WYOMING
ARCHAEOLOGICAL
SOCIETY

THE WYOMING ARCHAEOLOGIST

VOLUME 26(3-4)

FALL 1983

E R R A T A

FIGURE 5, page 15: This photograph has been printed in the wrong article. It should be found on page 41, figure 5.

FIGURE 5, page 41: This photograph has been printed in the wrong article. It should be found on page 15, figure 5.

THE WYOMING ARCHAEOLOGIST

WYOMING ARCHAEOLOGICAL SOCIETY, INC.

VOLUME 26(3-4)
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LETTER FROM THE EDITOR

As the readers of this journal can see, this issue of THE WYOMING ARCHAEOLOGIST initiates our new format and style of publication. The combined efforts of professional and amateur archaeological communities in the State of Wyoming are represented in this issue of the ARCHAEOLOGIST.

The format promotes more comprehensive reading, and we hope the improvement will bring more contributions for publication. We are presently striving for a minimum of two issues a year. If contributions increase, we may then be able to return to our previous practice of four issues per year.

Two of the articles in this issue, Lawrence Todd's and Cary Craig's, are the results of research conducted following the awarding of these individuals with the 1982 Mulloy Scholarship. The article by Carolyn Buff is based on work that was made possible by the combined efforts of the professional and amateur archaeologists. Let's hope that such efforts can continue. We are also pleased that the archaeological community of Montana wishes to provide us with articles, as shown by the rock art article by Tom Lewis.

We welcome comments, constructive criticism and items for inclusion in future issues.

Please address communications to either:

George Brox, Editor
1128 11th Street
Rawlins, Wyoming 82301

or

Danny Walker, Assoc. Editor
Department of Anthropology
University of Wyoming
Laramie, Wyoming 82071

Sincerely,
George Brox, Editor

ANNOUNCEMENTS

1. Imogene Hanson wishes to inform the society members and other interested persons that the Spring Meeting will be held in Cody the first weekend in April. Additional information will be sent chapter presidents as it becomes available, but tentatively, activities have been planned for April 5-8 (Thursday through Sunday, with field trips planned on Sunday.

2. Students interested in apply for the Mulloy and Frison Scholarships should submit their applications as soon as possible. As seen in the following article on the scholarships, the scholarship committee has designed an application form so that the applications can be easier evaluated.

3. Persons interested in obtaining a copy of Mary Helen Hendry's new book, "Indian Rock Art in Wyoming", may do so by sending checks for $20.00 payable to Mary Helen Hendry at the following address:

Mary Helen Hendry
Lost Cabin Route
Lysite, Wyoming 82642

WYOMING ARCHAEOLOGICAL SOCIETY
MINUTES OF THE SPRING MEETING
APRIL 28-30, 1983

FRIDAY EVENING, APRIL 28, 1983

A formal meeting was held Friday, April 29, 1983. Joe Bozovich and George Brox were appointed to audit the treasurer's books.

CALL TO ORDER AND WELCOME

The annual meeting of the Wyoming Archaeological Society was called to order at 7:30 p.m. by Bob Randall, President, at the Western Wyoming College Student Center. Mr. Randall thanked Rosalie Miller for her efforts in having the state meeting in Rock Springs.

CREDENTIALS COMMITTEE AND VOTING DELEGATES

Bob Randall asked that Mimi Gilman give the Credentials Report, at which time roll was called. Credentials were presented by the following chapters; Cheyenne Chapter--Doug Olinger and Norbert Hasenkamp, Cherokee Trail Chapter--Debbie Chastain, Big Horn Chapter--Milford Hanson and Imogene Hanson, Sweetwater Chapter--Joe Bozovich and Rosalie Miller, Sublette County Chapter--Wilma Shriver and Vivian Hurley, and the Fremont County Chapter--Ray Parman, Jr., and Doris Blakeslee.

SECRETARY'S REPORT

President Randall asked for the minutes of last year's annual meeting. Mimi Gilman passed the minutes to attending members to read and approve. Corrections were asked for. The Cheyenne Chapter was omitted from the 1982 Credentials Report. Motion was made to approve the minutes after correction of Cheyenne Chapter Credentials were made. Motion carried.

TREASURER'S REPORT

The audit of books by George Brox and Joe Bozovich was accepted. The complete report is attached.

A discussion by Milford Hanson followed his report with regards to $500.00 donated to the Foundation by Dr. George Frison. This money comes from the Agate Basin book royalties for 1982.

Mr. Olinger made the motion to accept the treasurer's report. Mr. Parman, Jr. seconded it. Motion carried.

EDITOR'S REPORT

George Brox was called to give his report on the Archaeologist. He opened his report with recommendations for updating the publication. The recommendations come from Dr. George Frison and the Wyoming Recreation Commission.

The recommendations are as follows:

1. Change of format, making the publication more like the Montana and Colorado Journals.
2. Association with Danny Walker as Co-editor would unite the Recreation Commission and University of Wyoming efforts to entice not only amateurs, but professionals to submit articles for publication.

Danny Walker announced papers being ready for publication on the Dead Indian site and Castle Gardens site.

A question was raised about papers from recipients of the Mulloy Scholarship not having appeared in the past few years. Danny Walker said he would notify

WYOMING
ARCHAEOLOGICAL SOCIETY, INC.

FINANCIAL STATEMENT
1982 - 1983

Balance checking 4/13/83		$ 2197.18
Income		$ 2163.33
		$ 4360.51

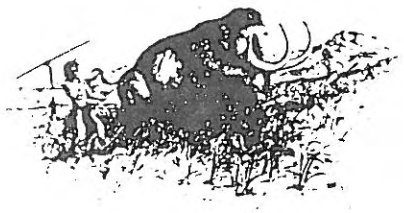
EXPENDITURES:

Editor	$ 200.00
Scholarship	$ 500.00
Refresh. meeting	$ 87.76
Treas.	$ 180.72
Sec. State	$ 3.00
Transfer to Foundation	$ 49.50
Bank	$ 20.00
	$1040.98

Balance checking 3/18/83	$ 3319.53
Savings Cert.	$ 5960.68
Net Worth 3/18/83	$ 9280.21
Net Worth 4/13/82	$ 7987.35
Net Gain 1983	$ 1292.86

This report respectfully submitted by: Milford F. Hanson Treas.

Audited by:	Date:
George Brot	4/29/83
Lee Bagnell	4-29-83



Wyoming Archaeological Foundation

FINANCIAL STATEMENT

1982 - 1983

Balance in checking		$ 69.33
Income		$ 1670.80
		$ 1740.13
EXPENDITURES:		
George Frison	$ 1600.00	
Secretary of State	$ 3.00	
	$ 1603.00	
Balance in checking		$ 137.13
Passbook Savings		$ 214.86
Money Market		$10658.74
		$11010.73
Projected Interest Due 5/6/83		$ 650.00
		$11660.73
Donation of Royalty on Agate Basin by Dr. Frison.		$ 552.42
		$12213.20

This report respectfully submitted by: Milford F. Hanson Treas.

Audited by: George Brott — Date: 4/29/83

for [illegible] — 4-24-83

last year's recipients and have them turn in manuscripts for publication.

Several members were interested in guidelines for articles. Danny Walker advised the membership to read Gary Wright's article about Yellowstone, and to use that article as a guideline in style and format.

The following motions were put before the membership for a vote:

1. Carolyn Buff made the motion that the format of the Archaeologist be upgraded. Motion was seconded by Joe Bozovich. Motion carried.
2. Olinger made the motion to have issues printed yearly, but not less than two. Seconded by Buff. Motion carried.
3. Olinger made the motion that scholarship winners be notified that they are required to turn in a manuscript to the Archaeologist and a paper presented at the following year's annual meeting. Seconded by Mr. Parman, Jr. Motion carried.

COMMITTEE REPORTS

There were no reports made at this time.

OLD BUSINESS

Danny Walker advised us that in last year's minutes it was reported that all persons giving papers were going to turn in manuscripts for publication in the Archaeologist and so far, none had been received.

NEW BUSINESS

George Brox announced his self appointment to a one man committee to improve the relationship of our Society with W.A.P.A.

Rosalie Miller announced the program for Saturday and once again Mr. Randall thanked and praised Rosalie for what she did in preparation for the meeting.

Danny Walker then reported that Jan Wilson, Director of the Recreation Commission had resigned and Al Bastron was appointed to that position as recommended by the Governor. He also announced the resignation by Dr. George Frison as State Archaeologist effective December 31, 1983, which means the Recreation Commission is looking for a replacement. The position being advertised is as follows:

Full-time State Archaeologist with an adjunct honorary professorship at U.W.

The membership was then invited to have the summer meeting at Keyhole Reservoir, July 9th and 10th. Motion was made to accept Walker's invitation for the summer meeting to be held at Keyhole Reservoir. Motion seconded, motion carried.

Mr. Bob Randall then made praises of Dr. Frison for all his efforts in the last few years as State Archaeologist.

Bob Randall made the motion that the Executive Secretary write a letter to Dr. Frison in his honor. Danny Walker seconded the motion. Motion carried.

NOMINATING COMMITTEE

Mimi Gilman introduced the names of the nominees. They are as follows:

Imogene Hanson-----President

Carolyn Buff-------1st Vice President

Evelyn Albanese----2nd Vice President .

These nominees were unanimously

voted on as presented. Milford Hanson was re-appointed treasurer, Mimi Gilman re-appointed secretary and George Brox with Danny Walker, editors.

OFFICER'S COMMENTS

Imogene Hanson was welcomed as President. Her first duties as president were to ask the membership for ideas to honor Dr. George Frison.

The ideas turned into motions and they were as follows:

Mr. Parman made the motion that a second scholarship be established and given in Frison's name, following the same guidelines as the Mulloy Scholarship. Vivian Hurley seconded it. Motion carried.

Doug Olinger made the motion that the Frison scholarship be awarded at the Banquet this year. George Brox seconded it. Motion carried.

Since there wasn't any more business the meeting was adjourned at 9:30 p.m.

SATURDAY, APRIL 30, 1983

At 9:00 a.m. the Executive Board met to admit into the Society the following new chapters: High Plains Chapter of Torrington: Sublette County Chapter of Pinedale.

At 9:30 a.m., the Paper Session was started with Steve Creasman of Western Wyoming College doing the introductions. The topics and presenters were as follows:

Temporal and Cultural Relationships of Deadman Wash Projectile Points--S. Creasman, Western Wyoming College

Rocks, Rocks From Everywhere, But What Does It All Mean--C. Craig, University of Wyoming

Lithic Reduction In The Green River Basin--J. Newberry, Western Wyoming College

Archaeological Sites In The Upper Sandy Drainage--D. Decker, Rock Springs BLM

Castle Gardens Site--Danny Walker, University of Wyoming and State Archaeologist Office

Taphonomy: Fleshing Out The Dry Bones Of Plains Prehistory--L. Todd, University of Wyoming

Altithermal Knives: A Diagnostic Altithermal Age Artifact--J. Head, Western Wyoming College

Historic Artifacts From Site 48SW336--A. Gardner, Western Wyoming College

Results Of Archaeological Investigations At 48CR3961 and 48CR3962: And Implications For Subsistence Adaptation In the Red Desert--Pat O'Brien, Western Wyoming College

The Role Of The Amateur In Wyoming Archaeology--T. Marceau, State Historic Preservation Office (Wyoming Recreation Commission)

BANQUET

The banquet was held at Western Wyoming College Student Center at 7:00 p.m.

Rosalie Miller, President of the Sweetwater Chapter, opened the meeting by introducing Mimi Gilman and presenting her with flowers since that week was "Secretaries Week".

Reverend Roy Miller gave the

invocation.

After dinner, Rosalie Miller thanked everyone and introduced Imogene Hanson. President Hanson welcomed the two new chapters which were voted in at an earlier session of the Executive Board. She announced the possible date for the summer meeting, July 9th and 10th at Keyhole Reservoir. A final notice will be sent to the chapters to confirm these dates. She also announced that at the summer meeting, we would be honoring Dr. George Frison and also invited the membership to the Foundation's breakfast, Sunday morning at the Signal Room of the Holiday Inn. Carolyn Buff was then introduced to announce the winners of the two scholarships.

Mulloy Scholarship----Howard Haskell $350.00

Frison Scholarship----Dale Wedel $350.00

Both students attend the University of Wyoming.

DISCUSSANT

Dr. Jeff Eighmy Ph.D., our guest speaker, holds a Ph.D. in Anthropology-Archaeology. He is the professor at Colorado State University in Fort Collins, Colorado, where he is in charge of the Archaeomagnetic Laboratory at C.S.U.

His presentation dealt with Archaeomagnetism. He explained the techniques and methods utilized for this specific science. The other topic discussed was the importance of dating all materials so no data is ever lost.

At 9:30 p.m., Steve Creasman thanked everyone and re-invited the Society to have their meeting in Rock Springs.

Banquet recessed at 9:30 p.m.

Respectfully submitted

Mimi Gilman,
Secretary

WYOMING ARCHAEOLOGICAL SOCIETY MULLOY AND FRISON SCHOLARSHIP AWARDS ELIGIBILITY GUIDELINES AND GENERAL INFORMATION

SCHOLARSHIP COMMITTEE

A five (5) member permanent committee to be composed of the chairman, the State Archaeologist, the Wyoming Archaeological Society, Inc. President, the executive secretary of the Wyoming Archaeological Society, Inc., and a University of Wyoming representative as consultant to the committee will be established.

SCHOLARSHIP AWARD

A two-thirds (2/3) approval of the permanent committee must be given before any award(s) is (are) granted.

REQUIREMENTS OF ELIGIBILITY FOR THE AWARD

Each applicant must be at least a junior at the University of Wyoming (this may be waived if the committee believes circumstances warrant) showing serious intent by having a major in anthropology with a preferred emphasis toward archaeology as a sub-discipline.

Each applicant must complete a project pertinent to Wyoming archaeology and/or its associated subjects, furnish periodic progress reports to the Scholarship Committee Chairman of the Wyoming Archaeological Society, Inc., and present a completed professional paper at the spring meeting of the Wyoming Archaeological Society, Inc. within one (1) year of receiving the award. In addition to a presentation, said paper will be submitted to the editor of the Wyoming Archaeologist for inclusion in that publication.

Each applicant must maintain

at least a "B" (3.000) grade point average in all anthropology courses and a 2.750 overall grade point average to be eligible for the award.

Each applicant must make application through an instructor or professor to obtain recommendations and approval of qualifications for applying for the award(s). Application will be made on a Wyoming Archaeological Society, Inc. Mulloy and Frison Scholarship Award form (attached), accompanied by two (2) letters of recommendation from University of Wyoming anthropology faculty.

The awards will be made only to those students who expect to make the world of anthropology a vocation and contribute constructively to any of its fields.

AMOUNT OF AWARD

The amount and number of awards will be determined by the Executive Committee of the Wyoming Archaeological Society, Inc., upon recommendation of the permanent Mulloy and Frison Scholarship Committee of the Wyoming Archaeological Society, Inc.

PAST MULLOY SCHOLARSHIP WINNERS

1969	Charles Reher
1970	John Lytle
1971	Ross Hilman
1972	George M. Zeimens
1973	George M. Zeimens
1974	Debbie Foster
	George M. Zeimens
1975	Mark Miller
1976	Susan Hughes
1977	Kim Smiley
1978	Mary Lou Larson
1979	Dave Darlington
1980	Dave Darlington
1981	Allen Darlington
	David Reiss
1982	Carolyn Craig
	Lawrence Todd
1983	Howard Haspel

PAST FRISON SCHOLARSHIP WINNER

1983	Dale Wedel

WYOMING ARCHAEOLOGICAL SOCIETY, INC.

Application for Mulloy and Frison Scholarship Awards

A. APPLICANT: Please type or print clearly in ink.

Full Name _____ Date _____

Mailing Address _____ Zip _____

Overall Grade Point Average _____

Grade Point Average in Anthropology Courses _____

Level of Degree Progress (if Bachelor's Degree attained, statement of progress on Master's, etc.)

Statement of Future Archaeological Intent

Proposed Project:

Statement of Need

B: FACULTY RECOMMENDATIONS: Please attach two (2) statements of recommendations from professors of Anthropology or related fields.

C: RETURN TO: Submit two (2) copies of this application to: Mulloy and Frison Scholarship Committee, Department of Anthropology, University of Wyoming, Laramie, Wyoming 82071.

THE RIVER BEND SITE

CAROLYN MILLER BUFF

ABSTRACT

The River Bend site is located along a large bend of the North Platte River on the west edge of Casper, Wyoming. It is a substantial campsite of the protohistoric period, probably of Shoshonean affiliation, discovered in the fall of 1977 by a construction worker during the removal of a sand dune complex for the development of a housing project; the site is no longer in existence. Emergency salvage resulted in the recovery of an excellent sample of material from the site. This paper presents a preliminary description of these excavations and of the more than 2,000 lithic, bone, antler, and shell items recovered.

INTRODUCTION

The River Bend site was located on the western edge of the city of Casper, Wyoming at the north end of Casper Mountain, the extreme northern extension of the Laramie Range (Frison 1974:1). The elevation of Casper Mountain is 8,130 feet, while that of Casper is 5,280. The campsite was situated on the flood plain along a large bend on the north side of the North Platte River (Fig. 1). The local environment was apparently an ideal setting and until recently the immediate area was covered by vegetated sand dunes (Frison 1974:8). Trees growing along the river banks would have provided fuel and shelter, the river itself varieties of fish and fresh water mollusks, and the grasslands an ideal habitat for both large and small game animals, as well as edible flora. Frison (1974:8) believes that the area was a favorable one for animals which tended to congregate there in large numbers. As today, water would have been readily available as would several varieties of trees and shrubs, thereby offering an ideal location for a seasonal village site.

The climate in the area ranges from cold winters (mean monthly temperature for January is 26° F.) to usually cool summers (mean monthly temperature for July is 73° F.), with rainfall averaging approximately 13 inches per year. Overall, the climate of the area is rather harsh (Frison 1974:11).

CULTURAL AFFILIATION

A dependence on stone tools, small base and side-notched arrow points, evidence of the horse, and a small amount of metal date the site to the protohistoric period, circa A.D. 1700-1750. The probable date, projectile point styles similar to those at the Eden-Farson site (Frison 1971), obsidian tools indicating contact to the northwest, and a diet typical of the Great Basin

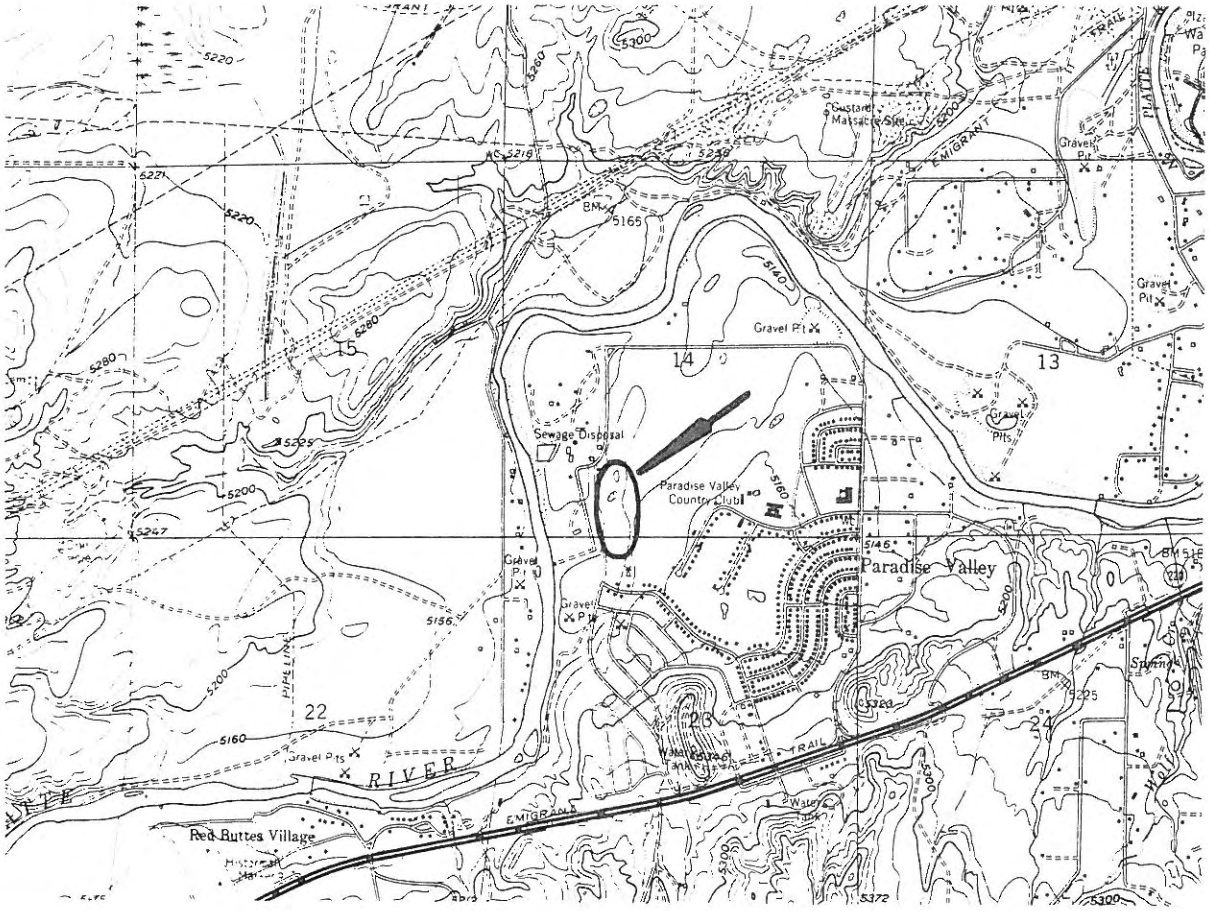


FIGURE 1: River Bend site area. Site location indicated by arrow.

Shoshoni (Steward 1938), all suggest the group occupying the site was probably of Shoshonean affiliation (Reher, personal communication:1981).

The people known as the Shoshoni occupied an area from the Panamint Mountains and Death Valley in California to the Rocky Mountains in Wyoming (Spencer and Jennings 1965:273-276). They began moving east onto the Plains from the Great Basin shortly before the beginning of the eighteenth century, according to Shimkin (1947:245). By the 1690s, horses were being introduced to the Northern Shoshoni of Wyoming by peoples from Spanish areas, making them the earliest to get the horse (Shimkin 1947:245). The Shoshoni then "began to expand out of the Wind River area into the Powder River Basin and north into Montana" (Reher 1977:80).

During this time (Late Prehistoric, Protohistoric, 1500-200 B.P.), these people were moving toward big game hunting, primarily the hunting of the buffalo. With this renewed emphasis on big game came the large villages of the horse Indians. According to Reher (1977, these large villages:

. . .are translated into sites - large sites, sites extending for acre after acre along a stream valley, with packed lodge floors littered with cultural debris, dumps and bone middens, chipping areas and other evidence of the

maintenance of technology, hundreds and thousands of hearths with datable charcoal and evidence for food resources utilized, meat drying racks, storage pits, hide preparation areas and the scattered tools these leave, with dance floors, sweat lodges, ceremonial structures, burials; all in all, the culture of the Plains Indian is laid out before the mind's eye. References are common to camps of 500 people or 1,000 people, or more. A village with this many people leaves a significant amount of artifactual debris in a short time (Reher 1977:89).

SITE EXCAVATION

So it was probably with the River Bend site. Neither the total size of the site nor human population occupying it could be ascertained because of extensive construction damage, but it was a sizable campsite, apparently occupied for at least one fall/winter season.

The site was discovered by a construction worker during the removal and leveling of a sand dune complex in preparation for a housing development. Emergency salvage archaeology was undertaken through the cooperative efforts of Casper College, the University of Wyoming, several chapters of the Wyoming Archaeological Society, and the Office of the State Archeologist (Wyoming Recreation Commission). The excavation crew was originally informed that construction was to begin immediately. Because of legal proceedings, construction did not begin for several months, thereby allowing the excavation to continue for a much longer time. Had this information been known at the onset, certainly a longer, more thorough and precise excavation could have been undertaken.

Other limiting factors involved dogs and young children, the weather (the site was reported the last weekend of October, 1977) with the ever-present winds; and vandalism. The discovery of the site also received massive media coverage, thereby alerting local artifact looters who found it convenient because of the proximity to the highly populated area.

Furthermore, it was a favored location for motorcycle and dune buggy enthusiasts, and during the spring and summer months, flying golf balls were a serious problem. Later in the excavation, labor became a difficulty, for as the newness of the find wore off and as the young and inexperienced discovered that the excavation of an archaeological site involves long, tedious hours of back-breaking physical labor in rain, snow, and wind, the "crew" dwindled to one, two, and sometimes three hearty souls. Even with these inherent problems, the material recovered yielded a more than adequate sample.

The excavated area of 364 square meters (3,918 square feet) was a large section of the most concentrated portion of the site, but was probably less than 25 percent of the total site area.

The site contained several clear, discernible living floors which had been covered by more than four meters of sand prior to construction activities. Soil in the cultural level was primarily sand with occasional intrusions of a clay deposit. Beneath the clay were layers of larger sand followed by gravel (Fig. 2). Distinct activity areas were noted, many with rodent bone middens near dense concentrations of artifacts and butchered bone. Packed floors with concentrations of decayed woody material and red ochre,

FIGURE 2: River Bend site soil profile. Cultural level is thin dark stain.

large rocks, and fire pits suggested possible lodge structures. Specific areas exhibited activity in meat processing, indicated by stone and bone butchering implements; hide preparation with end scrapers and bone needles; tool manufacture and resharpening with remains of large areas of stone flakes and cores; and shells and beads representing adornment and ceremony.

Apparently the inhabitants of the site used almost all of the natural food sources of the area. Faunal remains included the sagebrush vole (Lagurus curtatus), meadow vole (Microtus pennsylvanicus), prairie vole (Microtus ochrogaster), two to three species of fish, at least six species of birds, shrew (Sorex spp.) cottontail rabbit (Sylviligus spp.) jack rabbit (Lepus spp.) ground squirrel (Spermophilus lateralis), pocket gopher (Thomomys talpoides), deer mouse (Peromyscus maniculatus), beaver (Castor canadensis), porcupine (Erthizon dorsatum), pack rat (Neotoma sp.), muskrat (Ondatra zibethicus), fox (Vulpes fulva), bobcat (Lynx rufus), elk (Cervus elaphus), deer (Odocoileus hemionus or O. virginianus), pronghorn (Antilocapra americana), bison (Bison bison), possible mountain sheep (Ovis canadensis), and several fresh water invertebrate species (Walker, personal communication:1981; Clifford personal communication:1981). Remains of domesticated dog (Canis sp.) were recovered, but it is unknown whether these were a food source (Fig. 3). While Frison (1978:276) states dog meat was eaten, Shimkin (1947) says dogs were eaten only if the group was starving; that it is likely that the dog, like the horse, was used to draw the pack travois. If the quantity of faunal remains from the site is significant, one could speculate as to whether or not starvation was a main concern of this particular group when this site was populated. A determination of this might possibly be made only if human population studies could be conducted.

Data concerning the possibility of the group having utilized any of the varieties of food plants available is unavailable at this writing. In all likelihood they did, for many grinding stones were found in the site. Certainly there were such edible species available. Among the possibilities are buckwheats (Eriogonum spp.), yucca (Yucca glauca), prickly pear (Opuntia polyacantha), wild onions (Allium spp.), chokecherry (Prunus

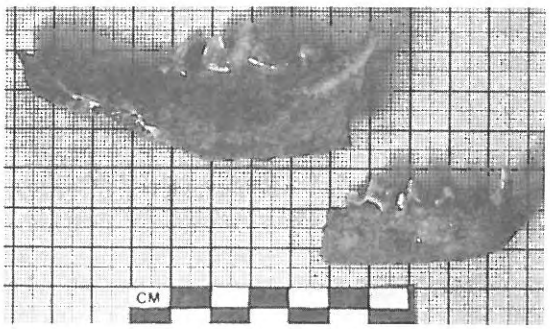


FIGURE 3: Canid mandibles from River Bend site.

virginiana), buffalo berry (Shepherdia canadensis), currant (Ribes cereum), gooseberry (Grosularia inermis), and sunflower (Helianthus sp.) (Frison 1974:9, Shimkin 1947:272-275).

Large quantities of crushed and broken bone were found in processing areas around fire pits, consisting mostly of rodent, although a good deal of it was bison and other big game animals as noted above. Few complete bison bones were recovered, most having been smashed. Of the faunal finds, one of the more significant was a horse skull, verifying that this was indeed horse Indian and thereby more closely pinpointing the date of occupation (Figure 4).

SITE ASSEMBLAGE

The cultural assemblage from the River Bend site was rich in stone and bone tools and ceremonial objects (Fig. 5). Over 2,000 artifacts were recovered from the site. Some historical material was found, but since the area had various uses over the years, little significance could be placed on a street car token from Salt Lake City, cow bones, car parts, or golf balls. However, 12 extremely rusted and corroded metal tool fragments were apparently associated with the prehistoric occupation.

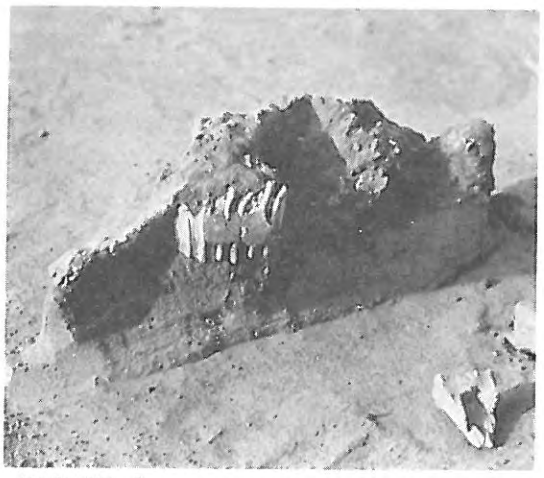


FIGURE 4: River Bend site horse skull.

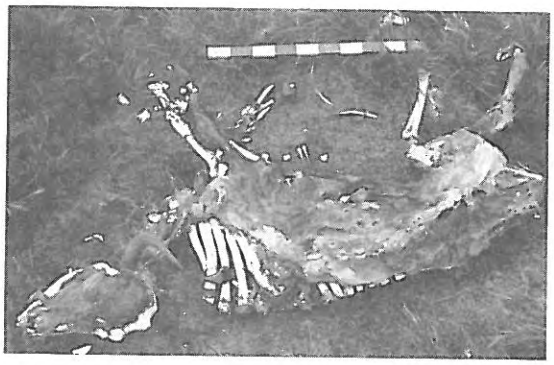


FIGURE 5: Site area during excavation, showing large amounts of broken bone and stone material.

Of the 2,000 plus artifacts, approximately 1,440 were stone, including various tools, biface knives, shaft abraders, and metates or griddle stones. Ten were steatite bowl fragments, while 90 were bone, ten were antler, and approximately 700 were shell. Many of the tools showed evidence of a good deal of resharpening and reuse.

Similarities can be seen between artifacts in this site and those of other known sites of the same approximate time period. Among these are reworked steatite pot sherds, small side and base-notched bow and arrow projectile points, a toothed flesher, and a grooved maul such as have been found at sites like Mummy Cave, Eden-Farson, Medicine Lodge Creek, and Big Goose Creek (Frison 1978:71-81). According to Frison (1978:64-69), "Side-notching and base-notching together on small bow and arrow points appeared toward the end of the Late Prehistoric period and was common in protohistoric times on the North-

western Plains, and diagnostic of the period are the grooved maul and the bison metatarsal flesher."

The projectile points (N = 145) are of this horse bow type, smaller and lighter than earlier points, and are side, base, and tri-notched (Figs. 6, 7). An eccentric obsidian knife caused some excitement among crew members, with a few suspecting a plant. Skepticism was eased with the further discovery of obsidian points, tool fragments and hundreds of tiny obsidian flakes (Fig. 8). Approximately 80 end scrapers of varying size, description, and material were recovered (Fig. 9).

Other stone artifacts found included unnotched preforms (Fig. 10), drills (Fig. 11), sandstone shaft abraders (Fig. 12), biface knives (Fig. 13), reworked flakes and tools (Fig 14), and several metates (Fig. 15).

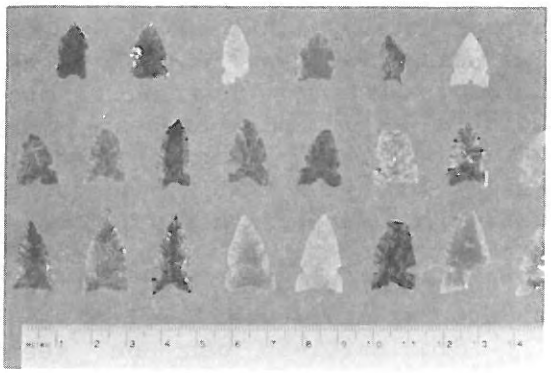


FIGURE 6: River Bend site tri- and side-notched projectile points.

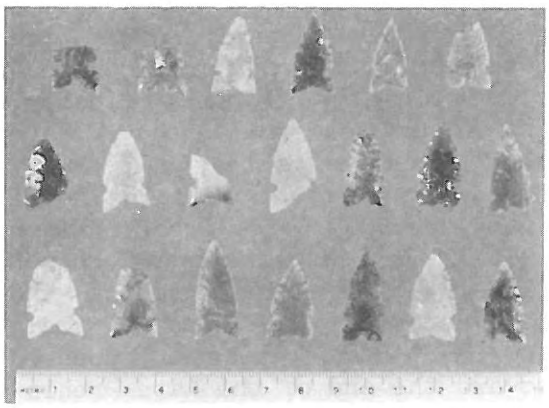


FIGURE 7: River Bend site tri-notched points.

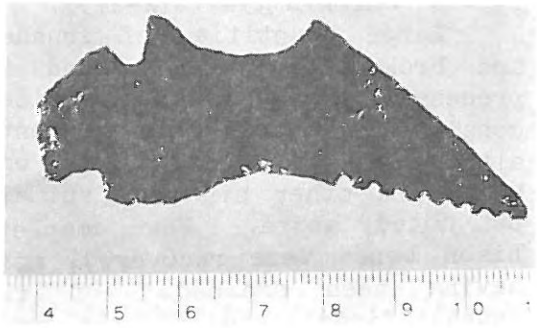


FIGURE 8: Unusual obsidian knife, possibly ceremonial item.

FIGURE 9: End scrapers found in River Bend site.

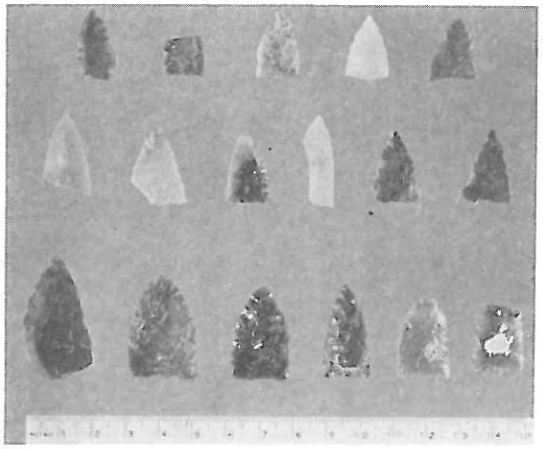


FIGURE 10: River Bend site unnotched projectile point preforms.

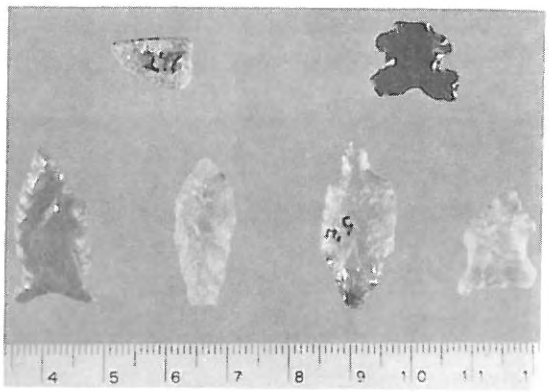


FIGURE 11: Stone drills (possibly bead drills; note that several are clearly reworked projectile points) and steatite pipe fragment (upper left).

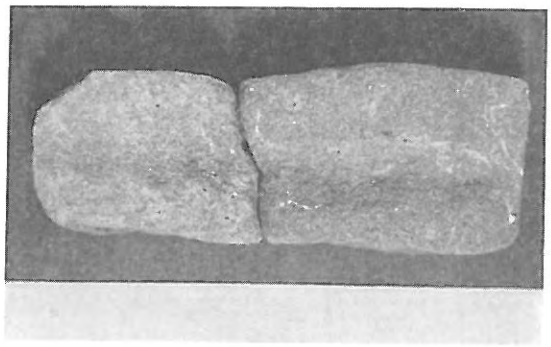


FIGURE 12: Sandstone shaft abrader.

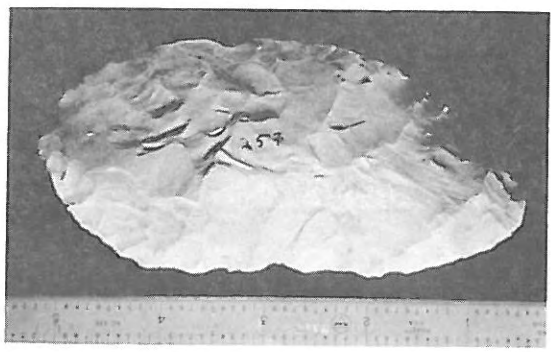


FIGURE 13: Biface knife.

In addition to the steatite bowl fragments, eight of which showed signs of reworking, one steatite pipe fragment was found (Fig. 11), and one small steatite

FIGURE 14: River Bend site stone cutting tools.

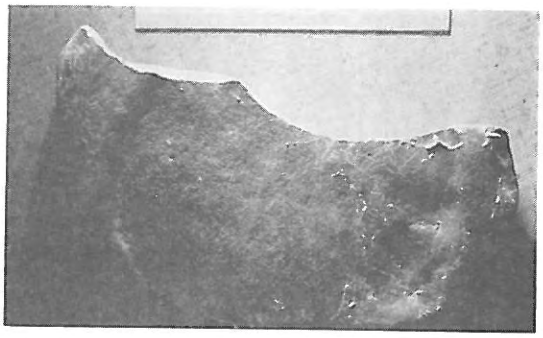


FIGURE 15: Stone metate or griddle stone.

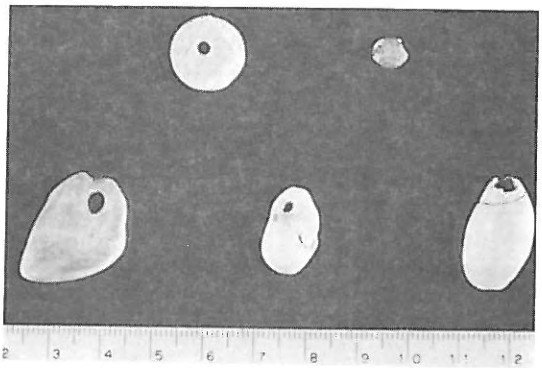


FIGURE 16: (a) shell bead; (b) steatite bead; (c) drilled elk tooth; (d) drilled shell fragment; (e) olivella shell bead.

bead (Fig. 16).

The bone and antler artifacts consisted of one possible eagle bone whistle blank, antler

knapping tools, bone needles, a serrated bison metatarsal flesher (Fig. 17), worked antlers, possible tools (Fig. 18), and bird bone and dog carpal beads (Fig. 19).

Of the hundreds of pieces of shell recovered, many showed evidence of having been worked; others exhibited definite uses, such as pendants (Fig. 20), and beads and drilled and undrilled blanks (Fig. 21). Added to the shell and bone beads were two drilled elk teeth, and one olivella shell (Fig. 16).

A small quantity of metal, of which four pieces appear to be possible drills (Fig. 22), was found, and these, too, aided in dating the site.

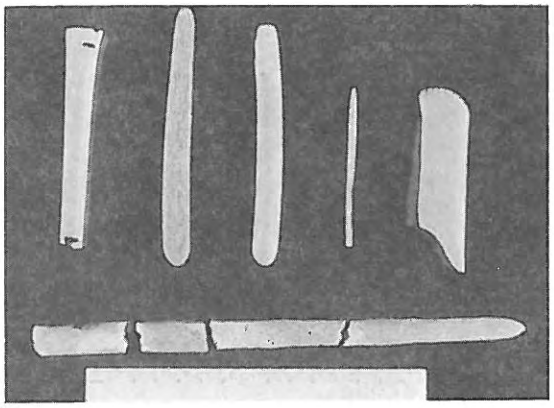


FIGURE 17: (a) possible eagle bone whistle, or whistle manufacturing blank; (b,c,f) antler knapping tools; (d) bone needle; (e) distal fragment of bison serrated metatarsal flesher.

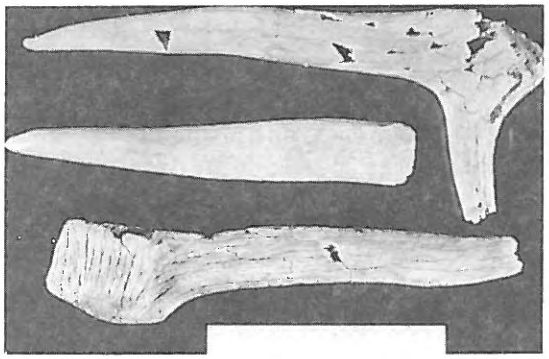


FIGURE 18: Possible elk antler tools.

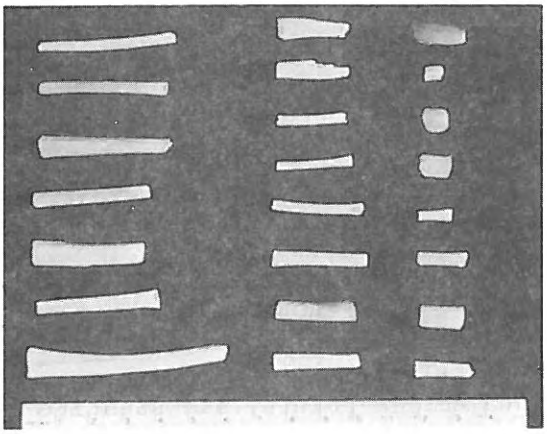


FIGURE 19: Bird bone and dog metacarpal bone beads.

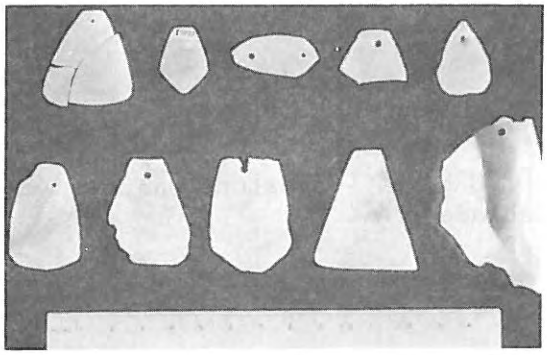


FIGURE 20: River Bend site shell pendants.

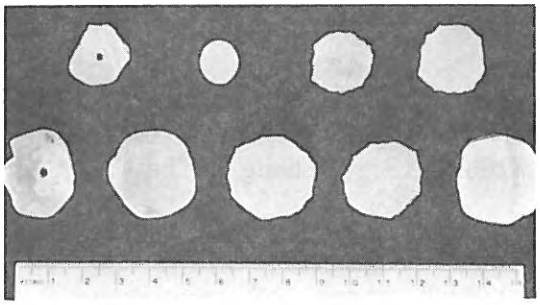


FIGURE 21: Drilled and undrilled bead blanks.

The shallow fire pits (Fig. 23) had heavily oxidized walls of bright red/orange, possibly indicating a sotiatopm similar to those recorded by Walker et al. (1977), where the hearths may have been heated to high temperatures.

CONCLUDING REMARKS

Although the excavation of the River Bend site produced a vast amount of information, work could only be conducted on a small scale for two years, until, in October, 1979, housing projects surrounded the area (Fig. 24). Even without a full-scale excavation, it is likely that the site may still be considered a major site for future interpretations of the time period. Analysis of site materials by the writer, Reher, and others continues and a full report will be forthcoming. Materials have been completely curated and cataloged at the University of Wyoming, and a number of preliminary analyses have been made.

The River Bend site, with its yield of over 2,000 lithic, bone tools, and decorative items may also dispel some earlier statements that the Shoshoni and other Plains groups represented humanity in its most elementary state. I would suggest the opposite may be the case, and agree with Netting, who writes:

. . .Far from being pressed to the wall by want and unavailing exertion, hunter-gatherers (1) have a food base that is with minor exceptions adequate and reliable; (2) expend minimal labor to

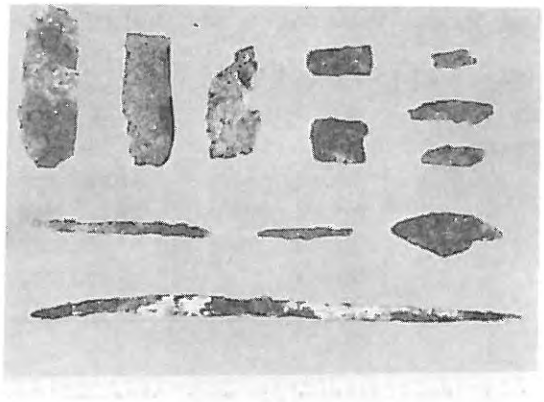


FIGURE 22: Metal. Four bottom pieces were possibly used as drills or awls, although largest piece may be a remnant of small file; some of the other objects are fragments of projectile points and knife blanks.

FIGURE 23: River Bend site activity area showing shallow fire pits with oxidized walls.

FIGURE 24: Final stages of excavations at the River Bend site as housing development began closing in.

provide for their physical needs; and (3) live often to a ripe old age with few signs of anxiety or insecurity.

As a mode of life support, hunting and gathering appears to be not only effective but remarkably efficient (Netting 1977:10-11).

This author believes that the River Bend site inevitably confirms that this group of people was far from being a starving group of hunters and gatherers, but rather a well organized band, living very well off the land.

ACKNOWLEDGEMENTS

The excavation of the River Bend site was accomplished through the cooperative efforts of Casper College, the University of Wyoming, several chapters of the Wyoming Archaeological Society, the Office of the State Archeologist (Wyoming Recreation Commission), and the Natrona County Sheriff's Office. Special appreciation must be extended to Dr. Charles A. Reher, who directed the excavation at the onset and then encouraged and allowed me to continue excavating after the professional crew had returned to Laramie; a major portion of the excavation was accomplished by a crew from the Wyoming Recreation Commission provided by Dr. George Frison and George Zeimens; thanks must also be extended to Danny Walker of the Wyoming Recreation Commission and Dr. Tom Clifford of Casper College for the identification of the faunal material; to Helen Bryant and Jim Curkendall of the Casper Chapter of the Wyoming Archaeological Society who were my reliable crew of two; to Leon Campbell and Grover and Lorraine Phelan of the Casper Chapter of the Wyoming Archaeological Society, Marty Russell of Casper College, and the University of Wyoming for the photography and support; to Carolyn Logan and Paul Wolz of Casper College for their editing expertise; and especially to my husband, Jim, and my children, Kip and Danae, who sacrificed wife and mother to science, and for most of the time remained mute while Mom went to spend weekends and any other free time with "old rocks and bones".

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Carolyn Miller Buff
125 College Drive
Casper, WY 82601

THE SIGNIFICANCE OF RAW MATERIAL TYPES IN ARTIFACT ASSEMBLAGES

CARY CRAIG

Lithic raw material types have often been the basis for assumptions and interpretations concerning various aspects of prehistoric settlement, and are believed to be informative of the areas exploited by the prehistoric inhabitants. Rarely, however, are the various factors considered which might influence the presence or absence of different materials in a site. Duration and season of occupation, material preference, and distance to source are thought to be among the primary factors which influence the acquisition, use, and discard of raw materials, and thus, their representation in a site (Craig 1983). These and other factors will be examined in this paper. The significance of these factors to interpretations of raw material representation at the Piney Creek (Frison 1976), Vore (Reher and Frison 1980), Hawken (Frison, Wilson and Wilson 1976), Agate Basin (Frison and Stanford 1982), and Kobold (Frison 1970) sites will be presented.

The analysis of raw materials in archeological assemblages has primarily dealt with the quantity of materials which were acquired and transported from various source locations, thus, the "bulk" of material was the primary concern (Chapman 1977; Earle and Ericson 1977; Francis 1983; Gramly 1980; Hester and Grady 1977; Keller 1982; Luedtke 1976; Reher and Frison 1980; Wilmsen 1973). Weight, therefore, has been proposed as a more uniform and comparative unit of measure than the number of items. For example, a site with 100 small flakes is not necessarily similar to a site with 100 large flakes because more material is represented by weight in the latter. However, when dealing with tool types, the number of items may be more useful than weight because the size of the artifacts within a single tool category can vary considerably.

The frequency of raw materials in an assemblage may also be indicative of the season of occupation of a site (Loendorf 1973). The season of occupation cannot always be ascertained, especially in assemblages which represent more than one occupation. However, seasonal data is available from the Vore site, a stratified, Late Prehistoric bison kill in the Black Hills used during various seasons over a 300 year period (Reher and Frison 1980). Several levels represent use during similar seasons, but there is no correlation in the frequency of raw materials represented. The Vore site has a high degree of variability in the raw materials represented throughout its levels: this may reflect differences in the raw material source areas utilized by the various occupants.

In the four levels of the Kobold site (Frison 1970) in

southeastern Montana, there was an inverse relationship between the amount of porcelanite and the amount of Cloverly formation quartzites. Porcelanite comes from sources in the Powder River Basin, the quartzite comes from sources in the Big Horn Mountains. Since the higher elevations tend to be occupied in the summer, it might be suggested that those components of the site which contained higher proportions of Cloverly quartzites represent earlier occupations. The seasonality of the four components is known to be fall (Frison 1970:29). However, the relative proportions of Cloverly quartzites and porcelanite might be interpreted to indicate early fall or late fall.

At the Piney Creek site (Frison 1967), in the foothills on the east side of the Big Horn Mountains, there also appears to be an inverse relationship between the frequency of Cloverly quartzites and porcelanite. The butchering area of the site has no Cloverly quartzites, but a relatively high frequency of porcelanite. The kill area contains some Cloverly quartzite and a lower frequency of porcelanite. However, seasonality cannot be a factor here as these site areas are contemporaneous. Function of the site areas and material preference may be more important factors here since the Lower Cretaceous quartzites of the kill location are all projectile points.

The distance to source area is apparently significant in the frequency of raw materials. There is a rapid decrease in the frequency of raw materials when sources are greater than 100 kilometers away. One exception to this observation is Knife River Flint from North Dakota. This material often makes up a relatively large portion of the raw material assemblages, regardless of distance. The frequency of cortex is also apparently related to distance to source. In the debitage of the Agate Basin site, the number of flakes with cortex from sources greater than 40 kilometers comprise between 0% and 13% of the assemblage, with 15% for Knife River Flint. The number of cortex flakes of materials available within 40 kilometers ranges from 17% to 50%. Miscellaneous material types with cortex range between 23% and 47%, which falls within the range for closer sources. This analysis is based only on the assemblages of one site, it is suggestive, but by no means conclusive.

It is sometimes assumed that the raw materials represented in a site are from the closest potential source. However, comparison of the raw material types of the Vore (Reher and Frison 1980) and Hawken (Frison, Wilson and Wilson 1976) sites in the Black Hills illustrates that the location of a site with respect to raw material sources does not necessarily dictate the kinds or amounts of materials which will be represented. The Black Hills has many sources of Mississippian and Pennsylvanian age cherts (the Pahasapa and Minnelusa formations) and Lower Cretaceous age quartzites. The Hawken site contains a relatively high frequency of the cherts and much lower frequency of the quartzites, while the reverse is true for the Vore site. In addition, the Lower Cretaceous age quartzites of the Vore and Hawken sites apparently come from different source areas. Most of the quartzites of the Vore site are similar in color and grain size to

materials found in the Hartville Uplift area to the south, while the Lower Cretaceous quartzites from Hawken are more similar to material from the Black Hills. The Hawken assemblage also has quartzite from the Morrison formation in the Black Hills and Knife River Flint-like chert from east of the Black Hills, but the Vore site has only trace amounts of both.

The dominant materials at the Hawken site are from sources in and around the Black Hills, suggesting that the area was intensively exploited by the occupants of the site. In contrast, the dominant materials at the Vore site are quartzites from the Hartville area, Knife River Flint from North Dakota, and porcelanite from the northern portions of the Powder River Basin. These materials represent a much larger area of exploitation. If it had not been possible to distinguish between the quartzites from the Hartville Uplift and the Black Hills, then it would have been assumed that the quartzites at Vore were from the Black Hills because it is the nearest potential source. Assuming the nearest source for raw materials can result in the interpretation of a smaller home range than may actually have been the case. The size of the area represented by raw materials may also reflect the type of social aggregation at a kill site. The predominance of materials from distant sources might represent the aggregation of bands, while material from closer sources may represent the aggregation of one or more dispersed family groups. Reher and Frison (1980:131-133) suggest the Hawken site represents a dispersed local group, while Vore represents the aggregation of centralized bands.

The analysis of raw material frequencies in assemblages which represent more than one occupation may result in somewhat different interpretations than would be attained were it possible to separate the material from each occupation. The Vore site can be used to illustrate this point. The Vore site represents several kill events over 300 years during the Late Prehistoric period. Many differences are noted in the types and frequencies of raw materials in the different levels. However, if the levels are combined and the assemblage is analyzed as a whole, then different conclusions result. In each level, from four to eight raw material types are represented, but taken as a whole, 15 material types are present. Furthermore, the same raw materials are not necessarily represented in each level and, thus, different areas of exploitation are indicated. For example, level 1 contains a very high proportion of Knife River Flint and a relatively small amount of Lower Cretaceous quartzites. Level 2, in contrast, is composed predominately of Lower Cretaceous quartzites with no Knife River Flint. The variation in the raw material representation in these two levels is significant and suggests some real differences in the areas that were exploited prior to the kill events. These variations in raw material representation are, of course, obliterated when the levels are combined.

Raw material frequencies can differ significantly depending on whether they are calculated from the number of items or the weight of the items. They may also differ depending upon whether one analyzes the debitage of an assemblage, or the artifacts, or both. Several assumptions are

generally made about raw material types (Reher and Frison 1980). One is that the distribution of raw material sources represented in a site approximately denotes the area exploited. Another is that the percent of material derived from a given source area is roughly proportional to the number of people from that area. This second assumption is the most complex because it involves the frequency of materials. The analysis of raw material representation indicates that frequencies may vary depending upon the unit of measure. Additionally, several factors may influence the amount of raw material in an assemblage and, thus, the proportion of material may reflect the distance to source and the availability of the material or perhaps the season of occupation.

Diversity indices for cultural and environmental data have been used in the analysis of site function. Low diversity of tool assemblages is assumed to indicate limited activity sites such as kill sites, while high diversity is interpreted as representing habitation sites. However, there is some variation in the diversity indices of kill and butchering sites. Diversities for the kill site assemblages analyzed have ranges from 0.47 to 1.47, indicating there may be a relatively wide range in diversity indices for sites which actually represent similar functions.

Diversities based on raw material types have been applied to the analysis of site function. Proponents of this idea argue some sites, such as campsites, that represent a greater diversity of activities, will also have a greater number of raw materials represented. However, tool type diversity, when compared with tool material type diversity, indicates there is no correlation between the two indices and, therefore, they do not reflect the same thing. Tool types are related to the activities performed at a site and, thus, may reflect a site's functions. The types of raw materials might be influenced by site function, but may also be related to the location and availability of sources, season of occupation, material preference, and other factors. Though the basic assumption upon which interpretations of diversity indices are based is valid, the factors which are involved in the calculation and interpretation of diversities are complex and need to be carefully considered and applied with caution.

The significance of raw material representation is a complex issue. It is apparent that several factors influence the types and amounts of raw materials in an archeological assemblage. However, the influence of each factor and the degree to which it can be examined varies with each site. Though raw material representation can be informative, it is obvious that more work is necessary in this area of research since the representation of raw materials in a site is more complex than is commonly assumed. The results of the analyses that are presented here are not intended as conclusive statements, but are suggestions and comparative data for further work. Caution and careful considerations are suggested for the analysis and interpretation of lithic raw materials.

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Cary Craig
717 Solano N.E.
Albuquerque, N.M. 87110

PICTOGRAPHS AT GOFFENA ROCKSHELTER, MUSSELSHELL RIVER VALLEY, MONTANA

THOMAS H. LEWIS

A group of pictographs in a rockshelter on the Musselshell River include a battle scene with shield-bearing warriors and an armored or caparisoned horse. The rock shelter (24ML408, Musselshell County, Montana) is hidden in rough breaks and dense thickets and is free of vandalism. It is presently used by livestock and is periodically swept by floodwaters, and the figures may eventually be destroyed. Because of the configuration of the cliffs, the lower figures are more exposed to weathering and water and are, as a result, fainter than the upper figures. The cliffs are of yellow sandstone. Cleavage planes along marine fossil deposits are visible in several places. The unexcavated floor of the rockshelter is deep in sand and trampled dust which contains both new and old bone fragments. The present river channel and water surface is, at ordinary water levels, about two meters below the edge of the shelter floor.

Along the 40 meter extent of the shelter, there are many remnants of now-eroded red pictographs, and spots and splotches of red paint. Most of these can no longer be traced as integrated figures. There are many faint, almost terminally eroded incised figures. A part of a horse with four legs, a horse head, sets of parallel and curved lines can be uncertainly discerned. The following figures are well-preserved.

The first (Figure 1) is a standing warrior 42 cm tall with arms. A heavy spear pierces his right side. The spear has a peculiar double shape of the upper shaft suggesting an atlatl. The figure is low on the wall where it is more exposed to weathering and flood waters. The pigment is faded to a soft pink. A ghostly-faint similar figures stands to the right and others even more fragmentary are to the left.

A two-headed horse-like figure (Figure 2) is done in yellow pigment.

A mounted shield-bearing warrior (Figure 3), done in red paint, has a headdress of "sunburst" shape, with faintly-indicated horns. The horse is more faintly delineated than the warrior.

A warrior, in red paint (Figure 4), wears a horned and feathered headdress and voluminous leggings, skirt, or armour. The shield is decorated with curved and concentric patterns in heavy red pigment. Lighter red pigment fills in between the lines. A decorated weapon extends to the right. He is in combat with the mounted personage to the right who has a shield, horned headdress, and a weapon extending from the upper left quadrant of the shield. A heavy spear-like object extends horizontally toward his adversary. The shield is decorated with concentric lines in red paint,

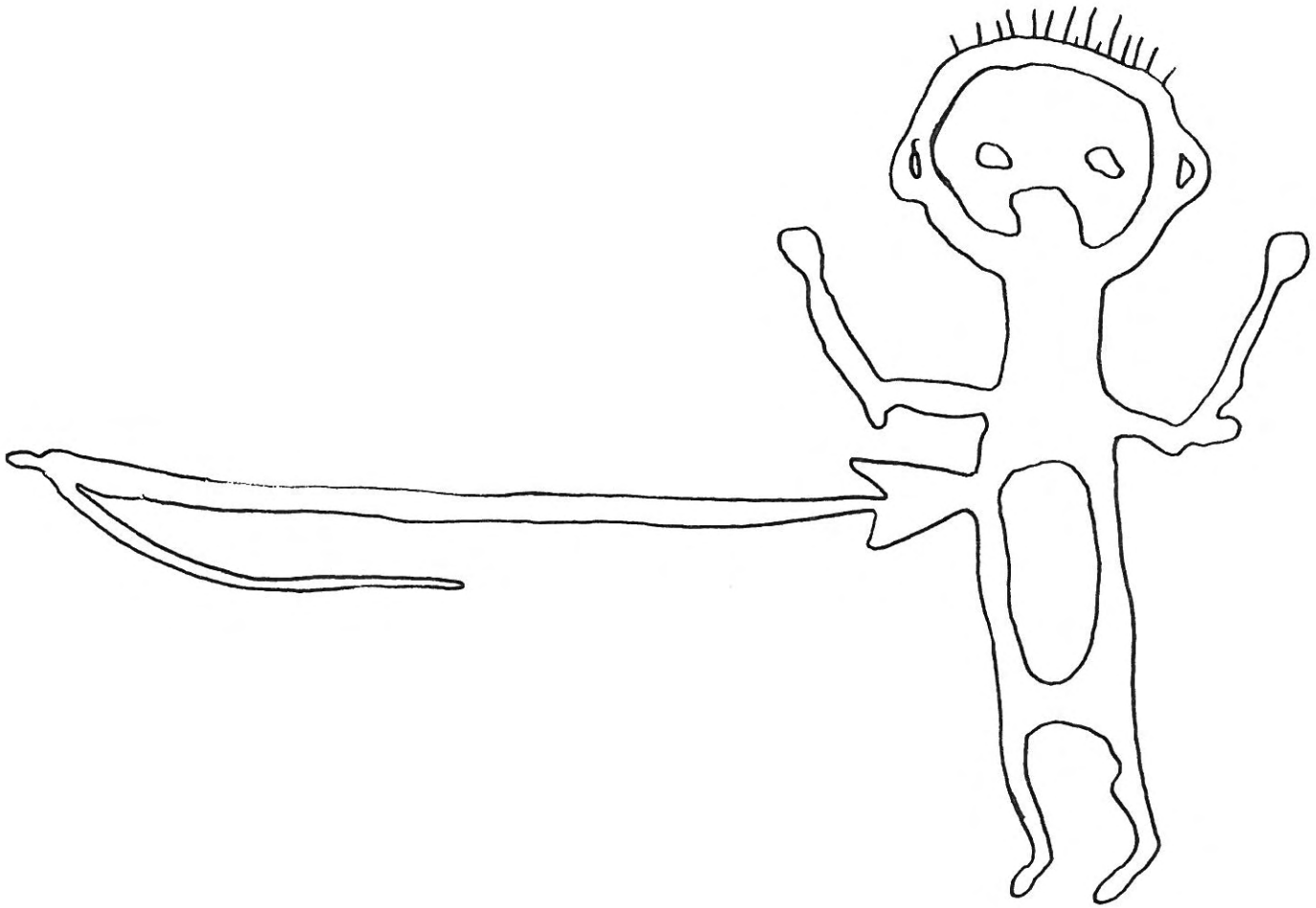

FIGURE 1: Standing warrior ——— 61 cm ———

FIGURE 2: Two-headed horse-like figure.

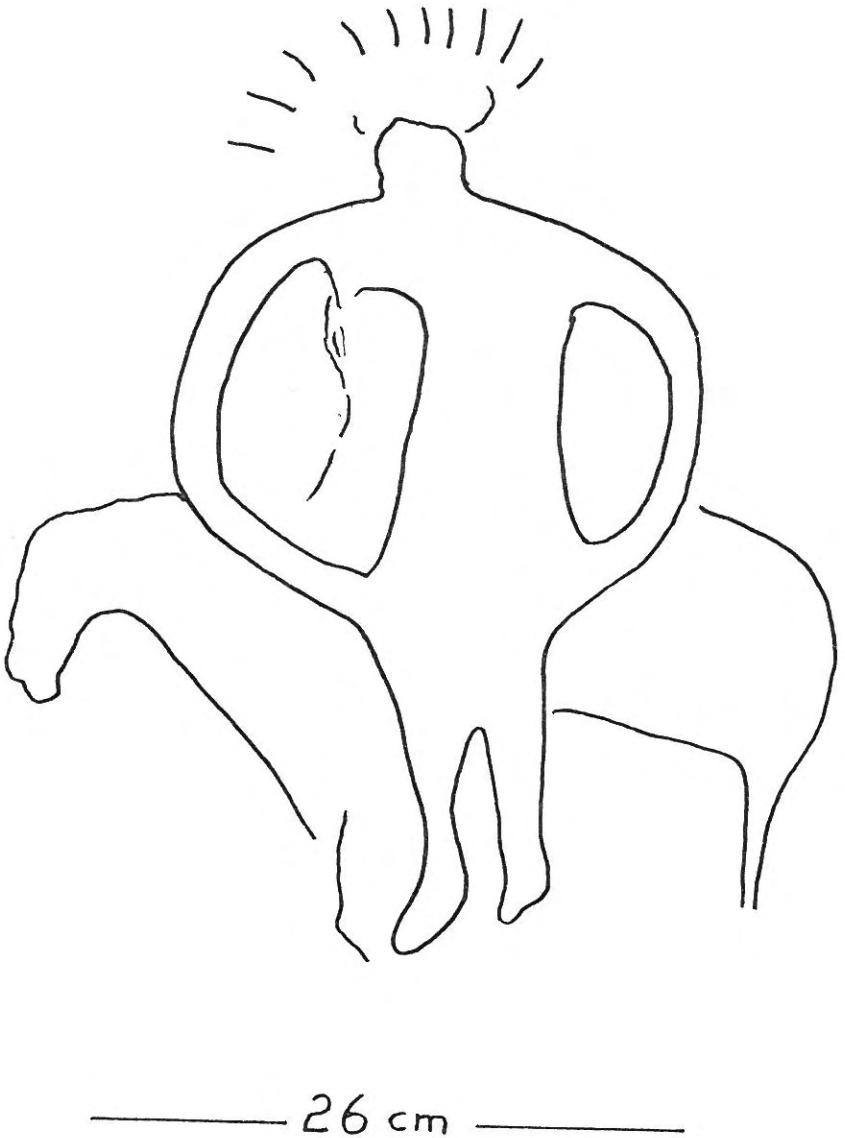

FIGURE 3: Mounted, shield-bearing warrior.

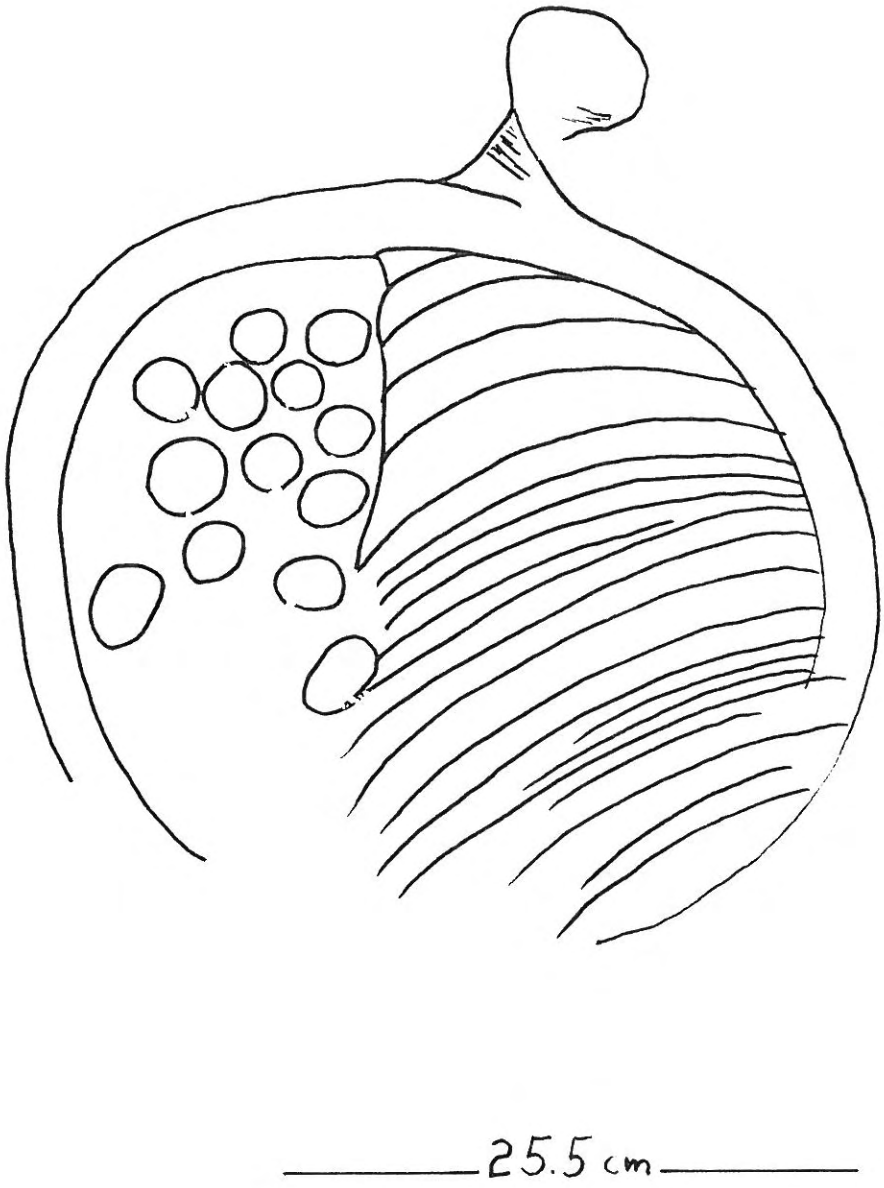

FIGURE 5: Shielded warrior.

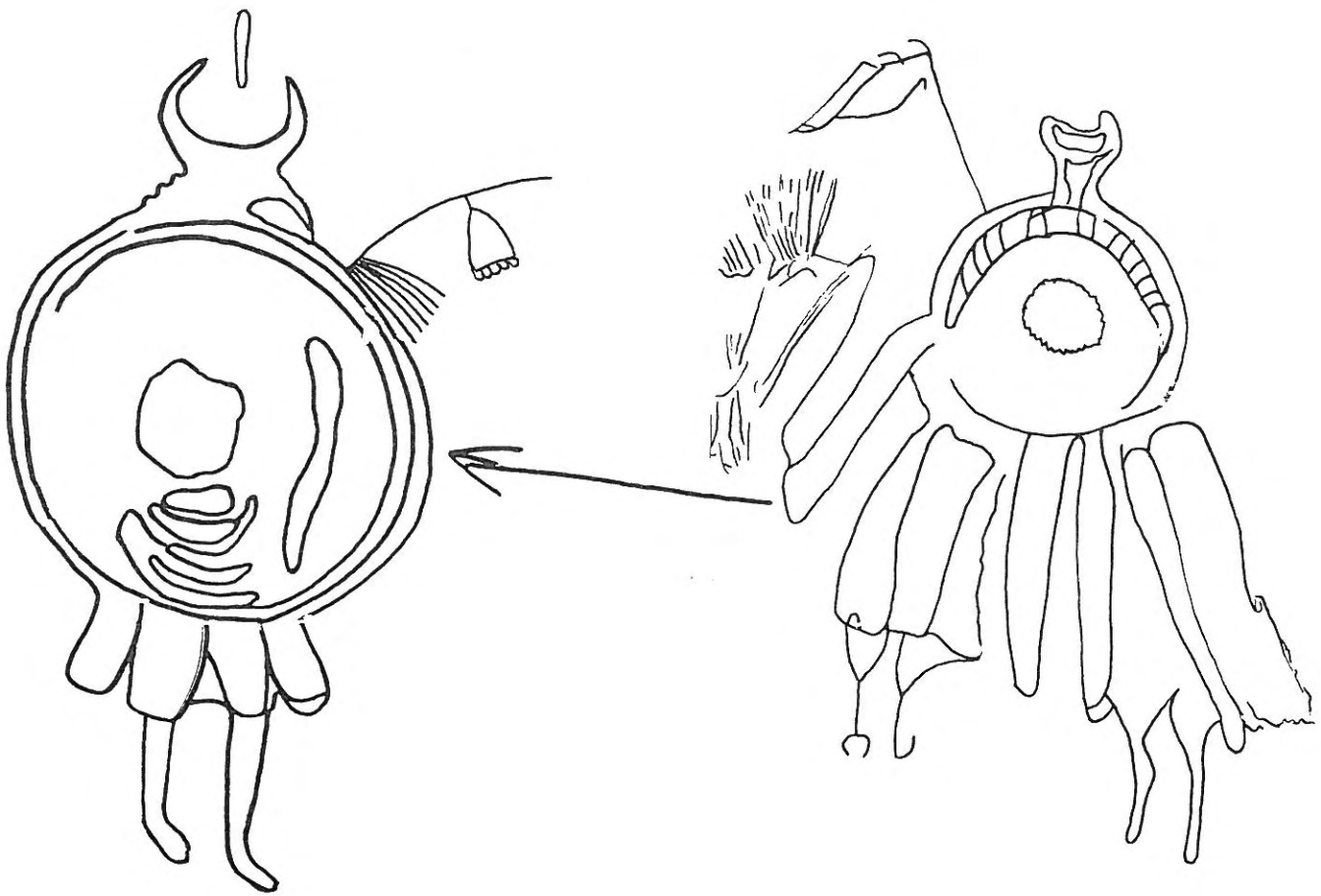

FIGURE 4: Warrior with horned and feathered headdress, in apparent conflict with mounted warrior to the right.

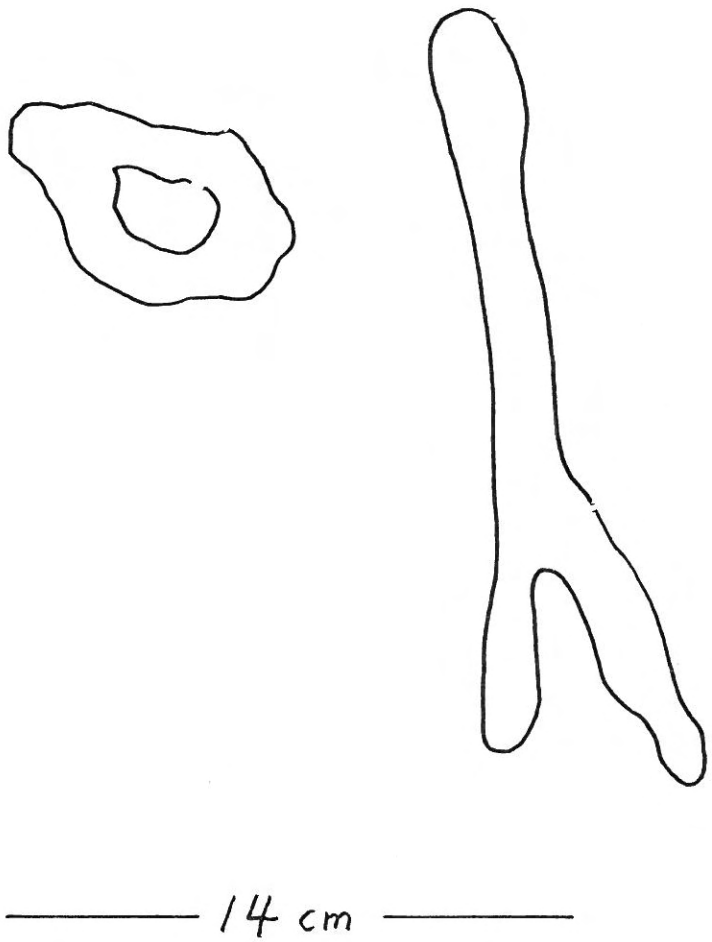

FIGURE 6: Standing, solid-color man-like figure, red in color.

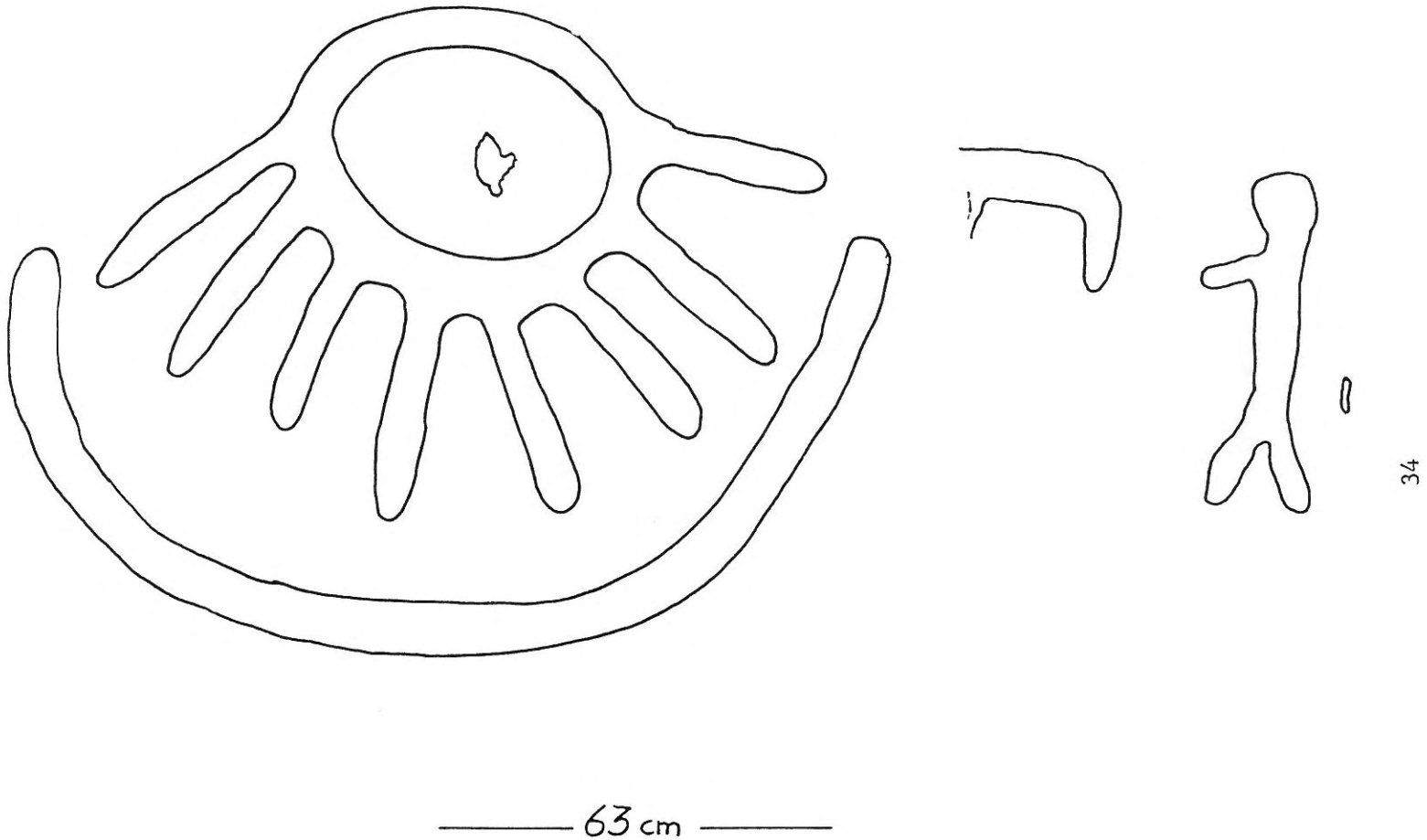

FIGURE 7: Rayed, sun-like figure.

with lighter red pigment interstitially. The upper half of the shield is incised beneath the paint. The horse has an ornate (feathered perhaps) headdress. The front feet have hooked hooves. The horse's body is caparisoned or armored.

Another shield-warrior is done in red-painted lines with lighter red interstitially (Figure 5). The left half of the shield has thirteen smaller concentric circles within its outline. The right half has a graceful carved-line decoration.

A red man-like figure is placed near a circular object (Figure 6).

A rayed, sun-like figure, which rests on a half-circle, is attended by an animal and an erect figure (Figure 7). All the elements in Figure 6 and Figure 7 are in bright red pigment.

Battle scenes are common in the rock art of the middle Yellowstone Valley (Conner and Conner 1971), but armored horses are not recorded there or in the adjacent Pryor and Bull Mountains. Keyser (1977: Figure 14) shows horse armor in two petroglyphs from the Milk River in Alberta Province. He notes that there are no other known representations of horse armor in Plains rock art. Secoy (1953) has described the use of horse armor by the Plains tribes before widespread use of firearms, and Ewers (1955) gives a comprehensive account of the development of horse-culture in the Blackfeet who commonly used the Musselshell and there encountered other combatant tribal groups.

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Thomas H. Lewis
1505 Avenue D
Billings, MT 59102

TAPHONOMY: FLESHING OUT THE DRY BONES OF PLAINS PREHISTORY

LAWRENCE C. TODD, JR.

ABSTRACT

Some of the most spectacular and potentially informative archaeological sites found on the Plains are the large kill-butchery sites. Investigation of sites where stone tools are found in associations with the bones of groups of large animals have played a major role in the development of current ideas about the prehistoric inhabitants of this area. Attempting to understand these complex archaeological deposits is, however, by no means a straightforward process. One of the primary objectives of the analysis of a bonebed must be an investigation of the role that both human action and the action of natural process have had in the formation of the site as we see it today. A field of investigation known as taphonomy provides a useful starting point in the attempt to distinguish intentional human action from the operation of natural process of decay and dispersal that affect carcasses. The integration of information gained from the study of contemporary carcass groups with the data that are collected from mass kill sites can provide the archaeologist with powerful interpretative tools.

INTRODUCTION

The reliable interpretation of archaeological finds is one of the most necessary and frequently one of the most difficult problems currently facing the discipline. Attempts to give meaning to materials from archaeological excavations do not always follow the most direct or obvious path. The results of excavations of the large bison kill sites in Wyoming and surrounding Plains states provide a good example of the difficulties and interpretative problems that must be overcome before we can arrive at conclusions about the behavior of prehistoric peoples.

The most striking features of these mass bison kill sites is frequently the apparently confused jumble of bones that form the bonebed. These bonebeds can be highly concentrated thick piles, as at sites such as Glenrock (Frison 1970), Vore (Reher and Frison 1980), Frasca (Fulgham and Stanford 1982); or more dispersed bones, as at the Agate Basin site in eastern Wyoming (Frison and Stanford 1982). They can range from the remains of a few animals, as at the Rex Rodgers site in Texas (Speer 1978), to the bones of many animals as at the Casper (Frison 1974) and Horner (Figure 1) sites in Wyoming (Frison 1982; Jepson 1953; Todd 1982, 1983; Todd and Hofman 1978) and the Hudson-Meng site in Nebraska (Agenbroad 1978). Excavation of these sites often uncovers the remains of large numbers of individual animals in various states of disarticulation and

artifacts. Recently, largely through the efforts of Joe Ben Wheat at the Olsen-Chubbuck and Jurgens sites in Colorado (Wheat 1967, 1972, 1978, 1979), and by George Frison at a number of sites in Wyoming (e.g., 1970, 1971, 1973, 1974; Frison and Stanford 1982), the potential of intensive study of the bonebeds at kill sites has begun to be appreciated.

There has, however, been a trend toward the opposite extreme from earlier investigations. While, at one time, little in the way of cultural patterning was expected to be found in the masses of bones at kill sites, recently there has been a tendency to view all patterning within the bonebeds as being culturally relevant (see statements by Wheat, and by Johnson, in Davis 1978:288-189). The position has been advocated that bonebeds can be interpreted as "cultural artifacts." Variables such as the amount of skeletal disarticulation, the patterns of dispersal of bones, and the types and frequencies of bone breakage have all been suggested to carry rather direct, obvious meaning about human action in the past.

DISCUSSION

One of the most frequently used principles in the interpretation of kill-butchery sites has been that the amount of disarticulation of bones is a rather direct measure of the amount of butchering that had taken place at the site. Sites with large numbers of bones still in the same relative position that they are in the living animals have been interpreted as having been subjected to less intense butchery than those where the individual bones are more scattered and dispersed. This may have been true at the moment that the hunters abandoned the site. However, by the time the site is investigated, the linkage between the amount of disarticulation and the degree of processing by humans is tentative at best. Almost immediately after human abandonment, carcasses begin to be further disrupted. Carnivores, of various types, consume, move, and drag away parts of animals. The masses of flesh and discarded organs begin to decay and to be dispersed by agents such as water running over the bones or trampling by other animals. Even if the period between abandonment and burial is as short as a few weeks, the patterning in a bonebed may be more a reflection of the actions of predator-scavengers and natural decay than it is of human butchery. If sites remain uncovered for longer periods (say, for example, several years) and the bones begin to deteriorate, then the difficulty of reconstructing the actions of people at the site becomes substantially greater. Archaeologically recovered bonebeds are not a clear picture of past human action - they are at best a very blurred representation of such action that require a good deal of effort to bring into focus. Their analysis requires, in addition to more standardized archaeological procedures, an active, intensive program of taphonomic research to filter out the effects of processes that have caused distortion of the picture and to give us a less muddled view of the activities of people at the site.

While Plains archaeologists have been aware of the potential for non-human modifications and non-human origins of patterns within the bonebed deposits we study, these processes have frequently not been given sufficient attention in analysis of the

FIGURE 1: View of bison bone bed at Horner site during 1978 excavations.

dispersal. One of the avenues of inquiry to understand and interpret these deposits is a field of study known as taphonomy.

The literal meaning of the name taphonomy is the "laws of burial" (Olson 1980). In practical terms, taphonomy is the study of the range of processes that affect the remains of an animal between its death and its recovery from a paleontological or archaeological site. Although taphonomic studies were originally undertaken to develop interpretative tools for paleontological studies, much of the recent work in the field has been directed toward the understanding of archaeological faunal assemblages (see Behrensmeyer and Hill 1980; Gifford 1981; and Shipman 1981). While much of the early actualistic (i.e., studies of ongoing processes) taphonomic research was conducted in western North American (Toots 1965; Voorhies 1969), many of the recent taphonomic investigations have been conducted in East Africa (Behrensmeyer 1975, 1979; Coe 1978; Hill 1979, 1980). One of these studies (Hill 1979) has resulted in the development of a general model of the way that animal carcasses become disarticulated naturally. Another has focused on the patterns that can occur as bone weathers and deteriorates (Behrensmeyer 1978). Still other studies have attempted, both through the use of mathematical models and laboratory and field experiments, to predict the effects of water transport on faunal assemblages (Behrensmeyer 1975; Hanson 1980; Voorhies 1969). The actions of predators and scavengers in modifying faunal assemblages have also received considerable recent interest (Brain 1981; Binford 1981; Binford and Bertram 1977; Haynes 1980a, 1980b, 1982, 1983).

All of these studies have added to our understanding of the processes that can operate to create archaeologically observable patterning in bone remains. The point has been rather forcefully made that the simple demonstration of systematic process creating patterns in a group of bones is not at all the same thing as identifying the results of human action (Binford 1981). This point is particularly relevant to the study of Plains bison kill sites, such as those mentioned above. For many years, the bonebeds at these sites were given little attention - the primary goal of excavation was the recovery of

sites. One important early analysis of what today is considered taphonomic processes was conducted by Mehl (1966) at the Domebo mammoth site in Oklahoma in the early 1960's (Mehl used the term "paleomortology" to describe his investigations). Recent taphonomic studies mentioned above have highlighted the fact that the creation of obvious patterning in faunal remains is not an unexpected consequence of processes totally independently of human action. In fact, in an early phase of my research into the types of patterning that can occur in bonebeds without any human behavior being involved, I noted that it was not at all uncommon for many of the patterns described by archaeologists as being diagnostic of human action to be found in dinosaur bonebeds created long before any human agent could have been present (Todd 1979; see Dodson et al. 1980). The formation of bonebeds, such as those investigated at bison kill sites, is a complex process. A wide variety of agents can taken part in their creation. Even if active agents (such as vertebrate scavengers) do not act on the bone remains left as the site, the simple processes of decay that inevitably occur can dramatically alter the arrangement and composition of the faunal assemblage.

The direct application of knowledge gained through the taphonomic studies from Africa (or those that have focused on the processes that affect single carcasses) to the interpretation of Plains kill-butchery is not, however, the key to interpreting which of the patterns are the result of human action and which are the result of subsequent agents. Several important variables are not "constants" between the taphonomic cases investigated and the formation of Plains bonebeds at kill-butchery sites. First, the potential for the creation of markedly different types of patterning when groups of up to several hundred carcasses are decaying, rather than a single animal, is great. Second, most of the recent taphonomic studies have been undertaken in areas where seasonal freeze/thaw cycles are not a factor. Finally, many of the best taphonomic studies have been undertaken with a different set of problems in mind than those that face us in the analysis of multi-animal Plains kill sites.

As part of a research program aimed at the development of a more specific understanding of the taphonomic processes that can be involved in the formation of mass bonebeds, I have begun a study of the carcasses or remains of groups of both domestic cows and bison. The localities have included a group of cow carcasses that have been studied at intervals since their deaths in 1981 (Figure 2); mapping and analysis of a large bonebed created in the 1930s when a group of about thirty cows were killed as part of a government stock reduction program (Figures 3 and 4); and the mapping and collection of a series of bison

FIGURE 2: Nall Bos site shortly after investigations began.

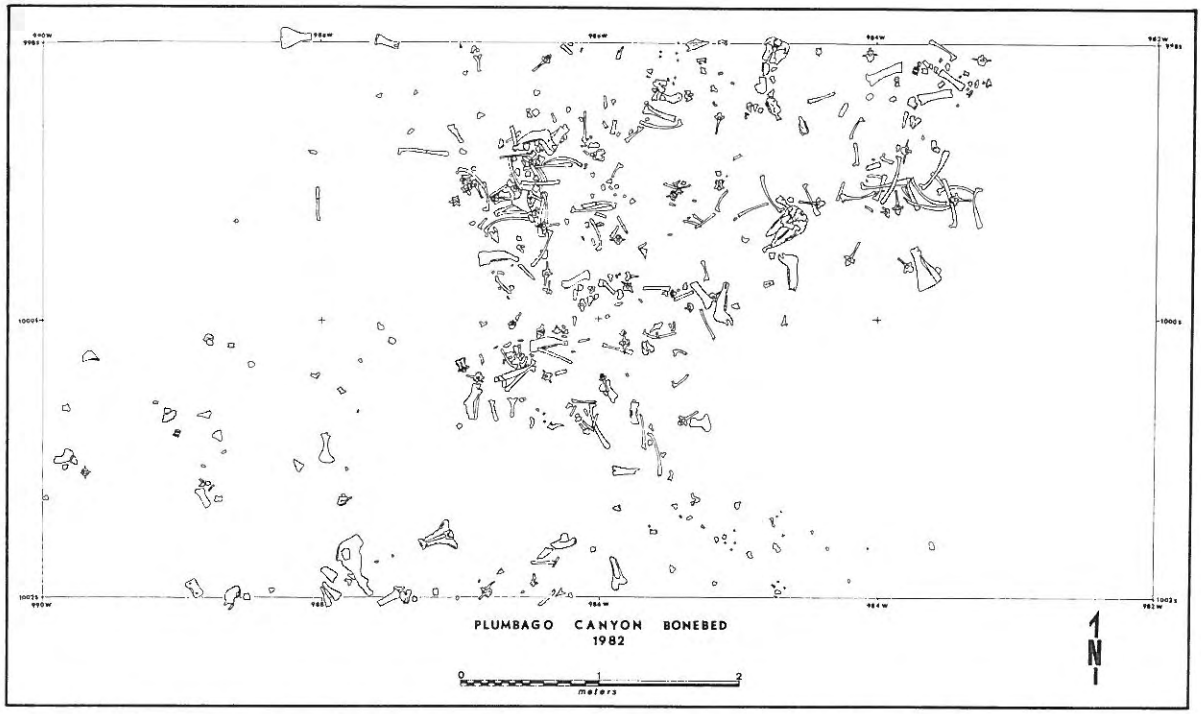

FIGURE 3: Plan view of portion of Plumbago Canyon bone bed, showing distribution of bones after fifty years of exposure.

FIGURE 4: View looking down gully at Plumbago Canyon bone bed.

carcasses of animals that died within a very brief period of time (Figure 5). These studies are aimed at the development of an analytic baseline of controlled taphonomic knowledge for the study of kill-butchery sites.

Although still preliminary, these investigations have led to some observations that are applicable to archaeological studies. For example, the number of carcasses initially present may cause the "natural" pattern of disarticulation to differ from that described by Hill, even if human butchery is not involved. A large number of closely spaced carcasses creates a rather distinctive micro-climate different from that which affects a single carcass. Research with such groups (Figure 2) indicates that as the number of carcasses increases and as the distance between carcasses decreases, the greater the potential

FIGURE 5: Bison skeleton as recorded during the investigations at Downare Ranch, Colorado (1.5 years after death).

for patterning different from that observed by Hill, 1979). Segments of skeletons touching other animals or under a carcass tend to disarticulate "out of sequence" and the patterns of dispersal can be altered. The general position of a carcass within a group can also lend to marked variability in disarticulation and dispersal. Animals around the margins of a group are more susceptible to the actions of predator-scavengers as well as to trampling by other herbivores. Animals near the center of a group are protected from these agents and their skeletons tend to remain intact longer. Normal processes acting on groups of carcasses can be expected to produce a roughly concentric pattern of skeletal disarticulation and disperal that should not be interpreted as differential human butchery.

The season of death can plan an important role in the creation of internal patterning within a bonebed. Animals that die in the fall or winter are usually frozen and decay and disarticulate differently than those that die in summer. A second seasonal factor that must be taken into account is the position of drifting snow. At the Plumbago Canyon Bonebed site (Figures 3, and 4) a large portion of the bonebed is frequently covered by a large snow drift for much of the year. The bones in this area of the site exhibit noticeable differences in the degree of disarticulation, dispersal, and deterioration than those in areas not covered by the drift. It seems, again, that position within a bonebed can play a major role in the development of different types of patterning across a site which could easily be mistaken for different "activity areas."

The results of these studies of "group taphonomy" are being employed in an analysis of the bison remains from the Horner site in the Big Horn Basin near Cody. This site was originally investigated from 1949 to 1952 by Princeton University and the Smithsonian Institution (Jepson 1953; Frison 1978; Wedel 1961; Wormington 1957). In 1977 and 1978 Dr. George Frison directed excavation at a new bonebed area of the site about 40 meters south of the original excavation area. The remains of at lest 65 bison were uncovered during these excavations (Figure 1). The creation of the bonebed has been dated to around 10,000 years ago (Frison 1982). Associated with the bison was a relatively small assemblage of Paleoindian artifacts from the Alberta Cultural Complex (Frison 1978, 1982). The interpretation of the distributional, patterning of bones from this site has relied heavily on the results of taphonomic studies. Although many of the bones were found disarticulated, comparison of the patterns of disarticulation from Horner with patterns from taphonomic local-

ities indicates that: 1) disarticulation and dispersal of the front limbs of the bison from the Horner site is quite similar to that documented in taphonomic bonebeds; 2) the rear limbs, and particularly the femur, do not conform to known natural patterns of dispersal; and 3) there is a strong relationship between the patterns of disperal and breakage of bones at the site and models of selective human utilization (Binford 1978) of animal carcasses (Todd 1983).

Although it might seem a bit out of place for an archaeologist to spend time mapping, photographing, and recording groups of decaying cows and buffalo, the relationship is not as tenuous as it might at first seem. Understanding the Horner site deposits, and those from similar sites, requires that we know what patterns can occur in bonebeds that have not been acted upon by human agents. The development of such interpretative methods in archaeology is referred to as "middle range" research (Binford 1977, 1983). The formation of bonebeds can result in a good deal of internal patterning without human intervention. We must have what amounts to a "library" of natural patterns we can compare to those observed archaeologically so that the distinctively human patterns can be reliably recognized. Unless we can securely document that the patterns we are interpreting are indeed the result of human action, the ideas we develop to "explain" patterning in the archaeological record may well be "explaining" behavior that did not take place.

The study of taphonomy is the development of one such library. It allows us to tie our conclusions about the past to an understanding of contemporary process. Taphonomy and related types of controlled study, although superficially tangential, can provide vital interpretative tools for archaeological investigations. In this sense the study of modern decaying carcasses is indeed an attempt to "flesh out" our view of the past.

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Lawrence C. Todd
Department of Anthropology
University of New Mexico
Albuquerque, New Mexico