THE WYOMING ARCHAEOLOGIST

VOLUME 29(3-4)
FALL 1986

THE WYOMING ARCHAEOLOGIST

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LETTER FROM THE EDITOR

This issue of The Wyoming Archaeologist contains six articles and three book reviews. Three of the articles were submitted by avocational members of the Wyoming Archaeological Society. It's nice to see such articles coming in from the membership. I hope to see more in the future. The other three articles were submitted by professional archaeologists working in Wyoming or the surrounding region.

Dale Wedel was the 1984 George C. Frison Scholarship winner. Wedel's paper published in this issue is based on research conducted as a student at the University of Wyoming following his receipt of the scholarship.

Please take note of the letters to the membership from Society President Carolyn Buff and Drs. Mark Miller and Danny Walker from the State Archaeologist's Office. Funding for printing of upcoming issues of The Wyoming Archaeologist is no longer available from their office. We (the Society) needs to find alternative sources of funding. Read their letters and try to come up with ideas. Contact any member of the Executive Committee if any ideas arise. We will be discussing this at the Spring Meeting in Casper.

ANNOUNCEMENTS

The 1987 Annual Spring Meeting of the Wyoming Archaeological Society will be held April 3-5, 1987 at Casper College, in Casper, Wyoming. The general format for the meeting will be similar to that in the past, with the business meeting Friday night (April 3), student papers of Saturday (April 4), banquet Saturday evening (April 4), and a field trip on Sunday (April 5). As plans are finalized, additional mailings will be sent to all members and chapters.

WYOMING
ARCHAEOLOGICAL SOCIETY, INC.

October 3, 1986

Dear WAS Members:

Unfortunately, the message I bring you in this issue is gloomy at best, and I will not make it long and boring.

Due to recent budget restrictions, the Office of the Wyoming State Archaeologist no longer has funds with which to publishe The Wyoming Archaeologist. This issue will be paid for by that office and then the Wyoming Archaeological Society must become responsible for it.

At the present tome, the only viable solution the Executive Committee can come up with is an increase in dues, with a portion of those dues earmarked specifically for publishing the Archaeologist. It is anticipated that this will come before the membership for vote at the annual meeting in Arpil 1987 in Casper.

If you have any suggestions for alternatives to raising dues, PLEASE forward them to any member of the Executive Committee in the very near future.

It is my sincere hope that economic conditions in Wyoming (and especially in Wyoming archaeologys) will improve in the near future.

Sincerely,

Carolyn M. Buff

Carolyn M. Buff
President

pc: Mark E. Miller

THE STATE OF WYOMING

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19 October 1986

Dear W.A.S. Member:

As you read this issue of The Wyoming Archaeologist, please note references to severe state budgetary restrictions that ultimately will affect the publication of this journal. For many years, this publication has been funded through the Wyoming Recreation Commission and State Archaeologist's office at no cost to the membership of the Wyoming Archaeological Society. During fiscal years 1985 and 1986, our printing budget was $5,500.00 annually. With this level of support, we could publish two issues of The Wyoming Archaeologist for W.A.S. and one issue of Occasional Papers on Wyoming Archaeology each year. We opened the present fiscal year in July 1986 with an annual printing budget of only $2,223.00, a reduction of over 40 percent. This has strongly curtailed our ability to provide publication services. In fact, we may have to suspend plans for future issues of Occasional Papers on Wyoming Archaeology indefinitely. This would be a devastating blow to our program and to Wyoming archaeology.

In September, we met with the Executive Committee of W.A.S. to discuss this topic. It was decided to try and continue publication of two issues of The Wyoming Archaeologist per year, using facilities at the Wyoming State Penitentiary in an effort to reduce cost. This should help. But unless there is a dramatic reversal of economic conditions in Wyoming and the State Archaeologist's budget can be built back up, we will need a more long term solution such as alternative funding for printing The Wyoming Archaeologist.

Please understand our commitment to Wyoming archaeology, but realize the budgetary constraints under which we must operate. I am sure that if we all work together, we will be able to keep the journal going.

Thank you,

Dr. Mark E. Miller
State Archaeologist

Dr. Danny N. Walker
Assistant State Archaeologist

cc: Al Bastron, P.E.
Director, Wyoming Recreation Commission

PRELIMINARY INVESTIGATIONS AT THE PLATT SITE (48PA848), PARK COUNTY, WYOMING

JIM PLATT AND SUSAN HUGHES

INTRODUCTION

On June 6, 1985, the North Big Horn Basin Chapter of the Wyoming Archaeological Society began excavations on a prehistoric campsite southwest of Cody, Wyoming. The site lying at the base of Cedar Mountain has produced over 68 projectile points and 64 tools and bifaces.

BACKGROUND

The site was discovered by the senior author (Jim Platt) on April 3, 1982. He had recently moved his family four miles up the South Fork of the Shoshone River. During one of his many walks throughout the area, he discovered a number of flakes eroding out of a small basin one mile from his home (Figure 1). Eight days later, he discovered a point.

On the flats above the basin, he found stone circles, a Hell Gap-like point and other artifacts.

None of the other localities were as prolific as the Platt site itself. A Folsom point found in 1984 created greater interest in the site as having a possible Paleoindian occupation.

Shortly afterwards, the North Big Horn Basin Chapter of the Wyoming Archaeological Society was reorganized. The chapter decided to excavate the site as a club project. The site was reported to the Wyoming State Historic Preservation Office, given a site number, and named the Platt site after its discoverer.

The junior author (Susan Hughes) offered to donate equipment and provide technical advice.

During the Archaeological Symposium held at the Spring Wyoming Archaeological Society meeting on April 5-8, 1984, George Brox and Mark Miller (soon to become State Archaeologist) visited the site.

A visit by Dr. George Frison on March 9, 1985 produced an olivella shell bead and a pottery sherd. A charcoal sample was collected from an eroding hearth. Dr. Frison took this sample back to the University of Wyoming for a radiocarbon date. The date is still pending.

An application was made to the State of Wyoming for a testing permit. Excavation began June 7th when club members put in a datum with north and west trending transects (Figure 2).

Actual excavations started the next day. Club members who participated over the following summer included: Jim Platt, his daughter Lisa, Roger Green, Susan Hughes, Bill Prentiss, Walt and Raymond Nelson, Debra Elwood, Claire Bouchard, Norma Strand, Frank and Nancy Zeller, Gene Romanski, John Wehren, Elizabeth Hawley, and Carl and Ilena Miller.

First, Units one and two were layed out and sod removed from unit two. While screening the sod, a small Shoshone type point was found

FIGURE 1: Overview of Platt site. View is to the west-northwest, with the site in the small basin in the center of the figure.

just below the sod. Flakes and pieces of worked glass were found *in situ* as work continued. Small fragments of charcoal were scattered throughout.

Carl Spath, National Register Archaeologist for Wyoming, and interns Bill McMillan and Gary Huckelberry visited the site July 17 to see if it was eligible for National Register nomination. They determined the site had the potential and they were going to apply for nomination.

On July 20 and 21, surface collecting of flakes and tools was begun. Two thousand square meters were collected. This was a big job since flakes were abundant and they were lost on the rocky ground surface. Temperatures were at an all time summer high that weekend as well.

Amidst the surface finds, purple bottle glass, thick window glass and shell casings were found. More shell beads, pottery, projectile points, and tools were recorded (Figure 3). Some of the glass had been flaked suggesting very recent occupation by Indians.

Local news reporters visited the site on August 10th. *The Cody Enterprise* printed a story on August 19th and the *Powell Tribune* ran a story on August 20th. *The Billings Gazette* and radio station KODI also picked up the story.

RESULTS

Four 2x2 meter units were begun in the 1985 field season. Unit 2 produced two possible layers. Both were badly deflated (Figure 4). Worked glass and a Late Period trinotch point were found in the upper level. The lower revealed a deflated hearth with a few small pieces of bone, flakes, and flecks of charcoal. No projectile points were found to help date this lower level, although glass was absent.

A large washed charcoal stain appeared in Unit 1 (Figure 5). Within the stain were small bone fragments and a few flakes. This level wasn't completed in the 1985 field season.

Unit 3 was placed on the edge of the basin near the spot where the

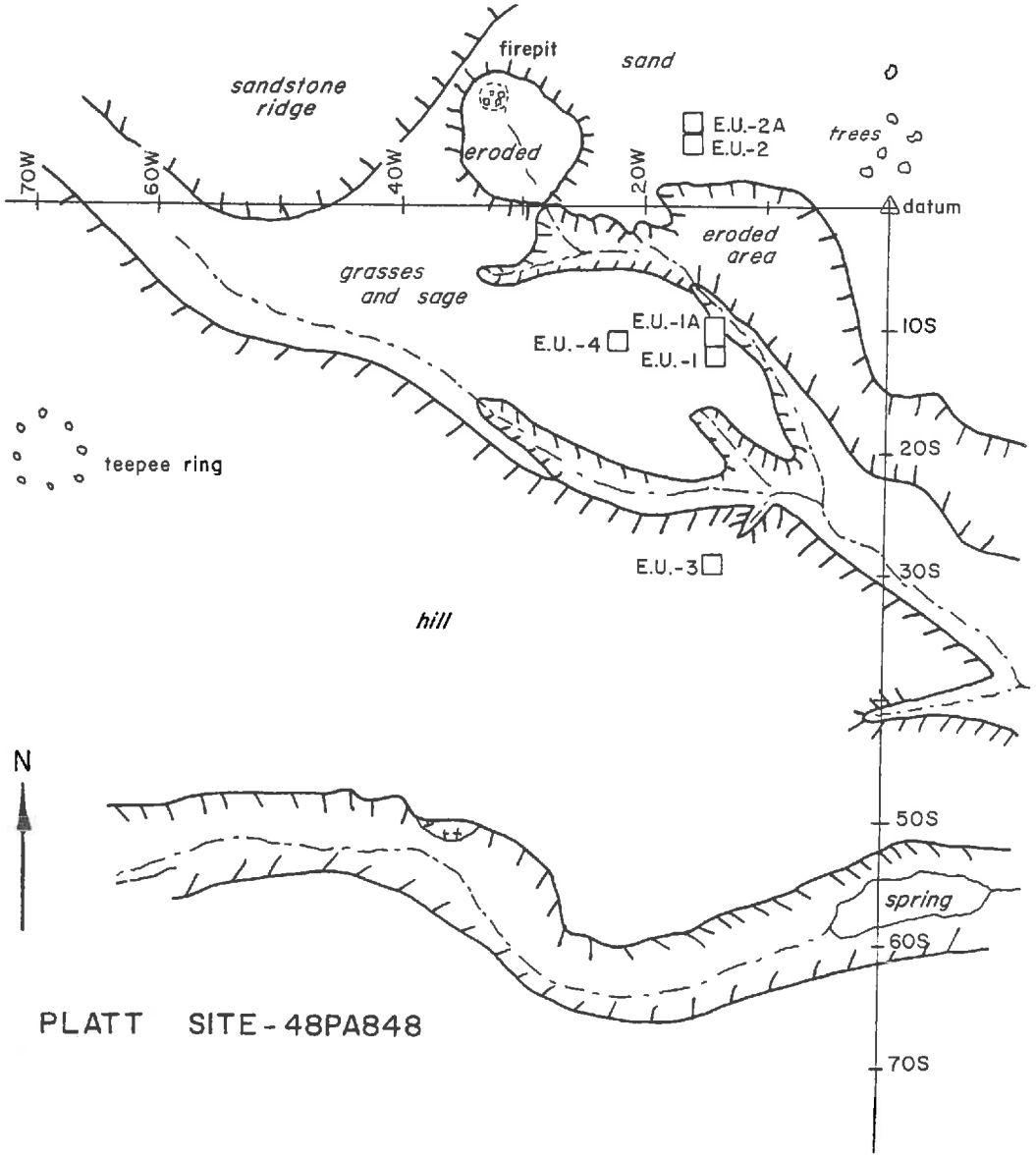

FIGURE 2: Map of Platt site, showing excavation units, surface collecting grid and geomorphic features.

Folsom point was found. Flakes occurred within the top ten cm, but below that, the soil was culturally sterile. The hope of finding a buried Folsom occupation diminished. The hopes diminished further when John Albanese, Casper archaeogeologist, visited the site. Albanese could see no buried paleo-sols in the profile. He also felt that the surface of the flats above the small basin were probably no older than 4500 yrs, and the deposits within the basin were considerably younger. This was collaborated by the point styles of the majority of the surface points. These ranged from McKean variants through Middle Archaic corner notch varieties, and Late Period side and tri-notch points. Work on Unit 3 was discontinued.

A fourth unit was opened in the center of the basin late in the summer. This has proved to be the most prolific area. The unit is

FIGURE 3: Surface artifacts from Platt site.

FIGURE 4: Plan view of Unit 2, Platt site. Note washed charcoal, with bone and stone scatter.

coming down on a well preserved firehearth producing large pieces of charcoal (Figure 6). Near the surface, two complete awls and a number of small pottery fragments were recovered.

The junior author (Hughes) offered to teach a lab class that fall through Northwestern Community College's extended education program to work on the artifact analysis. Following that analysis, a few, tentative, statements can be made about the Platt site.

The site provided an excellent camping locale for a number of groups over a period of time. It was nestled in a low basin beneath a sun-reflecting sandstone bluff. A spring may have provided a permanent

FIGURE 5: Excavations on Unit 1, Platt site. Left to right are Walt Nelson, Debra Elwood and Ray Nelson.

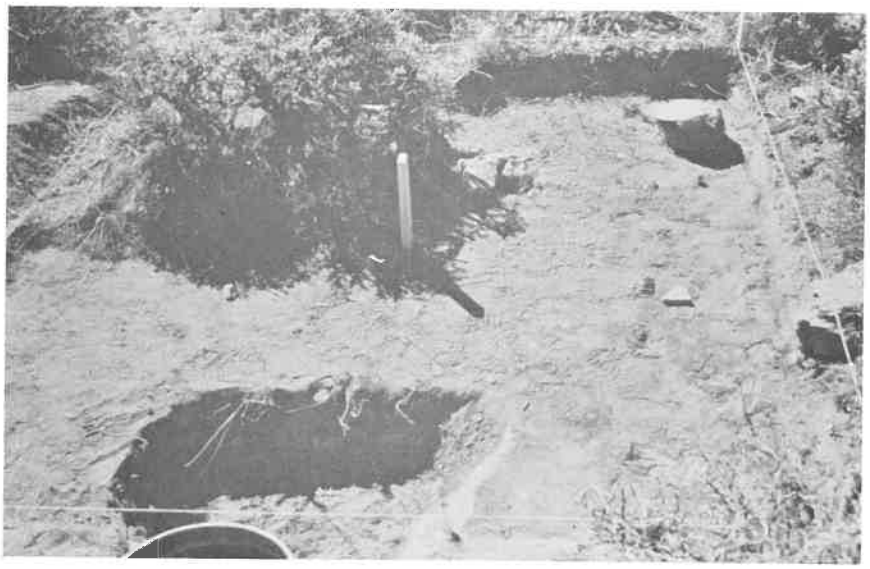

Figure 6: Plan view of Unit 4, Platt site. Note hearth, pottery and other artifact material.

water source. The area was used by McKean peoples and their corner and side notch successors in the Bighorn Basin. The latest inhabitants may well have been the earliest white settlers in the area. There was also probably pottery-making Shoshone groups, as evidenced by the small tri-notch points and pottery. These people worked old window glass acquired from early white settlers into usable tools.

The bone material in the excavations suggests mid- to small-sized animals were hunted. Large scale meat and marrow processing was not

The artifacts have taken on more meaning. They are not just isolated finds left by some imaginary people. They are a way of life left by people of the past. From the dig, we are learning insight into their lives and history. Each artifact was made with careful consider- occurring, suggesting a more Archaic economy, which is an economy utilizing a wide range of foods available in the environment, rather than focusing on communal hunting of bison or mountain sheep.

The presence of the marine Olivella shell bead found on the surface suggests a contact or trade with other Indian groups. Varieties of Olivella are found off the Northwest Coast and Gulf Coast today. Hopefully future identification of this shell will determine the direction of contact.

FUTURE WORK

Work on the Platt site will continue throughout the summer of 1986. It provides a great experience for all those people who have wanted to participate in an archaeological investigation. A number of club members have become proficient excavators.

Several problems need to be addressed in the next season. Hopefully, a backhoe trench will reveal the site geomorphology, presence of spring, and potential paleoindian deposits. Further excavation will determine the occupations of the basin. Hopefully these can be dated by projectile points or C-14 dating. Analysis of the glass, lithics, and bone could reveal still more about site activity.

CONCLUSIONS

This project has been an enlightening experience for those club members who have participated. ation as to its use and purpose.

Was the Folsom point left here after a successful hunting trip and another point hafted to the shaft? Was the Folsom point picked up by some later day hunter who wondered at its use, and brought it back to camp to show others of its uniqueness? Having only scratched the surface for now, we will have to wait and wonder if more of that early culture will be found. We can only hope to understand some of the things we find. May the fascination with artifacts not overpower the history of a people.

ACKNOWLEDGEMENTS

The authors would like to thank all those club members and visitors who have contributed their time and expertise to the site. Special thanks go to Dr. George Frison for a C-14 date; to John Albanese for his professional geological assessments; and to Bill Prentiss and Gene Romanski, archaeological graduate students from Florida who worked a number of weekends on the site. We would also like to thank Tom Phipps for allowing the club to work on his leased land, and Denman and Susan Jones who donated their yard for a parking lot on dig weekends.

Finally the senior author would like to thank his wife Jackie and daughter Lisa for the many hours of patience and sacrifice they put in so that the Platt site could become a reality.

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NEW EVIDENCE FOR LATE PALEOINDIAN OCCUPATION OF THE SOUTHERN ABSAROKA MOUNTAINS

EUGENE J. ROMANSKI AND WILLIAM C. PRENTISS

ABSTRACT

Recent archaeological surveys in the southern Absaroka Mountains have revealed important new evidence for late Paleoindian occupation. Two archaeological sites are described with attention focused on several diagnostic bifaces. Potential regional relationships are presented.

INTRODUCTION

Presently, little is known regarding late Paleoindian occupation of the southern Absaroka Mountains of northwestern Wyoming. Frison (1983a, 1983b) has conducted excavations at one Paleoindian site in the southern Absarokas, the Lookingbill site (48FR308), located at an elevation of 2499 m. Three Paleoindian components were detected at the site. The oldest of these is associated with extinct bison remains (Frison 1983a:124). The intermediate and youngest paleoindian components have been assigned to the Late Paleoindian period based on presence of several bifaces with thick, concave bases and heavily ground lower lateral edges (Frison 1983a:124).

In August 1985 and July 1986, we located and recorded two probable late Paleoindian sites while conducting archaeological surveys in the southern Absarokas. The Owl Creek Overlook site (48HO362) was located on a high terrace above the South Fork Owl Creek drainage (Figure 1) at an elevation of 2828 m. The site dates from the Late Paleoindian period based on presence of several parallel-oblique flaked biface fragments. The Klicker Creek site (48HO396) was also located on a high terrace above the South Fork Owl Creek drainage (Figure 1). Elevation is 2768 m. The Klicker Creek site dates from the Late Paleoindian period by the presence of one stemmed biface fragment which closely resembles several Pryor Stemmed projectile points (Frison 1978; Frison and Grey 1980) and several projectile points from the youngest late Paleoindian component at the Lookingbill site (Frison 1983b).

THE OWL CREEK SITE

The biface fragments from the Owl Creek Overlook site are lanceolate bases (Figures 2-5, A,B). The larger base was manufactured from a fine-grained light purple quartzite and exhibits parallel-oblique flaking on both aspects (Figures 2-5, A). The lower lateral margins, ears and incurvate portion of the base are rounded. The smaller base was manufactured from a fine-grained red chert and exhibits parallel-oblique flaking on only one of its aspects (Figures 2-5, B). Rounding is evi-

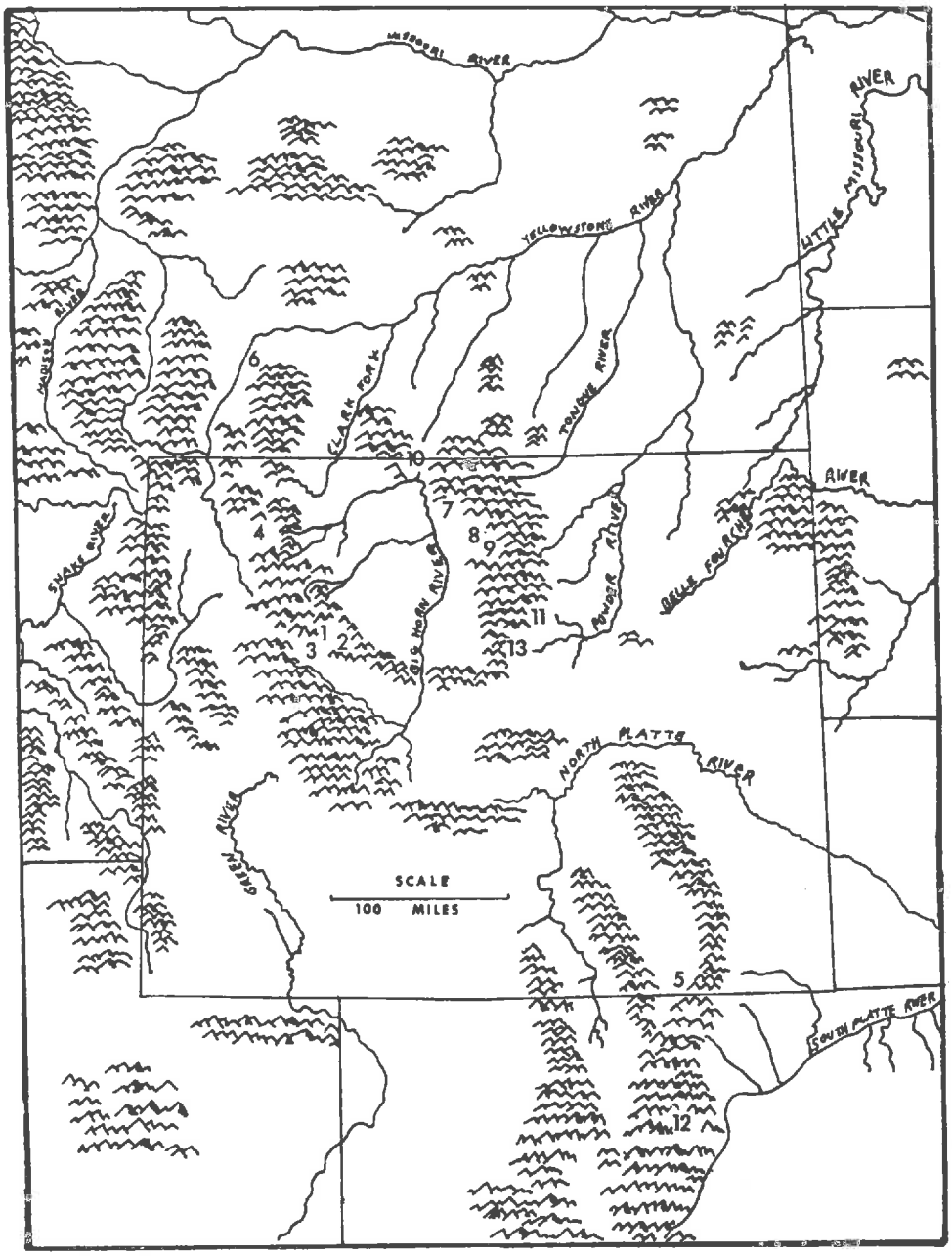

FIGURE 1: Late Paleoindian archaeological sites. 1: Owl Creek Overlook; 2: Klicker Creek; 3: Lookingbill; 4: Mummy Cave; 5: James Allen; 6: Myers-Hindman; 7: Hanson; 8: Medicine Lodge Creek; 9: Paint Rock V; 10: Big Horn Canyon caves; 11: Schiffer Cave; 12: Fourth of July Valley; 13: 48JO303.

dent on the lateral margins, ears and incurvate portion of the base. In both cases, this edge rounding may have been the result of grinding to facilitate hafting. It could also be the direct result of hafting wear. The third biface fragment is a biface tip, manufactured from a coarse-grained white quartzite (Figures 2-5, C). Parallel-oblique flaking is present on only one of its aspects. All three fragments have been laterally snapped.

Several varieties of parallel-obliqued flaked lanceolate bifaces, of generally Late paleoindian Period

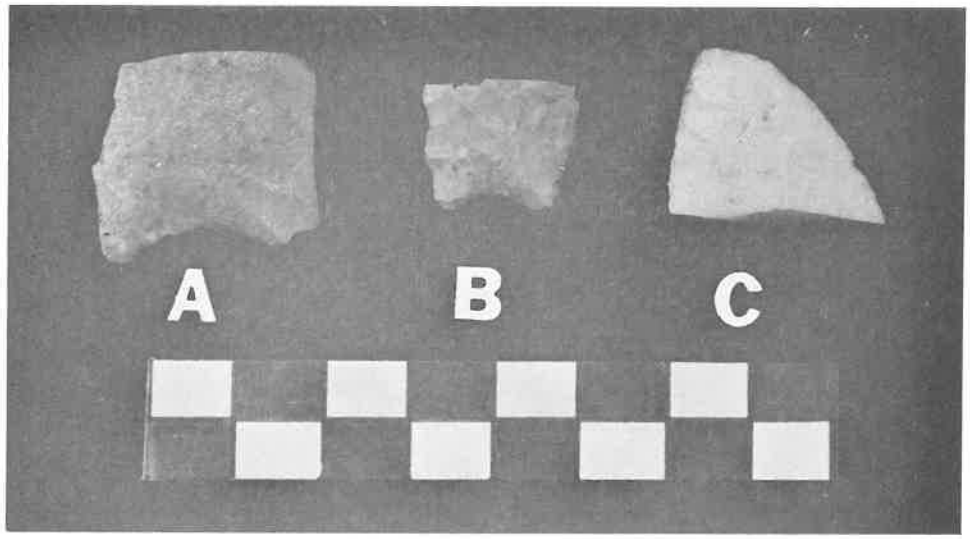

FIGURE 2: Parallel-oblique flaked bifaces from Owl Creek Overlook site (scale in centimeters).

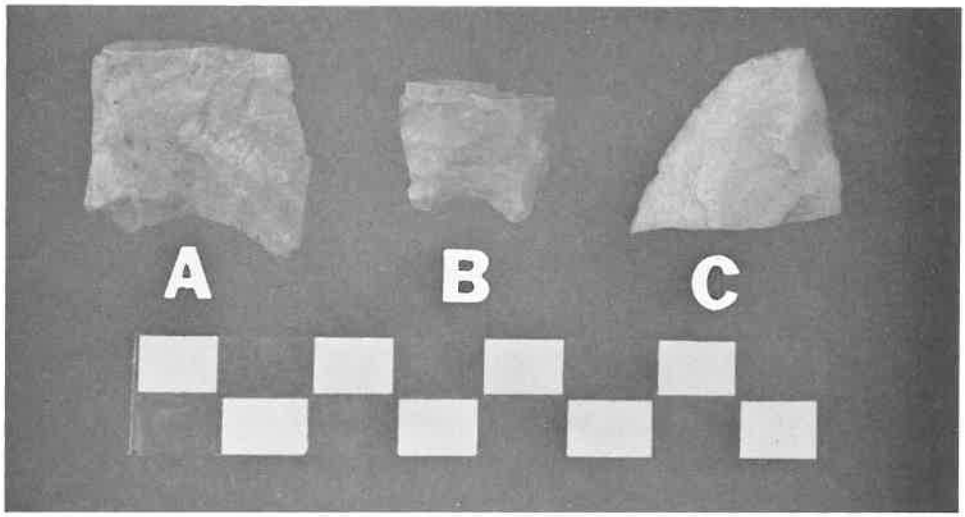

FIGURE 3: Parallel-oblique flaked bifaces from Owl Creek Overlook site (reverse aspect; scale in centimeters).

age, have been recognized in the High Plains and Rocky Mountain Regions (see Figure 1 for locations of late Paleoindian sites discussed in this paper, also see Frison 1978). We suggest the large biface base discussed above resembles a James Allen parallel-oblique flaked variety (Mulloy 1959). James Allen bifaces have been found at the type site (48AB4), located in the Laramie Basin in southeastern Wyoming, and at the Fourth of July Valley site (5BL120), located in the Front Range of northcentral Colorado at an elevation of 3415 m (Benedict 1981). Benedict (1981) gives a date of 5960 $\pm$ 85 radiocarbon yrs B.P. for the Fourth of July Valley site. Mulloy (1959) dates the James Allen site at 7900 $\pm$ 400 radiocarbon yrs B.P.. Benedict and Olson (1973) and Benedict (1981) suggest the 1900+ year difference between these two dates may be due to late Paleoindian technologies persisting into the

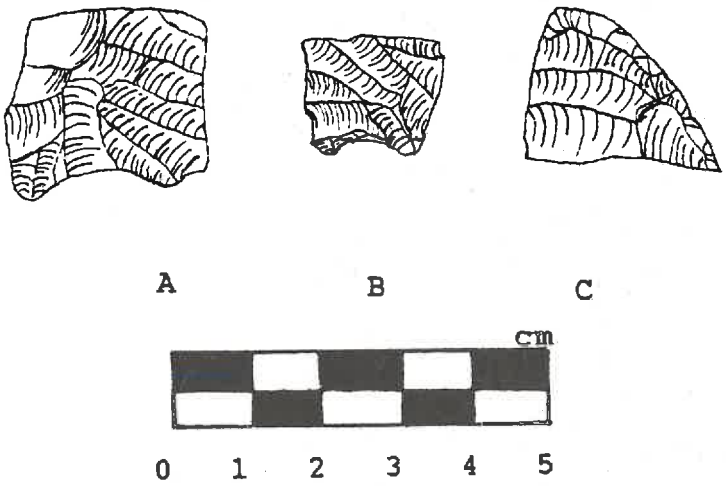

FIGURE 4: Parallel-oblique flaked bifaces from Owl Creek Overlook site (scale in centimeters).

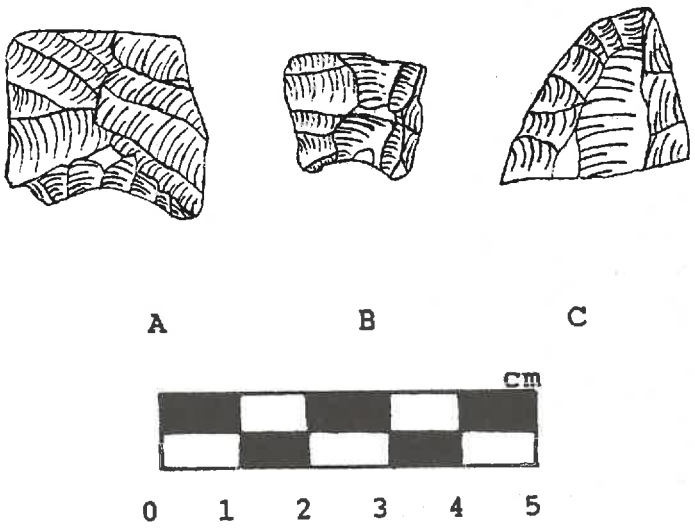

FIGURE 5: Parallel-oblique flaked bifaces from Owl Creek Overlook site (reverse aspect; scale in centimeters).

Altithermal period. Substantiation of this hypothesis, however, will require additional research.

The smaller biface base resembles several generalized late Paleoindian parallel-oblique flaked lanceolate biface types, including several from Mummy Cave (McCracken et al. 1978:128), Medicine Lodge Creek (Frison 1976:163; 1978:35; 1983a:121), Myers-Hindman (Lahren 1976), and several sites located by Husted (1969). Parallel-oblique flaked bifaces from these sites date from approximately 9000 to 8000 yrs B.P. (Frison 1978:38). This smaller biface also bears some resemblance to the basal portion of a small biface from the intermediate Paleoindian level at the Lookingbill site (Frison 1983b:6).

A small number of secondary and tertiary flakes and shatter of a variety of raw material types including cherts, quartzites and obsidian, were also noted at the Owl

Creek Overlook site. Other artifacts included a utilized secondary chert flake, two chert biface fragments, a quartzite scraper fragment, a mano and three unidentifiable bone fragments. All artifacts were observed in surface contexts. Hearths or other features were not observed. However, the presence of artifacts in erosional contexts suggests there is potential for such features in subsurface deposits.

THE KLICKER CREEK SITE

The biface fragment found at the Klicker Creek site (Figures 6 and 7) was manufactured from a fine-grained gray quartzite with no inclusions. It exhibits a perverse fracture caused by an excessive blow of force from one margin (see Johnson 1981). Transverse flaking is apparent on what remains of the blade portion of the biface. Two distinct shoulders are present. Stem margins exhibit extensive rounding which may be attributed to edge grinding and probably hafting wear. The base of the stem is concave and exhibits substantial basal thinning.

The biface resembles several bifaces recovered from sites containing Pryor Stemmed components in the Big Horn Mountains (Frison and Grey 1980) and several bifaces considered to be of late Paleoindian age from the Lookingbill site (Frison 1983b). Sites located in and around the Big Horn Mountains include site 48JO303, Hanson, Paint Rock V, and Schiffer Cave (see Figure 1). Pryor Stemmed components date roughly between 8000 and 8500 yrs B.P. (Frison and Grey 1980:29). Pryor Stemmed bifaces typically have beveled blade edges, distinct shoulders and stems which may be contracting, parallel sided or expanding (Frison 1978: 37). Bases are generally concave. Basal margins are usually well ground.

Similarities between the Klicker Creek site biface and Pryor Stemmed bifaces include distinct shoulders, marginal grinding and concave basal morphology. The only difference is the apparent lack of beveling. This conclusion, however, is tenuous at best due to the fragmentary nature of the biface.

Several bifaces were recovered from the Lookingbill site which bear resemblance to the Klicker Creek site biface. These bifaces have concave bases, with heavily ground

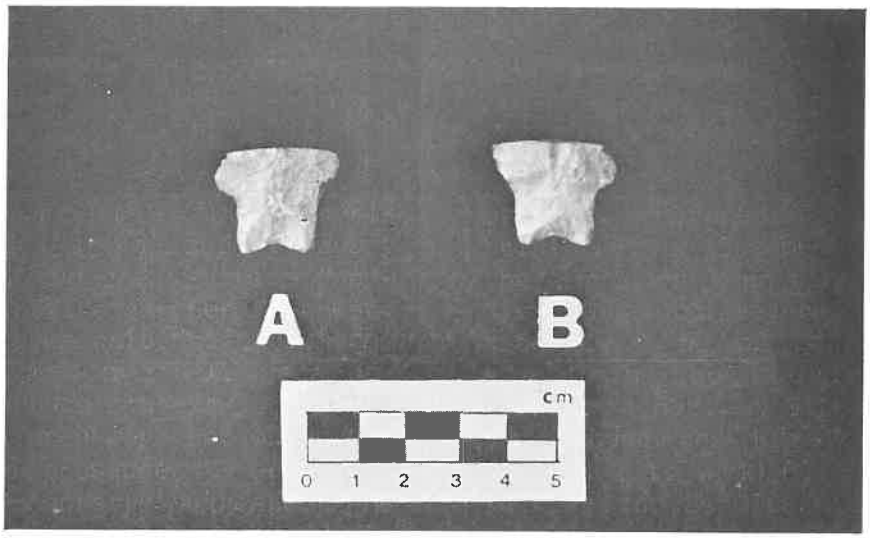

FIGURE 6: Stemmed biface from the Klicker Creek site.

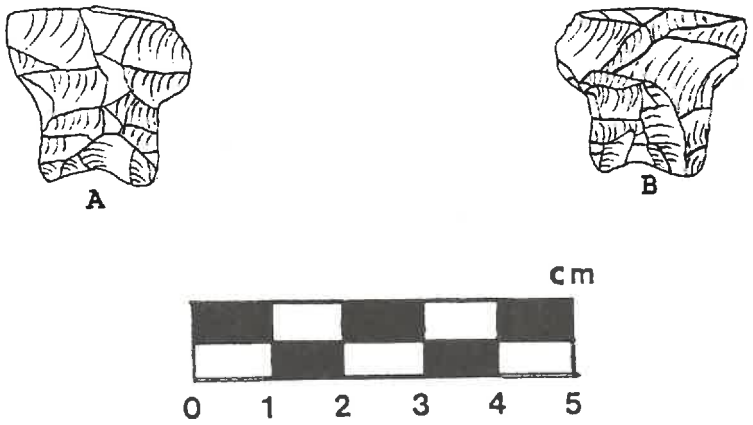

FIGURE 7: Stemmed biface from the Klicker Creek site.

thick stems, weak shoulders and convex blades. There is no evidence for beveling (Frison 1983b:6-9). They occur in the youngest cultural level assigned to a late Paleoindian age (Frison 1983b:9). The bifaces resemble the Klicker Creek site biface in that both are stemmed with deep concave bases and ground margins. They are somewhat different in that the Klicker Creek site biface has a well thinned base and distinct shoulders.

Numerous small chert and quartzite tertiary flakes and shatter were recorded at the Klicker Creek site. One obsidian shatter fragment was also present. Other artifacts included three quartzite biface fragments, one chert biface fragment, a chert uniface and a chert core. Artifacts were located in erosional contexts suggesting the potential for buried deposits.

CONCLUSIONS

In conclusion, surface artifacts from the Owl Creek Overlook site and the Klicker Creek site indicate they were probably occupied by late Paleoindian groups exploiting a montane environment. Future work at these sites may provide important information regarding late Paleoindian adaptations.

ACKNOWLEDGEMENTS

This research is a result of two archaeological reconnaissance surveys conducted by the authors while employed by the Worland District, Bureau of Land Management. We thank Lee Douthit, Danny Walker, Jim Welch, Nancy White, Ray Williams and one anonymous reviewer for their useful comments on this paper.

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SOME THOUGHTS ON POTENTIAL OF FIRE-CRACKED ROCK STUDIES IN ARCHAEOLOGY

DALE L. WEDEL

ABSTRACT

Fire-cracked rock is an archaeological phenomenon frequently encountered in Wyoming and elsewhere on the Northwestern Plains. This paper presents a review of fire-cracked rock, including ethnographic references to activities causing fire-cracked rock and a perusal of the archaeological literature for studies dealing with fire-cracked rock. It is hoped that this review will stimulate interest in more intensive analysis of this category of archaeological remains.

INTRODUCTION

A trend in current archaeology is the increasingly close attention being paid to portions of the archaeological record previously treated in a limited manner. One example of this, familiar to all, is the study of faunal remains (Frison 1978, Todd 1983). Whereas in the past these remains were given a cursory examination and then discarded, today we are mining a wealth of information from them. Lithic analysis has seen a similar intensification of analysis (Ingbar 1985, Reher 1985).

While advances in other areas have not been as spectacular as those realized in faunal or lithic analysis, we are beginning to detect increasing promise for a variety of subjects. One of these subjects coming under increased study is that of fire-cracked rocks.

Archaeological sites containing fire-cracked rock are common in Wyoming. Frison (1978:355) states that "beginning with the Middle Plains Archaic and continuing up to the historic period, the most common and widespread archeological features on the Northwestern Plains are artificial pits of varying sizes and shapes filled with fire-fractured rock, ashes, and charcoal." For a general discussion of these features, see Frison (1978:355-358). In this paper I will present a general overview of some of the processes believed to be responsible for fire-cracked rock and examine some literature dealing with archaeological fire-cracked rock studies.

ETHNOGRAPHIC REFERENCES

One process that can produce fire-cracked rock for the archaeological record is baking of vegetable foods. Ethnographic sources discuss what were at times elaborate techniques for cooking these substances. Turney-High, writing in 1933 of the Salish of western Montana, provides us with a vivid description of the cooking of camas:

> "The ancient method of preparing the camas bulb is a variant of the pit baking process. A pit about ten feet long and from two to three feet wide is dug, and a fire of

> intense heat is therein kindled. The Salish prefer to use cottonwood limbs and bark for this fire, since they burn longer than the conifers so plentiful in this region. When the wood is reduced to glowing coals, red willow sticks with the sap still in them are criss-crossed over the fire-bed in the form of a gridiron. Over this is laid a blanket of green grass, ordinarily the abundant bunch-grass, some two to three inches thick. Upon this, in turn, is placed a layer of moist earth. The final layer of this blanket consists of another coating of green grass. Then the camas roots are dumped into the pit. The mass is covered with more grass and a thick layer of earth. Another fire is now kindled on top of the heap, and kept alive from twelve to eighteen hours, when it is raked away and the oven opened for the prepared food" (Turney-High 1933: 263).

This description fails to mention rocks, but in 1937, Turney-High makes reference to this description and then adds that the pit was made as hot as possible by fire with stones to retain the heat (Turney-High 1937:127). It is pointed out that "while the hot pit was primarily for camas, flesh foods were also prepared in it. Dried meat was made more palatable by this slow steaming, while fresh meat was very superior when baked in this manner" (Turney-High 1937:127). One additional factor in the cooking of camas the mention that water was sometimes poured into the oven before it was closed (Harington 1967: 163).

Another reference to meat baking with rocks is provided by the Crow informant Plenty-Coups:

> "My mouth waters when I remember the meat-holes, he said. We used to dig a hole in the ground about as deep as my waist. You have seen many of them along the creeks and rivers. We would heat little boulders until they were nearly white and cover the bottom of the hole with these stones. Then we would cut many green boughs of the chokecherry trees and cover the hot stones a foot deep. Upon these we would place thick chunks of buffalo meat, fat and fresh from the plains, sprinkling them with water. On top of the meat went another layer of boughs, then more meat, more water and so on until the hole was full. Finally we spread the animal's paunch over the hole, covered it all with its hide, put gravel on this and kindled a log fire" (Linderman 1957:253).

That vegetable food processing can result in distinctive archaeological remains is not a new idea. In 1930, Ernest Wilson published an article on the burned rock mounds of southwest Texas. Wilson proposed that these features were formed by repeated episodes of baking local plant foods and cites a reference to the Lipan Apache preparing soto roots or bulbs utilizing heated rocks in the baking process (Wilson 1930).

Probably the most often mentioned process in the formation of fire-cracked rock is that of stone-boiling. Catlin describes the process as follows:

> "There is a very curious custom among the Assiniboines from which they have taken their name; a name given them by their neighbors, from a singular mode they have of boiling their meat, which is done in the following manner: when they kill meat, a hole is dug in the ground about the size of a common pot, and a piece of the raw hide of the animal, as taken from the back, is put over the hole, and then pressed down with the hands close around the sides, and filled with water. The meat to be boiled is

> then put in this hole or pot of water; and in a fire, which is built near by, several large stones are heated to a red heat, which are successively dipped and held in the water until the meat is boiled; from which singular and peculiar custom, the Ojibeways have given them the appellation of Assiniboines or stone boilers" (Catlin 1841:54).

Denig, again for the Assiniboine, describes the process a bit differently. He states:

> "The paunch of a buffalo in which meat can be boiled and still is on occasions, by filling the paunch with water and casting therein red-hot stones until the water attains a boiling point, after which the stones are taken out, and one added occasionally to continue the heat, or the paunch suspended above a blaze at such a distance that the fire, though heating, does not touch it" (Denig 1930:414).

Turney-High provides a discussion of the process for the Salish of Montana as follows:

> "Boiling was accomplished by digging a hole in the ground about one foot deep and of about the same diameter. This was then lined with a permanent bag of bison skin which had been carefully fitted and sewn to shape. This was sunk convenient to the fire (note: this is inside the lodge). In this the stones were placed to get as hot as possible, then dropped into the nearby water-filled receptacle. When the food had been boiled the bag was immediately removed, washed; then hung up to dry" (Turney-High 1937: 127-128).

He then goes on to mention that this process may have formerly been done using baskets instead of the bison skin bag (Turney-High 1937:128).

Lowie, in speaking of the Northern Shoshone, states that "a basket served for a boiling pot." Stones were heated and deposited in the basket with the food, "producing [Lowie is here quoting Nathaniel Wyeth] a mess mixed with soot, ashes, and dirt" (Lowie 1909:188). Lowie cites another early account to the effect that "the baskets were covered with buffalo skins and placed in an excavation when used for cooking. Both fish and game, as well as pulverized bones, were boiled" (Lowie 1909:188).

Kroeber in 1908 discussed cooking processes for the Gros Ventre:

> "Pottery is declared to have been made formerly of clay mixed with crushed rock. Rawhide bags, drawn together at the top with a string were also used for cooking by means of hot rocks. The often described method of cooking in holes in the ground lined with rawhide was also followed" (Kroeber 1908:150).

Another process causing fire-cracked rock is that of bone grease extraction. This process can be expected to produce fire-cracked rock if conducted using a stone-boiling technique. Such a methodology could be expected for groups lacking ceramic containers. Wilson described bone grease manufacture among the Hidatsa of North Dakota:

> "Bone grease, or marrow fat, was not obtained by cracking the leg bones and scraping out the marrow, but by pounding them, especially the joints, boiling the crushed pieces, and skimming the grease with a horn spoon. The ones of one buffalo yielded about five pounds or two quarts of this edible butter" (Wilson 1924:356).

Wilson also described the stockpiling of bones for bone grease manufacture:

> "It was on the floor of the winter stage, out of reach of the dogs (this winter stage was primarily for drying meat) that my mother used to toss buffalo bones, to await the time when they could be pounded up for boiling to make bone grease or bone butter. My mother, I remember, gathered up the leg bones to pound separately; for the grease so obtained was of a better kind, being yellow and never hardening. Bone grease from leg bones my mother called "foot-bone grease." Bone grease from shoulder bones and back bones was harder" (Wilson 1924:174).

Denig mentions the Assiniboines in times of meat shortage scavenging for bones on the prairies, pounding them and extracting the grease by boiling (Denig 1930:509).

Wilson gives an account of a group of Hidatsa out hunting who came across an old Sioux camp containing many bison bones. They collected these for bone grease manufacture (Wilson 1924:301-302).

ARCHAEOLOGICAL STUDIES

For the second part of this paper I will briefly examine certain archaeological studies dealing with fire-cracked rock. The first type of study to be dealt with are experimental studies.

House and Smith (1975), as part of the Cache River Archaeological Project, conducted replicative studies of fire-cracked rock. Their study specifically dealt with local cherts and quartzites from gravel sources, and pieces of sandstone and limestone. These were heated in a wood fire and cooled in a variety of methods, including allowing slow cooling overnight in the ashes, dropping in water, removal from the fire and cooling in the open air, and rolling on wet ground. House and Smith (1975) found that variation among experimental specimens could be attributed primarily to intensity and duration of heating instead of variation in method of cooling. They found the greatest modification to occur in specimens which were allowed to cool in the ashes overnight. One interesting point in their studies was that hard sandstone fragmented less than the chert and quartzite, and boiled a given amount of water longer than comparable sized pieces of chert or quartzite (House and Smith 1975).

A second experimental study of fire-cracked rock was done by McDowell-Loudan (1983). In this study, cobbles of quartzite, sandstone, and granite were first heated in a wood fire. This produced a variety of results, including reddening, oxidation, reduction, cracking and spalling. Additional tests were conducted in which cobbles were again heated in a wood fire, and then used for stone boiling. This resulted in increased reddening and a more jagged fracture pattern (McDowell-Loudan 1983).

Another experiment was conducted by Pierce (1983). A series of sandstone, quartzite and vesicular basalt rocks were heated in a wood fire and then used for stone boiling. The sandstone became so friable that sand was released into the water. The quartzite and vesicular basalt both sustained fracturing, with more fracturing during the heating process than during boiling. Pierce used these results in interpreting a Late Period Chumash site. One portion of the site contained a higher percentage of sandstone while another area contained a higher percentage of quartzite. Pierce inferred that the higher percentages of quartzite represented boiling, while the higher percentages of sandstone represented hearth cooking. Based on types of food known to have been cooked by these respective processes, different political and economic standing for residents

of the respective areas was proposed (Pierce 1983).

The final study that should be mentioned is a review by Vehik (1977) of archaeological use and potential of bone fragments and bone grease manufacturing. Vehik calls for more attention to be paid to activity structure responsible for the observed archaeological remains. This point I would fully agree with. I think it is absolutely necessary if we are going to obtain behaviorally significant information out of these sites.

SUMMARY AND CONCLUSIONS

From ethnographic sources reviewed in the first portion of this paper, it can be seen that fire-cracked rock results from a series of processes of great archaeological interest. Both plant and animal food processing is indicated from extant accounts. The archaeological reports reviewed in the second part of this paper indicate that archaeologists are beginning to obtain meaningful information from sites containing fire-cracked rock. Hopefully this trend will continue in the future.

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HUNTING AND BATTLE SCENES AT NORDSTROM-BOWEN SITE (24YL419) IN THE BULL MOUNTAINS, MONTANA

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Nordstrom-Bowen was first described by Harold Hagen in Trowel and Screen [vol. IV, no. 12, December, 1963, (5 unnumbered pages, with sketches of some of the figures)]. The site is in the southern edge of the Bull Mountains in Yellowstone County, Montana. The petroglyphs-pictographs are on massive yellow sandstone cliffs (bearing a thin coal layer) in remote broken country along the drainage of Cow Gulch Creek seven miles west of Castle Butte. The glyphs are scattered unevenly on either side of a deep wooded ravine which begins at a cave and opens out into Cow Gulch Creek. Many eroded and no longer decipherable figures are presumably older than the glyphs described here.

At the top of the panel, a large bear (112 cm long) has a humped shoulder, four clawed feet, and five teeth within the squared muzzle outline (Figure 1). The animal is tilted upward and touches a shield or shield-bearer.

An arrow or spear points at the head from above, a smaller arrow penetrates in front of the foreleg. A large weapon with an expanded (fletched?) shaft pierces the belly from below. Another pierces the rump from above. A weapon is poised behind the bear, held by a square-shouldered man. His left hand almost touches the bear's hind leg. The figures are deeply incised, the lines averaging 4 mm wide and 2 mm deep.

At the bottom of this panel, another crudely incised bear (26 cm long) is associated with three weapons, one is clearly an arrow.

Another bear (29 cm high) is also humped, abraded within the outline, and has a lance(?) in the rump (Figure 2). Another lance, heavily decorated, extends from a square-shouldered man to the body of the bear. The man holds a bow, from which numerous arrows are directed toward the bear. He has another bow (or other implement) pendant from his left elbow. From his left hand, an arched line extends across the bear's back to the lance in the rump.

Near these latter two bears, a clearly visible arrow lies within the fragmentary outline of another bear's head. The ears and muzzle of this bear are visible (36 cm long). These last three figures are in a tilted row beneath the dominant bear of Figure 1.

Based on the observation that bear hunts at many other Northern Plains sites are invariably associated with shield motifs, re-examination of the rough stone to the left of the bear panel discussed above, revealed dim, eroded, lichen-covered glyphs which might otherwise have been overlooked. A shield 60 cm high, but in fragmented state, can be traced. Another is 38 cm high and equally difficult to see without close perusal in favorable sidelight. This shield is based on a

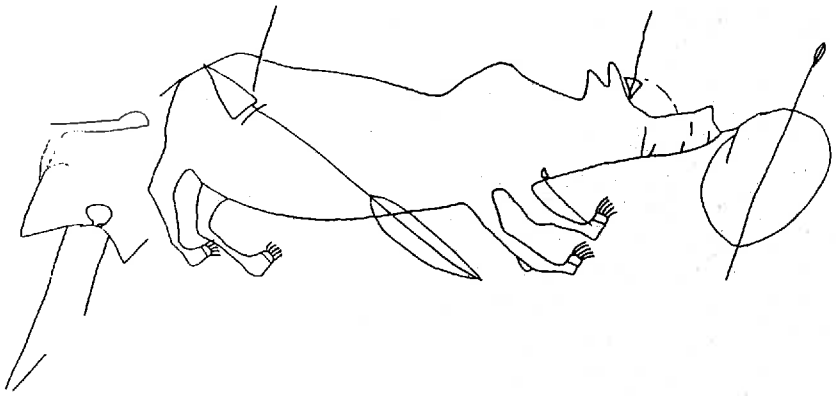

FIGURE 1: Bear figure from Nordstrom-Bowen, 24YL419, Montana.

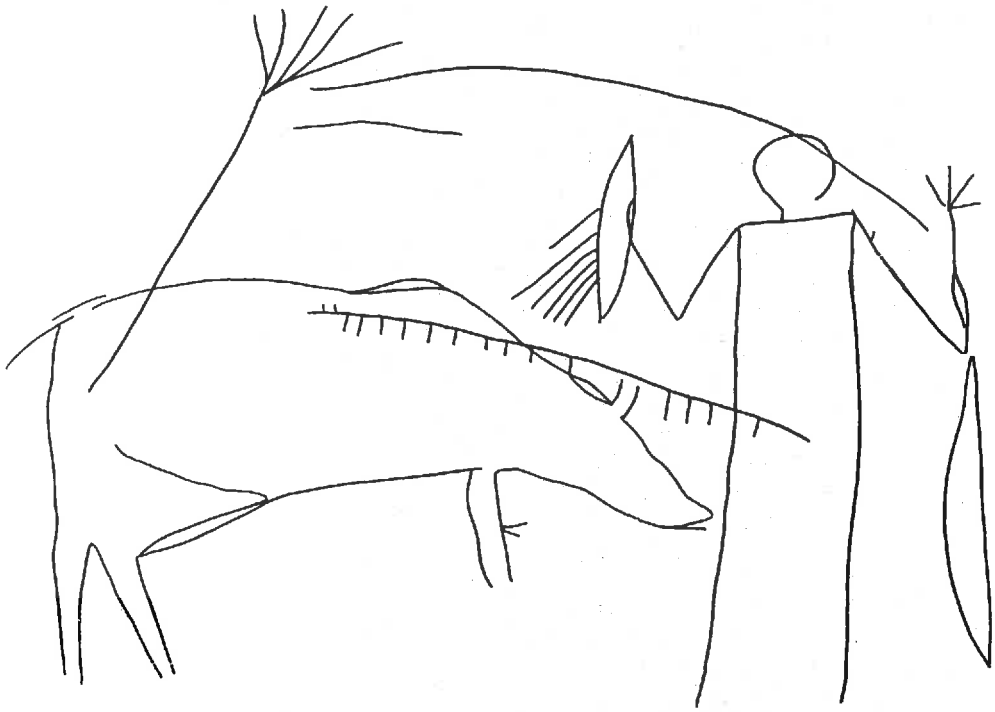

FIGURE 2: Bear and human figure from Nordstrom-Bowen, 24YL419, Montana.

natural shallow conchoidal surface, the outlines being scratched on the rim of the "bowl." There is an arrow within the outline.

To the right of the bear panel is a panel filled with count marks. The top series is of ten, 20 cm long, vertical marks arranged in a horizontal series. A lower horizontal row has 22 vertical, 30 cm long, lines. Nearby is a crude outline of another bear. Ten meters to the right are the first of many scattered "tool grooves" of varied size.

A large (88 cm high) oval shield with two legs and a deeply incised genital organ is also present on this panel. Most of the figure outline is done in deep scratchlines, with multiple curved scratchlines within, lending a textured appearance. The outlines have red

pigment. To the right are vertical count lines, and below is a lined, truncated pyramid.

There is also another oval figure, a shield or shield bearer 72 cm hight, which has a 7 cm wide red outer band and a yellow colored interior. Red and yellow lines emerge from the top. The figure is scratched and abraded underneath the pigments. These last two figures are reminiscent of the rows of painted shields seen at both the Weatherman Draw and Joliet, Montana, sites.

On the panel also is a man figure 47 cm tall (Figure 3) that has a rectangular, abraded head with an arrow, V-shoulders, "heartline," and bag-like expansions of the legs.

Nearby is an isolated bear paw, 18 cm long, stylized with seven claws.

A tipi-like structure, about 30 cm tall (Figure 4) can also be seen at Nordstrom-Bowen. Each tipi pole has a 3-pronged base and arrowhead tip. A small superstructure "tipi" converges on a "sun." Another "sun" appears on the right, above a series of slanted lines and a triangular abraded area. Arching over the entire structure is a spear.

Adjacent to each other are two men. The first (26 cm tall) resembles Figure 3 above (Figure 5, upper). This figure seems to have a bow. The legs are widely expanded. The second man (28 cm tall) is arm-

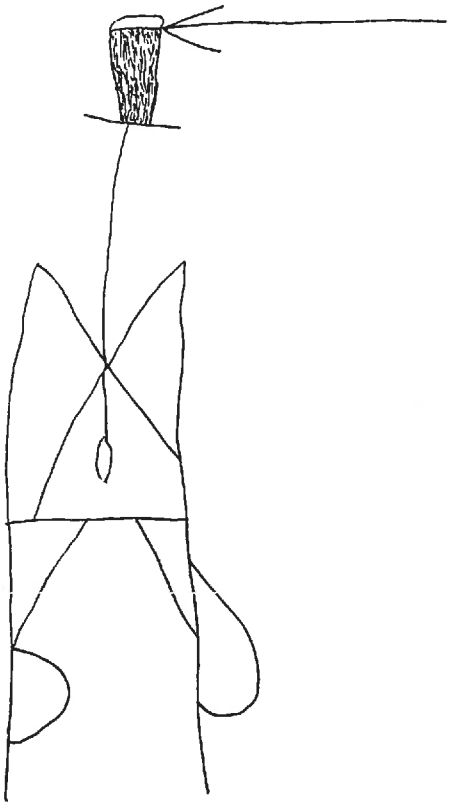

FIGURE 3: Human figure from Nordstrom-Bowen, 24YL419, Montana.

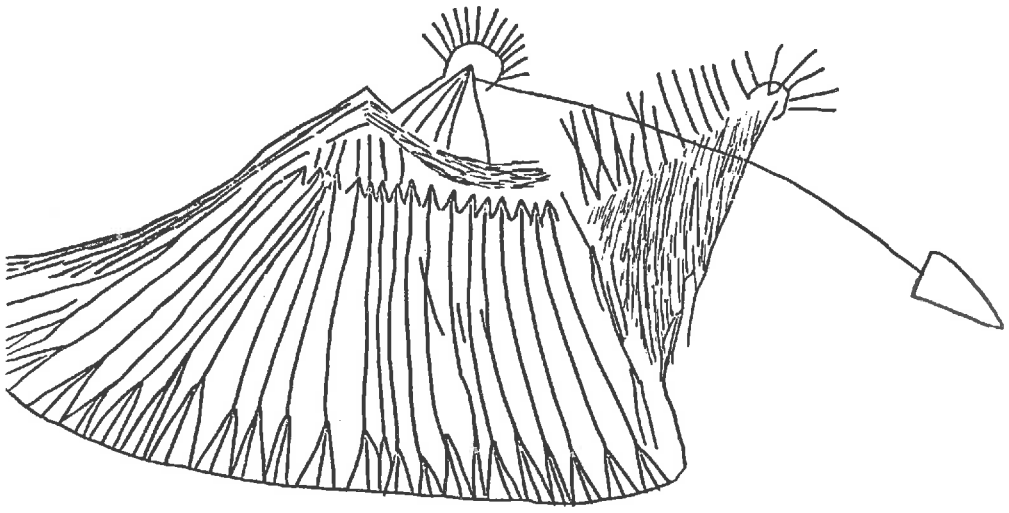

FIGURE 4: "Tipi" figure from Nordstrom-Bowen, 24YL419, Montana.

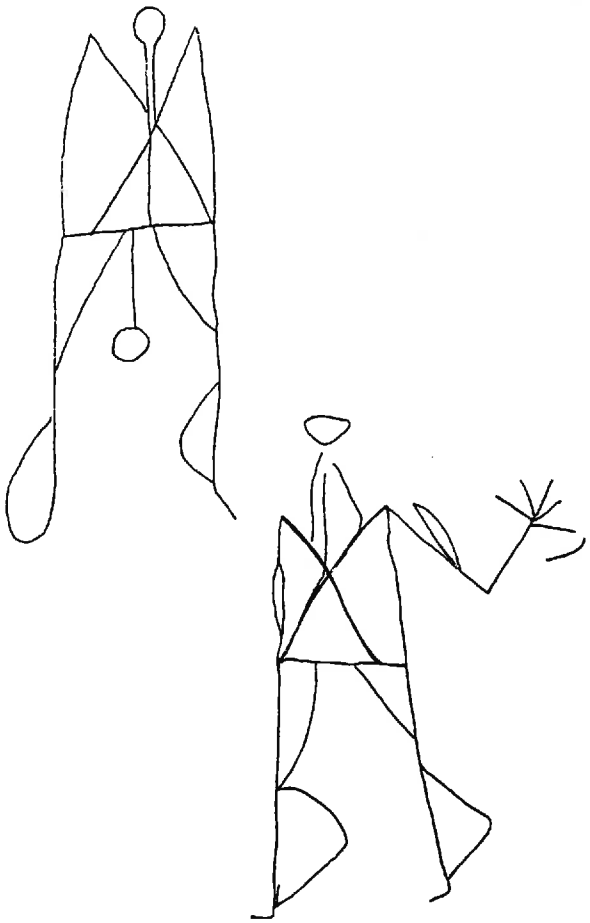

FIGURE 5: Two human figures from Nordstrom-Bowen, 24YL419, Montana.

less (Figure 5, lower), with expanded legs.

Passing along the cliff to the right, (i.e., toward the cave at the top of the ravine), one passes many indecipherable fragments of eroded glyphs, splotches of red paint, and eroded tool grooves. A panel protected by an overhanging rock mass seems to depict a complex battle scene (Figure 6). Across the top of this panel arch two long arrows. Beneath is a triangular figure decorated with globe-like objects. Through the top extends a long spear. Below, a shield has a long decorated lance. A pair of arrows oppose each other.

In the next lower horizontal array, a shield-bearer with a lance has other weapons pointed at him, and one strikes his shield. Another shield warrior holds a decorated pole-ax aloft. Another directs a lance at him. Near the bottom of the panel are a decorated lance, ax, shield, and shield-bearer. The triangular figure suggests a hill with multiple fighting pits. Two loaf-shaped objects, and one similarly constructed triangular structure suggest forts or pole-built war lodges, particularly since weapons emerge from them. Well preserved, truncated or crib-log lodges are still found in the Bull and Pryor Mountains. One of these can be seen in the timbered area above this panel.

Adjacent to this battle scene is a horse and rider, in a peculiar conventionalized style (Figure 7). Across the deep ravine from this panel, in a shallow alcove, a red pictograph represents either a hand or a bear paw (Figure 8). The "fingers" are unnaturally attenuated and measure 27 cm by 7.5 cm.

Farther along the next expanse of cliff is a well preserved panel (Figure 9) of incised, well-ordered objects which may represent differently-decorated lances (clan or society symbols), one gun, fan-like objects, and a combat between a mounted man with a shield and one on foot with a gun. The original site report by Hagen describes red pigment in these glyphs.

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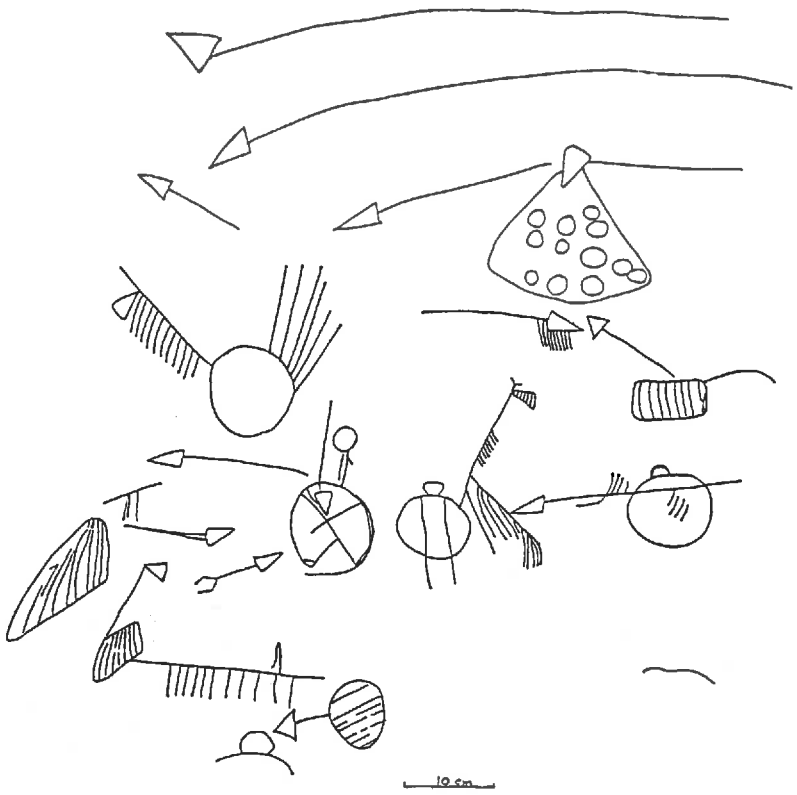

FIGURE 6: Battle scene from Nordstrom-Bowen, 24YL419, Montana.

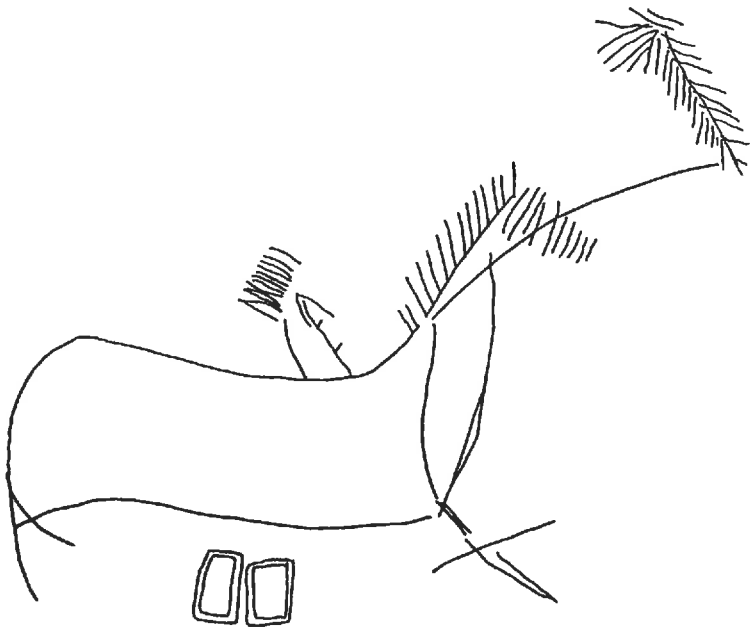

FIGURE 7: Horse and rider figure from Nordstrom-Bowen, 24YL419, Montana.

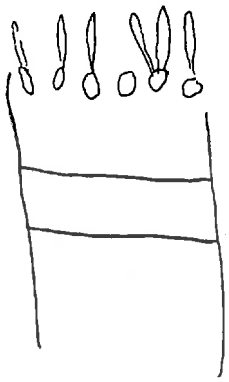

FIGURE 8: Paw or hand print figure from Nordstrom-Bowen, 24YL419, Montana.

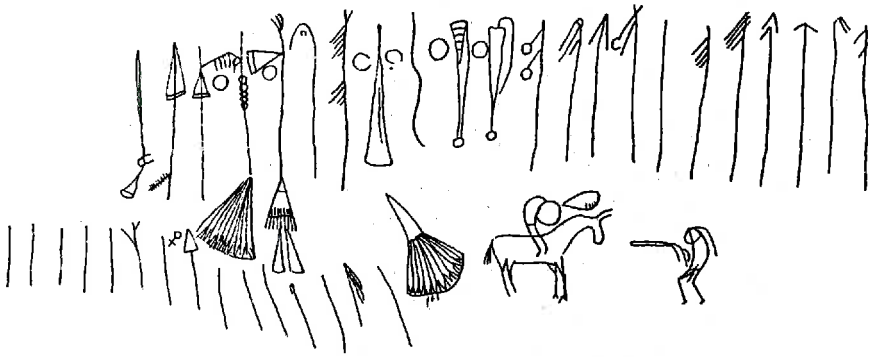

FIGURE 9: Panel from Nordstrom-Bowen, 24YL419, Montana.

A BEAR HUNT AT CANYON CREEK: 24YL1189

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Canyon Creek (24YL1189) is on the north bank of Canyon Creek, a tributary of the Yellowstone River west of Billings, Yellowstone County, Montana. It is north of Horse Cache Butte, west of Sturgis Monument, and at the base of a cuesta of Eagle formation sandstones. The road (Highway 532), formerly called Buffalo Trail, passes north from Laurel, turns west (now gravel surfaced) after crossing Canyon Creek, and turns north again to recross the creek and surmount the rimrock shortly after passing the glyphs.

The site looks out on broken coulee, cuesta, and arroyo country, empty of present habitations. A series of large rock shelters, protected from north winds by high cliffs, and with a southern exposure insuring radiation heat and snow-free winters, suggest aboriginal camps may have been placed there. Large mule deer herds were noted in February and March, 1981, and fresh bear tracks and digging sites were seen in March, 1982.

A series of lightly incised and abraded petroglyphs on a sandstone panel at Canyon Creek suggest a bear hunt, a bear-cult ceremony, or some other significant ursine encounter, either ceremonial or hunting. No external data for dating the panal is available. Intrinsic information (presence of firearms on the panal) suggest a date later than A.D. 1730-1750.

The central figure in the panel is a bear, 33.5 cm high, incised and scratched-abraded within the outline. This animal has ears, open mouth, and a "heartline." The shoulder hump and dished face identify it as Ursus arctos, the grizzly bear. Below, and perhaps subordinated, is a much smaller man-like figure. He has a pointed weapon in his right hand. Three other spear-like objects, one with a spearhead, approach the center of the bear. The left hand of the man rests on the nose of an antlered elk-like creature, or may be associated instead with a long spear above the elk's head. This spear has a fan-like decoration and a bent butt. Through the antlers is a linear series of eight horse hoofprints. To the far left are a vertical spear and gun with a breech mechanism. From the rump of the bear emerges a large, bent-butted, heavily ornamented spear.

The elements of the panel are sufficiently confused and separated that their relatedness may escape attention. The bear, although assailed by four weapons, seems unwounded. He seems designated, not attacked, by the ornate spear. The elk and man are closely approximated, and running through them is the hoof-mark line. The closely paralleled spear and gun are widely separated from the rest of the panel, again suggesting a designation instead of an intrinsic action-meaning. It is possible to consider this a hunting scene, a bear medicine statement, or a symbolic or spiritual "bear triumphant" scene, with name-designators separate from the central communication.

Farther along the cliff to the

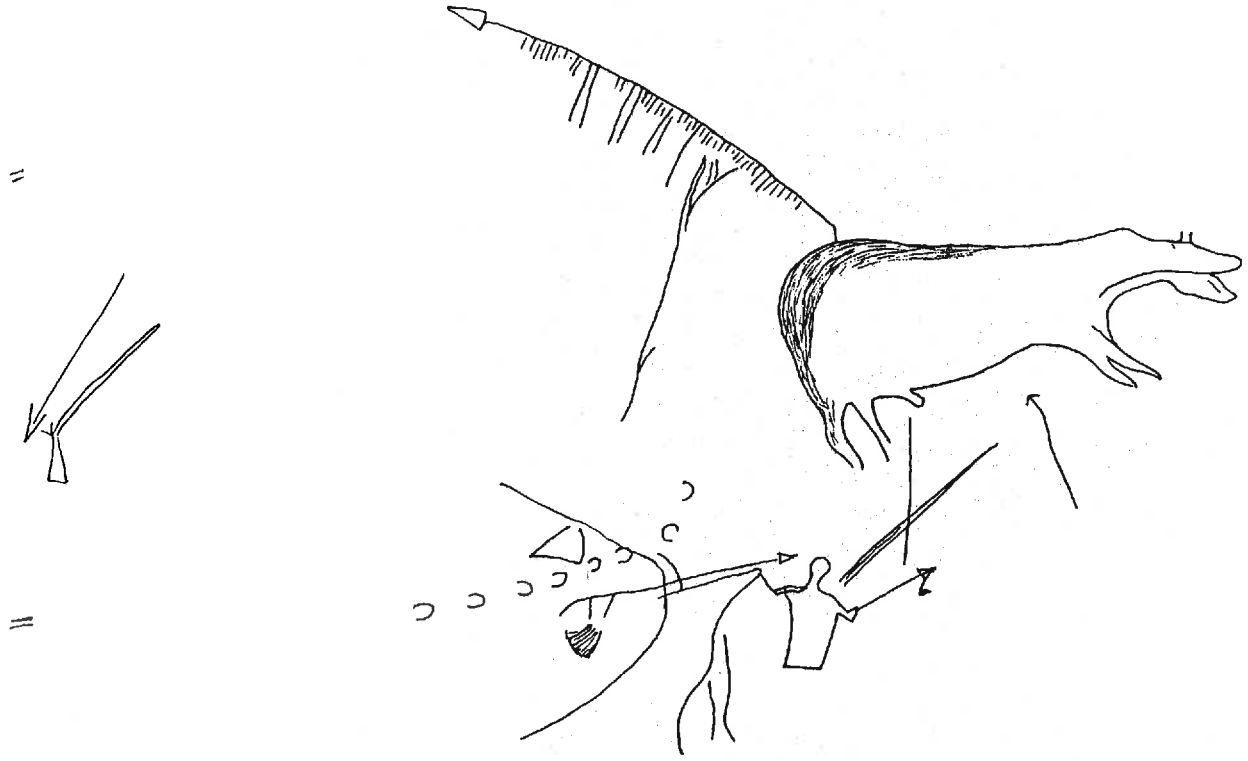

FIGURE 1: Petroglyph panal at Canyon Creek (24YL1189).

east is a crude pecked figure, and still farther a faint "lance head." All the glyphs are near the road. The nearby rock surfaces have been extensively vandalized by modern rifle fire.

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A POST-CONTACT PERIOD HUNTING CAMP ON THE LITTLE MISSOURI NATIONAL GRASSLANDS

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ABSTRACT

Site 32MZ33 is a Historic period occupation site on the Little Missouri National Grasslands of western North Dakota. An English gunflint found at the site dates it between A.D. 1800 and 1850. Associated artifacts suggest 32MZ33 was used by an equestrian group native to this area of the High Plains.

INTRODUCTION

Although the grasslands region of western North Dakota is rich in archaeological resources (Beckes and Keyser 1983), there is comparatively little archaeological evidence of the use made of this area by Historic Period Indians other than the Middle Missouri River Villagers. Recent work has demonstrated that village dwellers frequented the area on hunting trips (Wood 1971; Kuehn and Balikre 1985) to obtain lithic raw materials such as Knife River Flint and Antelope Chert (Ahler 1977; Beckes et al. 1985; Keyser and Fagan 1986), and to trap eagles (Allen 1983). However, until recently no reported site has yielded artifacts characteristic of equestrian Northern Plains groups using the area. Identifying such sites and using them in analyses is crucial to recently identified research problems that depend on differentiating transient occupations left by nomadic bison hunting groups from those of Middle Missouri Village hunting parties (Keyser and Davis 1982; Keyser et al. 1984).

In 1979, an Archaeological Services Inc. oil well pad inventory on the McKenzie Ranger District of the Little Missouri National Grasslands, Custer National Forest, located site 32MZ33. This site, a small lithic scatter on a low terrace above Poison Spring Creek in McKenzie County, North Dakota, is approximately 30 km southwest of Sidney, Montana (Figure 1) (Greer 1979). The site yielded a small collection of lithic artifacts that indicate a short-term hunting camp like many others on the Little Missouri National Grasslands (Beckes and Keyser 1983). What makes the site worthy of note however, was the presence of a single gunflint in the lithic assemblage. This enables us to identify the site as representing an occupation of the nomadic bison hunting groups that utilized this area.

SITE SETTING

Site 32MZ33 is located in the rolling Prairie ecosystem of the Little Missouri National Grasslands (USDA 1974), approximately midway

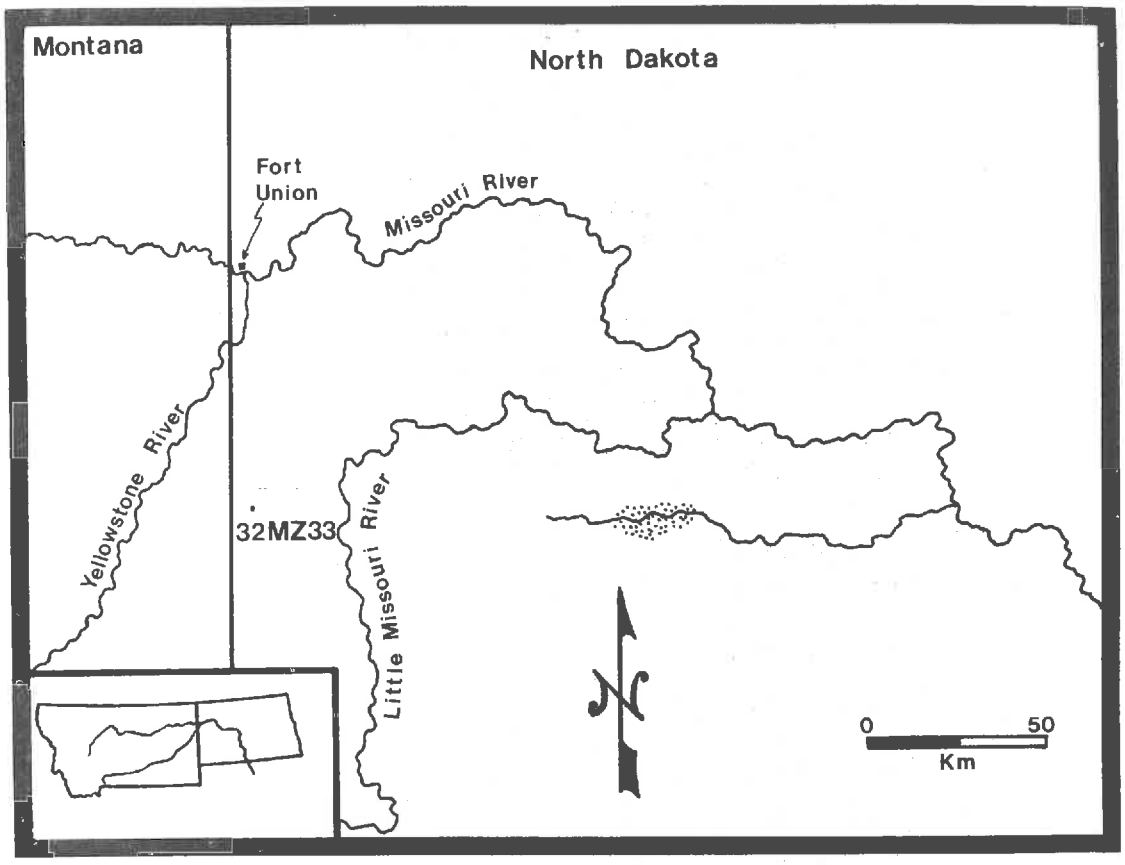

FIGURE 1: Location of 32MZ33. Stippling indicates area of Knife River Flint quarries.

between the Little Missouri and Yellowstone Rivers (Figure 1). This open grassland is characterized by broad expanses of mixed grass prairie covering a gently undulating topography along the Little Missouri River. Approximately 15 km to the east, the Rolling Prairie gives way to the Badlands ecosystem. This is a complex, eroded landscape characterized by bentonite buttes, ridges, and deep ravines. In combination, these two ecosystems provided a wealth of floral, faunal, and lithic resources that attracted a variety of prehistoric people to the Little Missouri National Grasslands (Beckes and Keyser 1983). During the Historic Period, this area was exploited by many groups (Bowers 1950.

Site 32MZ33 is a lithic scatter covering approximately 450 square meters. The few flakes found in buried context were at the margins of the site, eroding from a yellowish brown clay loam soil four cm below the ground surface. This thin loam topsoil is a maximum of ten cm deep, overlying a gray clay subsoil. Within the site boundaries, wind and water erosion have removed topsoil, leaving an extensive deflated clay pan surface. The surface artifacts were found mainly on the bare clay pan.

The site is situated in prime rolling prairie habitat, near a low divide separating the headwaters of three major local drainages. Recent archaeological research has shown that such areas were favored for habitation by Indians using the grasslands (Beckes and Keyser 1983). The site area is characterized by

several small seeps that normally flow from spring through mid-summer, and also in the fall. These produce sufficient water to form a lush, localized meadow several acres in extent that would have made the locality an ideal grazing area for bison and pronghorn. It would also have provided good horse pasture.

ARTIFACTS

A small chipped stone artifact assemblage consisting of fewer than 20 specimens was collected from the surface of 32MZ33 by the original survey crew and the junior author. The assemblage includes unworked flakes, utilized flake tools, end scrapers, a biface blade, and the gunflint (Figure 2). Although collection was unsystematic, all tool elements exposed on the site surface were collected and plotted on a sketch map. Without stratified buried deposits and lacking evidence for extensive erosion of multiple components, the integration of the gunflint with the other artifacts suggests all were contemporary.

Other than the gunflint, all artifacts are native-made from locally available materials including Knife River Flint, agate, chalcedony, porcellanite, and silicified sandstone. The best known source of Knife River Flint is the quarries on the Knife River and a major tributary, Spring Creek, approximately 100 km east of 32MZ33 (Clayton et al. 1970). The material also occurs in primary and derived contexts in several areas of the Badlands (Kuehn 1982:48-50). The chalcedony and silicified sandstone occur throughout the Little Missouri National Grasslands in lag gravel deposits and at primary exposures of the Bullion Creek Formation (Ahler 1977; Kuehn 1982: 48). Gravels along the Yellowstone River 25 km west of the site provide an excellent source for agate exploited throughout prehistory (Jerde 1981). Porcellanite also occurs in primary contexts in many areas of the Badlands (Fredlund 1976; Kuehn 1982: 49-50) where burn-

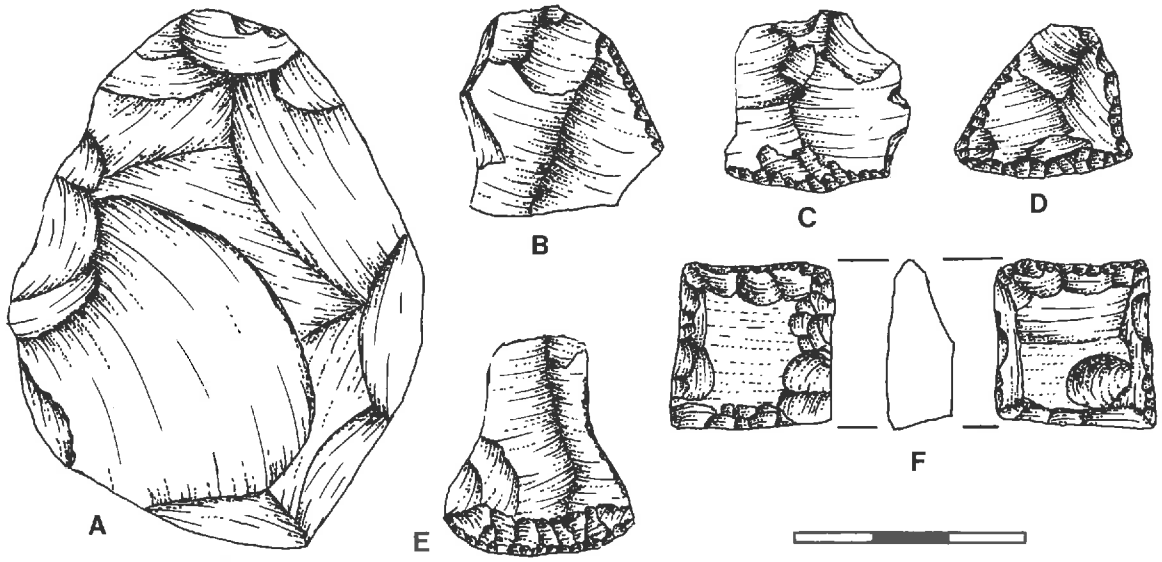

FIGURE 2: Artifacts from 32MZ33. A: biface; B,C: utilized flakes; D,E: endscrapers; F: gunflint (bottom - side - top views). A,C: Knife River Flint; B: porcellanite; D,E: agate. A,B,E drawn from Greer (1979). Scale bar is 3 cm.

ing lignite veins metamorphosed adjacent clay sediments of the Fort Union Formation. Characteristics of cortical surfaces on flakes of Knife River Flint and agate indicate that gravel was the source material. This implies the group using the site obtained these raw materials from nearby river gravels and lag deposits.

The large, well-worn gunflint is manufactured of gray translucent chalcedony (Figure 2F). It measures 2.25 cm long, 2.15 cm wide, and 0.95 cm thick. The extreme wear on the specimen suggests that it was originally considerably longer (Carlyle Smith, personal communication, 1979). Smith further indicated that the extent of wear is far beyond the capability of the artifact to function as a gunflint. This suggested that perhaps an attempt had been made to resharpen it, or that it was used as a "strike-a-light" after it could no longer be used in a flintlock. The width and thickness of the flint suggests that it was used in a rifle (Chris Dill, personal communication 1982). Its measurements are close to those characteristic of English rifle flints (Smith 1960), but also within the range of musket flints, especially considering the attributes of thickness and length of bed and wear of the specimen. Possibly this size overlap can be explained by the fact "many guns made for Indian trade utilized old musket locks which would accommodate the large musket flints" (Smith 1960: 48).

After examining the flint, Carlyle Smith indicated that it was of English origin due to its gray color and square back. French gunflints are made predominantly of a honey-colored chalcedony and have secondary chipping forming a rounded back. This distinguishing difference is due to the English "reinvention" of the micro-burin technique for separating blades into rectangular segments. This eliminates the need to retouch or back the flint into shape as was the French custom (Witthoft 1966). Combined with a shrinking market for gunflints, this invention gave the English a competitive edge and allowed them to dominate the gunflint trade after A.D. 1800, eventually putting the French out of business (Witthoft 1966:36).

Based on size and its identification as English, the gunflint from 32MZ33 almost certainly dates after A.D. 1800, since the French monopolized the gunflint market before that time (Carlyle Smith, personal communication 1979). This date coincides with establishment of major trading posts serving the Upper Missouri River region.

DISCUSSION

There is an accumulating data base indicating utilization of the Little Missouri National Grasslands by various Historic period groups. Conical timbered lodges and associated eagle trapping pits demonstrate Mandan and Hidatsa use of the area for obtaining ceremonial paraphernalia (Allen 1983). A site with post-Contact Coalescent ceramics was recently found near Medora. The Bear Den Tipi Ring yielded Knife River Phase ceramics associated with a date of A.D. 1790 (Kuehn and Balikre 1985). Additionally, a blue glass trade bead was recovered from the upper levels of 32BI319, near Grassy Butte (Arlyn Simon, personal communication 1983). Site 32MZ33 provides one more indication of the type and extent of use of this area by Historic period groups.

Since the gunflint originated as a trade item, apparently after A.D. 1800, it was likely obtained by the users of the site at a trading post established on the Upper Missouri to handle the expanding Northwestern Plains Indian trade. Although any of several trading posts in the region could have been the source of

the flint, the proximity of Fort Union (approximately 60 km north of the site) and the dominance of this post in the Upper Missouri trade, suggests that the flint may have originated there. Excavations at Fort Union recovered numerous gunflints. Although the majority were English black, a small percentage were gray (Bill Hunt, personal communication 1983). If the flint did originate at Fort Union, 32MZ33 dates between 1828 and 1870, the period when this fort (and its precursor Fort Williams) dominated trade in the area.

The predominance of chipped stone tools associated with the gunflint implies that the site probably dates earlier in this period instead of later, since metal implements rapidly replaced those of stone (especially hide scrapers). Therefore, we suggest that the site dates between A.D. 1828 and 1850. At first glance, this postulated date seems somewhat late, given the advent of the percussion cap in the 1820s and its revolutionization of firearms (Witthoft 1966:37). However, records indicate that flintlocks were used by nomadic Indian groups long after the invention of percussion rifles. The Indian Office of the War Department included flintlock firearms among goods used in payment for cessions by treaty as late as the 1860s (Witthoft 1966: 38). Flintlocks remained desirable to nomadic groups because they were:

> "...an inexpensive gun with simple parts and little to go wrong, a few flints, a small quantity of powder, ball, and shot; with these a man was lightly burdened but well equipped for long periods away from stores." (Witthoft 1966:38).

Thus, it is possible that this site dates after the advent of percussion firearms.

The artifact assemblage recovered from 32MZ33, coupled with the site's location, suggests that it functioned as a short-term transitory campsite used by a small group of equestrian Northwestern Plains bison hunting nomads. The variety of local lithic materials and occurrence of cortex flakes imply that this group was familiar with the resources of the Grasslands region. The absence of ceramics, which characteristically identify even transitory campsites used by seasonal hunting parties from the Missouri River villages (Wood 1971; Davis 1980; Kuehn and Balikre 1985) suggests that the site occupants were not Mandan or Hidatsa from the River Villages in North Dakota. More likely they were Assiniboine, Cree, or Crow hunters, all known from ethnohistoric evidence to have used this area. The preponderance in the artifact assemblage of cutting and scraping tools and the paucity of lithic manufacturing debris at the site imply a focus on hide and meat processing activities most likely associated with short-term hunting activities. The site location is optimal for a small group to camp and hunt the area's resident bison herds. The rolling hills and gentle drainage basins would have supported sizable numbers of bison and the grassy areas adjacent to the site would have been an ideal horse pasture.

CONCLUSIONS

Site 32MZ33 is a small lithic scatter in the Poison Spring Creek drainage of western North Dakota. Lithic artifacts from the site suggest that it was a short-term hunting camp occupied by Northwestern Plains nomadic bison hunters. The occurrence of an English made gunflint associated with a site assemblage of chipped stone implements indicates occupation during the post-Contact period, most likely between A.D. 1825 and 1850. As one

of few post-Contact period archaeological sites so far discovered on the Little Missouri National Grasslands that appears to be associated with other than Missouri River Villagers, 32MZ33 provides important documentation of historic Indian utilization of this region. Future research at this site should evaluate whether additional buried materials exist that could be used to test the hypotheses presented here. Additionally, this and other similar sites (e.g., 32BI319 reported by Arlyn Simon, personal communication 1983) are likely to be valuable in analyses that focus on determining the cultural ecology of and cultural dynamics between Middle Missouri Village and Plains nomad groups (Keyser et al. 1984: 48-50).

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BOOK REVIEWS

Stone Tool Analysis: Essays in Honor of Don E. Crabtree. EDITED BY MARK G. PLEW, JAMES C. WOODS, AND MAX G. PAVESIC. University of New Mexico Press, Albuquerque, 1985. 32 pp., figures, tables, references, index. $32.50 (cloth).

Don Crabtree played a seminal role in lithic studies in North American archaeology. Indeed, the common language of stone tools and their production allowed Crabtree to span international divisions in his work. Crabtree left a legacy of lithic technical studies that continues today in an increasingly interregional, international, and interactive school of lithic analysts. Part of the Crabtree legacy has been those fortunate enough to have worked and studied with him. This volume is a collection of papers by some of those people.

As a collection of works by archaeologists who (self-professedly) were influenced by Don Crabtree, Stone Tool Analysis is an interesting cross-section of Crabtree's influence. The papers in this volume can be considered of three sorts: lithic technical studies; lithic technical studies employed in the analysis of specific archaeological cases; and lithic technical studies that are used to illustrate a general perspective on the analysis of material culture. Although this typology is crude, it does provide a framework in which to summarize the twelve papers in the volume.

In the first category are papers that report on some specific aspect of lithic tool production or some "facts" about lithics. Material culture replications are undertaken in several of the papers. Plew and Woods report on edge damage and flaking pattern replications of materials from southern Idaho. Titmus presents a compendium of notching techniques. Fagan discusses the construction of a Chinook house and its associated features. Some of the other papers are more archaeological in intent but still present descriptive information. Ritchie and Gould present some general observations on an important raw material source in suburban Boston. Tindale discusses Australian Aboriginal flaking techniques and the distribution of distinctive stone tools in Australia. Schnurrenberger and Bryan attempt to bolster their controversial case for the Timlin site in New York State as a humanly modified stone tool assemblage through a study of off-site glacial clasts. They also generally re-vivify the naturefact vs. artifact argument. Hester discusses a technological (production-based) and typological (morphology-based) lithic artifact chronology for northern Belize. Statham, in an article that is entirely oriented to replicative studies, discusses how to document replicative collections.

In the second category -- studies that use lithic technology to further understanding of specific archaeological problems -- are two papers. Pavesic discusses the oc-

currence of distinctive morphological tools ("turkey-tail" bifaces) with Archaic burials in western Idaho. Although hampered by poor contextual information, Pavesic is able to demonstrate that the production of these large bifaces differed from other contemporaneous tool production sequences. From this Pavesic argues that some specialized burial practices occurred in the western Idaho area. Pavesic then goes beyond these regional descriptions to consider the conditions under which specialized burial practices would occur. The paper differs from the descriptive/technical papers above because it uses lithic studies to evaluate an anthropological question.

Shafer's analysis of two workshop middens in the huge workshop/quarry settlement of Colha, Belize is another example of using lithic studies to address anthropological questions. By examining debitage and production failures in two workshop middens Shafer musters convincing evidence of changes in craft specialization roles. This then leads one directly to consider the nature of specialized production in complex societies and how lithic technologies may change with changes in the system. While Shafer does not address these topics at length, the study certainly leads towards them.

The final grouping of papers (those that illustrate a perspective on material culture) are those by Young and Bonnichsen, and Flenniken. These three authors have been major proponents of the cognitive school of lithic analysis. That is, one must use a (flintknapper's) knowledge of potential reduction options to determine how tools were made and used. The set of choices taken in the prehistoric knapper's production is seen as a result of his or her structural "grammar." A structural grammar determines which options are correct. Effective lithic analysis then requires that the analyst evaluate the choices made by the creator of each individual tool. Bonnichsen and Young illustrate this by reporting on a well-controlled set of replicative experiments in which flintknappers were filmed and interviewed during their work. A flow model of their production techniques was derived from this information. The grammatical structures found in the experimental work are then examined in two fluted points -- one from the Anzick site in Montana and the other from the Moosehorn site in Maine. Two different structural grammars are found to be present in the fluted points from these sites.

Flenniken addresses a specific issue in his article: the use of morphological types as diagnostic types for culture-historical sequences. Flenniken's argument is that artifact morphologies may change through their use (especially after breakage and recycling). Consequently, it is artifact production sequences that are truly diagnostic of cultures, for they are part of a shared tradition of tool production and production traces may remain on items after recycling or repair that changes the shape of an artifact. He then presents an illustration of this with experimental dart points (used as spears) employed in killing two feral goats. Breakage in use and subsequent rejuvenation change the original artifact morphology, while traces of the original production technique remain.

What do these articles tell us about the influence of Don Crabtree? It is clear that Crabtree's influence was wide-ranging. His colleagues and students have undertaken a wide variety of researches. Our understanding of lithic production sequences has advanced significantly as a result of Crabtree's influence.

On the other hand, and completely aside from Don Crabtree, one has to ask what these particular studies

add to archaeology as an anthropological discipline. From an optimistic perspective, the first class of papers -- descriptive materials -- provide a reference library for stone tool studies. Regarded from a negative perspective, they add little to anthropology for they are specific and highly detailed considerations of specific technical aspects of lithic technology. There are, of course, exceptions to this view. Hester's study is basic, sound chronological work. Tindale gives more much-needed ethnographic observations on stone tools in living technologies. However, many of the other papers seem to be void of anthropological content. This is not to say that they are negative contributions. Instead, they are more null contributions to anthropology, at least until their results are put to some larger use.

In the second category are papers that one might consider more explicitly anthropological in intent. Both Pavesic and Shafer exemplify the use of technological studies to address really interesting questions. Lithic studies cannot stand in isolation as antiquarian activities. The two papers in this category are good examples of making links between lithic data and other aspects of prehistoric cultural systems. While some may question the hypothesized linkages employed by these two authors, I think one has also to recognize their appropriate use.

The third category of papers, between them, lay out a challenge to contemporary archaeology. One reading of them is that only by being a flintknapper can one understand a flintknapper. An additional message is that stone tool production, or any other cultural activity is highly normative: individual craftsmen have production grammars. Young and Bonnichsen would probably stop there, and say that individual variation in production grammars may be as high within cultures as between them (p.126). However, Flenniken's entire argument is based on the idea that this would not be the case and that cultural norms are different between culture-historical units. Both papers seem to agree that morphological variation is less significant (culturally) than production technique variation. This is an explicit feature of Flenniken's argument (p.266) and is implied in Young and Bonnichsen's work (p.127).

There seems to be a misconception here that most analysts wish to equate artifact morphology with particular cultural systems. While Flenniken contentedly criticizes the Kriegerian approach (in which artifact types are considered to be "diagnostic" of individual cultures), he is actually simply restating it in a different form (see Binford and Sabloff 1982; Dunnell 1971).

Flenniken is also liberal in criticizing David Thomas's projectile point chronology as assuming "that variation in projectile point morphology is always intentional and indicative of a cultural pattern" (p.267). Yet: "...morphological types...are abstract. Types are not artifacts. A type is the composite description of many artifacts, each of which is quite similar..." (Thomas 1979:216). Furthermore, Thomas explicitly states that temporal types are merely stepping stones and should not be mistaken as having any inherent cultural meaning in and of themselves (Thomas 1979: 225). Thomas's later works take this stance even more explicitly (Thomas 1983). While this is poor scholarship on Flenniken's part an important issue underlies the cognitive-structuralist approach. At a fundamental level, Flenniken, Young, and Bonnichsen, are resurrecting the notion of one artifact equals one cultural system, using the morphologies of production traits instead of the outline forms of artifact shapes.

These problems at the theoret-

ical level translate into practice as well. Neither Young and Bonnichsen, nor Flenniken, present applications to realistically large archaeological samples. The authors claim that the cognitive-structuralist approach is fruitful, but the tree has so far produced only a few dry pips. While neither Shafer or Pavesic explicitly argues for a theoretical perspective, each gives a more compelling demonstration of stone tool analyses and their anthropological importance.

In sum, the collection of papers presented in this volume is diverse. However, they may be of interest only to those who have specific technical and reference needs (although little hard data are presented) or those needing to take the pulse of North American lithic studies.

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Prehistoric Hunters of the Black Hills. E. STEVE CASSELLS. Johnson Books, Boulder, Colorado, 1986. vii + 104 pp., figures, illustrations, references, index. $6.95 (paper).

This volume was written by Cassells as a synthesis of the archaeology of the Black Hills region. Like his 1983 Archaeology of Colorado, this book is oriented towards the layman or amateur archaeologist, instead of the professional.

In the first chapter of this book, Cassells discusses some of the basic principles and goals of archaeology, and the relationship between general anthropology and archaeology. The second chapter is a brief overview of some of the dating techniques used by archaeologists. This chapter is informative in that a discussion of both the benefits and drawbacks of some of the commonly used dating methods is presented. There is also a description of some of the newer techniques which are currently being developed for archaeological use (archaeomagnetic dating, thermoluminescence, etc.).

The third chapter, entitled "Environmental Setting", is a broad and general description of the flora, fauna, geology, and geomorphology of the Black Hills region. This chapter lacks some cohesiveness in organization, but does present a decent overview of the environmental information available for the region.

The next several chapters attempt to synthesize what is currently known about the prehistoric inhabitants of the Black Hills from Paleoindian (ca. 12,000 BP) through Late Prehistoric (ending ca. 1600 AD) times. These chapters have several major problems. First, Cassells begins each with a colorful and descriptive scenario which puts the reader back in time with a group of prehistoric peoples. While enjoyable in a fictional sense, these scenarios do not adequately reflect current interpretations of the archaeological data from the temporal periods that they represent. If the author intended to use these scenarios to reflect cultural patterns specific to particular time periods, Cassells has not succeeded. In the scenario on Archaic lifeways, two young men are off flint knapping. On the way back to their "camp" they kill a deer. I fail to see how this scenario represents Archaic lifeways. Our knowledge of pre- historic peoples would suggest that flint knapping and hunting deer were practiced in many chronological periods.

A second problem noted in these chapters was an inconsistency in placing cultural materials into a temporal framework. Much of the discussion of Paleoindian culture is based on projectile point typology. The main problem is Cassells' style of presentation. In this chapter, the reader is lead to believe that Clovis and Folsom Complexes are immediately followed by "Angostura and Angostura-like" Complexes. This is a major flaw in Cassells' presentation because projectile points of the Hell Gap and Agate Basin complexes were found at the Agate Basin Site on the fringe of the southern Black Hills in Wyoming (Frison and Stanford 1982). The reader should have been present- ed with a complete and accurate chronological framework based on the known projectile point types (Clovis - Folsom - Agate Basin - Hell Gap - Alberta - Cody - Late Paleoindian types: Angostura, Jimmy Allen and Frederick).

A third problem is Cassells' brief overview of the Archaic periods. Little time is spent discussing the relevant data known for the Archaic periods from the archaeological record of the Black Hills. More information should have been provided to allow the reader to gain a better understanding of the flexibility of Archaic lifeways.

The primary benefit of these chronologically-oriented chapters is to list and describe some of the major archaeological sites and finds presently known in the Black Hills region. These chapters also attempt to synthesize a large body of data, and for the effort, Cassells should be credited. The summary of the chronological periods (a separate chapter) is the most useful part of this section, and provides the clearest evidence of an understanding of the current data-base.

In the final chapters, Cassells examines rock art in the Black Hills, and the current state of Black Hills archaeology. Much of the rock art chapter focuses on techniques for dating figures and panels, however, the discussion does suggest that more and different types of research need to be done. The last chapter discusses the current state of Black Hills archaeology. Cassells reviews academic research and cultural resource management. The impact of looting and vandalism on archaeological resources is also discussed.

Overall, this book does provide the layman with useful information for understanding the use of the Black Hills region by prehistoric peoples. It is well written, easy to read and understandable. While this book also provides a good synthesis of much of the archaeological data available for the region, some gaps are present. I

would recommend this book to those people who have an interest in the Black Hills region or North American Plains prehistory.

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Among Ancient Ruins: The Legacy of Earl H. Morris. EDITED BY FREDERICK W. LANGE AND DIANA LEONARD (with an Introduction by Joe Ben Wheat). Johnson Books, Boulder, Colorado, 1985. 94 pp., illustrations. $9.95 (paper).

This book presents a concise summary of the life of Earl H. Morris, primarily related to his work as a Southwestern and Mesoamerican archaeologist. The book came about as a result of a 1983 photographic exhibit at the University of Colorado Museum, entitled "Among Ancient Ruins: The Explorations of Earl H. Morris."

The Preface of the book sets the tone for the remaining text by stating in somewhat glowing terms the contributions and approach Morris brought to the early days of Southwestern archaeology. Morris' career lasted nearly 50 years, leaving ". . reports . . ." (page 7). Most of the efforts were excavations in the North American Southwest, but with some contributions to Mesoamerican archaeology and site restorations in both regions.

In the first chapter (The Early Years), the editors chronicle Morris' early life in New Mexico. As a child, Morris lived close to prehistoric sites and became familiar with prehistoric artifacts. In 1911, Morris spent a summer excavating at Bandelier and in 1912 at the Mayan site of Quiriqua in Guatemala. Morris continued to work in the Southwest and Guatemala from 1913 to 1914. He received a B.A. degree in 1914 and M.A. degree in 1915 from the University of Colorado and then pursued graduate studies at Columbia from 1916-1917, but did not finish the doctorate degree. Morris worked with Nels C. Nelson in the Rio Grande Valley after 1915 and learned during that time stratigraphic excavation and dendrochronology. A brief chapter entitled "Morris and His Family" reviews his family life.

The main portion of the next chapter (Morris, the Archaeologist) relates his work from 1915 on. Morris excavated in the Gobernador area of New Mexico; at Aztec Ruin, at Basketmaker sites in Arizona; at Chichen Itza in 1924; and led expeditions in New Mexico and Arizona in the late 1930s for the University of Colorado.

Morris was honored for his accomplishments by the University of Colorado in 1931 and 1942. He received the A. V. Kidder Award in 1953. Morris career ended in 1956 when struck by a heart attack.

The remainder of the book is a photographic essay of excavations and artifacts, and of the field life in which Earl Morris participated. The black and white photographs illustrate field situations in the early 20th century, including the kind of mechanical breakdowns we 1980s archaeologists certainly can appreciate. There are numerous photographs of Southwestern scenery in areas where Morris has excavated, and of individuals who accompanied the expeditions. Most of the photo essay shows excavated sites and sites being excavated. Several photos depict Southwestern pottery. These are primarily Southwestern subjects, with only three from Mesoamerica.

This is clearly a book printed for popular consumption. It should attract those interested in Southwestern archaeology from the point of view of the early days of excava-

tion. The photographs beautifully portray the sense of history involved here and many have their own artistic merit. The biography and list of publications by Earl Morris can also be valuable to both scholars and the public.

The book tends to wax nostalgic, to which I do not object. The purpose seems to be to present the positive, if not the romantic, side of field archaeology through the life of one of its early pioneers. Perhaps even the modern archaeologists can find a sense of perspective in Morris' own words:

> "Pick and shovel are the tools of a lonely and misunderstood profession. There are almost as many different kinds of picks and shovels as there are artist's brushes . . . to which it may be put with plundering stupidity or consummate skill . . . If ever the touch of the master is needed, it is in archeological excavation . . ."

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