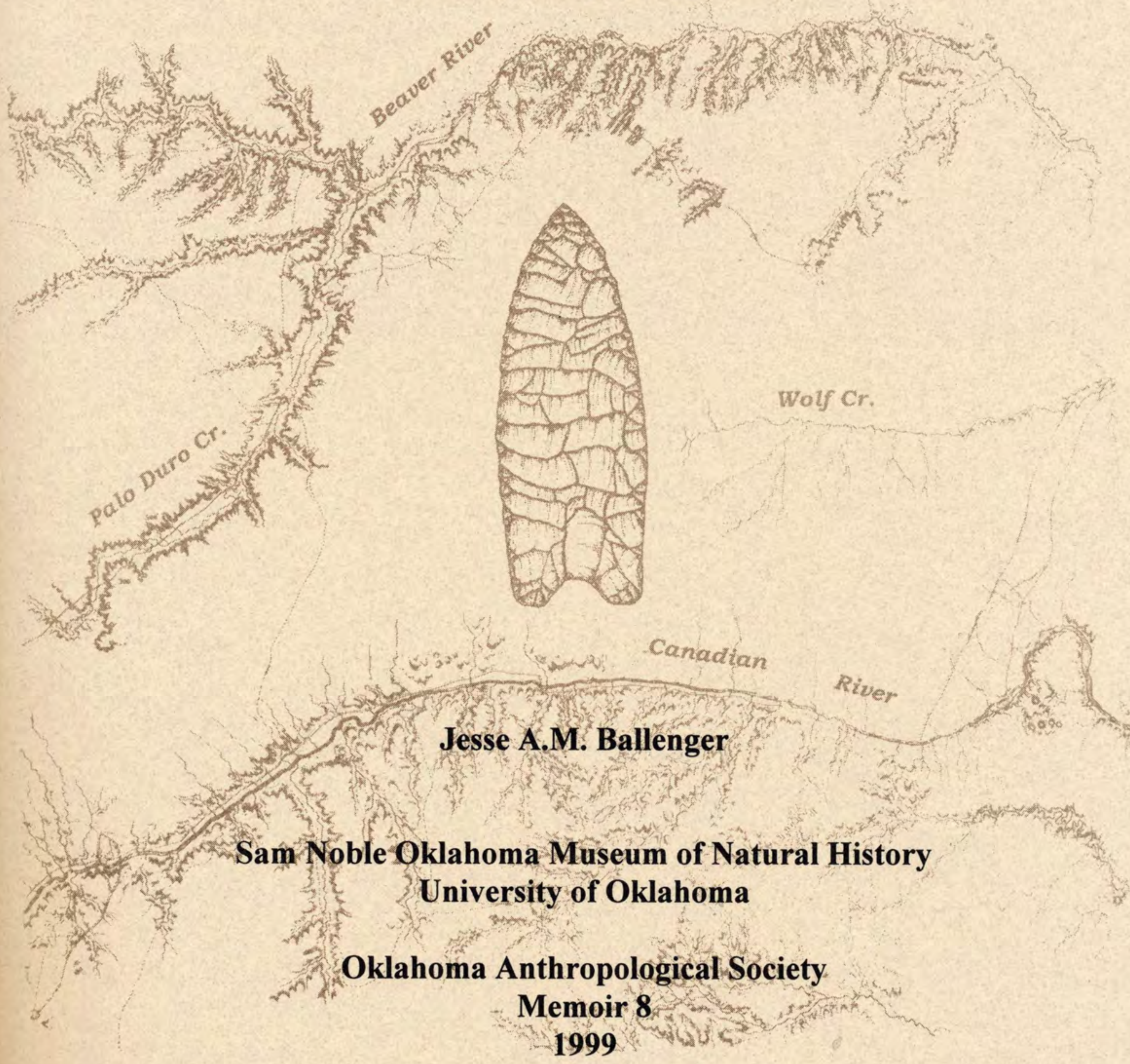
Goff Creek: Artifact Collection Strategy and Occupation Prehistory on the Southern High Plains, Texas County, Oklahoma



Jesse A.M. Ballenger

Sam Noble Oklahoma Museum of Natural History
University of Oklahoma

Oklahoma Anthropological Society
Memoir 8
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Preface

Between 1968 and 1996, while serving as Director of the Oklahoma Archeological Survey, I endeavored to see that this state agency's funds and effort were spent throughout the state to identify, preserve, and study the state's archeological record. Regrettably, the Oklahoma panhandle never seemed to get the attention and effort it deserved. Yes, a survey was completed of Black Mesa State Park in 1972, and, some five years later, we were able to fund graduate student Chris Lintz to visit avocational archeologists in the panhandle and preliminarily assess the significance of collections and archeological sites in Beaver, Texas, and Cimarron counties. But these and other professional archeologists' activities in the panhandle have been sporadic and usually focused on studying late prehistoric villages and camps threatened by road construction, changing farming practices, or natural erosion.

Despite the infrequent and limited studies by professionals, avocational archeologists have contributed much insight to our understanding of the prehistoric people who inhabited the Oklahoma panhandle. Such contributions have a long heritage, going back to the 1930s and the extensive findings by Uncle Billy Baker whose artifact collection is now preserved in the museum at Goodwell, Oklahoma. Since the 1960s, individuals like Alvie and Willa Laverty in Beaver County; Kenneth Saunders in Cimarron County; and the late Vincent Dale and the late Charles Rhoton in Texas County amassed collections of artifacts, kept notes on where they were found, and often wrote articles on particularly interesting artifacts for publication in the newsletters and bulletins of the Oklahoma Anthropological Society. As a consequence, a goodly share of what we know about Oklahoma panhandle prehistory comes from citizens who have lived there.

Since the late 1970s, it has been my privilege to become acquainted with another of these panhandle citizens. Long a resident of Guymon, Ralph W. White is a man small in stature, but big of heart and of interest in the archeology of the High Plains of the Oklahoma panhandle. Through the years, he and wife Charline have become close family friends and a source of inspiration because of their abiding love of each other, their family and friends, and the windswept lands around Guymon. Through Bill's interest in the artifacts he was finding, he and I have shared many hours discussing the nature and significance of these objects, especially the spearpoints and other tools recognized as evidence to people frequenting the Oklahoma High Plains between 5000 and 12,000 years ago. Without question, I benefited more from Bill's knowledge than he did from mine, but the times we've spent together are truly treasured.

A few years ago, Bill and Charline decided to move from Guymon to Buena Vista, Colorado. Here, Bill has been able to pursue his love of fly-tying and trout fishing as well as seeing the constant beauty and seasonal changes of the Rocky Mountains. Although he maintained an interest in archeology, several factors began to lessen his active collecting of artifacts, and he became concerned about the future of his massive artifact collection from the Oklahoma panhandle. While he wanted to write and publish on these artifacts, such endeavors became more and more difficult to accomplish. Thus, in 1996, when he offered to donate his collection to the Oklahoma Museum of Natural History, it was with both reluctance and appreciation that I was willing to accept the collection. The reluctance stemmed from my knowledge of the collection's importance and meaning to Bill. The appreciation came from my knowledge that Bill's collection was well-documented as to where the items had been found. Thus, it was a collection with good to excellent location information, and such information is vital, sometimes even more so than the artifacts themselves. So, in October of 1996, I traveled to Buena Vista, Colorado, to formally accept the gift of the Ralph W. White artifact collection on behalf of the Oklahoma Museum of Natural History.

One of Bill's cherished hopes was that he would get a report written on all of the artifacts he had found along Goff Creek, a Texas County tributary to the Beaver (North Canadian River). These artifacts are numerous and come from much of the length of the Goff Creek watershed. Seldom have archeologists had access to such findings from a single Oklahoma watershed, and so I made Bill a promise that, as the Museum's new Curator of Archeology, I would see that the Goff Creek artifacts would get top priority for study and report preparation.

This research began in December of 1996, when graduate student Jesse Ballenger returned to the University of Oklahoma from the United States Army Officer's Basic Course. Having had Jesse as a student and knowing of his interest in chipped stone tools, I believed Jesse to be the best prospect to undertake a detailed study of Bill's Goff Creek collection. His effort is represented by this report. Having read it, I see this monograph as a document that testifies to Bill's concern and interest in the artifacts from Goff Creek. Clearly, this monograph is the combined contribution of two individuals (the collector and the author) whose efforts illustrate the windy, deceptively subtle High Plains landscape and the hardy people who frequented it in prehistory. All Oklahomans who seek to learn about the state's prehistoric inhabitants will benefit from this study.

It should be noted that some of the artifacts described herein figure prominently in exhibits planned for the new Sam Noble Building that will house the Oklahoma Museum of Natural History. Most importantly, all of the Ralph White collection is curated here and available for continued study and learning by future generations of Oklahomans.

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September 20, 1998

Acknowledgments

Several people have contributed to this project. Bill and Charline White visited the museum on two occasions during the analysis and were able to provide important information. Their cheerful cooperation was invaluable and is greatly appreciated. Lloyd Tucker, Bobby Nickey, Paul Matchen, and Bill Pratt assisted in the relocation of old property boundaries and other features mentioned in Bill's notes. Chris Lintz provided notes from his 1975 interview with Bill, and these also contained helpful information.

Bob Brooks, Scott Brosowske, Tony Baker, Harold and Joan Kachel, Russell Tibbetts, and Pat Dunnegan were able to relay details about other collections from the Oklahoma panhandle. Mike Quigg, Jason LaBelle, Donna Roper, and Jack Hofman also offered ideas or leads to comparable collections from Texas and Kansas. Ken Turner (No Man's Land Museum) allowed access to the William Baker collection. KC Kraft shared his knowledge throughout the project and provided several references. James Harcourt provided the Hume quote. Susan Richter, as well as Stance Hurst, Erin Thompson, and Sabra Bailey assumed the task of preparing the Bill White collection for curation after the analysis. Technical support was provided by Al Rea, Warren Lail, Jim Johnson, Chris Ksepka, and Mary Knapp. My dear wife, Rebecca, tolerated many late nights of artifact illustration, and other nonsense, and carefully proof-read versions of the manuscript.

Finally, Don Wyckoff provided the opportunity to perform this study, offered his encouragement throughout the project and, when necessary, played the critical role of "reality police." He, Lee Bement, George Odell, Pete Thurmond, and Nina Flannery reviewed the manuscript and provided comments on its style, organization, and substance. To each of these people the author extends his sincere appreciation.

Bill White assisting with excavations at the Tucker's Blowout Site, 1983

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Chapter 1

The Collector and His Collection: Surface Hunting, Bias, and the Archaeological Record of Goff Creek

"Why do you collect?" I asked the large lady in the small red dress at an Antiques Forum cocktail party.

"Have a sausage," she replied. "Oriental Lowestoft. We collect Oriental Lowestoft. My husband just loves porcelain. We collect it all the time."

"Why?" I persisted.

"Why what?"

"Why do you collect porcelain?"

"Why does anybody collect anything?"

"Ah," I replied, chewing on my sausage.

from I.N. Hume 1974:16

Bill White gave a remarkable collection of stone tools to the Oklahoma Museum of Natural History in 1996 in the hope that the archaeology of the area he had searched for 19 years, Goff Creek, would be better understood. To that end, his donation included not only the artifacts that provide an amazing prehistoric record, but also a collection of field journals, photographs, and manuscripts that is equally remarkable and, one could argue, equally relevant to archaeology; it is a detailed record of the long-term development of a private surface collection.

Although archaeologists are becoming increasingly alert to the value of surface collections, their studies are rarely complemented by good documentation, and certainly not by the degree of documentation provided by Bill's patient observations, candid notes, and his generally inquisitive nature. A study of the Goff Creek collection would be disserved if such contributions by the collector were not taken into account (although Bill probably will be surprised to learn that he himself, as well as his artifacts, has become a subject of archaeological investigation). Doing so may lead to a better understanding of both the possibilities and the limitations of analyzing private surface collections. This chapter briefly discusses the role of the collector in archaeology, but mainly presents the history of the Goff Creek collection, examines the habits of the donor, and discusses how those habits have shaped the collection.

Why people collect artifacts is not necessarily a question here (see Hinsley 1996). Rather, it is knowing *where* and *how* artifacts are collected that is vital to archaeologists - every archaeologist practices, studies, and attempts to manage the process of collecting artifacts - and this knowledge gives to any artifact its value. Private collections are an intriguing and often troubling source of information (Hester 1991; Hoffman 1984; Hofman 1989a). Whether surface collections are treated as clues to buried deposits (Redman and Watson 1970), as alternative representations of the archaeological record (Ebert 1992), or simply dismissed as curiosities depends on the needs of the archaeologist and the collection's integrity. Where a relationship exists between an artifact collection and its geographical locale, the archaeologist is presented with a wealth of information. Efforts to use such collections, however, must contend with the sampling issues that affect any collection.

Avocational Archaeologists

The collector assumes an important role in archaeology, regardless of his or her intent, because the act of gathering artifacts shapes the archaeological record. Exactly how collecting alters archaeological manifestations is a difficult question. Collectors are a diverse lot, with diverse methods, talents, and motives. Still, archaeologists willing to use private collections must try to determine the habits and biases of the collector. At best, these efforts will provide some empirical data about collection strategies. At the very least, the archaeologist will develop a general sense of how large a geographic area is represented and perhaps how intensively the sites were collected (Schiffer 1991:118). Also, by exploring collector variability, archaeologists may better recognize certain kinds of collectors and their strategies, and even formulate general principles to aid in the analysis of poorly documented collections.

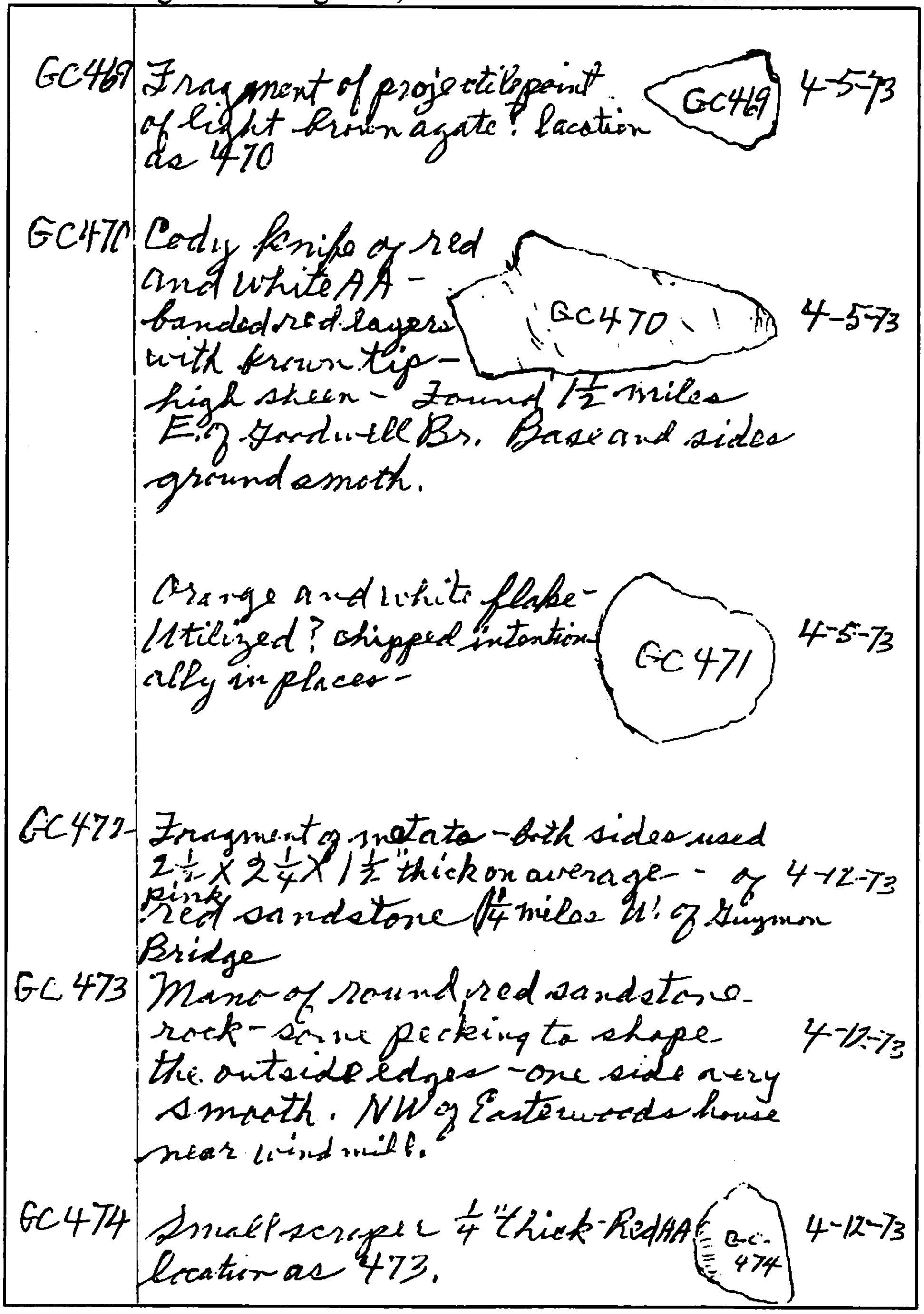
Collectors are classified according to their methods and motives, from opportunists to dealers and professional pothunters. Mallouf (1996) describes these classifications as fluid, the transition from opportunistic collector to pothunter being a slippery slope. Whether or not this is so, the opportunist who bothers to collect because antiquities are intrinsically interesting does so as a diversion and without significant interpretation of his finds. The artifacts may end up on display or in a shoe box and provenience information generally does not exist. Pothunters, on the other hand, seek and collect artifacts as an occupation, interpret their finds in terms of monetary value, and know exactly where their collections come from but are usually too secretive to share that information with archaeologists. In any case, neither end of the collector spectrum contributes much information to archaeology.

A wide and interesting assortment of people operate between these extremes, but critical among them are avocational archaeologists like Bill White. These folks go beyond "arrowhead hunting" by giving serious interpretation to their finds and becoming involved with amateur and professional societies. Most importantly, it is avocational archaeologists who are most likely to exchange information with others and donate their collections for study.

The role of private collections in archaeology has been limited to a few traditional perspectives that rightly emphasize site destruction and bias. Schiffer (1991:115), for example, examines arrowhead hunting as a rural hobby that distorts the archaeological record. On the other hand, several researchers are successfully integrating private collections into their studies to generate and test viable models (e.g. Anderson 1990; Lepper 1985; Hofman 1992). In either case, a fine line seems to exist between using private collections and encouraging them.

This study cannot ignore the positive contributions of surface collecting as it was practiced by Bill White. Although it is unfortunate that collections are bought, sold, mixed, and ultimately destroyed, archaeologists must be realistic, accepting their limits and the certainty that humans are going to interact with

Figure 1-1. Page 151, Bill White Collection Notebook



GC469	Fragment of projectile point of light brown agate? location as 470 (GC469)	4-5-73
GC470	Cody knife of red and white AA - banded red layers with brown tip - high sheen - Found 1½ miles E. of Goodwell Br. Base and sides ground smooth. (GC470)	4-5-73
	Orange and white flake - Utilized? chipped intentionally in places - (GC 471)	4-5-73
GC472	Fragment of metate - both sides used 2½ X 2¼ X 1½" thick on average - of pink red sandstone 1¼ miles W. of Guymon Bridge	4-12-73
GC 473	Mano of round red sandstone rock - some pecking to shape the outside edges - one side very smooth. NW of Eastwoods house near windmill.	4-12-73
GC474	Small scraper ¼" thick - Red AA location as 473. (G.C. 474)	4-12-73

antiquities. Perhaps, if archaeologists better integrate private collections into mainstream research, more collectors will appreciate the rewards of responsible collecting and recognize their own limitations. The ethical issues of artifact collecting are explored in larger works and are not reiterated here (see Vitelli 1996). It should suffice to ask, though, who would have collected these stone tools if not Bill? No ordinary or realistic professional survey could generate the resources to compare with his investment of time and concentrated effort. It is everybody's good fortune, in the end, to have people like Bill interested in prehistory and in preserving the artifacts left behind for all of us.

The Collector

Ralph W. White (known as "Bill" to his friends) was born in Grand Junction, Colorado in 1912 and moved to Oklahoma in 1923, where he developed his lifelong interest in prehistory (e.g. White 1981a, 1981b, 1982, 1986, 1987, 1995; Hays and White 1987). A boyhood influence to Bill, William E. Baker (aka "Uncle Billy"), served as County Agent for Cimarron County, Oklahoma between 1922 and 1947 and published early accounts of the region's archaeology (Baker 1929a, 1929b, 1939; Baker and Campbell 1959, 1960; Baker et al. 1957; Baker and Kidder 1937). The Bill White collection contains materials from several localities in the Oklahoma panhandle, including the Kenton Caves, that Bill and William Baker's son, the future archaeologist Ele, found as children (see Lintz and Zabawa 1984).

Excluding a brief stay in Colorado and his career as an artillery officer in the U.S. Army between 1942 and 1947, Bill taught math in the Guymon area from 1934 to 1972. After his retirement, Bill acted as the school custodian until 1982. Bill's interest in collecting fluctuated over time, but it seems that by the early 1960s every family or church outing served as an opportunity to revisit the windblown fields and dunes of the region. It was also during this period that Bill settled into a routine of collecting along Goff Creek. Therefore, between his late 50s and late 70s, Bill entertained two collecting methods: one opportunistic and the other deliberate. Some provenience information is available for the artifacts Bill opportunistically collected from several localities in the Guymon area, but this method did not lend itself to accurate record keeping. In contrast, his records from Goff Creek provide valuable insight to collector behavior.

The Goff Creek collection accumulated between December of 1970 and May of 1989. The collection is accompanied by two notebooks within which each artifact is assigned a number, illustrated, and described (Fig. 1-1). The descriptions usually include what the item is (tool categories and point types), when and where it was found, and the raw material type. While the provenience information is essential, the collection dates are also important. Archaeological surveys generally consist of single passes over the landscape and from these snapshots of the surface, archaeological "sites" are recognized. Based on the dates recorded in Bill's notebooks, the Goff Creek collection is a result of approximately 500 collecting episodes which lasted anywhere from 2 or 3 hours to all day, conducted along the lower 30 miles of the drainage. When Bill's collection intensity is compared to the typical survey's, the sample derived from single-pass professional survey seems ridiculously limited.

The Collector's Motives

Collector motive and method are important factors in the analysis of private collections. Pothunters, dealers, or hobbyists who are involved with buying and selling artifacts may have spectacular collections, but their emphasis on marketable relics, the number of hands through which their artifacts have passed, and the potential for fakery make their collections virtually worthless for study.

Opportunists introduce their own form of bias. When, where, and what they collect is influenced by factors that may change from one day to the next. Time constraints, for example, may encourage the collector to select only the best artifacts from one site while collecting virtually everything from another. Competition with other collectors, a common ingredient, will also affect how much time is allocated for collecting less spectacular finds.

Bill was not in the business of buying or selling artifacts. His notes indicate, for example, that a dealer once offered him $750.00 for a well-made Frederick/Allen point (Fig. 4-6b:50), which he declined. Only one of the artifacts in the Goff Creek collection (Fig. 4-23:80) was purchased; Bill bought it from a friend who was not interested in collecting. Bill competed with another young collector along Goff Creek, and this encouraged him to begin his hunts as early as possible. Otherwise, Bill usually hunted alone and for long periods of time. This permitted him to collect virtually everything free of concerns about buying and selling or of whether a hunting companion would find the next artifact.

Witnessing the erosion of the Dust Bowl and having found and examined so many artifacts from the Oklahoma and Texas panhandle regions, Bill came to possess a detailed understanding of Texas County and its archaeological record. It is telling that of the several intermittent and active drainages Bill lived near, he selected Goff Creek as his focus. Adjacent drainages such as Pony Creek and Teepee Creek were investigated by him but did not yield appreciable numbers of artifacts (Bill White, personal communication 1997). In fact, Goff Creek is represented in many collections from the Oklahoma panhandle.

Bill was motivated to survey Goff Creek partly by the influences, interests, and encouragement of archaeologists such as Robert Bell, Don Wyckoff, George Frison, and Jack Hofman. The presence of Northern Plains Paleoindian and Archaic projectile forms attracted special interest. However, the paramount concern was the need to find the artifacts in a buried and well-preserved context. As demonstrated in this chapter, this involved a systematic method of visiting and collecting from Goff Creek. What Bill did, in essence, was to conduct a 20-year-long archaeological survey.

In the Spring of 1982, a number of hearths became exposed along the creek. Known as Tucker's Blowout (34TX71), the site was monitored by Bill and reported to the Oklahoma Archeological Survey. Testing revealed the site to be a Late Prehistoric bison kill/processing site (Brooks and Flynn 1988), and a brief professional survey of the vicinity did not locate other deposits that could address earlier occupations (Brooks 1987). Bill diligently continued his quest until 1989, but never found the site he suspected to exist. Fortunately, he had the foresight to keep accurate records of his surface finds and, in lieu of dated, well-preserved deposits, these provide the most complete record we have of human occupation along Goff Creek.

The Collector's Bias

Bill picked up nearly everything in his path, from artifact to unusual ecofact. Still, biases are evident in every collection. All collectors and archaeologists alike discriminate between valuable items ("keepers") and common artifacts deemed unworthy of curation. "Keepers" are defined here as those items which Bill bothered to catalog. Though he collected virtually everything, he assigned numbers to a select range of artifacts he recognized after returning home and better examining his finds. The more valued items seem to be broken and complete tools diagnostic of particular cultures, time periods, or activities, such as projectile points and scrapers.

Bill's bias towards temporally and functionally diagnostic artifacts is reflected in his notes. One entry reveals that during the course of four hunt days, each lasting about three hours, Bill collected 35 artifacts, yet only 7 of these are cataloged; on another hunting occasion that lasted five hours Bill notes that he found 26 items but, again, only 7 are cataloged. And still another entry describes finding 29 items, of which only 3 are cataloged. The uncataloged items are described as "chips," or lithic reduction debris. If these entries are an accurate reflection of Bill's success rate and collection criteria, then less than a quarter of his finds are represented in the notebooks.

All formal tools and expedient flake tools seem to have entered Bill's collection, and several minute flakes were apparently cataloged because they exhibit some form of edge modification or utilization. Small to minute flake debris is underrepresented, and likely accounts for the "chips" that Bill discarded. As demonstrated in Figure 1-2, unmodified flake debris in the White collection is rarely less than 20 mm in length and 15 mm in width. The few examples that are below this size threshold are usually exotic raw materials or possess some distinguishing attribute such as well-defined striking platforms. Bill's method of artifact detection also may have biased his collection. He describes the drainage floor as occasionally "glistening" with lithic debris that could be spotted from afar. This possibly explains the near absence of pottery or other unreflective artifacts in the Goff Creek collection.

The number of hunts (daily excursions) made each year varies widely (ranging between 8 and 68), and the total number of artifacts recovered each year is strongly associated with the frequency of hunting trips (Fig. 1-3). The relationship between the number of hunts and the number of artifacts is shown to

Figure 1-2. Cataloged/Provenienced Flake Debris (N=349)

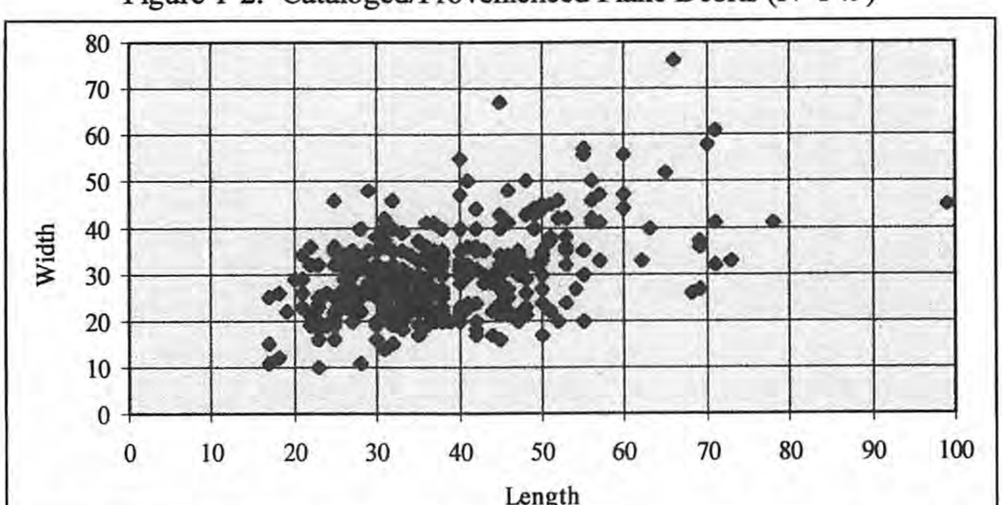
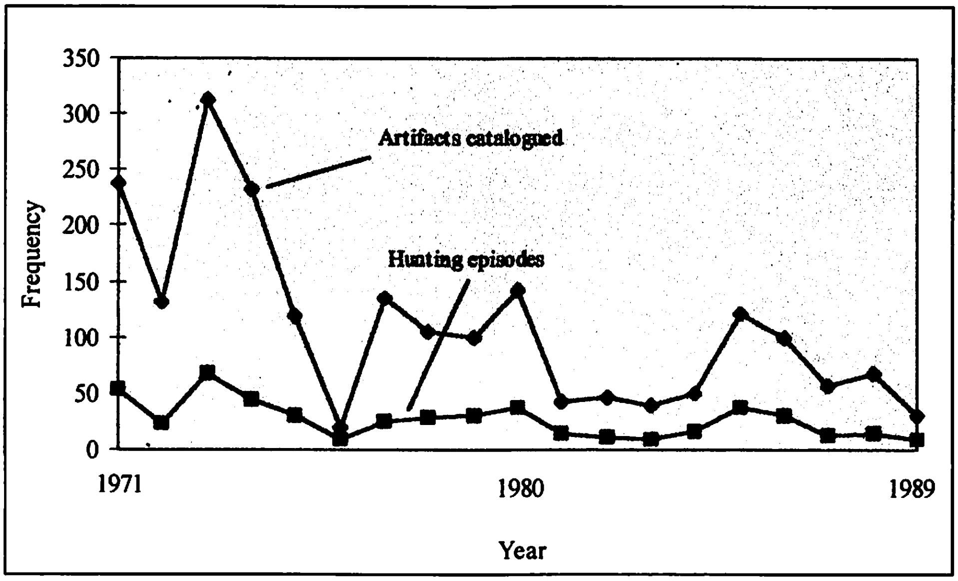


Figure 1-3. Hunting Intensity and Artifact Recovery

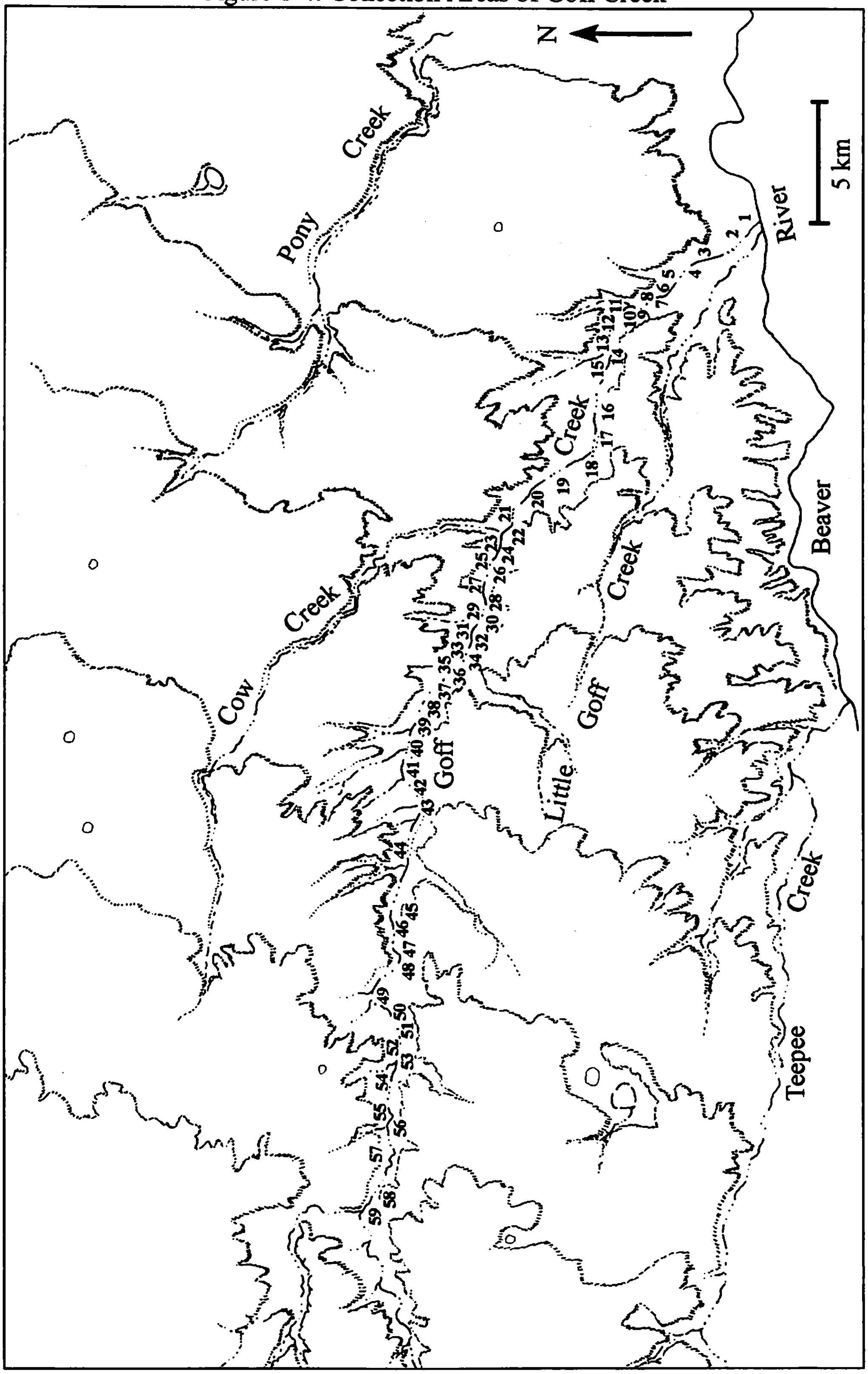


indicate that: 1) White's criteria for "keepers" were consistent while he accumulated his collection, and 2) avocational collecting from the creek during this period did not noticeably impact the abundance of collectable artifacts. Although there are a finite number of artifacts in the archaeological record, White does not seem to have experienced a shortfall of collectable items while he hunted Goff Creek.

The average number of artifacts White cataloged after each hunt range from 2.5 in 1976 to 5.7 in 1972. The average number of artifacts he cataloged after each hunt for the duration of his collecting activities along Goff Creek is 4.0. If collecting had noticeably impacted artifact abundance along Goff Creek, we would expect a declining number of artifacts proportionate to the number of hunting trips, or a change in the collector's criteria as the frequency of projectile points and other valued items fell off. Such trends are not apparent in White's notebooks. In fact, between 1971 and 1980 projectile points account for 26% of the total number of artifacts cataloged. Between 1981 and 1989 projectile points still account for 27% of what was cataloged. The size of the hunting area, the consistent movement of sands, and the high surface visibility of the region likely explain why Goff Creek did not become "picked over" during the period that White collected there.

Collection bias is also apparent in artifact provenience. Bill describes the location of each artifact in relation to prominent landmarks along the creek. These include bridges, property boundaries, railroad tracks, creek bends, and other miscellaneous features. Most of the provenience information in White's notebooks reads as, for example, "¼ mile below Guymon bridge" or "½ mile above Tucker's east fence." Based on these descriptions, the lower 30 miles of Goff Creek was divided into ¼ mile units for analysis (Fig. 1-4), and the artifacts recovered from within those units were grouped. In a few large, barren areas, devoid of nearby landmarks, artifact provenience is less certain. Numerous artifacts were recovered from "north of

Figure 1-4. Collection Areas of Goff Creek



Muncy elevator" (Area 44). This unit comprises three miles of Goff Creek.

Along Goff Creek are four improved crossings and three areas where artifacts cluster (Fig. 1-5). The relationship between creek crossings and artifact clusters indicates that Bill's collection is heavily biased by accessibility and that any clusters are coincidental. On the other hand, the absence of a cluster near the last crossing, which Bill used regularly, lends support to the notion that artifact densities exist independently of Bill and the crossings he used. In essence, the question revolves around how archaeological remains occur along Goff Creek: whether as a relatively uniform distribution of artifacts or as more discrete activity areas.

Archaeological explanation is understood to be a two-way street. As detached from reality as some archaeologists admittedly are, the paradigms used to explain prehistory are based on the methods used to collect data, and generate new ideas that shape future methods of data collection. Surface archaeology has developed directly from this relationship. As discussed by Ebert (1992), archaeological surveys over the last century have recognized "sites" where people and processes have exaggerated the archaeological signature. The artifacts found at these sites have been used to construct theories of prehistoric settlement systems. These constructs are challenged, however, by the realization that the archaeological record is not bound in time and space, but often continuous (e.g. Foley 1981; Thomas 1975), and that models of prehistoric land use have not incorporated the scanty evidence lost or discarded between "sites." In reaction to this problem, a "distributional" approach has emerged that stresses the discovery of individual artifacts in the field and the precise recording of their locations over large survey areas (Ebert 1992). Surface archaeology is therefore becoming increasingly theory-driven, influencing how data is collected and providing new insight into the archaeological record.

It may be comforting to some archaeologists that avocationists have a long history of emphasizing the individual artifact rather than the site. Their collections, however, introduce a serious bias. Ebert (1992), for example, has described the archaeological record as having two components: the sealed site and the surface record. Goff Creek demonstrates the potential for both. On one hand are the artifact clusters developed by Bill, but again these are commonly associated with bridges or preferred areas where he most commonly hunted artifacts. But on the other hand, if the number of times he hunted each ¼-mile unit (some as many as 60 times) is divided into the total number of items recovered from the unit, a relatively uniform distribution of artifacts is observed along the creek (Fig. 1-5). The manipulated data suggest that "distributional" perspectives, although coarse, may be extracted from well-documented private collections. For this to happen, however, collections must be still better documented. Furthermore, Bill's records are success-based. If we could quantify how many times he visited each unit without finding artifacts, then another set of clusters might be recognized.

The potential for spatially bound activity areas near Goff Creek is demonstrated at Tucker's Blowout (located in Area 49). Professional efforts uncovered discrete features that reflect brief, intensive use of the locality (Brooks and Flynn 1988). Bill's recognition of the site, however, was largely fortuitous. Had the site experienced another thousand years of erosion, or had he not watched it become exposed, it is unlikely that any survey technique could distinguish it from the other clusters observed along Goff creek. Consider that, although Bill collected from the site while it was freshly exposed, the density of artifacts occurring at the site is obscured by the eighteen visits he made there (Fig. 1-5). What evidence exists that all of the artifacts collected from Goff Creek did not originate from spatially bound "sites" such as Tucker's Blowout, and what does long-term surface collecting tell us that short-term, "distributional" approaches do not?

These observations and questions are not intended to preface a grandiose statement about the nature of the archaeological record, a subject far beyond the scope of this study, but should illustrate the complexity of the Goff Creek sample. Although archaeologists should be familiar with the relationship between avocational efforts and landscape accessibility, we should not immediately assume that long-term avocational collections are any more biased than our own short-term samples.

In regard to the Goff Creek collection, Bill insists that emphasis was placed on particular areas not because they were easy to reach, but because artifacts were more common there than in other areas. Given the intimate familiarity Bill acquired of Goff Creek over the years, it would be foolish not to respect his perception. Artifacts may be spread lightly throughout the drainage as a result of natural and cultural activities, but concentrations exist and Bill focused on these and perhaps, over time, exaggerated the recovery in those areas through which he passed most often.

Figure 1-5. Artifact Clusters and Crossings along Goff Creek

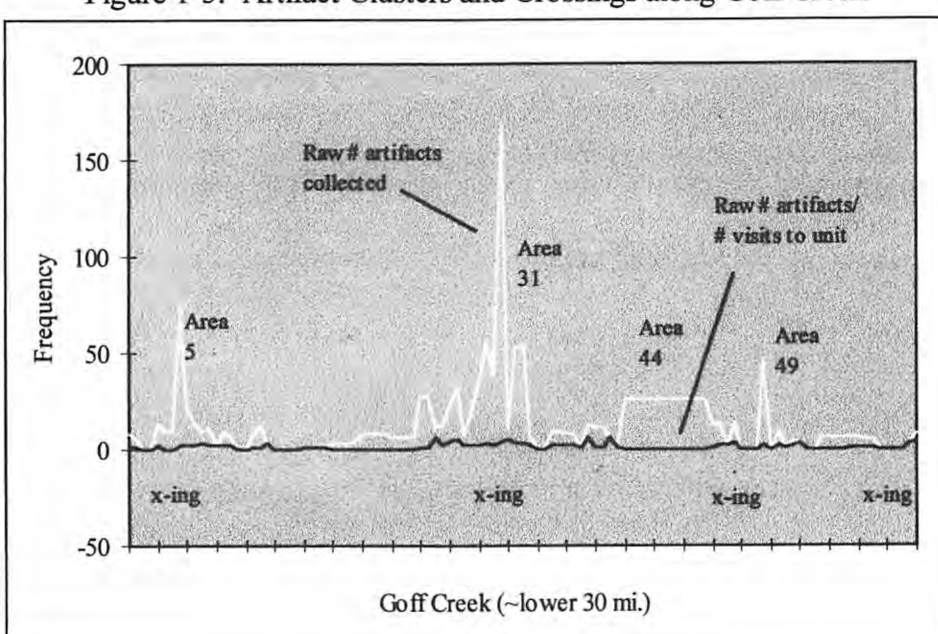
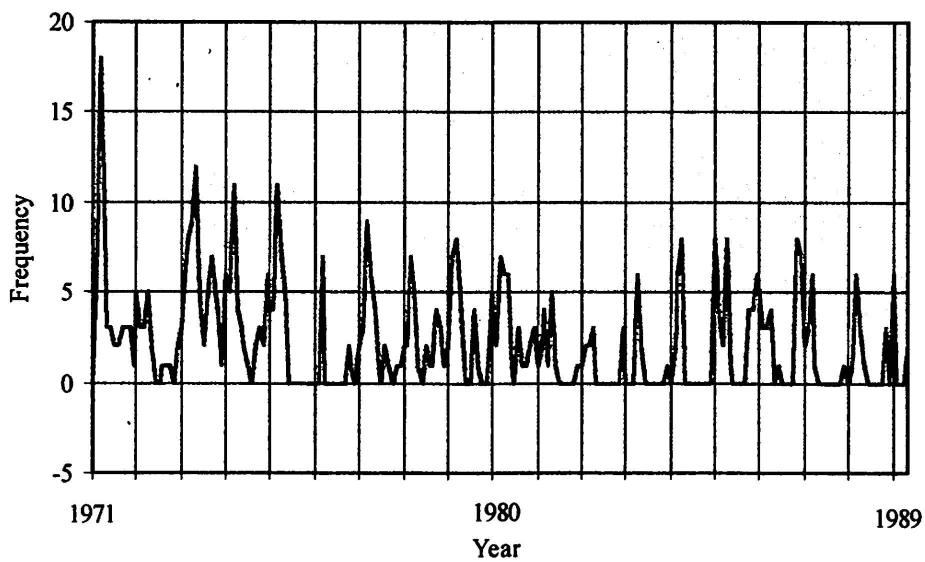


Figure 1-6. Collecting Activity of Bill White



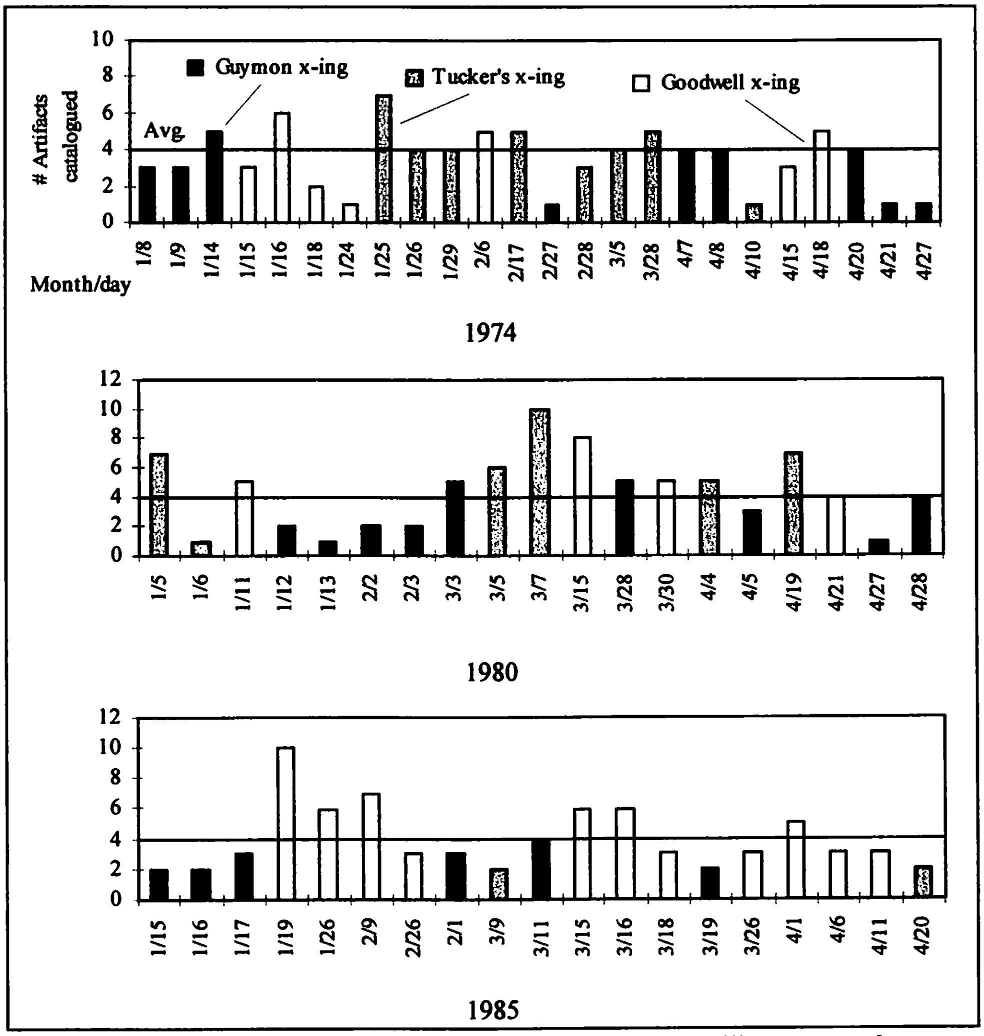
The Collector's Pattern

Bill roamed freely within Goff Creek and evidently ventured onto the sandy terraces above the creek. On rare occasions he notes that particular artifacts were found on a terrace or within the channel, but elevational information is generally absent. It is safe to assume that artifacts lacking elevational information (most of the collection) were found somewhere between the north and south terraces of Goff Creek. White's 18-year hunting pattern along Goff Creek is expressed by the number of hunting trips made each month between 1971 and 1989 (Fig. 1-6). It is apparent that his collecting excursions were a regular event and occurred during certain seasons. The most active hunting seasons were late winter and spring, when temperatures were cool and vegetation was exceptionally low. During these seasons Bill would make anywhere from 5 to 18 visits to Goff Creek per month. The least active season was summer, when the White family would vacation in Colorado. The months of June through September are rarely recorded. It is also apparent that White began collecting from Goff Creek with some vigor in 1971, but soon afterwards developed a more regulated schedule.

The author's misconception of collector strategy was realized during this analysis while trying to discern Bill's selection of hunting areas. My assumption was that a relationship would exist between Bill's success in a particular area on one day, and where he would perform his next hunt. Such a "success-oriented" pattern would be easily detected in Bill's notes. If he did unusually well at one locality, then he should return to that area for his next hunt; if he was unsuccessful in a particular area, then he would be motivated to search elsewhere.

This expectation was not supported by White's notes. As mentioned above, Bill could expect to find approximately 4 "keepers" during each excursion. Bill's notes reveal that he could find an above

Figure 1-7. Collector Success and Hunt Area Selection



*Guymon, Goodwell, and Tucker's crossings used by Bill to access lower, middle, and upper Goff Creek, respectively.

average number of artifacts on one day, but then shift his attention to a less productive area on the next. Or Bill could find a below-average number of artifacts on one day, and then return to that area on the next day and do poorly again (Fig. 1-7). In fact, when grappling with the notion that "collectors just want to find pretty points," a review of Bill's decisions over 18 years led me to consider whether Bill was after artifacts at all, or if artifact collecting had become a "routine-oriented" affair. After some further deliberation, and by considering both the date and location of Bill's hunts, I concluded that they reflect an episodic, "place-oriented" strategy that may not have capitalized on artifacts, but instead allowed Bill to systematically cover large areas before moving on to others.

These observations provide insight into a specific collector strategy in a specific setting, and weigh heavily upon how the Goff Creek collection can be examined and interpreted for meaningful archaeological information. In particular, the collecting strategies used by Bill demonstrate a strong influence on what we observe in the collection, as well as the location and intensity of artifact clusters along the drainage. However, the method, timing, and location of his hunting excursions reflect a systematic approach to collecting artifacts that is usually not afforded avocational archaeologists.

Additional Bias in the Collection

Several natural and cultural forces, besides Bill White, have contributed to how the Goff Creek collection is shaped. In reference to Collins (1975), Bill selectively collected his artifacts, which were already biased by postdepositional human and non-human events, to provide a sample that is biased by the activities of the people who originally discarded the artifacts. The multiplicity of archaeological biases is especially salient in the study of private surface collections.

First, Goff Creek is an intermittent watershed that has experienced particular physical processes and attracted particular human activities. Fluvial transport is the first postdepositional agent most archaeologists would suspect in a drainage setting. Historically, fluvial transport within Goff Creek, which drains nearly 200,000 acres in Cimarron and Texas County, is typified by brief runoffs that last only a few hours. Today, the deep, permeable sands of the region confine the normal load of the drainage to the subsurface. Other features which minimize the volume of water carried by Goff Creek include several playa lakes in the region and an evaporation rate nearly twice the annual rainfall (Gould and Lonsdale 1926).

Winds have also moved artifacts within the drainage. Some tools may have been covered by dunes that protected them for a millennium, whereas others may have entered into a cycle of being buried and reexposed every few years. Both of these forces have moved artifacts within Goff Creek but, in relation to the course provenience of the artifacts and the analyses performed herein, fluvial and eolian transport are not considered significant factors.

Prehistoric activities that have influenced the composition and distribution of artifacts within Goff Creek include the reuse of tools by subsequent groups. The surface visibility and dearth of quality raw materials around Goff Creek increases the likelihood that Bill was not the first person to find and collect stone tools from the drainage. A handful of tools from Goff Creek have flake scars that exhibit differential rates of patination caused by reuse and reshaping. Removing artifacts from different areas and bringing them together at a common activity area, i.e., scavenging, acts to create “mixed” assemblages (Schiffer 1991). Further, long-term scavenging activities may have partly contributed to the semi-continuous distribution of artifacts along Goff Creek.

Chapter 2

Environmental Setting and Resources

We went up Beaver about 15 miles where we established a camp on a little creek which emptied into the Beaver from the north and which was afterwards called Pony Creek. In this camp we killed about 200 buffalo. But the animals got scarce, so we moved about 15 miles farther west, where we found a nice little spring that also emptied into the Beaver from the north. As there were many buffalo about, we camped for two or three days and hunted. One night we got to talking in camp about being so far away from the railroad, and it seemed that along this little creek no white man had ever been before. We wondered whether the creek had ever been given a name, and we decided that it had not... So I told the boys I proposed to give the creek a name. So I christened it Goff Creek, in honor of my hunting partner... (Hoodoo Brown recalling the 1874 naming of Goff Creek, *Guymon Herald*, February 25, 1915).

The circumstances by which Goff Creek derived its name, as a place of water and good hunting, befits the artifacts collected from its course. Early accounts of Texas County, with rich game surrounding active springs and playa lakes interspersed by expanses of unbroken grass, are descriptions as distant from the present, however, as stone tools. Today the Oklahoma panhandle is characterized by its Dust Bowl legacy, an inhospitable but relatively brief situation illustrating the climatic extremes Texas County has experienced over the past 11,000 years.

This chapter reviews the environmental history of the Southern Plains. The reconstruction of past environments provides two backgrounds critical for understanding human adaptation: 1) the availability of resources capable of supporting human populations, and 2) the character of the deposits archaeologists use to investigate those populations.

Physiographic Setting

Goff Creek, a northwest to southeast trending tributary of the Beaver River, drains approximately 195,375 acres in western Texas County and eastern Cimarron County, Oklahoma (Rea and Becker 1997). The creek is located in the northern half of the Southern High Plains, which extend from the Rio Grande in south Texas to the Arkansas River in Kansas. The Canadian River divides the Southern Plains into the Llano Estacado to the south and the High Plains to the north. The western boundary is defined by the foothills of the Rocky Mountains, which begin at Black Mesa approximately 60 km west of Goff Creek's headwaters near Keyes, Oklahoma. The elevation of Goff Creek ranges from 3000 feet amsl at its mouth to 3900 feet amsl at its upper reaches (see Fig. 2-1). The eastern boundary of the High Plains is demarcated by eroded redbed hills and prairies, beginning with the Caprock Canyonlands of the Texas and Oklahoma panhandles (Flores 1990), and extending into the lower Rolling Plains. Floral communities described for nearby Palo Duro Creek include shortgrass prairies in the uplands, midgrass prairies on the slopes, tallgrass prairie in sheltered draws and alluvial soils, mixed shrub-juniper in the canyons, and riparian habitats along the creek (Lintz

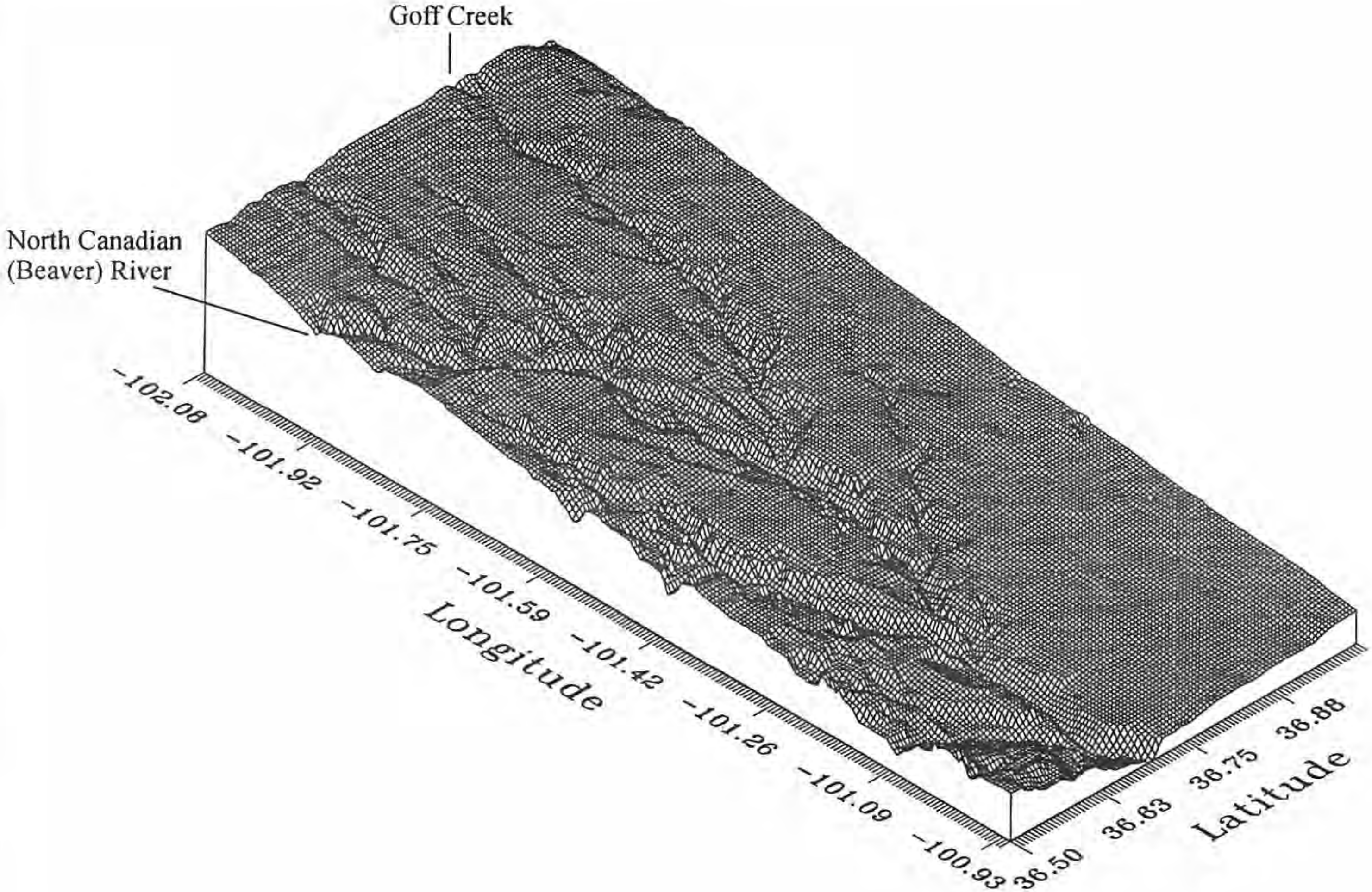


Figure 2-1. Orthographic Projection of Texas County, Oklahoma, Viewing Northwest

1993:14). Goff Creek is surrounded by uplands and slopes, and likely supported wet bottoms at various times in prehistory, but does not possess well-protected canyons. The flora and fauna of the Oklahoma panhandle and surrounding region are summarized by Lintz (1986).

Climatic Trends

The Southern High Plains are characterized as semi-arid to subhumid. The important factors contributing to the region's climate include warm dry air from the west, cold dry Arctic air from the north, and warm moist air from the Gulf of Mexico. Seasonal variation of each of these air masses causes unpredictable and sometimes violent storms where they converge. Equally important to the climatic conditions of the study area is its position in the Rocky Mountain rain shadow, a trough of low air pressure limiting the amount of moisture provided from the west.

The average annual rainfall for Texas County ranges between 16 and 20 inches, and nearly half of this occurs during the summer season. Only 2 inches of precipitation arrive during winter, making it the driest season. The mean annual snowfall for Texas County is approximately 15 to 20 inches. Summer daily extremes average between 90° and 92°F, whereas winter lows average between 20° and 22°F. Estimated annual lake evaporation is approximately 68 inches, regularly causing short to sometimes prolonged droughts (Johnson and Duchon 1995).

The environmental conditions of the Southern and Central plains have undergone significant change since the last deglaciation. Pleistocene-adapted fauna populations were in rapid decline by 12,000 years ago as smaller species adapted to increasingly regional biotic communities (Graham and Lundelius 1984; Guthrie 1984). Pluvial lake levels had also decreased by 12,000 years ago as these habitats eventually became seasonal (Holliday et al. 1996). It is unlikely that pine or spruce existed in the Oklahoma panhandle during the late Pleistocene-early Holocene transition. Wells and Stewart (1987) identify spruce charcoal and conifer macrofossils in western Kansas as late as 10,300 B.P., but the pollen record from Muscotah Marsh in northeast Kansas shows that these species were already becoming replaced with deciduous forest and prairie by 11,300 years ago and by prairie at around 10,000 years ago (Gruger 1973). The study area most likely supported an open grassland, with some nonconiferous trees, since around 11,000 years ago (Holliday 1987; Johnson 1987).

Evidenced by palynological, stratigraphic, and faunal evidence, the increasingly warm and dry trends of the early Holocene climaxed during the mid-Holocene Altithermal (Antevs 1955). Characterized as a 2000-year-long drought between perhaps 7500 and 4500 years ago, with at least one relatively mesic period, the Altithermal is marked by reduced effective precipitation and loss of ground cover, causing massive erosion and aeolian sedimentation on the Southern Plains. Playa lakes may have experienced seasonal activity, and productive springs were probably rare (Holliday et al. 1996; Meltzer 1991). Bison populations apparently suffered under these conditions (Dillehay 1974) and may have become a secondary resource on the Llano Estacado (Johnson 1997). Hughes (1991) further suspects that human populations on the Llano Estacado were reduced during this period - the Altithermal hiatus (Benedict 1978; Reeves 1973) - with even the bestwatered canyons being only lightly occupied. Argued by some to reflect the mass erosion of mid-Holocene deposits (i.e. Mandel 1995), stream-deposited samples such as the Goff Creek collection do not suffer from such profound geological biases and are the logical source to evaluate the relative frequency of temporally sensitive tools and, by extension, relative levels of human activity.

The late Holocene, beginning around 4500 years ago, is marked by a cooler, more moist climate and the return of mesic conditions to the Plains. In western Oklahoma, for example, a 4-meter rise of the water table is documented between 3200 and 2600 years ago (Hall and Lintz 1984). Although brief droughts and their ecological effects continued to occur in the Oklahoma panhandle, particularly around 1000 to 500 years ago (Lintz 1986), bison populations appear to have been abundant on the Rolling Plains (Bement and Buehler 1994; Buehler 1997) and were at least available on the High Plains along the tributaries of the Beaver River (Quigg 1997).

Geological Setting

The surface of the Southern High Plains, characterized as a series of alluvial fans or aprons by Webb (1931), provides a geological record ranging from Permian to recent times. Bedded deposits begin with early Permian-age gypsum, sandstone, dolomite, siltstone, claystone, and shale. These materials, belonging to the Cloud Chief Formation and recognized by their distinctive red coloring, represent marine sediments laid down on an ancient sea floor and are only documented in Texas County along Palo Duro, Chiquita, and Hackberry creeks (Gould and Lonsdale 1926; Schoff 1939). The Quartermaster Formation contains the dolomite member termed Alibates by Patton (1923), but is largely confined to its primary exposure along the Canadian River in Texas (see also Wyckoff 1993).

Overlying the Permian redbeds are Triassic-age deposits of the Dockum Group, alternating beds of sandstone, mudstone, and shale. Ranging in color from red to gray, these deposits were laid down along a shoreline during a period of fluctuating sea levels. Gould and Lonsdale (1926) identify Triassic-age deposits along the Beaver River northeast of Guymon (near the old Redpoint postoffice) and along Teepee Creek. The lower unit of the Dockum Group, the Tecovas Formation, occurs as gravels along Goff Creek. Farther north and south, in western Kansas and central Texas, massive Cretaceous-age deposits are responsible for the Niobrara group and the Edwards Formation. The Dakota Formation, another Cretaceous-age deposit, extends north-south along the Rocky Mountain front.

The Tertiary-age Ogallala Formation rests on the Dockum Group in most areas, including nearly all of Texas County, and consists of sands, gravels, and clays. Holliday and Welty (1981) have divided the Ogallala into upper and lower units to distinguish the eolian sediments which form the caliche caprocks from the fluvial sediments containing gravels redeposited from the Rocky Mountains (see also Reeves and Reeves 1996:30-51). Extensive sand dunes, concentrated on the south side of the Cimarron River in southwest Kansas, cover the caprocks in some areas and are observed principally in northern and eastern Texas County.

The topography of Texas County is drained by the Beaver River, which becomes the North Canadian River below Wolf Creek. Major tributaries include the Sand, Teepee, Goff, and Pony creeks to the north, and Coldwater and Palo Duro creeks to the south of Beaver River. The permanent drainages observed by Gould and Lonsdale (1926) include Beaver River, Coldwater Creek, and Palo Duro Creek. The intermittent streams are also capable of torrential runoff during floods and have significant transport powers.

Water availability within Goff Creek is documented by Hoodoo Brown (1915), who mentions a spring along its course. Based on Brown's 1874 illustration of the panhandle area, the spring was located up a draw on the south side of Goff Creek. Most likely Brown was describing one of two significant draws, one located in Area 34 of this study and the other in Area 44. Both are well incised and may have permitted discharge from the Ogallala aquifer before historic irrigation. These draws are also located directly north of the Triassic-age exposures documented along Teepee Creek, and may be that much closer to the base of the Tertiary.

Another water source in Texas County are the rather numerous playa lakes located in the uplands (Brosowske and Bement 1998). The more significant lakes include Eva Playa, located south of Area 1 along Goff Creek; the Lee Johnson playas, located south of Area 53; and Wild Horse Lake, located north of Pony Creek. These Pleistocene-age basins provide unpredictable but sometimes rich settings, attracting a variety of game from waterfowl to grazers (Gustavson et al. 1995; Holliday and Allen 1987).

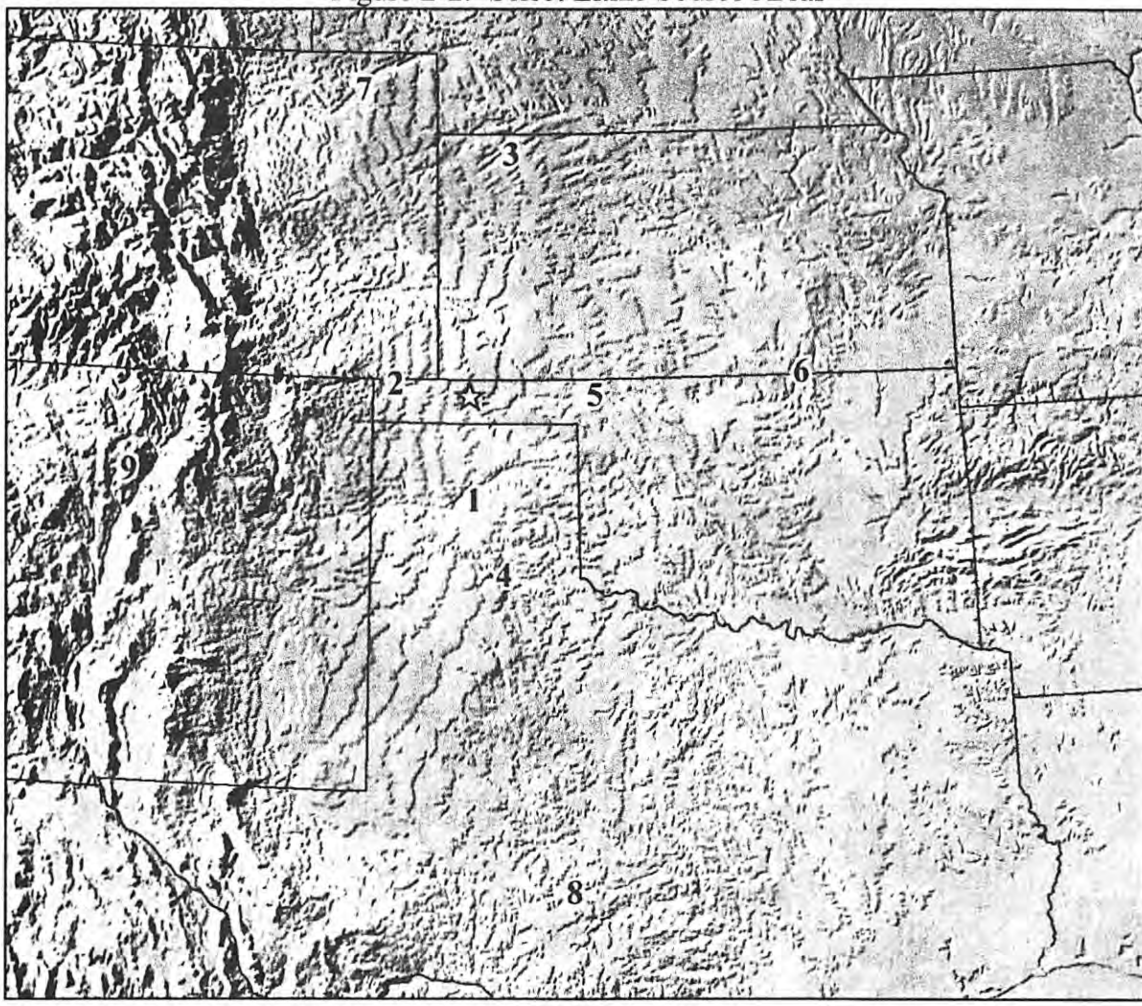
Geomorphology

Geomorphological investigations have not been performed along Goff Creek. The closest analog comes from Palo Duro Creek, where Frederick (1993:75-116) documents a series of depositional and erosional events beginning more than 14,000 years ago. Estimated to have developed with the Canadian River system, between 788,000 and 132,000 years ago, Palo Duro Creek likely experienced a series of incisions between 70,000 and 25,000 years ago (Caran 1989). Frederick (1993:80) further identifies at least five periods of incision since the arrival of recognized human populations. Although Palo Duro Creek is deeply incised in relation to Goff Creek and is perhaps somewhat older, its Late Pleistocene-Holocene development offers a general picture of paleoenvironmental change in the region.

The earliest stratigraphic unit defined at Palo Duro Creek (T_3a) is interbedded and laminated sands and muds overlying bedded couplets of clays, silts, and sands (pond or swale fill) that grade into a soil formed in massive overbank mud. Deposition of this unit began more than 14,740 years ago and ended between 12,920 and 12,220 years ago. Exposures of this unit are rare along Palo Duro Creek and were not observed along Goff Creek during a brief survey of its lower reaches.

The Late Pleistocene-Middle Holocene fill (T_2a) recognized along Palo Duro Creek and its tributary, Horse Creek, reflects a marshy valley floor or ponding adjacent to the channel between 12,220 and 9350 years ago. Clear palynological evidence for marshy conditions are limited, however, and indicate that these habitats were not widespread throughout the drainage (Gish 1993:C-14). Overlying these fine-grained deposits are water-transported sands and sandy loams dated between 9680 and 6820 years ago (Frederick 1993:91). Paleoindian deposits have been recovered from the T_2a unit at

Figure 2-2. Select Lithic Source Areas



☆ Goff Creek

Table 2-1. Non-Local Lithic Resources

Number	Raw Material (distribution)	Reference
1	Alibates (isolated)	Banks 1990; Shaeffer 1958; Wyckoff 1993
2	Dakota, Tesesquite, Basalt (dispersed)	Banks 1984, 1990; Saunders 1978
3	Niobrara (dispersed)	Banks 1990; Wedel 1986; Wright 1985
4	Tecovas (dispersed)	Banks 1990
5	Day Creek (dispersed)	Banks 1984, 1990
6	Wreford (dispersed)	Banks 1984; 1990
7	Flattop (isolated)	Greiser 1983; Hofman et al. 1991
8	Edwards (very dispersed)	Banks 1990; Frederick et al. 1994
9	Jemez Mountains Obsidian (dispersed)	Banks 1990; Baugh and Nelson 1987

41HF84 (Peterson 1988), located along Horse Creek.

Middle Holocene-Late Holocene deposits (T_2b) are inset into and occur at approximately the same elevation as T_2a. Following a period of erosion between about 6800 and 5500 years ago, aggradation of this fill lasted until around 4900 years ago and was followed by another period of erosion between approximately 4400 and 3900 years ago. The channel unit, consisting of sands and gravels, is overlain by mud and sand overbank, often modified by pedogenesis, or ponded deposits of bedded couplets of calcareous clay, silt, or sand. The latter, which represent deposition in standing water, occur infrequently and reflect isolated instances of sedimentation in the valley.

The uppermost fluvial unit described along Palo Duro Creek (T_1a) is recognized by distinctive black to dark gray muds deposited between 3900 and 1400 years ago underlying thinly bedded sand, loamy sand, and mud dated between 1240 and 940 years ago. The latest subunit apparently served as the floodplain until the 1940s, when the channel incised again in response to water loss from the Ogallala aquifer.

The depositional history of Palo Duro Creek demonstrates a series of deeply buried alluvial units. Based on the magnitude of diagnostic projectile points collected by Bill, deposits of equal age occur and have been partly eroded along Goff Creek. Exposures similar to the T_3a unit are unknown from Goff Creek and may explain the paucity of early Paleoindian remains in the drainage. Late Paleoindian artifacts, on the other hand, are abundant and suggest that at least the upper member of T_2a-age deposits are exposed. Further archaeological investigation along Goff Creek is needed to address the geomorphological peculiarities of the drainage and establish its relationship to Palo Duro and other nearby creeks.

Lithic Resources

The distribution of suitable raw materials for the production of stone tools are comfortably categorized as local and non-local. Local resources include the quartzites and other siliceous stone found among Ogallala Formation gravels and the opalites common to the caliche caprocks, both exposed along or near Goff Creek. Non-local resources include: Alibates silicified dolomite from the Texas panhandle; Day Creek chert from western Oklahoma and southwest Kansas; Tecovas jasper/Baker flint from Texas, Oklahoma, and New Mexico; Edwards chert from central Texas; Niobrara jasper from northwest Kansas; Obsidian, often sourced to the Jemez Mountains in New Mexico; Dakota/Tesesquite quartzites, Tesesquite chert, and basalt from the Cimarron River Valley and Black Mesa area; Flattop chalcedony from northeast Colorado; Wreford chert from the Flint Hills of Oklahoma and Kansas; rhyolite, which occurs in west Texas and eastern New Mexico; and lustrous chalcedony from an unidentified western source (Table 2-1, Fig. 2-2).

A variety of jaspers found along Goff Creek demonstrate colors ranging from yellow to purple. Some of these resemble Tecovas, whereas others exhibit the orange to yellow hues associated with Baker flint, a local equivalent (Banks 1984:72). Although one fist-sized example was collected by Bill, these gravels are normally too small to serve as sources of stone, and artifacts made from similar materials are considered non-local.

A more common lithic type from Goff Creek, opalite, occurs in massive beds along Palo Duro Creek (Lintz 1997). Tesesquite chert, a very fine-grained blue to brown material resembling some varieties of Edwards chert, is documented at the Kenton bison site also by Lintz (1976). Lustrous chalcedony, identical to examples from the Southwest, is also rare in the collection and has a number of potential sources.

Chapter 3

Cultural History of Goff Creek and the Surrounding Region

Although opinion concerning the occupational history of the Plains no longer suffers from the stereotypes and dismal expectations that persisted well into the twentieth century (i.e. Kroeber 1939), the chronology, distribution, and cultural affinity of those occupations, much less their role and response to social and environmental change, remains to be documented for significant portions of the landscape. The Goff Creek collection is therefore a modest contribution toward filling the large void of information which exists for the Southern High Plains between the North Canadian (Beaver) and Cimarron River valleys (Fig. 3-1). Although the number of temporally diagnostic projectile points fluctuates for different periods, the collection demonstrates a seemingly continuous presence of human groups in this region, from Paleoindian to Protohistoric times. Further, a mingling of Northern and Southern Plains complexes is observed and demonstrates the cultural diversity of the Oklahoma panhandle during prehistory.

This chapter summarizes the archaeological record of Goff Creek within a regional perspective. A thorough synthesis of the panhandle region is beyond the scope of this project, but some unpublished information on nearby collections and finds is provided. Emphasis is placed on those complexes that are best represented in the collection.

The Paleoindian Period

Bill was especially interested in Paleoindian evidence, principally due to the influences of Bill Baker and the absence of well-researched, buried deposits of such age in the Oklahoma panhandle.

Human activity along Goff Creek likely began with the appearance of Clovis populations, but this evidence is generally sparse. The nearest documented Clovis point comes from the Muncy site, located less than 5 km south of Goff Creek (White 1987). Other nearby evidence for Clovis is found at Miami (Sellards 1952), Nall (Baker et al. 1957), and possibly the Sailor-Helton cache (Mallouf 1994). Several surface finds are documented from southwest Kansas (Hofman 1996:50) and the Oklahoma (Hofman and Wyckoff 1991) and Texas panhandles (Meltzer 1987). Early Paleoindian occupation along Goff Creek is also demonstrated by a single Folsom and a single Midland point. Important Folsom bison-kill sites occur along tributaries to the North Canadian (Beaver) and Cimarron rivers (Bement 1997; Hill and Hofman 1997; Schultz 1943; Wormington 1957), but none have been reported along the upper reaches of the North Canadian River in Beaver, Texas, or Cimarron counties. In sum, the Goff Creek collection offers little information on early Paleoindian occupations.

By 10,200 B.P., or shortly thereafter, a number of late Paleoindian complexes are evident on the Plains. On the Southern and Central Plains these include projectile point types such as Plainview, Agate Basin, Milnesand, Hell Gap, Angostrura, Cody, and Frederick/Allen. The Goff Creek collection demonstrates that many of these groups visited the drainage.

Figure 3-1. Select Archaeological Sites on the Southern and Central Plains

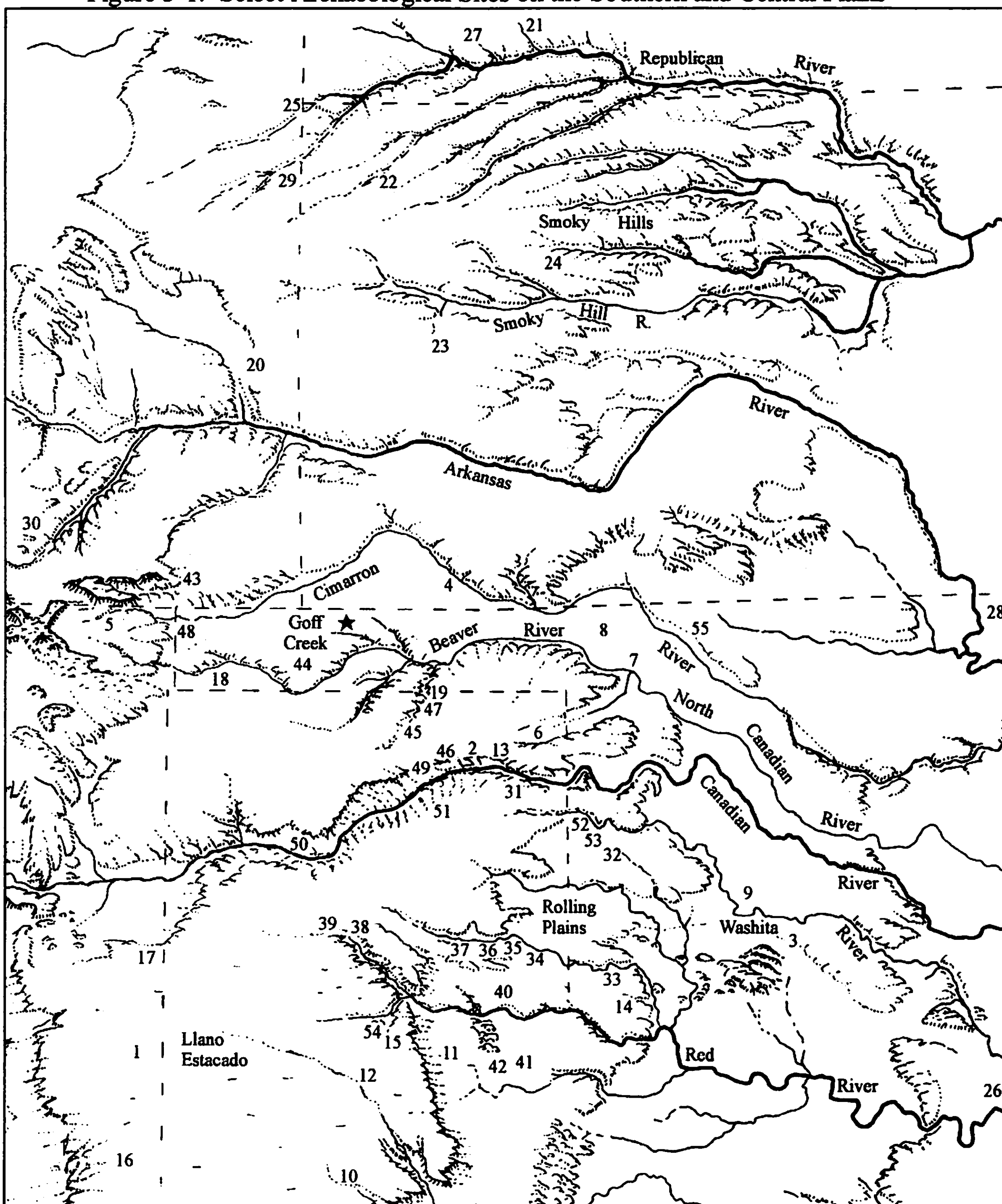


Table 3-1. Key to Sites Recognized (Fig. 3-1) on Southern and Central Plains

Map #	Site	Select Complex(s)	References
1	Blackwater Draw	Clovis, Folsom	Sellards 1952; Hester 1972
2	Miami	Clovis	Sellards 1952
3	Domebo	Clovis	Leonhardy 1966a
4	Sailor-Helton cache	Clovis (?)	Mallouf 1994
5	Folsom	Folsom	Wormington 1957
6	Lipscomb	Folsom	Schultz 1943
7	Cooper	Folsom	Bement 1997
8	Waugh	Folsom	Hill and Hofman 1997
9	Cedar Creek	Folsom	Hofman 1990
10	Lubbock Lake	Folsom, Plainview, Cody	Johnson 1987
11	Lake Theo	Folsom, Plainview	Harrison and Killen 1978
12	Plainview	Plainview	Sellards et al. 1947
13	Horace Rivers	Plainview	Mallouf and Mandel 1997
14	Perry Ranch	Plainview	Hofman and Todd 1997
15	Rex Rodgers	Plainview, San Patrice	Willey et al. 1978
16	Milnesand	Plainview/Cody (?)	Sellards 1955
17	San Jon	Plainview/Cody (?), Logan Creek (?)	Hill et al. 1995
18	Nall	Plainview, Frederick/Allen	Baker et al. 1957
19	41HS84	Plainview	Peterson 1988
20	Olsen-Chubbock	Cody (Firstview)	Wheat 1972
21	Lime Creek, Red Smoke, Allen	Plainview/Frederick/Agate Basin	Davis 1953, Bamforth 1991a
22	Laird	Frederick/Allen	Hofman and Blackmar 1998
23	Norton	Frederick/Allen	Hofman et al. 1995
24	Walsh cache	Hell Gap	Stanford 1997
25	Jones-Miller	Hell Gap	Stanford 1978
26	Pumpkin Creek	Plainview, Dalton	Wyckoff and Taylor 1971
27	Spring Creek	Logan Creek	Grange 1980
28	Kubik	Calf Creek, McKean	Neal and Duncan 1996
29	Hutton-Pinkham	McKean	Larson et al. 1992
30	Pinon Canyon	McKean	Lintz and Anderson 1989
31	Hoover	Little Sunday	Hughes 1977, 1989
32	Certain	Little Sunday	Bement and Buehler 1994
33	Summers	Little Sunday	Leonhardy 1966b
34	Buzzards Roost	Little Sunday	Hughes 1977, 1989
35	Strong	Little Sunday	Hughes 1977, 1989
36	Sitter	Little Sunday	Hughes 1977, 1989
37	RO Ranch	Little Sunday	Hughes 1977, 1989
38	Little Sunday	Little Sunday	Hughes 1955
39	Chalk Hollow	Little Sunday	Lintz 1995
40	Finch	Little Sunday	Hughes 1977, 1989
41	Collier	Little Sunday	Hughes 1977, 1989
42	Twilla	Little Sunday	Hughes 1977, 1989
43	McEndree Ranch	Late Archaic	Shields 1980
44	Johnson-Cline	Late Archaic	Lintz 1978
45	Sanders	Little Sunday	Quigg 1997
46	McIntyre	Late Archaic	Wilkens 1997
47	Sandy Ridge	Little Sunday, Lake Creek	Quigg et al. 1993
48	Carrizozo Bridge	Lake Creek	Saunders 1983
49	Lake Creek	Lake Creek	Hughes 1962, 1991
50	Tascosa Creek	Lake Creek	Couzzourt 1988
51	Duncan Ranch 1	Lake Creek	Gustafson 1994
52	Swift Horse	Lake Creek	Briscoe 1987
53	Beaver Dam	Lake Creek	Thurmond 1991
54	Deadman's Shelter	Palo Duro	Willey and Hughes 1978
55	Shadid	Woodland (?)	Wyckoff and Jackman 1988

The most common late Paleoindian projectile point form in the Goff Creek collection is characterized by parallel-oblique flaking. Termed Frederick/Allen by Hofman (1989b), the complex is best known from the Northern Plains. Evidence from Nebraska, Colorado, Kansas, Oklahoma, and Texas clearly illustrates that groups producing parallel-oblique flaked points extended into the Southern Plains during the early Holocene.

The definition of the Frederick/Allen complex is complicated by the variety of forms which occur in foothill-mountain, plains, and prairie-plains settings. The Hell Gap (Irwin-Williams et al. 1973) and James Allen (Mulloy 1959) sites in Wyoming, the type sites, have produced parallel-sided lanceolate projectile point forms that exhibit slight to moderate basal concavities. Similar forms are observed at LoDaisKa Shelter in Colorado (Irwin and Irwin 1959), and the Norton site in Kansas (Hofman 1996). The Red Smoke (Davis 1953), Allen (Holder and Wike 1949), and Lime Creek (Davis 1953) sites on Medicine Creek in southern Nebraska, as well as the Clary Ranch site in western Nebraska (Myers et al. 1981), and the Laird site in northwest Kansas (Hofman and Blackmar 1998) have produced similar forms sometimes referred to as Meserve or compared to Dalton because of less distinct parallel-oblique flaking and/or alternate beveling along the blade. The fact that most of these sites have also produced points that are better compared to the Frederick/Allen complex, and the pseudo parallel-oblique flaking on at least one Frederick example from Hell Gap (see Greiser 1985: Fig. 30a), suggest that these groups were not strictly confined to their signature flaking techniques. Evidence from Goff Creek further indicates that alternate beveling played a critical role in their projectile point technology and should be considered characteristic of the type (see Chapter 4). Radiocarbon dates from Hell Gap and James Allen indicate a temporal range between 8400 and 8000 years ago (Frison 1991a). A bone collagen date of 9080 ± 60 B.P. is reported from the Norton site by Hofman (1996), indicating a time range between 9000 and 8000 years ago for parallel-oblique flaked projectile points.

Angostura represents a somewhat distinct variety of parallel-oblique flaked points. Named from the Ray Long site at Angostura Reservoir, South Dakota (Wheeler 1995), the type site examples possess constricting lateral edges and slightly convex to slightly concave bases. The "classic" Angostura illustrated in Wormington (1957:139) was actually collected from Nebraska and shares no relationship with the type site (Greiser 1985). The Ray Long points have been unsuccessfully compared to Agate Basin (Agogino and Rovner 1964; Wormington and Forbis 1965), and appear more reminiscent of Lusk of Alder complex points (see Frison 1991a). A radiocarbon date of 9380 ± 500 B.P. is associated with an Angostura point recovered from Ray Long (Crane 1956), but it suffers from an unreliably large sigma.

Parallel-oblique flaked points on the Southern Plains are usually distinguished as "Texas Angostura" (Kelly 1982). Thoms (1993) illustrates five Texas Angostura points from the Richard Beene site in cental Texas. The Richard Beene site examples are stylistically similar to those recovered from Ray Long and are associated with an AMS date of 8805 ± 75 B.P. Holliday (1997) reports a time range of 8800 to 8000 B.P. for the Angostura occupation at the Wilson-Leonard site in central Texas. It is important to note that not all of the Texas examples possess the sharply constricting, slightly concave bases characteristic of the Texas Angostura type. Alexander (1963) illustrates a lanceolate point recovered from Levi shelter which is described as "Plainview-Angostura," and Turner and Hester (1985) illustrate forms resembling Wormington's (1957) "Angostura" as well as the original James Allen materials (Mulloy 1959).

The remains of Frederick/Allen groups demonstrate a mixed subsistence economy. At the James Allen site, at least 15 bison were killed (Mulloy 1959). A similar size kill is reported at the Clary Ranch site, where a minimum of 17 bison were processed after a late summer-early fall kill (Hill et al. 1997). The Norton bonebed contains only around eight bison, but severe erosion has removed some portion of the site and the original size of the kill is unknown (Hofman 1996; Hofman et al. 1995). Bison also played a significant role at the Frederick/Allen occupations along Medicine Creek (Bamforth 1991a; Holder and Wike 1949). More diversity is seen at the Hell Gap site, where bison, deer, pronghorn, rabbit, and other small mammals were taken along with riverine resources (Irwin-Williams et al. 1973). Ground stone, perhaps used for the production of stone and bone tools, is also noted at Hell Gap and Allen. Irwin-Williams et al. (1973) described a possible house feature and refuse piles at Hell Gap, indicating an occupation of some duration. The Angostura occupation at the Wilson-Leonard site in central Texas is associated with local plant foods and small-to-medium-sized game (Holliday 1997), and demonstrates "Archaic" adaptations during this period.

Although described as Plainview by Baker et al. (1957), nearly 100 Frederick/Allen points were collected from the Nall site in Cimarron County, Oklahoma. Recent excavations by Southern Methodist University promises to shed new light on the occupational history of the site and the activities that took place there. LaBelle (1998) has recently reported a radiocarbon date of approximately 7900 B.P. from the Frederick/Allen component at Nall. A comparison of the Frederick/Allen and Plainview points represented at Nall show subtle differences in raw material use and tool condition, perhaps indicating that Frederick/Allen groups spent less residential time at the site (Ballenger 1999).

The second most common class of Paleoindian projectile points are described as Plainview. Defined by an assortment of unfluted lanceolate projectile points at the Plainview site (Sellards et al. 1947), use of the Plainview complex as a descriptive taxon is rare north of the Oklahoma panhandle. Liberal application of the Plainview type to nearly any unfluted lanceolate, and from very different ecological settings, has encouraged rather rigorous perimeters for the type (e.g. Kelly 1982). Similarity with a number of early and late Paleoindian forms (e.g. Frison 1991b; Johnson 1989; Knudson 1983; Leonardy and Anderson 1966), and the association of Plainview points with Early Archaic-style forms (Willey et al. 1978), has further blurred the technological and chronological concept of Plainview. In fact, when only the best-fit examples are considered, few sites with unmistakable Plainview affinity are reported from the Southern Plains (Johnson and Holliday 1980). Such typological rigor leaves a large number of "Plainview-like" points, such as those recovered from Goff Creek, without a comparative or explanatory foundation.

Plainview groups are responsible for a number of small (Hofman 1996; Johnson and Holliday 1980; Willey et al. 1978) but occasionally large (Dibble and Lorrain 1968; Sellards et al. 1947) bison kill sites and associated or independent open camps (Harrison and Killen 1978; Johnson and Holliday 1980; Mallouf and Mandel 1997). The size of the kills indicates a mixture of small group and possibly communal hunts by Plainview groups (Bamforth 1985, 1991b). Smaller mammal and aquatic resources undoubtedly played an important role in Plainview subsistence as well, but these sites are less salient than the bison kill sites. Radiocarbon dates from Lubbock Lake (Holliday et al. 1983), Plainview (Campbell 1959; Speer 1986), Lake Theo (Harrison and Killen 1978; Johnson et al. 1982), Bonfire Shelter (Dibble 1970), Rex Rodgers (Speer 1978), and Horace Rivers (Mallouf and Mandel 1997) indicate that Plainview occupations occurred on the Southern Plains between 10,100 and 9000 years ago.

Plainview occupation in the Oklahoma panhandle area is documented at a limited number of sites. At the Horace Rivers site, located in the Canadian River Breaks in Hemphill County, Texas, Mallouf and Mandel (1997) uncovered Plainview points and preforms, end scrapers, blade fragments, and other informal tools and debris. The stone tools are compared to the Plainview materials recovered from the Lake Theo site (Harrison and Killen 1978). The faunal assemblage from Horace Rivers consists of a small amount of bison, as well as antelope, deer, rabbits, muskrats, wolves, badgers, skunks, squirrels, prairie dogs, birds, snakes, turtles, frogs, fish, mussels, and other species that demonstrate broad-spectrum foraging rather than intensive bison hunting. Four AMS dates from features and an approximate living floor indicate an occupation around 9000 years ago - a late Plainview expression, but economically similar to 10,000-year-old Plainview occupations at the Lubbock Lake site (Johnson 1987).

The largest Plainview collection in the Oklahoma panhandle is from the Nall site, located on an upland divide separating the Beaver River and Coldwater Creek. Reported by Baker et al. (1957), and recently investigated by LaBelle (1998), the Nall site is situated within a seasonal playa lake that experienced considerable deflation during the 1930s. The Plainview occupation is represented by more than 100 projectile points, many complete, and demonstrates a heavy reliance on local lithic resources such as Ogallala and Dakota/Tesesquite quartzites in addition to Alibates.

Undated evidence is also found at the Mayhan site, located in Cimarron County, Oklahoma. In February 1974, the Denver Museum of Natural History conducted brief excavations in an ancient arroyo and recovered an uncertain amount of bison remains. A local collector had found a lanceolate point associated with the bone, and this was reportedly described by Joe Ben Wheat as intermediate between Clovis and Plainview (Richard Stucky, personal communication 1974). At site 41HF84, located along a small tributary of Palo Duro Creek, Peterson (1988) recovered a Plainview projectile point base from an *in situ* bison bone bed, but the site was apparently never excavated. During the same investigation, at site 41HF82, a small hearth with no associated artifacts was dated to 9490 $\pm$ 150 B.P.

Cody complex occupations are represented by four bifaces in the Goff Creek collection. Defined by discoveries in the Northern and Central Plains (Howard 1943; Schultz 1932; Wormington 1957), the Cody Complex is dated between 8800-9300 B.P. (Frison et al. 1996:15). The relationship between the Cody complex and the Firstview complex, recognized by similarly stemmed projectiles at Olsen-Chubbuck in southeastern Colorado (Wheat 1972) and Lubbock Lake (Johnson 1987), remains unclear. At the Seminole-Rose site in Gaines County, Texas, Collins et al. (1997) recognize 46 Firstview points and fragments as technological varieties of the Cody complex. Cody finds near the study area include two surface collections located north of Goff Creek near a tributary of the Smoky Hill River in western Kansas (Greiser 1985:78), as well as 57 Cody/Firstview implements reported from western Oklahoma by Blackmar and Hofman (1997).

Two projectile points from Goff Creek are similar to Agate Basin forms. Known principally from the Northern Plains (Frison and Stanford 1982; Irwin-Williams et al. 1973), Agate Basin points may extend into Nebraska (Bamforth 1991a), Colorado (Greiser 1985; Wormington 1988), New Mexico (Agogino and Rover 1964), and Oklahoma (Wyckoff 1985, 1989). Radiocarbon dates indicate a time span between 10,500 and 9500 B.P.

The Archaic Period

Most of the projectile points from Goff Creek resemble Archaic-age forms. This lengthy interval, representing approximately 6,000 years of prehistory, is traditionally separated into Early (8000-5000 B.P.), Middle (5000-3000 B.P.), and Late (3000-2000 B.P.) stages. Because the Archaic is characterized by local adaptations, transitions from Early to Late Archaic lifeways occur at different times in different places. Local taxonomies aside, it is evident that by 8000 B.P. many ecological and cultural changes had begun to develop on the Plains. The basic characteristics behind the Archaic include the arrival of Holocene climates and biotic districts, increased human reliance on diverse plant and animal resources, and the use of restricted geographical areas and local resources.

As summarized by Hofman (1996:79-83), continued research on the Plains has acted to blur the line between "Paleoindian" and "Archaic" adaptations, which are sometimes arbitrary classifications for temporal rather than adaptive change. Essentially, a distinction is seen between groups who may have increased broad spectrum foraging in the Eastern Woodlands and Plains groups who continued to rely, in great part, upon bison (Forbis 1992). The transition between Late Archaic and Woodland adaptations on the Southern Plains is similarly vague (Boyd 1997; Thurmond 1991).

Early and Middle Archaic

Early to Middle Archaic projectile points are the least common forms in the Goff Creek collection, but express the cultural diversity of the Oklahoma panhandle area during a period characterized by increased localization.

Although some temporal overlap with lanceolate forms is evident in the archaeological record, the Early Archaic is recognized here as the transition to a variety of complexes that produced notched and stemmed projectile points. Early Archaic sites on and near the Southern Plains include Pigeon Cliffs in New Mexico (Wendorf 1960), Gore Pit in western Oklahoma (Hammatt 1976), and the Pumpkin Creek site in south-central Oklahoma (Wyckoff and Taylor 1971).

Unfortunately, these sites have not yielded discrete artifact assemblages that shed light on the Early Archaic forms from Goff Creek.

Early use of side-notched points on the Southern Plains is documented at the Rex Rodgers bison kill site, radiocarbon dated to around 9100 B.P. (Willey et al. 1978:38). Two side-notched points from Goff Creek are fluted, but these do not compare well to the Rex Rodgers examples. Early side-notched points also occur in the Logan Creek complex. Recognized at several sites from western Iowa to western Kansas and radiocarbon dated between 7500-6000 B.P. (Hofman 1996:83), projectile points from Logan Creek occupations are unfluted and often possess straight to concave basal elements which are ground. Five projectile points from Goff Creek are classified as early side-notched forms similar to those recovered from the Logan Creek site in Nebraska (Bozell 1994), the LoDiasKa site in Colorado (Irwin and Irwin 1959), and the Spring Creek site in southwest Nebraska (Grange 1980). Bison remains are common at Logan Creek complex sites, as well as deer, antelope, rabbit, fish, and other local resources. Early side-notched forms also occur at the Hawken bison kill site (Frison 1991a) and elsewhere on the Northern Plains.

A particularly intriguing Archaic manifestation on the Southern Plains, documented from the Ozarks to the Rocky Mountian foothills, is the Calf Creek horizon (Wyckoff and Shockey 1994, 1995). Radiocarbon dates from the Coffey site in northeastern Kansas (Schmits 1978) as well as the Kubic site from north-central Oklahoma (Neal and Duncan 1996) place the Calf Creek horizon between 4800 and 5500 years ago. Two important aspects of the Calf Creek adaptations include the heat-treatment and caching of local raw materials. Bison seem to have served as the primary economic focus, despite evidence that their populations were low during this period (Dillehay 1974). The use of specific raw materials by Calf Creek groups led Wyckoff (1995:205) to delimit four territorial boundaries within Oklahoma, and more recently Thurmond and Wyckoff (1999) have reviewed the western evidence for Calf Creek in terms of seasonal mobility (see also Brosowske 1996; Duncan 1995).

The Calf Creek horizon is represented by seven bifaces from Goff Creek. A single Calf Creek point was also recovered by Vincent Dale from the Muncy site. A projectile point similar to the Martindale type (Class A5), included in Prewitt's (1981) Jarrell phase with Bell and Andice points, is also observed in the Goff Creek collection. Similar "split stem" varieties are dated around 7400 B.P. at the Wilson-Leonard site and Devil's Rockshelter in central Texas (Story 1990:214).

A well-documented Archaic manifestation from the Northern Plains, also represented in the Goff Creek collection, is the McKean complex. First described in Wyoming (Wheeler 1952), the McKean complex is now recognized throughout the Northern and Central Plains (Frison 1991b; Greiser 1985; Kornfeld and Todd 1985), and generally dates between 5000-3000 years ago. Defined by McKean lanceolates, as well as Duncan, Hanna, and Mallory side-notched points, McKean complex evidence is found in Wyoming at bison kill and processing sites, pit houses, open habitations, rockshelters, and caches (Frison et al. 1996:20-22). Deer, sheep, elk, and smaller mammals were recovered from the Dead Indian Creek site (Frison and Walker 1984), and a variety of plant foods as well as roasted insects were exploited at a seasonal occupation at Leigh Cave (Frison and Huseas 1968). Hofman (1996:87-91) reviews several McKean complex sites on the Central Plains, including the Hutton-Pinkham site (Larson et al. 1992), but evidence south of the Arkansas River is usually limited to isolated surface finds (Lintz and Anderson 1989).

The Kubik site, in Kay County, Oklahoma, provides little chronological information on McKean occupations in the Southern Plains. There, a single Duncan point was recovered stratigraphically above a Calf Creek occupation. A radiocarbon date from the Duncan-bearing lense produced a date of 2373 ± 83 B.P. and is considered to be an unreliable absolute age (Larry Neal, personal communication 1998).

The identification of McKean complex forms on the Southern Plains is complicated by a range of Archaic-style points recovered from the San Jon site (Hill et al. 1995). A particular point found eroding from Stratum 2s, radiocarbon dated between 8400 and 7600 B.P., resembles examples described as Hanna or "Owl-ears" in the Oklahoma panhandle (e.g. Baker et al. 1957:Plate 3:l; LaBelle 1997:6) and bares close similarity to some Duncan/Hanna class points from Goff Creek. Two somewhat similar points recovered from the Area III bonebed (dated to less than 3600 years ago) also resemble Duncan/Hanna examples. Based on the radiocarbon dates, Hill et al. (1995:385) compare the San Jon points to the Logan Creek, Keithville, and Pedernales types. The presence of Mallory points on the Southern Plains, a far more distinctive design, is documented by Baker (1939). Final reflections of Middle Archaic occupations along Goff Creek consist of a single point that resembles Munkers Creek phase forms recovered from 5500 to 5000-year-old occupations in Kansas (Witty 1982), as well as several stemmed projectile points that probably date between 5000-3000 years ago.

Late Archaic-Woodland Period

Projectile points associated with the Late Archaic period are the most common forms in the Goff Creek collection. An emphasis on corner-notched dart points is evident across the Plains by 3000 years ago and persisted until around 1400 years ago. These forms have been referred to as Ellis, Edgewood, Ensor, Lange, Marcos, Marshall, Palmillas, Trinity, and Williams (Hughes 1991:22) and may reflect chronological changes in form, idiosyncratic variations on a theme, or distinct groups of people belonging to a larger tradition. Lintz (1995) discusses some evidence for temporal change at the Chalk Hollow site, but the co-occurance of Marcos, Castroville, Williams, and Ensor forms is noted there and in several surface collections from the region. There is a general feeling among some researchers that large dart points are earlier than smaller dart styles, but this assumption ignores that rather large dart points recovered from 1400 to 2100-year-old kills such as the Certain site.

The association of various corner-notched dart forms with Woodland style arrow points and pottery further complicates our perception of the Late Archaic-Woodland period. Thurmond (1991:120) notes that it is usually impossible to distinguish Late Archaic and Woodland components from small artifact collections, and the Lake Creek complex is, in fact, based on the mingling of Late Archaic and Woodland technologies (Hughes 1991). Boyd (1997:268) notes that the earliest well-documented arrow point in the Panhandle-Plains comes from a burial at the Sam Wahl site and dates to between 1694-1535 years ago, a time range that overlaps with dart-only bison kills by a few centuries.

The Late Archaic, thoroughly explored in Boyd's (1997) synthesis, is characterized by a continuation of hunter-gatherer lifeways, with perhaps greater emphasis on seasonal habitation and plant foods. A dramatic feature of the Late Archaic is intensive bison hunting, as evidenced by large kill sites from the Northern Plains (Frison 1970) to the Lower Pecos region of Texas (Dibble and Lorrain 1968). The large, communal bison kill sites documented on the Northern Plains may differ from those reported on the Southern Plains, where smaller kills may be the work of fewer people (Buehler 1997). Based on the increased number of kill and camp sites recorded for the Late Archaic (relative to the Middle Archaic), human and animal populations are assumed to have grown in response to more favorable climatic conditions (Hughes 1991:20). Boyd (1997:261) further suspects that animal and human populations increased during the Late Archaic, noting that few sites are known for the first half of the period, whereas several are documented for the latter half. Increasing territoriality during the Late Archaic is also indicated by violence (Gettys 1991; Button and Agogino 1987) and an emphasis on local raw materials (Leonhardy 1966b:30-32; Hofman 1973:195-197). Social relations are reflected by lunate "greenstones" and conch shell items. Nine boatstones were found with a disturbed burial at the Boatstone Field site (34TX60), located one mile south of Goff Creek (Dale and Lintz 1977).

The settlement pattern of Late Archaic groups was considered by Wedel (1975:273) to involve spring, summer, and fall residence in the uplands, with groups wintering in the canyons. Thurmond (1991) also argues for seasonal settlement based on his work along the Dempsey Divide and Moore's (1984, 1988) survey in the adjacent Quartermaster Creek area. Boyd (1997:265-266) applies Thurmond's scenario to the entire Caprock Canyonlands, postulating that the Caprock Canyons served as a base locality/foraging locus, whereas the Llano Estacado and Rolling Plains were used during bison hunting excursions.

Several Late Archaic sites are documented south of Goff Creek and Boyd (1997:234-260) has loosely incorporated many of these into the revamped Little Sunday complex. First proposed by Hughes (1955:72), the Little Sunday complex was based on a surface collection of artifacts from the Little Sunday site in Randall County, Texas. Because the Little Sunday site lacks chronological information, many researchers in western Oklahoma and northwest Texas have not adopted it as a taxonomic tool. Another Late Archaic taxonomic candidate, the Summers complex, was defined by Leonhardy (1966b) based on three sites within the proposed impoundment area of Mangum Reservoir in western Oklahoma. The Summers site contained a cooking pit, a hearth, and a concentration of bison bone with corner-notched and stemmed (Gary-like) projectile points. A radiocarbon date on charcoal from the cooking pit place the occupation between 2500-3000 years ago. Like Little Sunday, the Summers complex has not been applied to the growing number of Late Archaic sites in the region. Boyd (1997:235) includes the Summers site into the Little Sunday complex.

Woodland influences in the Panhandle-Plains, characterized by the appearance of cordmarked pottery and the use of arrowpoints, were in place by 1400 years ago. During the same period, Southwestern influences appear with the introduction of Magollon brownware pottery and distinctive (Deadman's) arrow points. These cultural manifestations are recognized in the Lake Creek and Palo Duro complexes, respectively. The Lake Creek complex, defined by Hughes (1962, 1991), is represented by a concentration of sites along the Canadian River Basin in the Texas Panhandle. The geographic range of the Lake Creek complex is tentatively confined by Boyd (1997:294) to the northern Texas Panhandle and adjacent Rolling Plains of western Oklahoma, although similar but poorly documented assemblages occur in the Oklahoma panhandle (e.g. Lintz and Zabawa 1984; Saunders 1983).

Influenced by or related to Plains Woodland groups to the east, Lake Creek populations may have experienced hostilities or full-scale warfare with Palo Duro groups to their south (Boyd 1997:330). In contrast to the Late Archaic, plant processing is well represented at Lake Creek sites with the use of grinding stones while bison seem to have played a lesser role during a brief mesic interval. Evidence for horticulture is lacking at Lake Creek sites, but was beginning to occur in adjacent regions of Colorado, New Mexico, and Oklahoma during this period (Gunnerson 1987; Stuart and Gauthier 1988; Brooks 1989).

The Palo Duro complex, originally defined by Willey and Hughes (1978), flourished between 1450 and 800 B.P. in the southern Caprock Canyons region. Boyd (1997:295-335) reviews 16 Palo Duro complex sites in terms of site function and seasonality, recognizing residential bases, open camps, and rockshelters. Residential bases contain pithouses and evidence for the procurement, processing, and storage of mesquite, shin oak, goosefoot, and buffalo gourd. These habitations occur in the upper drainages of the Red and Brazos rivers. Rockshelters and open camps are more widely distributed and were used in a variety of ways, ranging from ephemeral processing stations to relatively permanent bases. The northern boundary of the Palo Duro core cultural area may have existed near the Red River, and Deadman's points are rare in northern Texas (Couzzourt 1988:47) and the Oklahoma panhandle. Diversity within and between these site types suggest residential mobility and seasonal organization of subsistence activities. Recognized by the use of non-local brownwares produced in the Jornada Mogollon region of west Texas and southeastern New Mexico, as well as Deadman's and Scallorn points, Palo Duro complex groups shared an uncertain relatedness with groups from the Southwest.

Late Archaic Bison Kills

The distribution of Late Archaic bison kills on the Southern Plains may reflect bison distributions or human land use patterns, but may be biased by preservation and survey coverage. Of the 12 Late Archaic kills discussed by Hughes (1977, 1989), Bement and Buehler (1994), Quigg (1997), and Wilkens (1997), 9 are located along tributaries of the Red or Washita rivers in the Rolling Plains. These sites include Bell, Certain, Collier, Strong, Twilla, Buzzards Roost, Finch, R.O. Ranch, and Sitter. Of these, only the first five have been tested or excavated. The largest of these, the Certain site (34BK46), shows evidence of at least 6 kill episodes (Bement and Beuhler 1994; Buehler 1997). Based on 7 bone dates from Bell, Collier, Strong, and Twilla, Hughes (1989) estimates that the kills occurred between 1500-2000 years ago. Two charcoal samples from the Certain site, one recovered from a hearth 15 cm above the bonebeds and the other from below Trench B, bracket the kills between 1700 and 2100 years ago. Bone dates from the Certain kills range between 1370 and 2020 B.P. (Bement and Buehler 1994; Buehler 1997). Excluding a Woodland-age date from the Strong site, Boyd (1997:239) estimates that the Little Sunday complex kills occurred between 1350 and 2350 B.P. The raw materials found at these sites demonstrates a heavy reliance on Ogallala cherts and quartzites, Tecovas, and rarely Alibates and Florence-A chert. An exception is the Hoover site, located farther north, where Alibates and Niobrara are identified by Hughes (1989:200-201).

In contrast to the several Late Archaic bison kills documented south of the Canadian River, only two are documented north of the river. The Sanders site, dated to about 1700 years ago (Quigg 1997:42), is a briefly occupied bison processing camp. Sixteen secondary refuse features, including burned rock (3), ash/burned bone concentrations (6), and lithic debris concentrations (7), were recognized within a 115m^2 excavation area. Hearths or other features that might be associated with a primary activity area were not located. Based on the integrity of the secondary features, Quigg (1997:199-209) argues that the site was occupied for a period of a few weeks. Also, the bison elements (MNI=12) reveal a single catastrophic death during the Spring (March). The presence of heavy and low utility elements such as skulls, vertebrae, and limbs are reasonable evidence that the kill was relatively close-by (Tomka and Quigg 1997:190; Quigg 1997:118). Lithic tools and debris, to include 13 corner-notched dart points, 11 bifaces, 10 end scrapers, 2 side scrapers, 2 gravers, 3 choppers, 15 cores, 1 pebble tool, 76 edge modified flakes, and 3763 pieces of debitage are made nearly exclusively from Alibates (Quigg 1997:61-87). An exception are the cores, all 15 of which are made from opalite. The Sanders site also produced a single cordmarked sherd directly associated with the bison remains and dart points.

The McIntyre bison kill, located along Pats Creek within the Canadian River breaks of Roberts County, Texas, is a poorly preserved bone bed within an arroyo. The remains of at least three bison, some articulated, are scattered across the original channel, which is truncated. A single Marcos point made from "milky light gray" Kay County chert was found below the bone deposit and a single bone date yielded an age of 1775$\pm$115 B.P. (Wilkens 1997).

A third bison processing site documented north of the Canadian River, and occasionally referenced in discussions of the Late Archaic, was investigated by Lintz (1976). Termed the Kenton bison kill (34CI81), this site consists of a collection of disarticulated modern bison elements and flake tools deeply buried in the south bank of the Beaver River. No diagnostic tools were found with the bones, but geomorphological studies of the valley produced Late Prehistoric dates from a depth similar to that of the bones (Wilson 1972:207).

Late Archaic-Woodland Habitation Sites

Well-documented Late Archaic habitation sites are more widely distributed along the Panhandle-Plains, ranging from the southern end of the Rolling Plains to the North Canadian (Beaver) River. Boyd (1997:239) and others have noted that Late Archaic habitation sites date as early as 4000 B.P., while bison kills cluster toward the end of the Late Archaic period. One possible explanation is offered by Thurmond (1991:121), who speculates that only the latest of the kills are preserved. Many of the better-documented Late Archaic and Woodland habitations occur at the same site. Noteworthy habitation sites located south of the Canadian River include the previously noted Little Sunday and Summers sites, as well as Beaver Dam, Swift Horse, Chalk Hollow, Deadman's Shelter, and others summarized by Hofman (1989) and Boyd (1997).

The Beaver Dam (34RM208) and Swift Horse sites (34RM501) are both located in Roger Mills County along tributaries of the Washita River. At Beaver Dam, a sealed deposit between 150-160 cm below surface yielded five dart points that Thurmond (1991) compares to the types Ensor and Palmillas. A single charcoal sample from 135 cm below the surface is reported and produced a radiocarbon date of 1514 $\pm$ 79 B.P. Based on several unreported dates from the site, Thurmond (personal communication, 1998) summarizes the components at Beaver Dam to include Marcos and large Ensor points below a paleosol, two dart and arrowpoint-bearing components within the paleosol (ca. 1550-1300 B.P.), and a single component above the paleosol containing arrowpoints and cordmarked pottery (ca. 1050-950 B.P.).

Similarly late dates, ranging between 1590 and 1820 B.P., are available from the Swift Horse site which Briscoe (1987) associates with the Lake Creek complex. Faunal remains from Swift Horse are predominantly bison, with antelope, rabbit, bird, and other local resources represented. The association of corner-notched dart points with pottery and arrowpoints at Beaver Dam, Swift Horse, and Deadman's Shelter has led Thurmond (1991:121) to suggest contemporaniety and seasonal specialization between dart and arrow/pottery technologies.

Further chronological detail is presented by Lintz (1995) for Chalk Hollow. Briefly reported by Wedel (1975), the Chalk Hollow site contains two midden zones from which 25 radiocarbon dates are available. The upper zone, assigned to the Palo Duro complex by Hughes (1978), dates between 975-1546 B.P. and contained Scallorn points and plain pottery. The lower zone consists of three chronologically recognized occupations dating between 3566-3820 B.P., 2552-3042 B.P., and 2210-2421 B.P. The corner-notched dart forms associated with the Late Archaic occupations are classified as Marcos, Castroville, Williams, Palmillas, Ensor, and Unidentified. Although some postdepositional mixing is expected, the Marcos, Castroville, Williams, and Ensor forms co-occur vertically and may be contemporaneous designs. The Palmillas and Unidentified forms tend to occur above the other point types. The Late Archaic projectile points are made predominantly from Tecovas and Alibates, with lesser amounts of Edwards, Ogallala, chalcedony, and unidentified cherts.

The Deadman's Shelter site, after which was named the Palo Duro complex (Willey and Hughes 1978), contains two cultural units which lack strong stratigraphic separation. Stratum B, with two radiocarbon dates between 1240-1485 B.P., produced 14 Scallorn and Deadman arrow points with Jornada Brown pottery and one dart point. Stratum D produced two radiocarbon dates that ranged between 1740 and 1830 B.P., and one outlier of 630 B.P. The lower zone yielded 22 Scallorn, Deadman, and Washita arrow points, brownware pottery, and 8 dart points comparable to the types Edgewood, Ellis, Elam, and Lange. Faunal remains from the shelter are dominated by deer (Schultz and Rawn 1978). The presence of Washita points in the lower zone suggests to Thurmond (1991) that significant mixing is responsible for the artifact associations at Deadman's Shelter. The northernmost site assigned to the Palo Duro complex by Boyd (1997:303-304) is the South Ridge site located on the south side of the Canadian River.

Late Archaic-Woodland camp sites documented north of the Canadian River include Lake Creek, Sandy Ridge, Muncy, and Johnson-Cline. Late Archaic sites represented in the Vincent Dale and Bill White collections include Eva Playa, Payne, Muller, Glathaar, Yarbrough, Easterwood, Copps Station, Muncy, and possibly the Boatstone Field site (Fig. 3-2).

The Lake Creek site, the type site of the Lake Creek complex, is located in the breaks of the Canadian River (Hughes 1962, 1991). The site consists of surface and excavated materials that indicate Woodland and later occupations. Corner-notched dart points (Ellis-like), as well as corner and side-notched arrow points were found with unidentified cordmarked pottery and ground stone. Faunal remains demonstrate the pursuit of bison, deer, jackrabbit, and turtle, although the bison are attributed to the later, non-Woodland occupation (Hughes 1962). The rationale behind the Lake Creek complex is that Late Archaic groups gradually adopted a Woodland-like material culture, evidenced by the similarity between some Late Archaic and Woodland signatures (see Thurmond 1991:120). Other sites discussed by Boyd (1997:281-295) in relation to the Lake Creek complex include Tascosa Creek, Duncan Ranch 1, Sandy Ridge, Beaver Dam, Swift Horse, and Carrizozo Bridge.

The Sandy Ridge site is a multicomponent site located along Palo Duro Creek and is the largest of the prehistoric campsites tested by Quigg et al. (1993) in their survey of Palo Duro Reservoir. First documented by Hughes (1979), the site is assigned to the Lake Creek complex and has a Late Archaic component (Boyd 1997:287-288). Three excavation blocks produced a mixture of arrow and dart points. Only Block A yielded artifacts and soil humate dates consistent with a single-component Woodland occupation. The block excavations produced 24 stemmed, corner, basal, and side-notched arrow points, 4 corner-notched dart points, 1 basally notched dart point, 2 cordmarked sherds, as well as several scrapers, bifaces, utilized flakes, chipped stone debris, groundstone, bone, and 6 charcoal and ash features from a mixed, sandy matrix. Two radiocarbon dates on humate/charcoal from Block C cluster around 3450 B.P. and provide an early date for corner-notched dart points in the Oklahoma panhandle region. Faunal remains from Block C are dominated by bison, but also include deer and jackrabbit. The lithic assemblage is dominated by Alibates/Day Creek.

Carrizozo Bridge, the northwesternmost of the sites associated by Boyd (1997) with the Lake Creek complex, is located in Cimarron County, Oklahoma, and has produced three radiocarbon dates that place the occupation around 850-1050 B.P. (Saunders 1983). Corner and side-notched

Figure 3-2. Select Late Archaic Sites in the Goff Creek Vicinity

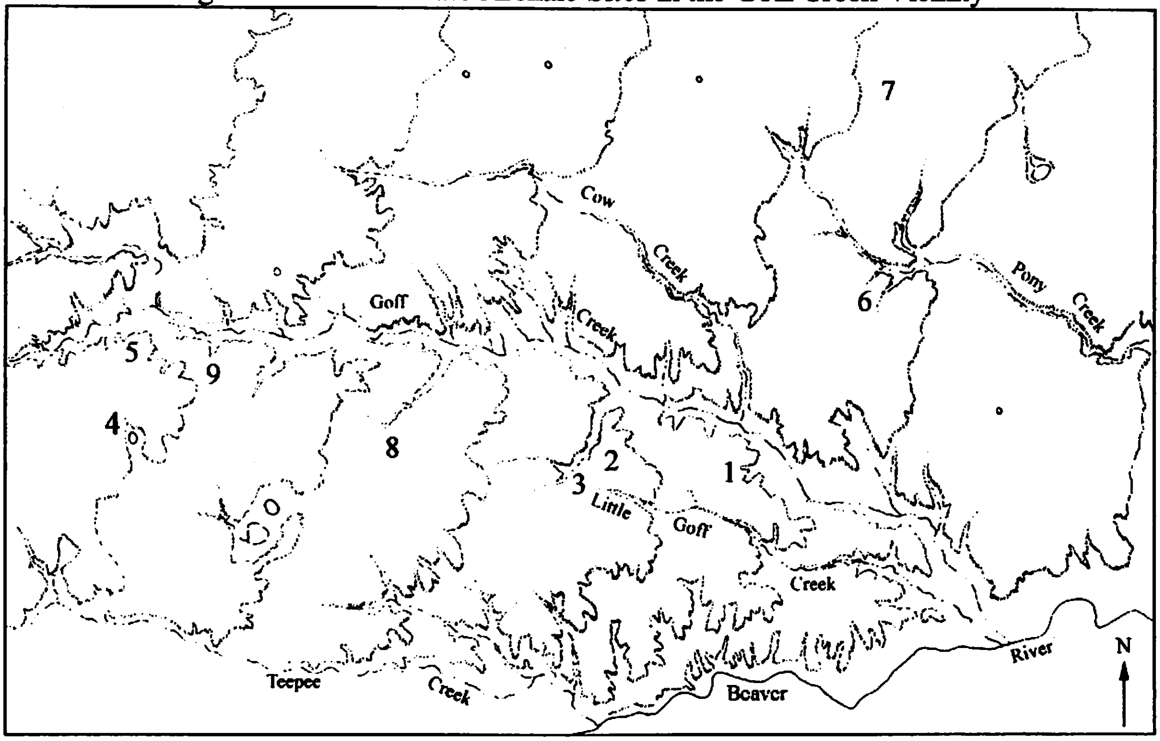


Table 3-2. Select Late Archaic Sites in the Goff Creek Vicinity

Site	Setting	Artifacts
1. Easterwood	South terrace of Goff Creek	10 corner-notched dart points
2. Glathaar	Prominent hilltop between Goff Creek and Little Goff Creek	8 corner-notched dart points
3. Copps Station	Upper Little Goff Creek	6 corner-notched dart points
4. Eva Playa	Large playa lake on divide between Goff Creek and Teepee Creek	11 corner-notched points
5. Yarbrough	North and south terraces of Goff Creek	several corner-notched points
6. Payne	Prominent hilltop overlooking unnamed tributary of Pony Creek	4 corner-notched points
7. Muller	Upland field north of Pony Creek near Kansas state line	14 corner-notched points
8. Muncy	Large upland blow-out south of Goff Creek	65 corner-notched points in the White (1987) and Dale collections
9. Boatstone Field	South terrace of Goff Creek	9 boatstones from disturbed burial (unknown affinity)

arrow points, corner-notched dart points, one Plainview base, ground stone, and one sherd of Toas Plain were associated with 17 features that contained 137 mussel fragments and a small amount of bison and bird remains.

Surface-collected sites include the Muncy site, an extensive blowout located 3 miles south of Goff Creek (White 1987). Long-term collecting has provided a diverse array of artifacts. The Woodland assemblage documented by White (1987) includes 214 corner-notched arrow points (including the types Scallorn and Deadman's) and 85 sherds, most of which are cordmarked. Another 77 "Scallorn" points were collected from the site by Vincent Dale. The Late Archaic occupation consists of 32 corner-notched dart points reported by White (1987), as well as 33 corner-notched dart points collected by Dale.

Documented by Lintz (1978), the Johnson-Cline site is located in an upland dune and was surface-collected by Vincent Dale and others during the 1940's. The Dale collection contains a small number of Scallorn and Deadman points (Lintz 1978:120). Late Archaic occupations are also reflected by 16 corner-notched dart points. A cursory survey revealed at least eight Late Archaic sites in the Dale collection (Fig. 3-2).

The Archaic record of the Black Mesa region, and areas immediately north and west of the Oklahoma panhandle, is especially poor. Lintz and Zabawa (1984) review the materials recovered from the Kenton Caves, including large corner-notched points, but their relationship with the Little Sunday complex is unknown. In southeastern Colorado, a small number of Late Archaic sites reflect localized broad-spectrum foraging. As reviewed by Hofman (1989) and Quigg (1997), sites such as Trinchera Cave (Wood-Simpson 1976), McEndree Ranch (Shields 1980), 5EP576 and 5EP935 (McDonald 1992), and 5BA320 (Nowak and Jones 1985) have produced corner-notched points or Late Archaic radiocarbon dates with bison, deer, elk, rabbit and other small mammals, plant remains, hearths, and a subterranean house floor. In northeastern New Mexico and southwestern Kansas, Late Archaic evidence is still more limited. In New Mexico, a 2700-year-old hearth with bison, deer, and flaked tools is reported at La8120 (Winter 1988), and a variety of corner-notched points were recovered from La5573, a stratified rockshelter near Ute Reservoir. Dorshow (1994) also reports several Late Archaic-Woodland age sites from the Southern Park Plateau area of northeast New Mexico, including corner-notched dart points dated between 1800 and 2200 years ago. In Kansas, Hofman (1996) reports McKean and later Archaic projectile points in local collections, but these are not well documented.

Other Woodland-age point styles in the Goff Creek collection include Shadid and Edwards forms. Shadid points are defined by work at the Shadid site in Woods County, Oklahoma (Wyckoff and Jackman 1988:114). Though not dated at the Shadid site, these points are stylistically similar to "Hog Back" points documented from the LoDaisKa shelter and Magic Mountain sites in central Colorado where they are associated with Plains Woodland cordmarked pottery (Irwin and Irwin 1959:Fig. 26aa; Irwin-Willuams and Irwin 1966:Fig. 29). Similarity with some Avonlea examples from the Beehive Butte site may also be noted (Frison 1991:114). Wyckoff and Jackman (1988) plot the distribution of Shadid points in eastern Colorado and northwest Oklahoma, to include the Muncy site. A single Edwards form is also present in the Goff Creek collection. Turner and Hester (1993:212) describe these as one of the earliest arrow point types documented in central and south Texas and assign them a date of 1050-910 B.P.

Late Prehistoric Period

The Late Prehistoric period of the Panhandle-Plains is characterized by the use of side-notched arrow points and beveled knives, immigrant populations of bison hunters, and increasing exchange between Plains bison hunters and agriculturists in the Southwest. Boyd (1997:337) sees these changes as being climatically driven during a time of xeric conditions that began around 850-750 B.P. The diagnostic points (Washita, Harrell, and Fresno) coupled with beveled knives and highly formalized end scrapers constitute a specialized tool kit geared toward the hunting and large-scale processing of bison (Hughes 1991:30).

North and east of the Caprock Canyons, in the Canadian and Washita river valleys, a Plains Village lifestyle developed that subsisted on a mixture of hunting, gathering, and agriculture. Known variously as Antelope Creek, Buried City, Zimms, and Washita River, these groups exhibit continuity with earlier Plains Woodland groups (Lintz 1986:285) or uncertain relations with eastern Caddoan-speaking groups (Boyd 1997:494). In the Texas and Oklahoma panhandles, the Antelope Creek and Buried City manifestations flourished quickly, emphasizing an economy based on bison, corn, beans, and squash. Though centralized around the Alibates quarries along the Canadian River, notable Antelope Creek sites are documented in the Goff Creek area. Traits include large rectangular, subterranean structures with vertical slab lining, as well as Borger Cordmarked and Puebloan pottery (Lintz 1986, 1991). Buried City architecture, concentrated along Wolf Creek, is lined with caliche boulders. The use of Upper Republican-like pottery is also characteristic of Buried City complex sites (Hughes and Hughes-Jones 1987). Several factors were likely involved with the demise or disappearance of Antelope Creek and Buried City around 500-450 B.P. Most important are a series of severe droughts affecting both bison and maize, population pressures from within and about, and hostilities with immigrant Athapaskan-speaking and perhaps fellow Plains Village groups (Lintz 1986:240-253; Boyd 1997:348; Brooks 1994:320).

The Antelope Creek sites documented in Texas and Beaver County, Oklahoma (particularly Stamper, Two Sisters/McGrath, and Roy Smith), are located directly above the North Canadian River or near well-fed springs. Antelope Creek architecture is not documented along Goff Creek, but a small rectangular post mold pattern is discussed by Shaeffer (1965). Located near Area 57 on the north side of the creek, the Rhoton site consists of wind-deflated materials including rock-lined hearths, milling stone, and small animal bone. Dart and arrow points were recovered from the vicinity, but diagnostic tools, including pottery, were not located inside the house pattern. The site is not dated and Bill White does not mention it in his notes.

Late Prehistoric use of the drainage is also reflected at the Tucker's Blowout site. Located in Area 49 of this study, the site was exposed by wind in the early 1980s and was tested by the Oklahoma Archeological Survey in 1983. Three bone and rock features were uncovered above the present channel and contained the fragmented remains of 5 to 8 bison and 2 rabbit. Lithic tools included Washita and Fresno points, diamond beveled knives, and an assortment of biface fragments, expedient flake tools, and retouch debris. Dated charcoal from Features 1 and 3 indicate an occupation between 498-405 B.P. (Brooks and Flynn 1988), or during the late Antelope Creek period.

Around 550 years ago, shortly before the disappearance of Antelope

Creek, the Tierra Blanca and Garza complexes appear in the Caprock Canyons. The rather sudden presence of these complexes after a 200-year hiatus following the Palo Duro complex, and the character of their lifestyles, suggest that they represent new tipi-dwelling peoples in the region. The relationship of the Tierra Blanca and Garza complexes is uncertain, but Boyd (1997:419-486) argues that subtle archaeological differences indicate separate groups who co-existed in the northern (Tierra Blanca) and southern (Garza) portions of the Panhandle-Plains. Both complexes are characterized as mobile bison hunters with sparse evidence for agriculture (Baugh 1986:180). Sites include bison kill/processing sites such as the Garnsey Bison Kill (Speth 1983), open camps, and rockshelters. Both economies produced distinctive "turtle-back" end scrapers, beveled knives, small triangular arrow points, and acquired and manufactured Puebloan and Puebloan-style pottery. However, the Tierra Blanca complex is associated with Washita, Harrell, Fresno, and Talco-like points often made from Alibates, whereas Garza components exhibit varying frequencies of Garza and Lott points often made from Edwards chert (Boyd 1997:419).

The Protohistoric and Historic occupation of Goff Creek and the surrounding region, underrepresented in the Bill White collection, is available in Chrisman (1998), Jackson et al. (1982), and Peterson (1988).

Chapter 4

Description of the Artifacts

Unlike buried assemblages, which have the potential to identify chronological, adaptive, or ideosyncratic variation in artifact form, the classification of surface-collected artifacts relies especially upon comparison. The limited number of projectile points recovered from dated contexts, however, do not capture variability within stone tool traditions. Subsequently, there exists a wide variety of forms that do not fit into extant typologies. Such examples seem especially prevalent in surface collections, perhaps reflecting a relationship between typology, craft specialization, and site function and context (i.e. Bamforth 1991b).

Considering the limited range of typological variability archaeologists observe in dated contexts, undated projectile point styles deserve thorough description. There is a limit, however, to how much description a surface collection warrants. The exemplary description and illustration performed with some buried assemblages (e.g. Knudson 1983) cannot be accomplished with large collections where projectile points alone number in the hundreds. In fact, the illustration of stone tools, which qualifies as the foundation of data presentation in some studies, has recently come under attack as a waste of trees (e.g. Burgett 1998:94). On the contrary, the comparison of surface-collected artifacts with buried forms requires more rather than fewer illustrations and provides the reader a better opportunity to evaluate and critique artifact classifications.

The artifacts from Goff Creek are organized into typological and morphological classes. The projectile point classes are based on comparison to recognized types from the Plains and central Texas. Artifact classes are based on tool form. Illustrations, which were expedited by the use of a scanner, are provided to convey the range of variability included within each class. Attributes and variables are presented in table format and the codes used in each table are provided in Table 4-0.

Most of the descriptive terms used here are straightforward. The classification of fracture types and tool maintenance, however, deserves clarification. Fracture types are grouped into two basic catagories: impact and snap fractures. The recognition of impact fractures generally follows the criteria presented in Dockall (1997) and Odell and Cowan (1986), and includes longitudinal and lateral fractures oriented along the long axis of the projectile point. Significant crushing and spin-off fractures are also considered diagnostic of impact damage in the Goff Creek analysis. Microscopic evidence of impact events (i.e. Fischer et al. 1984) was not explored.

Projectile point fracture types that do not exhibit the patterns associated with impact are classified as snap breaks. These demonstrate slightly undulating fracture surfaces or featureless breaks across blades, barbs, or on basal corners and may reflect either missile or knife-like functions. A small number of fractures are classified as thermal damage, and these are recognized by distinctive pot-lids within the fracture. Tools which have been retooled as scrapers, for example, are arbitrarily classified as being "modified."

The level of maintenance expressed on each tool is difficult to quantify and the criteria vary among different projectile point types with different rejuvenation techniques. The primary attributes considered diagnostic of maintenance include tool morphology, edge angles, and the flake scar patterns. In general, projectile points/knives that do not exhibit resharpening, or demonstrate one or two rejuvenation events that have not seriously affected the idealized symmetry of the tool, are considered to be slightly maintained. When retouch has noticeably changed blade form, often accompanied by beveled or undulating edge angles and significant attrition of original flake scars, the tool is considered to be moderately maintained. Extensively maintained tools bare little resemblance to the original form of the type or possess so little blade that their utility seems unlikely. These criteria are subjective, but provide some measure of tool condition for inter-type comparison.

The original catalog system used by Bill White, ranging from 1 to 2176, is maintained here. Specific artifacts are referred to throughout the text, and these and other specimens are described and often illustrated in the tables and figures. Nearly all of the artifact categories share a table and figure number. For example, the attributes and metric variables of the Plainview class points are found in Table 4-5, and select examples are illustrated in Figure 4-5.

Fluted Points (Table and Figure 4-1)

Limited evidence exists for early Paleoindian occupations along Goff Creek. Only five bifaces in the Goff Creek collection are fluted to a greater or lesser degree, and three of these are badly fragmented or reworked. The significant morphological variation observed within this class of artifacts led Bill to catalog these forms as Clovis, Plainview, and Jimmy Allen.

The largest point in this class (1344) is not especially well made. Bill's entry on October 8, 1978 records the specimen as "Clovis (repointed)" and documents that the item was found approximately "1 mile up from Goodwell Bridge." The point is fluted on one face and thinned on the other. The lateral edges are slightly ground.

Another potentially early point is thin and fluted on both faces (1890). Some

Table 4-0. Codes Used in Descriptive Tables.

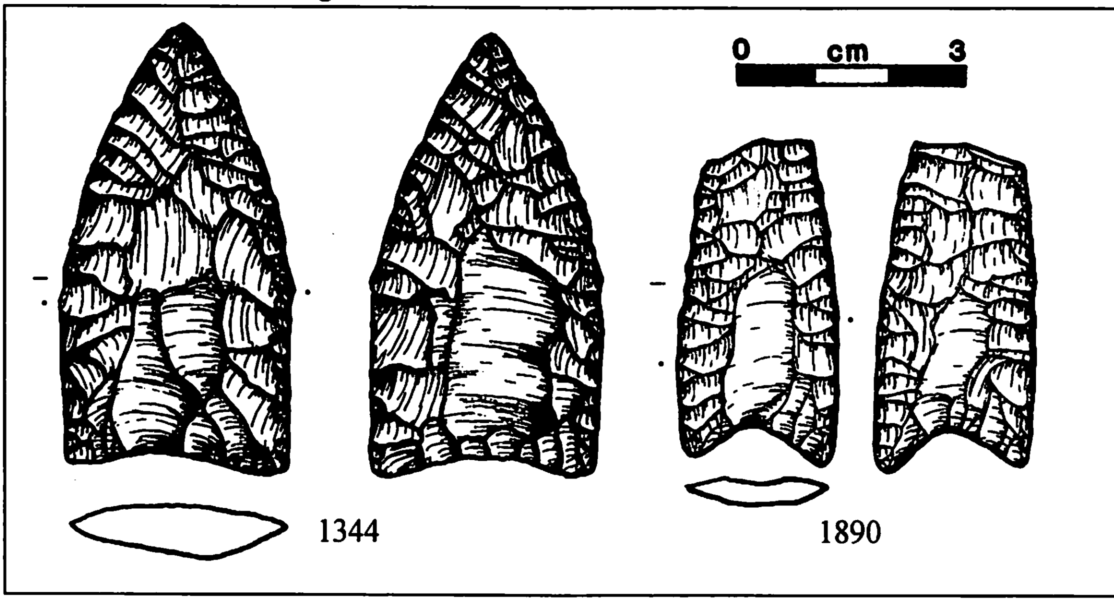
<table>
<tr><th colspan="6">Raw Material</th></tr>
<tr><td colspan="2">AA=Alibates
ED=Edwards
NJ=Niobrara Jasper
DT=Dakota/Tesesquite Quartzite
OQ=Ogalalla Quartzite
OC=Ogalalla Gravel Cherts/Agates</td><td colspan="2">OP=Opalite
PW=Petrified Wood
FC=Flattop Chalcedony
TC=Tesesquite Chert
TJ=Tecovas Jasper
WR=Wreford Chert
BK=Baker Chert</td><td colspan="2">BS=Basalt
DC=Day Creek
OB=Obsidian
TQ=Tecovas Quartzite
RY=Rhyolite
LC=Lusterous Chalcedony
UN(--) =Unidentified</td></tr>
<tr><th>Portion Present*</th><th>Fracture Type</th><th>Maintenance</th><th>Flake type</th><th>Biface/Core type</th><th>Platform/Cortex</th></tr>
<tr><td>B/P=base/ proximal
M=midsection/ medial
T/D=tip/distal
C=complete
L=lateral edge</td><td>I=impact
B/S=bending/snap
T=thermal
M=modified</td><td>S=slight
M=moderate
E=extensive</td><td>P=primary
S=secondary
T=tertiary</td><td>O=ovate
L=lanceolate
T=triangular
B=blocky
P=polyhedral
B.F.=bifacial</td><td>P=present
A=absent</td></tr>
</table>

(*) Projectile points with B, M, and T portions ("B,M,T") are missing ears, basal corners, or a lateral edge.

Table 4-1. Attributes and Variables for Fluted Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
728	30	19	5.1	4.3	Y	B	M	E	ED	30
1344	58	31	8.1	17	N	C	--	M	ED	31
1473	27	26	4.9	4.3	Y	B	B/S	–	ED	31
1890	42	21	4.5	5.3	Y	B,M	B/S	S	ED	44
2025	15	26	5.1	2.4	Y	M	B/S	–	AA	44

Figure 4-1. Fluted Points from Goff Creek



researchers have referred to this item as a Folsom, but classification is complicated by the intermediate length of its flutes. The smallest specimen (728) was made from a flake and exhibits a strong flute on the dorsal face. A slight undulation was removed from the ventral face and the piece has been retooled as a rather crude scraper.

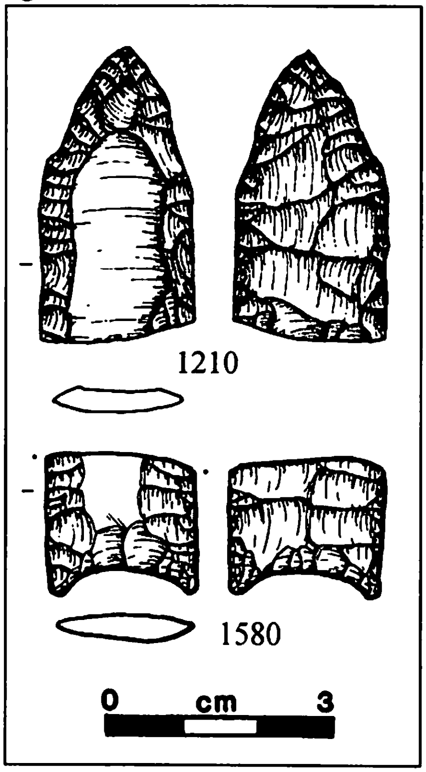
A distinctively Clovis point is recognized at the Muncy site (White 1987:51c), located less than 5 km south of Goff Creek. Other nearby evidence is found at Miami, Nall, and possibly the Sailor-Helton cache (Sellards 1952; Baker et al. 1957; Mallouf 1994). Several surface finds are also documented in southwest Kansas and the Oklahoma and Texas panhandles (Hofman 1996; Hofman and Wyckoff 1991; Meltzer 1987).

Folsom/Midland (Table and Figure 4-2)

A single Folsom (1210) and a single Midland (1580) were collected from Goff Creek. The Folsom example is fluted on one face and shows significant unifacial retouch near its tip. The Midland base is rather short but shows distinctive flaking on one face and the ventral surface of the original flake on the reverse face.

Bill's donation also included a McCormick replica, which he segregated from his collection. According to Vincent Dale (1939a), at least 11 Folsom replicas were passed in Texas County by McCormick during the summer of 1938. Four important Folsom kill sites occur within the North Canadian and Cimarron river valleys above and below Goff Creek (Bement 1997; Hill and Hofman 1997; Schultz 1943; Wormington 1957), but

Figure 4-2. Folsom/MidlandPoints



significant Folsom/Midland collections are not documented in Texas County. More often, Folsom/Midland points near Goff Creek occur as isolated finds. A miniature Midland is reported from the Muncy site (White 1987:51f), and one Folsom and a Midland are reported from Palo Duro Creek (Peterson 1988:16). Two unreported Folsom points from Beaver County are known to exist in private collections, one of which is observed in the Ross Goodner collection (Scott Brosowske, personal communication 1998).

Agate Basin (Table and Figure 4-3)
The two points represented here are characterized by long, contracting stems and basal forms that vary from irregular (1842) to slightly concave (1900). The former design is made from Niobrara jasper. The use of Niobrara jasper by Hell Gap populations is documented at the Tim Adrian quarry site and Walsh cache in northwest Kansas (O'Brien 1984; Stanford 1997), but the material is less common in the Oklahoma panhandle (Hofman 1990).

Specimen 1900 is relatively robust with a thick, strongly biconvex cross-section. The point was apparently fractured during manufacture and no portion of its lateral edges are ground. Knudson et al. (1998) have recently reported somewhat similar forms from the Lubbock Lake site. That assemblage is associated with a Bison antiquus kill/butchering activity area dated to about 10,000 years ago.

Figure 4-3. Agate Basin Points

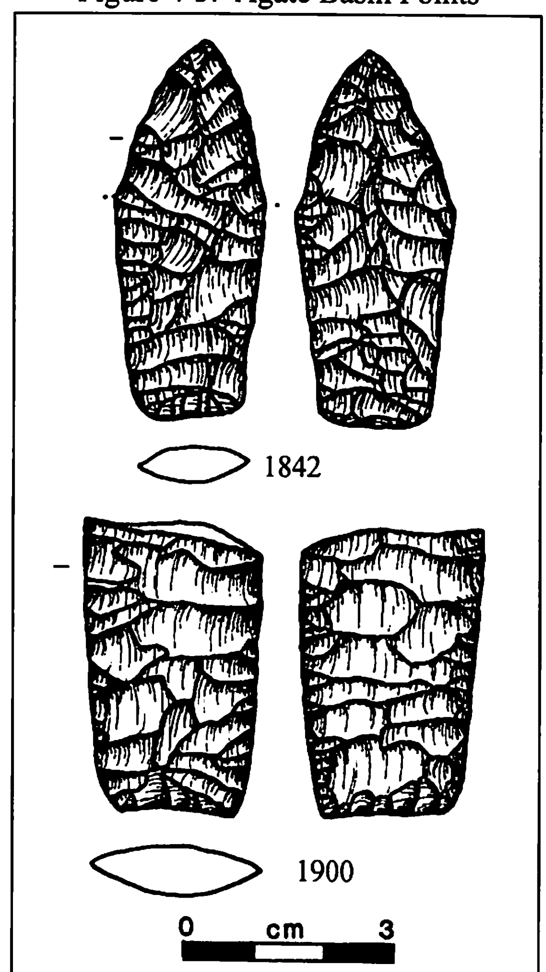


Table 4-2. Attributes and Variables for Folsom/Midland Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1580	18	21	4.3	2.1	Y	B	B/S	--	AA	31
1210	38	20	4.3	4.5	Y	M,T	B/S	M	AA	44

Table 4-3. Attributes and Variables of Agate Basin Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1900	40	26	9.1	11.3	Y	B	B/S	--	AA	27
1842	53	21	7.4	8.9	N	C	--	E	NJ	45

Cody/Firstview (Table and Figure 4-4)

Only 4 Cody/Firstview complex projectile points exist in the Goff Creek collection, and only one of these is complete. Included are 2 Scottsbluff forms (387, 436), and 2 square bases that are basally thinned and exhibit well-ground lateral edges (743, 170). Other Cody complex forms in the Goff Creek collection include a Cody knife and an Eden-like preform.

Evidence of Cody occupations in Oklahoma is provided by Blackmar and Hofman (1997), who document 57 Cody/Firstview implements from the western half of the state. Greiser (1985:78) also mentions two surface collections located north of Goff Creek near a tributary of the Smoky Hill River in western Kansas. A unique, strongly beveled Scottsbluff in the Dale collection was also found among the sand dunes of north Texas County during the Dust Bowl days and, although made from Alibates, resembles some of the Red River knives illustrated and discussed by Johnson (1989).

Plainview (Table and Figure 4-5)

The projectile points classified as Plainview are defined as unfluted lanceolate forms that do not possess parallel-oblique flaking. Often these forms exhibit portions of the original flake surface and collateral flaking. Variation within the Plainview type site materials (Knudson 1983), loose application of the Plainview type to virtually any unfluted lanceolate (Wheat 1972), and its uncertain relationship with Goshen points (Frison 1991a) has lessened its utility as a descriptive taxon.

Large forms characteristic of the Plainview type (2176) are contrasted with similar but smaller examples (450). Variation in stem configuration is expressed in Specimens 1466, with slightly flaring ears, and 1260, with basal corners that contract. Some researchers might classify the former example as a Golondrina (e.g. Kelly 1982). Two points (1436, 1902) exhibit slight alternate bevels and are described as Meserve by Bill White. Another two points have been retooled (i.e., "modified") as end scrapers

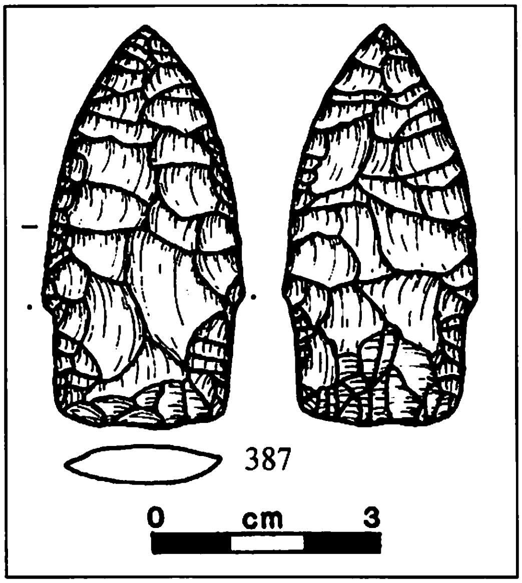
Table 4-4. Attributes and Variables for Cody/Firstview Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
436	16	27	5.7	2.8	Y	B	B/S	--	AA	--
743	18	21	4.8	2.4	Y	B	B/S	--	AA	22
170	25	25	6.9	5.0	Y	B	B/S	--	AA	31
387	51	25	6.9	9.2	N	C	--	S	PW	34

(1849, 1660), but the latter shows differential patination and was probably reworked by a later individual.

Many Plainview points are documented in collections from the Oklahoma panhandle (e.g. Baker et al. 1957; White 1987). Approximately 100 km southeast of Goff Creek, at the Horace Rivers site, Mallouf and Mandel (1997) uncovered a brief Plainview occupation that revealed broad-spectrum foraging and stone tool maintenance within the Canadian River breaks.

Figure 4-4. Scottsbluff point



Frederick/Allen (Table and Figure 4-6)

These 32 projectile point/knives are characterized as lanceolate bifaces that exhibit pronounced morphological variation, but share distinctive parallel-oblique and sometimes transverse flaking. Bill's notes refer to this flake scar pattern as "ribboned" and "diagonal" and he associates most of these points with the Jimmy Allen type (Mulloy 1959).

The largest example (1579) closely resembles Wormington's (1957:139) "Angostura" from Colorado (see also Greiser 1985:80, 84), whereas two smaller specimens (623, 1467) possess contracting stems more similar to traditional Texas Angostura forms illustrated in Turner and Hester (1993:73). Otherwise, nearly all of the points in this class can be described as Frederick/Allen (Hofman 1989b). Several points resemble those recovered from the Jimmy Allen and Hell Gap sites in Wyoming (Frison 1991a), Clary Ranch in Nebraska (Davis 1953, Myers et al. 1981), and the Norton bonebed in Kansas (Hofman 1996:73).

Frederick/Allen forms are occasionally documented in the Oklahoma panhandle (White 1987:51e,g,h), but have more often been described as Plainview or Yuma in the literature (e.g. Baker 1939; Baker et al. 1957). In fact, a large Frederick/Allen point from Goff Creek, referred to as the "Garcia Plainview," was documented by Dale (1967a).

Variation among the parallel-oblique points is remarkable. Exceptionally large bifaces (1648) as well as delicate flakes are observed (1760, 1451). The production of "mini" points is noted in other Paleoindian traditions as well (Amick 1994, Bonnichsen and Keyser 1982, Hofman et al. 1990, Storck 1991), and explanations for these items have focused on ceremony, raw material availability, and child's play (Dawe 1997). Several stages of reduction are represented in the Goff Creek sample. One late stage preform (370), many new to moderately retouched points, and a few exhausted tools are observed in the collection. While several examples possess parallel-oblique flaking on both faces, it is apparent that the use of flakes sometimes limited transverse flaking to the flat, ventral face of the flake, with collateral to random flaking on the dorsal face. Those points which exhibit parallel-oblique flaking on both faces are commonly beveled.

Table 4-5. Attributes and Variables for Plainview Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1436	45	18	4.8	3.9	Y	B,M,T	B/S	M*	AA	5
2088	34	20	5.3	4.0	Y	B,M	I	M	AA	19
2176	74	26	6.7	13.6	Y	B,M,T	B/S	S	DT	21
468	57	25	5.5	8.8	Y	M,T	B/S	S	AA	23
2072	47	19	5.0	5.0	N	C	--	M	AA	26
767	33	22	6.7	6.5	Y	B,M	B/S	S	TC	28
450	33	18	4.1	3.0	Y	B,M	B/S	S	AA	28
766	43	21	6.5	5.6	N	C	--	M	FC	28
1902	32	20	5.2	3.0	Y	B,M,T	B/S	E*	AA	31
1660	21	24	5.8	3.7	Y	B,M	M	--	AA	31
18	24	24	4.3	2.8	Y	B	I	--	AA	31
830	22	20	5.1	2.9	Y	M	I	S	AA	34
102	17	24	5.3	2.6	Y	B	I	--	AA	40
1816	16	25	4.8	2.4	Y	B	I	--	AA	42
1260	28	21	4.5	3.8	Y	B	I	--	AA	44
1849	20	21	5.5	2.6	Y	B	M	--	ED	44
1466	40	25	5.9	7.6	Y	B,M	B/S	--	AA	44
1089	51	23	6.0	8.2	Y	B,M	I	M*	AA	44
182	19	19	5.5	3.1	Y	B	B/S	--	AA	49
1515	46	23	6.8	6.8	Y	B,M,T	T	S	OP	55

Beveled lanceolates, some with oblique flaking, are documented in Colorado, the Laird site of western Kansas, and Clary Ranch in Nebraska. Hofman and Blackmar (1997) have noted the resemblance between these forms and the Dalton type (also LaBelle 1997). Similar observations have been made with Meserve points (Myers and Lambert 1983), which may also be better compared to Frederick/Allen (Johnson and Holliday 1980). The beveled points from Goff Creek shed light on the techniques used to manufacture and maintain Frederick/Allen points.

Some Frederick/Allen and Dalton points are morphologically similar in terms of haft configuration, alternate beveling, and even serration. A distinction exists, however, in how alternate beveling was used during edge maintenance. Bradley (1997) has observed that Dalton groups used alternate beveling not only for edge refurbishing, but also to create platforms for biface thinning during point manufacture. All of the early stage Frederick/Allen points from Goff Creek possess strong to minute bevels that served as platforms for the removal of obliquely oriented flakes. This technique is also observed on several moderately retouched and exhausted examples. Specimen 235 clearly illustrates a process of creating a left-sided alternate bevel during edge maintenance, using it to remove oblique flakes from the opposite face, and continuing to remove maintenance flakes from the opposite face until the bevel was reversed. The process of continually beveling the lateral edges provided serrated edges as well as platforms capable of supporting oblique-transverse flakes during edge maintenance. This helped maintain the oblique flaking that persists throughout the use-life of some specimens (see Myers 1997).

The use of bevels as platforms for rejuvenation does not transcend the use-life of Dalton points as it does the Frederick/Allen points from Goff Creek. Rather, beveled Dalton points will commonly reach a nearly drill-like form and still retain some early stage flake scars on both faces of the tool.

Figure 4-5. Plainview Class Points from Goff Creek

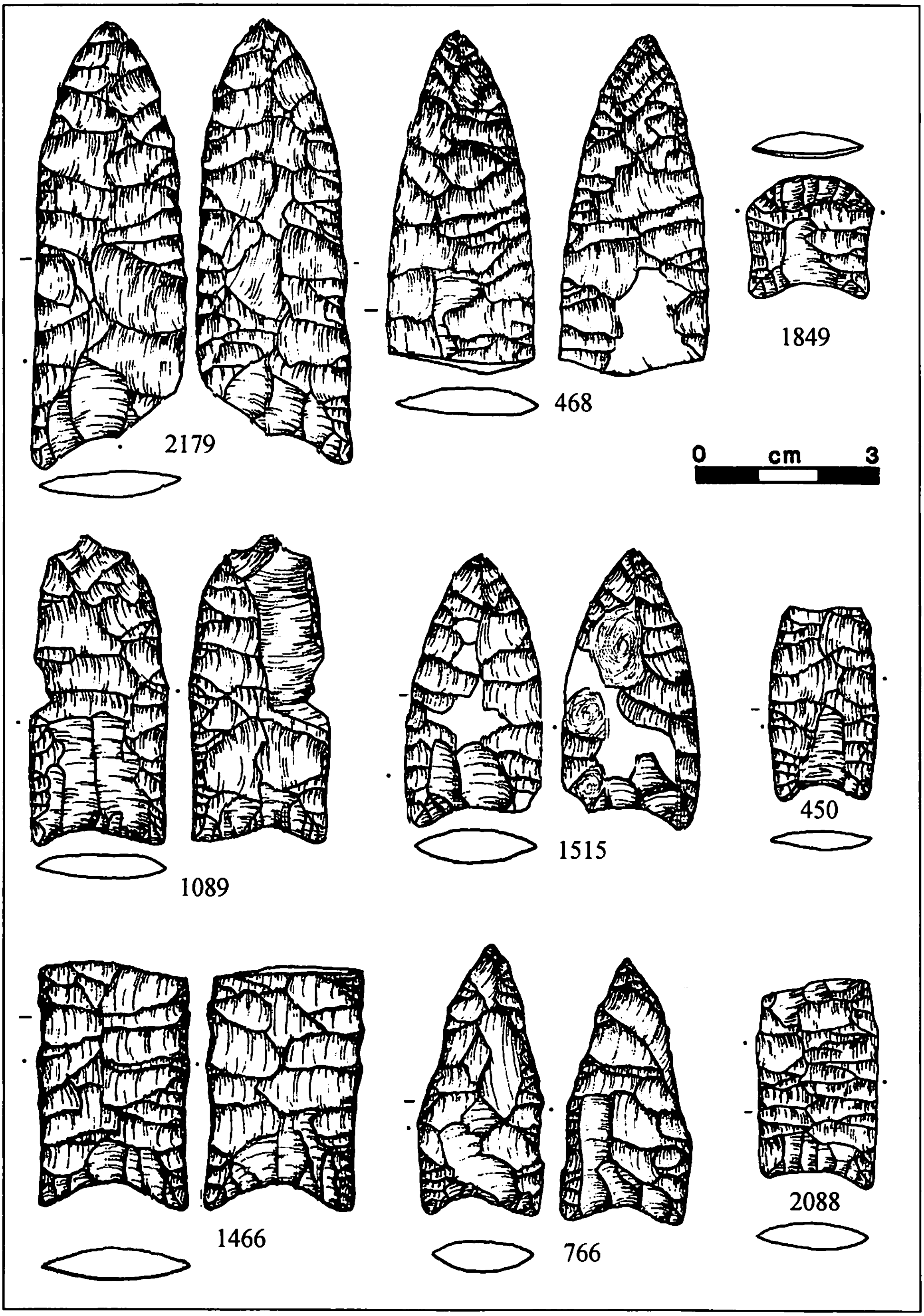


Figure 4-6a. Frederick/Allen Class Points

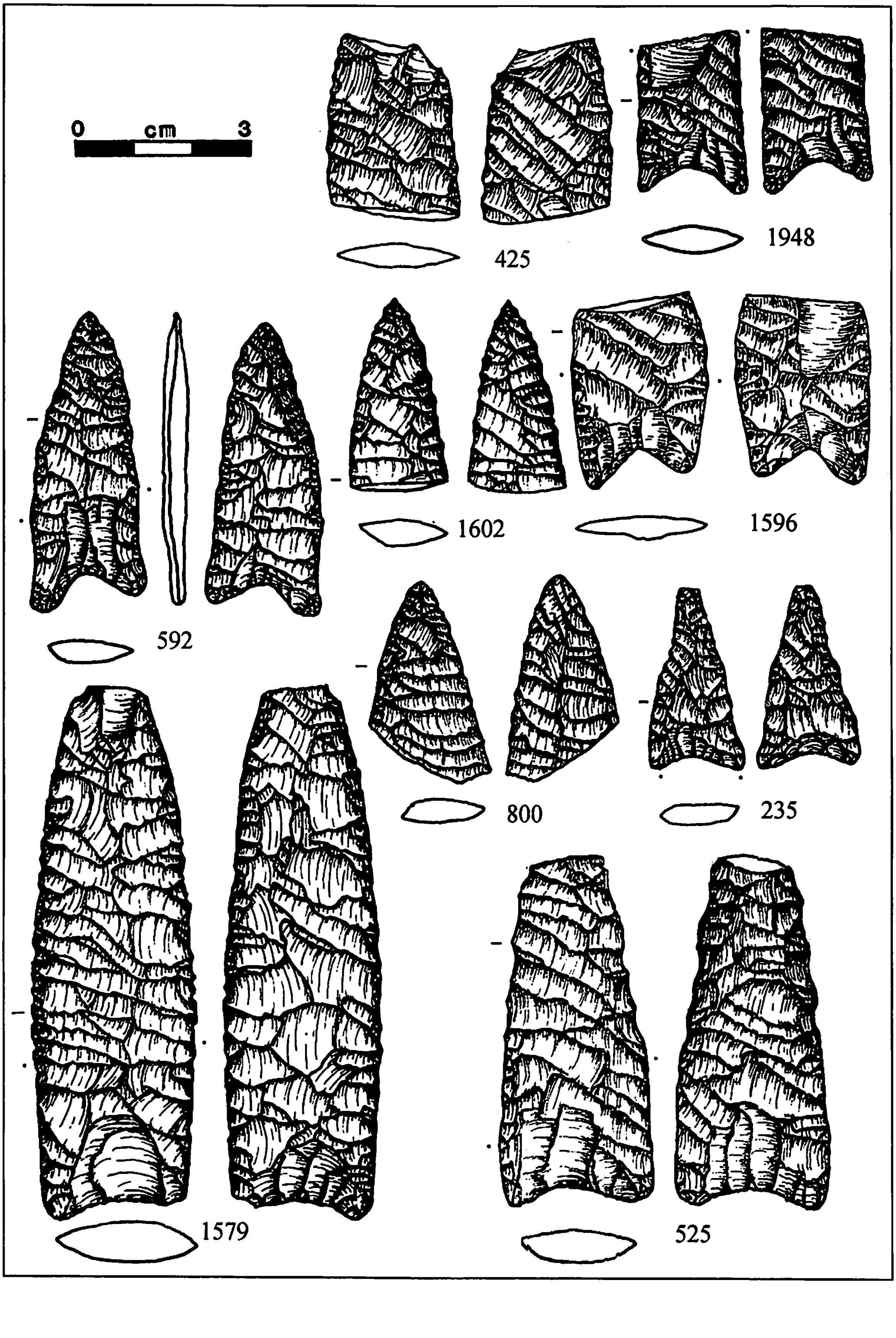
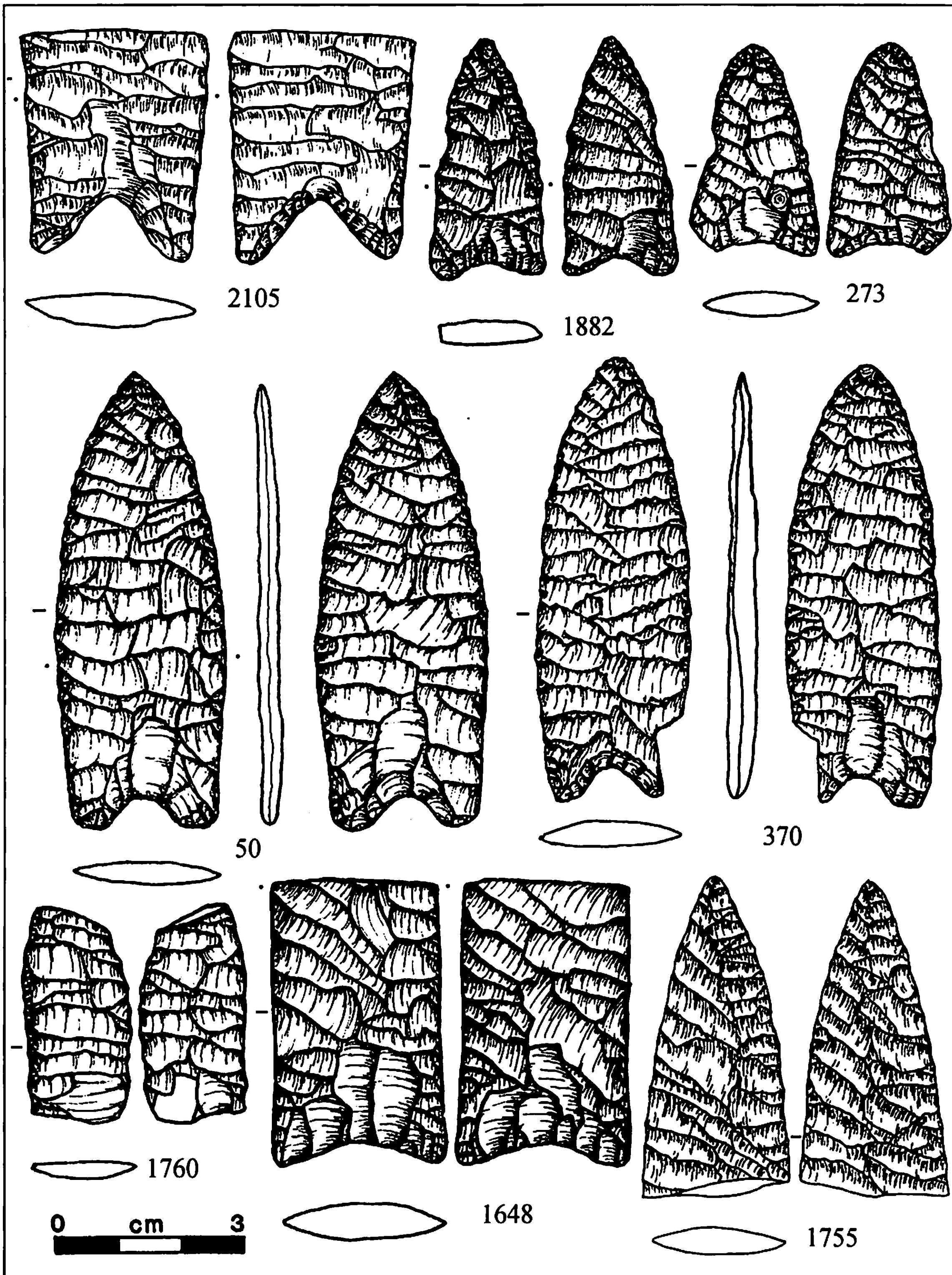
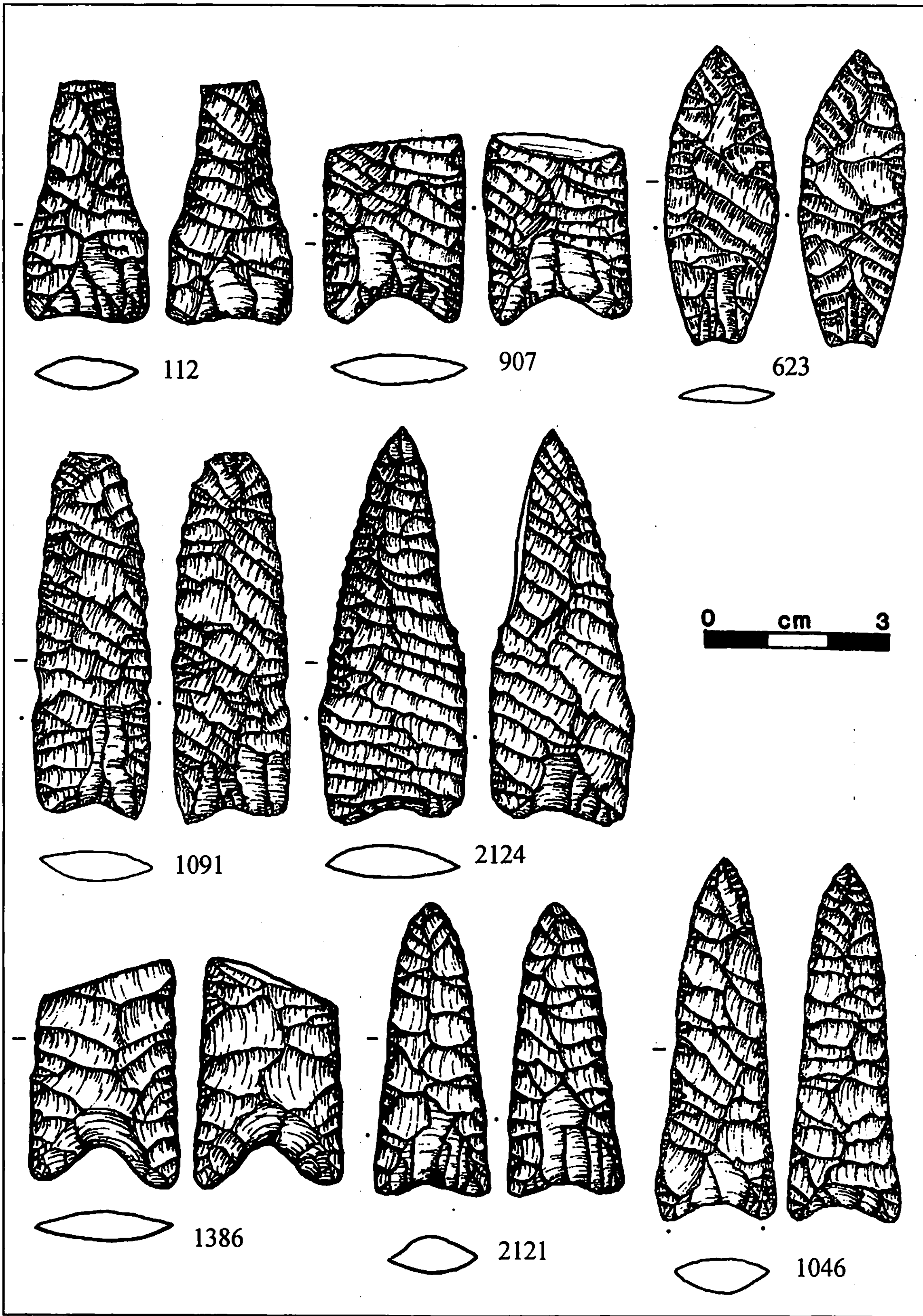


Figure 4-6b. Frederick/Allen Class Points



* Specimen 370 late stage preform
* Compare unifacial creation of basal concavities on Specimens 370 and 2105
* Bevels visible on Specimens 1882 and 1760 used to removed flakes from opposite faces

Figure 4-6c. Frederick/Allen Class Points



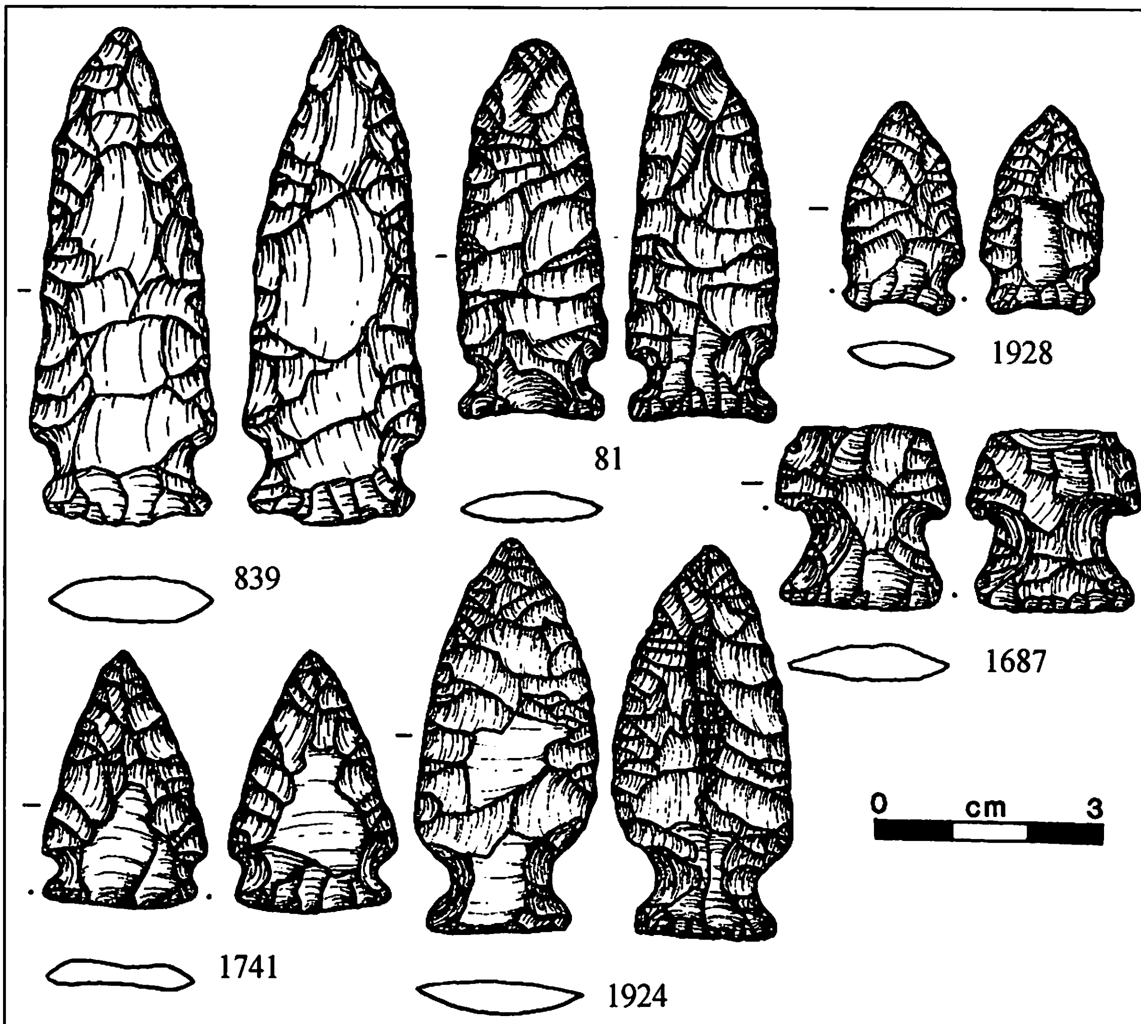
* Specimen 623 "Texas Angostura"

Table 4-7. Attributes and Variables for Unique/Fragmented Lanceolate Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1651	12	24	6.5	2.6	Y	M	B/S	--	AA	5
158	32	18	4.3	2.7	N	C	--	--	AA*	25
534	45	19	5.0	5.1	Y	M,T	I	M	AA	28
372	28	18	5.6	2.6	Y	T	I	S	OC	30
1885	43	22	6.0	5.8	N	C	--	S	AA*	30
868	22	28	7.2	5.5	Y	M	B/S	--	NJ	31
1190	54	20	5.9	7.4	Y	M,T	B/S	M	AA	31
1345	40	31	6.8	10.2	Y	M	I	S	AA	31
1610	36	16	3.3	2.3	N	C	--	S	FC	34
1923	27	18	4.5	2.6	Y	B,M	I	M	AA	44
346	42	23	4.6	5.2	Y	B,M	B/S	M	AA	44
125	13	16	4.4	1.0	Y	B	B/S	--	AA	44
2096	44	30	7.7	11.3	Y	B,M	B/S	M	AA	48
1615	40	16	4.0	2.7	N	C	--	M	OQ	48
94	37	24	5.5	3.9	Y	T	B/S	S	AA	--
1077	35	23	6.4	6.6	Y	M	I	S	DT	--

(*) High gloss

Figure 4-8. Early Side/Corner-Notched Points



* Specimens 1928 and 1741 fluted on right faces, basally thinned on left.

Table 4-8. Attributes and Variables.for Early Side/Corner-Notched Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1687	25	23	6.3	4.4	Y	B,M	I	--	DQ	5
1677	13	19	5.4	1.6	Y	B	B/S	--	AA	6
1928	28	16	4.6	2.2	N	C	--	M	WR	20
1741	34	22	4.8	3.9	N	C	--	M	AA	33
839	66	25	7.5	14.3	N	C	--	M	DT	33
1924	52	23	4.9	6.8	N	C	--	S	AA	44
1372	42	17	6.0	4.8	N	C	--	M	--	44
81	50	20	4.8	5.8	Y	B,M	I	S	NJ	48

Table 4-9. Attributes and Variables for Split Stem Points

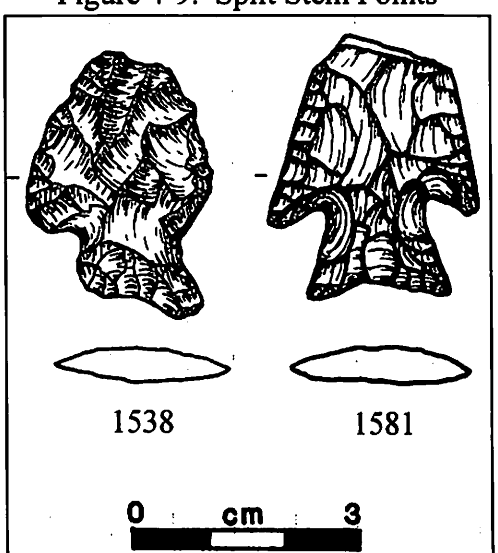
Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1581	34	29	6.0	5.8	Y	B,M	I	M	AA	31
1538	36	26	6.0	4.7	Y	B,M	I	M	ED*	45

(*) High gloss

Split Stem (Table and Figure 4-9)

Two points from Goff Creek are recognized by basal elements characteristic of the Martindale (1581) and Uvalde (1538) types. A single Uvalde point is also documented in the Minter collection from near-by Palo Duro Creek (Peterson 1988:152). The Uvalde point from Goff Creek, found during a survey of the Tucker's Blowout vicinity in 1983, is manufactured from a bluish variety of Georgetown chert which appears to have been heated.

Figure 4-9. Split Stem Points



Calf Creek (Table and Figure 4-10a)

Three projectile points are defined by deep basal notches and square bases characteristic of Calf Creek or Bell/Andice forms. All of these examples are fragmented and/or reworked. First reported by White (1995), Specimen 317 exhibits a significant longitudinal impact fracture which has been repaired. Likewise, Specimen 1411 demonstrates a fractured surface along the edge of its base and was apparently repaired (restemmed). A small number of Calf Creek preforms are also recognized in the Goff Creek collection. The limited number of Calf Creek points reported from western Oklahoma, and the implications for seasonal mobility during the Altithermal, are discussed by Thurmond and Wyckoff (1999).

Munkers Creek/Hoxie (Table 4-10b, Figure 4-10)

The forms included in this class are recognized by their slender design and stem. The complete specimen (597) possesses a slightly expanding stem and convex base. The haft element is not ground and bifacial retouch of the lateral edges has created a slightly asymmetrical blade. This artifact resembles Munkers Creek forms described in Hofman (1996:92), but it is notably smaller.

The fragmented point (35) is equally narrow but exhibits a well-ground haft element with parallel lateral edges and a slightly concave base similar to Hoxie forms from central Texas (Prewitt 1981). The blade appears to have been beveled before the projectile point experienced a massive impact fracture. Although Specimen 35 is made from Tecovas jasper, Hoxie points are not documented in the panhandle area and comparison is complicated by the poor condition of the Goff Creek example.

Table 4-10a. Attributes and Variables for Calf Creek Points

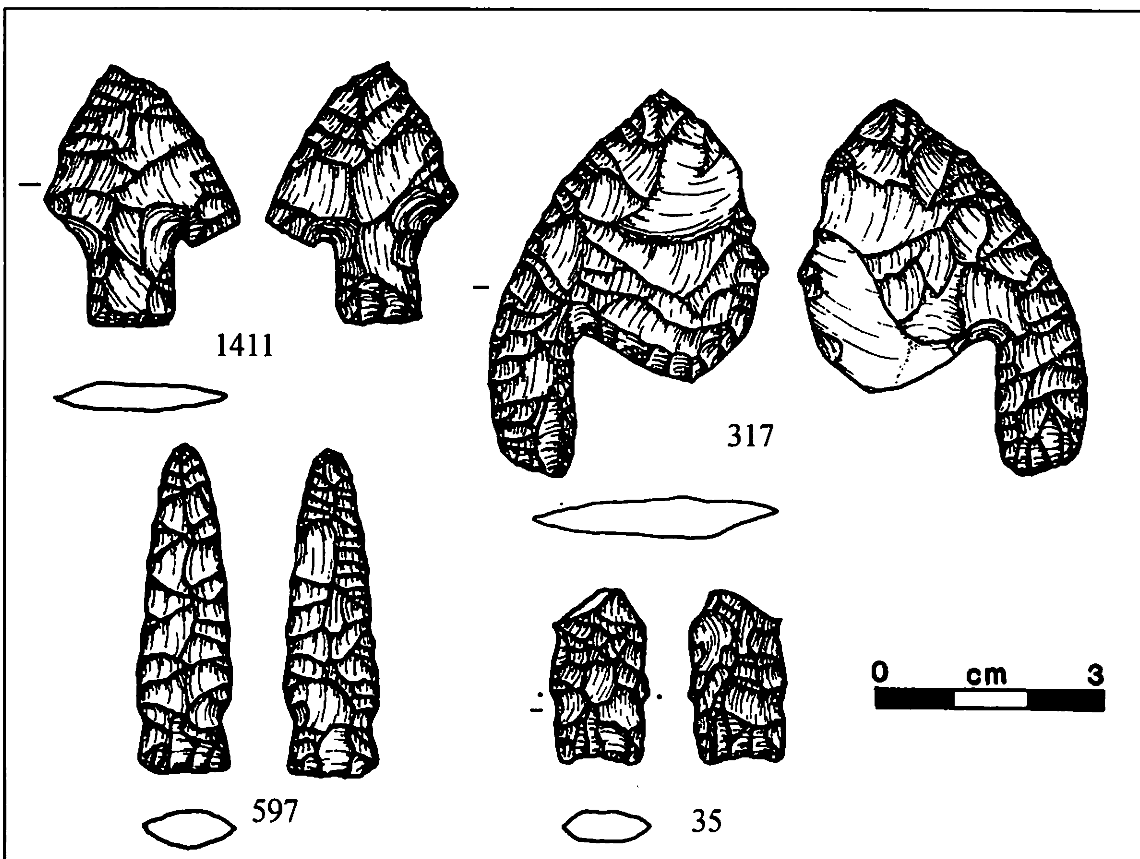
Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1411	24	25	4.8	3.4	Y	B,M,T	B/S	E	AA	6
317	50	35	6.2	8.2	Y	M,T	I, B/S	E	AA*	44
1106	30	25	4.0	2.8	Y	B,M	B/S	M	AA	44

(*) High gloss

Table 4-10b. Attributes and Variables for Munkers Creek/Hoxie Points.

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
35	23	13	5.3	2.0	Y	B	I	--	TJ	8
597	43	13	5.2	3.3	N	C	--	M	AA	21

Figure 4-10. Calf Creek and Munkers/Hoxie Class Points



* Calf Creek (1411, 317), Munkers (597), and Hoxie-like (35)

McKean (Table and Figure 4-11)

Seventeen projectile points from Goff Creek are compared to forms associated with the McKean complex. The Duncan/Hanna points range in size from delicate bifaces with notch-sized basal concavities to sturdy designs with wide basal concavities and occasional, albeit slight, edge grinding (see also White 1987; Baker et al. 1957). The larger forms from Goff Creek also resemble side-notched points from the San Jon site in northeast New Mexico, which Hill et al. (1995:385) compare to Logan Creek and Keithville points.

The next largest subclass of forms are distinguished by thin cross-sections, side-notching, and basal notching or concavities. These distinctive points, synonymous with the Mallory type from the Northern Plains (see Frison 1991a:94), were coined "Bridle Tops" by Bill Baker who observed that they resembled old horse bridles when inverted (Dale 1939b). Baker (1939:7) also discusses the stratigraphic position of Bridle Top points between "Folsomoid" and Late Prehistoric points in the eroding playa lake beds and dune fields of Dallam County, Texas.

The late Vincent Dale (1939b) documented 26 Bridle Tops from Texas County, not including eight examples recovered from the Muncy site (White 1987:61). Still, he notes that they were rare in the surface collections he examined. The last subclass includes three lanceolates with contracting stems.

Miscellaneous Stemmed and Notched (Table and Figue 4-12)

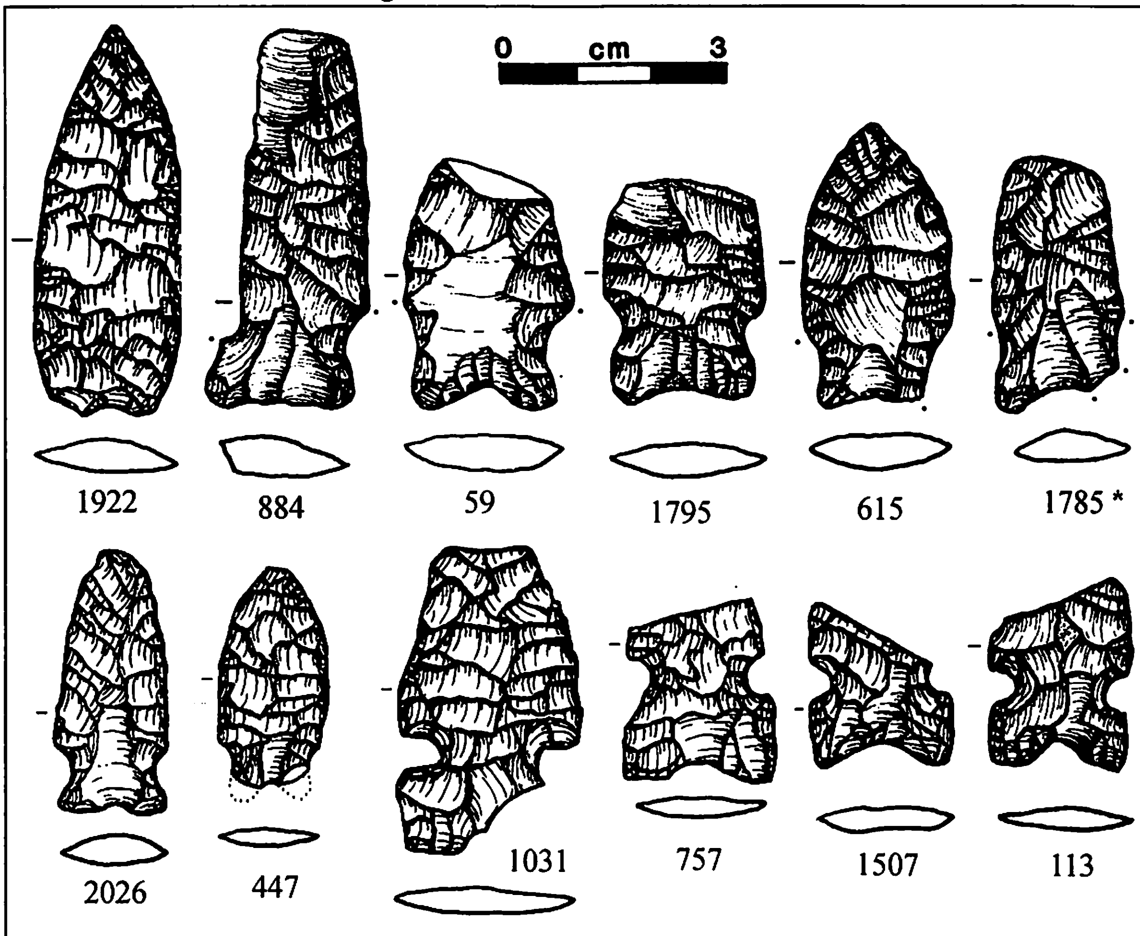
A small number of stemmed and notched dart points from Goff Creek fall within the morphological range of a variety of types or are badly fragmented/reworked. Within this class Bill White recognized a sturdy form (1589, 1576) with percussion flaking overlapped by short pressure flake scars that create bifacial bevels. Bill describes these items as having "rounded" tips caused by retouching the tips with small, impact-like flake removals rather than lateral retouch. Specimen 292 displays grinding along its base and may be compared to some Carrollton type examples from north-central Texas (Suhm and Jelks 1962). Other specimens have parallel-sided stems with straight to slightly concave bases.

Table 4-11. Attributes and Variables for McKean Complex Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Retouch (severity)	Raw material	Prov./ Class
59	33	23	6.1	5.5	Y	B,M	B/S	M	DT*	4/DH
1795	30	22	5.6	4.5	Y	B,M	I	S	AA	4/DH
1284	45	17	5.1	4.3	N	C	--	S	BS	5/DH
1785	34	17	5.3	3.4	Y	B,M	I	S	LC	6/DH
447	30	15	3.2	1.6	Y	B,M,T	B/S	S	AA	28/DH
615	37	20	6.5	5.3	N	C	--	M	OQ	31/DH
884	51	22	7.0	7.6	Y	B,M	I	S	AA*	34/DH
2026	35	15	5.0	2.9	N	C	--	S	OQ	44/DH
877	20	21	3.4	2.2	Y	B	B/S	--	AA*	30/BT
706	17	24	3.7	1.5	Y	B	B/S	--	DT	36/BT
1507	22	19	4.8	2.0	Y	B,M	B/S	--	AA*	44/BT
113	25	19	3.8	1.8	Y	B,M	B/S	--	AA*	44/BT
757	25	21	3.4	2.2	Y	B,M	B/S	--	AA*	44/BT
1031	41	25	4.0	4.5	Y	B,M	B/S	M	OQ*	59/BT
1427	26	20	3.6	2.4	Y	B,M	B/S	S	AA	28/L
388	37	18	3.3	2.1	Y	B,M	B/S	S	AA	34/L
1922	52	20	5.6	6.6	N	C	--	M	AA	44/L

(*) High gloss

Figure 4-11. McKean Class Points



* Right basal corner of Specimen 1785 removed by impact event

Table 4-12. Attributes and Variables for Miscellaneous Stemmed and Notched Points

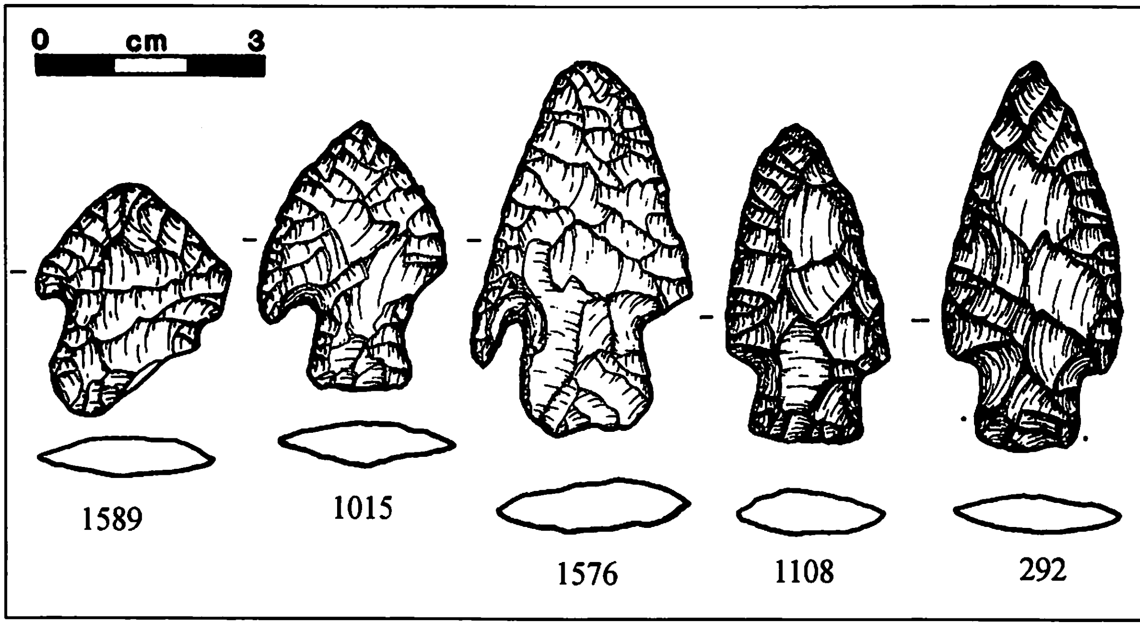
Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
682	44	17	7.0	5.6	N	C	--	E	BS	7
292	52	24	6.0	7.8	N	C	--	M	OQ	19
867	33	19	5.0	3.3	N	C	--	S	ED	31
117	40	17	6.7	5.6	Y	B,M	I	M	AA	44
338	40	20	6.5	6.2	N	C	--	M	AA	44
1576	49	30	6.7	9.3	Y	B,M,T	B/S	M	AA*	44
1108	42	21	6.7	5.7	Y	B,M	I	M	OQ	44
1589	32	26	6.5	4.9	Y	B,M,T	B/S	M	AA	47
1015	31	25	5.9	4.5	Y	B,M,T	B/S	E	BK	53
414	49	23	8.1	10.4	Y	B,M	B/S	M	DT	55
390	21	22	7.7	3.7	Y	B,M	B/S	--	AA	--

(*) High gloss

Corner-Notched Points

The largest class of points in the Goff Creek collection are Late Archaic corner-notched forms, also referred to as "broad-bladed" points (Hughes 1976:30). Some researchers have attempted to better define and classify this family of bifaces (e.g. Hughes 1977; Lintz et. al 1991), but limited evidence that these styles reflect temporal or adaptive shifts continues to encourage default descriptions such as Late Archaic (or broad-bladed)

Figure 4-12. Miscellaneous Stemmed and Notched Points



corner-notched points (e.g. Boyd 1997).

The Goff Creek collection complements the confusion surrounding Late Archaic point typologies on the Southern Plains. Collections of this size present a continuum of forms which blur the lines between projectile point types that are already quite similar. Still, obvious variation exists and for descriptive purposes the Goff Creek sample is loosely organized into type-based subclasses that reflect subtle if not subjective changes in morphology and size. The subclass Marcos, for example, denotes a broad range of corner-notched points that are generally larger than a number of small dart points described as Ellis. Other forms, such as the Castroville type, are more distinctive.

Marcos (Table and Figure 4-13)

The larger corner-notched points from Goff Creek vary in terms of production, and to a lesser extent, rejuvenation techniques. The thermal alteration of Ogallala quartzite is a noted feature among points from the Certain site (Kraft, personal communication 1997). Hughes (1989:189) also notes the presence of heat-treated Florence chert at Twilla. Nearly all of the highly siliceous materials from Goff Creek exhibit a slight luster, a polish likely caused by exposure to sands, but 26% of the Marcos points (27/103) have a remarkable sheen characteristic of heat-treatment.

Another trait observed among the corner-notched points from Goff Creek is the use of thin flakes. Approximately 20% of the Marcos points (21/103) retain the ventral surface of the original flake, and it is apparent that most of the corner-notched points were made from flakes. The size of these flakes and the amount of effort dedicated to shaping them differs. Robust bifaces with percussion flaking are contrasted by thin, expedient forms that required minimal pressure flaking. Late Archaic lithic technology has not been thoroughly explored, but the latter technique is uncommon to corner-notched points from the Rolling Plains (Pete Thurmond, personal communication 1998) and likely reflects the properties of cobble (Ogallala) and bedded (Alibates) raw materials.

The most common type of maintenance observed among the corner-notched points is bifacial retouch along the lateral edges, occasionally weakening or removing the barbs. Efforts to maintain only the distal tip are rare. Alternate beveling, accompanied by serration in one case, occurs (see Specimen 1686; Figure 4-13a) but is exceptionally rare.

Ellis (Table and Figure 4-14)

The corner-notched projectile points described as Ellis are morphologically and technologically similar to those described as Marcos, but are generally shorter and more narrow. All of the complete points are within or.above the dart/arrow metric thresholds identified by Corliss (1972), Shott (1997) and others (see Fig. 4-17a).

Table 4-13. Attributes and Variables for Large Corner-Notched Points (Marcos).

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1531	34	28/13.9	4.8	3.8	N	C	--	M	AA+	1
82	40	27/16.2	4.4	4.2	N	C	--	S	AA	2
3	56	30/16.8	4.6	7.8	N	C	--	S	AA-	3
1855	28	28/13.1	5.5	4.0	Y	B,M	I	S	TJ-	3
1686	57	23/14.1	6.8	7.6	N	C	--	E	AA	5
1211	51	23/15.0	5.5	5.2	N	C	--	S	DT	5
243	52	26/13.2	5.9	9.4	N	C	--	S	AA*	5
1488	26	22/15.0	4.8	3.0	Y	B,M	B/S	--	DT+	5
1663	34	26/14.9	6.1	5.1	N	C	--	M	AA	6
1786	47	23/12.7	6.0	7.1	Y	B,M,T	B/S	M	AA*	7
186	56	26/17.6	7.2	9.6	Y	B,M,T	B/S	M	OP	7
1776	50	26/11.2	6.0	5.2	Y	B,M,T	B/S	S	AA	8
61	42	29/14.7	5.0	4.6	Y	M,T	B/S	S	AA	8
531	39	26/11.0	5.8	4.2	Y	B,M,T	B/S	E	AA*	9
65	38	25/14.5	4.4	3.5	N	C	--	S	AA-	10
517	31	26/13.1	5.2	4.5	Y	B,M	I	S	AA+	13
121	58	30/11.3	5.6	7.2	N	C	--	S	AA+	21
69	46	23/14.8	5.9	6.3	Y	M	I	S	AA	21
896	37	29/15.1	5.3	6.3	Y	B,M	B/S	S	AA	23
478	34	24/11.7	4.3	4.1	Y	B,M	B/S	S	LC+	24
455	25	23/11.0	5.0	3.1	Y	M	B/S	M	NJ	25
456	30	19/--	3.9	2.0	Y	T	B/S	--	AA-	25
2005	30	25/--	4.2	3.8	Y	M	I	S	ED*	27
772	40	24/19.2	7.9	9.2	Y	B,M	B/S	E	DT	27
588	26	17/12.6	4.8	2.1	Y	B,M	I	--	ED+	28
449	40	21/11.7	4.6	3.4	Y	M,T	B/S	E	AA-	28
680	22	23/13.6	3.8	2.4	Y	B,M	B/S	--	AA-	28
1098	48	23/11.2	5.2	5.5	N	C	--	S	OC+-	29
290	37	28/17.0	5.6	5.6	Y	B,M,T	B/S	E	DT	29
898	46	21/10.0	5.2	4.0	Y	B,M,T	B/S	S	TJ	29
942	45	25/10.6	4.4	4.5	Y	B,M	B/S	S	AA*	30
1350	33	27/18.0	5.8	4.8	Y	B,M	B/S	E	OP	30
876	45	25/13.0	5.0	5.9	Y	B,M	B/S	M	AA*+	31
694	34	23/13.1	4.9	3.6	Y	B,M,T	B/S	M	AA*	31
1189	57	33/17.4	9.3	16.5	Y	M,T	I	M	DT	31
1541	42	21/10.9	5.4	4.1	Y	B,M,T	I	E	AA*	31
320	40	25/11.5	5.3	5.1	Y	B,M	I	S	NJ	31
291	35	27/13.8	5.5	4.7	Y	B,M,T	B/S	S	BK	31
1951	43	28/14.2	5.2	6.7	Y	B,M	I	M	AA*	31
1619	46	26/13.1	5.0	5.3	Y	M,T	B/S	S	AA	31
1828	34	24/14.3	5.2	4.6	Y	B,M	I	E	AA	31
K2	42	24/12.0	6.2	4.7	N	C	--	S	AA	32

K1	87	27/13.2	6.4	12.7	N	C	--	S	AA	32
553	30	28/12.8	5.0	4.8	Y	M	I	S	AA-	33
593	45	32/17.1	6.0	9.0	Y	B,M	B/S	M	AA	33
807	48	23/14.3	5.5	5.9	Y	M,T	B/S	M	AA*	34
1747	26	24/10.7	4.8	3.4	Y	B,M	B/S	S	AA	34
806	44	35/18.0	6.0	8.9	Y	B,M	I	S	AA*	34
618	38	25/12.1	4.0	3.3	N	C	--	S	AA*-	34
99	35	32/18.5	4.5	6.1	Y	B,M	I	S	AA*	37
651	21	23/13.1	4.5	2.2	Y	B,M	I	--	OQ+	37
100	42	26/13.3	5.4	5.2	N	C	--	S	AA	37
1339	28	29/14.6	5.6	4.9	Y	M	B/S	S	NJ	41
1813	51	33/17.3	5.9	8.1	Y	B,M,T	B/S	S	ED	42
4	56	24/13.0	5.5	7.0	Y	B,M	B/S	S	AA	44
400	42	24/12.1	4.7	4.4	N	C	--	S	AA*	44
2122	46	23/15.3	6.3	6.6	N	C	--	E	OQ+	44
136	43	25/13.4	5.7	4.8	Y	B,M,T	B/S	S	OP	44
1261	11	24/17.9	4.1	1.3	Y	B	B/S	--	AA	44
641	56	34/19.2	6.7	12.5	Y	B,M,T	B/S	M	OP	44
758	52	18/--	4.7	4.0	Y	M	B/S	--	AA	44
602	46	24/12.7	5.7	5.5	N	C	--	M	ED+	44
6	42	28/12.5	3.8	4.4	N	C	--	S	AA-	44
1168	29	33/--	5.5	7.0	Y	M	B/S	S	AA-	44
401	58	29/13.3	5.4	9.6	Y	B,M	I	S	AA*	44
337	37	27/13.0	5.7	6.5	Y	B,M	I	S	AA*+-	44
923	36	30/15.2	4.9	4.4	Y	B,M,T	B/S	E	AA	44
1280	43	23/12.0	5.1	4.2	N	C	--	M	OC	44
1883	31	23/15.0	4.9	3.5	Y	B,M	T	M	AA	44
1267	38	23/--	4.7	4.3	Y	M	B/S	S	DT-	44
357	37	28/13.8	4.2	3.6	N	C	--	S	AA-	44
331	41	27/14.8	6.2	6.3	Y	M,T	B/S	S	TJ	44
230	68	28/15.5	6.4	10.4	N	C	--	S	AA*+	44
145	44	28/14.4	6.5	6.3	Y	B,M,T	B/S	S	AA*-	44
1858	50	25/13.9	5.1	5.5	Y	B,M,T	B/S	M	ED	44
1315	43	23/15.0	6.6	6.0	N	C	--	E	LC+	44
1762	35	32/16.0	6.2	7.2	Y	B,M	B/S	S	OQ+	44
2154	50	29/13.6	7.6	13.8	Y	B,M	B/S	S	AA	44
1848	45	29/15.3	4.6	5.8	Y	B,M	B/S	S	NJ*+	45
1490	58	32/15.8	6.0	9.7	N	C	--	S	AA*	45
1918	33	26/12.8	5.5	5.7	Y	B,M	I	S	AA-	46
1588	40	23/13.3	8.1	6.7	Y	B,M,T	B/S	E	TJ-	47
1888	40	24/14.4	4.5	4.1	N	C	--	S	OC-	49
140	59	23/14.1	6.5	9.2	N	C	--	S	DT+	49
1993	96	38/24.3	7.8	30.0	Y	B,M	I	S	WR*	50
151	36	23/18.5	4.2	3.3	N	C	--	S	DT	54
152	32	28/13.5	6.5	4.7	Y	B,M	I	E	AA-	54
415	29	26/--	5.0	4.3	Y	B,M	T	M	AA	55
722	36	26/16.2	6.0	6.3	Y	B,M	B/S	S	AA-	56
675	53	32/13.1	5.4	9.6	Y	B,M,T	B/S	M	AA*+	59
92	20	31/16.0	5.9	4.4	Y	B,M	B/S	--	AA*+	--
1739	39	28/14.1	6.0	6.8	Y	B,M	B/S	S	AA+	--
1097	52	21/15.5	4.2	10.4	Y	B,M,T	B/S	S	AA-	--
242	42	24/--	4.5	4.7	Y	M,T	B/S	S	AA*	--
11	25	25/--	4.7	3.5	Y	M	B/S	S	AA	--
178	34	22/--	3.7	2.9	Y	M,T	B/S	S	AA	--
195	23	27/10.5	4.9	3.2	Y	M	I	S	ED	--
1622	55	28/--	5.5	5.4	Y	M,T	B/S	S	AA	--
72	38	28/13.0	5.6	5.5	Y	B,M	I	M	AA*	--
354	22	21/--	4.7	2.1	Y	B,M	B/S	--	AA	--
389	41	25/14.5	5.7	6.9	Y	B,M	B/S	M	AA*	--
1303	11	22/15.1	3.9	.9	Y	B	B/S	--	AA	--
1275	46	26/10.6	4.3	5.1	N	C	--	S	AA*	--

Table 4-13 (continued)

(*) High gloss, (+) Base ground, (-) Flake surface exposed

Table 4-14. Attributes and Variables for Small Corner-Notched Points (Ellis).

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
85	26	21/9.6	4.0	1.4	Y	B,M,T	T	S	AA	1
36	33	22/12.3	5.6	3.5	N	C	--	M	AA+	2
64	38	21/9.8	5.3	3.6	N	C	--	M	AA*	3
1170	29	20/10.9	4.6	2.7	N	C	--	M	AA-	5
1767	36	22/9.5	4.8	3.0	N	C	--	S	DT	5
2004	26	24/13.1	4.0	2.3	Y	M,T	I	S	AA*	11
516	38	20/10.6	3.2	2.8	Y	B,M	B/S	S	AA-	13
405	29	21/14.1	5.2	3.0	N	C	--	S	AA+	14
1973	27	22/13.2	4.8	3.3	Y	B,M	B/S	M	DC+	18
277	43	20/10.1	5.3	3.9	N	C	--	S	ED-	19
2155	25	26/12.0	3.7	2.1	Y	B,M	B/S	S	AA*	19
2030	31	21/10.8	5.0	2.8	N	C	--	M	OQ	19
276	35	22/12.0	4.5	2.9	N	C	--	E	AA*	19
745	28	20/11.0	4.7	3.3	Y	M,T	B/S	M	DT	21
746	21	22/12.5	4.2	2.2	Y	M	T	S	AA-	21
469	26	19/10.3	4.3	2.0	Y	M,T	B/S	M	OC	23
432	34	22/12.1	4.9	2.9	N	C	--	S	OB	23
2106	28	23/--	3.5	1.9	N	C	--	S	AA	24
53	32	23/10.7	4.2	2.8	N	C	--	S	AA*+	24
1804	42	22/10.3	4.0	3.5	N	C	--	S	AA+-	25
236	20	22/--	4.9	1.8	Y	M	I	--	ED	26
1609	27	18/--	4.4	2.0	Y	M	B/S	--	AA	26
1109	32	25/13.6	4.8	2.9	N	C	--	S	AA	28
1522	39	22/11.1	4.6	3.9	N	C	--	M	AA*	29
1628	40	20/12.0	3.5	2.9	Y	B,M,T	B/S	S	AA-	29
1289	32	24/12.0	6.0	3.8	N	C	--	M	AA*	31
1474	27	27/15.7	5.2	3.4	Y	B,M	I	M	AA*+	31
1620	26	24/14.0	4.5	2.5	Y	C	--	M	AA-	31
321	32	24/15.0	4.3	3.2	N	C	--	M	AA-	31
859	24	19/11.0	4.1	1.9	Y	C	--	S	OC-	31
784	26	23/--	4.5	2.3	Y	M	I	S	AA	38
1814	37	22/10.1	4.9	3.4	N	C	--	M	AA+-	42
1058	28	21/12.4	3.5	2.0	Y	M	I	S	AA	43
1763	28	25/10.2	4.6	2.6	Y	B,M,T	B/S	E	AA*	44
1383	32	21/10.4	5.5	2.5	Y	B,M,T	B/S	S	DT+-	44
330	30	28/12.6	4.5	3.0	N	C	--	S	AA*	44
1110	30	24/10.0	3.8	2.4	N	C	--	S	AA-	44
2028	25	14/--	3.8	1.3	Y	B,M,T	B/S	S	OP-	44
1380	31	19/11.5	4.0	2.3	Y	B,M,T	B/S	S	NJ-	46
2102	31	21/11.0	3.5	2.4	Y	B,M	I	S	OC-	46
1711	21	20/--	4.1	2.0	Y	B,M	B/S	M	AA	49
1732	24	24/11.0	5.3	3.2	Y	B,M	B/S	M	AA-	54
786	33	24/14.1	5.7	3.8	Y	B,M,T	B/S	S	AA	56
787	29	21/9.7	4.8	2.5	Y	B,M,T	B/S	M	OQ-	56
162	27	23/12.9	5.8	4.0	Y	B,M	B/S	E	OQ	57
216	31	22/11.3	4.2	2.5	Y	B,M,T	B/S	S	AA-	59
214	26	22/10.5	3.6	2.1	Y	B,M	M	S	AA-	59
244	28	22/10.6	3.9	2.2	N	C	I,repaired	M	AA-	--
--	33	20/10.2	5.2	3.4	Y	B,M,T	B/S	S	AA	--
185	28	19/11.4	4.3	2.2	Y	B,M	B/S	M	AA-	--
93	28	23/11.7	4.8	3.1	Y	B,M	B/S	M	AA	--
167	26	21/--	4.6	2.7	Y	M	I	S	AA	--

(*) High gloss, (+) Base ground, (-) Flake surface exposed

Figure 4-13a. Large Corner-Notched Class Points (Marcos)

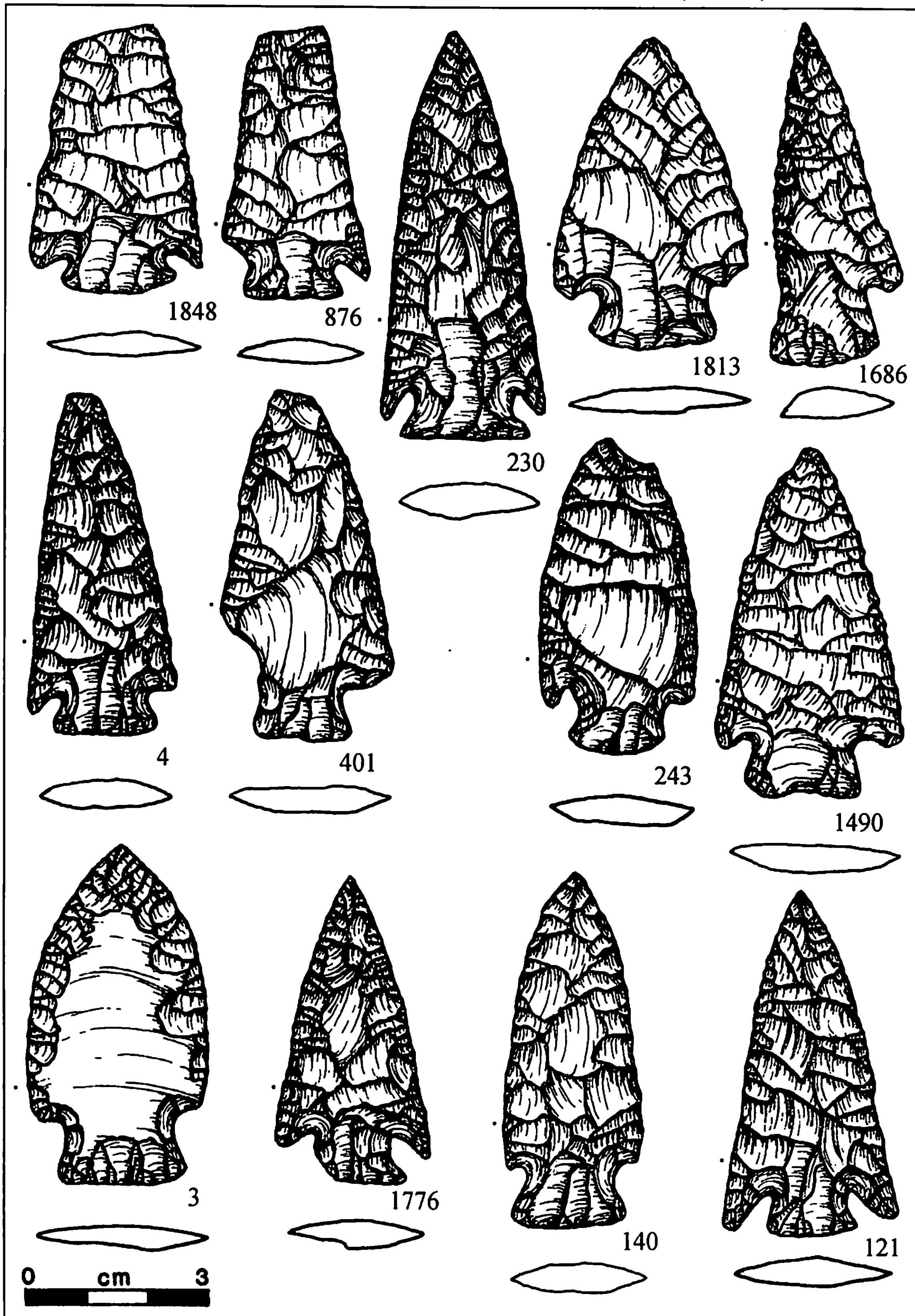


Figure 4-13b. Large Corner-Notched Class Points (Marcos)

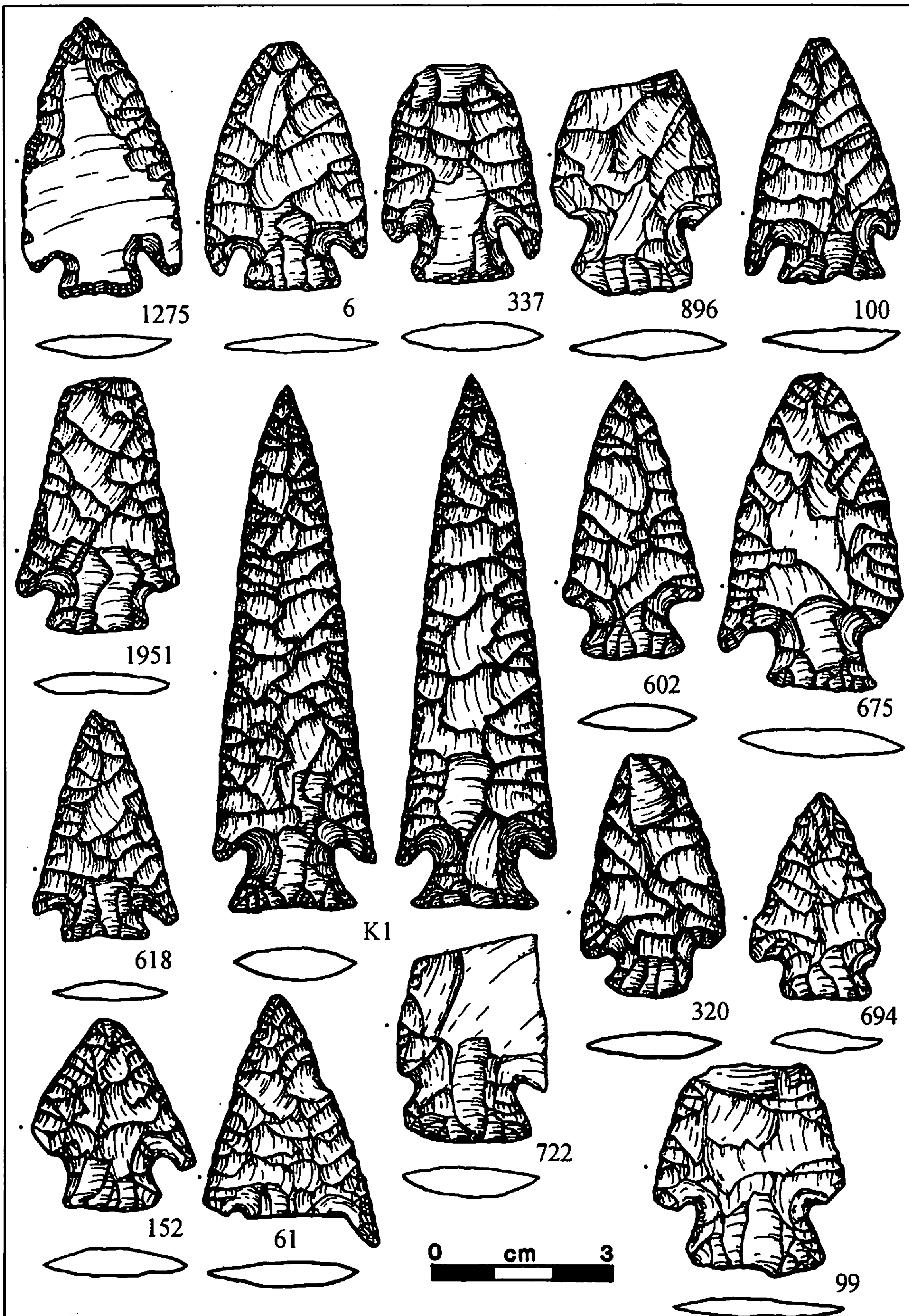
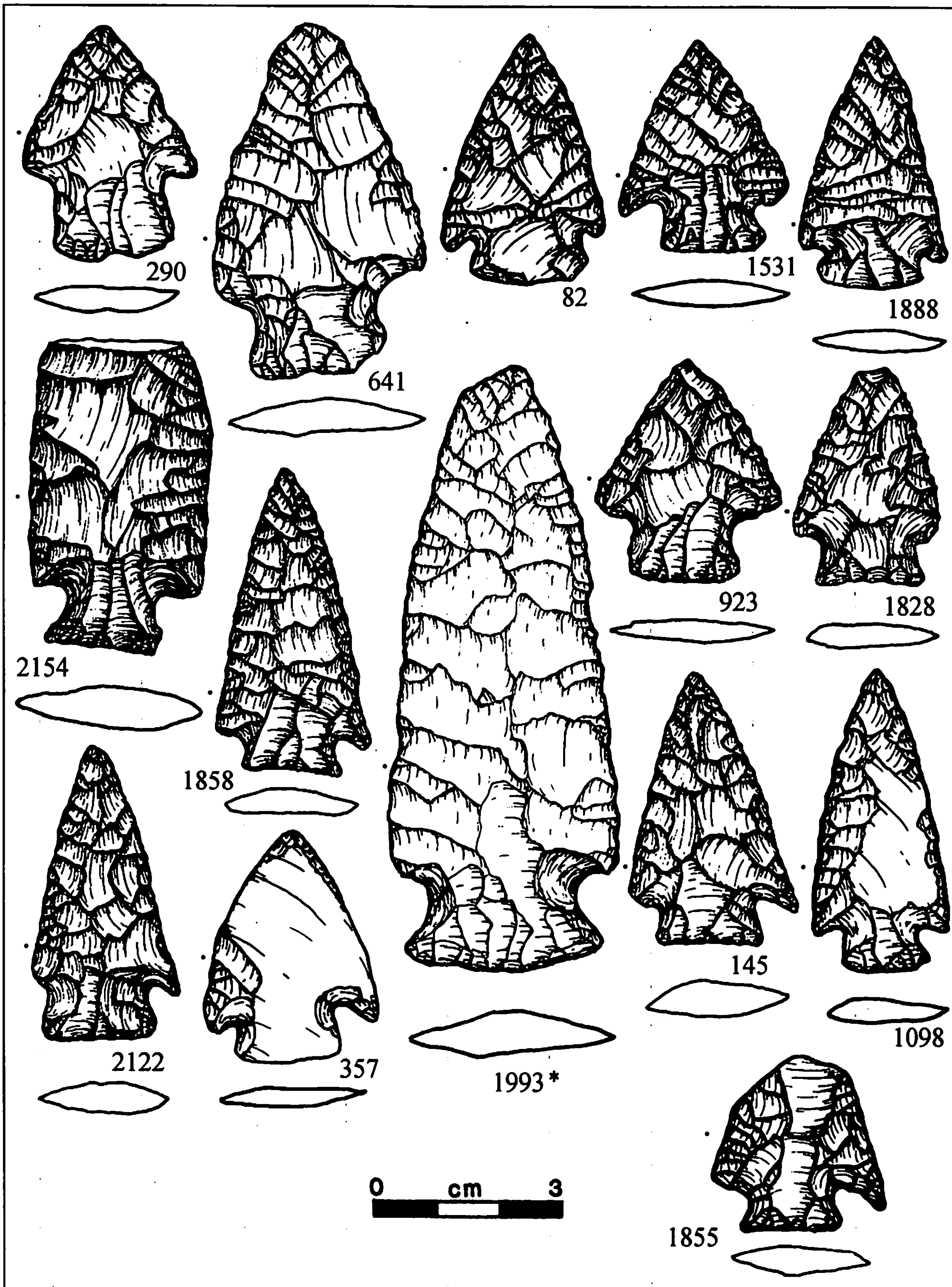
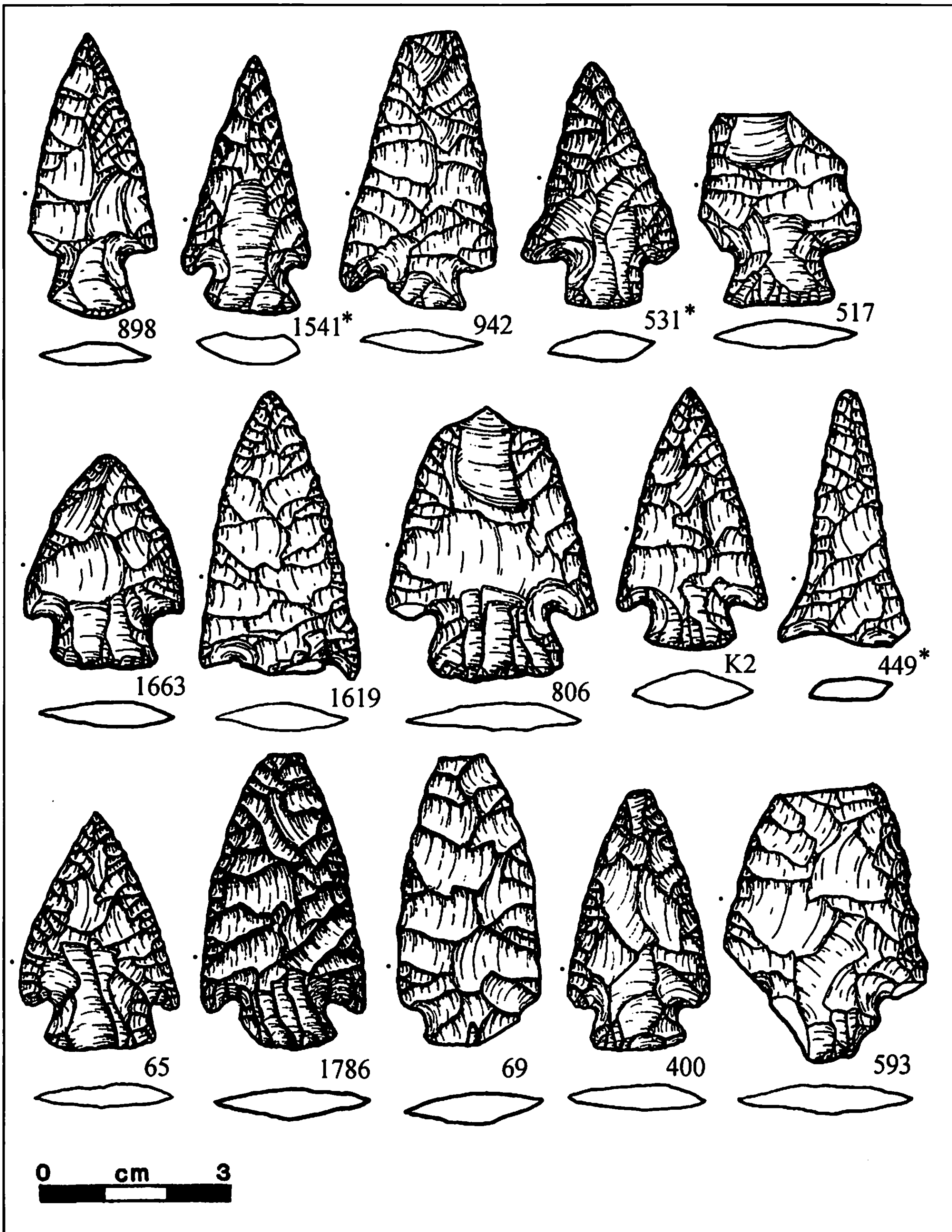


Figure 4-13c. Large Corner-Notched Class Points (Marcos)



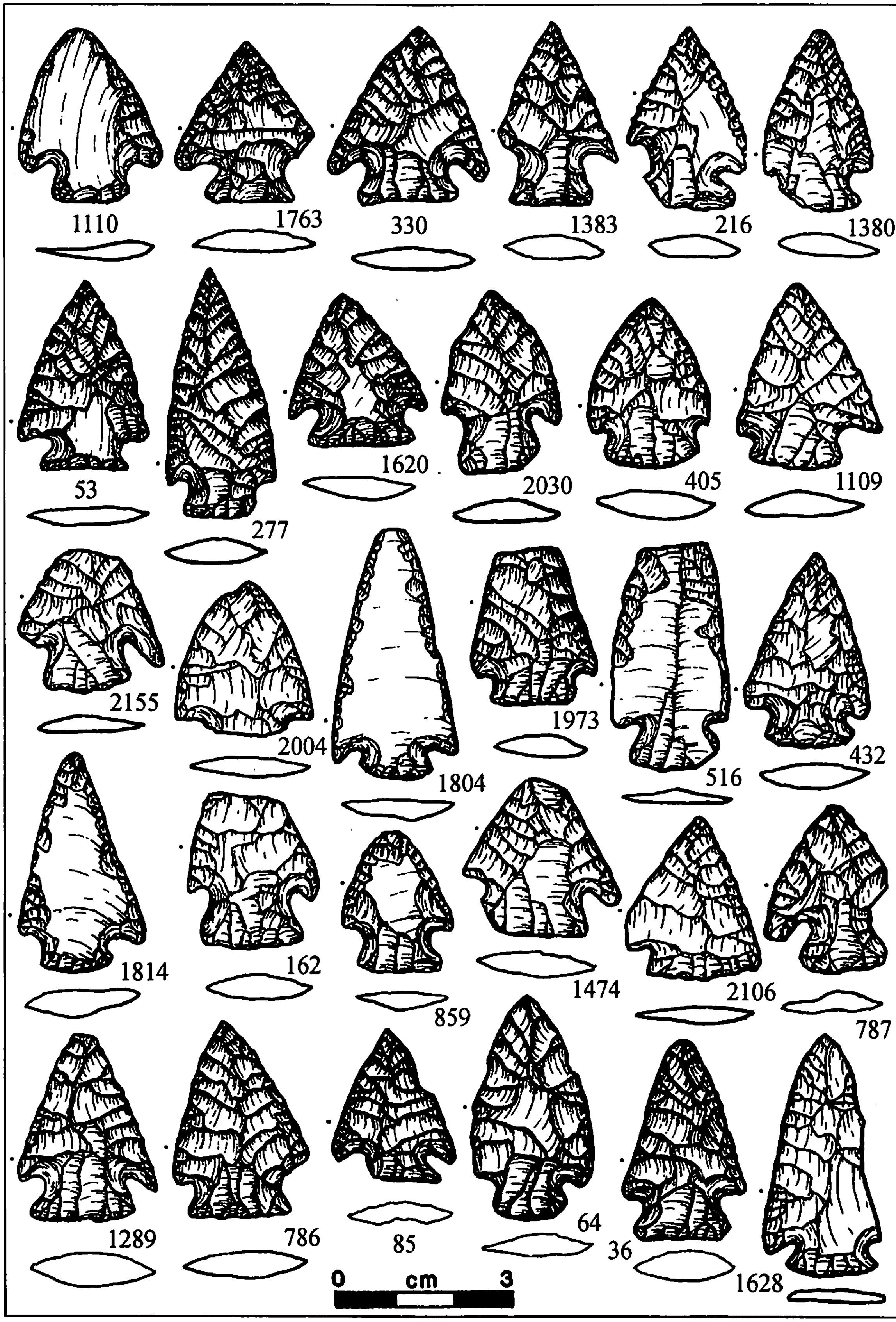
* Specimen 1993, Wreford chert, also classified as Gibson point by White (1982)

Figure 4-13d. Large Corner-Notched Class Points (Marcos)



* Specimen 1541 semi-fluted
* Specimens 531 and 449 slightly beveled

Figure 4-14. Small Corner-Notched Class Points (Ellis)



Castroville (Table 4-15a, Figure 4-15)

The artifacts classified as Castroville points are characterized by wide bases and shallow to deep basal to corner notching. Lee Bement has commented that these forms are also relatively small compared to the Castroville points common to south and central Texas (see Turner and Hester 1993:86-88). A small number of bifaces from Goff Creek are equally short and triangular and may represent Castroville preforms (see Fig. 4-21).

Palmillas (Table 4-15b, Figure 4-15)

The projectile points classified as Palmillas are defined by relatively narrow necks and expanding stems. Bases are occasionally ground smooth and serration sometimes occurs on the blade.

Ensor (Table 4-15c, Figure 4-15)

This small class of artifacts represents Late Archaic dart points that exhibit side-notching and straight to convex bases. A distinctive example (120) is characterized by wide percussion flaking and slight alternate bevels. An extensively reworked specimen (K17) has achieved a drill-like form.

Edgewood/Fairland (Table 4-15d, Figure 4-15)

The five points classified as Edgewood/Fairland possess concave bases that have been shaped with small pressure flakes on one or both faces and are distinctively beveled. Specimen 1839 is alternately beveled along its lateral edges as well. Specimen 759 exhibits a pronounced impact fracture.

Table 4-15a. Attributes and Variables for Castroville Points

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
245	24	31/19.0	4.5	3.7	Y	B,M	B/S	M	AA	6
5	33	35/16.6	5.0	4.3	Y	B,M	I	S	AA-	7
897	27	32/18.5	4.4	4.0	Y	B,M	I	S	AA-	7
632	32	32/22.5	4.8	5.0	Y	B,M	I	M	AA*	19
160	28	32/18.1	4.6	3.8	Y	B,M	T	E	AA	20
288	40	25/--	4.8	4.3	Y	B,M	I	S	OC	31
715	23	15/--	3.8	1.4	Y	M	B/S	--	AA	31
765	31	34/19.0	4.4	4.9	Y	M	B/S	S	DT-	31
322	43	37/20.3	6.4	10.7	Y	M	B/S	M	AA	33
1835	25	29/19.1	3.7	3.3	Y	B,M	B/S	S	AA-	44
1096	35	33/19.2	4.6	4.5	Y	B,M,T	B/S	M	AA	55
19	26	28/21.1	4.7	4.0	Y	B,M	M	--	AA	--

(*) High gloss, (-) Flake surface exposed

Table 4-15b. Attributes and Variables for Palmillas Points

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
58	34	22/11.2	4.2	3.5	Y	B,M	I	S	PW	6
477	69	17/9.7	6.1	7.9	N	C	--	E	DT	24
616	42	26/11.9	5.4	5.3	N	C	--	S	DT+	31
1308	36	21/9.5	6.3	5.5	Y	B,M	B/S	M	AA+	44
2123	35	22/9.5	4.8	3.8	Y	B,M,T	B/S	M	NJ	44
1634	38	21/11.0	4.8	2.9	N	C	--	E*	AA+	44
2062	54	26/10.5	5.6	8.3	N	C	--	S*	DT	48
1009	39	22/9.5	5.1	4.0	N	C	--	M	AA	54
1463	41	20/12.9	6.1	4.9	Y	B,M	B/S	M	AA	--

(+) Base ground, (*) Serrated

Table 4-15c. Attributes and Variables for Ensor Points

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
120	36	25/15.5	5.1	5.3	Y	B,M	I	M	AA	21
1024	43	27/--	5.6	6.6	Y	M,T	B/S	S	AA	34
K17	43	18/12.2	5.0	3.1	N	C	--	E	DT	41
1820	34	18/14.1	4.8	3.0	Y	M,T	I	S	NJ	44
213	27	21/18.2	6.0	3.7	N	C	--	E	AA-	59
1069	40	19/12.6	4.5	3.1	Y	B,M,T	I	S	AA+	--

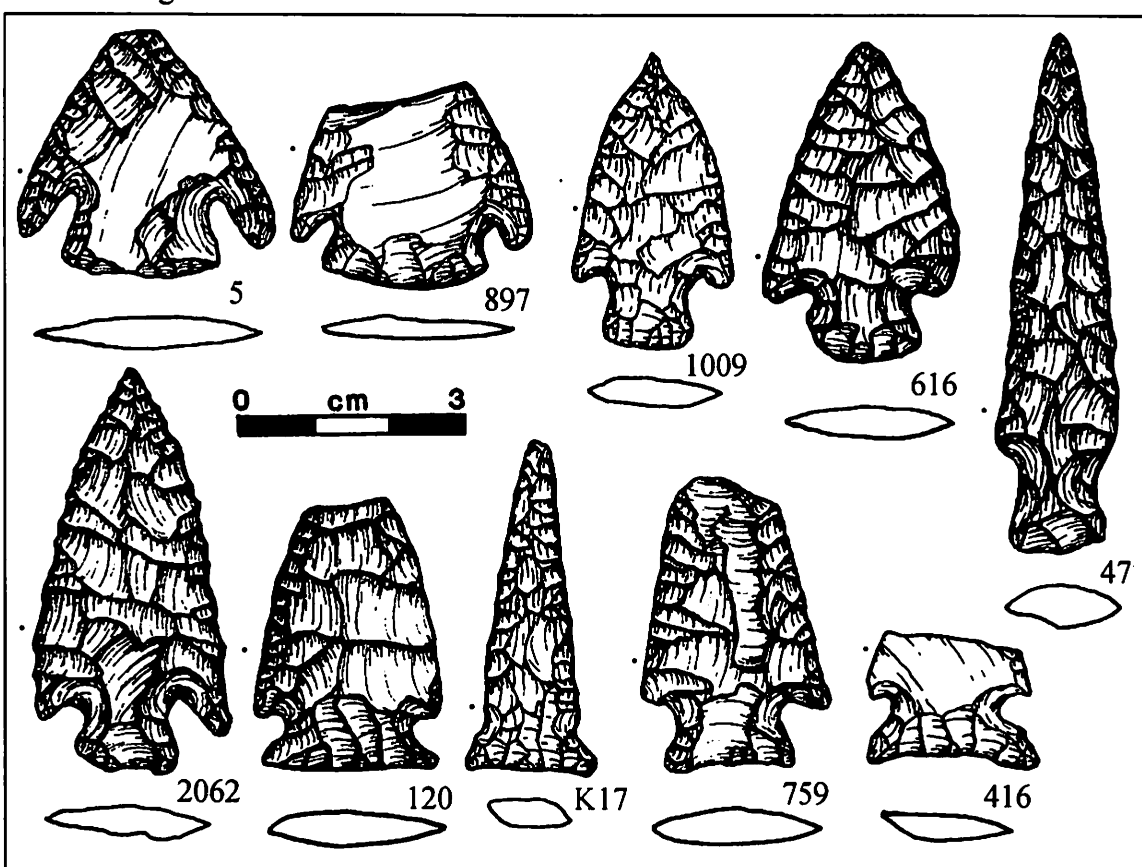
(+) Base Ground, (-) Flake surface exposed

Table 4-15d. Attributes and Variables for Edgewood/Fairland Points

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
684	29	26/13.0	5.2	4.0	Y	B,M	B/S	M	OC	5
759	39	26/13.0	5.7	5.8	Y	B,M	I	M	ED*	6
555	26	19/12.8	4.2	2.3	N	C	--	E	AA	18
1839	36	21/13.0	6.1	4.6	N	C	--	E	AA	44
416	18	23/14.0	4.4	2.0	Y	B,M	B/S	--	AA-	58

(*) High gloss, (-) Flake surface exposed

Figure 4-15. Various Late Archaic Corner/Side-Notched Class Points



* Castroville (Specimens 5, 897), Palmillas (Specimens 1009, 616, 47, 2062), Ensor (120, K17), Edgewood/Fairland (Specimens 759, 416)

Unclassified Dart Forms (Table 4-16a, Figure 4-16)

Two points do not compare well to recognized point types. Specimen 1761 may be extensively reshaped and unrecognizable. Specimen 107 is made from a thin flake and possesses intermediate barbs. Bill describes Specimen 107 as a "doodled flake" in his notes.

Dart Fragments (Table 4-16b)

Seventy-four fragments can only be identified as dart tips or midsections. It is reasonable to assume that many of these artifacts represent Late Archaic points.

Figure 4-16. Unclassified Forms

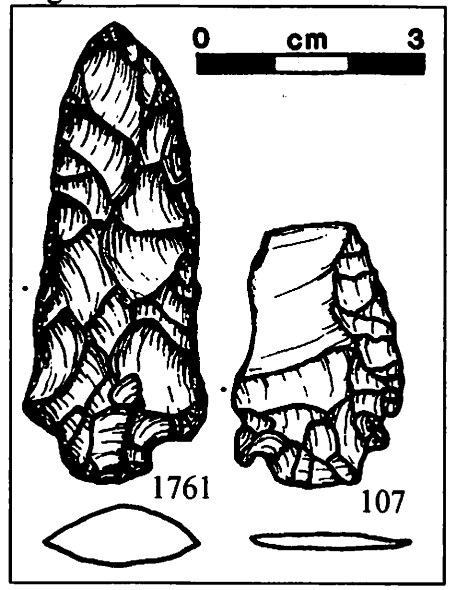


Table 4-16a. Attributes and Variables for Unclassified Dart Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1761	62	25	9.3	12.8	N	C	–	E	ED*	44
107	36	23	3.8	3.5	Y	B,M	B/S	S	AA-	–

(*) High gloss, (-) Flake surface exposed

Table 4-16b. Raw Material and Distribution of Dart Fragments.

Prov.	4	7	11	18	19	21	22	23	25	28	29	30	31	33	34	37	40	41	44	45	54	55	–
AA	2	1	1	1		1	1	1	3		2	1	3	1	2	1		2	12		1		18
OP				1															1				
DT										1			1										1
NJ																							
ED															1				1				1
OQ																			1	1			
OC																			1				
TQ												1											1
OB																	1						
DC					1							1											
UNID										1		1						1				1	

Scallorn (Table and Figure 4-17a,b)

A number of corner-notched arrowheads were collected from Goff Creek and these are classified as Scallorn points. The morphological variability within the Scallorn class is significant. Large forms that, if complete, would have measured more than 45 mm in length dwarf the several examples that are less than 20 mm in length. Like the Late Archaic dart points, well-executed bifaces and expedient flake forms are both observed. In fact, some of the larger points in the Scallorn class are similar to small dart points in the Ellis class. Two Scallorn class points even have well-ground bases.

The metric characteristics of dart and arrow points have been explored by a number of researchers. These efforts have emphasized projectile point length, shoulder width, thickness, and neck width

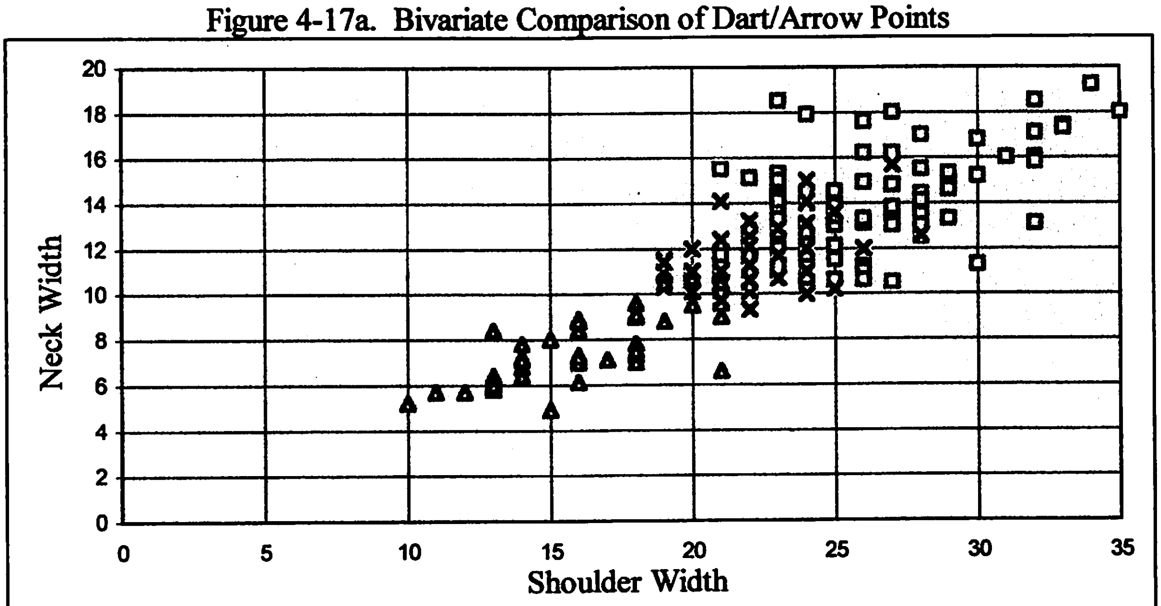
(Thomas 1978), with neck width (Corliss 1972) and shoulder width (Shott 1997) demonstrating strong predictive qualities. In terms of neck width, the threshold between dart and arrow points ranges between 8-10 mm (Corliss 1972; Fawcett and Kornfeld 1980; Roney 1985). The shoulder width threshold is approximately 20 mm (Shott 1997). Boyd (1997:268) cites these studies in his discussion of dart and arrow usage during the Late Archaic-Late Prehistoric transition in the Caprock Canyons, where he addresses the similarity between and possible co-existence of small dart points and arrow points (see also Thurmond 1991:121).

The shoulder and neck widths of Marcos, Ellis, and Scallorn class projectile points from Goff Creek demonstrate average measurements above and below the thresholds reported by others for well-documented dart and arrow points (Table 4-17a). The average neck and shoulder widths of the Ellis point class are closest to the thresholds and compliment the similarity observed between late dart points and early arrow points on the Southern Plains. Individually, the slight overlap in the metric ranges of dart and arrow points from Goff Creek (see Fig. 4-17a) indicates potential misclassification within these classes.

Table 4-17a. Metric Attributes of Dart and Arrow Points

	Marcos (N=84)	**Ellis (N=43)**	**Scallorn (N=37)**
Shoulder width			
Average	**26.36**	**22.19**	**16.05**
S.D.	**3.23**	**2.12**	**2.88**
Neck width			
Average	**14.08**	**11.63**	**7.6**
S.D.	**2.09**	**1.51**	**1.52**

Figure 4-17a. Bivariate Comparison of Dart/Arrow Points



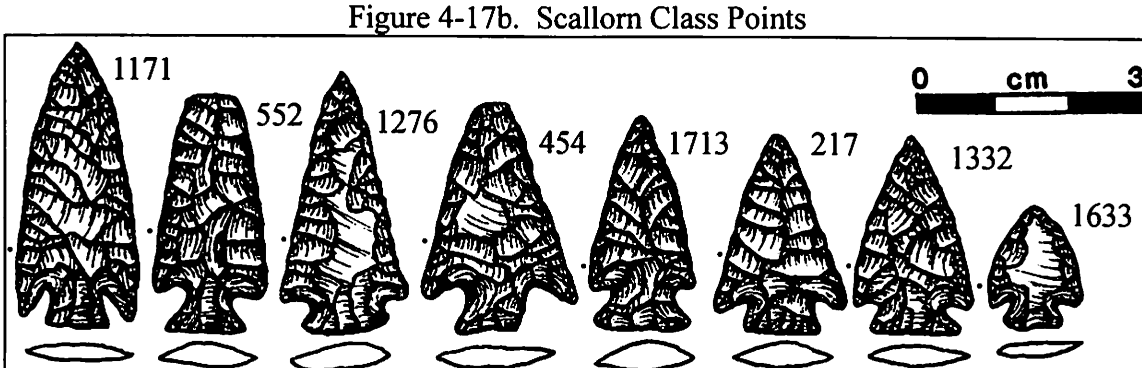
Δ = Scallorn points, × = Ellis points, □ = Marcos points

Table 4-17b. Attributes and Variables for Scallorn Points.

Spec. #	Length	Width/ Neck Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main- tenance	Raw material	Prov.
1551	28	17/7.1	3.4	1.3	Y	B,M,T	B/S	S	AA	1
1231	20	14/6.8	2.4	.6	Y	B,M,T	B/S	S	AA-	3
1713	18	14/7.2	4.2	4.3	N	C	--	M	AA	4
1481	38	19/--	3.7	2.0	Y	M,T	B/S	S	AA	5
1276	35	18/9.0	4.9	2.0	N	C	--	M	AA+-	5
1573	30	18/7.3	3.5	1.9	N	C	--	S	AA+-	5
818	31	14/7.1	3.6	1.4	N	C	--	E	AA	5
732	26	15/--	3.9	1.5	Y	M,T	I	M	AA	12
52	37	16/7.0	4.5	2.1	Y	M,T	B/S	M	AA	15
129	20	20/10.7	3.0	1.3	Y	M	I	S	AA-	21
908	21	13/5.8	2.7	.6	Y	B,M,T	B/S	S	AA-	21
744	26	14/7.8	2.5	.8	Y	M,T	B/S	S	AA-	21
1805	36	16/8.4	3.6	1.7	Y	B,M,T	B/S	S	AA	25
454	30	21/6.6	3.8	2.0	Y	B,M	I	S	AA	25
505	31	19/8.8	4.1	2.2	Y	B,M	B/S	M	AA	27
773	21	10/5.2	3.2	1.0	Y	B,M,T	B/S	E	AA	27
2070	27	11/5.7	2.6	.8	N	C	--	S	OP-	29
1105	20	15/8.0	3.8	1.0	Y	B,M,T	B/S	S	AA	29
887	36	138.4	4.0	1.9	N	C	--	S	AA	31
289	31	21/9.0	4.2	2.5	Y	M,T	B/S	S	AA	31
1332	26	16/7.3	3.6	1.3	N	C	--	M	AA	31
1662	19	18/9.6	3.1	1.2	Y	B,M	I	S	AA-	31
1475	20	14/--	3.1	.9	Y	M	B/S	--	AA	31
552	31	15/4.9	3.8	1.8	Y	B,M	B/S	S	AA	33
1633	16	12/5.7	2.4	.5	N	C	--	S	AA-	44
314	26	18/7.0	3.3	1.6	Y	B,M	B/S	S	AA-	44
1981	19	15/--	3.0	1.1	Y	M	B/S	--	AA-	44
336	21	16/7.2	3.4	.9	Y	M,T	B/S	S	DC	44
2078	29	18/9.1	3.1	1.8	Y	M,T	B/S	S	OQ	44
1128	25	13/6.4	2.3	.7	Y	B,M,T	B/S	S	TJ-	44
1171	38	16/6.1	2.5	1.6	N	C	--	S	OP	44
2063	19	16/--	3.5	1.1	Y	B,M	B/S	E	AA	48
2067	30	20/9.5	4.2	2.0	Y	M,T	B/S	S	AA-	48
2098	17	14/6.4	2.5	.6	Y	B,M	B/S	S	AA-	48
141	25	16/8.9	3.4	1.3	Y	B,M	B/S	M	NJ	49
1035	36	13/6.1	3.9	1.8	Y	B,M,T	B/S	S	AA	54
217	26	18/7.8	3.9	1.4	N	C	--	S	AA	55
215	23	18/7.5	4.1	1.8	Y	B,M	B/S	S	AA	59
1393	32	16/8.8	4.1	1.9	Y	C	--	M	AA*	--
1358	20	13/6.0	2.9	.8	Y	M,T	B/S	M	AA-	--
1949	36	21/10.5	2.9	1.9	N	C	--	S	AA-	--
439	19	19/10.5	4.2	1.4	Y	B,M	B/S	M	AA-	--
95	21	17/--	3.9	1.6	Y	M	I	M	AA	--
1778	13	15/--	2.5	.5	Y	M	I	--	AA	--
441	21	10/6.8	2.8	.6	N	C	--	S	AA-	--

(*) High gloss, (+) Base ground, (-) Flake surface exposed

Figure 4-17b. Scallorn Class Points



Deadman (Table 4-18a, Figure 4-18)

Six Deadman points are recognized by relatively long stems and bulbar basal outlines. Lintz (1978:Fig. 2) illustrates Deadman points from the Johnson-Cline site, located in southwest Texas County, and White (1987:75) recovered several examples from the Muncy site.

Edwards (Table 4-18b, Figure 4-18)

Four arrow points from Goff Creek are classified as Edwards. These specimens are characterized by deep corner notching located immediately above the concave base. Two examples possess well-tapered and sharp distal tips. The Goff Creek points also demonstrate the potential for extensive rejuvenation. Specimen 1709 was found by Chris Lintz near a rock concentration at the Tucker's Blowout site, an Antelope Creek phase bison kill/processing site (Brooks and Flynn 1988), and is considered out of place.

Shadid (Table 4-18c, Figure 4-18)

Defined by Wyckoff and Jackman (1988:114), Shadid points are distinguished by "delicate corner notches" that are "chipped at very acute (22-28 degrees) angles, creating barbs that reach almost to the base and a stem that is nearly as wide as the barbs." Not dated at the type site in Woods County, Oklahoma, these points are similar to "Hog Back" points from the LoDaisKa shelter and Magic Mountain sites in central Colorado (Irwin and Irwin 1959:Fig. 26aa).

Washita (Table 4-18d, Figure 4-18)

Nearly half of the Washita points from Goff Creek were recovered from Tucker's Blowout. These points were sometimes found among discrete rock features and often exhibit impact fractures.

Fresno (Table 4-18e, Figure 4-18)

Five of the Fresno points come from the Tucker's Blowout site. But in contrast to the Washita examples, the Fresno points do not exhibit breakage types characteristic of impact events.

Harrell (Table 4-18f, Figure 4-18)

Only two Harrell points were collected from Goff Creek, and one of these was found by Don Wyckoff in the creek bed in May 1983. At that time the Oklahoma Archeological Survey was excavating the Tucker's Blowout site and documenting other nearby sites. Harrell points appear to be better represented in the Ross Goodner collection from Beaver County, Oklahoma. The Goodner collection, and others from Beaver County, also demonstrate more extensive use of Niobrara jasper during Late Prehistoric times (Scott Brosowske, personal communication, 1998).

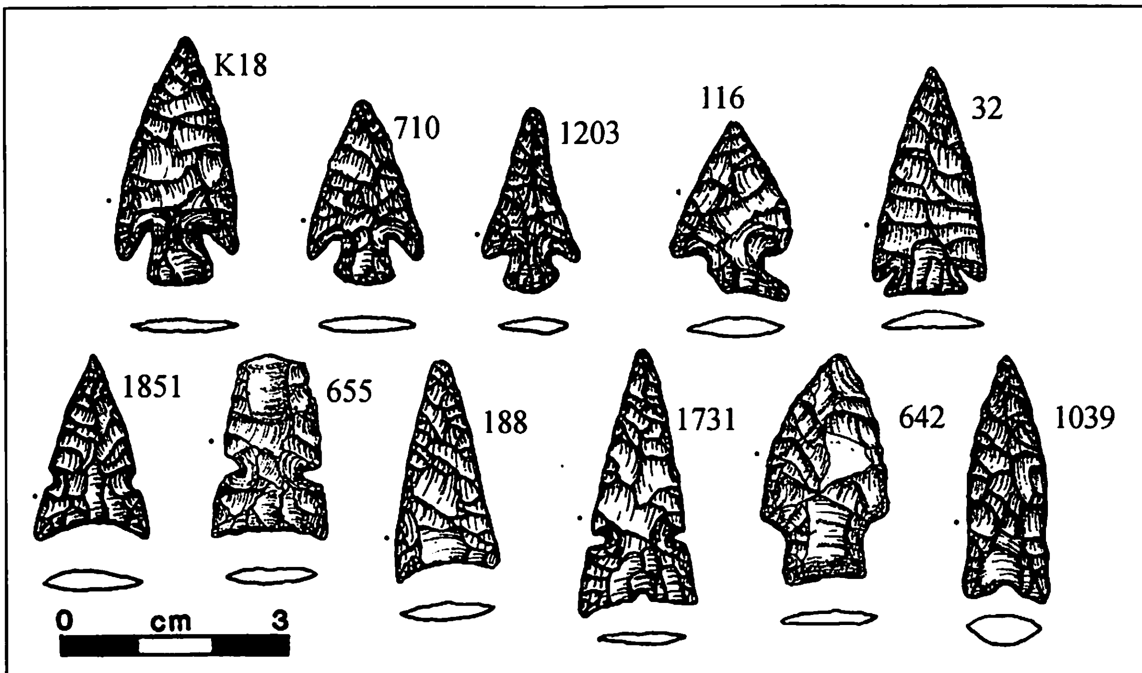
Chadbourne (Table 4-18g, Figure 4-18)

Two arrow points are tentatively classified as Chadbourne type points. These forms are generally shouldered with straight to slightly concave bases.

Garza (Table 4-18h, Figure 4-18)

A single Garza point was collected from Goff Creek. This specimen is heavily reworked but retains the basal notch characteristic of the type. A single Garza point is also documented in the Minter collection from the Palo Duro Creek area (Peterson 1988).

Figure 4-18. Various Arrow Points



* Deadman (K18, 710, 1203), Edwards (116), Shadid (32), Washita (1851, 655), Fresno (188), Harrell (1731), Chadbourne-like (642), and Garza (1039)

Table 4-18a. Attributes and Variables for Deadman Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
710	24	15	2.2	.7	N	C	--	S	AA	21
1203	25	13	2.7	.6	N	C	--	E	AA	31
1111	30	18	4.0	1.8	N	C	--	S	OQ	44
710	21	14	2.5	.6	Y	B,M,T	B/S	M	AA	--
221	24	14	3.2	.9	Y	B,M,T	B/S	M	DT	--
K18	33	16	2.7	1.4	N	C	--	S	AA	--

Table 4-18b. Attributes and Variables for Edwards Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
42	26	16	3.8	1.5	Y	B,M	I	M	OP	9
875	29	15	3.6	1.3	N	C	--	E*	AA	31
116	24	17	3.7	1.1	Y	B,M,T	B/S	M	TJ	44
1709	31	14	4.2	1.6	N	C	--	E*	AA	49

(*) Tapered

Table 4-18c. Attributes and Variables for Shadid Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
32	31	15	2.8	1.2	N	C	--	S	AA	8
1862	17	14	2.3	.6	Y	B,M	I	S	AA	29

Table 4-18d. Attributes and Variables for Washita Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1852	25	15	3.0	1.0	Y	B,M	I	S	AA	3
1851	25	16	3.5	.9	N	C	--	S	AA	3
2089	27	16	2.5	1.0	Y	B,M	B/S	M	AA	20

655	24	15	3.5	1.3	Y	B,M	I	S	AA	40
1815	25	16	3.0	1.1	Y	B,M	B/S	S	AA	42
1355	20	13	2.0	.4	N	C	--	S	AA	44
1623	16	13	2.3	.6	Y	B,M	I	S	AA	49
1666	20	13	2.5	.6	Y	B,M	B/S	E	AA	49
1527	18	11	2.5	.4	N	C	--	M	AA	49
183	23	14	2.4	.9	Y	B,M	I	M	AA	49
1701	17	12	2.3	.5	Y	M	I	S	AA	49
1669	19	10	2.7	.5	Y	M	I	M	AA	49
1556	24	14	2.5	.7	Y	B,M	B/S	S	AA	49
1448	31	15	2.7	1.1	N	C	--	S	AA	--
451	23	15	3.5	1.2	Y	B,M	I	S	AA	--
2148	20	12	2.6	.4	N	C	--	M	AA	--

Table 4-18d (continued)

Table 4-18e. Attributes and Variables for Fresno Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
13	21	14	3.4	.9	N	C	--	E	AA	5
738	29	15	4.4	1.9	N	C	--	S	AA	20
260	25	17	4.0	1.7	Y	B,M	B/S	S	AA	25
1613	33	19	5.0	2.7	N	C	--	M	DT	28
625	20	18	4.1	1.5	Y	B.M	B/S	M	AA	32
1286	14	12	3.0	.6	Y	B.M	B/S	M	AA	44
721	23	13	2.5	.6	N	C	--	S	AA	44
1665	24	14	3.2	.9	N	C	--	M	AA	49
1699	17	14	2.9	.7	Y	B,M	B/S	S	AA	49
1528	22	16	2.6	.8	N	C	--	M	AA	49
1667	12	15	1.9	.4	Y	B	B/S	--	AA	49
1574	27	18	4.0	1.7	N	C	--	M	AA	49
1217	29	16	2.6	1.5	N	C	--	S	AA	55

Table 4-18f. Attributes and Variables for Harrell Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
2097	33	14	3.3	1.2	Y	B,M	B/S	S	AA	48
1731	34	16	2.5	1.0	N	C	--	S	AA	53

Table 4-18g. Attributes and Variables for Chadbourne Points

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
2008	39	18	3.0	2.3	N	C	--	S	AA	8
642	31	17	3.4	1.7	N	C	--	S	AA	44

Table 4-18h. Attributes and Variables for Garza Point

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1039	32	10	4.9	1.7	N	C	--	E	TJ	54

Table 4-19. Attributes and Variables for Metal Point

Spec. #	Length	Width	Thickness	Weight (g.)	Broken	Portion present	Fracture type	Main-tenance	Raw material	Prov.
1075	59	16	2.7	4.9	N	C	--	--	Metal	--

Metal Arrowhead (Table 4-19, Fig. 4-19)

A single metal arrowhead was recovered from Goff Creek. The point is made from cut metal and shows manufacturing flaws near its stem. The distribution of metal points in the Oklahoma panhandle area is documented by Baker and Campbell (1959) and Dale (1967b). Dale's paper describes nearly 50 points, six of which were purchased by Henry Hitch for .25 cents each from an unspecified group camping on Coldwater Creek in 1896. Three of Dale's points were found at a camp located on the Easterwood Ranch along Goff Creek, but the exact location of this site is unknown.

Unclassified Arrowhead Fragments (Table 4-20)

A small number of arrowhead fragments are broken above the base and cannot be assigned to a particular projectile point type.

Dart Preforms (Table and Figure 4-21)

The artifacts described as preforms are well-shaped bifaces with significant amounts of pressure flaking and edge finishing.

A distinctive form that recurs in the sample is ovate to triangular in outline and probably represents Late Archaic (perhaps Castroville type) preforms. These implements are principally recognized by wide bases and are usually made from thin flakes.

Three preforms, one reported by White (1986), are characterized by high width to thickness ratios, wide, shallow flaking, and thermal alteration. These specimens resemble Calf Creek preforms recovered from central Oklahoma (Bartlett 1994).

Fig. 4-19.
Metal Arrowhead

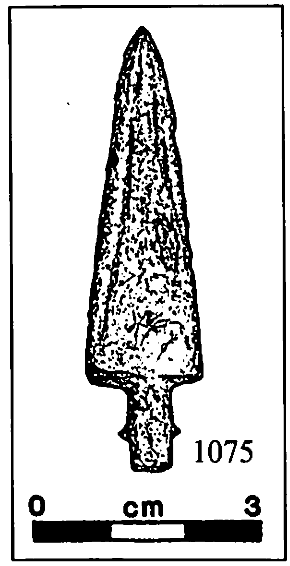


Table 4-20. Unclassified Arrowhead Fragments.

Prov.	1	14	33	44	49	?
AA	1	1	1	1	1	
NJ						1

Another biface is remarkably narrow and may represent an Eden or Firstview type preform. Some researchers have observed similarity with extensively resharpened Calf Creek points as well. Calf Creek bases, however, are created by notching and do not possess the collateral flaking observed across the base of Specimen 318. Provenience information is not available for 11 preforms (7 AA, 1 OQ, 1 DT, 1 OP, 1 BS).

Arrowhead Preforms (Table 4-22)

A small number of bifaces appear to represent arrowhead preforms. These are generally too ovate and thick to be classified as Fresno points and do not show evidence of significant use or resharpening.

Table 4-21. Attributes and Variables for Dart Preforms

Spec. #	Length	Width	Thickness	Ratio	Weight	Broken	Outline	Raw Material	Prov.
685	34	28	5.5	5.1	6.4	Y	O-	AA	5
1244	51	29	6.0	4.8	7.0	N	L	AA	5
1608	26	28	4.3	6.5	3.0	Y	L	AA	6
689	37	33	6.5	5.1	8.3	Y	O-	AA	7
1904	33	27	6.7	4.0	5.8	N	O	PW	7
688	34	25	4.5	5.6	4.9	Y	L	AA	7
1903	104	57	7.7	7.4	49	N	O+	AA*	11
558	29	33	5.7	5.8	6.6	Y	L	AA	18
2093	30	22	4.1	5.4	2.9	Y	L	NJ	19
2156	33	22	5.7	3.9	3.6	N	O	AA	19
2090	20	23	5.1	4.5	3.0	Y	L	AA	19
736	31	28	4.9	5.7	4.8	Y	O-	AA	20
1929	29	26	6.3	4.1	5.8	Y	O	AA	20
576	32	29	6.0	4.8	4.4	Y	T	AA	20
123	29	29	4.1	7.1	3.4	Y	O-	AA	21
577	70	37	7.9	4.7	23.8	N	L	AA	21
504	37	39	5.8	6.7	9.6	Y	O-	AA	27
1288	78	44	13.5	3.3	42.4	N	O-	AA	29
1194	29	33	7.7	4.3	9.3	Y	L	AA	31
1583	32	27	5.5	4.9	4.8	N	O	AA	31
671	22	25	5.2	4.8	3.6	Y	L	AA	31
696	27	29	4.9	5.9	3.6	Y	O	OP	31
285	54	29	8.0	3.6	12.7	N	O	OC	31
871	30	46	5.5	8.4	10.8	Y	O+	AA*	31
2103	29	23	6.5	3.5	5.3	Y	L	AA	32
1296	29	35	4.8	7.3	5.9	Y	O-	AA	34
794	38	35	5.3	6.6	7.0	Y	L	AA	37
1818	29	35	6.1	5.7	5.9	Y	O	OP	42
1840	42	27	5.9	4.6	7.2	N	O	AA	44
341	40	30	7.1	4.2	6.5	N	T	AA	44
1938	41	24	7.0	3.4	7.5	Y	O	OP	44
1208	50	25	5.7	4.4	8.1	N	L	AA	44
318	51	18	5.0	3.6	6.3	Y	L~	AA	44
1748	38	33	9.6	3.4	11.9	Y	O	OP	45
1635	25	28	5.4	5.2	4.1	Y	O-	DT	49
1008	108	42	9.8	4.3	56.0	N	L	AA	54
2080	67	45	5.3	8.5	19.3	N	O+	AA*	59
1032	36	18	4.4	4.1	3.3	Y	L	AA	59

(+) Calf Creek, (-) Late Archaic, (~) Eden, (*) High gloss

Table. 4-22. Attributes and Variables for Arrowhead Preforms

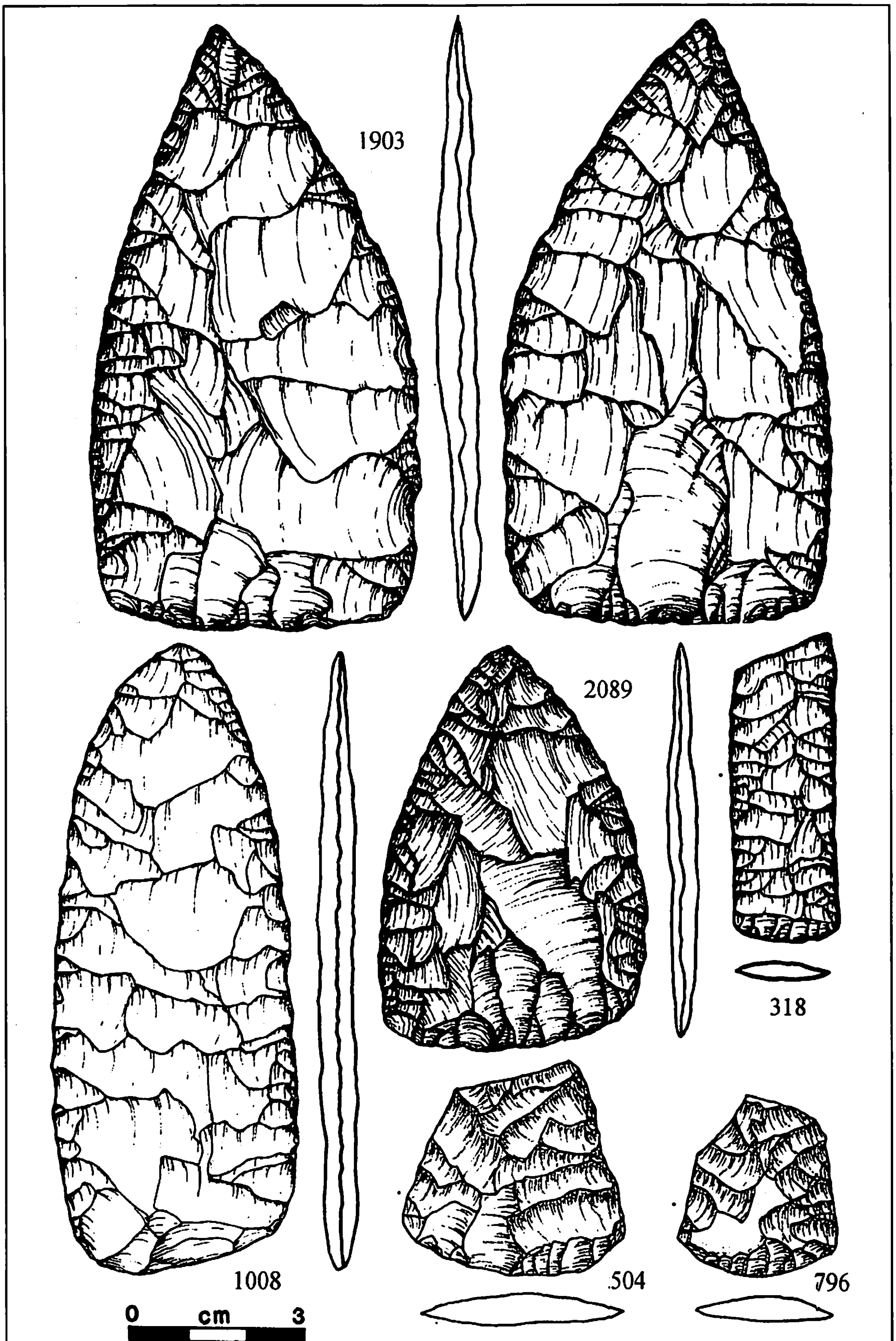
Spec	Length	Width	Thickness	Raw Mat./ Prov.
575	28	19	5.0	TJ/30
1875	28	22	3.7	AA/32
1491	32	24	4.2	AA/46
212	29	20	4.2	--/--

Bifacial Knives (Table and Figure 4-23)

Three varieties of bifacial knives are recognized in the Goff Creek collection: a Cody knife, two corner-tang knives, and 13 beveled knives. First reported by White (1981b), and illustrated in Hofman (1989b:Fig.8f), the Cody knife (470) is unifacially beveled along one lateral edge and exhibits a moderately ground haft element. Based on the size of a relatively prestine Cody knife documented by Bradley and Stanford (1987:431), the Goff Creek example has been extensively resharpened.

Corner-tang knives (see Kraft 1994) are also rare in the collection. The larger specimen (80), also illustrated in Bell (1980:Fig.4a), was found by Benny Dain while picnicking along Goff Creek in 1971. Mr. Dain was not interested in collecting and sold the artifact to Bill for

Figure 4-21. Preform Class Artifacts



$25.00. The smaller knife (695) was found by Bill in 1974 and is made from a flake. The blade is extensively retouched and broken.

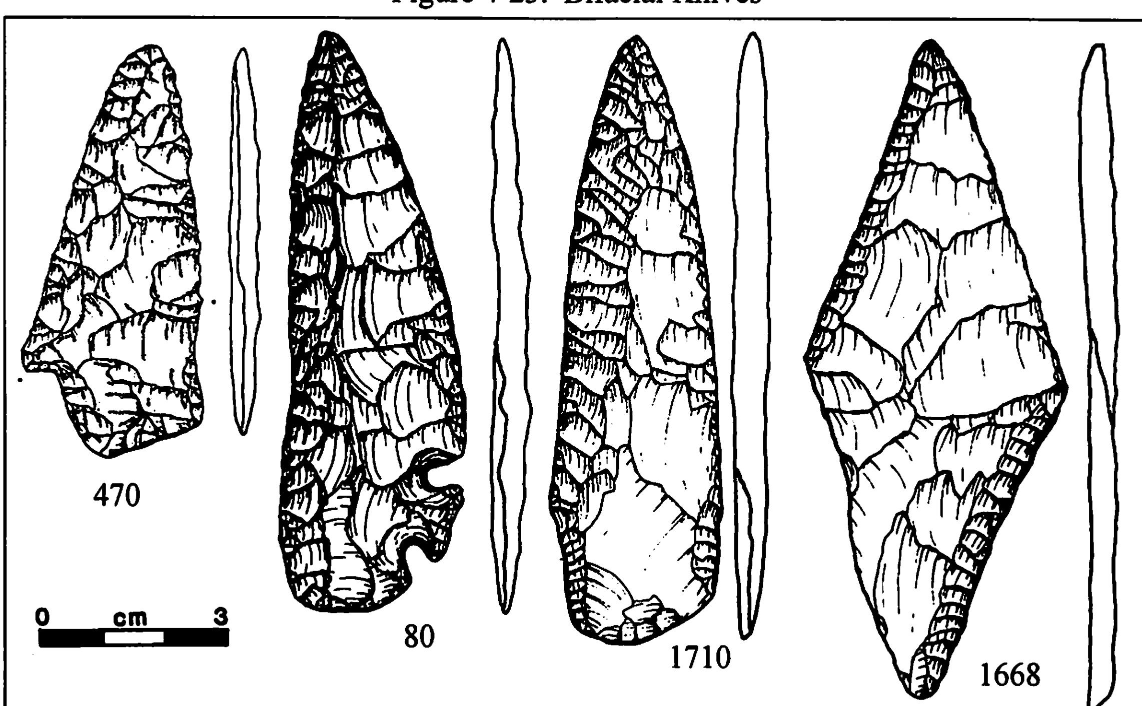
Late Prehistoric beveled knives are well represented in the Goff Creek collection. These tools are commonly characterized by their diamond-shaped outline and alternate beveling. Two of the Goff Creek specimens (501, 1710) are lanceolate rather than diamond-shaped. The latter, which appears to have been hafted, was recovered along with three other examples from the Tucker's Blowout site. The proximal portion was found by Chris Lintz as he visited the site in April 1983, and the distal tip was found by Bill almost one year later.

Table 4-23. Attributes and Variables for Bifacial Knives.

Spec.	Length	Width	Thickness	Weight (g.)	Broken	Main-tenance	Raw Material	Prov.
470	58	28	6.7	11.3	N	E	AA*	23
80	94	29	7.1	19.0	N	M	AA	7
695	44	32	5.2	8.2	Y	E	AA*	31
482	35	39	7.4	9.6	Y	M	AA	17
476	96	26	8.9	26.8	Y	E	AA*	21
501	122	34	7.2	37.1	N	S	DC	21
1774	70	39	8.4	18.2	Y	S	AA	30
329	101	41	10.2	42.7	N	E	DT	44
399	58	27	5.6	8.8	Y	M	ED*	44
1719	54	33	7.2	11.5	Y	S	AA	44
1535	77	29	5.8	13.2	Y	S	AA	49
1710	97	28	6.0	19.7	Y(Refit)	M	AA	49
1534	105	43	8.2	32.9	N	M	AA	49
1668	106	43	6.7	28.6	N	M	AA	49
1070	25	27	6.0	5.5	Y	--	AA	--
1086	72	31	7.3	17.9	Y	E	AA	--

(*) High gloss

Figure 4-23. Bifacial Knives



* Cody (470), Corner-tang (80), and beveled (1710, 1668) knives.
* Illustration slightly reduced

Gouges (Table 4-24)

Three Clear Fork Gouges exist in the collection. Of these, two are bifacial (324, 1248) and one is unifacial (662). The best example is made from a high quality piece of opalite. The unifacial gouge is made from rhyolite. White (1981b) documents 10 Clear Fork Gouges from the Muncy site.

Table 4-24. Attributes and Variables for Clear Fork Gouges.

Spec. #	Length	Width	Thickness	Raw Material/ Prov.
324	49	45	12.7	OQ/33
662	50	42	16.3	RY/33
1248	44	42	10.1	OP/--

Drills/Perforators (Table 4-25)

Six Late Prehistoric drills are recognized. These implements are long, cylindrical bifaces with expanding bases.

Table 4-25. Attributes and Variables for Drills/Perforators.

Spec	Length	Width	Thick.	Raw Mat./ Prov.
1712	70	17	8.7	PW/4
1854	38	19	4.6	AA/4
1181	38	16	6.2	AA/5
33	37	16	6.5	AA/8
1887	43	17	5.2	AA/46

Bifaces (Table 4-26)

A total of 94 bifaces were collected from Goff Creek. Of these, 70 are biface fragments. The morphology of the bifaces is generally ovate to subrectangular. All of the bifaces are predominantly percussion flaked and do not show evidence of edge finishing for the production of projectile points or other formal tools. Provenience information is not available for 20 biface fragments and 3 bifaces (11 AA, 4 DT, 2 OQ, 2 NJ, 2 UN, 1 BS, 1 OP).

Table 4-26. Attributes and Variables for Bifaces.

Spec. #	Length	Width	Thickness	Ratio	Weight (g.)	Portion Present	Raw Material	Prov.
83	55	30	12	--	21.5	P,D,L	OP	2
1443	55	33	12	2.8	22.0	D,M	NJ	3
1958	44	44	12	3.7	16.1	C	NJ	4
1422	62	34	13	2.6	22.2	C	AA	5
1658	46	52	10	5.2	29.9	D,M	AA	5
15	40	46	11	4.2	19.6	P,M	AA	5
1322	54	37	10	3.7	20.3	C	DT	5
1324	32	38	8	4.8	11.8	M	AA	5
681	59	38	13	--	33.9	P,D,L	OC	5
1182	26	44	5	--	5.4	P/D	AA	5
1657	38	39	11	3.5	18.3	C	AA	5
1756	38	18	8	--	5.3	L	AA	5
1185	35	22	5	4.4	3.7	C	AA	5
1337	37	16	8	--	5.3	L	AA	6
1413	12	33	7	--	2.3	P/D	AA	6
1688	35	53	9	5.9	18.2	P,M	AA	7
1673	59	45	9	5.0	27.2	D,M	AA	9
2012	48	41	15	3.2	33.1	D,M	NJ	12
467	37	33	10	3.3	13.9	C	OC	14
465	48	31	8	3.9	13.1	C	AA	14
781	21	40	5	--	4.5	P	AA	15
128	59	39	11	3.5	30.8	C	DT	21
2114	35	20	8	--	7.8	L	AA	24
54	44	41	8	5.1	16.6	P,M	ED	24
258	58	43	9	4.8	26.7	D,M	OQ	25
458	46	38	10	3.8	14.2	P,M	DT	25
1246	18	39	6	--	3.7	P	AA	28
2069	59	33	14	2.4	24.9	C	DT	29
2168	38	33	9	3.7	12.1	P,M	AA	29
1645	36	31	8	--	9.6	D	AA	29
1513	21	18	5	--	2.1	L	AA	29

287	99	40	15	2.7	48.2	C	AA	31
1334	32	45	13	3.5	20.3	P,M	AA	31
1319	45	27	10	2.7	10.2	C	AA*	31
1143	66	53	10	5.3	31.9	P,M	NJ	31
1192	46	45	10	4.5	24.7	P,M	OP	31
300	51	37	10	3.7	21.3	M	DT	31
890	47	35	13	2.7	25.9	P,M	AA	31
873	48	48	11	4.4	27.6	D,M	AA	31
1367	28	45	9	5.0	12.0	M	AA	31
253	36	24	7	3.4	5.9	C	OB	31
1810	37	25	7	3.6	6.6	C	AA	31
323	50	40	11	3.6	26.6	P,M	DT	33
1874	36	29	9	3.2	8.8	P,M	AA	33
2003	29	23	6	--	2.9	L	AA	33
1226	37	31	11	2.8	12.7	P,M	DT	34
885	36	27	7	3.9	6.2	C	AA	34
776	43	15	8	--	5.4	L	AA	34
1943	26	34	7	--	6.1	D	AA	41
1057	76	45	11	4.1	41.0	C	DT	43
2021	45	39	9	4.3	17.1	D,M	AA	44
310	39	25	10	2.5	11.1	C	AA	44
2019	56	21	24	--	27.0	L	BS	44
1140	46	47	11	4.3	24.4	D,M	AA	44
1169	43	40	7	--	9.1	P/D	AA	44
1282	31	38	9	--	10.5	M	AA	44
1262	46	28	11	2.5	14.4	C	AA	44
1472	54	45	15	3.0	45.0	P,M	AA	44
2022	34	42	7	--	9.9	D	AA	44
342	35	22	6	3.7	5.5	C	AA*	44
333	59	43	7	--	14.7	D,L	AA	44
1365	50	25	9	--	13.2	P,D,L	AA	44
--	24	31	7	--	5.8	D	AA	44
1309	45	32	7	4.6	12.6	P,M	AA	44
309	34	22	8	2.8	6.8	C	AA	44
1980	33	19	8	--	2.7	L	AA	44
1833	66	42	10	4.2	32.4	C	AA	44
2015	45	31	9	3.4	14.3	C	AA	45
1720	26	32	6	--	6.1	D	AA	47
2042	60	44	13	3.4	37.9	C	AA	48
1002	46	45	11	4.1	26.1	P,M	AA*	53
418	33	30	7	4.3	8.3	M	AA	55
419	57	34	9	3.8	18.1	C	DT	55

Table 4-26 (continued)
(*) High gloss

End Scrapers (Table 4-27a, Figure 4-27)

A large number of scrapers were collected from Goff Creek. Unifacial flake tools described as end scrapers are formal designs with well-shaped and well-maintained edge units. These are subclassified as end and end/lateral scrapers. The latter exhibit utilization and maintenance of one or both lateral edges. Provenience information is not available for 35 specimens (25 AA, 3 OC, 2 OQ, 2 DT, 1 ED, 1 NJ, 1 UN).

Table 4-27a. Attributes and Variables for End Scrapers

Spec. #	Length	Width	Thickness	Weight	Platform/ Broken	Flake type	Raw material	Provenience/ Subclass
678	34	25	5.1	4.5	P/N	T-	AA	2/E
63	27	29	9.5	6.9	A/Y	T	AA	4/EL
1793	28	21	7.7	4.1	A/Y	T	AA	4/EL
1716	25	26	5.4	3.2	P/N	S	AA	5/E+
1486	22	21	4.8	3.1	A/N	T	AA	5/EL
1689	16	27	4.9	2.4	A/Y	T	AA	5/EL
1228	15	27	4.0	1.5	A/Y	T-	AA	5/E

683	44	31	10.5	13.1	P/N	S	AA	7/E
20	49	23	10.0	12.5	A/N	T	AA	9/EL
731	33	23	6.1	5.0	P/N	T-	AA	12/EL
2010	38	29	7.0	8.1	A/N	T-	AA	12/E
1	63	44	11.4	36.0	P/N	S	BS	13/EL
7	48	29	7.0	10.3	P/N	S	ED	14/E
22	25	27	10.8	8.7	A/Y	S	AA	14/EL
512	17	21	3.7	2.0	A/Y	T-	AA	18/EL
513	18	21	4.6	2.3	A/Y	T-	AA	18/E
2164	33	25	7.5	8.4	P/N	P	AA*	19/EL
2117	37	22	6.7	6.0	P/N	T-	AA	19/E
2163	23	28	5.0	4.4	A/Y	T	NJ	19/EL
127	67	40	13.6	33.0	P/N	T	AA	19/EL
161	34	21	6.9	4.4	P/N	S	AA	20/E
474	17	20	7.8	3.7	A/Y	T	AA	20/EL
1974	36	26	8.2	9.6	P/N	T	NJ	20/EL
1975	27	21	4.2	3.1	A/Y	T-	TC	20/E
1930	30	29	8.5	10.8	A/Y	S	ED	20/EL
798	21	24	7.6	4.5	P/N	T	NJ	21/EL
749	33	36	11.8	14.3	P/N	S	AA	21/E
544	20	30	3.3	2.5	A/Y	T-	AA*	22/E+
1030	24	27	7.2	5.4	A/N	T	AA	22/E
542	27	33	5.7	6.0	A/Y	T-	AA	22/E
541	42	26	9.3	11.7	P/N	S	AA*	22/EL
543	25	23	4.0	2.9	A/Y	T-	DT	22/E
540	47	40	9.4	19.6	P/N	S	AA	22/E
2107	51	34	6.0	15.2	P/N	S	DT	24/E
2108	24	30	7.2	6.2	A/Y	T	AA	24/E
362	50	39	12.2	25.2	A/N	T	AA	24/EL
631	48	34	14.1	23.0	P/N	T	AA*	24/EL
1682	33	39	13.5	20.3	A/Y	T	AA	25/E
363	45	33	8.5	14.6	P/N	T	AA	27/EL
1425	34	23	8.5	8.1	P/N	T	AA	28/E
1325	48	42	12.6	26.0	P/N	T	AA*	28/E
1612	32	25	3.9	3.6	P/N	T-	ED	28/E
2160	34	37	8.7	15.2	A/Y	S	AA*	28/EL
1508	35	54	14.4	26.3	P/N	S	AA	29/E
1523	43	34	10.9	19.6	P/N	T	NJ	29/EL
1863	31	28	5.4	5.9	P/N	T-	AA	29/EL
2170	40	25	5.2	6.0	P/N	T	LC	29/EL
1100	39	33	10.4	11.1	P/Y	T	AA	29/E
901	51	51	20.4	58.7	P/N	S	DT	29/E
1629	48	39	16.1	35.4	A/N	T	AA	29/EL
1410	21	27	7.3	4.5	P/N	S	AA	30/EL+
1351	37	30	9.0	10.9	P/N	S	ED	30/E+
371	32	22	5.9	5.6	A/Y	T	AA	30/EL
870	41	26	5.1	6.3	P/N	T	AA	31/E
712	39	23	9.8	8.4	P/N	S	AA*	31/E
888	37	37	9.5	11.8	P/N	T	AA	31/E
894	28	25	4.3	3.2	P/N	T-	AA	31/E
381	29	27	7.0	6.2	A/N	S	AA	31/E
889	25	28	7.9	5.8	P/N	S	FC	31/E+
1618	33	19	4.4	4.1	A/N	T-	AA	31/EL
1542	39	22	9.3	8.8	A/N	T	AA	31/EL
1144	37	28	11.8	15.0	A/N	T	AA	31/EL
250	41	28	11.7	13.8	A/N	T	--	31/EL
638	45	51	10.5	27.7	P/N	S	AA	32/EL
1681	64	52	19.7	70.6	A/N	P	OQ	32/EL
1873	50	32	10.9	18.9	A/N	T	AA	33/EL
296	62	49	20.0	75.4	P/N	S	DT	33/EL
1999	36	28	9.3	10.3	A/N	T	AA	33/EL+
619	48	43	13.9	25.0	A/N	S	AA	34/E
1025	28	33	6.3	6.4	A/N	T	AA	34/E
1295	32	27	6.0	6.5	A/N	T-	AA*	34/EL
779	34	30	10.5	9.0	P/N	T-	AA	34/E
774	42	32	11.2	14.8	P/N	T	NJ*	34/EL
646	35	30	10.6	12.9	A/N	T	AA*	37/EL
493	37	38	12.7	16.5	P/N	T	DT	38/EL

1404	43	30	13.0	19.7	A/N	T	AA*	38/EL
1945	39	30	7.8	10.2	A/Y	T-	AA*	41/E
1946	23	19	8.1	4.6	A/Y	T	AA*	41/EL
339	79	41	8.8	29.9	P/N	T	AA	44/EL
1498	54	36	11.0	19.7	P/N	T	AA	44/EL
1207	42	44	12.5	29.0	P/N	T	OQ	44/EL
852	29	26	7.8	6.5	P/N	S	DT	44/EL
2046	26	25	7.9	6.7	A/Y	T	AA	44/EL
526	47	34	10.6	19.2	P/N	S	AA*	44/EL
804	32	24	8.8	8.3	P/N	T	AA*	44/EL
1925	29	30	5.2	5.6	P/N	T-	AA*	44/EL+
2023	38	33	6.5	8.9	A/N	T-	AA	44/EL+
1926	50	33	9.4	15.1	A/N	T	AA	44/EL
610	48	34	7.2	12.3	P/N	T	DT	44/EL
119	63	42	15.5	47.6	P/N	T	DT	44/E
603	23	30	9.2	6.0	A/Y	T	AA	44/E
1897	23	30	5.4	4.5	A/Y	T	AA	44/E
1821	31	36	9.7	11.8	A/Y	T	AA	44/E+
137	28	32	6.4	6.3	A/N	T-	AA*	44/E
1765	22	23	6.9	4.4	A/Y	S	NJ	44/E
2129	36	33	8.0	10.7	A/N	S	AA	44/E
1354	44	29	14.0	19.6	A/Y	T	OQ	44/E
853	42	27	14.3	18.2	A/N	S	TJ	44/E
150	17	23	5.0	2.2	A/Y	T	AA	44/E
2128	44	46	5.8	13.1	A/N	T	ED	44/E
1751	55	43	12.8	33.6	P/N	S	AA	45/EL
1702	30	28	6.8	6.7	A/Y	S	AA	49/EL
1265	32	33	5.1	7.0	A/N	T	AA	49/EL
1879	45	23	9.6	7.8	A/N	T	AA	49/EL
1614	42	35	8.3	13.2	A/N	T	AA	50/EL
1021	33	33	6.0	7.1	P/N	S-	NJ	52/E
1772	28	20	5.6	3.3	P/N	T	AA	52/EL
1041	33	27	6.1	6.3	A/Y	T-	AA*	54/EL
153	33	31	6.3	6.6	A/N	T-	AA	54/EL
155	44	27	4.4	5.2	P/N	T-	AA	54/EL
154	35	25	8.1	8.4	P/N	T	AA	54/E+
421	25	24	6.9	4.3	A/N	S	NJ	55/E
788	35	29	11.0	13.9	A/N	T	AA*	56/EL
789	62	49	29.5	93.8	P/N	T	DT	57/EL
420	48	29	13.6	20.6	A/N	T	ED	58/E

Table 4-27a (continued)

(*) High gloss, (-) Biface thinning/Biface core, (+) Spurred

Lateral Scrapers (Table 4-27b, Fig. 4-27)

The artifacts classified as lateral scrapers are unifacial implements that exhibit planar edge units with relatively steep edge angles. These are generally flakes with modification along one or both lateral edges. Provenience information is not available for 13 lateral scrapers (7 AA, 2 OC, 2 DT, 1 OQ, 1 OP).

Table 4-27b. Attributes and Variables for Lateral Scrapers

Spec. #	Length	Width	Thickness	Weight (g.)	Platform/ Broken	Flake type	Raw material	Provenience
946	38	29	13.2	13.0	A/Y	T	AA	5
1649	17	21	5.6	2.2	P/Y	T	AA	5
1483	35	29	11.0	10.5	A/N	T	OC	6
532	31	21	9.0	6.1	A/N	T	AA*	9
66	42	26	9.4	11.1	A/N	S	AA	10
1933	18	25	6.2	3.7	A/Y	T	OC	12
30	27	51	4.0	6.9	P/N	S	–	14
466	26	39	7.7	7.1	P/N	S	AA*	14
293	45	29	5.1	8.3	A/N	T-	AA	18
2092	50	31	8.2	14.6	P/N	S	AA	19
2162	42	23	9.4	8.1	A/N	T	AA	19

68	32	28	7.4	8.4	P/N	T	DT	20
741	40	33	7.6	7.9	A/Y	P	DT*	20
1932	32	24	9.0	8.6	P/N	T	BS	20
904	50	39	7.2	15.3	A/N	T	AA	21
67	50	21	8.5	10.2	A/N	T	AA*	23
480	67	30	10.3	21.5	P/N	T	DT	24
54	30	53	14.5	26.4	A/N	T	AA	24
233	76	29	14.7	26.1	A/N	T	AA	26
2158	35	27	11.0	12.8	A/Y	T	OC	28
1118	48	38	7.3	15.6	P/N	T	DT	28
1191	42	44	12.5	23.4	P/N	T	AA	31
1368	59	32	8.2	17.6	P/N	S	DT	31
1193	45	30	9.1	15.1	A/Y	T	AA	31
428	37	24	8.7	11.1	P/N	S	OC	31
1347	43	27	8.3	11.4	P/Y	T	AA	31
1346	39	27	9.5	8.2	A/N	T	AA	31
1584	24	21	5.2	3.6	A/N	T	AA	31
286	63	58	21.4	81.0	P/N	S	DT	31
1107	58	30	8.9	18.7	A/N	S	DT	31
1830	59	28	6.9	9.4	A/N	T	TC	31
1860	24	25	5.5	5.5	A/Y	T	AA	31
624	60	29	12.6	25.2	P/N	S	DT	32
442	57	34	10.7	22.9	P/N	S	DT	34
1294	45	24	5.7	7.7	A/Y	T	AA*	34
647	33	27	6.0	6.4	A/N	S	ED*	37
656	33	26	8.5	8.6	P/Y	S	AA	40
657	32	35	7.8	8.7	A/Y	T	AA*	40
1592	28	14	4.2	2.3	A/Y	T	NJ	40
502	59	44	16.2	46.2	A/N	P	OC	40
2055	45	35	8.6	13.6	A/Y	S	AA	40
1944	63	16	6.4	7.5	A/N	T	AA	41
1982	46	17	4.9	4.3	P/N	T-	AA	41
1342	89	66	23.9	141.4	P/N	P	AA	41
1769	48	22	6.9	8.5	A/Y	T-	ED	44
1385	36	17	6.1	4.7	A/N	T	AA*	44
125	36	25	4.7	5.6	P/N	T-	AA*	44
1456	37	29	7.3	8.9	P/N	T	AA	44
332	51	27	7.5	9.0	P/N	T-	AA*	44
2081	22	18	5.2	2.9	A/Y	T-	AA*	44
142	37	49	8.7	15.8	P/Y	S	AA	49
1664	64	30	9.6	19.5	P/N	T	AA	49
1843	47	20	7.9	8.8	A/N	S	AA	49
1637	45	28	8.1	11.5	A/N	T	AA	49
1536	60	19	8.2	11.1	A/N	T	AA	49
1638	43	38	5.6	11.1	A/Y	T	AA	49
724	25	37	9.8	9.6	A/N	T	AA	57
508	32	26	6.0	6.8	A/Y	T	ED	59

Table 4-27b (continued)

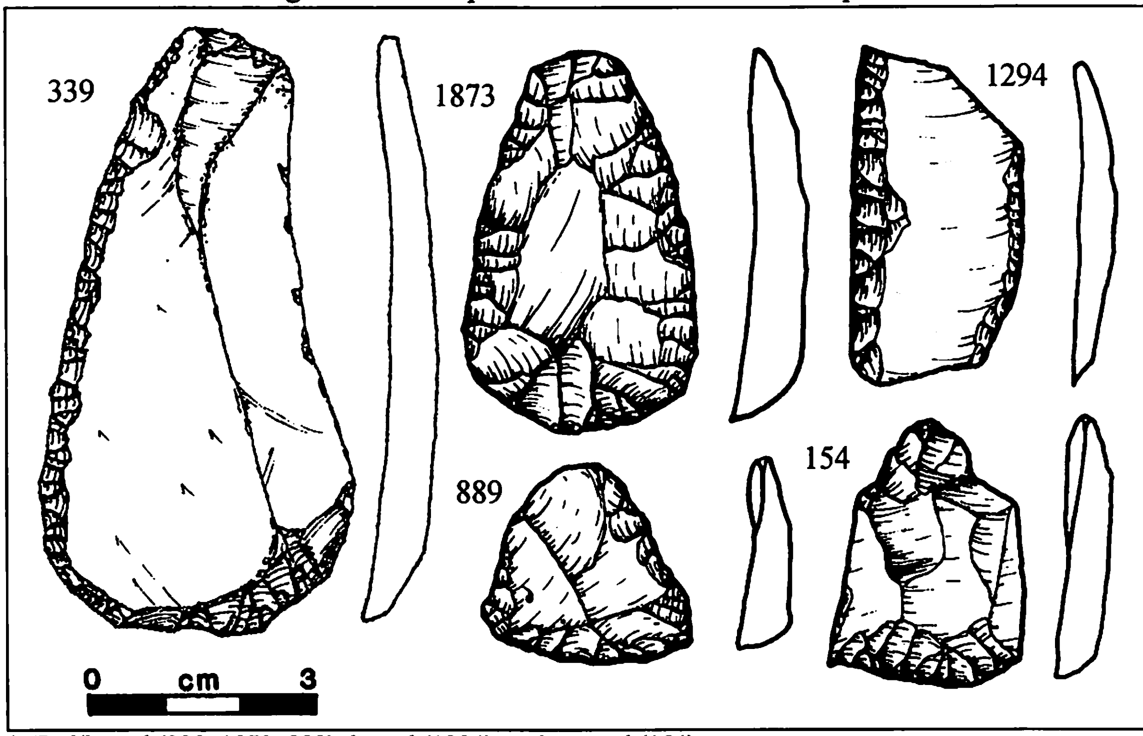
Miscellaneous Scrapers (Table 4-27c)

A small number of flake tools cannot be accurately classified as end or lateral scrapers. Seven (7) specimens are described as circular ('turtle back") scrapers. These implements exhibit modification along all margins. Another five (5) scrapers exhibit edge modification that alternates from one face to another. These specimens are often modified on the distal end of the ventral face and only on the lateral edges of the dorsal face.

Flake Knives (Table and Figure 4-28)

A moderate number of flake tools are distinguished by their size and acute edge angles. These unifacial knives represent some of the largest flakes in the collection and possess long cutting edges and occasional backing.

Figure 4-27. Representative End/Lateral Scrapers



* End/lateral (339, 1873, 889), lateral (1294), and spurred (154) scrapers

Table 4-27c. Attributes and Variables for Miscellaneous Scrapers

Spec. #	Length	Width	Thickness	Weight (g.)	Flake type	Raw material	Provenience /Subclass
1845	47	36	19.2	30.6	T	AA	44/C
147	24	26	8.6	5.6	T	AA	44/C
1846	24	25	8.7	6.0	T	AA	44/C
34	35	38	9.7	14.3	T	AA	8/C
2161	30	40	12.2	15.6	T	AA	28/C
2159	35	36	13.4	17.9	T	AA	28/C
1093	29	21	10.0	7.0	T	AA*	--/C
1896	26	26	8.1	7.0	T	AA	44/A
1138	51	19	14.2	17.7	T	AA	44/A
257	30	32	9.7	12.7	T	AA	25/A
1388	39	39	13.0	22.0	T	OQ	29/A
1219	42	28	10.6	12.7	S	AA	55/A

(*) High gloss

Gravers (Table and Figure 4-29)

Thirteen gravers are observed in the Goff Creek collection. Specimen 2157 has multiple spurs. The remaining specimens retain a single spur, or a single spur with a few attritioned spurs. A unique multi-graver is teardrop-shaped with what appears to be a delicate stem. An identical graver is seen in the Vincent Dale collection from Texas County.

Spokeshaves (Table and Figure 2-30)

Seven flake tools from Goff Creek are classified as spokeshaves. A unique example from Bill White's Goff Creek collection (Specimen 1446) appears to be a retooled Late Archaic preform. This biface was carefully pressure flaked before a large crescent-shaped concavity was created, perhaps by a later individual, along one lateral edge.

Figure 4-28. Flake Knife

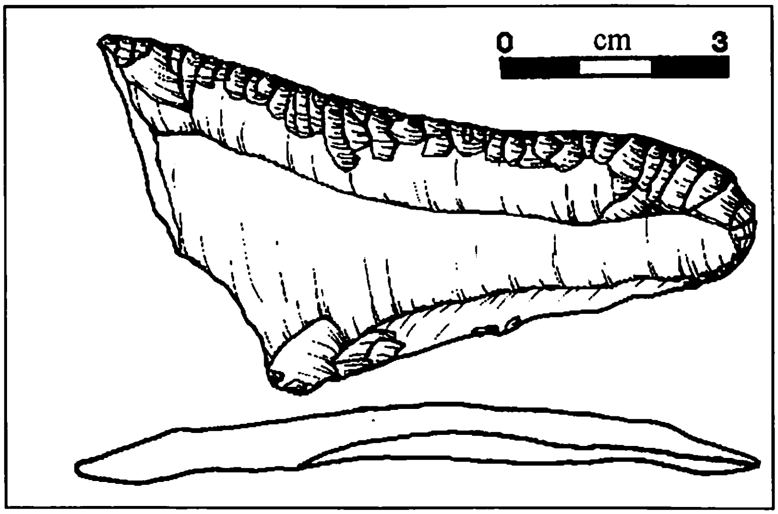


Table 4-28. Attributes and Variable for Large Flake Knives

Spec.	Length	Width	Thickness	Weight (g.)	Broken	Flake type	Raw material	Prov.
1787	86	32	13.7	38.3	N	T	AA	7
218	58	23	4.6	7.5	N	T	AA	16
1939	43	49	9.4	17.7	Y	T	AA	21
249	68	36	10.5	26.1	N	P	NJ	23
234	97	53	11.4	61.5	N	S	--	25
2169	55	33	7.2	14.7	Y	T	AA	29
1145	47	22	7.0	8.4	Y	S	AA	31
878	33	30	3.9	5.3	Y	P	AA	31
1335	45	34	10.0	16.7	N	T	AA	31
1952	28	28	6.5	5.3	Y	P	ED	31
410	40	29	6.8	7.1	N	T	AA	33
1742	53	34	6.2	11.3	N	T	AA*	33
645	58	40	9.0	22.8	N	T	AA	37
1403	53	28	4.9	6.4	N	S	AA*	38
1652	50	28	5.7	7.4	N	T	AA	44
1750	89	52	9.5	29.9	N	T	AA*	45
1526	65	21	4.2	--	N	T	AA	49
1624	57	32	7.5	--	Y	T	AA	49
1749	109	45	11.7	62.7	N	T	AA	51
1036	44	34	7.3	11.2	N	T	DT	54
165	63	43	7.1	22.6	N	P	ED*	--

(*) High gloss

Table and Figure 4-29. Gravers

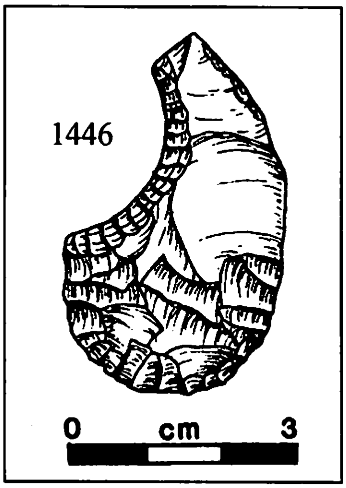
Spec	L	W	T	Flake type	Prov./ Raw Mat.
2157	26	24	4.6	T	19/AA
711	29	31	4.2	T+	21/AA
1103	26	25	4.6	T	29/AA*
1290	16	25	3.1	T+	29/AA
860	25	18	5.9	S	31/AA
K14	30	22	4.7	T	32/AA
554	31	19	4.0	T+	33/AA*
494	40	31	4.4	T+	38/AA
1141	37	22	3.9	T+	44/DT
2130	35	32	5.0	T	44
382	18	34	4.9	T	--
1967	47	26	4.3	T	--
--	41	24	6.1	T	--

Table 4-30. Spokeshaves

Spec #	L	W	T	Concavity width	Flake type	Prov./ Raw Mat.
1230	41	55	16.7	7.5	T	4/AA
278	53	35	10.0	13.0	S	19/AA
311	44	27	6.0	11.1	T	44/AA
1625	34	24	6.3	8.5	T	49/AA
212	16	24	5.6	9.5	T	59/DT
1446	48	30	5.7	25.5	--	--/AA
2041	24	16	4.4	6.3	T	--/AA

Fig. 4-29. Stemmed Graver

Fig. 4-30. Spokeshave



Cores (Table 4-31)

Artifacts classified as cores range significantly in size and can be subclassified as blocky and polyhedral in form. Provenience information is not available for six blocky cores (3 AA, 2 OC, 1 OQ).

Edge Utilized Flakes (Table 4-32)

The flakes classified here exhibit slight utilization or modification along one or more edges. The modification consists of one or perhaps two events of scalar flaking. Edge angles are generally acute. In functional terms, most of these artifacts may be described as expedient knives or scrapers. Artifacts from upper, middle, and lower Goff Creek were grouped according to raw material types and averages were calculated. A small number of exotic lithic types are not included in the tables and include: NJ 2, ED 2, FC 1, WR 1, BK 1, and TJ 1. Approximately 3,009 non-utilized flakes from Goff Creek do not have provenience information.

Miscellaneous Cobble Tools

A total of 24 Ogallala cobbles have had one or two flakes removed and are described as tested cobbles. Two separate implements, classified as choppers, are quite heavy and exhibit crushed bits. Another 6 cobbles are severely battered and are described as hammerstones.

Groundstone Fragments

Six pieces of groundstone were collected from Goff Creek. These examples are relatively small and made from finely cemented sandstone.

Pottery

Only nine small pottery sherds were found along Goff Creek. Six of these are thick, sand-tempered, cordmarked sherds probably associated with Lake Creek occupations. The three remaining sherds are relatively thin plainwares which are also tempered with coarse sand.

Ornamental Items

The only ornamental artifacts collected from Goff Creek include a fragmented stone pendant and a thin rhyolite celt.

Bone Tools

Two bone tools, both bison tibia digging sticks, were found along Goff Creek and are associated with Antelope Creek occupations in the area. Antelope Creek architecture is not documented along Goff Creek.

Table 4-31. Attributes and Variables for Cores

Spec.	Length	Width	Thickness	Weight (g.)	Core type	Cortex	Raw material	Prov.
1184	67	46	28	76.6	B	P	OQ	5
1212	53	40	21	43.5	B	P	TQ	6
38	62	50	45	177.7	P	P	OQ	9
483	47	40	15	34.6	B	A	AA	17
734	39	45	25	46.0	B	P	OQ	19
754	33	38	18	19.8	B	P	AA	21
122	50	35	18	27.0	B	A	AA	21
1514	37	46	16	22.0	B	A	AA	29
1647	71	49	22	78.5	B	P	BS	29
1149	55	44	26	64.4	B	P	PW	31
940	97	83	43	326.1	P	A	DT	34
327	41	37	26	35.9	P	A	BK	34
705	36	30	16	19.3	B	A	OC	36
704	52	31	14	23.1	B	P	NJ	36
1409	38	31	14	17.1	B	P	NJ	38
537	67	42	31	104.0	B	P	AA	38
1590	117	84	40	445.2	B	P	AA	40
344	40	36	17	53.3	B	P	AA	44
2175	40	38	20	35.6	B	P	OC	46
1218	37	34	14	20.6	B	P	OQ	55
621	43	34	21	34.5	P	A	DT	59

Table 4-32a. Provenienced Edge Utilized Flakes (Alibates)

Prov.	*No.*	*Length (avg.)*	*Width (avg.)*	*Thickness (avg.)*	*Weight (g.) (avg.)*	*Platform*				*Flake Type*		
						P (%)	A (%)	B.F. Core (%)	Other Core (%)	P (%)	S (%)	T (%)
Lower Goff Creek (Areas 1-21)	42	35.6	27.5	6.0	6.0	20 (48)	22 (52)	22 (52)	20 (48)	1 (2)	8 (19)	33 (79)
Middle Goff Creek (Areas 22-43)	89	33.4	26.8	5.6	5.7	33 (37)	56 (63)	62 (70)	27 (30)	1 (1)	15 (17)	73 (82)
Upper Goff Creek (Areas 44-59)	62	36.0	29.6	6.7	8.2	26 (42)	36 (58)	31 (50)	31 (50)	1 (2)	14 (22)	47 (76)

Table 4-32b. Provenienced Edge Utilized Flakes (Non-Alibates)

Raw Materials: DT 27, OQ 10, OP 2, BA 1, OC 1, PW 1						Platform				Flake Type		
Prov.	No	Length (avg.)	Width (avg.)	Thickness (avg.)	Weight (g.) (avg.)	P (%)	A (%)	B.F. Core (%)	Other Core (%)	P (%)	S (%)	T (%)
Lower Goff Creek (Areas 1-21)	12	47.2	36.5	9.0	19.3	5 (44)	7 (56)	6 (56)	6 (44)	1 (8)	3 (25)	8 (67)
Middle Goff Creek (Areas 22-43)	20	44.8	35.9	9.7	19.8	10 (50)	10 (50)	4 (20)	16 (80)	1 (5)	9 (45)	10 (50)
Upper Goff Creek (Areas 44-59)	10	42.4	33.2	9.8	17.9	8 (80)	2 (20)	2 (20)	8 (80)	0 (0)	1 (10)	9 (90)

Flake Debris (Non Utilized)

Table 4-33a. Provenienced Non-Utilized Flakes (Alibates)

Prov.	No.	Length (avg.)	Width (avg.)	Thickness (avg.)	Weight (g.) (avg.)	Platform				Flake Type		
						P (%)	A (%)	B.F. Core (%)	Other Core (%)	P (%)	S (%)	T (%)
Lower Goff Creek (Areas 1-21)	53	38.4	28.6	7.5	7.1	31 (58)	22 (42)	27 (51)	26 (49)	0 (0)	7 (13)	46 (87)
Middle Goff Creek (Areas 22-43)	119	36.7	28.2	5.8	6.2	78 (66)	41 (34)	57 (48)	62 (52)	0 (0)	17 (14)	102 (86)
Upper Goff Creek (Areas 44-59)	77	36.0	28.9	5.8	6.2	57 (74)	20 (26)	39 (51)	38 (49)	0 (0)	11 (14)	66 (86)

Table 4-33b. Provenienced Non Utilized Flakes (Non-Alibates)

Prov.	No.	Length (avg.)	Width (avg.)	Thickness (avg.)	Weight (g.) (avg.)	Platform				Flake Type		
Raw Materials: OP 19, DT 23, OC 15, OQ 12, PW 5, BS 2						P (%)	A (%)	B.F. Core (%)	Other Core (%)	P (%)	S (%)	T (%)
Lower Goff Creek (Areas 1-21)	27	46.8	34.6	7.9	19.9	21 (78)	6 (22)	2 (07)	25 (93)	3 (11)	17 (63)	7 (26)
Middle Goff Creek (Areas 22-43)	25	27.0	32.8	8.3	12.1	20 (80)	5 (20)	4 (16)	21 (84)	1 (04)	14 (56)	10 (40)
Upper Goff Creek (Areas 44-59)	28	48.2	36.3	10.0	17.9	24 (86)	4 (14)	4 (14)	24 (86)	2 (08)	13 (46)	13 (46)

Chapter 5

Analysis and Discussion

As discussed in Chapter 1, the Goff Creek collection offers a unique look at prehistoric activities on the Southern High Plains. And, although the study of surface collections has seen considerable attention, the thorough study of avocationists' surface collections has not appreciated widespread application. This chapter briefly reviews some of the directions offered by others and employs similar concepts to the Goff Creek collection.

Surface Archaeology

Several terms have been applied to studies which use surface rather than buried evidence to explore prehistory, including "nonsite archaeology" (Thomas 1975), "off-site archaeology" (Foley 1981), "distributional archaeology" (Ebert 1992) and, of course, "surface archaeology" (Sullivan 1998). Unfortunately, none of these truly capture the nature of the archaeological record at Goff Creek, where sites and somewhat arbitrary clusters mingle and are only distinguished by chance observations in the field. Furthermore, all of these terms are applied to professional, single-pass surveys. The Goff Creek collection is a result of approximately 500 visits to a particular drainage, a collection method better described as "recurrent archaeology."

Surface-based studies have traditionally focused on hunter-gatherer settlement systems. Thomas (1975), testing Julian Steward's (1938) ethnographic account of Shoshonean settlement and subsistence in the Great Basin, was early to abandon the site concept and emphasize the individual artifact's location on the landscape (see also Clarke 1968). Whereas previous studies had focused on dense, winter habitation sites, Thomas' sample represented the ephemeral occupations created during the seasonal round. In California, Bettinger (1977) also used ethnographic accounts to compare where artifacts were predicted to occur with actual distributions. The colonization, mobility, and settlement of Paleoindian and Early Archaic groups in the Southeastern United States has also been explored using surface evidence (Anderson 1990; Ballenger 1998; Gillam 1995) or distributional archaeology (Cabak et al. 1998), although the resolution provided by these studies varies significantly.

Studies which have relied exclusively upon private collections to address the occupation of a specific drainage are more rare. Harrison et al. (1995) used the Redepenning collection, a large assemblage of predominantly late Paleoindian tools, to explore the occupation of the Cloquet River area in northeastern Minnesota. Unfortunately, the ecological and topographic nature of that setting, as well as the distribution of those sites, prevents comparison with Goff Creek. On the Southern Plains, the benefits of this approach have been advocated by Jack Hofman, who encouraged Banks' (1993) study of Farra Canyon in western Oklahoma and Wetherill's (1995) study of the lower Kansas River in eastern Kansas. Lail (1997), using what he termed "gravel bar archaeology," has also summarized the early occupational history of the Canadian River in eastern Oklahoma.

Provenience information was not available for the 103 projectile points collected from the gravels of Farra Canyon, including 15 Paleoindian, 15 Archaic, 47 Terminal Archaic, 10 Late Prehistoric, and 16 unidentified fragments. Examining the frequency, raw material use, and breakage patterns of projectile points from each time period, Banks (1993) concluded that Farra Canyon had been the locale for predominantly camping activities rather than kill events from Paleoindian to Terminal Archaic times and that decreasing mobility was detected as these populations gradually focused on local resources. Banks (ibid.) indicates that hunting activities may have increased during the Late Prehistoric period, as logistical parties left the residential floodplains to hunt the surrounding canyons.

Two methods attempted by Banks which warrant discussion include his comparison of projectile point frequencies and breakage types by time period. Using aspects of Foley's (1981:176) absolute discard rate, Banks divided the number of projectile points represented for each time period by the approximate duration of each period. The dividends were then multiplied by 1000 and comparisons made between each time period. The standardized frequency of points was graphed as Paleoindian (6), Archaic (3), Terminal Archaic (23.5), and Late Prehistoric (13). The results showed Terminal Archaic forms to be most frequent whereas a trough is observed between Paleoindian and Terminal Archaic times. The low frequency of Archaic points, as well as the selection of local raw materials, is argued by Banks to represent those populations being less mobile than Paleoindian groups but more mobile than Terminal Archaic groups, therefore making fewer and briefer stops along Farra Canyon. However, following this line of reasoning, the frequency of Paleoindian points might be expected to be still smaller than Archaic points, and it is not. There are several variables which would influence the number of tools recovered for the Archaic period, including tool kit size, tool loss, tool discard schedules, and the number of people present to lose or discard those tools.

Following Fawcett (1986), who expects projectile point tips to dominate kill sites and complete points and bases to dominate camping and processing sites, breakage patterns among points from Farra Canyon were compared. Most of the projectile points from Farra Canyon were either complete or represented by basal fragments, and chi-square tests did not recognize a significant difference between the Paleoindian, Archaic, and Terminal Archaic samples. Banks (1993) interprets these findings to indicate that Farra Canyon experienced mainly camping activities from Paleoindian to Terminal Archaic times.

Although breakage patterns can be a useful method for discerning tool function, tool completeness alone will not distinguish activities. Furthermore, the premise that kill sites will be dominated by projectile point tips, a rather dated assumption (i.e., Davis 1953), is demonstrably false. The Cooper bison kill site, for example, yielded the remains of 34 Folsom projectile points associated with the bonebeds or their slump, and only 13 (38%) of these are represented by tips and/or midsections (Bement 1997).

Along the lower Kansas River, in a section recognized as the Bonner Springs locality, a number of Paleoindian tools have been collected by avocational archaeologists. Wetherill (1995) examined 56 projectile points, including the types

Clovis, Plainview, Agate Basin, several Dalton, and some Cody varieties, to address the question of what may have attracted Paleoindians to the locality and what activities occurred there. All of the points described by Wetherill were found on one of 17 gravel bars recognized along the drainage, providing some provenience information.

Wetherill uses essentially two lines of evidence to argue that the lower Kansas River witnessed predominantly hunting activities during Paleoindian times. Although not quantified, Wetherill (1995:70) reports that a number of the points exhibit impact fractures with no evidence of repair. The bulk of the analysis, however, is dedicated to Reid's (1981) proposition that large campsites can be distinguished from small camps and kill sites based on the Coefficient of Variation (CV) observed among projectile points. In theory, more variation is expected in large campsite collections and less variation is expected in assemblages from small camps and kills. Comparing the CV values of the Bonner Springs sample to those calculated for Rogers Shelter, the Hawkins cache, and other Dalton collections, Wetherill demonstrates that variation among the Bonner Springs sample is relatively low.

There are, of course, several problems with this method. Significant variation can be expressed by a single individual (Cross 1983). And, although kill sites may contain projectile points that were manufactured by a limited number of people (Bamforth 1991b), those points may vary if they were made during periods when raw material availability fluctuated (e.g. Hofman 1988). It is particularly troubling that the CV for the Hawkins cache, interpreted to be an individual's tool kit (Morse 1971), yielded the second highest amount of variation when point length, width, thickness were measured, and demonstrated the most variation when only point width and thickness were considered (Wetherill 1995:68).

A unique quality of the Bonner Springs study is the provenience information which exists for the collection. The 17 localities recognized along the drainage have yielded varying numbers of projectile points, with points clustering in two areas. Wetherill (1995:93) demonstrates a relationship between artifact clusters and potential river crossings, arguing that hunting parties could plan kills at these locations. While there is no evidence that the Bonner Springs sample suffers from collector bias, Goff Creek demonstrates that creek accessibility also encourages artifact collectors, and that caution should be exercised when determining connections to prehistory.

All of these studies reflect the challenges that are faced in using private collections, offering innovative techniques, and encouraging alternative perspectives. The Goff Creek collection demonstrates many of the analytic limits inherent to avocationists' collections. Little valuable information can be gleaned from, for example, the numerous end scrapers, knives, and flake debris collected from Goff Creek. Ebert (1992:12) has suggested that removing time from artifact distributions may help archaeologists recognize the repetitive repositioning of human systems across the landscape. Avocational collections seem more likely to reflect the repetitive repositioning of the collector on the landscape. This analysis therefore focuses on the projectile points recovered from Goff Creek, which provide a general measure of time and can be compared for evidence of adaptive change and more.

Artifact Frequencies

Some of the most popular, important, and debated research on the Southern Plains is formulated around the relationship between prehistoric human groups and the environment. Climatic, biotic, and archaeological evidence indicates that the environment strongly conditioned human adaptations on the Plains. These changes are most evident during the Altithermal (Antevs 1955), a hot-dry period between about 7500 and 4500 years ago (see Meltzer and Collins 1987). Locally, the Palo Duro Creek record shows a significant period of erosion occurring between 6800 and 5500 years ago (Frederick et al. 1993).

The conditions of the Altithermal are argued to have affected bison (Dillehay 1974) as well as human (Benedict 1978; Hughes 1991) populations on the Plains. The impact on human groups is evidenced by the paucity of Middle Archaic sites and the drastic measures people were taking at some locations (Meltzer 1991). On the other hand, the number of middle Holocene sites may be seriously biased by the geomorphological processes associated with the Altithermal (Mandel 1995; Reeves 1973; Wyckoff 1984). Assuming that these sites are deeply buried and/or washed away, artifacts from secondary deposits, such as Goff Creek, may provide an alternative record of human presence, at least within the respective watershed.

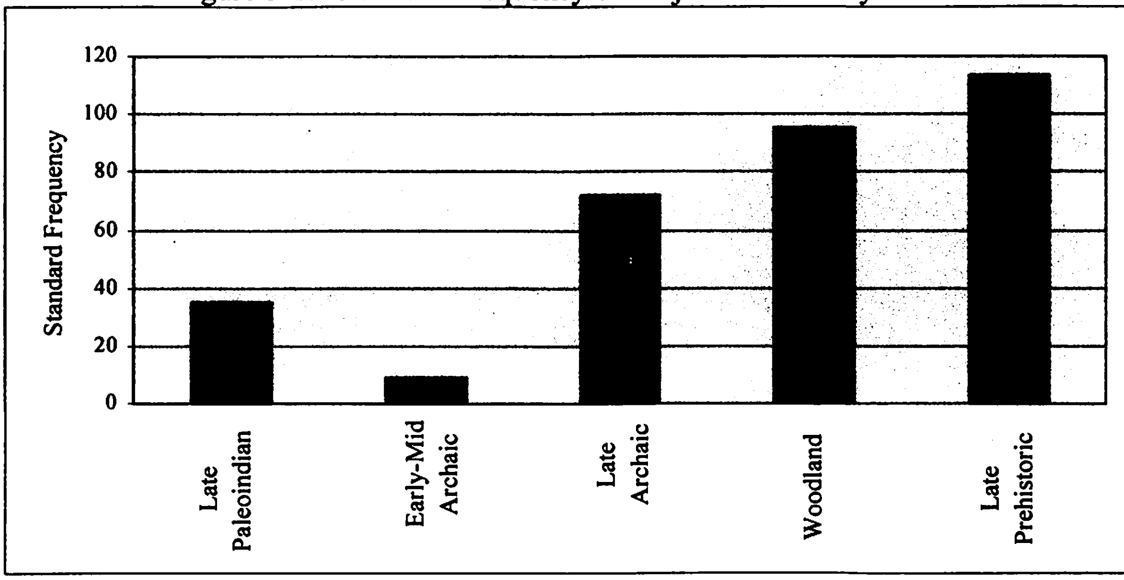
The projectile points from Goff Creek were organized into five time periods: Late Paleoindian (Tables 4-3 to 4-7), Early and Middle Archaic (Tables 4-8 to 4-12), Late Archaic (Tables 4-13 to 4-15), Woodland (Tables 4-17b to 4-18c), and Late Prehistoric (Table 4-18d to 4-18h). The number of projectile points assigned to each group and the approximate time span of each period are presented in Table 5-1. To accommodate the potential for, for example, late McKean and early corner-notched occupations, some overlap is afforded between the Middle Archaic and Late Archaic periods. Following Banks (1983) and Foley (1981), the number of projectile points from each time period were divided by the duration of each period, then multiplied by 1000 for comparison (see also Thurmond 1990:236-238).

The standard frequency of projectile points from Goff Creek (Fig. 5-1) demonstrates that although Late Archaic corner-notched points are the most common forms in the collection, considering that they may have been discarded during a 2600 year interval, their frequency is relatively low compared to the number of points discarded or lost during Woodland and Late Prehistoric times. The same is true for Late Paleoindian points, which are numerous in the collection but also experienced a lengthy period of use. The number of Late Prehistoric points

Table 5-1. Temporal Units and Projectile Point Frequencies

Period	Sample size /	Time Interval (B.P.) x 1000 =	Standard Frequency
Late Paleoindian	73	10,100-8000	34.8
Early-Middle Archaic	43	8000-3000	8.6
Late Archaic	187	4000-1400	71.9
Woodland	57	1400-800	95.0
Late Prehistoric	34	800-500	113.3

Figure 5-1. Standard Frequency of Projectile Points by Period

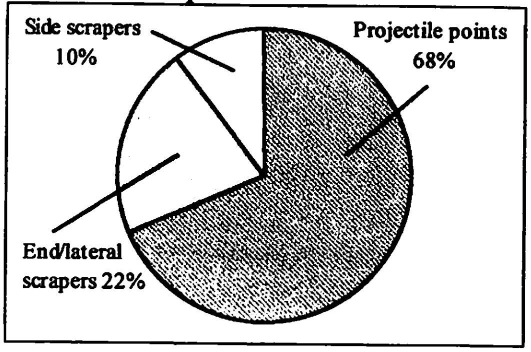


discarded during a 300-year interval is remarkably high and is certainly biased by the visibility and integrity of the Tucker's Blowout site (Brooks and Flynn 1988), where 12 Washita and Fresno points were recovered by Bill and professional archaeologists during several intensive surveys of the area.

The meager number of Early and Middle Archaic projectile points observed by Banks (1983) from Farra Canyon is also apparent at Goff Creek. Considering the common fluvial origin of the projectile points, geomorphological factors are not deemed a significant bias. Rather, it seems clear that cultural activity within Goff Creek was severely limited during this period. Admittedly, the Goff Creek sample can only speak for itself, but if this pattern can be demonstrated in other drainages, greater resolution may be provided for mid-Holocene impacts on the Southern Plains. Variations may also help identify what areas and resources were attractive to groups between 8000 and 4000 years ago. Goff Creek, for example, seems to have attracted Calf Creek groups between 5500 and 4800 years ago.

The ratio of artifact classes may also shed light on what activities were stressed in specific settings. Tool classes that are mutually exclusive of kill and camp activities may not exist, but the frequency of select tools might better illustrate the long-term role of specific settings. Projectile points and scrapers, for example, can occur at kill/processing sites as well as base camps. However, a watershed that is dominated by projectile points and contains few scrapers may be argued to have witnessed several kills but relatively brief occupations. On the other hand, an abundance of scrapers and few projectile points would be unlikely if kills were common in the drainage. The ratio of projectile points to scrapers in the Goff Creek collection (2.15:1) demonstrates that numerous kills and several processing/camp sites may have occurred along Goff Creek. However, because we are examining more than 10,000 years of prehistory and the remains of several

Fig. 5-1a. Frequency of Projectile Points and Scrapers from Goff Creek



cultures that organized themselves differently, there is no way to estimate what the ratio of projectile points to scrapers should be if both of these activities were equally common along Goff Creek.

Comparison can be made with multicomponent occupations from different topographic settings, such as the Muncy site. Also collected and documented by Bill White (1987), the Muncy site is situated in the uplands approximately 5 miles south of Goff Creek (Fig. 3-2). Collector bias should be minimal, considering that Bill produced both samples. At Muncy, the ratio of projectile points to scrapers is approximately 4.5:1. The large number of projectile points, in relation to scrapers, demonstrates that intercultural differences in settlement strategies and tool discard can seriously affect the ratio of tool types between two settings. Nearly half of the projectile points from the Muncy site (408/1022) are Woodland/Late Prehistoric forms, whereas only about a quarter of the Goff Creek collection (91/349) are Woodland/Late Prehistoric points. Comparison with another drainage collection having a similar occupational history may be more appropriate, but such a collection has not been documented in the vicinity of Goff Creek.

Raw Material Selection

The Goff Creek collection demonstrates that Alibates silicified dolomite was, without question, the most important and influential lithic resource in the area, accounting for approximately 73% of all the chipped stone. Over the past 12,000 years people have visited the Alibates quarries and used its stone, eventually trading and guarding the resource (i.e. Lintz 1986), and leaving more than 500 quarry pits in the outcrop near Alibates Creek. Alibates exhibits excellent fracture qualities, but is also a beautifully colorful and distinctive stone (Banks 1990). Further, Alibates is a small, isolated lithic resource in a region blanketed by rather bland gravels that are knappable but of lower quality. It is therefore necessary to consider Alibates a much-sought raw material rather than a single resource choice among many.

The notion that the distribution of lithic raw materials influenced hunter-gatherer mobility has been explored from several perspectives. A rudimentary but important quality of raw material sources is their limited, fixed, and predictable distribution on the landscape (Goodyear 1989). Based partly on this fact, archaeologists have predicted relationships between raw material availability, tool-using behavior, and settlement mobility. For example, Binford (1979) contends that raw material acquisition was incorporated into the settlement round of hunter-gatherer groups, therefore not significantly influencing technological strategies such as curate behavior and expedient tool use. Bamforth (1986) argues that raw material availability directly influenced the way groups treated and maintained their stone tools. The distribution of raw materials in Virginia and Arkansas is even argued to have encouraged some Paleoindian groups to become "tethered" to specific resources, including lithics (Gardner 1977; Gillam 1995).

There are a number of isolated lithic sources which share characteristics with the Alibates source, but few that were so popular on the Plains during prehistory. Reher (1989) has explored the "Spanish Diggings" of Wyoming in terms of how large lithic quarries influenced regional transport systems, but dedicates the thrust of his paper to documenting the labor associated with quarrying suitable stone (*contra* Binford 1979). A similar situation is observed at the Alibates flint quarry, where individuals exhausted remarkable amounts of energy while attempting, sometimes unsuccessfully, to dislodge blocks of stone from the outcrop.

The distribution of raw materials in Cimarron County, Oklahoma, is documented by Saunders and Saunders (1982), who demonstrate Alibates clustering in the southern half of the county and Dakota/Tesesquite clustering in the northern half. Goff Creek, located nearly 140 km from the Alibates quarry, demonstrates varying supplies during prehistory and illustrates the material's relative frequency and condition when it reached the drainage.

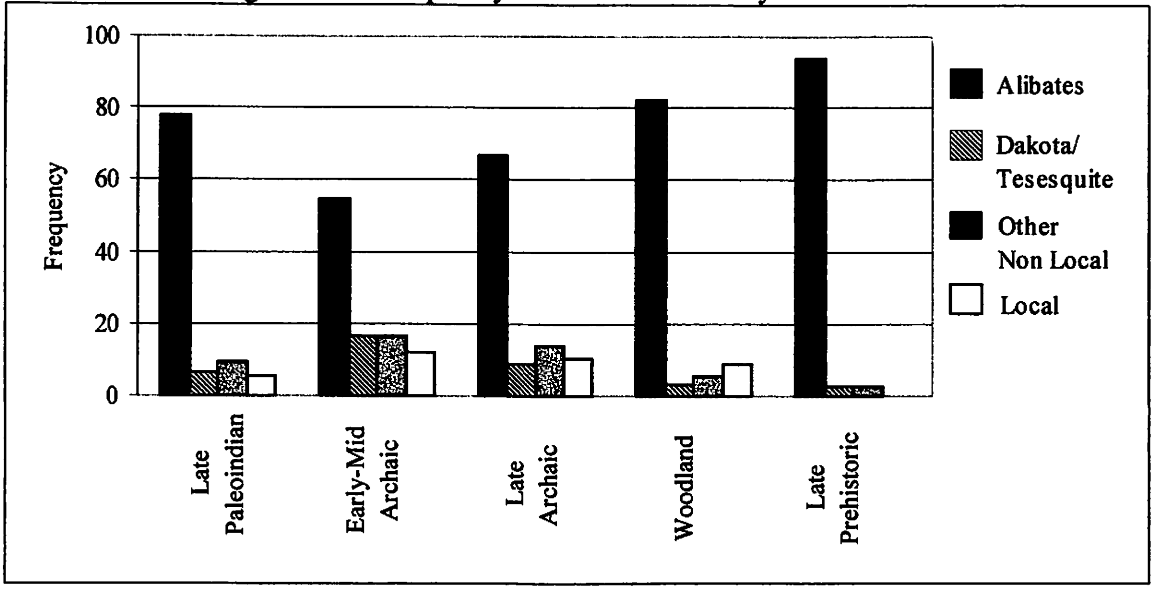
Using the samples identified for Table 5-1, raw material use was examined for each time period. Again, early Paleoindian points were excluded because of the small sample size, although it is worth noting that Edwards chert is well represented among the fluted points. Using a threshold of 40 km, the raw materials represented at Goff Creek are classified as local (Ogallala Formation materials and opalite) and non-local (Alibates, Dakota/Tesesquite, and other exotic stone). A single projectile point made from an unidentified material was dropped from the Early-Middle Archaic sample.

The frequency of Alibates and other non-local and local lithics (Fig. 5-3) demonstrates varying levels of mobility and commerce throughout prehistory. The Paleoindian sample shows a strong reliance on Alibates and likely reflects direct acquisition by highly mobile populations. The use of Alibates during the Early and Middle Archaic is somewhat lower, however, and indicates that although Alibates remained the dominant raw material, significant amounts of quartzite from the mesas and canyonlands around Black Mesa were also important. This does not apply to the Calf Creek evidence from Goff Creek, which includes projectile points and preforms all made from Alibates. The other non-local lithic types used during the Early and Middle Archaic include small amounts of Edwards, Tecovas, Niobrara jasper, and Wreford. The use of local resources is most common during this period, with nearly 12% of the projectile points being made from Ogallala quartzite.

Table 5-2. Distribution of Raw Materials by Time Period

Time Period	N	Alibates	Dakota/ Tesesquite quartzite	Other Non-Local	Local (Ogallala and Opalite)
Late Paleoindian	73	57	5	7	4
Early-Middle Archaic	42	23	7	7	5
Late Archaic	187	125	16	26	20
Woodland	57	47	2	3	5
Late Prehistoric	34	32	1	1	0

Figure 5-3. Frequency of Raw Materials by Time Period



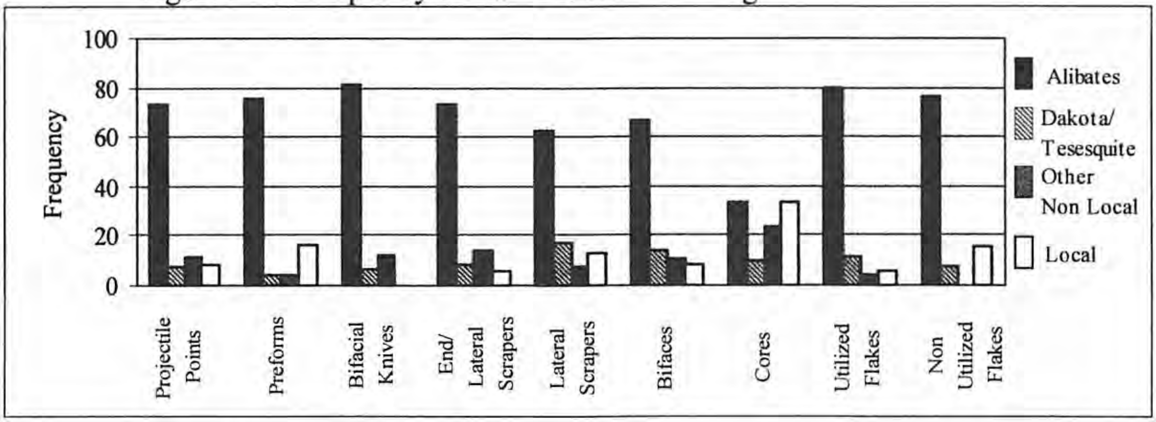
Alibates is slightly more common during the Late Archaic, but those groups, too, demonstrate moderate use of alternative sources. Edwards, Niobrara jasper, Tecovas, and even obsidian are noted in the Late Archaic sample, and local lithic types still account for 11% of the points. Although trade is noted among Late Archaic groups (Boyd 1997), it is reasonable, given the amount of Alibates observed in the sample (66.8%), to assume that Alibates was normally procured directly from the quarries throughout the Archaic. An even greater supply of Alibates is observed at the Sanders site, where 12 of 13 projectile points were made from the material (Quigg 1997:61). Boyd (1997) and others suspect that these groups were highly mobile, moving between the High Plains and Rolling Plains on a seasonal schedule. Brosowske (1996), relying on Shott's (1986) model of technological organization as well as raw material use, argues, however, that Late Archaic populations were less mobile than previous Calf Creek groups. Based strictly on raw material use at Goff Creek, Early-Middle and Late Archaic hunters were using nearly equal amounts of non-local stone. On the other hand, trade may be responsible for a small amount of the more distant raw materials, such as obsidian, in the Late Archaic sample. Based on raw material use, there is no evidence that Late Archaic groups manufacturing small corner-notched points (Ellis) were less mobile than the Late Archaic groups using large corner-notched (Marcos) points.

The frequency of Alibates is still higher during the Woodland period, whereas other types of exotic stone are less common. Explanations for the change in raw material use include a shift in mobility and territory size, trade, and the simple fact that at least two arrowheads can be manufactured from a flake that may produce only one large dart point. The alternative explanation for the increase in Alibates is that Woodland groups were more mobile than Late Archaic groups. While Boyd (1997) and others characterize Lake Creek and Palo Duro complex peoples as extremely mobile, it is unlikely that either population moved more

Table 5-4. Distribution of Raw Materials Among Select Tool Classes

Tool Class	N	Alibates	Dakota/ Tesesquite	Other Non Local	Local (Ogallala and Opalite)
Projectile Points	469	343	34	54	38
Preforms	49	37	2	2	8
Bifacial Knives	16	13	1	2	0
End/Lateral Scrapers	148	108	12	20	8
Lateral Scrapers	70	44	12	5	9
Bifaces	94	63	13	2	8
Cores	21	7	2	5	7
Utilized Flakes	243	193	27	9	14
Non Utilized Flakes	325	249	23	2	51

Figure 5-4. Frequency of Raw Materials Among Select Tool Classes



frequently or farther than did bison-oriented groups during the Late Archaic. Trade is most certainly responsible for the nearly exclusive use of Alibates during the Late Prehistoric period, the only sample which does not contain at least some local stone.

Given the overwhelming use of transported Alibates along Goff Creek, select tool classes were compared in order to better observe expedient tool use (Table 5-4). Projectile points, end scrapers, bifaces, and other "curated" tool classes regularly contain between 60% and 80% Alibates. The only tools which do not show a heavy reliance on Alibates are the 21 cores recovered from the creek. More than half of these are made from non-Alibates exotic stone or local resources. The foreign materials are usually Niobrara and Tecovas jaspers, perhaps discarded by groups approaching or leaving the Alibates source area. While local Ogallala and opalite cores are also well represented, the amount of flake debris made from Alibates is evidence that, while not discarded as regularly, Alibates cores were more commonly used within and carried beyond Goff Creek. The distribution of raw materials within the end/lateral scraper class is most similar to that observed among the projectile points, perhaps reflecting similar raw material preferences for these tool classes.

Tool Breakage

The relationship between tool breakage and tool function has been explored using buried (Ahler 1971; Bradley 1974; Frison 1987) and surface (Hofman et al. 1990) assemblages, and may distinguish points used as missiles from those used as knives. The broken points from Goff Creek were classified as having impact or snap fractures (see Dockall 1997; Odell and Cowan 1986). Impact fractures are good evidence that the tool was used in a kill situation, whereas snap fractures may occur during missile or knife-like functions. Tool completeness may also indicate different activities. Complete tools that do not appear to be exhausted are likely associated with tool loss, whether massive (e.g., large kills) or piecemeal (e.g., small kills and camps) in scale. Point base fragments, on the other hand, are expected at camp sites where tools are returned and rejuvenated or replaced (i.e. Binford 1979). Unfortunately, because basal elements are also the most diagnostic portion of projectile points, analysis of mixed surface collections will be biased towards those forms which retain the base. A number of dart and arrow tips and midsections may be affiliated with Early to Late Archaic or Woodland to Late Prehistoric groups.

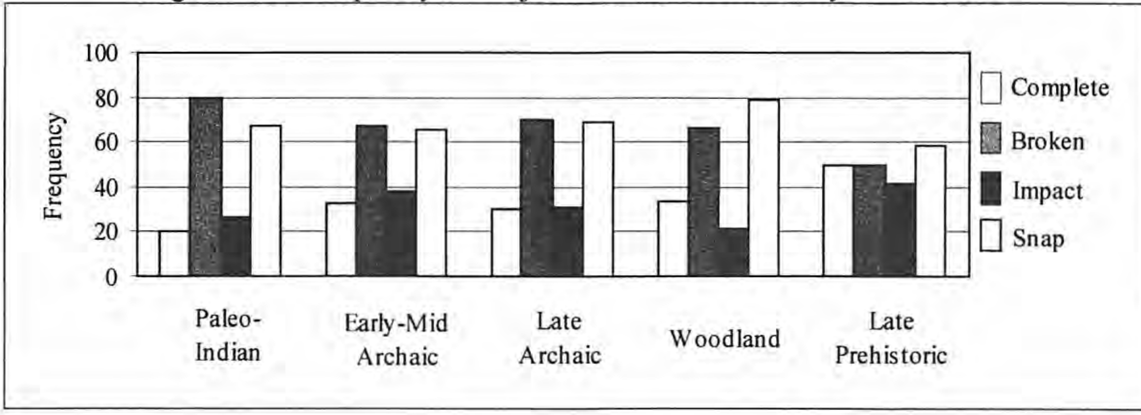
Paleoindian groups left the smallest percentage of complete points along Goff Creek, whereas Late Prehistoric groups left the highest percentage of complete points (Table 5-5). Tool loss between these widely different groups would be partly influenced by their technologies. Paleoindians, for example, invested significant energy into their points compared to Late Prehistoric arrowheads, probably encouraging tool recovery. Further, spears may be easier to relocate than small arrows propelled by a bow. The Archaic and Woodland frequencies are closely similar and may simply reflect the number of points bison hunting groups could expect to lose during kills or because of misplacement.

The breakage of certain projectile points has undergone some valuable experimentation. Many of these efforts, however, have focused on morphological change and the implications for projectile point typology (i.e. Flenniken 1985; Flenniken and Raymond 1986; Thomas 1981). On the Southern Plains, the ratio of impact and snap fractures has been documented at the Shifting Sands site (Hofman et al. 1990). Altogether, nearly 60% of the broken points from Shifting Sands were impact fractured, a percentage that far exceeds those observed at Goff Creek. Factors which may influence breakage patterns in a kill situation include tool morphology, hafting technique, propulsion technology, angle of impact, target resistance, tool recovery, and the geological setting of the kill site.

Table 5-5. Projectile Point Condition by Time Period

Time Period	N	Complete	Broken	Impact	Snap
Paleoindian	80	16	64	17	43
Early-Mid Archaic	43	14	29	11	19
Late Archaic	187	57	130	38	85
Woodland	57	19	38	8	29
Late Prehistoric	34	17	17	7	10

Figure 5-5. Frequency of Projectile Point Condition by Time Period



The frequency of impact and snap fractures varies slightly through time (Fig. 5-5), with impact fractures ranging between approximately 20% and 40% of the sample. The Early-Middle Archaic (37.9%) and Late Prehistoric (41.2%) points show the highest frequency of impact fractures, while Paleoindian (26.6%) and Woodland (21.1%) points exhibit many fewer impact fractures. At 29.2%, the Late Archaic points exhibit a moderate frequency of impact fractures. These numbers do not complement the intensive bison hunting practiced during Paleoindian and Late Archaic times, adaptations which should produce more impact fractures relative to other periods. The Early-Middle Archaic points display a breakage pattern most similar to the Late Prehistoric sample collected largely from the Tucker's Blowout site, an excavated bison kill/processing site. Although the Early-Middle Archaic sample is small and typologically diverse, it appears that many of those groups were conducting small kills.

Tool Maintenance

The fact that tool maintenance varies through time and across space has provoked an extensive amount of literature on human mobility and settlement, raw material availability, ecological constraints, economic risk, and tool design (i.e. Bamforth 1986; Binford 1979; Bleed 1986; Kuhn 1994; Nelson 1991; Odell 1996; Shott 1986; Torrence 1989). Several researchers have attempted to characterize Southern Plains prehistory in terms of a forager/collector construct. Based on work at the Lubbock Lake site, for example, Johnson (1997) suspects that foraging adaptations were practiced during Clovis, Middle, and Late Archaic times, whereas a collector model was used by Late Paleoindian and Early Archaic groups.

The Goff Creek collection does not lend itself to such an endeavor, which must examine the entire technological system and how it varies across the landscape. Rather, Goff Creek shows how extensively maintained projectile points appear to have been when they were left at a particular place on the landscape. Variation through time will not identify more or less "curated" technologies for two important reasons. First, all of the artifacts belong to a curated tool class - projectile points. Of course, Plainview points were probably more difficult to replace than Washita points, and levels of maintenance may even vary within a curated tool class according to raw material availability and other constraints, but these issues must be examined in a context of intentional tool discard. A large number of the points from Goff Creek were likely lost. Furthermore, when dealing with mostly broken implements, there is no reliable way to determine how much maintenance a tool would have received had it not broken.

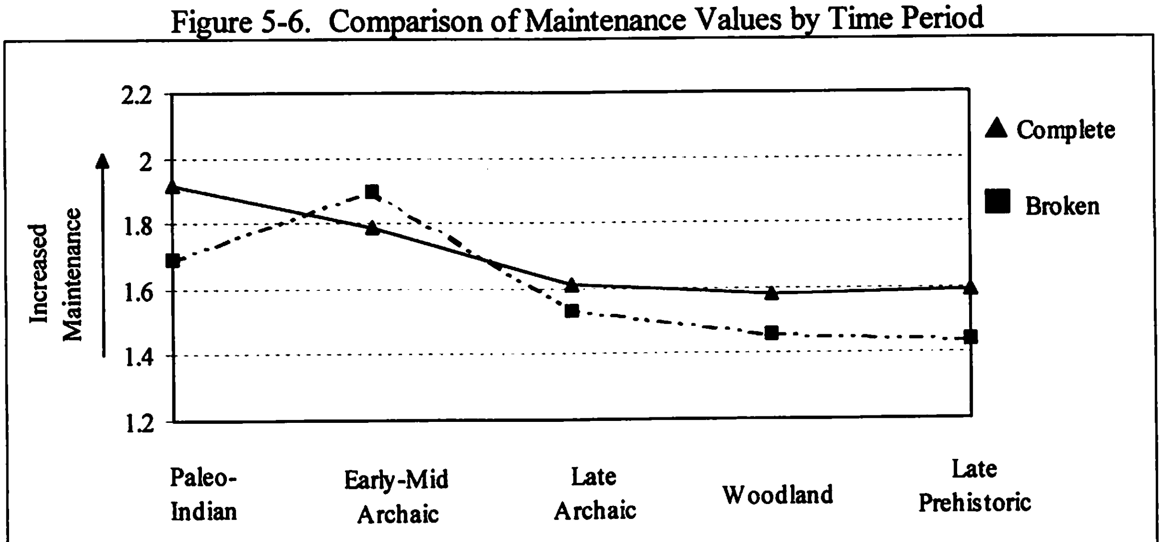
The projectile points from Goff Creek were classed as slightly, moderately, or extensively maintained, or resharpened. Slightly resharpened points show one or perhaps two retouch events, whereas extensively retouched points do not appear to possess any realistic utility. Moderately resharpened points exhibit intermediate levels of retouch. Each class was weighted, and complete and broken projectile points from each time period were compared (Table 5-6).

The maintenance levels observed in the Goff Creek collection demonstrate that Paleoindian and Early-Middle Archaic projectile points were generally more exhausted when they were lost or discarded compared to Late Archaic, Woodland, or Late Prehistoric forms (Fig. 5-6). Because nearly all of these tools were carried to Goff Creek and

Table 5-6. Maintenance Values of Complete and Broken Projectile Points

Time Period	Complete Points S=1	M=2	E=3	Total (weighted / N)	Broken Points S=1	M=2	E=3	Total (weighted / N)
Paleoindian (N)	4	6	3	25 / 13	19	17	6	71 / 42
Weighted	4	12	9	**1.92**	19	34	18	**1.69**
Early-Mid Archaic (N)	4	9	1	25 / 14	6	10	4	38 / 20
Weighted	4	18	3	**1.79**	6	20	12	**1.90**
Late Archaic (N)	32	14	10	90 / 56	67	36	13	178 / 116
Weighted	32	28	30	**1.61**	67	72	39	**1.53**
Woodland (N)	12	3	4	30 / 19	21	12	2	51 / 35
Weighted	12	6	12	**1.58**	21	24	6	**1.46**
Late Prehistoric (N)	9	6	2	27 / 17	10	5	1	23 / 16
Weighted	9	12	6	**1.59**	10	10	3	**1.44**

Figure 5-6. Comparison of Maintenance Values by Time Period



belong to a curated tool class, and because many of the points were probably lost before they could fulfill their use-lives, the variation observed here may only reflect how many retooling events the points experienced before entering the archaeological record. If this is the case, then Paleoindian and Early-Middle Archaic groups may have reached Goff Creek with tool kits that had experienced more use than those carried by later groups.

A potential explanation for this trend is the difference between directly acquired and traded raw materials. Direct acquisition would encourage at least some of an individual's tools to begin their use-lives near the source, whereas trade delays the manufacture of tools and therefore allows them to begin their use-lives much farther from the source. The Late Archaic sample complicates this scenario, since these groups probably obtained Alibates from its bedrock source but visited Goff Creek with relatively new projectile points.

The trend for complete points to be more extensively resharpened than broken points has a number of potential behavioral ramifications, many of which are probably spurious. Breakage shortens a tool's use-life, and a full use-life and discard ends a tool's potential for breakage. This logic is defied, of course, by the Early-Middle Archaic sample, which is anomalous.

Artifact Provenience

As demonstrated in Chapter 1, creek accessibility greatly influenced the number of artifacts Bill collected from particular portions of the drainage. An analysis was performed to investigate whether Paleoindian, Archaic, Woodland, and Late Prehistoric points occurred in different sections of the drainage. A shift in projectile point distributions could indicate changing activity areas through time. Unfortunately, the previously recognized clusters (Fig. 1-4) were again expressed when points from each time period were plotted separately. The same clusters were observed when projectile points were plotted against other tool classes. The distribution of impact and snap fractured projectile points does not reveal any discernable pattern and may also be affected by collector strategy as well as fluvial transport.

Discussion

The Bill White collection provides information on prehistoric activities along Goff Creek - evidence and insight that we would otherwise lack. The distribution of stone tools along the watershed may not identify changing activity areas or attractive topographic features, but important aspects of collector behavior are demonstrated and should contribute to continued work with avocational collections. On the other hand, while repetitive surveys (or "recurrent archaeology") may introduce some distributional bias, they garner a remarkable record of occupational history. A single-pass survey of Goff Creek today would probably discourage most archaeologists. This section concludes the Goff Creek study by summarizing what groups visited the drainage and what changes are evident in the stone tool assemblage.

The early Paleoindian evidence from Goff Creek is scanty and likely reflects the depositional history of the creek. Late Paleoindian tools, however, are well represented. A few Agate Basin and Cody forms are recognized, but Plainview and Frederick/Allen points are by far the most common projectile points in the collection. Both of these populations demonstrate a heavy reliance of Alibates, in a manner not equaled again until Woodland and Late Prehistoric times. The projectile points these groups left at Goff Creek are the most heavily maintained in the collection, perhaps reflecting the number of retooling events that took place between the Alibates source and Goff Creek. Palo Duro Creek, where Plainview hunters made at least one kill (Peterson 1988), would have provided a sheltered corridor between Goff Creek and the Alibates quarries. Relative to other periods, the frequency of impact fractures is low among the Paleoindian points.

Dated between 10,100 and 9000 years ago, Plainview groups on the Southern Plains witnessed a favorable environment. The geomorphological record at Palo Duro Creek reflects a marshy valley floor and ponding until about 9000 years ago (Frederick et al. 1993). The Plainview groups who passed along Goff Creek were also near the northern limit of large Plainview occupations. How far those groups ventured into the Central Plains is not documented. One of the Plainview points from Goff Creek is made from Flattop chalcedony, and a few others demonstrate that these groups visited the mesas and canyonlands of the Black Mesa area, but these are rare examples. A much stronger reliance on Dakota/Tesesquite quartzites is observed farther west at the Nall site, but Alibates still accounts for nearly half of the Plainview projectile points collected there. Niobrara jasper, used nearly exclusively at the Red Smoke site in Nebraska (Davis 1953), is not observed in the Plainview collection from Goff Creek and is rare in the Nall assemblage as well. On the other hand, one of the points described as Plainview from the Red Smoke site in Nebraska is made from Alibates (Davis 1953). Continued work in western Kansas is needed to understand the geographic range of Plainview populations over the Central and Southern plains.

Frederick/Allen points are relatively numerous in the Goff Creek collection. These groups are not recognized, however, in the cultural chronology of the Southern High Plains. Based largely on the Lubbock Lake site, the stratigraphic record of the Llano Estacado is Clovis, Folsom, Plainview, two unnamed components, Firstview, and an ephemeral Early Archaic flake assemblage (Johnson 1987, 1997). The unnamed Paleoindian substrate, dated between 9780 and 9200 years ago, may be too old for Frederick/Allen occupations. The unnamed Early Archaic assemblage (ca. 8000) dates near the end of Frederick/Allen times. Recent work at the Nall site recovered a Frederick/Allen base fragment within a paleosol dated around 7900 years ago (LaBelle 1998).

The presence of Frederick/Allen groups on the Southern Plains has been partly obscured by the sometimes arbitrary distinction of "Texas Angostura." Some of these forms possess strongly tapered bases (see Thoms 1993) and probably deserve to be distinguished from the Angostura points at the Ray Long site (Wheeler 1995), but other examples illustrated in Turner and Hester (1985) and Alexander (1963) better resemble the points recovered from Hell Gap and James Allen (Irwin-Williams et al. 1973; Mulloy 1959). The diversity of parallel-oblique flaked forms, and their distribution from the Prairie-Plains to the Rocky Mountains, suggest that several groups with perhaps different economic pursuits were using these tools at the end of the Paleoindian period. Comparison of the Plainview and Frederick/Allen evidence from Goff Creek and the Nall site identified subtle differences indicating that Frederick/Allen groups were performing fewer or briefer hunts and spending less time on the creeks and playas of the Oklahoma panhandle, a shift that may relate to intensifying Holocene conditions after 9000 B.P. (Ballenger 1999).

The Early and Middle Archaic evidence from Goff Creek is limited. Partly fluted side-notched points may date to the late Paleoindian period, but this cannot be demonstrated. Logan Creek-using groups also passed through the area with supplies of Niobrara, Dakota/Tesesquite quartzite, and Alibates. The mid-Holocene incision of Palo Duro Creek occurred between approximately 6800 and 5500 years ago (Frederick et al. 1993) and may signal the climax of the Altithermal conditions in the region. Subsequent groups in the panhandle area were diverse, as evidenced by Calf Creek, Martindale, McKean, and other projectile point types. Together, the Early and Middle Archaic samples comprise the lowest frequency of projectile points. It is unlikely that the small number of Early and Middle Archaic forms is significantly influenced by the geological processes of the Altithermal, since all of these points were found in a fluvial setting. It seems more likely that human populations on the Southern Plains were reduced or displaced during the middle Holocene.

Raw material selection during the Early and Middle Archaic involved a reduction in the use of Alibates and an increase in the use of other non-local cherts and jaspers. Use of local lithic resources increased only slightly during the Early and Middle Archaic and certainly does not support the notion that these groups were significantly more localized than Paleoindian populations. Rather, raw material selection became more diversified during the Early and Middle Archaic and may reflect the array of groups who visited Goff Creek between 7000 and 3000 years ago. The frequency of impact fractures indicates that these groups were focused on hunting activities while occupying Goff Creek, perhaps even more so than Paleoindian and Late Archaic groups who would have enjoyed better local conditions and apparently made temporary camps along Palo Duro Creek (Peterson 1988; Quigg et al. 1993).

Along Palo Duro Creek, the Sandy Ridge site (ca. 3450 B.P.) and the Sanders site (ca. 1700 B.P.) demonstrate that corner-notched dart points were in use for a considerable period of time. Environmental conditions along Palo Duro Creek during this period were characterized by seasonal marshes or ponded settings and a diversity of plant life, although drought conditions may have occurred near the end of the Late Archaic between 1700 and 1400 years ago (Frederick et al. 1993:428). Doug Boyd has integrated these sites into the Little Sunday complex, which:

> is intended to represent a cultural tradition or lifestyle that covers a long span of time and a broad geographical area....It is not intended to represent a specific group of people and is not analogous to a phase (Boyd 1997:266).

Although Boyd (1997:259) arbitrarily defines the northern border of the Little Sunday complex at the Texas-Oklahoma state line, the Late Archaic evidence from Goff Creek, using this definition, could probably be attributed to the Little Sunday complex. The Sandy Ridge and Sanders sites are only about 50 km from Goff Creek.

The problem at Goff Creek is that we do not understand the Late Archaic record farther north. Although archaeologists have adopted Southern Plains projectile point types such as Marcos and Ellis to describe Colorado forms, occupations such as McEndree Ranch (Shields 1980) demonstrate diverse economies and structures that distinguish those groups from Late Archaic bison hunters on the Plains. Kansas has better potential to demonstrate the northern limit of Late Archaic groups frequenting the Panhandle-Plains. The use of Alibates by those groups, and the sites where Niobrara or other raw materials begin to dominate local collections, would provide some helpful information.

One important trait observed in the lithic technology of Little Sunday complex sites is the extensive use of local raw materials. This characteristic applies most to Certain, Twilla, and other Late Archaic sites in the Rolling Plains southeast of Goff Creek. High Plains sites such as Chalk Hollow, Hoover, Sandy Ridge, and Sanders are dominated by Alibates, which in some cases outcrops nearly 100 km from the site. The middle of Goff Creek is nearly 140 km from the Alibates quarry.

Trade affiliations with groups who had access to the Flint Hills is demonstrated at McIntyre and Twilla. This relationship may have extended over to Goff Creek, as evidenced by the presence of Wreford chert. More common, however, are the corner-notched points made from Niobrara jasper. A Niobrara-using Late Archaic group has not been identified in Kansas, but someone was apparently bringing the material into Oklahoma during this time. The Boatstone Field site offers the possibility that Late Archaic groups around Goff Creek were tied into Little Sunday complex ceremony, but the recovered items are undated and rather wide compared to the Late Archaic lunate stones discussed by Boyd (1997:253).

Based on the comparison of Alibates use by Early-Middle and Late Archaic populations, the latter do not appear to be significantly less mobile or at all restricted to local resources. Assuming, however, that bison exploitation was seasonally organized during the Late Archaic (*sensu* Boyd 1997), then Goff Creek and other High Plains localities might be expected to reflect significant mobility if these assemblages were created during the hunting season. Seasonality data from Sanders indicate that the site was occupied over a period of perhaps three weeks during the spring (Quigg 1997). Alternatively, there is no evidence that Late Archaic groups used Goff Creek strictly for hunting, or wintered a significant distance from the drainage. The frequency of impact fractured points is slightly less during the Late Archaic compared to Early and Middle Archaic points, and a number of Late Archaic sites are documented in a variety of settings around Goff Creek.

The residential sites of Late Archaic groups frequenting Goff Creek have not been investigated in the Oklahoma panhandle, but several upland sites, such as Muncy, Johnson-Cline, and Muller, are good candidates for research. Sandy Ridge attests to camping activities along Palo Duro Creek, but the excavated Late Archaic component at that site is relatively small compared to the 65 corner-notched points recovered from the Muncy site. The projectile points from Goff Creek are not heavily maintained and appear to have been lost rather than discarded. If the analysis of upland collections could identify greater tool maintenance or similar variation at those settings, then a stronger argument could be made that Goff Creek was mainly visited during hunting activities.

Woodland period evidence from Goff Creek indicates the presence of Lake Creek and Palo Duro complex peoples, as well as other groups making Shadid and Edwards type projectile points. Cordmarked pottery is also present and is attributed to Lake Creek groups. Diatoms from Palo Duro Creek reflect a dry setting, occasionally inundated by rain rather than groundwater. Bison populations may have been low in some regions (Dillehay 1974), but were certainly available and hunted by Lake Creek groups. Plant processing is evident as well, but agricultural tools are not documented (Hughes 1991).

Again, Lake Creek groups are believed to have been highly mobile hunter-gatherers who developed out of Late Archaic populations, adopting some Woodland technologies and lifeways. Boyd (1997:294) suggests that, with an increase in plant foods and a decreased emphasis on bison, Lake Creek populations may have maintained a Late Archaic settlement strategy with perhaps longer stays at the residential base.

Judging from the number of Scallorn points observed in the Bill White collection, Goff Creek seemingly witnessed an increase in human activity during Woodland times. The nature of these activities is conjectural, however, considering the reduced frequency of impact fractures relative to Late Archaic times. The relationship between Late Archaic and Woodland settlement cannot be fully explored at a single locality, but Woodland groups demonstrate a significant increase in the use of Alibates and less use of other non-local stone. Quartzites from the Black Mesa area are extremely rare and do not indicate a strong relationship with Woodland groups in that area. Although it cannot be demonstrated here, trade relations are a plausible explanation for the increase in Alibates and the decrease in other non-local raw materials. So, although the mechanisms for a change in raw material use are not fully understood, it is unlikely that such change would occur if Woodland groups practiced a settlement strategy very similar to that used during the Late Archaic.

Because many of the Late Prehistoric points and knives described here were recovered from a professionally excavated and reported bison kill site (see Brooks and Flynn 1988), little information can be added to our knowledge of Late Prehistoric activities along Goff Creek. Antelope Creek groups hunted along the drainage, making small kills, but are not known to have built farmsteads along the creek. Garza and other groups visited the area as well, but their artifacts are very rare. The number of Late Prehistoric points found by Bill gives the impression that Antelope Creek activity along Goff Creek was relatively common, but this may be biased by the degree of attention afforded the Tucker's Blowout site.

Conclusions and Afterthoughts

This study was conceived and performed with a number of goals in mind, some of which were quickly abandoned, and others that blossomed slowly. The analysis of Bill's collection methods was intended from the beginning, but I did not appreciate until much later in the analysis how important a role Bill White would play, at times overshadowing the archaeology. In trying to discern how people accumulate large collections, I have illustrated the systematic nature of Bill's methods. However, it was exactly Bill's system that, over time, created a strong bias in artifact distributions.

The artifact clusters developed along Goff Creek do not reflect an error on Bill's part. Archaeologists could not ask for a more conscientious or concerned advocate. Rather, Bill allowed himself and his methods to be scrutinized by the archaeological community, a torment that most people would decline. By doing so, Bill gave us the opportunity to quantify and test some of our assumptions.

The occupational history of Goff Creek is arguably one of the best records of human activity in the Oklahoma panhandle. Its limits are evident, but we hope this analysis has identified some strengths as well. The use of fluvial deposits to ascertain levels of cultural activity, for example, seems to be a reasonable approach but would benefit from more testing and consideration. Other analyses were expected to yield greater variability through time, such as more significant changes in raw material use, breakage patterns, and tool maintenance, that could be used to explore regional archaeological questions. What variation exists is discussed in such terms, but these are admittedly minor trends in relation to the cultural dynamics which must have occurred over the past 10,000 years. It is important to remember, however, that Goff Creek is a particular type of setting that probably attracted very similar activities throughout prehistory. A comparison to multicomponent playa lake sites, or other settings, would be simple and informative.

The Goff Creek collection demonstrates a number of groups occupying the Oklahoma panhandle during prehistory. Some of these people's remains have been well-documented in the region, whereas others have not. This information is explained within a context of cultural and environmental change on the Southern Plains, supporting some constructs, not supporting others. For whatever useful information this study provides, it is a product of Bill White's efforts and generosity.

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