowers, Rakes, Walking and Riding Sulkey Plows, Stalk Cutters, Grain Drills, etc. The standard of these goods among the farmers is too well known to need recommendation from me. I call special attention to my Rock Island Disc Plow. There is no better plow made. It is especially adapted to this section, and will interest anyone desiring to buy a Disc Plow. Give me a call before placing your order and get my terms and prices.
>
> M. Fassel

History of the Fassel Property

The Fassel house and lot were purchased by the Gillespie County Historical Society as part of the Pioneer Museum complex. The entire complex, which included the house, was restored to some extent and readied for interpretive tours for the 1975 Founders Day observance in Fredericksburg (Kowert 1977:8). Earliest deed transactions show that Mr. Heinreich Kammlah, a property owner to the east (the present historic Kammlah house on the museum grounds), obtained an encompassing parcel from the German Emigration Company in 1852. The parcel on which the STAA excavations were conducted was purchased by Mathias Fassel in 1876 for $600 (Kowert 1977:8-9):

> Mathias Fassel, from whose descendants the Gillespie County Historical Society bought this property Feb. 4, 1967, was a native of the Duchy of Nassau in Germany. He left there in 1871, and came here (Fredericksburg) to make his home. He married Mary (Maria) Baumann on November 3, 1875, and they moved into the small house which was on this lot. They had six children (Figure 5).

Before Mathias and Mary Fassel bought the house, "someone had a butcher shop in the small building," according to the family (Kowert 1977:9). It is not known exactly when Mr. Fassel opened his wheelwright shop for operations, but it appears that he operated the shop beginning shortly after moving onto the property in the 1870s.

Family members have fond memories of the shop, and knew that:

> Mr. Fassel was a skilled wheelwright, and had his shop in a frame building which stood between the house and Main Street. Here he made wheels and axles, and assembled buggies and wagons. The floor of the shop was covered with wood shavings and chips which the youngsters gathered for their parents to use in starting fires in the wood stoves in the house (Kowert 1977:9).

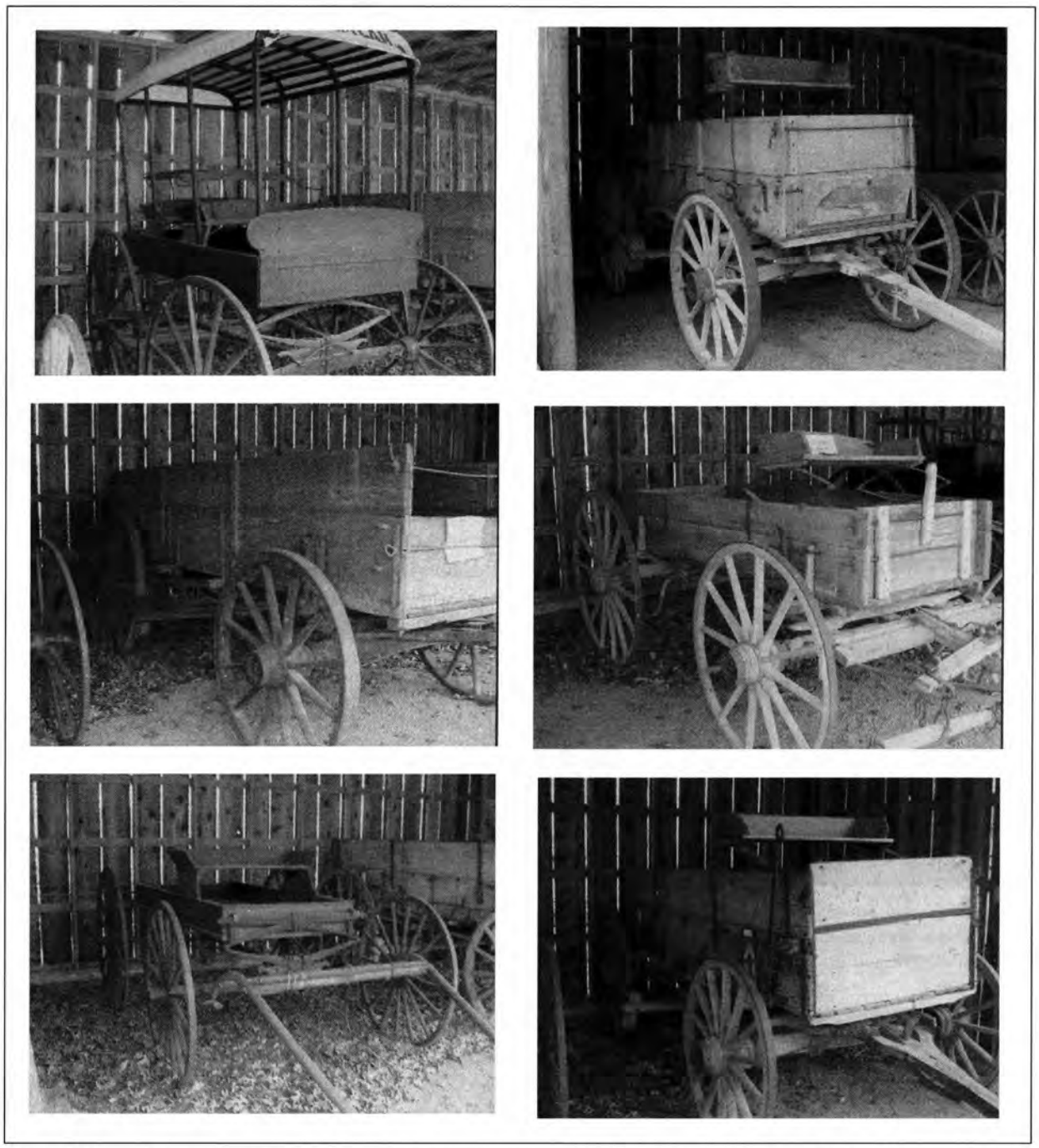

Figure 3. Examples of wagons that Mathias would have repaired; they are on display on the grounds of the Pioneer Museum.

One of Mathias' daughters, Mrs. Lina Dupray, recalled:

> . . .what a familiar sight it was to see their friends, in their long skirts and petticoats, coming up to the house through the shop, and then pausing on the porch to shake the shavings off their hems. . . the path through the shop was also a short-cut to St. Mary's Church for persons on their way there from the main street [Haupstrasse] (Kower 1977:10).

The Fassel heirs relinquished title of the property to Mr. And Mrs. William Roeder, who then passed title to the Gillespie County Historical Society in

Figure 4. Cover from an 1897 Rock Island Plow Company product brochure. Mathias Fassel was a Rock Island agent for the Fredericksburg area.

Figure 5. Family portrait of the Fassel family, ca. 1894. Pictured are Mathias and Mary, children Sophie, Arna, William, Albert, and the baby Lina. A sixth child, Alma, died in 1900.

1967 (Kower 1977:10). The wheelwright shop was apparently dismantled in the 1930s.

PRE-FIELD PLANNING

As with all archaeological investigations, the object of excavating is not just for the sake of digging into the ground and finding what may be deemed "treasure" or "pawnable artifacts of monetary value." Rather, the object is to recover artifacts of a past culture in a stratified and cultural context that by virtue of their recovery below the surface can relate a real story: that can tell us something about the way people lived, survived, laughed, and died in the past, whether it be 50 years ago or 5,000 years ago. With that in mind, we very carefully examined the available documents—1896, 1902, 1911, 1915, 1924, and 1938 Sanborn Insurance maps for the city (Figure 6)—and a few vintage photographs of the Fassel's, the Roeder's, and Kammlah's taken on the grounds.

Although lacking specifics in scale, the Sanborn Insurance maps proved invaluable in placing the Fassel shop in relation to the Fassel House as we see it today. The architectural changes over the ensuing 42 years are remarkable. It is interesting to note that although the changing family structure must have necessitated changes in the house structure, the wheelwright shop must have met the business needs of Mr. Fassel, as its dimensions remained constant.

For instance, the 1896 map (see Figure 6a) shows the original structure of the house was only a one-room structure, and from scales on the original map, we knew that the wheelwright shop's southern end was 27 ft. north of the north wall of the house; its west wall was aligned with the west wall of the original Fassel house structure. Within six years, the 1902 Sanborn's (see Figure 6b) map indicates that an addition was made to the house, almost doubling its size. By 1910 the family had added front and rear porches to the home (see Figure 6c).

Four years later in 1915 (see Figure 6d), they had put in a new wall in the western half of the house, presumably to separate the kitchen and bedroom as the home appears today. For whatever reason, the back porch is missing from the house, perhaps simply because it was unmapped by the insurance company. The house apparently remained unchanged for at least the next nine years, through 1924 (see Figure 6e). And finally, by 1938 the Sanborn's map (see Figure 6f) indicates that one of the interior walls of the house had been altered, and the wheelwright shop was no longer there.

A picture taken about 1930 (Figure 7) shows that the wheelwright shop was constructed with framed lumber. Unfortunately, the north end of the framed building is missing from the picture. However, knowing that the plank and batten buildings of the

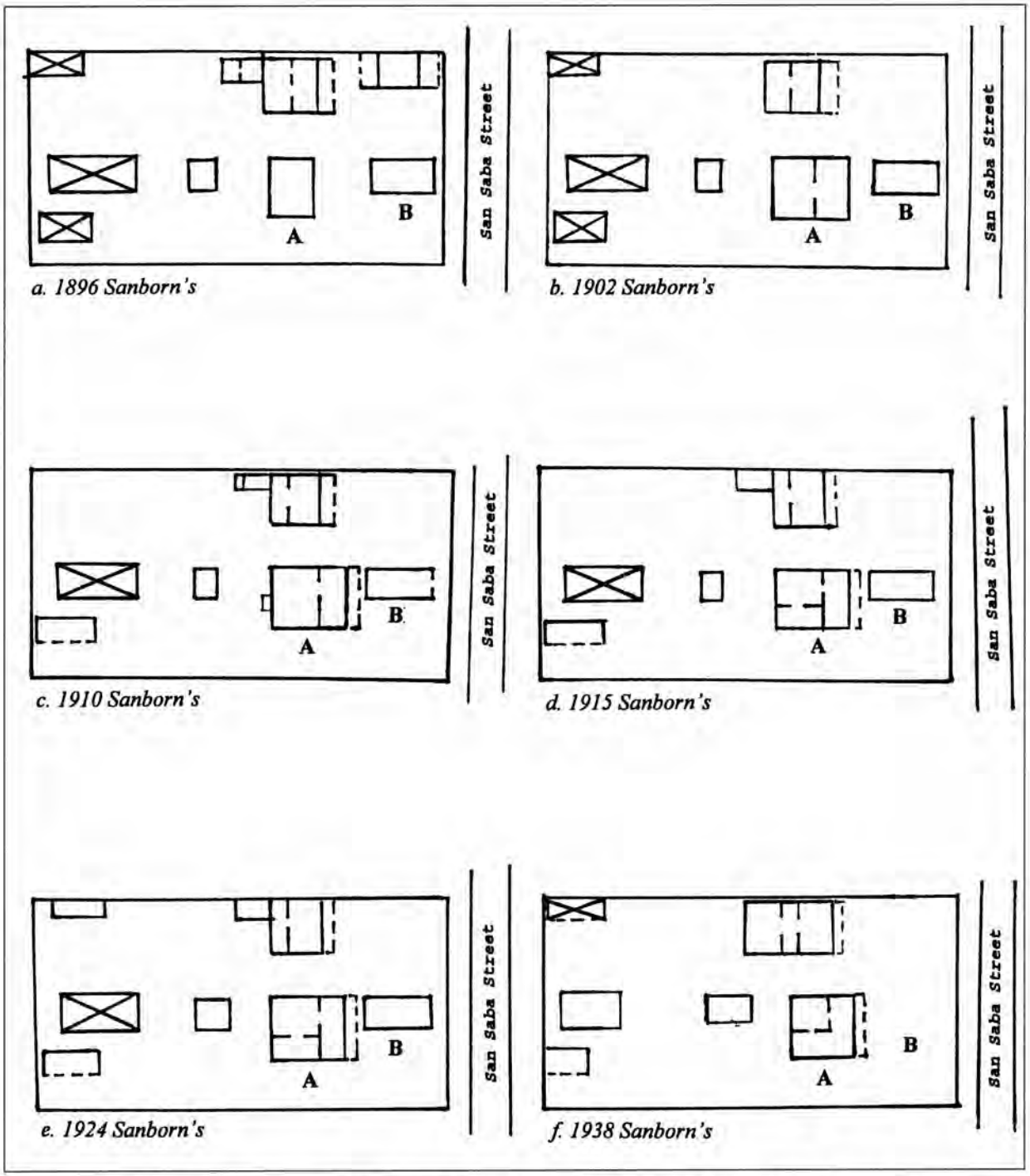

Figure 6. We used these Sanborn Insurance Maps to understand the many architectual changes that had occurred over the years; "A" is the Fassel house, and "B" is the blacksmith-wheelwright shop: a, 1896; b, 1902; c, 1911; d, 1915; e, 1924; and f, 1938.

late 1800s and early 1900s were built of true 1 x 12 inch lumber, we counted the boards, and based on window placement, estimated the number of boards that were missing from the picture. We concluded that the structure would have been approximately 30 feet long. Because the structure was framed, we doubted very seriously that any existing foundation remaining would be little more than small stones.

Figure 7. This ca. 1930 photograph of Monroe Dupray, the Fassel's grandson, shows the best view of Mr. Fassel's wheelwright shop, located directly in front of the house. The pile of wood and debris in the background denotes the property line between the Fassel and Kammlah families.

ARCHAEOLOGICAL INVESTIGATIONS

Methodology

The STAA crew placed four 3 x 3 foot excavation units over the suspected corners of the wheelwright shop (Figure 8). Excavation was conducted using square shovels to penetrate the surface turf, and then hand trowels and brushes in the underlying soils and sediments, which were sifted through 1/4-inch wire mesh (Figures 9a-c).

All artifacts were placed in either paper or plastic bags labeled with the site name, unit and level provenience, date, and name of the excavators. They were then taken to the Center for Archaeological Research, The University of Texas at San Antonio (CAR-UTSA), where they were washed, sorted by category, and catalogued using a Microsoft Excel spreadsheet not only as a permanent record, but also for easier manipulation and interpretation of the artifact data. All artifacts are the property of the Gillespie County Heritage Association (GCHA) and will be permanently housed at that association's museum in Fredericksburg. A copy of the artifact catalog was provided to the GCHA, and a copy is on file at the STAA desk at CAR-UTSA.

As stated previously, the earliest available Sanborn Insurance map (1896, see Figure 6a) showed the wheelwright shop to be 27 feet north of the outer wall of the original structure. Using a tape measure, we entered the front of the Fassel house as it exists today, measured 28 feet from the interior wall (i.e., the front wall of the original structure), and then moved west on a line with the west wall of the house (Figure 10).

In attempting to straddle any existing cornerstones, we positioned Unit 1 so that our excavations would expose both the exterior and interior of the structure, and hopefully uncover the southwest cornerstone. Based on our estimation of the 30 foot length of the wheelwright shop from the incomplete photograph (see Figure 7), Unit 2 was placed 29 feet north of Unit 1, and also on a direct line with the west wall of the Fassel-Roeder house (see Figure 10). Once again, we hoped to encounter a cornerstone, specifically the northwest cornerstone.

The width (east-west) of the wheelwright shop was also unknown, but we estimated its width from the Sanborn Insurance maps (see Figure 6) to be about 17 feet. With the permission of Mr. Camfield, parts of a flagstone walkway placed there in the 1970s were removed. Units 3 and 4 (see Figure 8) were then placed over the estimated southeast and northeast corners. Excavations in units 3 and 4 were terminated at 9.5 inches below the surface.

RESULTS OF THE EXCAVATIONS

Unit 1

The placement of Unit 1 over the suspected southwest corner of the wheelwright shop proved to be accurate. The unit straddled both the interior and exterior of the structure. A stone foundation much more substantial than expected for a frame building was encountered at about 4.5 inches below the modern surface (bs). The unit was excavated to the base of the foundation at 9 inches bs. Artifacts recovered included a horseshoe, five coins, square nails, whiteware ceramics, several unidentifiable metal fragments, and several animal bone fragments (Figures 11 and 12).

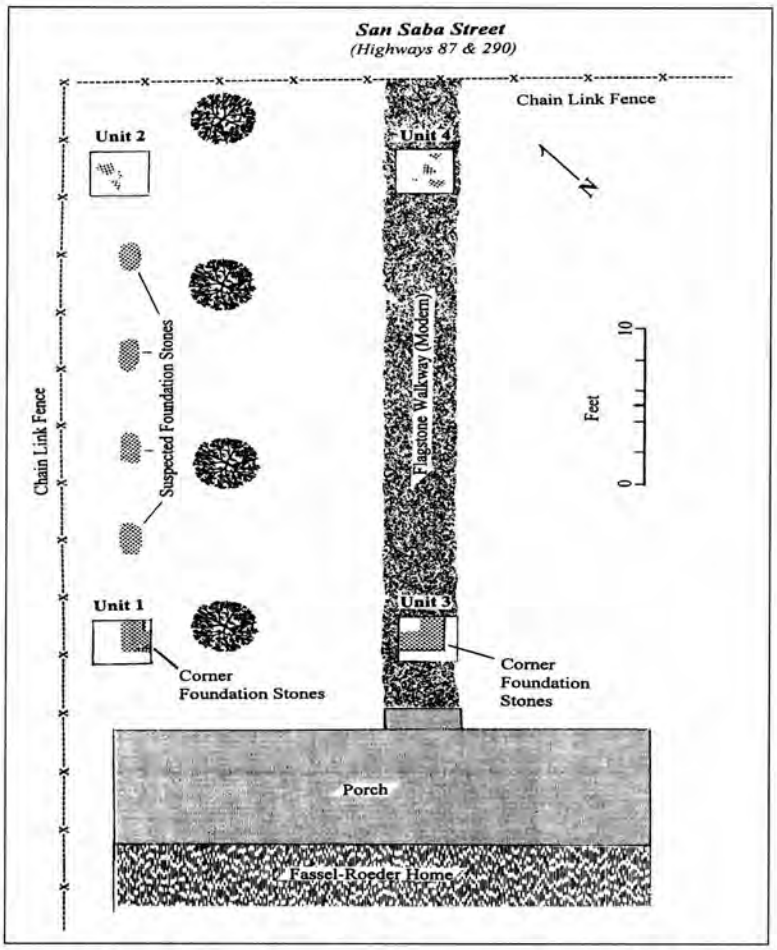

Figure 8. Map of excavation units with exposed and suspected locations of wheelwright shop foundation stones.

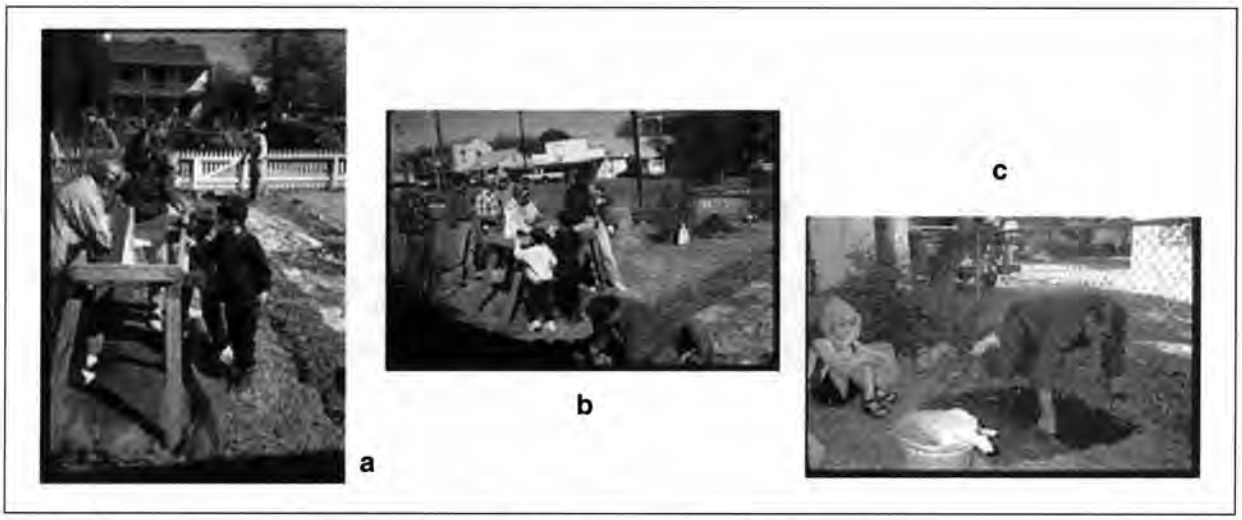

Figure 9. Excavations at the Fassel-Roeder site: a, local visitors and avocational archaeologists recover artifacts from the screens, while at the end of the paved walk another archaeologist prepares Unit 4 for excavation: b, local visitors and avocational archaeologists recover artifacts from the screens, while archaeologist Preston McWhorter excavates in Unit 3 just off the porch steps of the Fassel house; c, while being observed by a local enthusiast, archaeologist Ray Smith excavates in Unit 1 just off the west wall in front of the Fassel house.

Figure 10. Photograph of Mr. and Mrs. Fassel on the front porch of their home, ca. 1940s. The wheelwright shop stood between the front porch and the fence in the foreground. The west wall of the house is represented by the pillar in the right side of the photograph, and would have been aligned with the west wall of Mr. Fassel's blacksmith/wheelwright shop.

Figure 11. Unit 1; coins, bones, and a horseshoe were found around the foundation in this unit.

Figure 12. A solid foundation was uncovered in Unit 1, around the southwest corner of the building.

Unit 2

As with the placement of Unit 1, excavations in Unit 2 also came down on a corner (northwest) of the wheelwright shop (see Figure 8). Excavations were terminated at 9 inches bs after we were certain the bottom of the original foundation had been reached. However, unlike the substantial stone footing encountered in Unit 1 on the southwest corner of the shop, no limestone blocks were found on the northwest corner (Figure 13). A remarkable differentiation in soil texture and color, as well as artifact density was noted: outside of the structure, the sediments consisted of a loose and sandy clay, with many artifacts, but inside the structure the sediments were a hard-packed dark brown clay, void of artifacts. The artifacts found in Unit 2 were (without exception) on the exterior of the structure, and included large metal fragments, square nails, animal bones, glass fragments, ceramic sherds, and substantial quantities of sandy paste mortar.

Unit 3

Substantial limestone foundation cornerstones were found 4.5 inches bs in Unit 3. An intact stone footing similar to that found in Unit 1 was also uncovered 9 inches bs (Figure 14). Artifacts recovered include nails and tacks, a coin, scrap metal, glass fragments, and buttons, exclusively on the exterior of the building.

Unit 4

As with Unit 2, no intact foundation was found in Unit 4; the only ephemeral evidence of any pre-existing foundation were remnants of mortar and fragmented limestone (Figure 15). Soil in the western half of the unit was a reddish-brown Pedernales fine sandy loam, indigenous to the immediate area (Allison et al. 1975:26-27 and Sheet 53). Artifacts recovered included nails, tacks, assorted pieces of metal, glass, aluminum foil, and a small quantity of bone.

Figure 13. Unlike the southwest and southeast corners of the building, no solid stone foundation was found in Unit 2, around the northwest corner of the shop.

Figure 14. Unit 3, with southwest corner foundation; note the wider stone footing.

Figure 15. Only rubble was found in Unit 4 in the northeast corner of the shop, where a solid stone foundation may have existed.

ARTIFACT ANALYSIS

General Discussion

The artifacts recovered during this project are discussed below. The few coins recovered provide an absolute date of manufacture and thus the earliest year when they could have been lost at the site. Other artifacts can be relatively dated based upon the changes in manufacturing technology through time.

Most commonly, glass, nails, and ceramics provide some clues as to when they were manufactured, thus providing an approximate period when they were deposited at the site. Accordingly, this section includes a discussion of the coins, window and bottle glass, wire and square nails, ceramics, buttons, and a horseshoe found during this project.

Historic Artifacts that are Helpful in Dating Sites

Bottle and Jar Glass

Finding a piece of bottle or jar glass with a maker's mark on it is always helpful in determining its approximate date and place of manufacture, as well as its likely contents. The shapes of bottles are usually used to imply what they may have held, and by knowing their contents we can then infer their possible uses. Even though a maker's mark may not be present or legible, the manufacturing technique, labeling process, and color of the glass can provide an approximation of when it was used.

Additives caused glass colors to change through time (Table 3). Aqua, amber, olive green, and brown are natural colors produced in glass manufacture. However, before 1880, the predominate color of bottle glass was various shades of green. The standard, natural color of most cheap bottles produced since the beginning of making glass, until about 1900 (and even somewhat later for medicine bottles) was aqua, with varying hues of green and blue. Glass is a mixture of lime, soda, and sand with traces of iron oxides. When molten, the iron oxides in the sand causes a chemical change that produces the aqua color (Munsey 1970:69; Kendrick 1966:53).

Table 3. Approximate ages of glass based on color.

Brown (thin) Modern	Clear Modern	White Post-1900	Light Green Pre-1900
Amber Post-1915	Purple 1880-1915	Pink Pre-1900	Dark Green (thick) Pre-1880
Light Brown Pre-1900	Aqua Pre-1900	Blue Post-1900	Dark Brown (thick) Pre-1880

With the exception of "black" glass, glass color was not an important consideration until around 1880 when food manufacturers began demanding clear glass containers for preserved foods. Beginning in the 1880s, American manufacturers added manganese to the glass as a decolorizer. After exposure to the sun's ultra-violet rays, the manganese would change the color of the glass to purple. Manganese worked fine until the outbreak of World War I in 1915 caused another defining temporal characteristic to occur in bottles. Prior to 1915, Germany was a main supplier of manganese. When the war broke out, the supply of manganese was no longer available to the bottle makers and they resorted to using selenium as a decolorizing agent. Selenium causes the glass to turn an amber color when exposed to light (Munsey 1955:55; Kendrick 1966:53).

Window Glass

Even window glass can potentially be dated. As a general rule, the older window glass is thinner. Randall Moir (1987, 1988) came up with a formula to date window glass, accurate to within a span of 14 years. Quite simply, the equation uses the average thickness of window glass found at a site to provide an approximate date that the glass was manufactured ± 7 years (Moir 1988:271-274). Obviously the date of manufacture does not necessarily represent the date the glass was brought to the site, but it does offer a reasonable time frame. By looking at the variations in the thickness of glass found on a site, we are sometimes able to estimate not only when a house or barn was built, but maybe even when, and how many times, it was renovated.

Ceramics

Ceramics are usually found around all old houses, and occasionally around old outbuildings. There are many kinds, and they have changed through the years. Some of the ones we most frequently find are discussed below (Figure 16).

Decalcomania

The decalcomania decoration technique was developed in 1850 by Minton's potters in England as a way to decorate cheap tableware. This type of tableware became quite popular during the mid-19th century, and is still used today (Ramsay 1976:108; Durrenberger 1965:66).

Transfer Ware

The technique of transfer-printing was developed in England in the late 1740s. By the late 18th century, this technique was a low cost way of elaborating the design on a vessel compared to painting the decoration by hand. However, employing skilled engravers to etch the decorations on copper plating did not provide a cheaper product compared to other types of decorated ware during the late 1700s. With the development of more reasonably priced white earthenware with an alkaline glaze in England about 1810, transfer ware became more popular. And, with the end of the War of 1812, transfer-printed ware became popular in American markets through the mid-19th century. A large number of these wares were exported to the coastal ports of Texas, and redistributed to the major cities to meet consumer demand

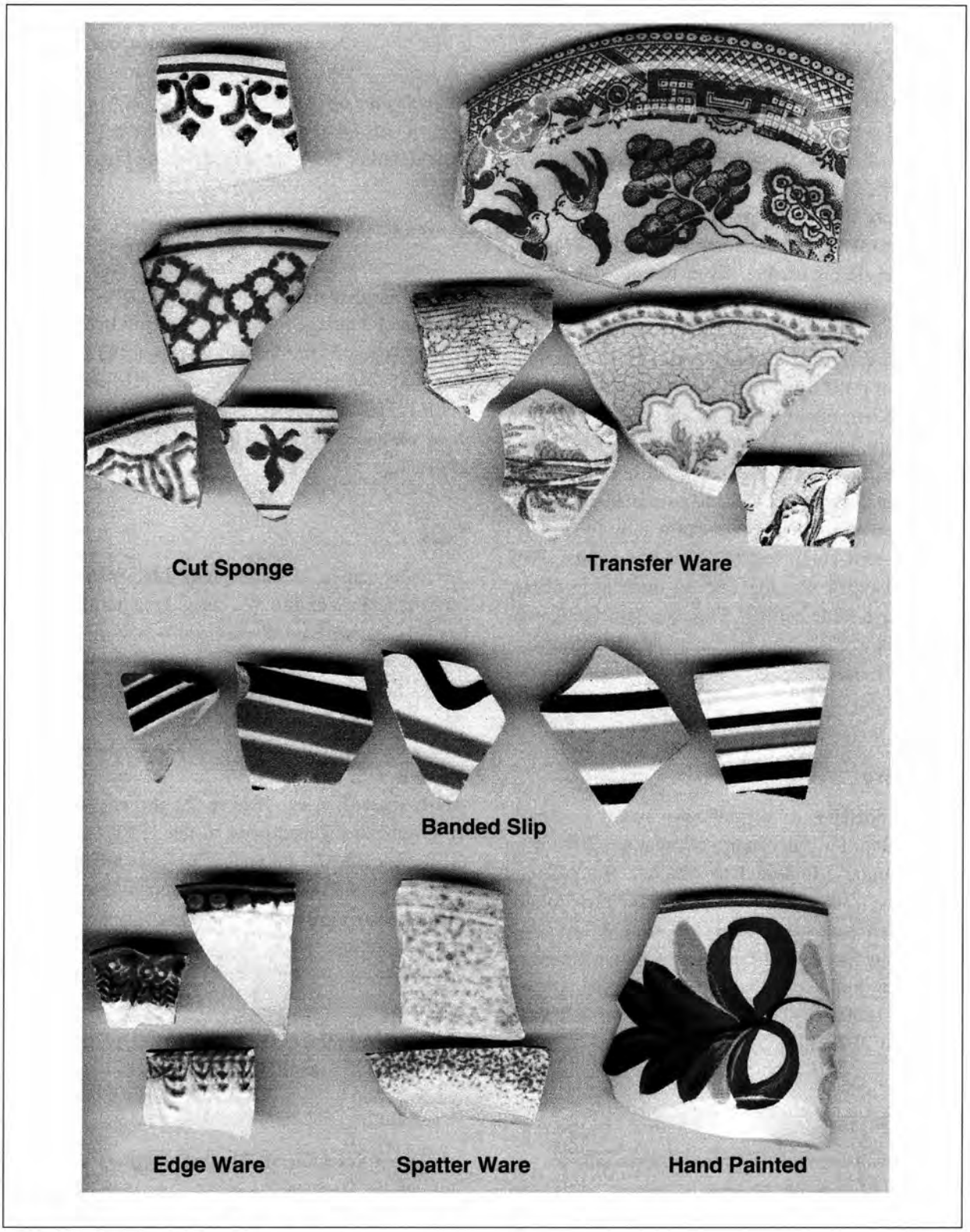

Figure 16. Examples of mid-19th to early 20th century decorated ceramics.

Atterbury 1979:144; Labadie 1986:111; Miller 1980:4; Ramsay 1976:152; Samford 1997:3).

By the mid-1850s the demand for transfer-printed wares in the United States was declining. In Texas this trend is reflected by the increasing popularity of undecorated white granite ware between 1850 and 1870. The majority of transfer wares coming into Texas were imported from England, and the naval blockades off Texas' coast during the Civil War disrupted the Texas market. Even the post-Civil War years would have been difficult for the market of transfer-printed wares since hard cash was scarce. However, there was a short popularity in American markets for the flow-blue transfer-printed pattern from 1880 to about 1890. At the end of the 19th century, the increased use of decals as a decorating technique for ceramics probably caused the decline of transfer-printed wares. Transfer-printed wares with a central undecorated area usually surrounded by a floral pattern continued to flourish, and the 1902 Sears, Roebuck Catalog offered them as a cheap, inexpensive table setting. They are still being produced today (Blake and Freeman 1998:18; Majewski and O'Brien 1987:147; Miller 1980:4; Samford 1997:25).

Whiteware

The presence of white-bodied wares is usually an indicator of a 19th century occupation. Whiteware was commonly imported to America from Britain during the 1800s, but the demand for undecorated wares increased significantly in America by 1860. Undecorated whiteware became a common tableware setting for middle class families around San Antonio after the 1860s, replacing pewter and wooden wares (Fox et al. 1989:45).

Porcelain

A small amount of Chinese porcelain was imported to Mexico on the Manila galleons in the 18th century. Under careful examination it can be distinguished from European and American porcelain by the slightly blue-gray tint of the body, and when decorations are present, the grayish-blue designs lie beneath the glaze, while delicately painted orange floral designs lie over the glaze. Porcelain is rarely present on 18th and early 19th century sites because the fragile ware had to be transported from Europe, but it became more common after 1832, when by that time, it was commonly manufactured in the United States (Barber 1976:126-127; Ivey and Fox 1981:35).

Stoneware

Popular stonewares found in the area includes Albany Slip/Bristol glaze and Bristol glaze. The combination of Albany Slip (brown slip) and Bristol glaze (white) appeared in the first quarter of the 20th century and was continuously used until about 1920. Bristol glaze then became the dominant type of stoneware used after 1920, and through about 1950 (Greer 1981:212).

Nails

Nails can be classified into three main categories: (1) hand wrought; (2) cut with hand-hammered heads or cut with machine-made heads; or (3) wire. Hand wrought nails were commonly used until the 1800s, falling off in popularity with the introduction of cut nails. Cut nails with hand-hammered heads were popular between ca. 1790-1825, followed by cut nails with machine-made heads; these were commonly used from ca. 1825 to the present. Although they were introduced prior to the 1850s, wire nails did not become the dominant nail type until the 1890s (Nelson 1968:1-10). Figure 17 shows examples of square nails commonly found during excavations around historic structures, including the Fassel-Roeder shop.

Artifacts Recovered during Excavations at the Fassel Shop

Ceramics

Twenty ceramic sherds that represent tableware and can be associated with household use were recovered from the four units (Table 4). Eleven (55%) are undecorated whiteware, primarily used after 1850 (Hard et al. 1995). Three fragments (15%) are transfer ware. The fragment from Unit 1, level 1, has a blue on white pattern, popular through the 1880s and

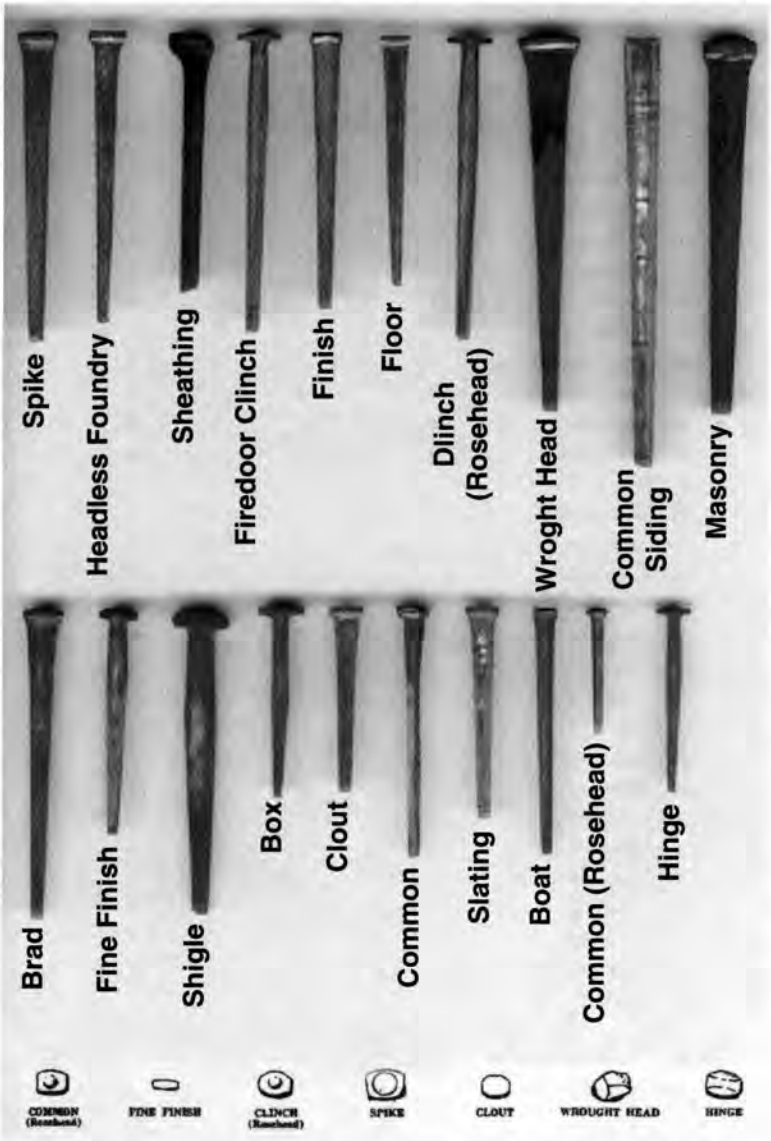

Figure 17. Square nails. Adapted from Tremont Nail Company board display, Wareham, Massachusetts.

1890s, and the fragment from Unit 1, level 2, has a black on white pattern, popularly produced between 1829 and 1840. The third specimen, from Unit 2, level 2, has a flowing blue print color instead of the more rigid lines of the other two pieces. The flowing colors (or flow blue) were a later style, dating after ca. 1840-1850. Although the preference for transfer ware waned for a period, it once again became a popular dinnerware from about 1875 through 1900 (Miller 1991:9).

Three pieces (15%) are hand-painted, a type of tableware commonly found in artifact assemblages that date to the mid-1800s (Hard et al. 1995; Meskill 1992). Three other fragments (15%) are European porcelain; two fragments are from Unit 1, level 1, and the third is from Unit 1, level 2. European porcelain is commonly found in archaeological sites that date after 1859 (Miller 1991:11). The fine quality of porcelain made it more expensive than other dinner wares and its presence here is an indication that perhaps the Fassel's were able to enjoy some of the finer qualities in life.

Construction Materials

Nails

A total of 164 intact nails and 35 broken nails (n=199) were uncovered at the Fassel-Roeder site. Of the 164 intact nails, 115 (70%) are square cut nails with machine-made heads, and 49 (30%) are wire nails. As stated previously, wire nails did not really become the dominant type until the 1890s; however, many builders preferred using cut nails well into the 20th century. The greater holding power of cut nails was a factor delaying the acceptance of wire nails. Perhaps this was the case at the Fassel Wheelwright-Blacksmith Shop.

All of the nails collected are rusted with the exception of one, a galvanized nail found on the northeast corner near the main street at a depth of 6 inches bs. Galvanized nails are iron nails coated with zinc as a protection against rust and were used to nail shingles or shakes to roofs. They first appeared around 1901, and have been manufactured continuously until the present. This could be evidence of repairs to the roof during the waning years of the wheelwright shop's existence.

Seventy-two (62.6%) of the 115 intact cut nails are classified as "common." One other (0.9%) is an L-headed nail (usually used in flooring and trims); one (0.9%) is a barrel nail; 29 (25.2%) are cut tacks;

Table 4. Artifacts recovered during the excavations.

	Unit 1 Lv 1	Unit 1 Lv 2	Unit 2 Lv 1	Unit 2 Lv 2	Unit 3 Lv 1	Unit 3 Lv 2	Unit 4 Lv 1	Unit 4 Lv 2	TOTAL
CONSTRUCTION									
tar pieces	3	2		1	13				19
paint chips	2	3							5
hook-in-eye					1				1
crushed red rock								5	5
quartz rock	12		9						21
quartz rock in mortar			2						2
window glass	29	28			6	3		3	69
square cut nails	16	15	9	2	63	5	8	9	127
wire nails	11	2	1	3	19	2	11	6	55
unidentified nails	6	5	5	1					17
vitrified pipe	5								5
mortar	2	6	5	5					18
tile			1						1
metal pipes			9	7	3		2	4	25
cement			2	2					4
limestone w/mortar				2					2
electrical wire	1		1						2
OCCUPATIONAL									
metal cloth stay					1				1
metal grommets					3				3
tacks					10	2	11	7	30
bar with rods								1	1
wagon wheel retainer nut								1	1
metal pin					1				1
rebar					1				1
metal bar					1	1			2
spark plug					1				1
metal bolt w/nut					2				2
metal paper clip frag.					1				1
unidentified lead frag.		1							1
bone	29	84	4	5	12	4	3	2	143
metal wood screw	2	1			4				7
metal scrap frags	16	47	14	18	23			1	119
metal strap frag		7						1	8
metal triangles		2							2
metal threaded screw				1	1				2
metal bar w/hole				1	3				4
metal handle	1								1
tire plug			1						1
metal wire			1	1	1				3
metal fence staple					1				1
washers	3.5	1			1	1			6.5
metal nuts	1	1			7				9
horseshoe		1							1
hinge plates	1				1				2
carriage bolt	1								1
metal pin	1	2						2	5
metal plate w/ hole	1				1			1	3
screw w/ loophole			1						1
metal rod				1	6			2	9
well casing		1							1

	Unit 1 Lv 1	Unit 1 Lv 2	Unit 2 Lv 1	Unit 2 Lv 2	Unit 3 Lv 1	Unit 3 Lv 2	Unit 4 Lv 1	Unit 4 Lv 2	TOTAL
HOUSEHOLD									
Ceramics									
hand-painted					1	2			3
transferware			1		1	1			3
whiteware	3	7			1				11
porcelain	2	1							3
Glass									
aqua, bottle neck					1				1
cobalt blue, bottle	2				1				3
aqua, bottle	5	7	5						17
brown, bottle	4	1	6	2	21	4	1	1	40
opaque, bottle			1						1
amethyst, bottle			4						4
milky, bottle		1							1
green, bottle								11	11
clear, bottle	4	11	9		12		3	1	40
clear, lamp	11	5							16
clear, light bulb bottom	1								1
Other									
cork		1	1						2
metal spoon handle					1				1
bottle caps	1	1	1		2	1			6
Clothing									
shoelace eyelet	1								1
hook-overall strap					1				1
metal snap					3			1	4
metal button					1				1
ceramic button					6				6
shell button					2				2
MISCELLANEOUS									
porcelain doll head		1							1
coins	1	4			1				6
mussel shell								7	7
green foil			1				1		2
silver foil	1		2				2		5
green plastic			1						1
blue plastic	1								1
peach pit			1						1
chert	9							1	10
snail shells	2								2
shell	1								1
orange plastic					1				1
yellow plastic	1						1		2
TOTALS	197	251	98	52	241	23	43	67	972

10 (8.7%) are horseshoe nails; one (0.9%) is a patent brad; and one (0.9%) is a hand wrought nail (Nelson 1968). Forty-five (91.8%) of the 49 wire nails are classified as "common;" one (2.0%) is a flooring brad; two (4.1%) are classified as "roofing" (Nelson 1968); and one (2.0%) is a galvanized common nail.

Window Glass

Sixty-nine window glass fragments were recovered, 57 (82.6%) from Unit 1. Using a regression equation developed by Randall Moir (1987:77, 1988:271) of I=84.22(T) + 1712.7 (in which I = the initial date of construction and T = the mean thickness in millimeters), dating window glass by thickness has been successfully tested in urban San Antonio (e.g., Gross and Meissner 1995:240-241; Nickels and Fox 1997:11). Based on the mean thickness of the 69 sherds from the Fassel-Roeder site of 2.04 mm, the regression coefficient of .93 and a 95% confidence level indicate that the window glass recovered was manufactured sometime between 1878 and 1892.

Household Materials

Bottle Glass

One hundred and eighteen bottle glass sherds were recovered from the site. Eighteen fragments (15.3%) are aqua; one of these fragments is a bottle bottom with a round seam at the base, revealing that it was made by an automatic bottle machine sometime between 1903 and the present (Newman 1970), and the second has a cork stopper neck commonly in use until about 1925 (Miller and Pacey 1985:45). Three fragments (2.5%) are cobalt blue, an expensive colored glass that often times was difficult to obtain (Robinson 1971:31). Forty fragments (33.9%) are clear glass that was most likely produced between 1880 and the present (see Table 3).

One clear glass fragment has embossed letters on it: "...ERAL LAW FOR...RE-USE OF TH...." This is part of an embossing that was put on alcohol bottles after 1932 (Robinson 1971:13; Newman 1970). Forty sherds (33.9%) have an amber-brown coloring. Two of these are light amber-colored, most likely produced after 1915 (see Table 3). One sherd (0.8%) is extremely dark brown, or "opaque," and from its color it can be dated ca. 1815 to 1885 (Newman 1970).

Four fragments (3.4%) are purple, which was a common product between 1880 and 1915 (see Table 3), but examples have been found dating to 1925 (Newman 1970). One fragment (0.8%) is white, or "milk," glass, often times used in cosmetic containers (Miller and Pacey 1985: 45). Finally, 11 pieces of bottle glass (9.3%) are green, a color commonly used prior to 1900. Other glass recovered includes 16 clear lamp-glass sherds (see Table 4), and when compared to the glass light bulb fragment found, they are probably associated with an earlier occupation.

Buttons

Eight complete buttons, and a half of another were recovered, all from Unit 3, level 1. Two are shell buttons: a two-hole, sew-through type and a four-hole, sew-through type (Figure 18). Shell buttons, made from non-iridescent freshwater shells, were used as utilitarian fasteners for children's clothing, underwear, and shirts. Before 1900, most shell buttons were imported from Europe. By 1900, there were over 200 shell button factories in the United States, and shell buttons were popular in the United States from 1890 through 1910, when they were generally replaced by plastic buttons after World War I.

One half, and five whole buttons, were ceramic buttons, of the four-hole sew-through type (see Figure 18). Ceramic buttons prior to 1840 were expensive because the clay was molded by hand. They were also ornate, fancy, and decorative. However, ceramic buttons became common and inexpensive after 1840 when a machine method was first used for the job. Machine-made ceramic buttons were plain, utilitarian, and simple (Epstein and Safro 1991:74).

The last of the buttons is made of metal, and is also a four-hole, sew-through type (see Figure 18). This is a plain metal button with deep wells and four sewing holes, typical of buttons for work clothing, especially overalls. Metal buttons have the advantage of being easily moldable and thus may be mass-produced, but have the disadvantage of being susceptible to corrosion (Albert and Kent 1949:3, 24). This particular specimen was corroded, but still usable.

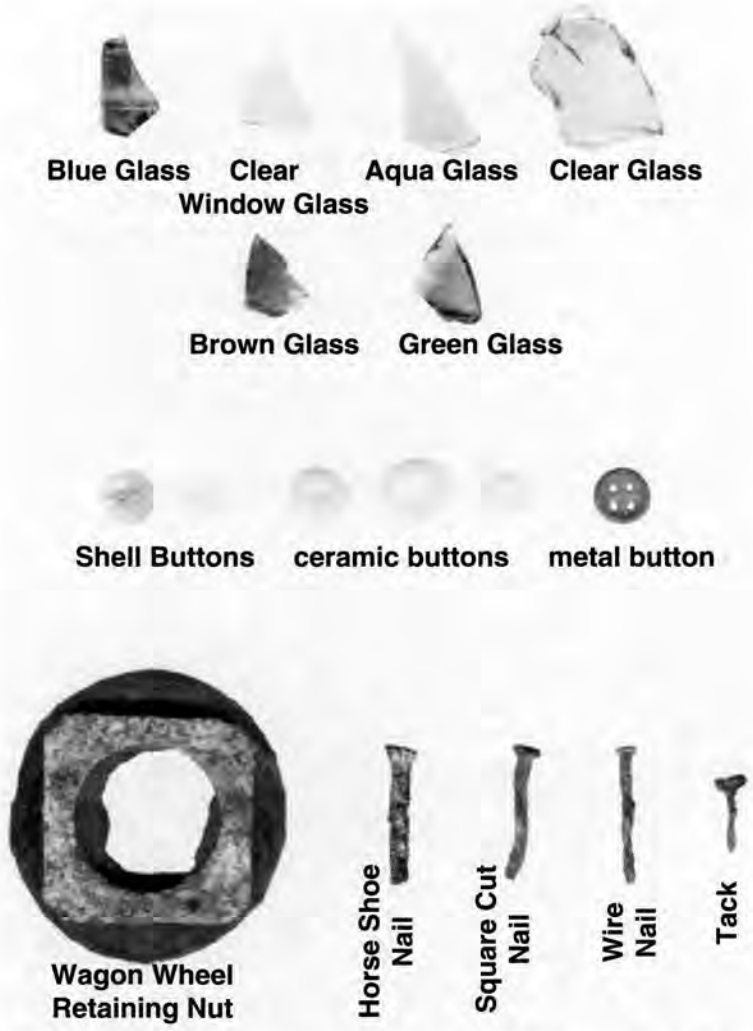

Figure 18. These artifacts were found while excavating around the shop.

Coins

Six coins were recovered from two units at the wheelwright shop. Two are Liberty Seated quarter dollar pieces, one is a nickel five cent Shield piece, two are Indian Head nickels, and one is a Lincoln Head cent piece. One coin was found in Unit 1, level 1, four coins were found in Unit 1, level 2, and a third was discovered in Unit 3, level 1.

A quarter dollar recovered in Unit 1, level 1 is in very good condition with at least three letters in the word "Liberty" visible on the shield (Yeoman 1967:117). Although the U.S. Department of Treasury authorized production of Liberty Seated coins as early as 1838, this particular quarter dollar's date is 1855. An absence of a mint mark indicates that it was minted in Philadelphia (Deisher 1987:436). Two other mint marks appeared on the quarter dollars during this time period; the "O," which was minted in New Orleans, and the "S," which was minted in San Francisco (Deisher 1987:431,433).

The second quarter piece (Unit 3, level 1) is so worn that no date could be perceived. Enough of the design remains, though, to enable it to also be recognized as a Seated Liberty quarter dollar. The first mint of this design had no drapery at all. By 1840, Miss Liberty began to be draped, but only from the elbow down. By 1842, she was draped from her shoulder down to her feet. The drapery on the worn coin is apparent, but whether it begins at the shoulder or the elbow is not clear. It is enough to establish an earliest issue date of 1840 and a latest issue date of 1891, when a different quarter dollar design was authorized (Yeoman 1967:120).

A five-cent piece dated 1867 came out of Unit 1, level 2. The Shield-type nickel five-cent piece was made possible by an act of Congress on May 16, 1866. This act authorized a new nickel/copper alloy (Yeoman 1967:11). There were now two five-cent pieces in circulation. The second type was a silver five-cent piece. In 1866, the design of the nickel/copper alloy coin included rays shooting out between the stars on the reverse side of the shield, and in 1867 a second variety was authorized. The coin recovered from Unit 1 represents the second variation, which is exactly like the 1865 version except for the elimination of the rays. There was no further change in the Shield type five-cent piece until the introduction of the Liberty Head type in 1883 (Yeoman 1967:92).

The other two nickels (both from Unit 1, level 1) are 1918 Indian Head nickels, which were first issued by the U.S. Government in 1913. They were also

referred to as Buffalo or Bison Nickels. At this time there were two distinct varieties: the first variety shows the buffalo standing on a mound; the second depicts the buffalo standing on a flat, narrow line. By 1918 all Indian Head nickels have the buffalo standing on the flat line. Neither Indian Head nickel in the Fassel-Roeder collection has a mint letter accompanying the date; this indicates they were minted in Philadelphia. Both of the nickels at the wheelwright shop, as well as the other coins that contain copper, appear to have been burned. This is not evident on the silver quarter dollars, and the cause of the burned appearance on the pennies is unknown.

A 1937D Lincoln Head penny was found in Unit 3, level 1. In 1937, two other mints of Lincoln Head pennies were issued: one without a mint letter and one with an "S." The "D" after the date on this specimen indicates the coin was minted at the Denver, Colorado mint. The Lincoln Head type penny was first issued in 1909 to commemorate the 100th anniversary of Abraham Lincoln's birth. It was also the first one-cent piece to display the motto "In God We Trust." Victor D. Brenner designed the coin and his initials, V.D.B., appeared on the reverse side between and below the wheat ears. In 1910 this was discontinued, but in 1918 the initials were restored to the front side just below Lincoln's right shoulder (Yeoman 1967:86). These initials are no longer visible on the 1937D specimen recovered during excavations at the wheelwright shop. This may be attributed to either the corrosive activity that naturally occurs in the alkaline, Pedernales soils around the shop (Allison et al. 1975:26-27), or the burning of the coin's surface.

Miscellaneous

Horseshoe

One rusted horseshoe with a nail head imbedded in it was recovered from Unit 1, level 2. The shoe belongs to the front hoof, which can be detected from the absence of the reinforcing bar (Labadie 1986:70). Also, due to the amount of wear on the horseshoe, it may be inferred that the owner maintained an urban life instead of using the horse as a field animal.

Faunal Remains

Although faunal remains were recovered from all four units, 122 of 143 (85.3%) pieces were found in units 1 and 2 (see Table 4). An examination of the faunal material recovered from the two units indicates that it is primarily artiodactyl (goat or sheep), cow, jackrabbit, and pig. The predominance of bones showed evidence of a metal, hand-sawing tool (Barbara Meissner, 1998 personal communication).

CONCLUSIONS AND DISCUSSION

Stone houses were commonly being constructed in Fredericksburg by 1856 (Leiding 1992:375), and it can be assumed that when Mr. Fassel purchased the property in 1876, the house was already there. After Mr. Fassel built his wooden frame wheelwright shop structure with a sound, solid, limestone foundation in the 1870s, he forged wagon wheels and axles made with both wood and iron. The floor of his shop was covered with shavings in 1876, suggesting that he conducted more wood-working than metal-working.

The excavations in Unit 1 and Unit 3 clearly identified the solid stone foundation and footing in the southwest and southeast corners of the wheelwright shop. Such a solid stone foundation would have held a substantial structure. The results obtained from these two excavation units in the rear of the structure indicate that the ground in that area has been relatively undisturbed since the building was torn down in the 1930s. The artifacts found in Unit 1 suggests that the site was occupied from 1855 at the earliest, but no archaeological evidence was found that would validate when the building was no longer in existence. The coins in Unit 1 could have been lost either in the butcher shop or the wheelwright, and subsequent blacksmith, shop operation.

The excavations in Unit 2 and Unit 4 around the northeast and northwest corners determined the outline of the foundation by the presence of mortar on smaller rocks (see Figures 8, 13, and 15). On the northern end of the site the modern surface slopes with the landscape toward the north, and the main street. Presumably any large limestone foundation that may have existed there was removed during landscaping operations. As revealed in the two

excavation units at the front of the shop, near San Saba Street (now Main Street, Highways 87/290, see Figure 6), the area around the front of the shop has undergone extensive disturbance, probably as a result of sidewalk and street construction in the 1900s. Metal pipe fragments, cement fragments, electric wire, and various-colored glass mixed together in the same excavation levels attest to this disturbance.

Over 62% of the cut nails recovered were classified as "common," a 2-inch nail typically used in wooden siding; and over 91% of the wire nails recovered were the 3d common type, a 1 inch multipurpose nail that was relatively cheap. In April 1897, a 100-pound keg containing about 60,000 3d nails cost around $1.50 (Israel 1968).

One of our questions was whether or not this particular shop had a wooden floor, either partial or full? With the recovery of only two nails that would normally have been used in flooring, along with the absence of a "sleeper" or flooring support along the walls, we can presume that the building had a dirt floor. However, the nails may have been removed with the flooring when the building was dismantled, and the general absence of artifacts found inside the structure seem to imply this.

The absence of ornate, fancy, elegant, unusual, and expensive buttons leads one to believe that the inhabitants of this site were common, ordinary working-class people whose clothing was utilitarian and inexpensive.

In 1855, the loss of a quarter dollar amounted to the approximate loss of a week's worth of food for the average United States citizen (Barabba 1976:200-209). At this time in history, well over one half of the U.S. citizens obtained their livelihood through agricultural endeavors. Although much of what they consumed was produced by their own hands, there are some items that many would have purchased. For example, in 1855 wheat flour would have cost $8.76 for 100 pounds; sugar was going for $0.07 a pound; and 50 pounds of nails could have been obtained for $4.10 (Barabba 1976:209).

In 1867 still more than half of all U. S. working people were employed on farms. Their approximate wage was $1.50 per day and they worked an average of 66 hours per week. They could expect to pay approximately $1.00 for a pair of men's work shoes of good quality, $0.75 to $5.00 for a pair of pants, and $1.00 for a shirt. Coffee would have cost them approximately $0.07 a pound for the cheapest brand. Flour, by the half barrel, was $2.50, and for the physically impaired, an artificial leg would have cost them a whopping $75.00 (Derks 1994:5-35).

Between the years 1914-1918, the nation assumed fully the responsibilities of world citizenship and experienced the effects of a centrally managed wartime economy. Industrial barons were raking in the profits. The middle class was emerging and the lower class of workers were at an all time low. These laborers toiled under unhealthy working conditions for very little return. Farm laborers could expect to earn $604 annually. They would have paid approximately $0.38 a pound for beef round steak, $0.54 for a pound of butter, $0.18 for a pound of dried beans, $0.37 for a pound of cheese, $0.10 for a loaf of bread, $0.30 for a pound of coffee, and $0.07 for a pound of sugar. Boots would have cost them $21.00 a pair, pants $1.50, and a work shirt $0.75. During this industrial age an automobile could have cost them anywhere from $625 up to $1,995 (Derks 1994:57-157).

Losing a penny in 1937 was certainly a dearer loss then than it is today. In 1937, the American economy was beginning to pick up after the "Great Depression." The Commerce Department experts reported only nine million people were unemployed. Employed people who were inclined to indulge were happy to learn that there would be a 50% tariff cut on all imported liquor and they could now pick up a pint of Canadian Club for $2.09. Farm laborers were finally back to earning 1868 wages with an annual income of $407, but the price of food and clothing, meanwhile, had gone up. A pair of men's shoes cost $7.50 to $11.00 a pair, an axe cost $0.98, and smoking tobacco was about $0.15 a can. As far as the price of food, a pound of sugar cost about $0.06, rice cost $0.09 a pound, salt pork could be purchased for $0.27 a pound, coffee was $0.23 a pound, and a loaf of bread was between $0.04 and $0.05 (Derks 1994:262-279).

SUMMARY

This article has discussed the results of limited archaeological investigations at a Central Texas wheelwright/blacksmith shop in operation from the 1870s through the 1930s. Although many interesting and informative clues have been obtained from these limited excavations, many more questions remain unanswered. For example, what kind of floor was in the building? The relative absence of artifacts inside the foundation suggests that the shop had a tight wooden floor; otherwise artifacts would have fallen through the cracks. However, common sense says that hot coals, ashes, and metal would not mix well with a wooden floor. The full excavation of the interior of the structure should provide us with this information as well as the spatial layout of Mr. Fassel's work area(s), such as the location of his forge, storage areas, areas of refuse, possible anvil location, etc.

For the serious researcher, an excellent synthesis of research issues that can be addressed with further excavations of the Fassel shop are discussed by Light (1984). Otherwise, a replica example of blacksmith operations can be seen at the Johnson Settlement in the Lyndon B. Johnson National Historic Site in Johnson City, Texas. Many hours of archival work in Gillespie County legal documents and newspapers, along with oral histories and photographs, should accompany the archaeological dirt work. When did Mr. Fassel perceive that the trend in technology would force his business into servicing combustion engine vehicles with rubber tires instead of wooden axled and steel-rimmed autobuses pulled by steel-shod horses? The significant role that Mr. Fassel's shop and other similar shops played in the development of Fredericksburg and Central Texas requires further investigation.

ACKNOWLEDGMENTS

The members of the Gillespie County Historical Society and Pioneer Museum Director, Paul Camfield, are to be commended for their efforts in preserving the county's heritage. The field work could have not been accomplished without the help of STAA volunteers Wilson McKinney, Ray Smith, Bobby Rector, Ken Watkins, Tom Miller, Preston McWhorter, Waynne and Darla Cox, Curt and Helen Harrell, Anne Fox, Dave Nickels, and Clemente Murguia. Funding for the excavations was supplied by the STAA. Laboratory analysis of the artifacts was conducted by Kristi Miller, Clemente Murguia, and Ruth Miller with assistance from Dave Nickels and Anne Fox. The Center for Archaeological Research Directors, Dr. Bob Hard, followed by Dr. Steve Tomka, are thanked for allowing us to use the laboratory for both analysis and temporary curation of the artifacts.

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