

WHERE'S THE CLIFF?: LATE ARCHAIC BISON KILLS IN THE SOUTHERN PLAINS

Kent J. Buehler

ABSTRACT

Current research at western Oklahoma's Certain site (34BK46) has substantially increased our knowledge of Late Archaic bison hunting in the Southern Plains. Comparison with several other kill sites in the Texas Panhandle shows a broad, regional pattern. Small to moderate numbers of bison were trapped in arroyos, killed, and butchered. Butchering patterns and carcass utilization vary in detail, but generally show less than full use of what was available. Seasonality data are tentative, but seem to show some variability as to timing of the kills, with a possible preference for late fall/early winter.

Keywords: Southern Plains; Late Archaic; bison kills

INTRODUCTION

In 1966, Frank Leonhardy proposed and defined the Summers Complex, based largely on information derived from excavations at 34GR12. This site, located in what is now the Mangum Reservoir in far southwest Oklahoma, yielded hearths or cooking pits containing significant quantities of bison bone. Leonhardy (1966:31) interpreted the artifacts and features to reflect a society "apparently specialized toward hunting and the principal resource is presumed to have been *Bison bison*." A single radiocarbon assay obtained on charcoal from one of the features yielded a date of 2770 ± 150 BP (Leonhardy 1966:29-30).

To postulate a society based on bison hunting from such meager evidence is tenuous at best. However, in Leonhardy's defense, little was known at the time about the role bison exploitation may have played during the Archaic on the Southern Plains. At the time, only two kill sites were known: Twilla, in the eastern Texas Panhandle and then undated (Tunnell and Hughes 1955); and Bonebed 3 at Bonfire Shelter (Dibble and Lorrain 1968). The latter was of the same general age as the Summers site, but located over 600 km to the south.

Since then, our knowledge has improved but slowly. David Hughes (1977, 1989) published descriptions of several kill sites (including Twilla) based on limited test excavations and surveys. More recently, excavations conducted by the Oklahoma Archeological Survey at the Certain site in western Oklahoma have given us the opportunity to add substantially to our knowledge of bison procurement during the terminal Archaic on the Southern Plains. This paper presents a general overview of this information.

THE STUDY AREA

The area under consideration lies along the eastern border of the Llano Estacado in the physiographic region known as the Rolling Red Bed Plains (Fig. 1). It is dominated by mixed-grass prairie on the uplands with riparian zones along the rivers and spring-fed drainages (Blair 1950; Bruner 1931). As its name implies, it is an area marked by a gently undulating landscape cut by numerous arroyos and gullies. Some of the latter are today quite deep. These arroyos have undergone multiple cycles of cutting and filling. The last such cycle to have taken place during prehistoric times apparently occurred between 3000 to 1500 years ago, with the arroyos being filled by the later date (Hughes 1977:27-28). This episode corre-

Kent J. Buehler, Oklahoma Archeological Survey, University of Oklahoma, Norman, OK 73019

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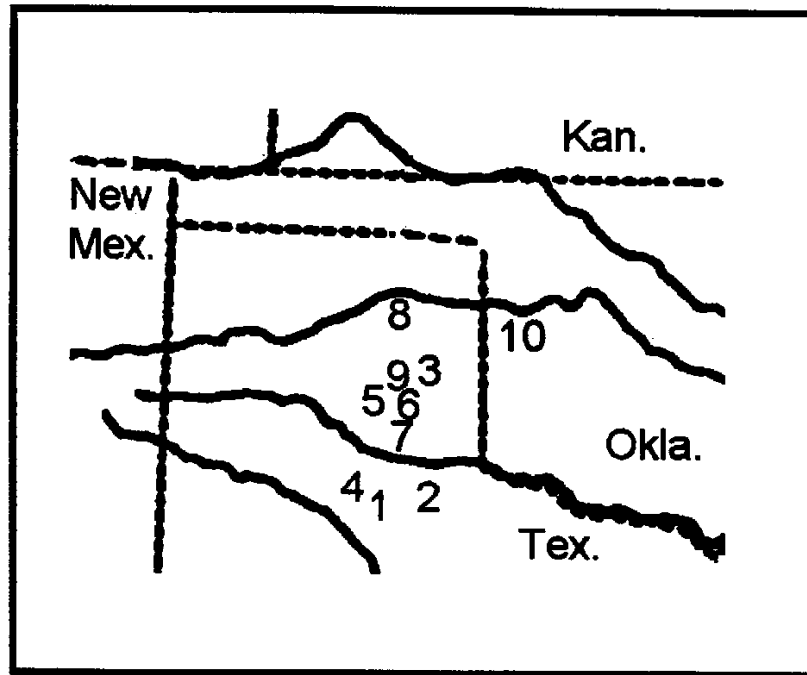


Figure 1. Study area and locations of Late Archaic bison kills.

sponds to the time frame of interest here. A final cutting episode has occurred within the last 100 years (primarily due to overgrazing) and has resulted in reexposure of the sites under examination.

THE SITES

Information is presented from 10 sites (Fig. 1), nine of which are in the eastern Texas Panhandle. The remaining site, Certain, is in Beckham County in west-central Oklahoma. Eight of the Texas sites are located in the upper Red River drainage, whereas the ninth site (Hoover) is within the Canadian River drainage. Four of the Texas sites have undergone minor test excavations (Twilla, Bell, Collier, and Strong) with the remainder known primarily from survey examinations (Sitter, Finch, R.O. Hoover, and Buzzard Roost) (Tunnell and Hughes 1955; Hughes 1977, 1989). The test excavations were conducted in the 1950s and 1960s. Since this paper focuses on initial bison procurement/utilization, all of the sites dealt with here are kill locations. They are provisionally considered to be Late Archaic in age based on projectile point typologies (including a lack of

Table 1. Radiocarbon ages (uncalibrated) for Texas/Oklahoma Late Archaic bison kills.

Site	Age
Certain	1400 ± 70 BP (Beta 28121)
	1440 ± 70 BP (Beta 55386)
	1370 ± 80 BP (Beta 56837)
	1370 ± 90 BP (Beta 55429)
	1730 ± 60 BP (Beta 66019)*
Twilla	1120 ± 100 BP (RL570)
Bell	1520 ± 110 BP (RL573)
Strong	980 ± 100 BP (RL572)
Collier	1930 ± 110 BP (RL571)

* Date on wood charcoal. All other dates on bone.

arrowpoints) and radiocarbon dates. Dates are available for four of the Texas sites (Twilla, Bell, Collier, and Strong) and for Certain (Table 1). They range in age from 980 to 1930 years ago, averaging 1429 BP (Hughes 1977; Bement and Buehler 1994). With one exception, all of the dates are on bison bone. Bone dates are prone to problems stemming from diagenesis of the organic constituents following deposition (Stafford et al. 1991), resulting in dates that are too young. There-

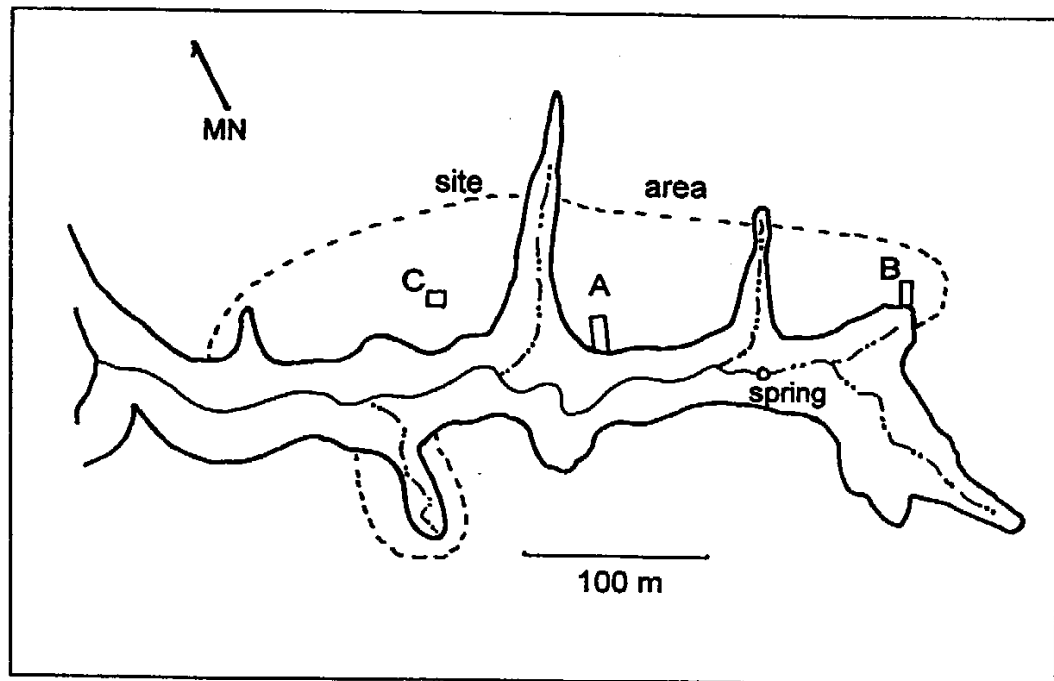


Figure 2. Map of the Certain bison kill site showing main canyon and excavation areas.

fore, they should be considered minimum ages. This is illustrated by the series of dates obtained from the Certain site. Four radiocarbon dates on bone all fell between 1370 and 1440 BP, an internally consistent clustering. However, a single date obtained on charcoal from a hearth lying 15 cm above the bonebeds gave a result of 1730 ± 60 BP (Beta-66019), some three hundred years older than the bone underlying it. Therefore, it is likely that the true ages of the kills are somewhat older than the radiocarbon dates indicate.

THE CERTAIN SITE

The Certain site (34BK46) was first brought to the attention of the Oklahoma Archeological Survey in 1970, when the landowner noticed bones eroding out of the walls of a deep canyon on his property. A broken projectile point found at that time suggested the bone deposits were the result of human activity. The site was periodically checked over the years until excavations were initiated in 1992. At that time, two backhoe trenches, designated A and B (Fig. 2), were opened up in areas where bone was exposed in the gully wall. Additionally, other bone exposures were

probed with a truck-mounted soil coring rig. This tool allowed us to roughly map the depth and extent of the different bonebeds and to determine that each concentration marked the location of a buried side gully off the main channel of the canyon. To date, we have located six bone-bearing fossil arroyos, five on the north side of the main channel, and one on the south. All of these deposits occur at a rather consistent depth of 2.5-3.0 m below the modern ground surface. Each, presumably, represents the location of a kill.

One additional area of bone concentration turned out to be not a kill location but a secondary processing area. This location, designated Trench B, yielded a small pit containing several bison bones, mostly disarticulated forelimb elements. Although the pit did contain small fragments of burned bone and burned sandstone, none of the larger elements showed evidence of having been burned. This feature is tentatively interpreted as an area where select portions of the carcass, primarily the hump and forelimbs, were stripped of meat, and the bones then discarded into an old firepit. The bones were not broken, showing no evidence of marrow or grease extraction.

To date, two kill locations have been partially excavated by backhoe trenches followed by manual exposure of the bonebeds. Trench A was initiated in 1992 and expanded in 1993. Trench C was initiated in 1993. A brief description of Trench A follows. (For a more thorough discussion see Bement and Buehler 1994.)

Excavations in Trench A exposed a 4 m wide by 8 m long portion of the fossil arroyo containing the kill. Because recent lateral widening of the main canyon has removed part of the lower portion of this arroyo, the original extent of the kill cannot be determined. However, probing with the truck-mounted coring rig indicates we have exposed most of what remains. The kill consists of a single event which took place at the head of the arroyo. The bonebed is approximately 20 cm above the sandstone bedrock floor. The overlying deposits lack distinct strata, suggesting filling of the gully was fairly steady with no interruptions long enough to allow significant pedogenesis.

The existing portion of the arroyo contained the remains of at least 20 bison, based on axial articulations. A modified MNI of 23 is obtained from aged mandibles. The bonebed contained everything from single elements to articulated limbs to major axial articulations. Some organization is apparent with most of the axials oriented either parallel with or perpendicular to the long axis of the arroyo (Fig. 3). There is some overlapping of individual skeletons, but by and large they are separate from one another. Most animals were either supine or on their sides. Approximately a third had complete vertebral columns. Of the remainder, separation commonly occurred in the area of the eighth to tenth thoracic vertebra. Several animals were split lengthwise, with the upper ribs and limb elements detached, leaving the remainder of the carcass intact. There is no evidence of any subsequent butchering of these remaining halves. The detached rib racks were evidently removed from the kill location, as disarticulated ribs were relatively rare. Detached limbs were stripped of flesh and discarded, usually without further disarticulation.

Crania were left attached to the vertebral column in about half of the cases. Regardless, most skulls were smashed, usually by crushing the occipital and removing the frontal, presumably to

gain access to the brains. Hyoid bones were usually absent, suggesting removal of the tongues. There was little if any evidence of breakage of long bones for marrow. Caudal vertebrae were rare, suggesting hides were completely removed and taken away. The overall picture of the butchering in Trench A is one of incomplete utilization of the available meat. The degree of butchering varied from animal to animal, however, and it is not possible at this point in our analysis to postulate whether certain cuts were preferred.

The season of the kill is believed to have been late fall, based on the dental attributes of 38 mandibles (Frison and Reher 1970; Todd and Hofman 1987). The age composition of the herd varied from 0.3 years to over 11 years (Table 2). Median age was approximately 5.6 years. Only one mandible had a horizontal ramus height greater than 72 mm, suggesting it may have been a male (Reher 1974). The remaining animals are therefore considered to have been females and/or juveniles.

Trench C, another arroyo kill located some 100 m down the main canyon from Trench A, shows some departures from the latter. An 8 m by 6 m area was opened up in 1993. Much of the bonebed thus exposed remains in situ, awaiting further fieldwork. Thus, our assessment of this area is preliminary. Like Trench A, the gully at Trench C was used to trap bison at its head. Preliminary testing indicates two vertically separated bonebeds are present, suggesting the arroyo was used for at least two kill episodes. The lower bed is exposed only by two 50 x 50 cm units, so little is known about it at this time. The upper bonebed, unlike that of Trench A, appears to have been the result of more intensive butchering. Articulated elements are less frequent, consisting of occasional limb and short vertebral segments. There are no major axial articulations or half skeletons as in Trench A. The vast majority of the bones occur as disarticulated, single elements. However, unlike Trench A, there is some stacking of like elements. Since there is no evidence of major post-kill disturbances, the character of the Trench C bonebed is attributable to rather extensive human processing.

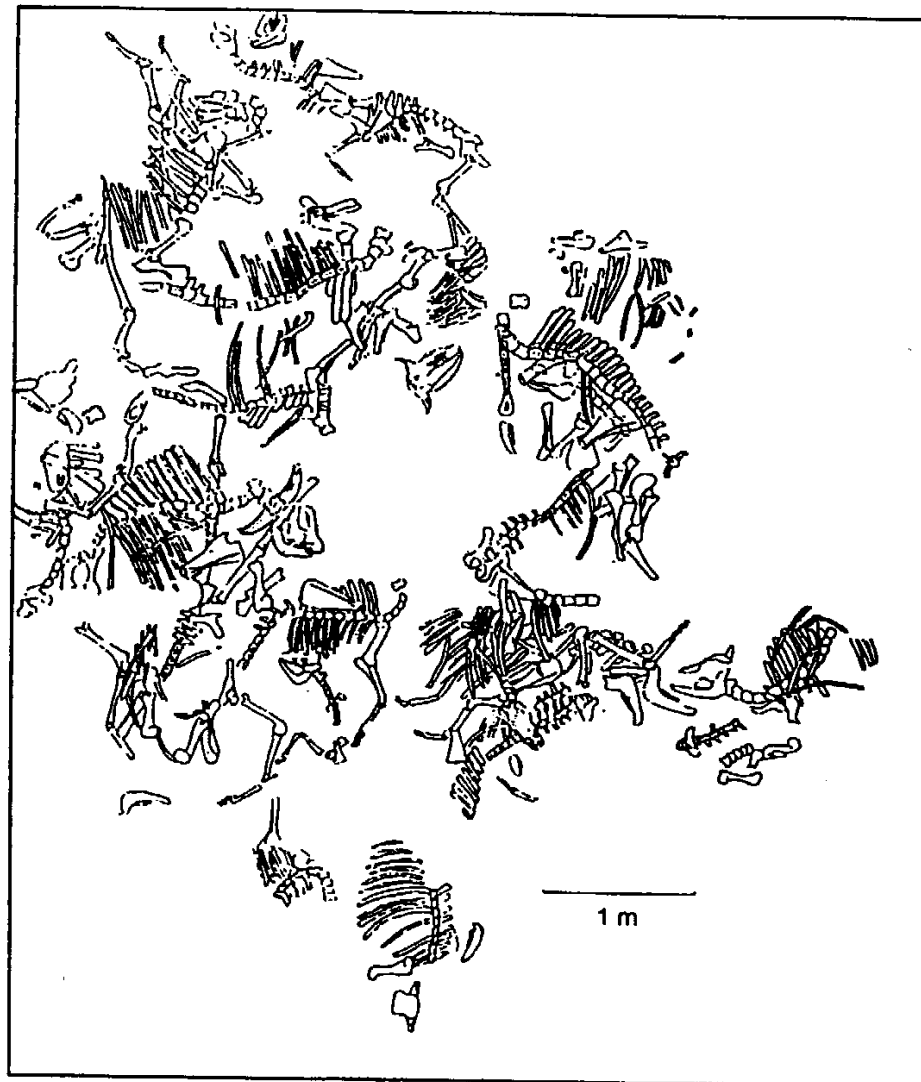


Figure 3. Major articulated skeletal segments at the Certain site, trench A.

COMPARISONS: PATTERNS AND VARIATIONS

Analysis of the Certain site data is ongoing and additional fieldwork is planned. Nonetheless, our work to date has prompted questions as to how this site compares with other terminal Archaic bison kills in this portion of the Southern Plains. Several basic lines of inquiry are examined using information derived from the nine Texas Panhandle sites mentioned above (Tunnell and Hughes 1955; Hughes 1977, 1989). They are (1) method

of capture, (2) herd size, age, and sex composition, (3) seasonality, (4) number of kill events per location, (5) butchering patterns/carcass utilization, and (6) artifact assemblages.

As stated above, four of the Panhandle sites have been subjected to test excavation. Testing ranged from two 5 x 5 foot squares at the Strong site, to three 5 x 5s at both Bell and Collier, to eight such units at Twilla. The remaining five sites are known only from survey reconnaissance. Thus, the information produced is based on small samples and this limitation should be kept in mind

Table 2. Age composition of Trench A bison, Certain site, Oklahoma.

Age (yrs)	MNI
0.3	1
1.6	1
2.6	4
3.6	2
4.6	2
5.6	2
6.6	2
7.6	1
8.6	2
9.6	2
10.6	3
≥11.6	1
Total	23

when evaluating the apparent patterns presented here. Nonetheless, there are more than sufficient data to allow the formulation of initial interpretations which can be used as the basis for further research.

METHOD OF CAPTURE

All of the sites in this study employed arroyos as natural traps to capture and contain the bison (Hughes 1977, 1989; Bement and Buehler 1994). The animals were apparently driven up to the arroyo head where they were unable to proceed further or to escape. At this point, the bison were dispatched with spears and the butchering began. There is no evidence that any of these kills were the result of bison being driven off a jump, as was common at different time periods in the Northern Plains.

HERD SIZE, AGE AND SEX COMPOSITION

Herd size is difficult to reconstruct since none of the sites has been completely excavated and, in some cases, portions of the bonebeds have been lost to erosion. The MNI was calculated for each of the tested sites (Table 3). This figure ranges from a low of seven at Bell and Collier, to 10 at Strong, to 23 at Certain Trench A, and 23 at Twilla. Taking incomplete recovery into account, the data suggest that the hunters were dealing with small to moderate numbers of animals, most likely on the order of 50 or fewer (Trench C at Certain likely

Table 3. Texas/Oklahoma Late Archaic bison kill MNI data.

Site	MNI
Certain	23
Twilla	23
Bell	7
Strong	10
Collier	7

exceeds this number). This is dramatically less than the 800 some animals estimated to have been present in the Archaic horizon (Bonebed 3) at Bonfire Shelter and substantially less even than the 197 MNI figure derived for that same deposit (Lorrain 1968:84). The inferred herd size for the sites under consideration here suggests the animals could have been handled by a relatively small number of drivers/hunters.

Herd age and sex composition is relatively constant among the 10 sites. In all cases, the animals consisted primarily of mature cows and juveniles (Certain Trench C data are still being compiled). Very young animals were present at two sites; Certain produced a calf aged at approximately 4 months, and a single near-term fetus was recovered at the Strong site (Hughes 1977:93). Keeping in mind the fact that not all animals originally present were recovered at any of these sites, bulls appear to have been rare. One was possibly present in Trench A at Certain, one at Twilla, and one at the Strong site (Hughes 1977). Data for Trench C at Certain are incomplete at this time. Taken together, these data show an apparent preference for cow/juvenile groups.

SEASONALITY

The estimates of the season of the kills are based on animal ages derived from analysis of mandibular dentition (Frison and Reher 1970; Todd and Hofman 1987) and the assumption of a calving season peak in mid to late April. Halloran (1968) reports the average date of first birth to be March 31 at the Wichita Wildlife Refuge in southwestern Oklahoma. Tentative seasonality estimates are postulated for the five tested sites. The results give an appearance of bimodality, with two sites (Twilla and Strong) likely to have been spring kills and the remaining three (Collier, Certain, and Bell) late summer/early fall kills. While the scar-

city of bulls at all of the sites does not confirm any of the proposed kill seasons, it does tend to support the conclusion that none of the kills took place in midsummer when rutting bulls are most likely to be incorporated into cow/juvenile groups.

NUMBER OF KILL EVENTS PER LOCATION

Two sites show evidence of multiple kill events at the same location. Hughes (1977:33) reports,

Field records indicated that at Twilla there may have been two bone beds present, vertically separated by a thin, sterile horizon of silt. These were not kept separated in excavation or transportation and so are treated as a single bone bed...

The Certain site was also the scene of multiple kill events. Based on our initial excavations in Trench C, this arroyo appears to contain two kills, separated by 15 cm of sterile colluvium. Additionally, there are at least six buried side gullies at Certain which contain bonebeds. Presumably, each of these represents a kill location. Although it is possible they represent a single, widespread kill event, it is more likely that at least some of them took place at different times. Thus, it seems that some locations were suitable, for whatever reasons, for repeated kills.

BUTCHERING PATTERNS AND CARCASS UTILIZATION

Information on butchering and carcass utilization is available from the five tested sites (Certain, Twilla, Bell, Strong, and Collier). Again, although this information is not as complete as one might wish, given the limited excavations, some overall patterns are apparent. There is also variation between sites as well. Hughes (1977:153), interpreting the evidence from the Texas sites, concluded that butchering was incomplete, utilizing perhaps 25% of the available resource. He further states that the overall pattern indicates a concentration on the forequarters, including the shoulder, hump, and possibly the upper foreleg (Hughes 1977:152). Additionally, some use of the rump and loin meat occurred at each site. These interpretations are based largely on bone fractures and cut marks.

In Trench A at the Certain site, there is like-

wise less than full utilization of all the available meat; in several cases entire halves of carcasses were apparently left untouched. There was considerable variation, however, from one carcass to another. The degree of dismemberment ranged from nearly complete to largely intact. Unlike at the Texas sites, there does not seem to have been a preference for any particular carcass portion; forequarters and hindquarters were both taken and ignored. In Trench C, carcass dismemberment was much more complete, with many fewer articulated segments and no major axial articulations. The overall impression at this kill location is one of rather extensive utilization; the skeletons are so thoroughly dismembered that it appears all meat portions were utilized. It should be pointed out that the taphonomic data suggest relatively quick burial of the bonebed; there is no evidence of substantial post-kill modification by geological or biological agents. Thus, the character of the bonebed should be substantially the result of human processing. Crania were poorly preserved in most of the Texas sites, making it difficult to assess treatment of this element. There is some evidence of the smashing of skulls, presumably to obtain the brains. The poor condition of the skulls may in fact be the result of such activities or it may simply be the result of only fair preservation conditions at each of the sites. In Trench A at Certain, skulls were commonly broken open. Thus, it is possible that brain extraction was more frequent than in the Texas sites, but this is not definite.

The Twilla and Bell sites show some evidence of removal of the tongue. The taking of this organ was the norm in Trench A at the Certain site; hyoid bones were usually absent from the crania. The Texas sites also show some evidence of marrow extraction. Each of the tested sites contained spirally fractured humeri. By contrast, spiral fractures were essentially nonexistent in both Trench A and Trench C at Certain, suggesting marrow extraction was not a priority.

In summary, the available evidence suggests butchering practices were variable. If Hughes is correct in his assessment of the Texas sites, there may be a general pattern of less than full use of the available resource. Based in part on data from Twilla, Todd (1987) suggests a possible regional pattern in the Southern Plains such that limbs were

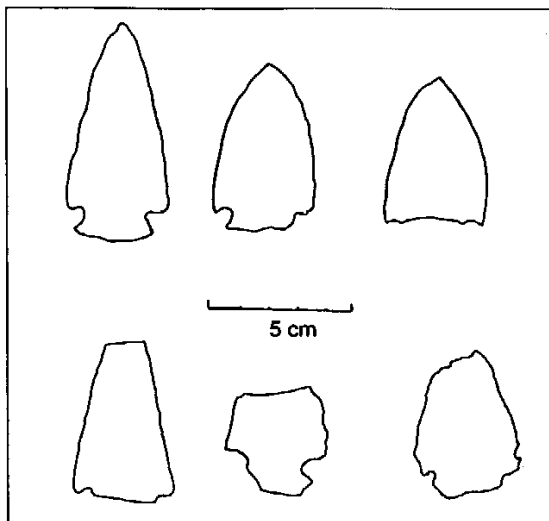


Figure 4. Projectile points recovered from the Certain site.

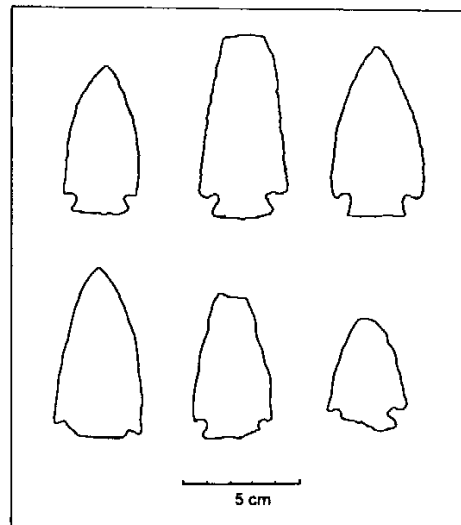


Figure 5. Projectile points recovered from the Twilla site.

treated as single units with little segmentation at the kill. While Trench A at Certain would support this hypothesis, the Trench C butchering suggests that this did not always hold.

There was at least some use of both the brains and tongues, though it may have varied from kill to kill. Some marrow extraction was practiced, but it was not extensive, and was completely absent at some kills.

ARTIFACT ASSEMBLAGES

The artifacts recovered from the kill sites fall into two categories: projectile points and processing tools. The projectile points are somewhat variable in form, mainly in terms of size. Most of the points are large, corner-notched dart points with triangular to slightly ovate blades and straight to convex bases (Figs. 4 and 5; see also Hughes 1977, 1989). There is a general agreement in form between the Texas and Oklahoma kills. Although none of the points fit readily into any formal types, they are reminiscent of Castroville, Ellis, and Marcos points (Suhm et al. 1954:Plates 89 and 100) and have been compared to these (Collins 1968; Hughes 1977, 1989). The points are consistently of local lithology, with the exception of a single specimen from Twilla made from heat-treated Florence A (Kay County) chert from north-central Oklahoma (Hughes 1977:40). The processing tools consist primarily of simple modified flakes; more formal bifaces are occasionally present but

rare. Some crude choppers were also recovered (Hughes 1977). This suggests either that most of the butchering was done using simple flake tools and choppers or that formal bifaces were curated, i.e., carried away after use. Bison bone expediency tools were used at least occasionally. At Twilla, one cranium was smashed and several incisors were imbedded in the depression, suggesting use of a mandible as a battering tool (Hughes 1977:51). Also, two skulls had ribs inserted into their mouths, presumably to pry them open for access to the tongue (Hughes 1977:55).

No definite butchering tools were recovered from either excavation area at Certain; however, numerous resharpening flakes were found in both areas. Interestingly, almost all of the Trench A flakes were of Alibates (i.e., nonlocal). Trench C flakes were both Alibates and local Ogallala quartzite. The lack of processing tools, especially of Alibates, suggests such items were curated.

CONCLUSIONS

The presence of 10 locations representing a probable minimum of 16 kill events testifies to the significance of bison exploitation during the terminal Archaic on the Southern Plains. Although there is some variation in detail from site to site, there are enough similarities to postulate that bison hunting was an important component of the subsistence practices of local Archaic populations. Similarities in the method of bison procurement

suggest the use of arroyo traps was a widespread and regular practice. At this time, our knowledge of Late Archaic populations in this portion of the Southern Plains is insufficient to allow the construction of a model of the overall importance bison played in Archaic societies. Additional in-depth analysis, and in some cases reanalysis, of kill sites is needed. Even more badly needed are additional data from habitation sites so that bison kills can be incorporated into an overall view of the Southern Plains terminal Archaic.

Acknowledgments

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