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Archaeology
IN MONTANA

ARTICLES

MAS
Journal of the Montana Archaeological Society

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MONTANA ARCHAEOLOGICAL SOCIETY MISSION

Organized in 1958, membership in the Montana Archaeological Society (MAS) is open to both amateur and professional archaeologists. MAS was created to stimulate interest in and promote research into the archaeology of Montana and to encourage increased public appreciation and involvement in this fascinating process.

MAS encourages a bond between professionals and non-professionals interested in Montana archaeology and works to focus all efforts into scientific channels. The end goal is to advocate and assist in the conservation and preservation of archaeological sites and materials.

To assist in these efforts and to share the archaeology of Montana with others, MAS publishes the biennial ***Archaeology in Montana*** journal. The primary purpose is to publish the results of archaeological research in Montana. The publication serves as a bridge between interested amateurs with professional attitudes towards archaeology and professionals who realize the value of cooperative participation by amateurs.

INDIGENOUS PEOPLES ACKNOWLEDGEMENT

The Montana Archaeological Society acknowledges that information published on archaeological sites in this journal lie within the aboriginal territories of the Assiniboine Sioux, Bannock, Blackfeet, Chippewa Cree, Crow, Gros Ventre, Kalispel, Kootenai, Little Shell, Northern Cheyenne, Nez Perce, Salish, and Shoshone people. We honor the path they show us in caring for cultural resources for generations to come.

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EDITOR'S COMMENTS

IN JANUARY OF 2023, I began my three-year role as editor of Archaeology in Montana (AIM). The previous editor of AIM, Ann Johnson, was at the helm for close to 30 years. She admirably steered the journal into the great place that it is today. A huge debt of gratitude goes out to Ann for all her efforts and hard work.

As the new editor, I would like to reach a broader audience of readers and get people excited about publishing in AIM and receiving the journal. I want to include articles on historical and indigenous archaeology and on research happening outside of Montana, but close to our borders as this work is relevant to the archaeology of our state. I am hopeful that with new energy, we can increase membership in the Montana Archaeological Society (MAS) as membership declined over these last several years. The new cover of the journal and inside layout are part of this effort.

Many professional journals, such as *Plains Anthropologist* are available to members online via the organizational website. The journals are subject indexed allowing people to search online for information on specific sites and a variety of subjects. This wonderful tool makes articles more relevant for research because they are easily accessible. In looking over past issues of AIM, I found an incredible number of excellent articles that sadly, mostly just members of MAS can access for research via hard copies of the journal. As editor, I believe these articles need to be available to all researchers (through MAS membership) via our website accompanied by an index of searchable topics.

Our MAS web designer, Dan Smith, is already at work to make past volumes of AIM available (as PDFs) on our website for members to examine. Riley Auge generously offered to index all previous issues (126) of AIM for a nominal fee which was paid for by a generous anonymous donor. Riley started the arduous task of indexing all AIM issues which will require hundreds of hours to complete. She will be volunteering part of her time to MAS to accomplish this work.

The website and indexing tasks will take some time, but we hope to have PDFs of all issues on the MAS website as well as a searchable database, available to MAS members by early next year.

I hope you enjoy the current issue of AIM and would be interested to hear any comments you might have.

Up next, our Fall AIM issue will feature articles on Rosebud Battlefield, stone alignment sites in southwestern Montana and in the Paradise Valley, and more.

INFORMATION FOR AUTHORS

All articles for Archaeology in Montana should be mailed or e-mailed to:

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For Information regarding article layout and format, authors should refer to "Editorial Policy and Style Guide for American Antiquity." This information is available at:
https://documents.saa.org.

Manuscripts submitted for publication in AIM should be printed on one side of the page and double-spaced with wide margins. The document should be accompanied by a thumb drive or a CD with the manuscript and all graphics

included. Graphics should be high quality and show good contrast. Digital photos and graphics should be submitted in jpeg format. All graphics should be submitted as individual separate files and should not be embedded in the manuscript.

Figure and table captions should be provided in a separate WORD document and keyed clearly to the individual figures/tables and their citation in the text.

ABOUT THE AUTHORS

Crystal Alegria is the Executive Director of The Extreme History Project, a nonprofit located in Bozeman, MT. Crystal has worked in the field of public history for the past twenty years at a variety of museums and heritage organizations, always with the goal of bringing history to the public and highlighting the stories of marginalized people. Crystal has a B.S. in Anthropology and a M.A. in History from Montana State University. She served as the President of the Montana Archaeological Society in 2012 and is a long-time member of the MAS education committee. She co-produces the Dirt on the Past Podcast with co-host, Nancy Mahoney. Crystal grew up in Livingston, Montana but now calls Bozeman home.

Marsha Fulton has taught in both the Anthropology and Art History departments of several universities including Kent State University in Ohio, William Paterson University in New Jersey and the State University of New York at New Paltz. Her museum background includes working in the North American Archaeology Lab at the American Museum of Natural History in New York City and remodeling the Native Cultures area of the Yellowstone Gateway Museum in Livingston, MT. She has also worked at many North American archaeological sites around the country and has developed several archaeology educational programs for K-12 students. She just finished the final manuscript of the history of Fort Parker which Crystal and Marsha have been researching for over 10 years. Marsha currently lives in Blue Hill, Maine where she and her husband have planted an apple orchard.

Gretchen T. Hibbard grew up in Florida, where she received her B.A. degree from Stetson University. Her marriage to Scott Hibbard brought Gretchen west to what she considers her wondrous life as an artist/rancher. For the past 27 years, she has worked with Patrick Rennie on various archaeological projects, at times providing illustrations for the resulting reports and articles.

Scott G. Hibbard is a fourth generation Montanan where his family has owned and operated a cattle and sheep ranch for over one-hundred years. Scott attended public school in Helena and received degrees from Williams College and the University of Montana. In addition to ranch work, Scott provided management and consulting services related to ranching. His historical novel, *Beyond the Rio Gila*, puts the reader in the longest march in U.S. infantry history – from Council Bluffs to San Diego during the Mexican American War – which included four laundresses, two of whom were pregnant.

Chere Jiusto has served as the director of Preserve Montana from 2002 until 2023. From 1985-1990 she was the Montana Historical Society Museum's Curator of History, then served as Coordinator for Montana SHPO's National Register of Historic Places and Community Preservation programs until 2001. Her research interests focus on history and architecture, ethnic communities, and tribal and rural landscape studies. She has co-directed a range of community heritage projects, and strategically worked with many partners to advance the role of historic preservation across

the state. She is an award-winning co-author of Hand Raised: The Barns of Montana (2011), and in 2017 received the Governor's Award for the Humanities. She holds a B.F.A. from the University of Montana.

Ann Johnson joined the Montana Archaeological Society when she was about 16 and has been a member for more than 50 years. She left the state for education and then for employment but is now happily living in Kalispell. Her major interests include precontact pottery and the people who made them, the past 3000 years, and the Northern Plains.

David A. Kaiser has been an independent rock art researcher for the last twenty years, conducting field recordings, analysis, and writing covering half a dozen western states in the U.S. as well as Alberta, Canada. His work primarily focuses on the Pacific Northwest and the Northern Plains. He has written, co-authored, and edited over 50 rock art publications. He recently co-authored the book *War Stories: Reading Plains Indian Biographic Rock Art* with James Keyser. Currently on the board of the American Rock Art Research Association (ARARA), he lives in Portland, OR.

James D. Keyser, is a Montana native who earned his PhD in anthropology from the University of Oregon in 1977. Keyser has conducted rock art research across western North America from Alaska to New Mexico and in the Valcamonica in Italy. He has more than 200 rock art publications and is the author/co-author of several books on the subject. He was an Assistant Professor at the State University of New York at Buffalo and the University of Tulsa before he retired from the U.S. Forest Service. He now splits his time between his home in Portland, OR and a home in Italy.

Lawrence L. Loendorf is an archaeologist who has completed research across the Intermountain West for the past 60 years. Much of his Montana work has been in the Pryor Mountains and surrounding canyons. He is the President of Sacred Sites Research, Inc., a 501c3 non-profit company that is dedicated to protecting and preserving rock art sites.

Stephen J. Lycett, Department of Anthropology, University at Buffalo (SUNY), earned his MSc from University College London and his Ph.D. at the University of Cambridge, UK. His research focuses on cultural evolution, social learning, and the patterns these processes leave in artifactual data. Since 2014, he has been member of the Department of Anthropology, University at Buffalo (SUNY).

Patrick J. Rennie received degrees from Montana State University and the University of Montana. He currently serves as archaeologist for the Montana Department of Natural Resources and Conservation.

INTRODUCTION TO A STONE FEATURE COMPLEX NEAR CANYON CREEK, MONTANA

PATRICK J. RENNIE

INTRODUCTION

SITE 24LC1259 LIES IN THE FOOTHILLS of the Rocky Mountain Front in an open, severely undulating, sagebrush steppe environment. Geographically it is situated between Helena and Lincoln, Montana (Figure 1). The site area is in the mid-elevation hills on the north side of the upper reach of the Little Prickly Pear Creek valley. The constituent stone features range in elevation from 4823-5118 feet (1470-1560 m) above sea level. The arid landscape receives 14-16 inches (36-41 cm) of precipitation in an average year (Ross and Hunter 1976). Frequent winds that average 20 miles per hour (32 km/h) tend to keep snow accumulations limited on the slopes and more prominent topographic features, thus providing ungulates access to forage during winter months.

Figure 1. General location of site 24LC1259.

Site 24LC1259 consists of a series of rock features presumably constructed by precontact Native American occupants of the region, but a specific time frame has not been determined. It is also presumed that the stone features represent at least two distinct categories of human activities. These are designated, somewhat subjectively, as Stone Feature Groupings 1 and 2 (Figure 2). It is uncertain if the items comprising Stone Feature Group 1 are temporally coeval with, or even representative of the same cultural group as Stone Feature Group 2. Global Positioning System (GPS) waypoints and metric and non-metric information was collected for

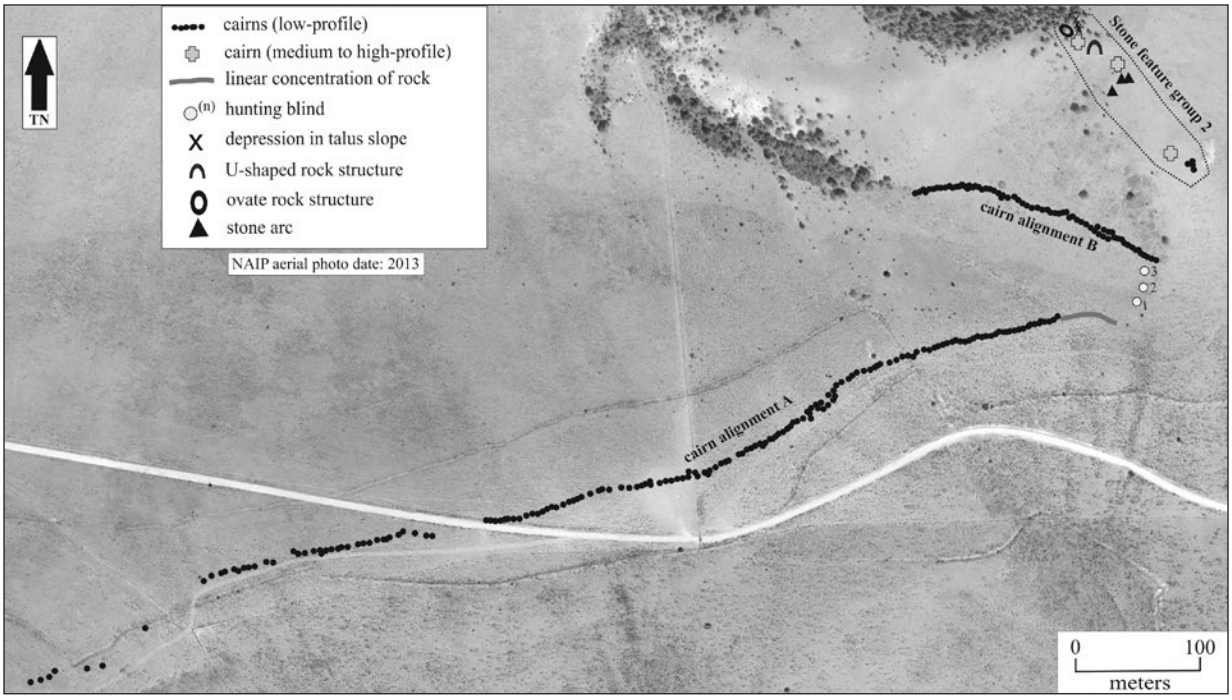

Figure 2. Aerial map with the NE portion of cairn alignment A and all other stone features in site 24LC1259 indicated.

all stone features. Photographs of the site were taken at various times of year since 2000. In 2021, a drone with a high-resolution camera was used to take low and high-angle overhead photographs of the site and its individual features. Because most of the stone features are difficult to see in either low or high angle photographs, some were dusted with flour to better illuminate them for illustrative purposes. Detailed photographic documentation, GIS data, and metric and non-metric data concerning the site can be found in Rennie (2022).

Most of the site was identified in May of 1995 when Patrick Rennie inspected a platform excavated for a drilling rig that was illegally established on state land as part of Newmont Exploration Ltd. Pike's Gulch mineral exploration project (Rennie 1995). Although very near stone features designated here as hilltop cairns 1-4 of Stone Feature Group 2 (Figure 2), the drill rig platform did not appear to damage material culture. It was reclaimed and recontoured to match the hillside slope in the summer of 1995. Today the reclaimed platform is fully covered with native vegetation and juvenile sagebrush. Were it not for the presence of a fiber mesh fabric used to control erosion, and large and small rocks with thick caliche coatings and unweathered surfaces now exposed to the light, it would be difficult to determine that the locality was disturbed.

Although the arbitrarily defined boundaries for site 24LC1259 apply to the distribution of stone features, a moderate to thin scattering of lithic debitage is found across the landscape. On-going inventory of the general area suggests that a break of more than 100 m between any two pieces of lithic detritus over much of a 6 km square area is difficult to find. Chipped stone debitage largely consists of dacite and chert flakes with lesser quantities of quartzite flakes and cores. The dacite is probably largely from the Grady Ranch dacite source (24LC2013) some 2.5 miles (4 km) to the northwest (Rennie et al. 2008).

Figure 3. Looking W from the top of Tom's Hill at the routes of cairn alignments A and B (white dotted lines).

STONE FEATURE GROUP 1

The first grouping of stone features is believed to represent small to medium-size ungulate hunting efforts. Although it is unclear what species were targeted, the kinds of stone features and the arrangement of those features would work well for passive driving/hazing of small numbers of bighorn sheep, deer, elk or pronghorn. This grouping occupies most of the site area and extends southwesterly from the base of Tom's Hill. Two cairn alignments, designated here as cairn alignment A and B, nearly converge at three small diameter circular arrangements of stone (hunting blinds 1-3) on the west slope of the hillside (Figure 2). Cairn alignment A consists of 286 low-profile cairns, all of which are heavily sodded and most of which are not easily discernible. In addition to the cairns, an isolated small boulder appears to have been incorporated into the alignment. This naturally occurring rock is located near the alignment mid-point. Cairn alignment A is 2.14 km long and traverses the crest and saddle of a NE/SW oriented low but prominent ridge. Its west end extends approximately half the distance between the saddle and the apex of the long ridge (Figure 3) and offers an unrestricted view of the Sears and Cottonwood Creek drainages below (to the north). Extending for 48 m off the northeast end of the cairn alignment is a continuous, linear, one or two-tiered concentration of stone best described as a low-profile rock row. Elevation changes for the 900 m long portion of cairn alignment A that traverses the saddle are negligible. It is consistently situated at 1,486 m above sea level (ASL). In contrast, the 1.24 km long segment that extends southwesterly from the saddle and up the ridge crest

Figure 4. View east of typical cairn in cairn alignment A.

Figure 5. View SE along cairn alignment B. Arrow indicates hunting blind 3 location.

increases in elevation from 1487 m ASL to 1560 m ASL.

The cairns in alignment A are well-consolidated clusters of stone arranged in 1-2 tiers. Specific metric information is provided in Table 1. The cairns are largely composed of quartzite cobbles that are abundant throughout local sediments. The cairns are heavily sodded. The exposed surfaces of the constituent rocks are uniformly weathered and exhibit a patterned lichen development. Some of the cairns are partially obscured by anthills or sagebrush. The cairns appear to average seven stones each, but this is difficult to assess because some constituent cobbles are undoubtedly covered with sediment (Figure 4).

Excluding three 30 m gaps, average spacing of the cairns in alignment A is 5 m. Two of the gaps are a product of road and ditch construction that likely obliterated a few cairns. The easternmost 25 m of cairn alignment A shows tighter spacing of the cairns where average spacing is 3 m with a minimum spacing of 1.7 m and a maximum spacing of 4.7 m. At the transition from cairn alignment to continuous rock row, the geology changes to a volcanic intrusion of medium-grained rhyolite. In fact, all the stone in the continuous rock row is rhyolite (Table 1). The constituent rocks show no evidence of having been stacked, just clustered. The rock row exhibits minimal sodding with patterned lichen development and uniform weathering of the exposed surfaces of the constituent rocks. The lack of sodding results from a lack of fine sediments and igneous bedrock exposed at the ground surface. The eastern end of cairn alignment A (the eastern end of the rock row) is 23 m southwest of hunting blind 1.

The increased number of cairns and the continuous rock row at the eastern end of cairn alignment A is consistent with the notion of "rock loading" noted by Brink (2013). The explanation is that more visible structure is needed at the pit/pound/trap/ambush end of drive lines to provide increased control of the prey moving through the drive lane. The method, including applicable ceremonies, in which drive lanes were used for bison is well documented by Brink (2008:97-114) and Verbicky-Todd (1984:43-49) and is not reiterated here. Although probably not associated with bison hunting, Stone Feature Group 1 likely functioned in a similar manner for smaller ungulate species. One cairn near the southwest end of alignment A was relatively recently constructed. It is composed of 2-3 tiers of cobbles and exhibits no sodding or

Cairn Alignment A	
Number of cairns	286
Average cairn dimensions	77 cm N/S x 83 cm E/W x 8-12 cm tall
Average constituent cobble and angular rock size	20 cm in maximum dimension
Average number of cobbles per cairn	7
Minimum cairn spacing	90 cm
Maximum cairn spacing	10.9 m
Average cairn spacing	5 m
Rock row	48 m long x 70 cm wide x 12 cm tall

Cairn Alignment B	
Number of cairns	107
Average cairn dimensions	80 cm N/S x 80 cm E/W x 35 cm tall
Average constituent angular rock size	23 cm in maximum dimension
Average number of cobbles per cairn	9
Minimum cairn spacing	1.2 m
Maximum cairn spacing	10.9 m
Average cairn spacing	6 m

Table 1. Selected metric data for cairns comprising alignments A and B.

lichen development on the exposed surfaces of the constituent stones. A piece of weathered wooden lathe is situated at the center of the cairn. It is likely a surveyor's cairn built in 1994 as part of Newmont Exploration Ltd. Pike's Gulch mineral exploration project. This cairn is documented for reference purposes only. It is not considered part of Cairn alignment A (see Rennie 2022).

Cairn alignment B (Figures 2 and 3) consists of 107 low-profile cairns. The southeast end of alignment B is situated 11 m north of hunting blind 3 and angles downslope 206 m across the fractured igneous bedrock hillside to the head of a narrow ephemeral drainage that is incised two to three meters in depth. Elevation changes along cairn alignment B are substantial with the northwest end situated at 1471 m above sea level (ASL) and the southeast end situated at 1502 m ASL. Cairn alignment B is thus constructed on a 15 percent grade ascending from the northwest end to the southeast end (Figures 2, 3 and 5). Approximately 55 m separates the east ends of cairn alignments A and B. The northwest end of cairn alignment B diverges 132 m north of cairn alignment A. This is the maximum width of the drive lane. The cairns in alignment B are difficult to see because of the background noise of fractured bedrock, and because most of the cairns are minimal or subtle. The alignment is also visually obscured by the densely growing sagebrush. The constituent cairns are composed of the local, igneous (rhyolitic) bedrock. Their constituent stones exhibit little if any sodding but are uniformly weathered and exhibit a patterned lichen development thus taking on the exact appearance of exposed bedrock. The cairns are all heaps or clusters arranged in two or three tiers (Table 1). The constituent rocks have angular to sub-angular edges. The northwesternmost 25 cairns are similar to those in alignment A. They are situated on the ground instead of a rock outcrop. They are also moderately to heavily sodded because they are downslope of the igneous rock outcrop and in colluvium. As a result, the average current height is approximately 18 cm. The northwesternmost 14 cairns are tightly spaced averaging 70 cm between features. In fact, the northwest end of cairn alignment B appears to be more of a linear concentration of rock as opposed to being

Figure 6. Experimental heaped/clustered cairn (left feature) constructed next to cairn 202 (right feature) in alignment A for comparative purposes. Note stylistic similarity.

Figure 7. Distance view of experimental heaped/ clustered cairn (left arrow) constructed next to cairn 202 (right arrow) in alignment A for comparative purposes. Note visual similarity.

composed of individual cairns. Rock loading is not observed at the southeast end of cairn alignment B. This patterning might conflict with the notion of rock-loading at the trap ends of drive lines to better control movement of prey (Brink 2013). Alternately, the degree of hillside slope may influence rock loading, but more comparative data is needed to support this hypothesis.

The cairns of alignment A are certainly more sodded and weathered than when originally constructed. Presumably, this renders them less visible today. To test this assumption, the author constructed a fresh clustered/ heaped cairn adjacent to a heavily sodded cairn (No. 202) in alignment A. Surprisingly, the cairn in alignment A was only slightly less visible than the experimental cairn (Figures 6 and 7), but both become difficult to identify at distances greater than 50 m. The primary factor today that obscures the cairn alignments is the densely growing sagebrush that covers the site. There is no way to determine if sagebrush density was similar when cairn alignments A and B were constructed. A lack of sagebrush would certainly increase the short distance visibility of the stone features, whether weathered and sodded or not. They are far too subtle to be seen at distances exceeding 50 m unless artificially illuminated.

The cairns of alignment B largely sit atop the bedrock outcrop and are probably of the same height and configuration as when originally constructed. As they weathered and developed lichen they have taken on the appearance of the surrounding bedrock and have become camouflaged. If at the time of construction there was less sagebrush on the landscape, the cairns of both alignments would have been readily visible from a short distance. There have been many assumptions made in the archaeological literature without the benefit of experimentation. Some researchers suggest that cairns of most drive lines were once stacked vertically to conceal people laying or crouching behind them. They then collapsed after construction and are now in a "deflated" state. Others feel that the clustered or minimally heaped arrangements are unchanged from their genesis. While cobbles and sub-angular stones can be stacked short heights, they are not very stable and are toppled by strong winds and animals pushing against them. Also, it is difficult to stack more than 8 or 9 cobbles in a vertical column, and more time is required to form a vertical column

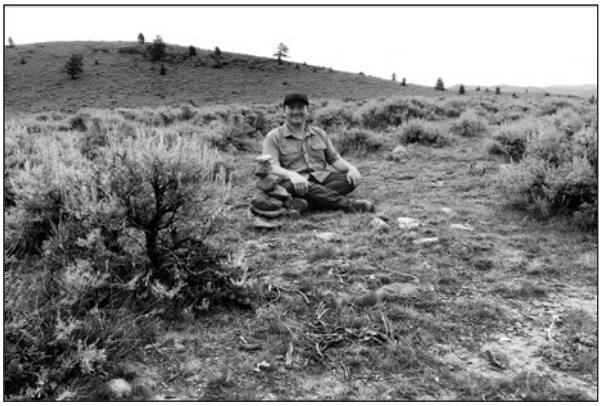

Figure 8. Experimental stacked cairn of nine cobbles. Person sitting behind stacked cairn for scale.

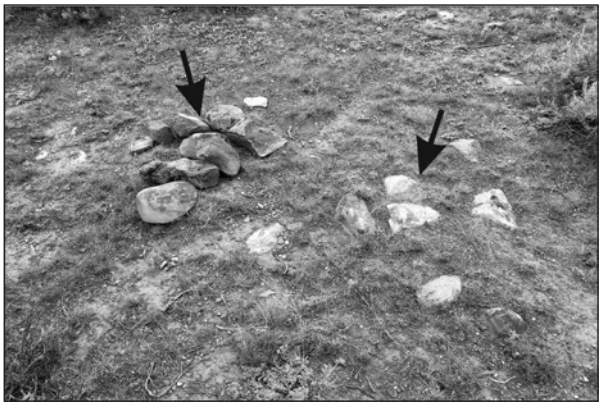

Figure 9. Experimental stacked cairn of nine cobbles after being toppled (left arrow). Cairn 206 of alignment A shown for comparative purposes (right arrow) Toppled pattern is also similar to cairns in alignment A.

than clustering the same number of stones in 1-2 tiers.

A second experiment involved constructing a nine-cobble stacked cairn and toppling it to see how the resulting formation compares to the low-profile cairns of the alignments. Interestingly, when a column of stacked cobbles is toppled, the resulting pattern is an oval/circular cluster, but not a linear distribution as might be expected (Figures 8 and 9). The result of this experiment demonstrates that the cairns of alignments A and B could have originally been individual stacked columns or the clustered/slightly heaped arrangements seen today. It should be noted that after the experimental cairns shown in Figures 6 and 7 and Figures 8 and 9 were photographed, the constituent rocks were randomly tossed in the nearby Gravelly Range Road borrow ditch.

Another consideration is the amount of concealment a stacked vs. clustered arrangement would afford. Clustered/slightly heaped cairns of 8-10 cobbles averaging 15 cm in maximum dimension are generally less than 15 cm in maximum height when freshly made. Stacking 10 cobbles in a column would give a maximum height of around 50-60 cm and a maximum width of approximately 15-20 cm. Either arrangement is insufficient to hide anyone (see Figure 8). This is relevant because historic accounts suggest, "Once the buffalo had entered the drive lane they were spurred on by the people behind the piles of buffalo chips, rocks, etc. These people stood and waved robes in the air to frighten the buffalo into staying between the drive lines. The buffalo thus moved on into the pound (e.g., Verbicky-Todd 1984: 49)."

Archaeological research in the northern Plains demonstrates that alignments of cairns, lines of individual rocks, or continuous linear concentrations of rock that nearly converge are often associated with bison kills (Verbicky-Todd 1984). Numerous historic references also allude to alignments of individual stakes driven into the ground, or piles of stone, brush, dung, snow, sod, or poles each about 1.5 m in height. Sometimes these items were embellished to appear, at a distance, as humans, dogs, or some other animal (Benedict 1996; Forbis 1978; Spiess 1979; Verbicky-Todd 1984). The structures were occasionally called "deadmen" by European explorers who witnessed bison drives (Verbicky-Todd 1984). These "deadmen" formed a fence of sorts, but certainly not an impenetrable or

Figure 10. Failed attempt to brace a 203 cm long lodgepole sapling with a 5 cm diameter base in a 10-cobble cairn. To keep the pole upright, a 20-25 cm deep hole was required to place the base of the sapling into before mounding rock around it.

Figure 11. Successful attempt to brace a 122 cm long willow branch with a 2 cm diameter base in a 10-cobble cairn. Note cow dung speared to top of willow stick.

physical barrier. Verbicky-Todd (1984:42) also points out that the use of stone in drive lines used for bison is "curiously absent" from the historic accounts. If organic components were once present in 24LC1259, they have long-since deteriorated. In contrast to other accounts, Wissler (1910:36-38) engaged elderly Blackfoot informants who insisted that nothing was added to alignment cairns and the cairns seen today are nearly as large as when constructed.

To partially test one historic description of how the cairns in an alignment may have functioned, a series of sticks and poles were made from lodgepole pine saplings and willow limbs. All secondary branches were removed from the main stems. Lengths ranged from 56 cm to 254 cm and base diameters ranged from 2 cm to 7.6 cm. A 10-cobble, heaped cairn could not support a 2.03 m long stick with a 5.7 cm diameter base (or 3.2 cm diameter at breast height) with or without wind. In general, when poles and limbs used in the experiment approached 1.27 m the typical low-profile cairn found in most alignments could not support the vertical structure (Figure 10). The only way this could be accomplished was to excavate a small diameter hole 20-25 cm deep and place the base of the stick in the hole before mounding rock around it. In contrast, poles or limbs less than 1.27 m with less than 2.5 cm diameter bases were surprisingly stable in the middle of a heaped cairn, even in a steady 20 mile (32 km) per hour wind. Additionally, pieces of cow dung were speared to the top of the smaller stakes to replicate some early historic descriptions from the Canadian Plains (Figure 11). It is worth mentioning that although calm when the dung-topped limb and cairn were built, the wind blew at approximately 20 miles (32 km) per hour shortly thereafter. The stick remained upright and the dung stayed atop the willow branch even in a strong, continuous wind. It was knocked over by cattle investigating it.

Although a low approximately 91-122 cm row of stakes protruding from cairns and topped with pieces of bison dung would seem inadequate to manipulate the movement of a herd of ungulates, herd animals living in the northern plains prior to European settlement were unaccustomed to fences or similar obstacles. The presence of something so alien, albeit subtle, may have been sufficient to guide animals into a trap or ambush. To extend this part

of the discussion, Brink (2008: 99-101) suggests that instead of single sticks or limbs, several short limbs or brushy pieces were braced upright among a cairn's stones. The increased mass would result in a more visible corridor.

The time required to construct hunting architecture is dependent upon number of participants, availability of useable stone, and type of configurations desired. Specific to pronghorn traps, ethnographic accounts suggest construction times ranging from half a day to as many as five days, but specificity pertaining to the aforementioned variables is not provided. Recently, one researcher has experimented with low-profile clustered/heaped cairn construction time (Zedeño et al. 2010:14-15). Her observations will be relied on with regard to site 24LC1259. Because rock is readily available throughout the site area, using an average construction time of 2.7 minutes per cairn and assuming that only one person is constructing any given cairn, an expected labor investment of 17.8 person-hours was required to construct cairn alignments A and B. If 10 individuals were involved, construction of Stone Feature Group 1 could have taken less than two hours. If only two individuals were involved, construction would have taken a full day. If brush was piled on or around the stone features and sticks were collected and placed upright within the cairns, then additional time was needed to locate, transport and emplace these organic items.

Figure 12. Oblique ground level view looking northwest at hunting blind 3.

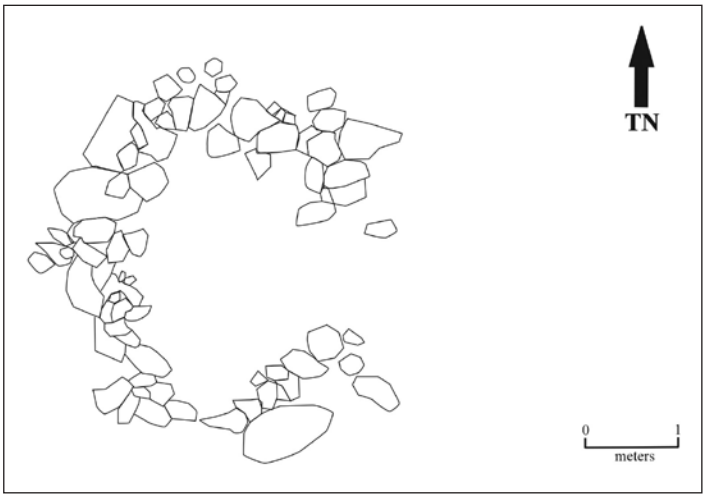

Figure 13. Plan drawing of hunting blind 3.

Between and slightly beyond the east ends of cairn alignments A and B are three circular arrangements of stone that outline very shallow, leveled off areas (Figures 12 through 15). These are assumed to be hunting blinds. The slightly leveled interiors were probably formed through clearing rock subsequently used to construct the perimeter walls. Actual digging or scraping to remove sediment was minimal at best so the interiors cannot be described as pits or even shallow depressions. The leveled areas inside the circular arrangements are less than 5 cm deep, but current depths may reflect colluvial infilling over time and not original construction configuration. The interior of each blind is fully covered with native vegetation today. The local angular rhyolite has been stacked in two

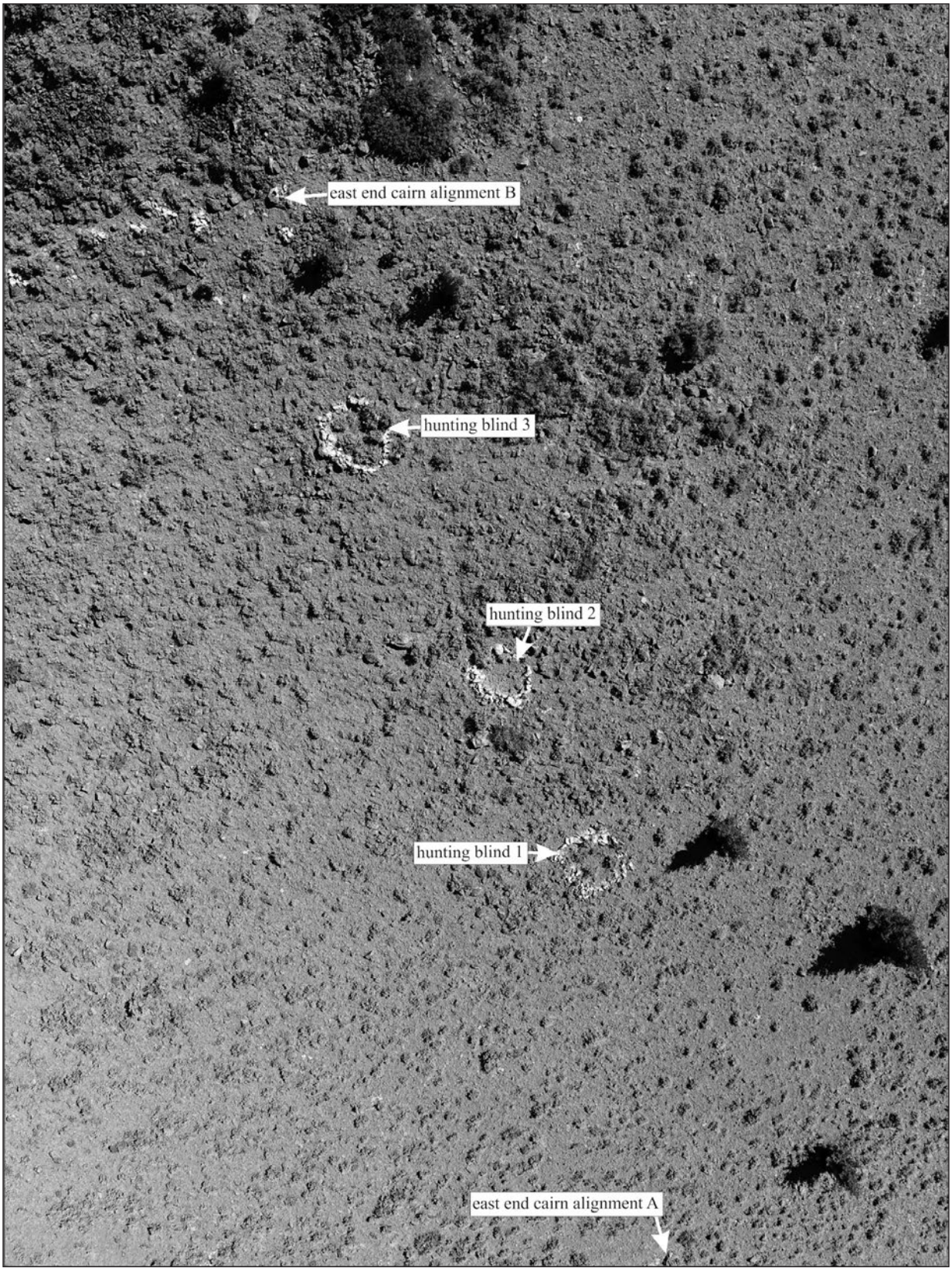

Figure 14. Aerial view of hunting blinds 1-3 in relation to cairn alignments A and B.

Figure 15. Fieldworkers (arrows) positioned in hunting blinds 1-3. Photo taken from northeast end of cairn alignment A. Southeast end of cairn alignment B indicated with white dotted line. Note degree of hill slope between alignments A and B.

	Hunting Blind 1	Hunting Blind 2	Hunting Blind 3
Interior dimensions	2.27 m N/S x 2.05 m E/W	2.3 m N/S x 1.74 m E/W	2.82 m N/S x 2.13 m E/W
Exterior dimensions	3.51 m N/S x 3.57 m E/W	3.51 m N/S x 3.57 m E/W	4.37 m N/S x 3.8 m E/W
Constituent stone count	~80	~70	~65
Constituent stone size range	9 cm to 35 cm	8 cm to 40 cm	8 cm to 80 cm

Table 2. Selected metric data for hunting blinds 1-3.

to three tiers so that the walls of each blind are approximately 10-15 cm above the ground surface. The three hunting blinds are distributed progressively upslope along a minimally arcing line oriented slightly NE/SW. The distance from hunting blind 1 to hunting blind 3 is 24 m with 10 m between hunting blinds 1 and 2, and 14 m between hunting blinds 2 and 3. Table 2 provides metric data for these three small diameter circular stone features. The largest constituent rocks were probably not moved but taken advantage of where they were found and incorporated into the blind walls. The three blinds have similar interior and exterior dimensions to those

documented in site 5BL148 in the southern Colorado Rockies (Meyer 2019). Wall heights of the three blinds in 24LC1259 tend to be substantially lower than those in 5BL148, and most of the Colorado blinds are open at one side. Rock counts and number of tiers of the 5BL148 hunting blinds was not available for comparative purposes with 24LC1259 (Meyer 2019). Another dissimilarity is that the blinds in site 5BL148 tend to be located between, along or a few meters outside of a drive line. In 24LC1259, the blinds are positioned at the convergence of cairn alignments A and B.

Wall height of the blinds in 24LC1259 would not be sufficient to conceal a human from game animals passing through the drive lane. Sagebrush and tree branches may have been cut and piled on top of, or immediately outside of the perimeter rocks to aid in concealing the hunters stationed in the blinds. Since the rocks appear to have served no concealment purpose, perhaps they only marked preferred locations for hunting blinds. If the concealing brush burned, blew away, or deteriorated the blind locations could easily be reidentified by the circular arrangement of rock, then reconstructed with fresh screening material. Hunting blind 1 is at an elevation of 1494 m ASL, hunting blind 2 is at an elevation of 1496 m ASL, and hunting blind 3 is at an elevation of 1498 m ASL. Thus, hunting blinds 2 and 3 are progressively 2 m higher in elevation than hunting blind 1. This orients the hunting blinds on a 19 percent grade. Said another way, there is a 10.8-degree angle of elevation from blind 1 to blind 3. Specific to cairn alignments A and B, hunting blind 1 is 4.2 m higher and hunting blind 3 is 8.8 m higher than the east end of cairn alignment A. Similarly, hunting blind 3 is 3.6 m lower and hunting blind 1 is 8.8 m lower than the southeast end of cairn alignment B.

Brink et al. (2003) have made the most comprehensive study to date of northern plains cairn alignments. Their research suggests an average of eight rocks per drive line cairn, an average spacing of 5.2 m between cairns, and an average drive line length of 348 m. High altitude drive lines prepared for small and medium ungulate hunting tend to be continuous rows or low-profile walls of dry-laid masonry works. These rock alignments average approximately 150 m in length (Meyer 2019:66). Drive lanes are typically oriented in the direction of prevailing winds with the trap, ambush, jump, or pound situated downwind of the converging ends of the drive lines. Using the data calculated by Brink et al. (2003), the dimensions, rock counts, and spacings of the drive lane cairns at 24LC1259 are similar to those in other rock alignments in the northern Plains, but dissimilar to high altitude alignments in the southern Colorado Rockies (Cassells 1995; Meyer 2019). Further, the orientation of the drive lane in 24LC1259 follows the prevailing wind; the hunting blinds are downwind of the proximal end of the drive lane. The distance between alignments A and B at their west ends is difficult to quantify because of the length disproportion. However, the distance from the west end of cairn alignment B due south to cairn alignment A is 133 meters. The distance between alignments A and B at their east ends is narrowed to approximately 55 meters.

Lengths of the cairn alignments in 24LC1259 are dissimilar to the average proposed by Brink et al. (2003) for bison. Cairn alignment A is approximately six times longer than expected, while cairn alignment B is only 59% of the average length. Cairn alignment A is also approximately 14 times longer and Cairn alignment B is 1.4 times longer than expected for high altitude hunting architecture used in mountain sheep acquisition (Meyer 2019). To keep these alignment lengths in perspective, two of the drive lines documented at the Kutoyis site in northern Montana are 4.5

km and 2.5 km in length (Zedeño et al. 2010). Further, Tom Jerde has documented several rock alignments in the Paradise Valley of south-central Montana that exceed 1 km in length (Jerde 2013). One important aspect of the cairn alignments in site 24LC1259 is that there is no evidence that the ends have been truncated with farming or any other ground disturbing developments. Excluding possibly two 30 m segments of alignment A that were obliterated during construction of the Gravelly Range Road and secondary access trail blading and ditch (24LC2769) construction work, the alignments appear to be intact. Most importantly, the ends are fully intact to give confidence in the maximum length of the original alignment.

While many drive lanes associated with bison kills terminate on a decline (Brink 2008; Davis et al. 2016; Rennie and Brumley 2013; Verbicky-Todd 1984), cairn alignments A and B terminate on an incline, and the degree of slope where cairn alignment B is situated exceeds that of any bison kill site the author is aware of. At site 24LC1259, animals were moved from the drainage bottom then upslope to the three hunting blinds. The orientation of cairn alignment B is not directly uphill. Instead, it is on a slight slant across the lower face of Tom's Hill to take advantage of a natural tendency of ungulates to angle across a slope instead of move straight up or down it. This is especially true when an animal is not spooked to the point of running but is aware of potential danger and begins moving out of that area at a slow to moderate pace to gain elevation and a better vantage point to see or scent the cause of the distress. Another consideration is the kind of trap or ambush represented near the convergence of the two drive lines. Running bison headed toward the three hunting blinds would pose a major safety risk to waiting archers. The layout of Stone Feature Group 1 is best designed for smaller bodied ungulates that tend not to congregate in large herds and can be moved passively through a drive lane into an ambush.

Forming a reasonable conclusion as to what ungulate species were targeted is difficult. The cairn alignments in 24LC1259 are considered here to be two converging drive lines that together form a drive lane. This drive lane, however, is atypical for the northern Plains because of its topographic setting and for its hunting blind features. While the location of one side of a drive lane associated with many bison kill sites is visible from its opposing side, the curvature of the ridge makes identifying the location of cairn alignment A impossible from cairn alignment B until one reaches the southeasternmost 100 m of alignment B. Even if 3 m tall structures were established along the cairns of alignment A they would be concealed from people or animals near the drainage bottom because of the height and curvature of the saddle portion of the ridge. It is hard to understand what role cairn alignment A played in helping direct game animals toward cairn alignment B and the three hunting blinds.

The American pronghorn (*Antilocapra americana*), commonly referred to as "antelope" was occasionally hunted by historic and precontact Native Americans of the Great Plains, Great Basin, and American Southwest. Key behavioral characteristics of these small to medium-size ungulates include their reluctance to jump vertically, their curiosity, their habits when fleeing danger, their predictable daily movements, and migration patterns. Both small cooperative groups and large communal groups of people participated in pronghorn hunts. The typical approach was to construct a V-shaped funnel of stone, brush or other organic material that led to an enclosure, pit, or other type of trap. Isolated blinds at watering sites or along recognized travel routes were also utilized but these were occupied by one or only a few archers.

Where drive lanes were constructed, pronghorn were hazed passively or aggressively toward hunters concealed in brush or stone blinds (Lubinski 1999; Pastor and Lubinski 2000).

Although pronghorn kill sites have been documented throughout the northern Plains, the sites currently reported for Montana, Wyoming and the Dakotas lack stone drive lanes/funnels (Davis et al. 2000; Frison 1967, 1971, 1991; Kornfeld et al. 2010:291-304; Lippincott 1996). In contrast, the Laidlaw and Barnett sites in southern Alberta consist of short, converging cairn alignments with rock densities increasing at the converging ends. It is uncertain if pits or other types of blinds were constructed in these sites where archers would have been stationed, but the stone hunting architecture remains (Brink 2013; Brumley 1983). In central Asia, hunting Tibetan antelope (*Pantholops hodgsonii*) can involve shallow, circular, rock outlined pits (hunting blinds), used in conjunction with drive lane structures. Each drive lane typically exhibited two blinds. These blinds are described as being 2.5 to 3 m in diameter and excavated to a depth of 40–50 cm (Lemke 2021:3).

The hunting architecture, and geographic setting of site 24LC1259 could be evidence for bighorn sheep *(Ovis canadensis)* hunting. Frison (2004:151) explained that when bighorn sheep are alerted to danger and leave a bed ground, they move rapidly downhill, make a half-circle away from the perceived threat, then run back uphill. The open ends of the drive lanes were placed in the optimum position to intercept the animals once they started their uphill run. Local ranchers, John and Nina Baucus (pers. comm. 2017) described how for several consecutive years the same herd of bighorn rams would appear on a certain hillside at the same time annually and stay for a couple of weeks. This kind of behavioral predictability would lend to repeated, seasonal, and passive, small-scale participant use of Stone Feature Group 1-- at least while the same band of sheep annually visited the area.

Lemke (2021:5) and Kornfeld et al. (2010: 304-327) observed that communal sheep hunting often consisted of constructing pens/corrals from juniper, lodgepole pine, and fir. Occasionally leading to these traps or pens are rock alignments that were once part of wood and stone sheep fences. Two methods of communal sheep hunting are noted. The arrangement of the stone features was to capitalize on the sheep moving uphill, directing them between converging drive lines toward a pen/corral, then downslope between drive lines to another pen. Blinds however are not noted at the drive lane convergence or within the pens. In addition to communal or small-scale cooperative hunting techniques, a variety of stone and small wooden features can be strategically located where individuals await wild sheep, deer or elk to pass by.

Communal drives for deer were common from the Great Basin north into British Columbia. Presumably the common species targeted were mule deer (*Odocoileus hemionus*) and black-tailed deer (Odocoileus hemionus columbianus), but the literature is unclear. Although stone and the standard "V" arrangement drive lane of stone can be part of deer hunting architecture, the distinguishing feature is a sufficiently tall corral of wood and brush that members of the deer family could not jump out of once they were inside the structure. References are also made to the use of pits up to 4 m deep in conjunction with, or instead of, corrals (Lubinski 1999:168; Steward 1943:359; Teit 1909:573). Edwin Denig (1930:536-537) noted that traps and pits were never used by Plains Indians. Deer (and presumably moose) were typically pursued as individual animals or in small numbers by one hunter at a time, while

elk being herd animals, were hunted by parties.

Both Meriwether Lewis and William Clark noted in their journal entries of February 2nd, 1806, that the natives of coastal Oregon kept a small breed of dog that they use only to hunt elk (Moulton 1990:235). Grinnell (1923:276) reported that the Arapaho occasionally drove elk over an embankment and into a pit or possibly a corral, and there is at least one reference to the Assiniboine surrounding a herd of elk and engaging in a crossfire with firearms. Denig claimed that elk hunting in the northern plains was done on foot by a group following a detailed ceremony, but he submits that while elk hides were useful, elk meat was tolerated but not "relished" among the tribes of the upper Missouri. The ethnographic observations are consistent with the archaeological evidence for the northern plains where deer bone in camp, kill or processing sites away from the mountains and foothills tends to be a minor component, and elk and moose remains are very rare (Kornfeld et al. 2010:327-333). Hunting of deer, elk *(Cervus canadensis),* and moose (*Alces alces*) for northern plains tribes was clearly secondary to the pursuit of bison, but also to bighorn sheep and pronghorn.

Worthy of mention is that the geographic setting of 24LC1259 is prime mule deer and elk habitat—especially wintering range. Today, a prolific amount of scat produced over the winter months by mule deer is found throughout the area. If the local mule deer behavior of today reflects what occurred during pre-contact times, then the possibility of 24LC1259 being used for passive hunting of deer during winter months should not be dismissed.

The arrangement of hunting blinds positioned between the converging ends of cairn alignments A and B appears to be unique in northern Plains archaeology. The closest analogy the author could identify is found in some caribou hunting sites in the arctic (Brink 2005:13), and small or medium-size ungulate hunting complexes at high altitude in the southern Colorado Rockies (Meyer 2019). Lubinski (1999:165) notes, "…enclosures and pit traps are most commonly associated with communal hunts, while isolated fences and blinds may be better associated with single hunters or small-scale cooperative hunts." Also, while behavioral traits are different from species to species "…the general principal of hunting architecture is the same, and these behavioral differences serve to underscore the flexibility of the method, hunting architecture features are extremely adaptive (Lemke 2021:5)." The lack of a bone bed or associated processing site is not uncommon among small and medium-size ungulate hunting architecture (Lemke 2021). It is most likely that prey shot by archers was limited in number and the mortally wounded animals ran short but varying distances before succumbing to their wounds. Some percentage of animals were likely shot, but not fatally, or they were not sufficiently injured to cause death within a few minutes. These animals likely escaped, at least for a few days before lethal infection set in. If the target species were deer, pronghorn, or wild sheep each animal was possibly hauled whole to a base camp and processed there. Larger ungulates such as elk or moose, could have also been transported in their entirety, albeit in pieces, by multiple individuals or dogs pulling travois. Under these scenarios, neither a bone bed nor dedicated processing site is expected.

STONE FEATURE GROUP 2

Stone Feature Group 2 occupies the top and upper edges of Tom's Hill in the eastern extreme of the site (Figure 16). The Group 2 features are separated from Group 1 by a minimum of 80 m and may in fact not be fully unrelated. If these are pre-contact in age, some of the second grouping of stone

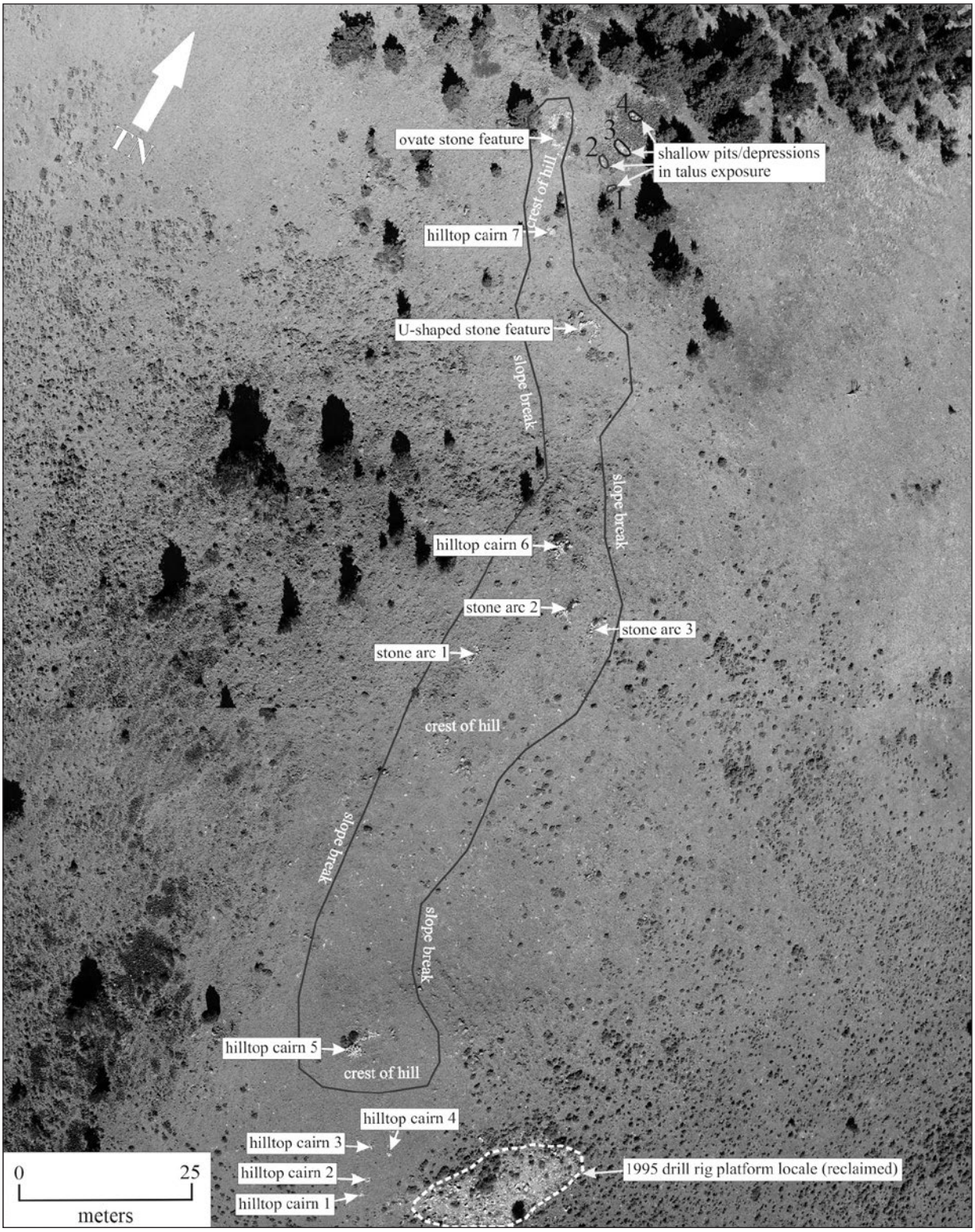

Figure 16. Aerial photo showing distribution of stone feature group 2.

Figure 17. Oblique view southwest of hilltop cairn 5.

features may reflect activities that are more spiritual in nature such as vision questing, shamanistic practices, elements of shrines, human burial coverings, or making offerings to some benevolent being. Others may have been used as wind breaks, temporary shelters, caches, lookout points, location markers, or mock sentries. Still others may have served as blinds for hunting solitary or small numbers of small or medium-size ungulates, portions of deadfall traps, or raptor traps. Alternately, if some of the cairns are from the late 19th or early 20th centuries they could represent landmarks, monuments, survey points, or mineral claim-corner/boundary markers (Rennie and Lahren 2004). Even though the north margin of an 1870s placer claim (GLO 1874) passes immediately south of hilltop cairn 5, that cairn is stylistically dissimilar to other claim markers throughout the region. It is suggested here that cairn 5 is not associated with a mineral claim. Excluding cairns 1 through 4, the constituent stones of features comprising Group 2 are minimally sodded but exhibit uniform weathering and patterned lichen development on their exposed surfaces.

Just below the crest at the south end of Tom's Hill are four small low-profile cairns. The cairns are designated here as "hilltop cairns 1-4." All four cairns are small, well-consolidated, heaps or clustered arrangements of 1-2 tiers of local angular to sub-angular rhyolite pieces (Table 3). The constituent stones of cairns 2-4 are minimally sodded but exhibit uniform weathering and patterned lichen development on their exposed surfaces. In contrast, cairn 1 is heavily sodded suggesting that it may be older than cairns 2-4.

At the crest of the south end of Tom's Hill is a large well-consolidated cairn (hilltop cairn 5) best described as a dome-shaped heap or mound. It is composed of at least 100 local rhyolitic rocks that average 30 cm in maximum dimension (Table 3). The cairn has a short, single tiered rock row, 2-3 stones wide, that extends off its northwest edge and arcs slightly northeast (Table 4; Figure 17).

Approximately 60 m northwest of cairn 5 is stone arc 1. It is composed of 21 locally available rhyolitic rocks clustered in 1-2 tiers, 2-3 stones wide, that form a semi-circle. The arc is open to the west. Average constituent stone size is 30 cm in maximum dimension. Approximately 12-15 m north of stone arc 1 are stone arcs 2-3 (Table 4; Figure 18). Stone arcs 2-3 are composed of 27-28 locally available rhyolitic rocks clustered in 1-2 tiers, 2-3 stones wide, that form semi-circles open at their east sides.

Approximately 8 m northwest of stone arc 2, near the center of the top of Tom's Hill, is hilltop cairn 6 (Table 3; Figure 18). It is well consolidated and composed of 45 locally available rhyolitic rocks clustered in three tiers and constructed on a minor rock outcrop.

Thirty meters northwest of hilltop cairn 6 is a U-shaped stone feature (Table 4; Figure 19). It is composed of 40 locally available rhyolitic rocks clustered and heaped in 2-3 tiers; 2-3 stones wide. Wall height ranges from 50 to 25 cm at the south ends. The feature is open to the south.

Twelve meters west of the U-shaped stone feature is hilltop cairn 7. It is well consolidated and composed of approximately 25 locally

	Cairn 1	Cairn 2	Cairn 3	Cairn 4
Dimensions (cm)	70 N/S x 70 E/W x 10 tall	100 N/S x 110 E/W x 30 tall	140 N/S x 100 E/W x 25 tall	140 N/S x 120 E/W x 25 tall
Rock count	10	~17	9	~23
Stone size range	15 - 22 cm	14 - 23 cm	17 - 35 cm	14 - 24 cm
	Cairn 5		**Cairn 6**	**Cairn 7**
Dimensions (cm)	220 N/S x 240 E/W x 80 tall. Associated rock row measures 300 NE/SW x 110 NW/SE x 20 tall		340 N/S x 270 E/W x 45 tall	160 N/S x 150 E/W x 20 tall
Rock count	~100; An additional 25 stones comprise the rock row		*~45*	*~25*
Stone size range	12 - 35 cm		*15 - 40 cm*	*15 - 29 cm*

Table 3: Selected metric data for cairns of stone feature group 2.

	Stone Arc 1	Stone Arc 2	Stone Arc 3	U-shaped Feature
Inside Dimensions (cm)	210 N/S	230 N/S	220 N/S	160 N/S x 250 E/W
Outside Dimensions (cm)	280 N/S	340 N/S	340 N/S	320 N/S x 320 E/W
Wall thickness (cm)	50	40	40	50
Wall height (cm)	30-40	40	40	50-25
Rock count	21	~27	~27	40
Stone size range	17 - 34 cm	15 - 35 cm	15 – 33 cm	14 - 38 cm
	Oblong/Ovate Feature		**Talus Pits 1 through 4**	
Inside Dimensions (cm)	380 NW/SE x 230 NE/SW		Pit 1: 150 cm NE/SW x 120 cm NW/SE; Pit 2: 120 cm N/S x 240 cm E/W; Pit 3: 110 cm N/S x 240 cm E/W; Pit 4: 110 cm N/S x 200 cm E/W Pit depths = 40-50 cm	
Outside Dimensions (cm)	570 NW/SE x 400 NE/SW			
Wall thickness (cm)	60 - 140			
Wall height (cm)	25 - 40			
Rock count	~120			
Stone size range	12 - 30 cm			

Table 4. Selected metric data for arcs, U-shaped, oblong/ovate features and talus pits of stone feature group 2.

available rhyolitic rocks clustered in two tiers and constructed on a minor rock outcrop (Table 3).

Twelve meters northwest of hilltop cairn 7 is an ovate or oblong shaped stone structure composed of approximately 120 rhyolitic rocks clustered and heaped in 2-4 tiers, 3-5 stones wide depending on portion of the feature being examined (Table 4; Figure 20). The wall is 60-70 cm thick along the southeast-half of the south side and it is 25 cm in height. This portion of the wall is composed of 2 tiers of rock. The wall comprising the northwest-half of the feature is 1.4 m in maximum thickness and it is 40 cm tall being composed of 4 tiers of rock. Wall height decreases to 25 cm tall at the SW ends. There is a 2 m long gap at the southeast portion of the north wall. The feature is positioned both on the apex of the narrow ridge spine and on its north slope.

Five meters east/northeast of the ovate/

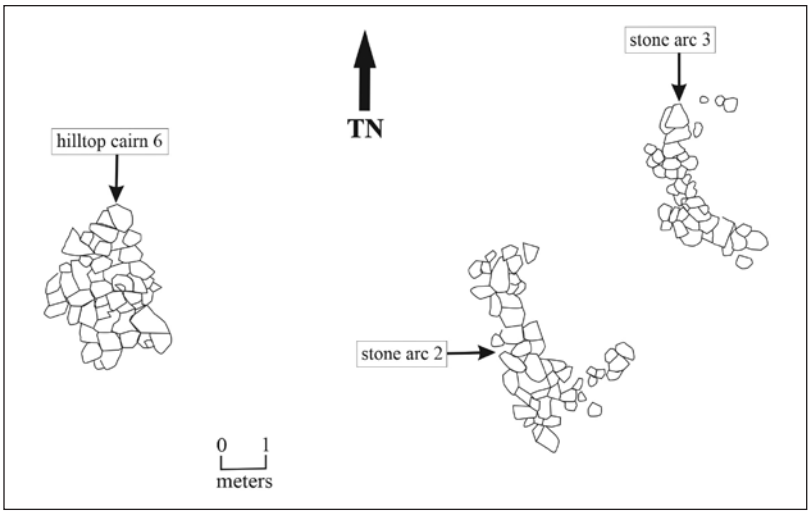

Figure 18. Plan drawing of hilltop cairn 6 and stone arcs 2 and 3.

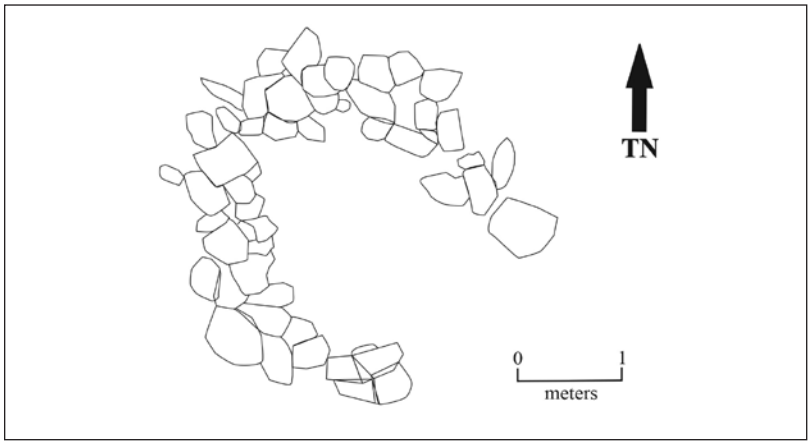

Figure 19. Plan drawing of U-shaped stone feature.

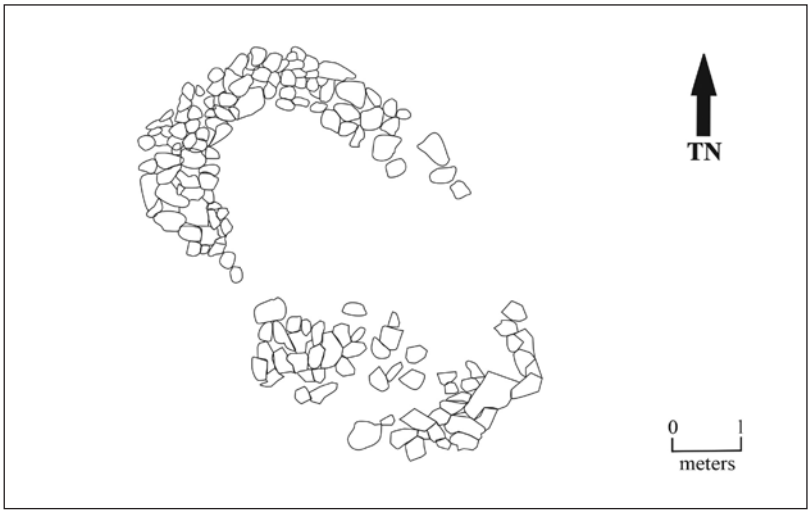

Figure 20. Plan drawing of ovate stone feature.

oblong rock structure are four small diameter, shallow pits or depressions in a rhyolitic talus outcrop on the hillside immediately below its crest (Table 4). Talus pit 1 is oriented NE/SW while talus pits 2-4 are oriented E/W. The pits are similar in form with side-slopes that taper inward toward the base. There is no evidence of rock stacking within or around the perimeters of the pits, but it does appear that rock was removed from the talus slope to form these depressions. If these pits are human-caused and not a natural phenomenon they could represent hunting blinds, raptor traps, or borrow sources for the rock used in Stone Feature Group 2 construction. All pits range from 45-50 cm deep. Lichen development and weathering of rock surfaces is uniform across the pits and unmodified surface of the talus exposure suggesting the depressions are not recent. The pits are separated by 3-4 meters of distance.

Fire cracked rock is not present in site 24LC1259, and the thin stable soils suggest that buried heating/cooking facilities are absent. Chipped stone debitage generated from minimally processed locally available dacite, quartzite, and chert pebbles and cobbles is common in and adjacent to the site. The frequency of

these materials diminishes on the top of Tom's Hill but increase on the landform containing the southwest portion of cairn alignment A. Clearly imported toolstone consists of approximately five well dispersed, small obsidian flakes observed over multiple visits in the vicinity of cairn alignment A. In addition to the debitage and small core pieces, a small, stage II quartzite biface was found near the southeast end of cairn alignment B. None of the chipped stone pieces have been collected and their locations have not been mapped. It is ubiquitous over a very large area.

CHRONOLOGIC PLACEMENT

Although site 24LC1259 is presumed to date to the precontact period, it cannot be determined by visual inspection alone when the site was created, or even if a single event is represented among the stone features. The site could have been constructed at one time by one group of people, or it could represent multiple activities by multiple people over multiple years. The potential for finding associated, datable organic material in site 24LC1259 is unlikely. However, the site is a good candidate for luminescence dating of sediments beneath stone features. Future efforts in the documentation of site 24LC1259 will be the pursuit of funding to cover several luminescence dates that can be used to place the stone features in 24LC1259, and adjoining cultural resource sites, in a temporal context. One alternate approach might be lichenometry but a credible baseline dataset must first be established for the site locality (e.g., Benedict 1967, 1996, 2009; Locke et al. 1979; Meyer 2019).

CONCLUSION

Site 24LC1259 is described herein as a complex of stone features. That is only because the stone has survived. There is no way to know what if any organic materials (e.g., limbs, hides, brush) were once used in conjunction with the stone features. Further, we have not conducted sufficiently detailed study, including luminescence dating and lichenometry, to conclude if the constituent stone features were formed at a single point in time, or the current arrangement and feature configuration is a product of modification and accretion over time.

It is argued here that the cairn alignments and small diameter, low-profile stone enclosures that comprise Stone Feature Group 1 are associated with communal or small group hunting of small or medium-size ungulates by past Native Americans, but the time of use is unknown as is the ethnic identity. It is also uncertain what game species was targeted but bighorn sheep or pronghorn are the most probable choices based on the geographic setting and topography. It is also proposed that some features comprising Stone Feature Group 2 may reflect activities that are more spiritual in nature such as vision questing, shamanistic practices, or making offerings to some benevolent being. Others may reflect wind breaks, raptor trapping efforts, or blinds for hunting solitary or small numbers of small or medium-size ungulates. This grouping occupies the top and upper edges of Tom's Hill in the eastern extreme of the site. The assumptions made here are based on the kinds, locations and orientations of stone features present, ethnographic analogies, and archaeological evidence. Although site 24LC1259 is unique and possesses readily discernible qualities, until credible dating methods are employed it can only be assumed that it was constructed during the precontact period.

Stone Feature Group 1 consists of two alignments of low-profile cairns and rock outlined shallow depressions. Precontact alignments of cairns are generally considered to reflect three possibilities. First, they were used as a guidance

system for directing herd animals into a snowbank, surround, ambush, corral, or over a precipice. Second, cairn alignments are identified in association with major, prehistoric human travel routes. Third, some cairn alignments are associated with ceremonial structures such as medicine wheels (Rennie and Lahren 2004). The converging alignments with hunting blinds at their terminal ends strongly suggests communal hunting of ungulates. Assuming the cairn alignments in site 24LC1259 reflect guidance systems between which small or medium-size ungulates were passively directed, the blinds where archers were once concealed are positioned in a logical location near the convergence of the two drive lines. The uniqueness of Stone Feature Group 1 is the arrangement of features. A similar configuration to Stone Feature Group 1 could not be identified in the archaeological literature for the northern Plains.

Although no evidence of a bone bed or temporally diagnostic or dateable cultural remains were found at the site, preservation and dating issues plague hunting architecture sites (Lemke 2021:13). The development of luminescence dating now gives us the ability to date stone features and establish a chronologic context.

While drive lines are commonly associated with communal hunting activities of bison, hunting blind features are not expected (Frison 1981). Drive lines and hunting blinds associated with bighorn sheep hunting are relatively common in the high altitude areas of the southern Colorado Rockies. Many of these features were apparently modified over time to suit the needs of subsequent hunters (Benedict 1975, 1985; Meyer 2019). If the Stone Feature Group 1 portion of 24LC1259 appears today as when constructed, this could indicate a limited use of that portion of the site. Possibly implying a single use event or a failed effort to secure prey. Alternately, it could suggest that the system fit into a seasonal round for the group that utilized it, so modification of the individual elements was unnecessary. Stone Feature Group 1 is also important because the drive lines and blinds are arranged in such a manner that any contemporary hunter could readily visualize how game animals were brought into the drive lane and then moved toward the archers concealed in the blinds. While visualizing those events, the anxious moments and emotions associated with watching prey come within lethal range is recalled and a sense of sympatico is formed for the precontact human activities represented. It is always a possibility that the animals will spook if the wind changes direction or if they detect movement in a blind. These are but two scenarios where game animals would change course and escape from perceived danger thus foiling plans laid for obtaining meat, hide, bone, or horn/antler resources, and generating feelings of disappointment. If all is successful, modern hunters know the rush of adrenaline that occurs when a target steps into lethal firing range and the projectile is launched. So, integrity of feeling, at least for the Stone Feature Group 1 component, is very much intact making it relatively unusual among archaeological resources.

The site experienced minor damage during the late 19th and early 20th centuries. A rough and unmaintained dirt road (Gravelly Range Road) passes through cairn alignment A and likely destroyed a small number of original cairns when it was constructed. An abandoned ditch system (24LC2769) passes through two segments of cairn alignment A and may have also destroyed a small number of cairns. Although much of Stone Feature Group 1 is within the boundaries of George W. Cleveland's placer mining claims (GLO 1874), there is little, if any evidence that placer mining occurred within or immediately adjacent to the site. Excluding a few barbed-wire fences, the ditch

system (24LC2769), and the Gravelly Range Road, the setting of the site is much as it was prior to Euroamerican settlement. Further, most of the countryside surrounding the site is intact rangeland with the closest evidence of cultivation or housing developments being a minimum of 3 km to the southeast, and no such developments to the west or north. Integrity of feeling is generally subjective, but that is not the case at 24LC1259. One critically important attribute of cairn alignments A and B is that their terminal ends appear to be fully intact.

Precontact, ethnographic, ethnohistoric, and contemporary peoples constructed cairns for numerous possible reasons throughout the world, and these can take on a myriad of configurations (Rennie and Lahren 2004). Additionally, the communal or cooperative modification of landscapes using earth, stone, or wood for the purpose of increasing the yield of hunting efforts has occurred on every continent except Antarctica (Lemke 2021:1). Engineered landscapes were critical in meeting the subsistence, clothing, shelter, tool, and weaponry needs of non-industrialized societies (Brink and Rollans 2009). The drive lines and hunting blind features in 24LC1259 are clear and deliberate in their positioning. The natural environment was modified and allowed human participants to exploit natural tendencies of the desired prey. Whether organic materials such as logs, limbs, brush, grass, dung, or hides were once part of the hunting architecture at site 24LC1259 is unknown. All we are left to evaluate are the stone features. One researcher has superbly articulated the relevance of hunting architecture to archaeological study:

> …regardless of the intended prey species, the layout of the site itself is a valuable record of planning and organizing communal kills, and reflects people's deep knowledge of game behaviour and biology (Brink 2008). Thus, even in the absence of archaeological deposits, the study of [communal kill] sites… offers important windows into the process of communal manipulation of game animals to achieve mass kills. While from a global perspective the specifics of communal hunting will differ by such factors as landscape, species and cultural group, it is expected that common threads of process should be apparent on a worldwide scale (Brink 2013:26)."

Consideration was given to complexity and visibility of hunting architecture and what that suggests for the number of animals being hunted, whether the architecture reflects passive or aggressive game drives, and the kind of weaponry being used (see Lemke 2021:11). Communal or small group hunting efforts, including the layout and construction of hunting architecture, in egalitarian societies were typically directed by an adult male of experience and status. While it is assumed here that the site was operated by a small number of allied people who came together one or more times each year, there may have been an implied sense of ownership. Deer "fences" in British Columbia and caribou hunting complexes in Alaska and the North American arctic were operated communally but usually considered property of the individuals who constructed them. These were also inheritable or purchasable properties (Gordon 1990:287; Teit 1909:573). Pronghorn traps in the Great Basin and bison kill sites in the northern Plains were usually considered property of the band that constructed them and maintained the systems (Schaeffer and Schaeffer 1934; Steward 1938:175). These notions of ownership regarding hunting architecture imply territoriality

and a desire to control access to specific resources. This adds an additional human element to site 24LC1259.

Two low-volume perennial streams (Sears Creek and Cottonwood Creek) converge north of the site and form a narrow drainage bottom bound by high and moderately-steep hillsides. If ungulates grazing upstream in the Cottonwood and Sears Creek drainages were alerted to danger they would tend to distance themselves from the potential threat by angling southeasterly and upward along the north slope of Cottonwood Creek in an effort to cross the dividing ridge and enter the Little Prickly Pear Creek valley. The placement of cairn alignment A in 24LC1259 on the ridge top would have re-directed prey toward hunters who were concealed in the three blinds on the west slope of Tom's Hill. In the event that ungulates followed the drainage bottom to near the base of Tom's Hill they would likely have moved from this point southeasterly up the small, narrow ephemeral drainage and angled up and across the west side of Tom's Hill to better determine the location and source of what initially alerted them. In this scenario the shorter of the two alignments would have served to generally direct the game toward the hunters concealed in the blinds. Oetelaar (2014:11-12) points out that while past Native American occupants were aware of local climate, topography, ecosystem, and animal behavior, a strictly ecological explanation neglects the "… role of humans as active agents in the management of the landscape, the control of herd movement, and the maintenance of the kill complex." Included here at 24LC1259, without evidence, could also be the human use of fire to control vegetation within or adjacent to the site for the purpose of influencing prey in some way that would be advantageous to those engaged in the hunt. Stone Feature Group 1 clearly illustrates a thorough understanding of ungulate behavior and strategic use of the topography both with and without the modifications of man. Specifically, orientation of cairn alignments A and B and the positioning of the three blinds reflect the tendency of ungulates to follow fence-like alignments or structures rather than crossing them, and their tendency to angle uphill to observe a perceived threat.

The significance of Stone Feature Group 2 is presently unclear. It is also unclear if Stone Feature Group 2 is at all related to Stone Feature Group 1. If associated with activities of past Native Americans, these features could have been used as hunting blinds, wind breaks, temporary shelters, lookout points, location marker, burial locales, caches, elements of shrines, portions of deadfall traps, mock sentries, raptor traps, or vision quest structures. Alternately, if some of the cairns are from the late 19th or early 20th centuries they could represent landmarks, monuments, survey points, or mineral claim-corner markers (Rennie and Lahren 2004). A review of the DNRC landownership records and the 1906 GLO survey plat and notes did not shed light on the age or function of the stone features. To date, no attempt has been made to sample and characterize the chipped stone debitage intermittently found on the site surface, or across the greater landscape containing the site. It is presently unknown if this cultural material is temporally associated with the stone features of site 24LC1259.

Although site 24LC1259 is arbitrarily contained in an area that measures 1,110 m NE/SW x 492 m N/S it may be interrelated to adjacent stone feature sites (24LC1620 through 24LC1625). The site complex could also include the Grady Ranch dacite source (24LC2013) which was heavily utilized in stone tool manufacture. When considered as a contiguous group, these cultural resources cover approximately 6 square km of surface area. Most of the stone features

in these sites are subtle at close range, not visible from even a short distance, and generally not recognizable to most who traverse the area on foot, in a vehicle, or from the air. While landscape engineering at site 24LC1259 is not highly visible, if most of the stone features were constructed to manipulate the movements of small or medium-size ungulates, an intentionally and purposefully engineered landscape is represented. The numerous stone "tipi rings" that occur across the Great Plains are incidental upon the landscape. They were not intended to artificially modify the local topography for the purpose of either habitation, or in the case of 24LC1259, manipulating the movements of prey. Further, if some of the stone features assigned to Stone Feature Group 2 and reported in sites 24LC1620 through 24LC1625 represent spiritual or ceremonial activities, then the landscape holds more significance than adjoining areas where residues of these human behaviors are absent.

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THE ENIGMA OF SITE 144

LAWRENCE L. LOENDORF

INTRODUCTION

SITE 144 IS A NEWLY DISCOVERED ROCK ART site in the Pryor Mountains of Montana. Actually "newly discovered" is a misnomer because a metal tag is attached to the site with the number 144 engraved into it (Figure 1). No record of the site is found in the Montana SHPO site database. In fact, a number for a site in Carbon County could be 24CB144, but that number was never used to identify a site. The number 24CB144 was originally allocated by Dee Taylor at the University of Montana in a batch of numbers given to Custer National Forest in 1981.

Mike Beckes, the Custer Forest archaeologist in 1981 is not familiar with the site nor did he ever use site metal tags like the one found at the site. Robson Bonnichsen was an archaeologist who conducted a cultural resource survey on Custer Forest lands in the Pryor Mountains in 1981. Importantly, Bonnichsen did use numbers that were sequentially close to 24CB144, so it is possible that his field crew was responsible for tagging the site. However, individuals who worked on Bonnichsen's crew say they never used tags like this for sites. Further, the site is more than a mile from the Custer Forest boundary. If Bonnichsen was working on the forest, the site is a long way from the assigned survey area.

Curiously, when Douglas Melton of the Bureau of Land Management (BLM), saw a photograph of the site tag, he recalled that both the Forest Service and BLM archaeologists were using site tags like it in the 1980s. So, who originally identified the site with a metal tag is unknown. It seems most likely that a person on Bonnichsen's crew found and tagged the site for later recording. However, they never returned, or they were told by a supervisor that the site was too far outside the survey boundaries to be recorded in their present effort.

SITE 144

The enigma of the site tag aside, Site 144 is an important rock art site. In August 2022, David Eckroth of Billings who is an avocational archaeologist, and Patty Molinaro, Director of the Carbon County Museum led me to the site. A few days later, Cobe Chatwood and I returned to undertake a complete recording of the site. The site is located on private land, so no permits were required to record it. It is found in one of the many canyons that flank the southwestern side of the Pryor Mountains in the juniper breaks zone. The site lies in a low canyon with Amsden Formation limestone at higher elevatoions with Tensleep Sandstone on lower slopes. The site is situated in the Tensleep Sandstone at an elevatiion of 4920 feet above msl (Figure 2).

A rock art panel is found on the ceiling of

Figure 1. Metal tag with 144 attached to the base of the rockshelter that contains the pictographs. No one seems to know who put the tag on the site.

Figure 2. Site 144 is in the small alcove at the top of the photograph. A small rock cairn at the base of the site may also have been left by the individual(s) who first discovered the site.

a small, cubby hole-like rockshelter about 5 m above the current ground surface. The rockshelter measures 1m front to back, 1.8 m side to side, and 90 cm high. It faces east at about 100 degrees. A less defined rockshelter is below the upper one with a sloping, bare sandstone floor. The slope makes it unsuitable for human use. It measures 3 m front to back by 2.2 m side to side. A small cairn of rocks is situated on the lower shelter floor. It appears to be a recent addition to the site that was likely put there as an aid in re-finding the site.

It was likely difficult to reach the upper shelter, but a possible access was from the south where some tenuous foot holds would allow a person to scramble up into the shelter. The floor of the upper shelter is relatively flat and covered with about 5 cm of rat midden. We accessed the shelter with a ladder and examined midden but no obvious artifacts associated with the rock art were found.

Five paintings were placed on the ceiling of the upper shelter. They include two linear body anthropomorphs with short, inverted v-shape legs, out-stretched arms with fingers, and small round heads that appear to wear horned headdresses. They are both about 23 cm tall. These are simply made with a crayon, or a lump of solidified bone grease colored with red ochre. Thin lines like the fingers on hands must have necessitated the use of a sharp edge of the crayon. The paintings are in good condition, partly because they are in a protected setting on the ceiling.

Another element is an arrow-like object with a thin line encircled by an oval that is often

Figure 3. Two anthropomorphs, a partial circle line enclosing a straight line that transects a circle, and a stenciled human hand make up the elements at the site.

interpreted as the feather fletching on an arrow. It could also represent an atlatl with the finger loops depicted. It is about 18 cm long. This object is enclosed in a fine-line oval form that is 38 cm top to bottom by 18 cm across (Figure 3).

A stenciled human hand is overlapping the oval form. It measures 16 cm high by 9 cm wide. Stenciled hands, also called negative handprints, are usually made by creating a mixture or slurry of paint in the mouth and then spitting or splattering it over their hand which is held against the wall. At Site 144, the crayon material was likely chewed to add with water or saliva to make the paint.[1]

Stenciled or negative handprints are rare at Montana rock art sites. Mavis and John Greer (1999) completed a study of all known sites with handprints in Montana. The majority are solid or positive handprints where paint is applied to the hand and then pressed to the wall. This technique accounted for 87 percent of the 413 hands at Montana rock art sites. Stylized hands that are representational drawings of hands make up 11 percent. Stenciled hands found at two sites constitute three percent with five examples at these two sites.

One site in Beaverhead County, the Cabin Creek Rockshelters (24BE1766), contains three stenciled hands and the other in the Big Belt Mountains includes two hands at the Hand Stencil Sink site (24BW1053). The Cabin Creek site has an additional circular line motif and some finger smears that were applied with liquid red paint. The Hand Stencil site has only some splatter marks. Except for the stenciled hands, neither site contains motifs comparable to Site 144.

COMPARISONS

The isolated occurrences of negative handprints in Montana make it difficult to fit the Site 144 figures into any known rock art style. The paintings may be part of a heretofore unrecognized type of rock art that may have counterparts with sites in Wyoming.

All three of the Site 144 elements, the stenciled hand, the linear body anthropomorphs and the straight line bisecting a circle, are found on three closely related sites (48JO3, 48JO4 and 48JO6) along the Middle Fork of the Powder River. The sites, on a private ranch, near Barnum, Wyoming, include two that are adjacent to each other with the third located about 600 m downstream. Hundreds of petroglyphs and pictographs are found on these sites with approximately 80 stenciled hands, in a white pigment, that were made in the same time frame. Thirty-five of these hands are at 48JO3 which is high up on the canyon wall, tucked into an alcove which is somewhat larger, but much like Site 144. Other figures at 48JO3 include straight zigzag and other interconnecting white lines with other stencils that appear to have been made of objects rather than hands. One of these, about 69 cm long, resembles a stenciled atlatl (Figure 4). While it is difficult to identify this stenciled object with any certainty, as noted below, the site is quite possibly Archaic in age. There is also a straight line bisecting a circle on 48JO6 that is very similar to the possible atlatl figure found at Site 144.

Other important figures at 48JO3 for comparison to Site 144 are the linear body anthropomorphs on the Middle Fork sites. They exhibit the same round head, long body, short split legs, and down turned arms. These figures lack the horned headdress and fingers that appear on the Site 144 figures, but some of them possess headgear.

An important panel on 48JO4, with stenciled hands is isolated more than 5 meters above the current ground surface (Figure 5). To explain how these figures were made on a surface so high above the ground, Bill Eckerle (2020) undertook a geoarchaeology study of the site area. Any study of Holocene geology in the Powder River system is supported by pioneering terrace research completed by Luna Leopold and John Miller (1954). In their study they identified three fluvial terraces that are often defined as abandoned floodplains that are no longer active (Leopold and Miller 1954:13). Three terraces were identified in order of their elevation above the current river as the Lightning, Moorcroft, and Kaycee terraces. Remnants of the Kaycee terrace, the highest, are found 7 to 15 meters above the Powder River floodplain (Leopold and Miller 1954:29).

It was hypothesized that the panel 5 m above the ground on 48JO4 was accessible from the top of the Kaycee terrace. Although Eckerle was unable to find any remnants of the Kaycee terrace in the immediate area of the three rock art sites, he did find evidence for it, upstream where Buffalo Creek enters the Middle Fork of the Powder River. Further, Eckerle was able to obtain a sample, which was subsequently dated as a Single Aliquot Regeneration, with an optically stimulated luminescence (OSL) age of 4065±360 BP. This age fits well with other recent OSL dates in the Powder River drainage (Huffman et al 2022).

Another discovery was observed at 48JO11, a site less than a kilometer downstream from the stenciled hands sites where a Middle Archaic occupation was found buried about 1.5 m below the top of the Kaycee terrace. The site was dated to ca. 3200 radiocarbon years before present (RCYBP) (Francis et al. 1986:205), indicating the presence of a floodplain with aggrading overbank alluvium at that time. An overlying Late Archaic occupation was documented at about 20 cm below the top of the Kaycee terrace and

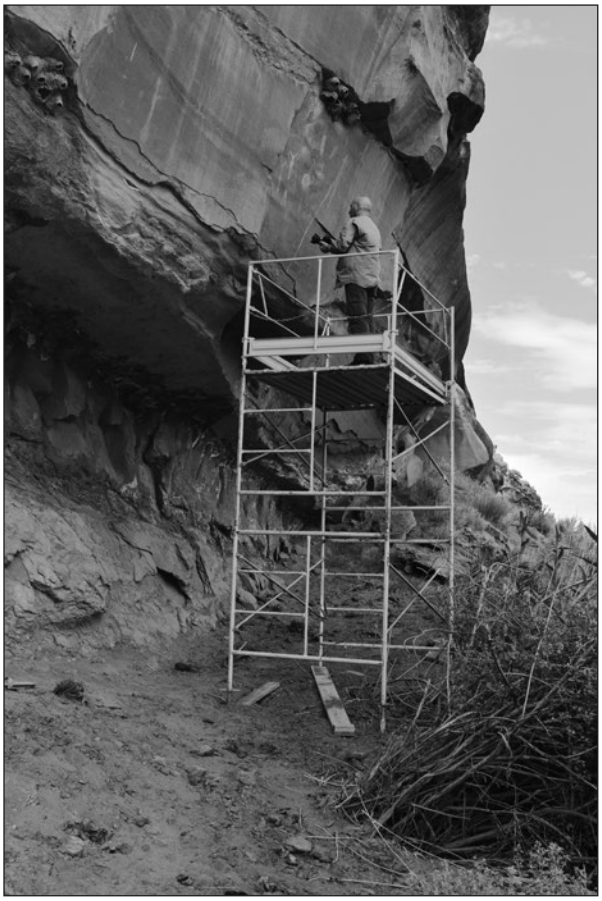

Figure 4 (top). Stenciled hands in the alcove at 48JO3, located on the Middle Fork of the Powder River, near Barnum, Wyoming. The stenciled object associated with the scale may be an atlatl. Stenciling objects is exceptionally rare in North American rock art.

Figure 5 (left). Mark Willis on scaffolding photographing the stenciled hands and other figures at a panel on 48JO4. The panel is more than 5 m above the current ground surface. A study of the site's geomorphology indicates the Kaycee terrace once filled the area below the panel. Dates from upstream and downstream suggest the terrace was in place circa 4000 to 1400 RCYBP. The means that if the paintings were made by someone standing at the base of the panel, they did so in the Archaic Period.

radiocarbon dated to ca.1550 RCYBP (Francis et al. 1986:209), reflecting continued aggradation of the floodplain.

These two dates, upstream and downstream, from the high panel on 48JO4 strongly suggest the Kaycee terrace was developed to the extent that it allowed access for someone to have left their handprints sometime after about 4000 years ago. Other Powder River studies suggest it washed away circa 1200 to 1500 years before present.[2]

These age estimates are important because they indicate, from a comparative standpoint, the Site 144 figures were painted sometime in the Archaic Period, before the use of the bow and arrow. The age supports the identification of the line with the loops as an atlatl or an atlatl dart.

CONCLUSIONS

Site 144 is a newly reported rock art site in the Pryor Mountains of Montana. The site is located in a small rockshelter set high in the canyon wall with a single panel consisting of two linear body anthropomorphs, a thin line and a stenciled hand. The thin line has an oval outline form that encloses a line that transects a small circle. The stenciled hand was apparently superimposed on the outline design. The figures were executed in red paint.

Stenciled hands, linear body anthropomorphs, and a straight line that transects a circle are found at three closely related sites, 48JO3, 48JO4 and 48JO6, on the Middle Fork of the Powder River on the east side of the Bighorn Mountains near Barnum, Wyoming. Stenciled hands are found at all three sites while the linear body anthropomorphs are found only at 48JO3 and 48JO4 (Figure 6). Examples of the straight-line figures intersecting circles are found at 48JO6. This group of elements are so comparable to the figures at Site 144, it seems likely they represent the same rock art type. While there is variation, the figures are more alike than different. The figures appear to constitute a new figure type in regional rock art.

The Middle Fork sites are more than 200 kilometers away from Site 144 and it is uncommon to find two sites with similar imagery so far apart. There could be other unreported sites in the area between the two and there could be a petroglyph variety of the figures that is unrecognized. It should also be noted that there was a trail system that connected the two areas. From the south end of the Pryor Mountains there is an Indian trail marked with cairns that travels down from Lovell, past Shell, and to Tensleep, Wyoming. From Tensleep it proceeded south to Big Trails and then over the Bighorns to the

Figure 6. Anthropomorphs from Site 144 (left two); 48JO3 (center) and 48JO4 (right two).

Middle Fork of the Powder River valley.

Dated Kaycee terrace remnants upstream and downstream from the Middle Fork sites indicate the figures were likely made in Archaic times. Because they are old, the paint clearly had ideal conditions to survive. This may also account for the few examples.

In conclusion, the main contribution of Site 144 is that it introduces a new anthropomorph type for regional rock art studies. It is quite likely more of these linear body figures will be found through future research.

END NOTES

[1] There are other ways to make a stenciled handprint. One is to use a hollow tube to suck up the paint and then spew it against the hand. Another is to use a brush to flick paint onto the hand.

[2] Deadman Cave (48AB342), north of Laramie, is the only other reported site with stenciled hands in Wyoming. Four handprints in red outline paint are found at the site with no other associated figures. It is worth noting that a test excavation in the cave deposits revealed a Late Archaic layer with a radiocarbon date of 2590±100 RCYBP. While this date does not offer an age for the pictographs, it does let us know someone was at the site during the same time we believe the stenciled hands were made on the Middle Fork of the Powder River.

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SPIRIT POWER TO FIREPOWER

Evolution and Chronology of Petroglyphs at DgOw-32, Verdigris Coulee, Alberta

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INTRODUCTION

ESTABLISHING A CHRONOLOGY OF IMAGERY is one of the primary challenges for rock art researchers everywhere, especially since petroglyphs and pictographs can only rarely be directly dated by radiometric analysis and are even less commonly found in stratigraphic context where they can be dated by their association with other materials (Francisco Ruiz and Rowe 2014). Nowhere is this need for tight chronology greater than the northern Plains of North America where hundreds of sites contain thousands of Biographic rock art tradition images documenting the history of the best-known Plains Indian tribes as they responded to nearly four centuries of encroachment by Euro-American civilization ending only with the extinction of the bison and the confinement of tribes to reservations in the last decades of the 1800s.

Elsewhere, we and others (Fowles and Montgomery 2019:105; Keyser and Kaiser 2023; Lycett and Keyser 2017, 2018, 2019a, 2021) argue that these Biographic tradition images should and can, in fact, be treated as genuine *historical* documents, authored by tribesmen themselves, which record firsthand accounts of northern Plains history from at least the late 1500s (CE) through the reservation period. Crucially, it was during this span that northern Plains groups evolved from pedestrian bison hunting cultures with an autochthonous, group-oriented, "shock-troop" warfare to one of equestrian nomads engaging in highly mobile and individualized warfare conducted with introduced weapons (metal implements and guns) and primarily oriented toward the capture of horses and the acquisition of individual status for important men. In addition, concurrent with this change in warfare was the initiation of a continent-wide market economy focused on the robe trade and centered around major trading posts scattered along most of the major rivers in the region. Therefore, being able to better date these "historic documents"—especially those carved and painted prior to the earliest surviving painted robes and war shirts—will help us better understand the evolution and development of northern Plains cultural systems from Late pre-contact times into and through the Historic period (Lycett and Keyser 2019a, 2019b, 2021).

One corpus of northern Plains Biographic rock art that begs for a more definitive chronology is that authored by Blackfoot artists at more than 100 sites scattered from Crossfield Coulee just north of Calgary, Alberta south to Writing-on-Stone and then through Montana into northern Wyoming. Several factors enhance the value of Blackfoot rock art for such chronological study. First, the Blackfoot were one of the earliest northern Plains tribes to experience

European contact and thus receive trade goods because the Saskatchewan River system in their northern homeland was one of the initial points of European entry into the northern Plains. The result was very early fur trading posts and some of the earliest distribution of metal weapons and guns into the region. Second, the Blackfoot have the longest and richest robe art record of any Plains tribe, including more than two dozen pieces, the earliest of which were collected in the 1820s (Lycett and Keyser 2021) while the latest were painted in the first decades of the 1900s. These robes have enabled the construction of a reasonably detailed seriation spanning nearly a century (Bouma and Keyser 2004; Lycett 2017; Lycett and Keyser 2021) that can serve as a matrix within which to place some rock art images. And finally, Blackfoot Biographic art is the most intensively studied rock art of its kind known from the entire Plains (Bouchet-Bert 1999; Dewdney 1964; Kaiser and Keyser 2015; Keyser 1977b, 1979, 1991. 2007, 2011, 2017a, 2017b, 2018; Keyser and Kaiser 2023; Keyser and Klassen 2001, 2003; Keyser and Lycett 2019; Keyser and Poetschat 2012, 2014:54-64; Keyser and Renfro 2017; Keyser et al. 2012:233-237, 2014; Klassen 1995, 1998; Lycett and Keyser 2017; McCallister et al. 2021; Magne and Klassen 1991; Woodman 2016).

SITE DgOw-32

In 2019 the authors had the opportunity to record site DgOw-32, located at Verdigris Coulee on the Milk River in Alberta, about 12 Km upstream from Writing-on-Stone Provincial Park. In Canada, archaeological sites are numbered using the Borden system, designed by archaeologist Charles Borden in 1954. The system is based on major and minor blocks of latitude and longitude designated by capital and lower-case letters with a sequential site number assigned within that particular block. Thus, DgOw-32 represents the thirty-second site sequentially recorded in a block of land measuring sixteen km (ca. 10 miles) on a side.

Site DgOw-32 was first partially recorded by Selwyn Dewdney in 1962, but has been mostly out of reach since that time due to river erosion of the floodplain beneath it (Keyser et al. 2023). With the assistance of Mark Willis we photographed the entire site using an unmanned aerial vehicle (a DJI Mavic 2 Pro Zoom, quadcopter drone, outfitted with a 12-megapixel camera with mechanical zoom capabilities) and were able to identify more than 200 elements and motifs that were not previously documented. A second, and equally important discovery was that the site had suffered no modern vandalism, thanks in large part to its remote location where it was out of reach for the last 60 years. As such, the site imagery was essentially pristine, and we were able to view it in nearly the same condition as did its makers. This absence of modern graffiti "masking" the indigenous art provided an optimal opportunity to utilize all the standard means of dating this art to construct a detailed chronology of imagery carved at the site, and then to address the broader chronology of Blackfoot rock art throughout the region.

Site DgOw-32 stretches along the cliffs on the north side of the Milk River (Figures 1, 2) where it is part of a cluster of five large sites originally recorded in 1962 and 1976 (Dewdney 1962a, 1962b; Keyser 1977a). Because the Milk River floodplain below the site was being eroded away even in 1962, only parts of it were recorded in the two earlier projects. Based on our drone survey we now know that DgOw-32 consists of petroglyphs clustering in three major loci labeled 1-3 from west to east (Figure 3). Each of these are separated from the other by areas where no rock art was observed by early recorders nor were any images discovered during our project. Locus 1 is the most extensive, consisting of four separate "panel" areas, while loci 2 and 3

Figure 1. Looking upstream (west) on the Milk River in the Verdigris Coulee area. Site DgOw-32 is on riverside bluff indicated by arrow. Other sites located in abandoned meanders located downstream. David Minick photograph.

are more discretely bounded and cover smaller areas. For those interested in a fuller description of the site and its imagery, a monograph report was recently published by the Oregon Archaeological Society (Keyser et al. 2023).

ETHNIC IDENTITY OF THE ARTISTS

Our first task was to determine the ethnic identity of the artists responsible for the imagery at DgOw-32. Initially, our visual examination strongly suggested that the DgOw-32 petroglyphs appeared to be primarily—if not exclusively—of Blackfoot authorship. Despite Keyser's (1975, 1977b, 1979) original suggestion that shield-bearing warriors and V-neck humans were of Shoshonean origin, and that the small rectangular body and hourglass body humans indicated a replacement of Shoshones by Blackfoot artists, exhaustive research since that time shows this to be in error (Brownstone 2001; Keyser and Klassen 2001; Keyser and Poetschat 2014; Klassen 1995, 1998, 2006; Magne and Klassen 1991). Instead, it is now known that Blackfoot artists' style evolved from typically portraying humans with tall, V-neck bodies to the later rectangular body and triangular body forms, and there are many intermediate types that combine the V-neck with almost every other body type. At this site, for example, there are humans that combine a V-neck with the rectangular body form and others that use a large X for the top of the torso. Other nearby Verdigris Coulee sites also have these variants and even a triangular body human with a V-neck at nearby DgOw-31 (Figure 4).

V-neck humans are widespread in Plains rock art, found from southern Alberta through Montana, South Dakota, and Wyoming and all the way south to Kansas, so finding them at DgOw-32 is not necessarily indicative of Blackfoot authorship. However, the fact that five of the earliest ten pieces of perishable Blackfoot Biographic art use predominantly V-neck humans to tell their narrative stories (Lycett and Keyser 2018) makes it likely that many of the V-neck humans at DgOw-32 (and other Writing-on-Stone sites) were drawn by Blackfoot artists. This conclusion was first advanced by Magne and Klassen (1991).

Like V-neck humans, shield-bearing warriors at DgOw-32 are part of a widespread type of human figure with essentially the same

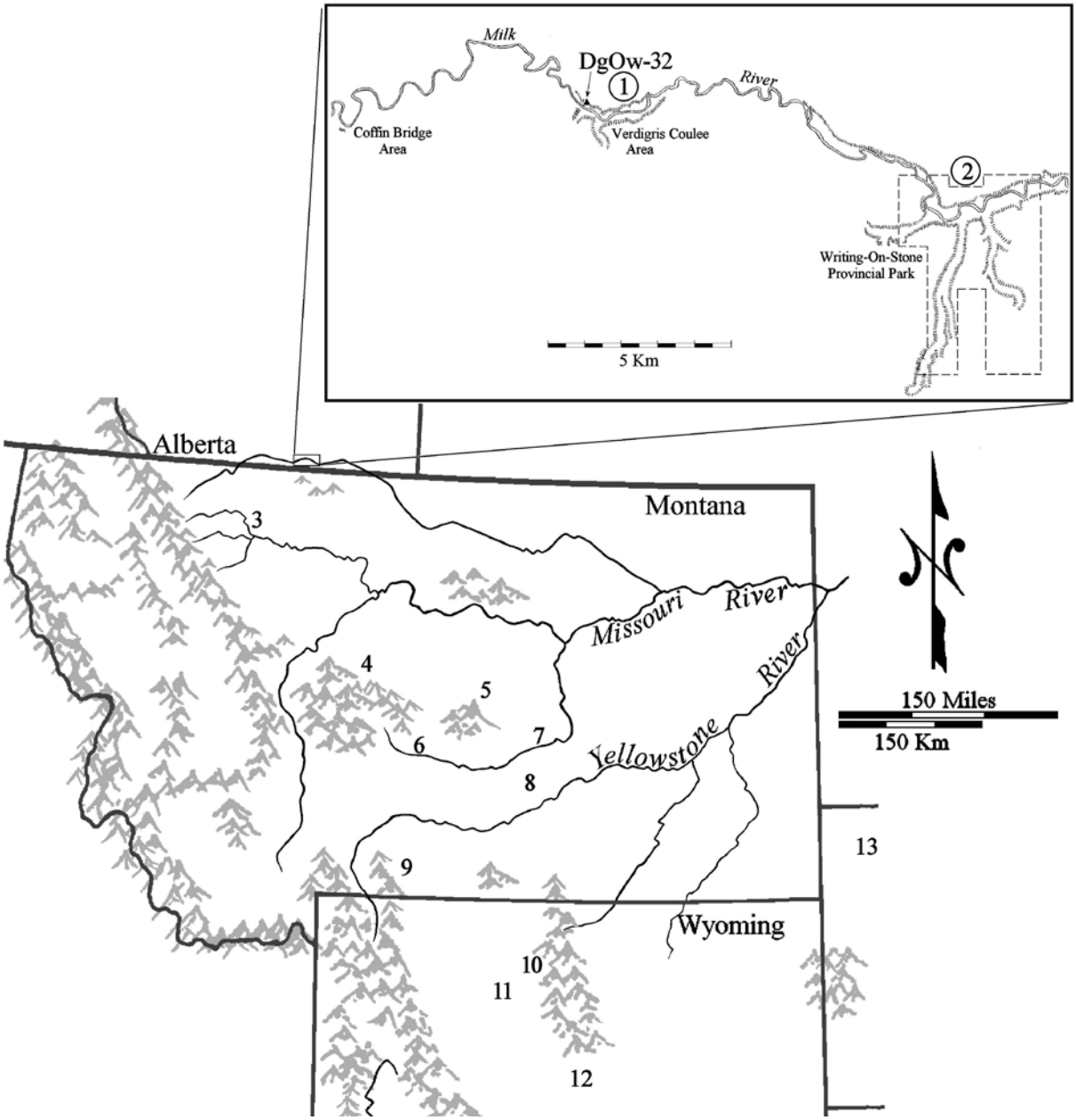

Figure 2. Location of DgOw-32 on Milk River in southern Alberta. Other numbered sites mentioned in text and captions are: 1, DgOw-29, DgOw-31, DgOw-41; 2, DgOv-2, DgOv-45, DgOv-57, DgOv-60, DgOv-69, DgOv-79, DgOv-84; 3, Cheval Bonnet (24GL1663), 24GL67, 24GL1661; 4, 24JT87; 5, Bear Gulch (24FR2); 6, 24GV191; 7, Goffena (24ML408), Musselshell (24ML1049), Horned Headgear (24ML508), Kyte; 8, Castle Butte (24YL418), 24YL1358, Turner Rockshelter; 9, Joliet (24CB402); 10, Mahogany Butte (48WA1218), 48BH4275; 11, No Water (48WA2066); 12, Arminto (48NA991); 13, 39HN177.

Figure 3. Drone photograph looking downstream showing DgOw-32 with numbered loci containing petroglyphs. Dashed line shows former ground surface used by artists to access cliff. Mark Willis photograph.

distribution. However, a detailed compilation of northern Plains shield-bearing warriors includes seven of the nine shield bearers at the site (all those identified at that time)[1] in the Verdigris and Blackfoot shield-bearing warrior styles (Keyser and Poetschat 2014:54-64, 71-78, 120), which span the period from about A.D. 1500 through 1830. The identification of these shield bearers as Blackfoot is consistent with the findings of Magne and Klassen (1991).

In contrast to both V-neck and shield-bearing humans, the several forms of triangular body humans appear to be almost exclusively of Blackfoot and Sarsi authorship in Plains Biographic art. This style of drawing humans appears to be related to a broader Algonkian art style stretching across North America from the Canadian Shield north of the Great Lakes to the northern Plains. Thus, a few Biographic images attributed to linguistically related Cree and Gros Ventres artists also use these small rectangular body humans and an occasional triangular body form. However, more than 90 percent of the triangular body humans known in Plains Biographic rock art occur in the northern Montana/southern Alberta homeland of the three Blackfoot tribes. In Blackfoot robe art the triangular body humans were used at least as early as the 1830s and were a regular component of Biographic drawings into the early

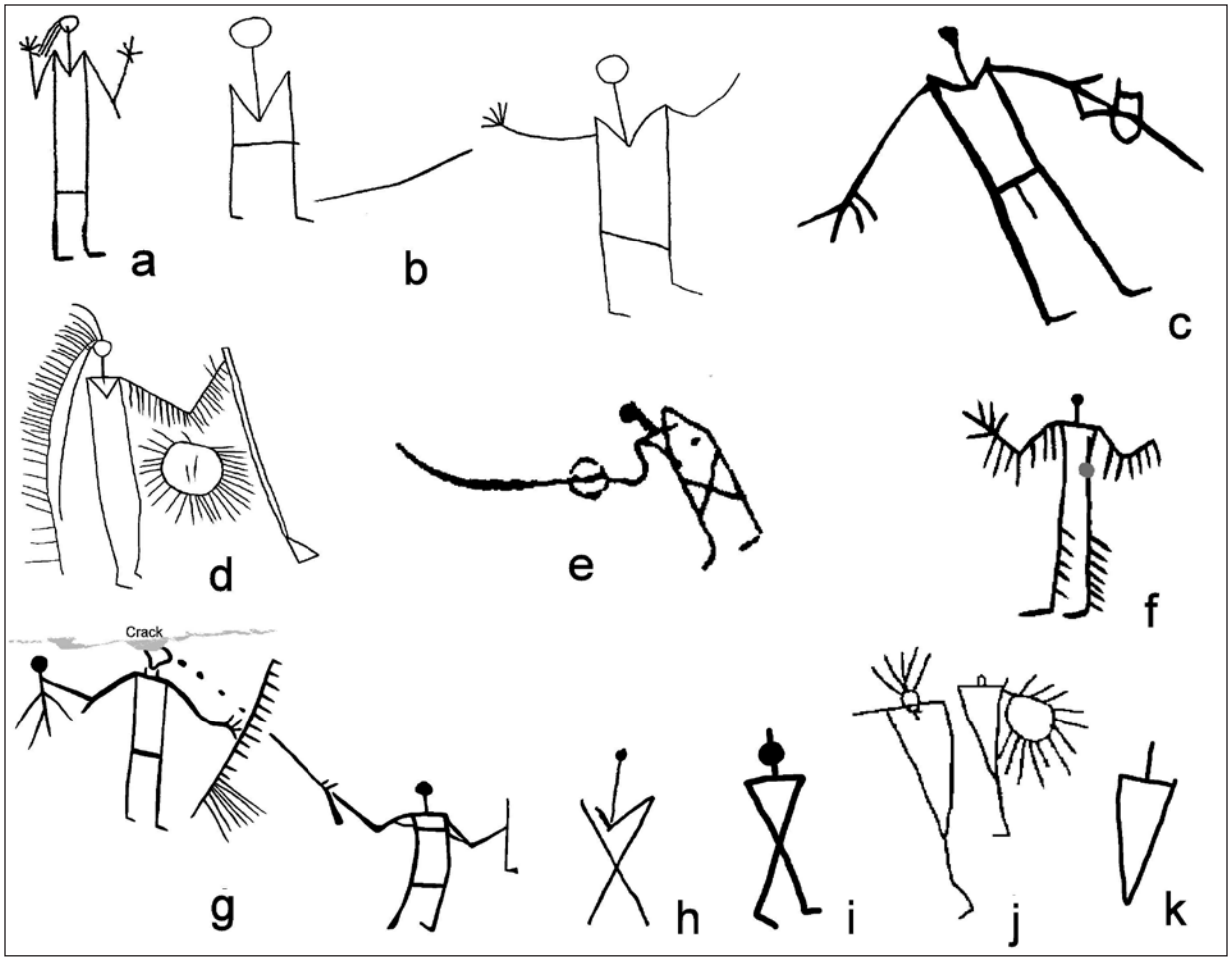

Figure 4. Styles of Blackfoot humans. a, 24FR2 (Bear Gulch); b, d, DgOw-32; c, DgOv-60; e, DgOv-57; f, DgOv-2; g, DgOw-29; h, DgOw-31; i, DgOv-45; j, k, Turner Rockshelter.

1900s (Bouma and Keyser 2004; Lycett and Keyser 2018:788). Thus, the presence of multiple triangular body humans at both Locus 1 and Locus 3 strongly implies that these petroglyphs were made by Blackfoot artists.

Finally, nearly all of the horses carved at this site conform to the Blackfoot style as identified by Keyser and Renfro (2017). In their study, Keyser and Renfro (2017) used detailed measurements of sample populations of Crow and Blackfoot horses (Figure 5) to show significantly different distributions of neck form and head orientation between these populations in both rock art and robe art. Overall, horses drawn by Blackfoot artists are generally simpler with long straight necks and forward-pointing heads. Correspondingly, Blackfoot horse tack in rock art tends to be minimal and simply drawn, with the exception of a characteristic bridle bit decoration known as "a thing to tie on the halter" (Keyser 1991; Lycett and Keyser 2021:11-13).

To further verify the Blackfoot authorship of the DgOw-32 horses, we undertook a quantitative comparative analysis examining their form. We used the morphometric system designed by Keyser and Renfro (2017), which emphasizes differences in the form of how the animal's neck is drawn in relation to the rest of

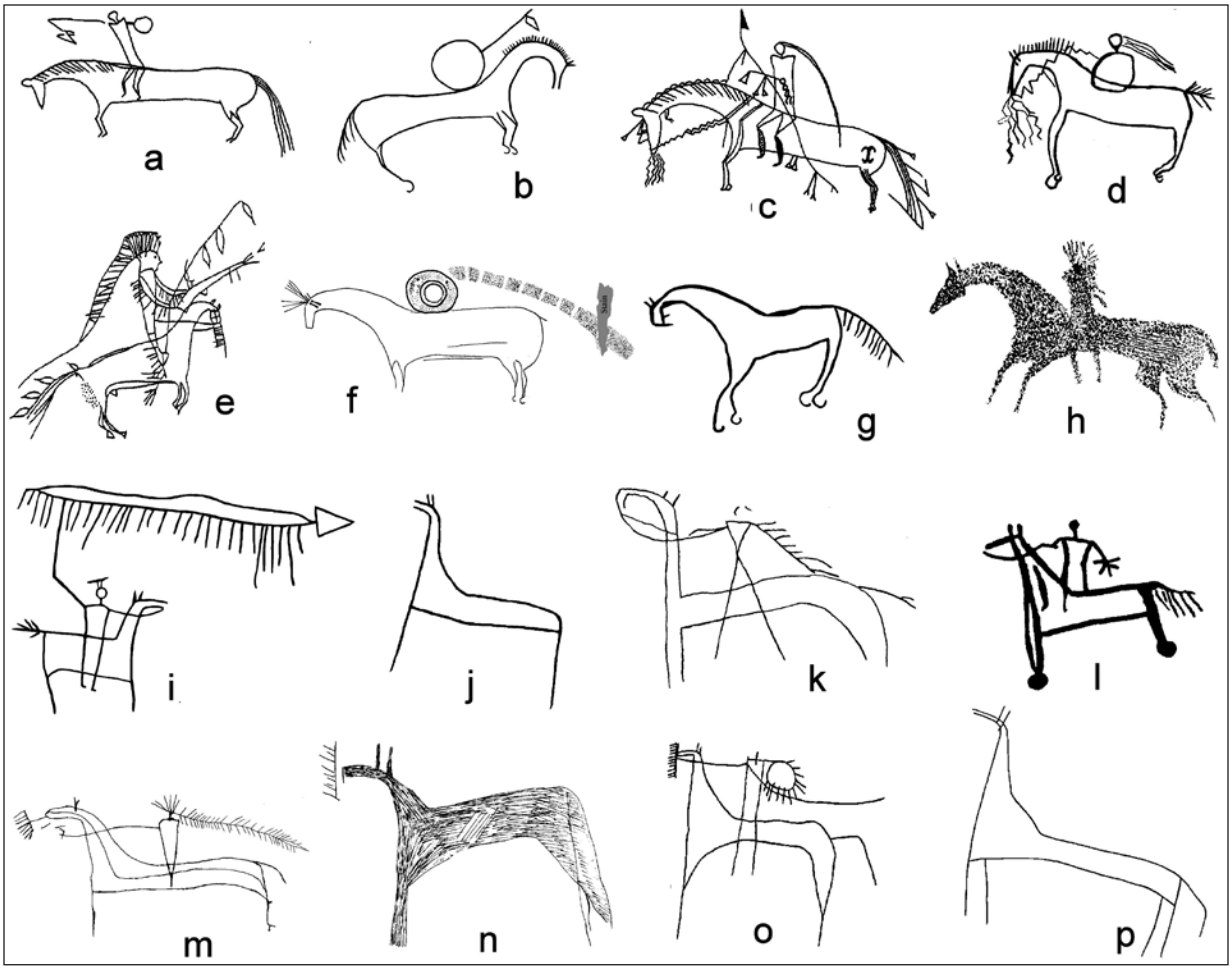

Figure 5. Crow horses (a-h) and Blackfoot horses (i-p). a, Castle Butte (24YL418); b, Kyte; c, e, Joliet (24CB402); d, No Water (48WA2066); f, Musselshell (24ML1049); g, 48BH4275; h, Mahogany Butte (48WA1218); i, j, DgOv-2; k, DgOv-69; l, DgOw-41; m, DgOv-79; n, DgOv-84; o, Turner Rockshelter; p, 24GL1661.

the body ("chord/sagitta ratio") in addition to the angle of the head ("head angle"). We measured 44 horses carved at DgOw-32 using this system, which accounted for all the mature-style horses from across the various recorded panels/loci. We were then able to directly compare these data to a sample of 48 mature-style Blackfoot horses from 22 sites in the greater Writing-on-Stone area, as well as an additional 52 Crow horses from 21 sites located in south-central Montana and northern Wyoming. Figure 6 shows how the horses from each of these groups compare against each other. Blackfoot horses (dark grey stars) tend to plot in the lower left part of the diagram, while Crow horses (outlined light grey triangles) plot in the upper center and right portion. The maximum extent of spread along the two axes is marked on the plot by the polygons, which indicate a small amount of overlap between them. Notably, the horses from DgOw-32 (solid black circles) also plot in the lower left of the diagram, demonstrating their greater similarity to the Blackfoot sample. It is particularly important to note that only three horses from DgOw-32 (less than 7 percent of the total) fall

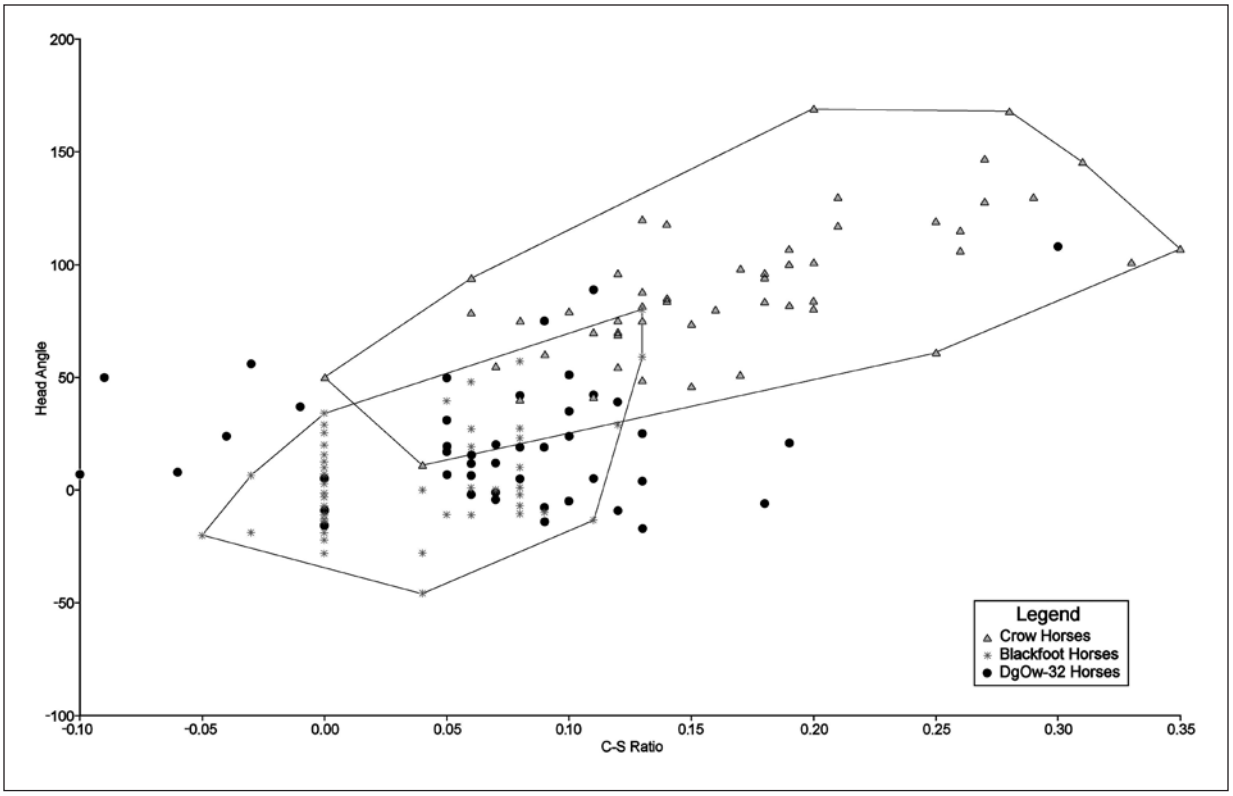

Figure 6. Scatter plot showing the comparison of Crow, Blackfoot, and DgOw-32 horses based on their neck and head morphology. Polygons indicate maximum extent of spread along the two axes for Blackfoot versus Crow horse forms, as well as the small amount of overlap between them. Like the Blackfoot examples, horses from DgOw-32 (solid black circles) tend to plot in the lower left of the diagram and, notably, only three DgOw-32 horses fall within the portion of the plot occupied exclusively by Crow horses, strongly pointing toward a Blackfoot authorship.

within the portion of the plot occupied exclusively by Crow horses. Using these same data, we were also able to undertake a discriminant analysis, which is a statistical procedure for classifying items based on selected variables (Hammer 2016). This statistical analysis first uses the input data to calculate how to maximize the separation between known groups (in this case the Crow and Blackfoot horses) based on measures of variation (eigenvalues) computed among individual items. Thereafter, the analysis then uses this information to determine to which of the two groups any unknown cases (in this instance the DgOw-32 horses) are most likely to belong. Using this procedure, 90 percent of the DgOw-32 horses were classified as Blackfoot. Overall, these results strongly support a Blackfoot authorship.

Finally, during the entire period when nearly all of the DgOw-32 imagery was drawn (ca. A.D. 1500-1880), Writing-on-Stone was in the heart of Blackfoot territory. Although there are images from this period at Writing-on-Stone that were likely drawn by groups other than the Blackfoot (Keyser and Renfro 2017:20-22; McCallister et al. 2021:32-33), the great majority of pictographs and petroglyphs at these sites are felt to be of Blackfoot authorship based on oral tradition and the presence of motifs linked to the Blackfoot.

In summary, it seems almost certain that most of the DgOw-32 imagery was carved by

Blackfoot artists. They are the group that occupied this area during the Late Prehistoric to Historic period transition and both the horse and human images are essentially identical to those we know were used by the Blackfoot in their Biographic art.

CHRONOLOGY

Once we identified the great majority of imagery at DgOw-32 as Blackfoot in origin, we then used four principal lines of evidence to construct a chronology of the DgOw-32 petroglyphs. The method we use to construct this chronology is the concept of "cables" versus "chains" of evidence. This approach was first clearly articulated and widely circulated for rock art study by Chippindale and Taçon (1998) although it had been used in some guises for several decades previously (e.g., Sundstrom 1990) and has been widely used ever since (e.g., Keyser and Klassen 2001; Keyser et al. 2012). Succinctly summarized, a ***chain of evidence*** is built by connecting individual bits of evidence, one to the other, like links in a chain, to arrive at a chronological sequence of images or styles. The flaw in this method, however, is that any conclusion drawn in this way is only as strong as the chain's weakest link. Thus, if one link fails, so does the entire chain and any conclusion based on it is potentially flawed. In contrast, a conclusion based on a ***cable of evidence*** relies not on separate links, each tied only to the two adjacent ones, but instead on various strands intertwined to create the metaphoric cable. Consequently, if one such strand is later found to be weak or wrong, the entire cable does not fail, and the chronology may still be valid.

We use four major strands of evidence to construct our DgOw-32 rock art chronology: (1) the portrayal of datable objects including horses, metal projectile points, horse armor and human body armor, guns, and different sized shields; (2) superimposition sequences between particular images, which enable us to arrange basic styles in order; (3) stylistic relationships between some images at this site and similar ones at other northwestern Plains sites, and (4) seriation derived from Principal Coordinate (PCo) analysis. In keeping with the making of a cable, however, each of these strands is interrelated with at least one other. For instance, horses are datable in themselves as they have a relatively well-supported date of introduction into the Plains Indian cultures of this area, but horses also can be stylistically segregated into the boat-form and mature styles, which occur in a superimposition at the site, and which can also be stylistically compared to a chronology of animal forms developed in a broader northwestern Plains context (Keyser and Klassen 2001:200-203). Likewise, V-neck humans are involved in several superimposition sequences at the site but are also associated with several different items which have known dates of introduction into Plains cultures, and they form a key element in our seriation study of Blackfoot robe art (Bouma and Keyser 2004; Lycett 2017). We discuss each "strand" in detail below.

DEPICTION OF DATABLE OBJECTS

Plains rock art is blessed with depictions of many items that have known dates for their introduction and use in regional cultures. Among these are everything from metal projectile points and horses to buildings, boats, and even automobiles. At DgOw-32 there are many horses and several items of material culture (including metal weapon tips, guns, large-sized and small-sized shields, horse armor, and human body armor) whose known dates for their introduction into the northern Plains and/or the approximate dates when they were invented and used and/or abandoned (Figure 7) make them chronologically relevant. Thus, if a

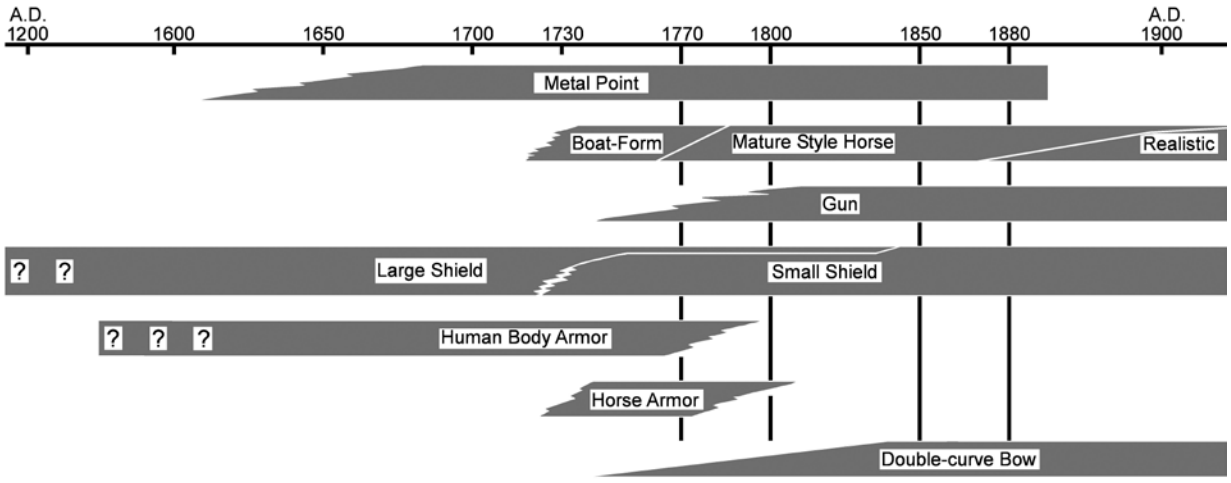

Figure 7. This bar chart shows the approximate time spans for various items of material culture and the various northern Plains styles of drawing horses.

particular item—such as a horse with a known date for introduction into the region—is present in a drawing, it provides a *terminus post quem* for the image—that is, the earliest date at which it could have been drawn. And concomitantly, if we find a drawing of human body armor—which we know was abandoned when Indians acquired dependable numbers of firearms and ammunition—it provides a *terminus ante quem* for the image—that is, the latest date at which it is likely to have been drawn. While neither the *terminus post quem* nor *terminus ante quem* can indicate specifically how long after the first introduction of an item or how many years before its effective abandonment any particular petroglyph horse or armor poncho was depicted, sometimes other associated images or a combination of them can help narrow down the date. We discuss the known dates for these material culture items at DgOw-32 below and then provide some examples of how we can use these to date particular images.

The most common of these Euro-American "introductions" is the horse, with hundreds of examples carved and painted at sites across the northwestern Plains (Figure 5). Historic records indicate that horses were introduced into the northern Plains from the south, after the Pueblo revolt in the late 1600s (Haines 1938:431) and reached as far north as the Blackfoot, Flathead, and Crow by about A.D. 1700 (Ewers 1955:17; Haines 1938; Medicine Crow 2000:23; Secoy 1992:105). By just after the mid-1700s all Plains groups had at least some horses, and only a few decades later many tribes were horse-rich and horse raiding between enemy groups became the primary focus of warfare.

Metal projectile points have an even longer history than horses on the northwestern Plains. These weapons first came into the area sometime shortly after A.D. 1600 and were used until the reservation period (Keyser and Kaiser 2010). The first such items were apparently large, DAG style knives often employed as spearpoints. Rock art shows these illustrated in considerable numbers (Figures 8, 9a, c), many before northern Plains tribes obtained the horse, but they remained common well into in the mid-1800s (Keyser and Kaiser 2010). Approximately contemporaneously, iron arrowheads were

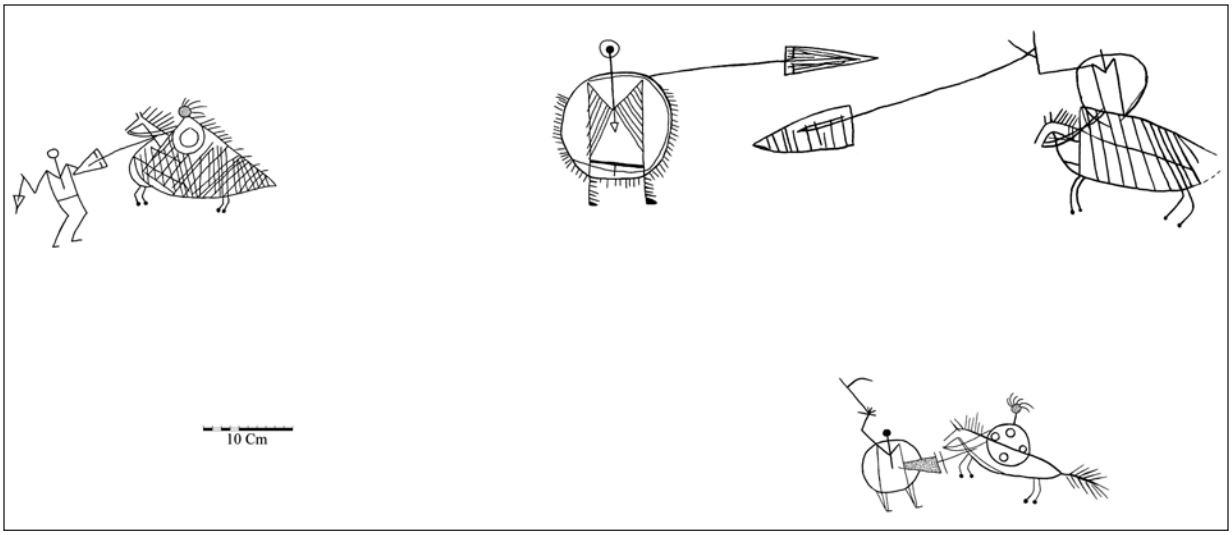

Figure 8. The armored horse battle scene at Locus 1, Panel 1 of DgOw-32. Note the metal spear points and a probable metal knife (held by the pedestrian at far left), the relative size differences of the shields for the pedestrians and horsemen, and the body armor worn by the two upper horses.

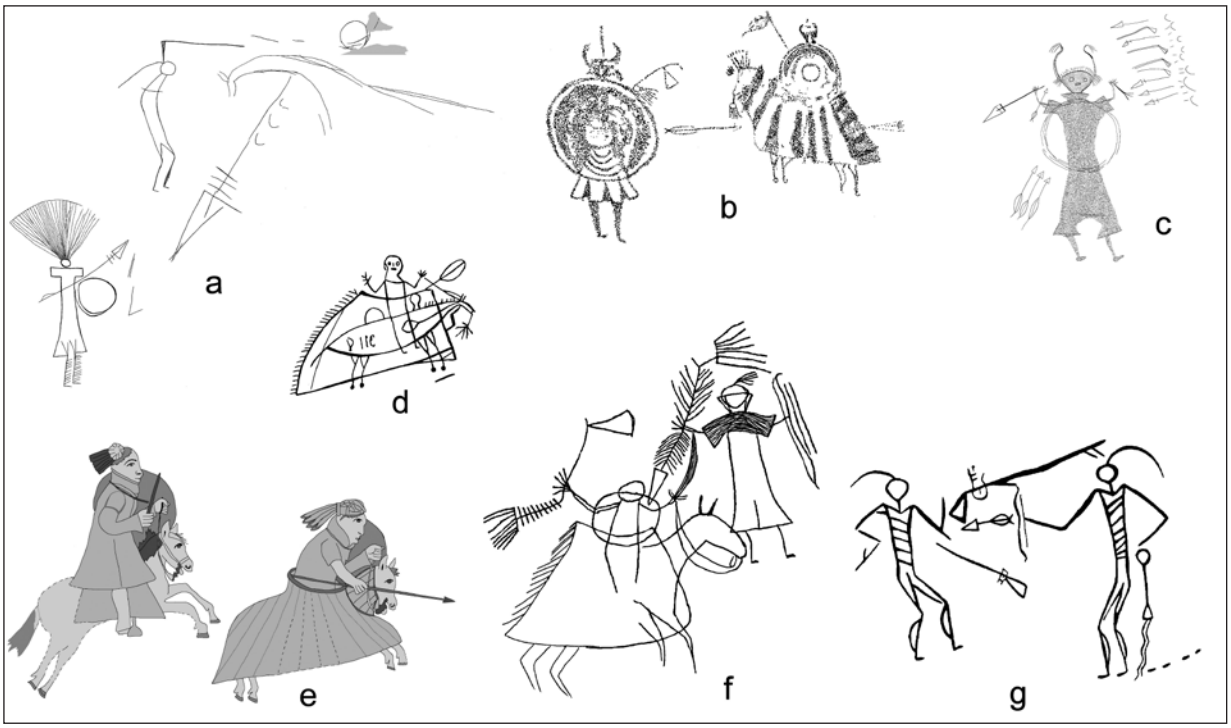

Figure 9. Plains Biographic art is replete with items of material culture, many of which provide good dating opportunities. Note metal projectile points a, c; shields a-c, f; horse armor b, d-f; human body armor c, e, f; double-curve bows f, g; guns c, g; Spanish brand d. a, Cheval Bonnet (24GL1663); b, Goffena (24ML408); c, Horned Headgear (24ML508); d, Arminto (48NA991); e, Segesser Hide Painting, ca. 1700; f, 24YL1358; g, 24YL418.

Table 1. Frequency of Weapons Portrayed in Blackfoot Robe Art from 1830 to 1910.					
	Guns	Bows	Spears	Other	%Guns#
Ellis ca. 1830	4	8	1	4	24
Bodmer 1 1832	2	8	1	2	15
Bodmer 2 1833	15	5	1	2	65
Foureau ca. 1830	24	16	4	9	45
Malcolm ca. 1830	52	17	4	9	63
Five Crows* ca. 1842	76	10	11	1	78
Sweden 1843	8	11	5		33
Kane 1848	17	1		2	85
Hime 1858	20	18	8	5	39
Peabody ca. 1870	12	4		3	63
Curzon ca. 1870	19	4	1	2	73
Sharp 1892	46			2	96
Calf Child 1909	66			1	99
Running Rabbit 1909	110	4	1	2	94
Four Chiefs 1909	92	7	1	1	91
Wolf Carrier 1909	74	1		4	94

Percentage of guns in total arsenal of weapons

* Thirteen ledger drawings by two Flathead chiefs

introduced and they, too, were used throughout the Historic period. Such metal points used as spear tips are shown in Biographic art as outsized triangular points with either crosspiece(s) on the tang or a quillon (a spur of metal at a right angle to the long axis of the blade) at one corner of the point. Metal arrowpoints typically show a crosspiece on the tang.

Guns also have a reasonably well-documented history on the northern Plains. The first guns apparently came into the northern Plains only a few years after the Blackfoot saw the first horses in possession of their enemies (Secoy 1992:34-37; Tyrell 1916:328-335), but they remained uncommon so that even by the first decade of the 1800s Lewis and Clark reported that guns remained a relatively scarce and highly prized item among the groups farthest west on the Plains. By the first decades of the 1800s, however, Blackfoot robes and rock art show an increasing number of guns (Figure 4c, g) until they became the weapon of choice in most fight scenes after about 1830 (Table 1).

Three material culture items illustrated at DgOw-32 with known dates of use and abandonment are objects invented or modified in response to the introduction of the horse and gun by the artists themselves. The change to the notably smaller sized shields used by horsemen when compared to the full-body sized shields carried by pre-horse pedestrian warriors was obviously intended to facilitate a mounted man's ability to use and maneuver such a defensive weapon. Keyser was able to show this change and segregate images into pre-horse, occasional-horse, and post-horse periods

(Keyser 2010:88-98). Thus, large full-body size shields (e.g., Figure 10A/4, A/5) apparently date prior to about A.D.1730;[2] but beginning with the earliest horsemen (e.g., Figure 10A/3. B/7), shield size was almost immediately reduced by a significant amount until by the late 1700s shields of Plains nomadic tribes were universally smaller sized (e.g., Figures 4d, j, 5a, o).

The effective use of both human body armor and horse armor ended with the widespread adoption of guns in northern Plains cultures. Human body armor—made of leather and tailored into the form of a long coat, a shorter jacket, or an A-line poncho—almost certainly predates the introduction of the horse. Such armor was widespread across North America at the time of contact between Euro-Americans and natives (Figure 9b, c, e, f) and examples were reported ethnohistorically on the Canadian Plains and in the Rocky Mountains (Burpee 1909:110-111; Moulton 1988:150; Secoy 1992: 46-48).

Although we have no reason to believe personal body armor was not present in Late Prehistoric period combat, there is no documented example, since most rock art fighting men in scenes of this period are instead protected by large shields. However, one warrior carrying a full-body sized shield at the Goffena site in the Musselshell River Valley (Figure 9b) wears an armor garment that hangs beneath his shield (Keyser 2016:37), but he is fighting an enemy mounted on an armor-wearing horse. This suggests that human body armor was sometimes paired with a large shield.

Regardless of whether such armor garments were used in pre-horse days, they were apparently abandoned by about A.D. 1800 because none is pictured on bison robes or in ledger drawings after that date.[3] This is consistent with the rock art evidence, which shows a dozen warriors wearing body armor garments, but only two of them are associated with guns (e.g., Figure 9c). In contrast, although most armored warriors are in scenes with horses, their weapons are more typically trade items including swords, Missouri war axes, Spanish lances, and metal-tipped spears.

Horse armor—also constructed of leather in the form of a large shroud encasing the horse's body (Figures 8, 9b, d-f)—is dated more securely. The only northwestern Plains reference to such armor is by Lewis and Clark, who saw it in use by Shoshones in the Rocky Mountains of southwestern Montana in 1805 (Moulton 1988:150), but the Segesser I hide painting (Figure 9e) shows that it was in use about A.D. 1700 in a battle somewhere in the American Southwest (Hotz 1991). The earliest northern Plains rock art examples so far identified are worn by boat-form horses and show a shape and construction almost identical to those illustrated on the Segesser I hide painting (Figure 9d, f). The earliest rock art horses wearing this armor also have dots for hooves and a boat-form example at the Arminto site (Figure 9d) in central Wyoming has a heartline, confirming its early stylistic association. This Arminto horse also has a brand indicating the animal's Spanish origin (Greer et al. 2019:76-77).

As with human body armor, weaponry associated with horse armor at other Plains sites tells a compelling tale. Riders primarily use lances (some with metal points), but one wields a sword and a Missouri war axe, and another uses a spike mace. Their opponents fight with knives, bows and arrows, a Missouri war axe, and lances (some metal-tipped) but only a single opponent (also apparently riding an armored horse) shoots a gun (Greer et al. 2019:57, 60-61). The obvious inference from these images and their associated weapons is that horse armor was rapidly abandoned after guns became regularly used in warfare. This is confirmed by the occurrence of only a single ethnohistoric reference to

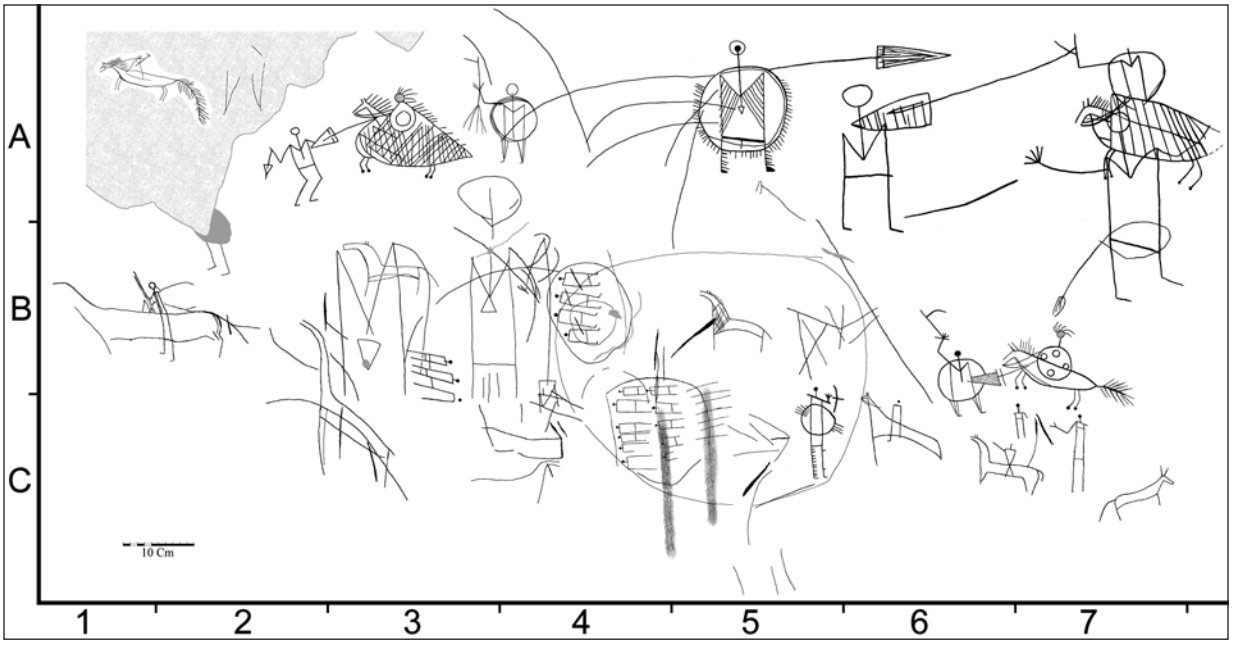

Figure 10. Locus 1, Panel 1 at DgOw-32, photo-traced from Michael Klassen photographs and Mark Willis drone photographs taken on this project. Alphanumeric grid used to locate particular images. Note extensive superimpositions.

such armor on the northwestern Plains and its complete absence in painted robes and ledger drawings. In sum, horse armor was used to protect some of the earliest horses drawn in rock art, but it was apparently abandoned shortly after A.D. 1800 (Figure 7).

Given this list of reasonably well-dated items that are portrayed in the petroglyphs at DgOw-32 we can use various combinations of them to provide relatively secure dates for specific compositions where they co-occur. For instance, two horses in the battle scene at Locus 1 (Figure 8) wear horse armor while none of the six participants in this scene uses a firearm. However, the horsemen, who carry significantly smaller shields, are fighting pedestrian enemies who carry full-body sized shields. Finally, both horsemen and pedestrians use metal spearpoints, which came into the area a few decades before the horse (Keyser and Kaiser 2010; Keyser et al. 2012:118-123).

In short, the information in this carving indicates it must record a time when both groups had some metal spearpoints, but only one group had horses and smaller shields and they armored at least some of their mounts with bulky leather "overcoats" because they did not yet face gunfire in their battles. Given these factors, we can confidently date this fight to the approximately two decades between A.D. 1710 and 1730 when horses first came into the Milk River region, so only some groups had them, and no one yet had guns.

We can make similar age assessments for four other scenes. The horseman dressed in a body armor poncho and riding a boat-form horse just to the left of the armored-horse battle scene (Figure 10A/1) must be approximately contemporary with the larger scene. Based on style, the image is almost certainly drawn by a different artist than the one who drew the fight scene, but both artists appear to

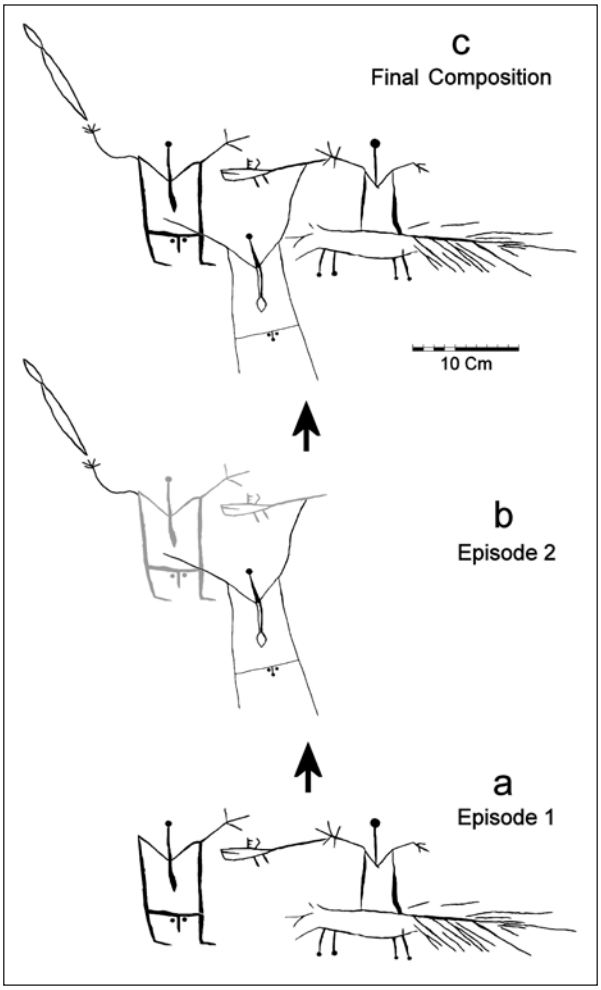

Figure 11. Selwyn Dewdney's gun capture scene, located on Locus 1, Panel 3. Episode 1 indicates earliest, more deeply incised images and shows mounted man taking gun from pedestrian warrior. Episode 2 is much more lightly incised and includes third warrior and arm and bow-spear added to earlier warrior (shown in grey). This scene shows the lower warrior taking a gun and counting coup on the upper warrior. Photo-tracing from Mark Willis drone photographs.

have drawn at about the same time. Boat-form horses are early in the evolution of the horse form in Plains rock art, and personal body armor predates the common occurrence of firearms. Consistent with that, the horseman's weapon is a spike mace, one of the close-quarter weapons preferred in the Late Prehistoric and Protohistoric periods. We suggest this image was carved not long after A.D. 1730.

Roughly coeval with the boat-form horses in the armored horse battle scene is the gun-capture scene also at Locus 1 (Figure 11). This scene shows two separate narratives that share some elements. It was originally drawn by one artist to record his capture of a gun (Figure 11a), and then repurposed by a second artist (Figure 11b) to record his own gun capture and also counting coup on an enemy. The scene has several chronological indicators. Initially all the humans are V-neck style and two show heart-lines and genitalia—attributes characteristic of early humans in the Biographic art sequence at Writing-on-Stone. In addition, one man rides a boat-form horse with dot hooves, which is the earliest horse style at these sites. The gun is clearly a flintlock long gun, carefully illustrated to show its cock and frizzen. Such flintlocks were introduced in very small numbers just a few years after Indians in southern Alberta saw their first horses. Finally, the lower human—who is drawn with much finer lines—is superimposed on the upper left human, indicating he was carved separately and after the initial scene.

In sum, both of these scenes were drawn after horses and guns had arrived on the southern Alberta Plains, but since the three warriors own only one of each between all of them, it is almost certain that the scene records a time before either was a common occurrence. Correspondingly, these artists were still drawing early-style V-neck humans and boat-form horses, indicating the scenes predate the introduction of mature-style horses and the small, rectangular body and triangular body anthropomorphs that characterize Blackfoot art by about A.D. 1800. The second scene was clearly added after the first but only shortly afterward since the artist was still using the earliest style of V-neck warrior as his self-portrait. Our best estimate is the initial scene dates to sometime between A.D. 1730 and

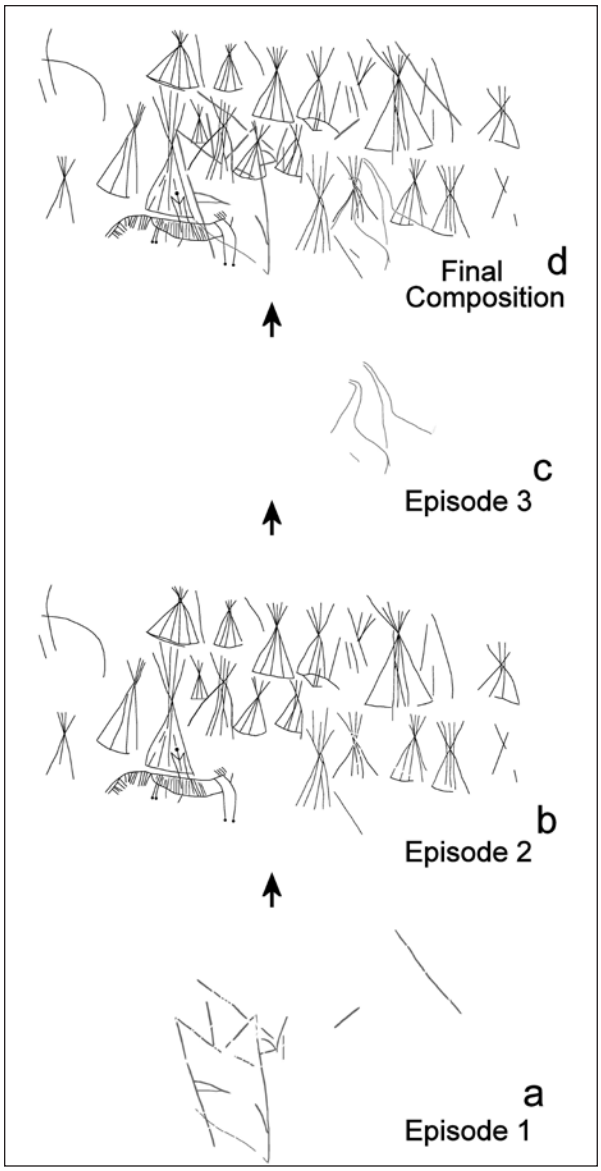

Figure 12. A series of superimpositions at the far left of Locus 3 at DgOw-32. Episode 1 is early V-neck human with lines. Episode 2 shows a warrior riding a horse away from a large tipi village, and episode 3 shows two shorthand mature-style horses superimposed on tipis in the village. Photo-tracing from Mark Willis drone photographs.

1750, while the second scene was drawn to repurpose the first only a few years later.

The horse raid scene at Locus 3, which involves a man riding away from a tipi village on a boat-form horse, is almost certainly more-or-less contemporaneous with the boat-form horses at Locus 1. The rider is a V-neck warrior with a heartline, and his horse has an exaggerated feathery tail and dots for hooves (Figure 12b). These characteristics all suggest an early date in the Biographic sequence at DgOw-32, probably between about A.D. 1730 and 1750.

A later fight scene on Panel 3 at Locus 1 (Figure 13) has several key chronological indicators. The three horses are all mature-style animals, ridden or led by rectangular body style humans typical of mid-1800s Blackfoot robe paintings. Two of the horsemen are armed with guns one of which floats away from the rider and is then shown being held by the scene's much larger hero who took it in the heat of battle. One horseman and the large protagonist both carry small, equestrian-period shields, indicating that the two pedestrian warriors at the left of this scene represent a force who had horses, even if not illustrated here. Finally, the pedestrian bowman shoots a double-curved bow—found only in Historic period Plains rock art imagery (Keyser and Kaiser 2023; Keyser et al. 2023:52-53). All these chronological clues in this drawing point to a date sometime in the mid-1800s.

SUPERIMPOSITIONING

The second strand in our cable of evidence is the superimpositioning of images at DgOw-32. Chronologically relevant superimpositions occur in nearly three dozen instances at DgOw-32, with at least one example found at every locus. These range from the very simple—a mature-style horse over a second mature-style horse or a rectangular body human superimposed on a rectangular body horseman riding a mature-style horse (Figure 14)—to considerably more complex, such as a three-level superimposition of mature-style horses over a tipi scene (which includes a boat-form horse and V-neck rider) which are themselves superimposed on a

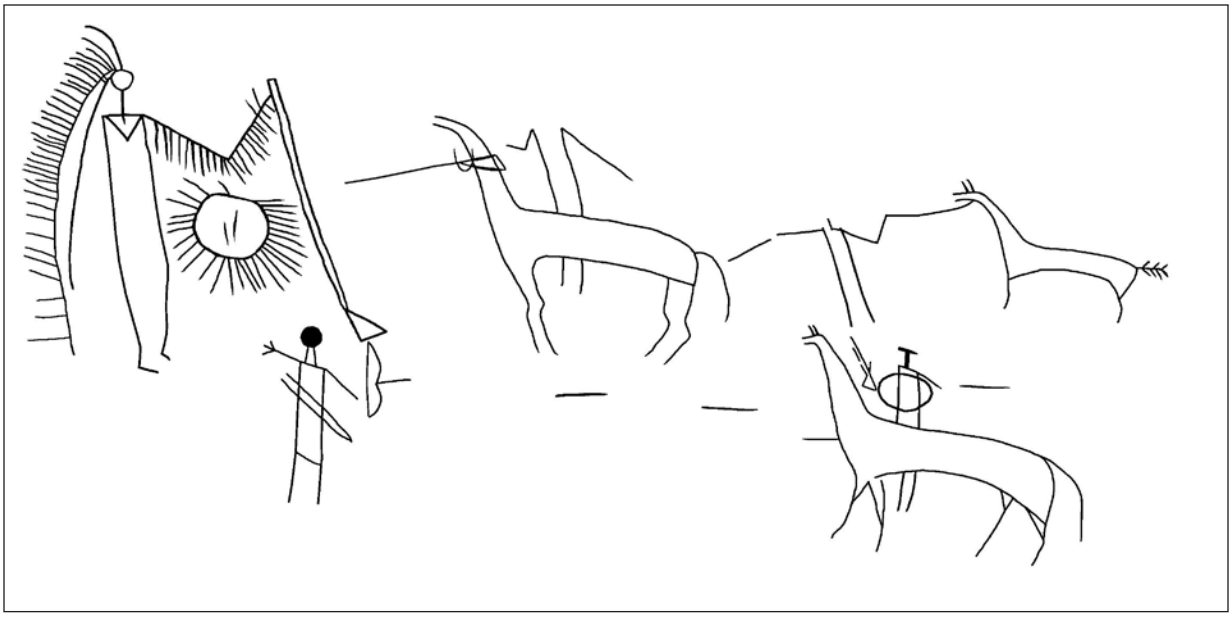

Figure 13. Battle scene on Locus 1, Panel 3 at DgOw-32. Note large pedestrian warrior holding gun he has taken from lead rider (shown with the same weapon floating out of his reach) and the lower bowman with a double-curved bow shooting a volley of arrows at and past the rider. Photo-tracing from Mark Willis drone photographs.

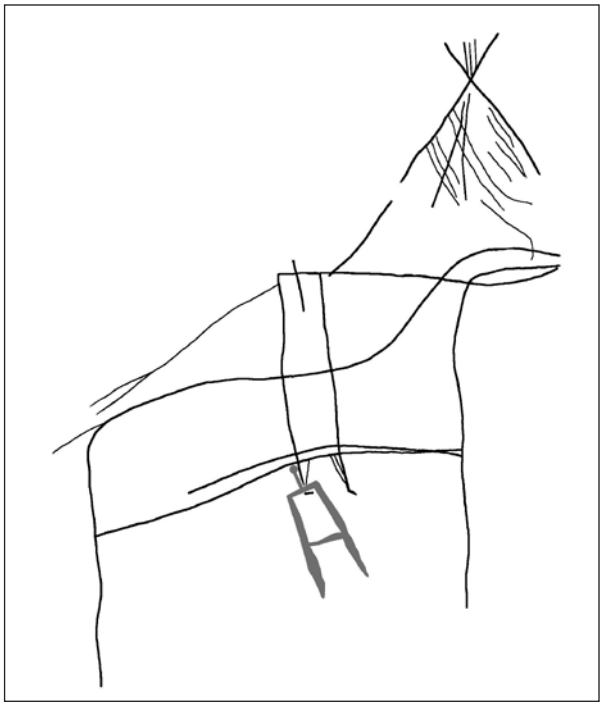

Figure 14. This rider stealing a horse from in front of a war lodge is incised at Locus 2 of DgOw-32. The smaller, rectangular body style human is superimposed on the horseman. Photo-tracing from Mark Willis drone photographs.

large, statically posed V-neck human (Figure12).

Counts of the superimpositions between the various images at DgOw-32 show some interesting chronological relationships between them (Table 2). Initially, stylistically unique or rare images occupy both extremes—quite likely the oldest and the youngest—in the superimposition sequence, although that cannot be conclusively demonstrated. Potentially the oldest images at the site are an abraded human figure at Locus 3 that is unlike anything else currently known in the greater Writing-on-Stone area, and two deep, wide tool grooves at Locus 1. The unique human is shallowly abraded and incised in the center of Locus 3 (Figure 15) where it is superimposed by a combat scene involving a mature-style horse and two rectangular body humans (Figure 16). Unfortunately, we have no way of determining how much older this figure is than the superimposed horse and humans, and we know of no comparable figures elsewhere on the northern Plains. The

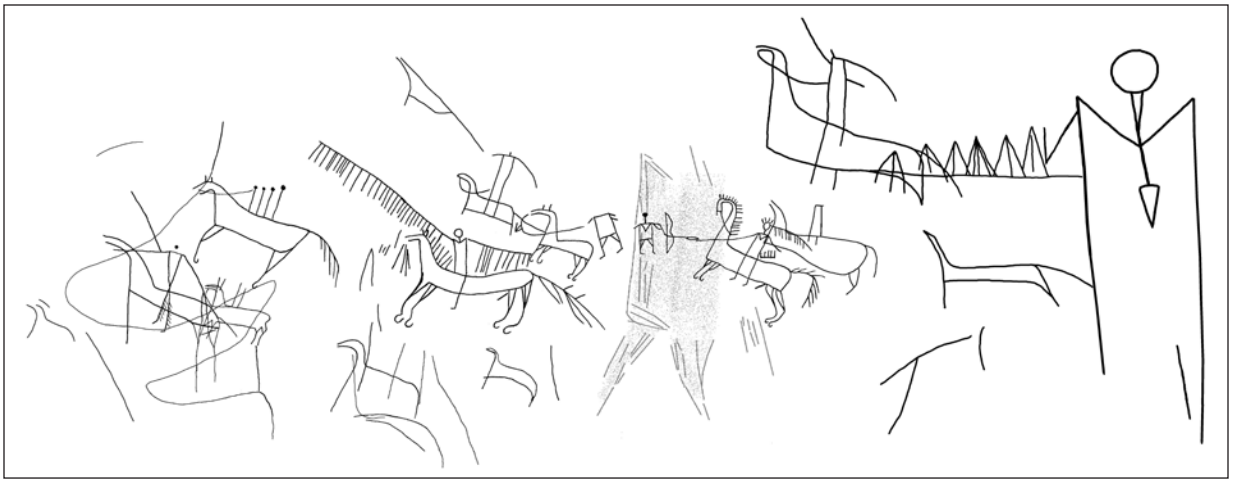

Figure 15. The horse raid panel at Locus 3 of DgOw-32. Note palimpsest of mature-style horses, rectangular and triangular body humans superimposed on large abraded human (in center) shown in grey. Original direct tracing by James Keyser with photo-tracing additions from Mark Willis drone photographs and David Kaiser photographs.

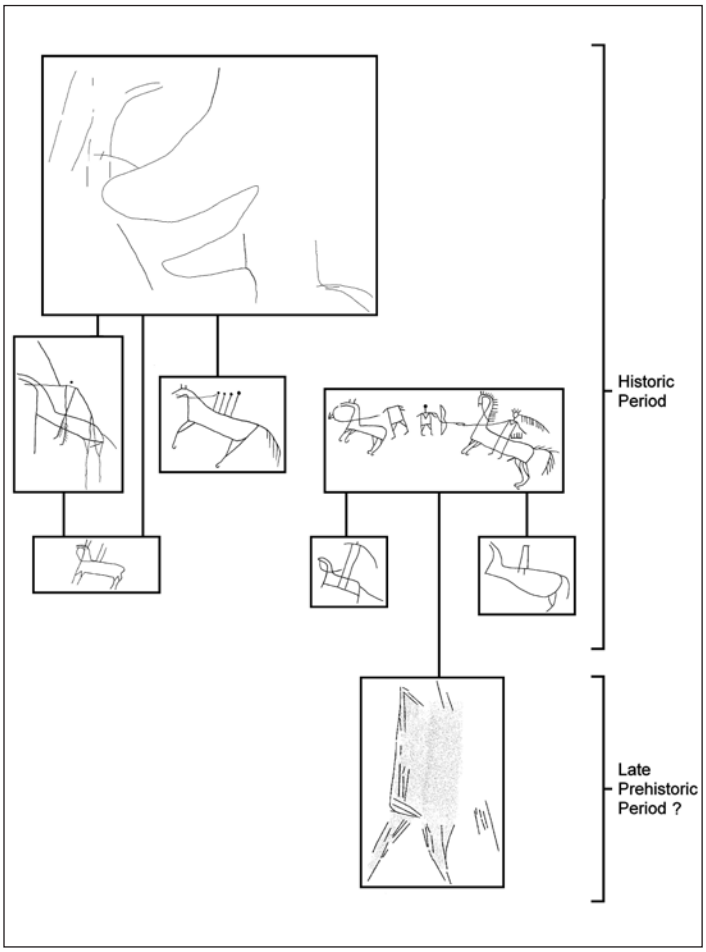

Figure 16. Harris diagram showing superimpositions on horse raid panel at Locus 3 of DgOw-32 (cf. Figure 15).

deeply abraded tool grooves at Locus 1 are superimposed by—and thus older than—both a fortification scene containing multiple rectangular body humans and by a large circular scrawl (Figure 17). How much older cannot be determined.

The remaining superimposed images at DgOw-32 have numerous analogs at other sites here at Writing-on-Stone and scattered further afield across the northern Plains. Thus, their superimposition sequence has the potential to elucidate relationships throughout the region. Superimpositions at DgOw-32 were analyzed using a Harris matrix (Loubser 1997), and the summary result (Figure 18) was the identification of three distinct groups of imagery each of whose component motifs are found in an "anti-symmetric relationship" to one another, signaling that they are contemporary (Loubser 1997:15).

V-neck humans and shield-bearing warriors have the most skewed distribution, being superimposed

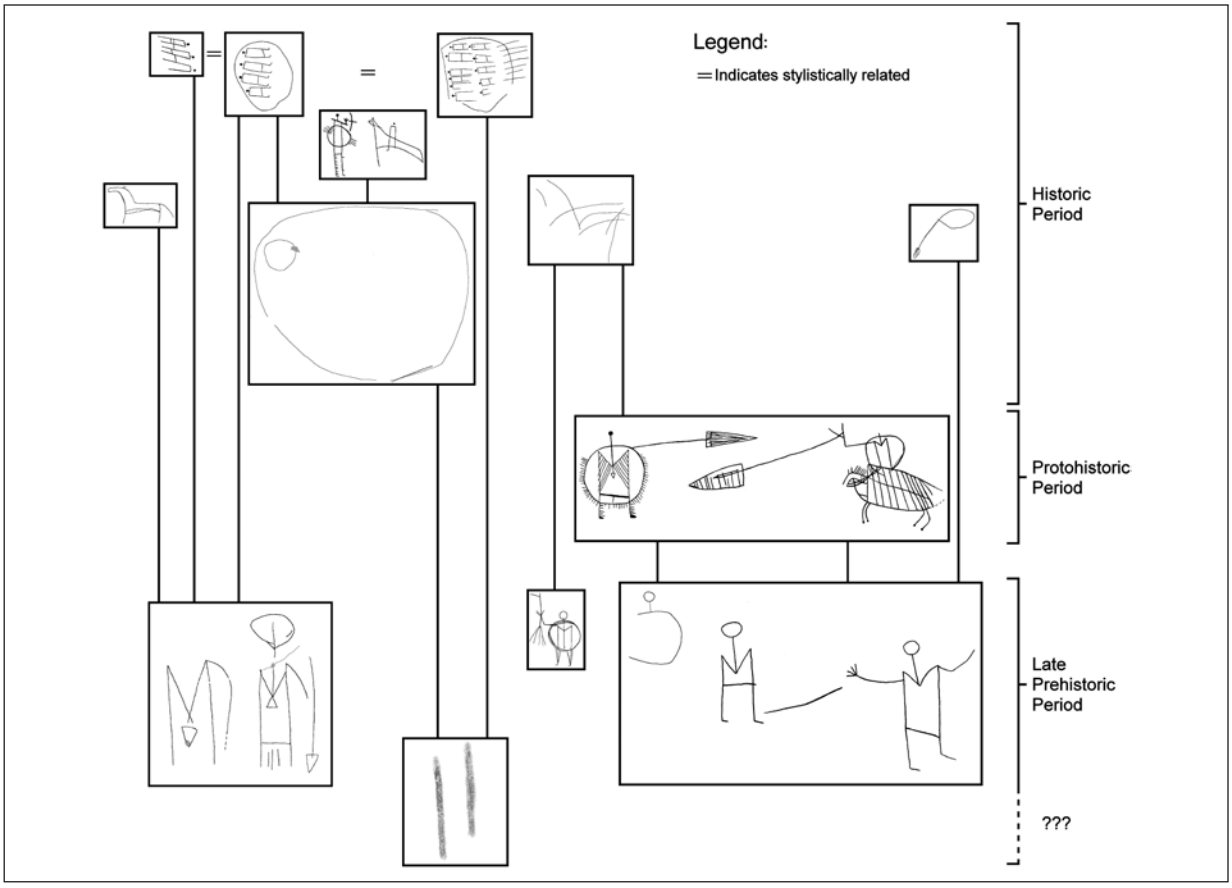

Figure 17. Harris diagram showing superimpositions on Locus 1, Panel 1 of DgOw-32 (cf. Figure 10). Note that chronological position of large abraded tool grooves is indeterminate, but probably Late Prehistoric period.

by other images more than twice as often as they are superimposed on others (Table 2). In addition, they are only superimposed on other V-neck humans or shield bearers, and never on mature-style horses. The most obvious conclusion to draw from this is that the V-neck style of illustrating humans is one of the oldest styles in this sequence, and that it eventually became less popular at the site—and thus less likely to be carved when there were more numerous styles of humans and mature-style horses. The reduction in popularity of the V-neck human motif is consistent with what we know from seriation studies of Blackfoot painted robes (Bouma and Keyser 2004; Lycett 2017; Lycett

Table 2.
Contemporaneous Imagery Grouped by Superimpositions at DgOw-32.

Motif	Over	Under
Horses		
Armored/Boat-form	3	1
Mature Style	11	13
Humans		
Shield-bearing Warrior		2#
V-Neck SBW	3#	1
V-Neck	2	11*
Rectangular Body	8*	7*
Triangular Body	1	1
Stick Figure		1*
Large Abraded		2
Curvilinear Scrawls	11	3
Tool Grooves		2

These are the warriors in the direct conjoined Overlay.

* In these totals, groups of interacting humans are counted as single instances.

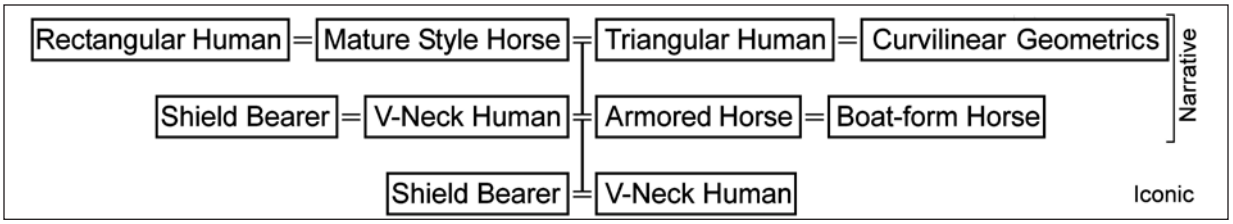

Figure 18. A summary Harris diagram for site DgOw-32 identifies three distinct groups of contemporaneous imagery at the site.

and Keyser 2017).

In contrast to the V-neck style, both mature-style horses and rectangular body humans are almost evenly split between the "Over" and "Under" categories—and both are often superimposed by one another (e.g., Figures 14, 16). Furthermore, neither is superimposed by any V-neck human, but mature-style horses are superimposed over V-neck humans at Locus 1 (Figure 17) and indirectly superimposed in this same relationship at Locus 3 (Figure 12). This distribution indicates that mature-style horses and rectangular body humans were coeval with one another and made later than V-neck humans.

Finally, boat-form horses superimpose only V-neck humans; never mature-style horses or any other Historic period type of human. One is indirectly superimposed by a mature-style horse in the tipi scene (Figure 12).

In summary, superimpositions reveal three groups of contemporaneous images with chronological utility (Table 3). The early group has V-neck humans and shield-bearing warriors both of which are structured in iconic compositions. An intermediate group includes V-neck humans and shield-bearing warriors who are shown in narrative compositions, along with boat-form and armored horses. The most recent group includes rectangular body humans, mature-style horses, triangular body humans, and geometric scrawls. We can also provide generalized dates for these three groups. V-neck humans are the earliest images in the site superimposition sequence for which we have both a reliable start date and (presumed) end date. The earliest V-neck humans and shield bearers at the site were carved in the pre-horse period based on the absence of any trade items, horses, or equestrian-sized shields. However, slightly later examples are associated with boat-form horses, metal projectile points, and a single gun in three scenes, so we know they continued into the Protohistoric period. In fact, one variant type of V-neck human (with an X defining the upper body) is associated with two mature-style horses in one Locus 2 scene indicating that this variant style survived well into the Historic period. V-neck humans similar to these, found at site DgOv-57 in Writing-on-Stone Provincial

Table 3. Contemporaneous Imagery by Superimpositions at DgOw-32.

Most Recent Group
- Geometric scrawls
- Triangular body humans
- Rectangular body humans
- Mature style horses

Intermediate Group
- V-neck humans (narrative)
- Shield-bearing warriors (narrative)
- Boat-form horses
- Armored horses

Early Group
- V-neck humans (iconic)
- Shield-bearing warriors (iconic)
- Abraded human?
- Tool grooves?

Park have been dated to A.D. 1830-1850 (Lycett and Keyser 2017:77).

Finally, nearly half of the superimpositions at the site involve mature-style horses and rectangular body style humans, indicating these two motifs were drawn in relatively large numbers by numerous artists who visited the site during many different episodes to leave their marks.

STYLISTIC RELATIONSHIPS

Rock art styles at Writing-on-Stone have been studied since Dewdney's initial recording effort and a reasonably coherent sequence of types of human and animal forms is now developed (cf. Dewdney 1964; Keyser 1977b; Keyser and Klassen 2001; Keyser and Poetschat 2014:58-64; Magne and Klassen 1991). The last century of this sequence has been refined by various seriation studies using Blackfoot painted robes and war shirts (Bouma and Keyser 2004; Lycett 2017; Lycett and Keyser 2017, 2018, 2021). This stylistic sequence begins with Ceremonial tradition art comprising relatively large V-neck and rectangular-body humans and shield-bearing warriors. Animals associated with these humans are primarily boat-form images. The presence of full-body sized shields and the absence of horses and guns associated with the humans places them firmly in the Late Prehistoric period. Both humans and animals are typically characterized by internal organs (ribs, heartline, kidneys) and external genitalia, and humans occasionally wear a headdress and often hold a weapon (Figure 19).

Klassen (1995, 1998) has identified these figures as expressing an iconic pose; often composed in loosely juxtaposed pairs or small groups to represent vision quests, game charming, sexual acts, or supernatural expressions of military might. We do not know exactly how far back in time such figures extend, but

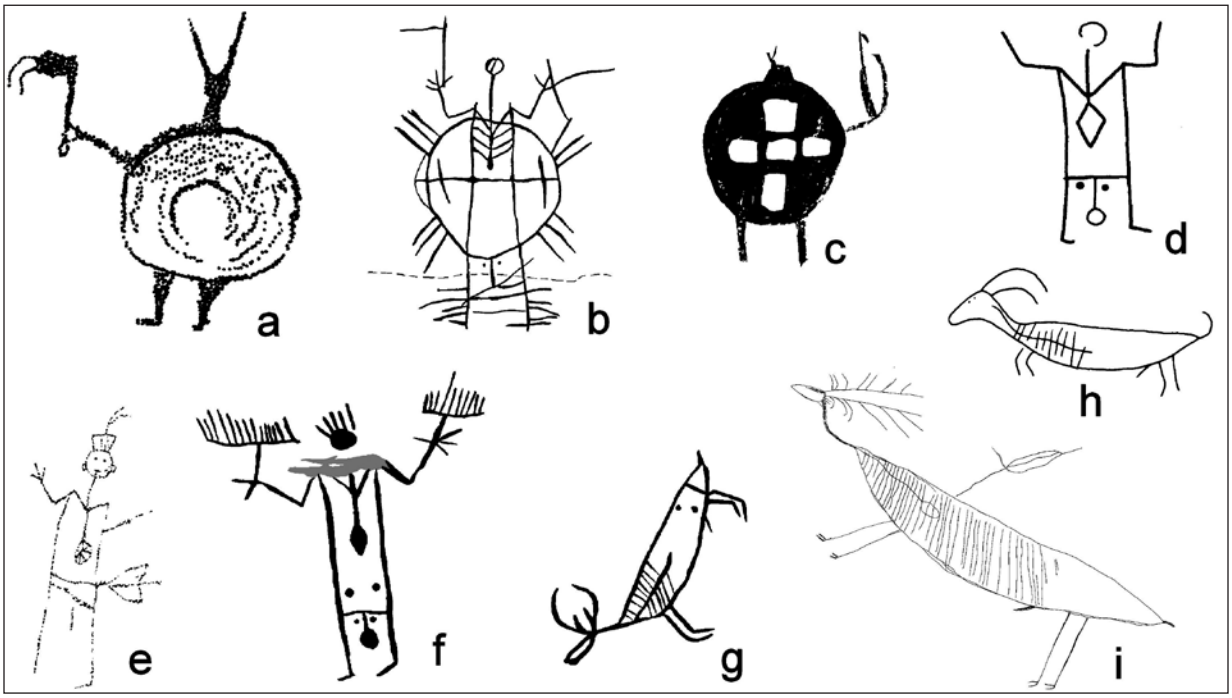

Figure 19. Northern Plains Ceremonial tradition rock art includes shield-bearing warriors a-c; V-neck humans (some of which are also shield-bearing warriors) b, d-f; and boat-form animals g-i. a, 24GL67; b, 39HN177; c, DgOv-2; d, f-h, DgOw-29; e, 24JT87; i, 24GV191.

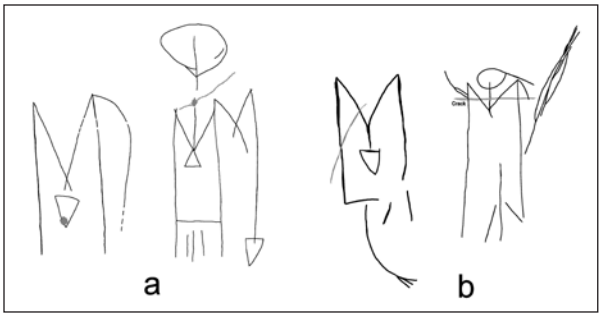

Figure 20. Paired V-neck humans at Locus 1 of DgOw-32. a, Panel 1; b, Panel 3. Photo-tracings from Mark Willis drone photographs.

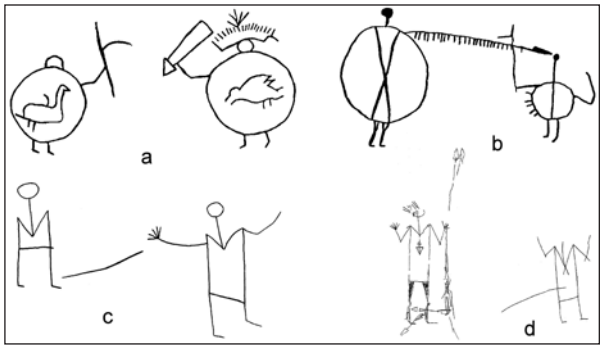

Figure 21. Late Prehistoric and early Historic images show V-neck humans and shield-bearing warriors in combat indicating the beginnings of narrative Biographic art. Wounds (d) and coup-strike weapons (b, d) are early uses of these conventions. A, DgOw-29; b, DgOv-2; c, DgOw-32 Locus 1, Panel 1; d, 24FR2.

a charcoal-drawn shield bearer at Atherton Canyon is radiocarbon dated between A.D. 1280 and 1395 (Keyser et al. 2012:176-177) and charcoal-drawn V-neck humans at Kibbey Alcove (24JT87) are dated between A.D. 700-1300. From studies done elsewhere across the region, shield-bearing warriors and associated V-neck humans have been assigned, using a variety of actual and estimated dates, to the period between about A.D. 1000 and A.D. 1700 (Keyser 1977b; Keyser and Poetschat 2014:72; Keyser et al. 2012; Loendorf 1990, 2009). At DgOw-32 we have both V-neck humans (Figure 20) and shield-bearing warriors (Figure 10A/3) drawn in such iconic poses.

Beginning in the Late Prehistoric period, sometime between A.D. 1500 and 1600, these characteristically iconic images began to be drawn in simple narrative scenes (e.g., Figure 21) showing close-quarter fights animated with only a few of the conventions (e.g., coup-strike weapons, wounds) that give later Biographic art its explicit narrativity. Still, real-life stories are being told and some of these men would have been recognizable by their shield design and headdress.

Relatively quickly, metal projectile points and then the horse and gun are introduced into this art, and it develops into full-fledged Biographic narratives. Winners and losers are identified by posture, weapons are explicitly shown being taken by the winners of fights, and floating weapons are added to the lexicon. Some combatants are pedestrians with full-body shields while others have reduced their shield size as a consequence of needing to maneuver them on horseback. Some shield bearers and many other fighters are V-neck warriors, some still illustrated with internal organs. A few combatants have rectangular bodies. Fighters continue as shock troops, battling at close-quarters, and the first horses are used more-or-less like tanks to break through massed ranks of enemies. These earliest horses are boat-form animals with ball feet rather than track-shaped hooves, and a few of them even have a heartline like characteristic Ceremonial tradition boat-form animals. Several early horses wear leather armor to protect the animals from enemy weapons in their close-quarter charges.

Sometime during the last quarter of the 18th century, northern Plains artists began to draw horses in what Dewdney (1964) named the mature style. This style emphasizes the speed and grace of these animals and shows them transformed from a tank into a light cavalry vehicle perfectly

suited for hit-and-run warfare. These horses are clearly different than earlier boat-form animals both in morphology but also in what they portray about Plains culture. Often they are a vehicle for their rider to run down an enemy, whether trampling him under foot or affording the opportunity to strike a quick blow before moving on to confront other foes. Other horses are frequently the focus of a man's successful attempt to steal the animals from an enemy. The warfare portrayed in these scenes is clearly a "quick-strike" combat, notably different from the ponderous battles shown in preceding decades.

Along with horses, human figures also change. V-neck humans continue to dominate into the early 1800s, but relatively rapidly combatants began to be shown as small, rectangular body and triangular body humans. No longer are these drawn with internal organs or genitalia. Instead, the artistic focus is on the "doing" of deeds in the form of an explicitly narrative account. How was an enemy struck, or what did the victor do? Was the enemy scalped or wounded and were multiple attackers involved in his defeat? Tallies of defeated enemies, captured war trophies, and stolen horses become more the focus of compositions. In short, an art expressing ceremonialism and the supernatural has been completely transformed into one glorifying the individual in his quest for war honors and the resultant status he has acquired.

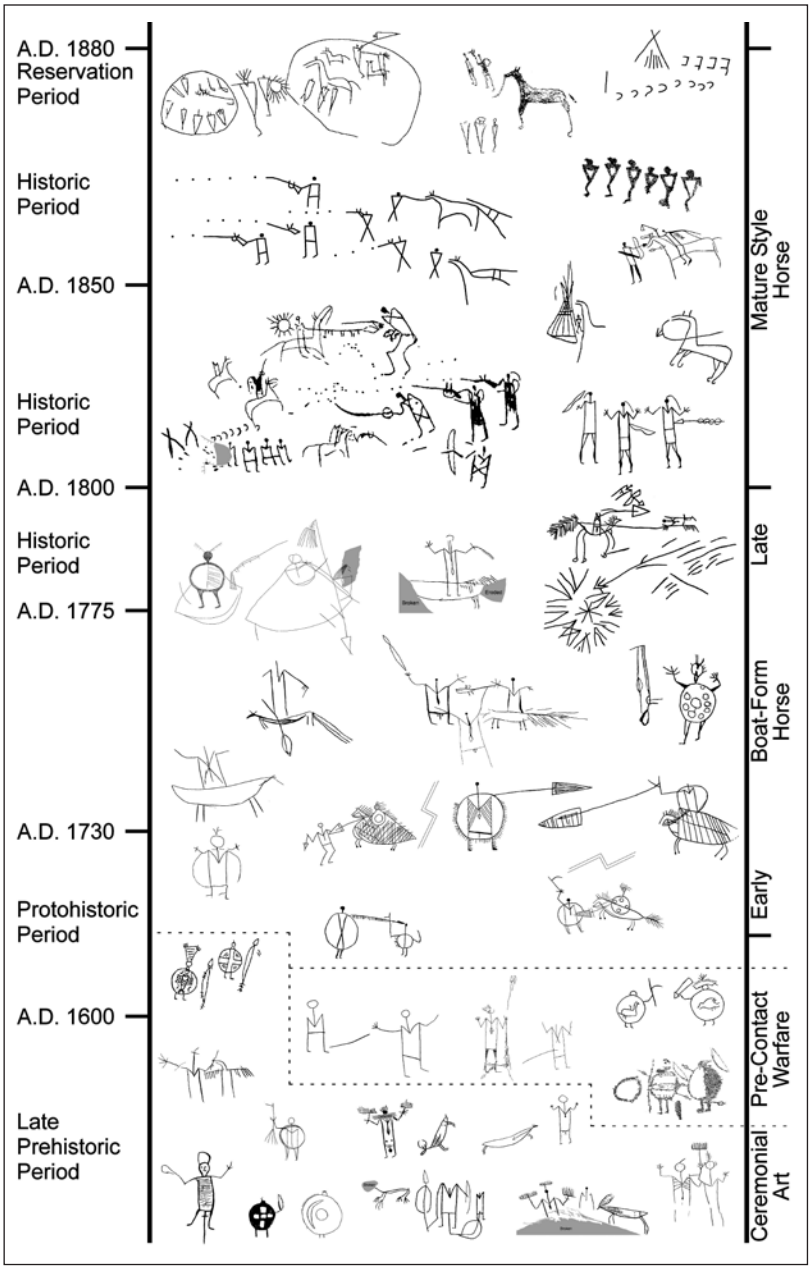

Figure 22. Generalized chronology for the period A.D. 1400-1900 for Blackfoot rock art.

This stylistic evolution enables us to place individual compositions at DgOw-32 into a general chronology (Figure 22) developed primarily

from other sites in the Writing-on-Stone area and closely surrounding regions. Such placement usually yields only a general date—accurate only to a half century or so—but when combined with both superimpositioning of motifs and the known dates for the introduction of different weapons and horse accoutrements, we can often narrow this down somewhat to within one to three decades.

PRINCIPAL COORDINATE ANALYSIS

To further explore the chronology of the art at DgOw-32, we also used a statistical seriation technique (principal coordinate analysis or "PCo") that we have previously used successfully on Blackfoot rock art and robe art, as well as rock art, robe art, and ledger drawings of Crow artists (Keyser and Lycett 2021; Lycett 2017; Lycett and Keyser 2017, 2018, 2019a, 2019b, 2021). In this instance, we used a comparative sample of 25 Blackfoot robe art examples for which chronology is now reasonably well established (Lycett and Keyser 2021). Comparing the images at DgOw-32 using this technique is not without its challenges, since the composition of the artwork from the site often involves fewer elements than we have used in other rock art comparisons. Accordingly, we mainly limited our analysis to panels and scenes that included both horses and humans, but—as described below—we extended our dataset slightly in terms of artwork features described.

PCo is a variant of a class of multivariate statistical procedures referred to as ordination methods. Several authors have used different ordination methods to show that a seriated archaeological sequence will produce a broadly linear arrangement when depicted as a scatter plot, taking the form of an arch or parabola distributed across each of the primary axes of variation (e.g., Jensen and Nielsen 1997; de Torres and Ruiz-Gálvez 2014; Lycett and Keyser 2019b). PCo analysis is undertaken by first generating a matrix of features that describes the presence and absence of the various attributes recorded for all artworks. This initial matrix must then be converted into a "distance matrix," which quantitatively describes the extent of similarity and dissimilarity between all pairs of items (in this case artworks) listed in the dataset (Shennan 1997). Jaccard distances are commonly used to convert the presence/absence data since they help to reduce the problematic influence that false absences may impose as a result of sampling error (Shennan 1997). Such a consideration may be particularly appropriate here given the relatively limited number of elements in the DgOw-32 scenes. Using the distance matrix, PCo analysis extracts eigenvalues (measures of variance) and eigenvectors (coordinates), which enable major patterns of variation between items to be quantitatively described and plotted. Each of the coordinates extracted explains relatively less of the variation between items, so that the first coordinate explains the largest percentage of variation among items, the second explains a relatively smaller percentage of the variation, and so on. Here, we plotted the first two principal coordinates against each other, which allows the relative similarity between each of the robe art and rock art scenes to be visually described. The set of features we recorded for each art example included 16 features we have used elsewhere (see Lycett and Keyser 2021 for details) but taking specific account of the nature of the scenes at DgOw-32, we included an additional six features to the dataset which recorded the presence or absence of ball feet (for horses), large-shield-bearing warriors, boat-form horses, double-curved bows, firearms, and mature-form horses. The PCo analysis itself was undertaken using the software PAST v3.07 (Hammer, Harper, and Ryan 2001).

Figures 23 and 24 show the results of the

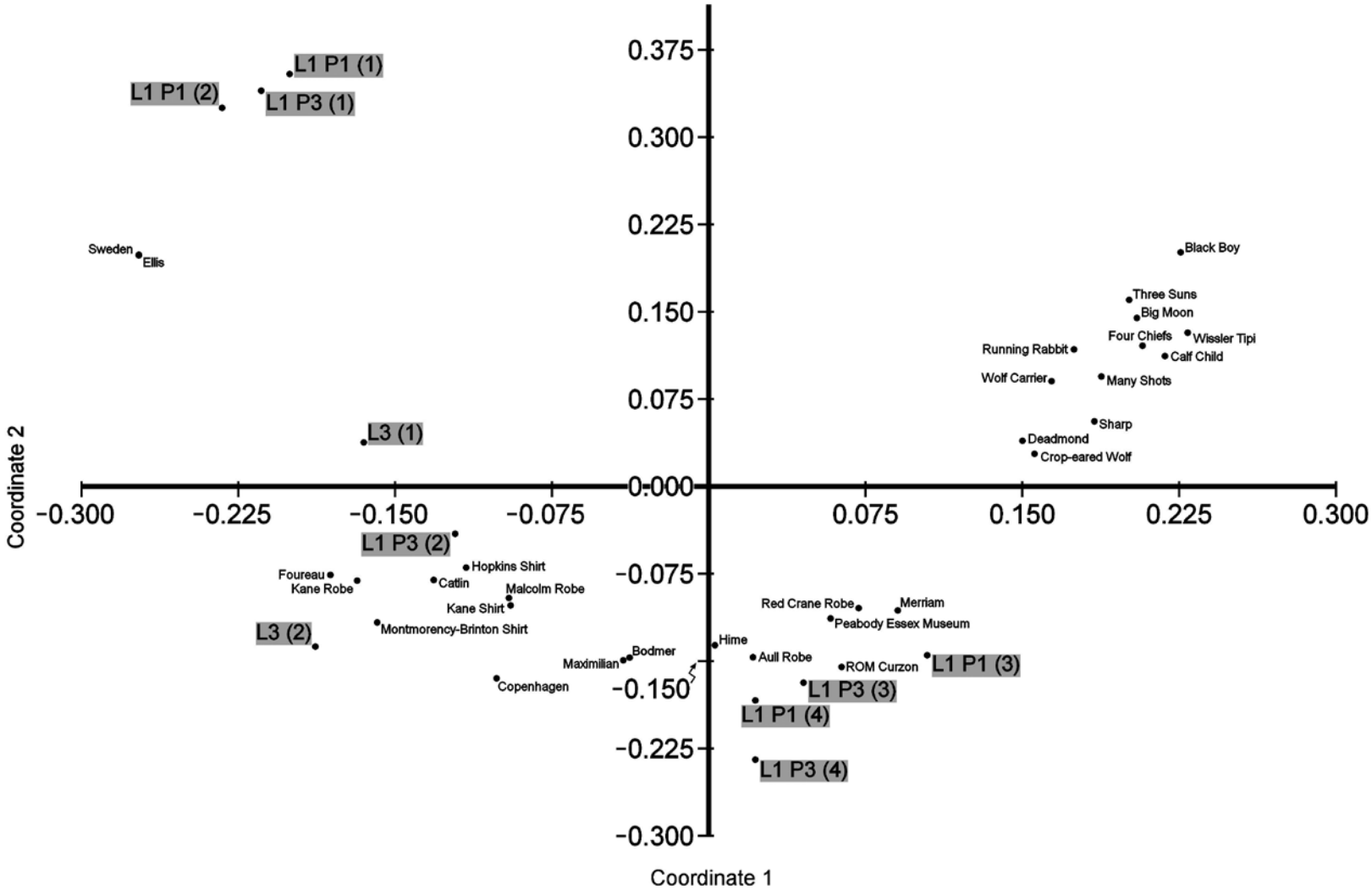

Figure 23. Principal coordinates (PCo) plot showing relationships between rock art scenes at DgOw-32 (highlighted in grey, numbers refer to scenes illustrated in Figure 24) and previously dated Blackfoot biographic artworks. Notably no rock art scenes at DgOw-32 are shown in the upper right of the plot which contains robe art examples dating to post 1880, indicating the site had gone out of use by Blackfoot artists by this time.

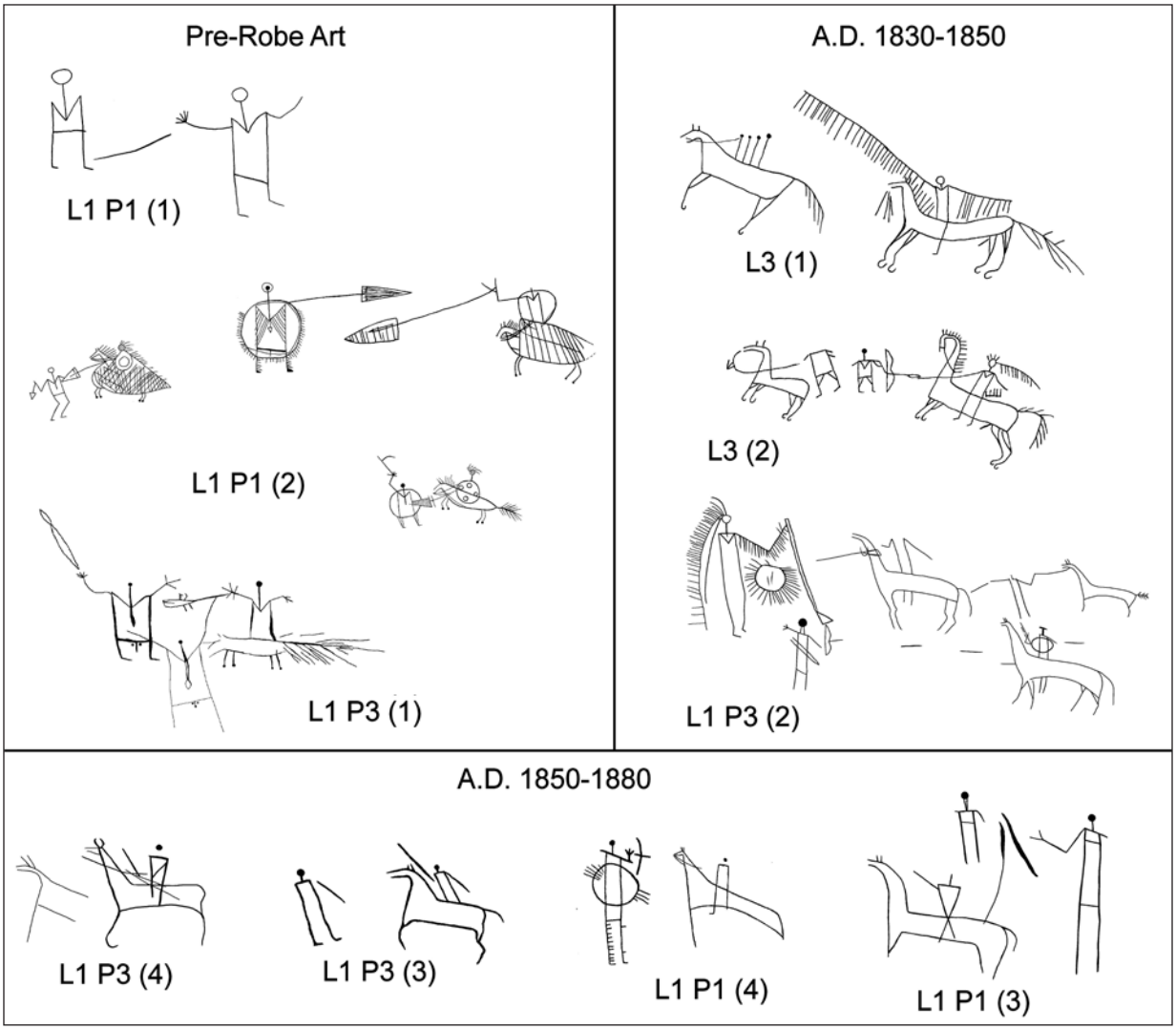

Figure 24. The chronology of narrative scenes at DgOw-32 based on the Principal coordinates analysis and their relationship to previously dated Blackfoot artworks (numbers correspond to those shown in Figure 23).

analysis. The plot shows that some of the scenes from Locus 1 (panels 1 and 3) are among the earliest artworks, plotting in the upper left of Figure 23 and predate the earliest comparative robe art examples. A second scene from Locus 1 (Panel 3), however, would appear to compare most closely to robes dating from around 1830 to 1850, as do two other scenes at Locus 3 (Figure 24). Several further scenes from Locus 1 plot in the lower right of the PCo, and are situated alongside robes that date to *circa* 1858 to 1880 (Figures 23, 24). None of the rock art scenes, however, are positioned in the upper right of the plot, which includes robe art works painted in the reservation period. Overall, the PCo analysis indicates that these panels were incised over a period of more than a century, from at least the Protohistoric period and through the early Historic and later Historic phases. The analysis also suggests that use of DgOw-32 by Blackfoot warrior-artists ceased sometime prior the onset of reservation life.

The concentration of early imagery at Locus 1 identified by the PCo analysis indicates that this part of the site was intensively used at a relatively early date. Initially, of course, we have the three scenes that can be dated. However, other images on that panel, which cannot be directly dated by this analysis, can be related to those dated images by various formal correspondences. Initially, both the shield-bearing warrior carrying a spike mace and the boat-form horse whose rider wears an armor poncho and carries a spike mace share time-sensitive weaponry (spike maces, full-body size shield, leather armor) and body morphology (boat-form horse and V-neck human) with the dated images. Additionally, based on weathering and erosion, the shield bearer appears to pre-date the armored-horse battle scene, though it is not directly superimposed by it.

Another pair of large V-neck humans just below the armored-horse battle scene also appear early in the panel's superimposition sequence (Figures 10B/3, 17, 20a). Both are superimposed by several later Historic period images including a mature-style horse, rectangular body humans, and a circular fortification structure. Additionally, we see a somewhat similar situation on Panel 3 at this same locus, where a pair of large V-neck humans (Figure 20b) appear to pre-date adjacent mature-style horses, while three other V-neck humans are badly eroded where bison have rubbed against the bottom of the panel. In both cases, the iconic poses with corresponding lack of action and the overall formal simplicity of these V-neck humans suggests they are just slightly older than the fighting V-neck warriors associated with boat-form horses on Panels 1 and 3 (Figures 8, 11).

In summary, it appears that Panels 1 and 3 at Locus 1 were heavily used by Late Prehistoric period artists who drew several large iconic compositions, each involving one or two V-neck humans or shield-bearing warriors. Slightly later artists reused these panels, drawing early protohistoric action scenes of horse riding and combat nearby or on top of these iconic images. Given this clearly expressed chronological sequence at Locus 1, we can infer that at least some of the few large V-neck figures at loci 2 and 3 were likely also drawn in the Late Prehistoric period, and that the horse-raid scene at Locus 3 showing a V-neck horseman riding a boat-form horse away from a tipi village is most likely a Protohistoric period composition. This conclusion is consistent with the superimposition sequence on this panel showing the horse raider superimposed on a large V-neck style human and superimposed by typical Historic period mature-style horses (Figure 12).

DISCUSSION: PROPOSING A CHRONOLOGY FOR DGOW-32 AND ITS CHANGING SOCIO-CULTURAL CONTEXT

Using the four strands of evidence detailed above, we can construct a fairly specific chronology for most of the petroglyphs at DgOw-32 (Figure 25). Such dating can sometimes enable us to address questions of cultural process and interaction that are often beyond the scope of typical archaeological research (Keyser 1979; Lycett and Keyser 2019a, 2021). Initially, all the evidence points toward the classic V-neck style humans and shield-bearing warriors being the verifiably earliest images in general use at the site. The great majority of these two motifs are found in Late Prehistoric period contexts across the northern Plains as indicated by a lack of associated historic items (e.g., guns, horses, metal weapons) and the prevalence of full-body sized shields for more than 90 percent of shield-bearing warriors (Keyser 2010; Keyser et al. 2012; Keyser and Poetschat 2014). Detailed statistical analysis of the anthropomorphs at

Writing-on-Stone bears out the early date for most V-neck humans and shield-bearing warriors (Magne and Klassen 1991:411). We also note that V-neck humans are typically associated with boat-form animals at sites across the northern Plains—especially at Writing-on-Stone (Keyser 1977b).

Thus, at DgOw-32, we see V-neck humans carved at all three loci that appear to be of Late Prehistoric period age. Pairs of such humans are carved in iconic pose on two panels at Locus 1, and one of these pairs is superimposed by later Historic period humans and a mature-style horse. A pair of fighting V-neck warriors is carved elsewhere at Locus 1 but these have neither metal weapons nor horses and they are superimposed by the Protohistoric period armored-horse battle scene. Other individual V-neck humans are carved at all three loci in iconic poses, and one is superimposed by a V-necked man riding a boat-form horse in an early Historic period horse-stealing scene. No V-neck human is superimposed on any other image. In short, these pedestrian V-neck humans appear to be the earliest images carved at DgOw-32 and date to the two centuries before 1700.

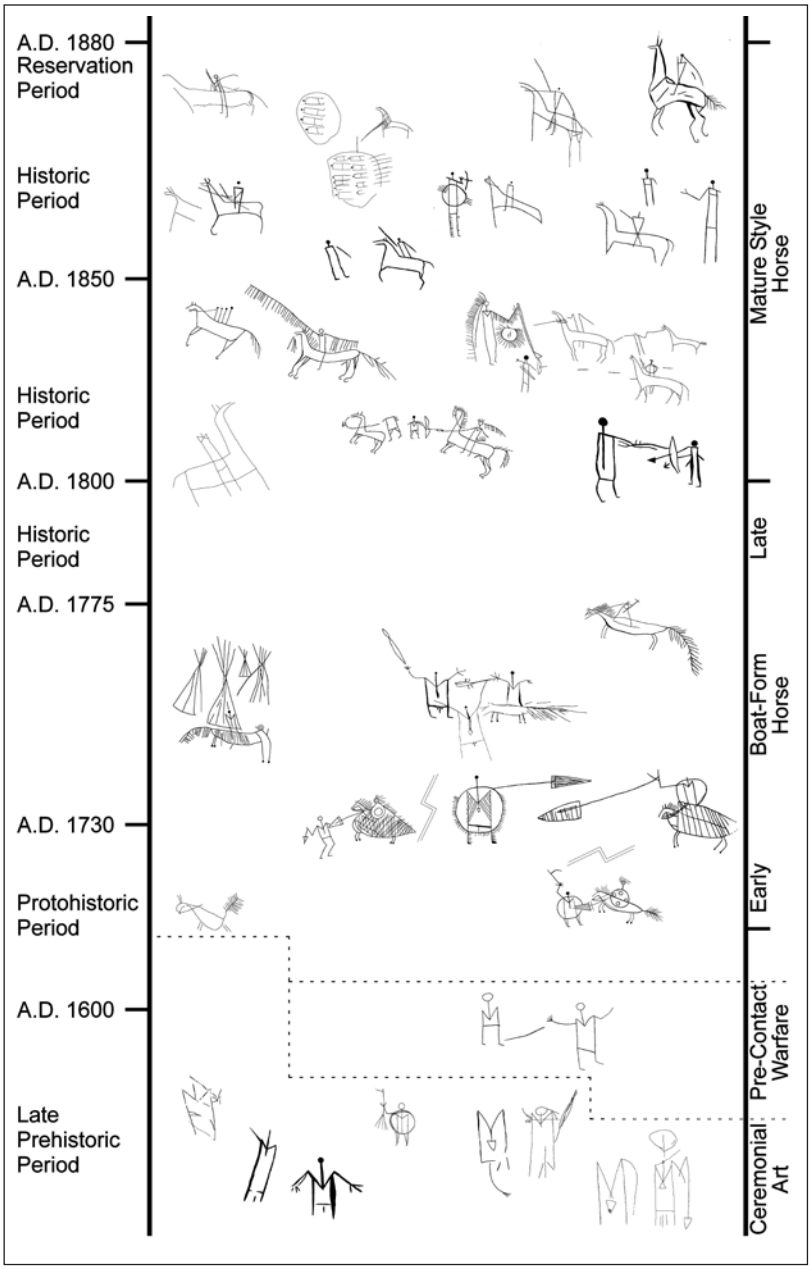

Figure 25. Chronology for the petroglyphs at DgOw-32.

We know from other Protohistoric and early Historic period art that Blackfoot artists retained the boat-form style for early horses into the 1700s and the V-neck body style for humans even into the early 1800s. Early robes and war shirts collected from the northern Plains show V-neck warriors associated with guns, mature-style horses, and metal weapons as late as the 1830s. Boat-form horses, on the other hand, appear to have been abandoned in

favor of the mature style of drawing these animals sometime in the mid to late 1700s.

So, when Euro-American goods began arriving in this area of the northern Plains, artists drawing at DgOw-32 added metal projectile points and horses (but maintained their boat-form style of drawing them) to their compositions. They also drew leather horse armor, shields that became smaller in diameter so they could be used and easily maneuvered on horseback, a leather armor coat for one rider, and—just slightly later—guns to the scenes they drew. We know this transformation of the art took place over just more than a century (from ca. A.D. 1620 to ca A.D. 1730). But it was initially an additive process, with these new items being drawn in use by shield bearers and V-neck warriors. Clearly what changed was the material culture available to these people and the fact that they began to draw scenes showing narrative interactions with one another. But, into the first decades of the 1700s, the artists' societal ideal of how to draw both humans (with V-neck style bodies) and animals (with boat-form style bodies) remained the same as it had in pre-contact times.

In addition to the relatively secure, historically known dates for the introduction of these foreign items into the region (and then—quickly—into the rock art), we have two lines of corroborating evidence at DgOw-32 for dating this change. Initially, there are three key superimpositions. The first shows the armored-horse battle scene at Locus 1 incised over a shield-bearing warrior and a nearby pair of fighting V-neck warriors. The second is on another Locus 1 panel where a V-neck warrior is superimposed over a combat scene involving a V-neck warrior riding a boat-form horse who takes a gun from a V-neck pedestrian. The third shows a V-neck horse raider riding a boat-form horse superimposed on a large, classic V-neck human at Locus 3. Thus, we see a constellation of motifs including V-neck humans, shield-bearing warriors, boat-form horses, and horse armor all used together for a short period while warriors reduced the size of their war shields to facilitate their use in equestrian warfare. This pattern is supported by our PCo analysis, wherein the three DgOw-32 combat scenes involving this constellation of motifs cluster at the early end of the seriation (Figures 23, 24).

The appearance of guns as a regular weapon of war apparently sufficiently reduced the effectiveness of leather body armor for both horses and humans, thus these were abandoned relatively quickly across the northern Plains. At DgOw-32 this is indicated by the presence of only two coats of horse armor and a single poncho-style human body armor garment, despite the occurrence of 66 horses and more than 90 humans at the site. Furthermore, all three instances are associated with early boat-form horses. This conclusion accords well with the evidence from elsewhere on the northern Plains that shows a relatively rapid abandonment of these items, with the last of them showing up in the late 1700s or very early 1800s.

A large corpus of petroglyphs at the site comprises dozens of images arranged in just more than two dozen compositions dating to the Historic period. These are primarily Biographic scenes involving interacting participants. The main actors are mature-style horses and rectangular and triangular body humans—often shown using guns, bows and arrows, and spears. A few humans wear identifying regalia. Minor components of these scenes are an occasional stick-figure or V-neck human, structures such as tipis and picket pins, and horse tack including reins and bridle bit decorations. A single scalp symbol, two capture-hand ideograms, and the occasional depiction of wounds add minor but significant detail to these scenes.

Based solely on the items with known dates

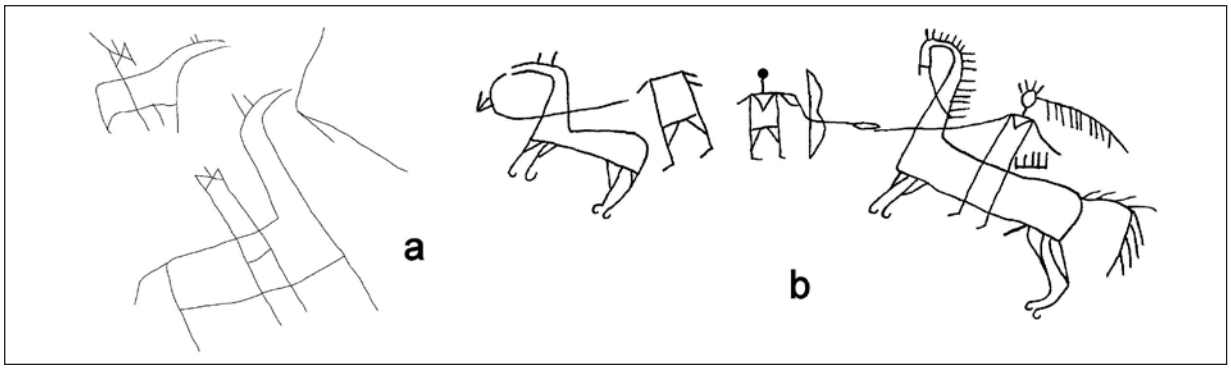

Figure 26. Variations of the V-neck human at DgOw-32. a, Locus 2, X used to delineate upper torso; b, war honor tally in horse raid panel at Locus 3, V-shape set in rectangular body. Note scalp (upward-pointing rake form) under arm of rider, and trident capture hand on rein of horse at left. a, photo-tracing from Mark Willis drone photographs; b, Keyser's original direct tracing augmented by photo-tracing from David Kaiser photographs.

for introduction and use, and the superimpositions occurring among these petroglyphs, we know they date to the Historic period spanning a little over a century from approximately A.D. 1760 to 1880. Stylistically, these images fit very well with hundreds of petroglyphs and pictographs carved and painted at other regional sites, but that in itself tells us little of chronological value. However, they also mimic the imagery painted on more than two dozen perishable items of Blackfoot authorship, including clothing, tanned hide robes, tipi covers, and muslins that are collectively known as robe art (Lycett and Keyser 2021:2). These perishable pieces have considerable historical depth, dating from approximately A.D. 1820 to 1920, and have been the subject of several seriation studies using different techniques (Bouma and Keyser 2004; Lycett 2017; Lycett and Keyser 2017, 2018, 2021). Such seriation analysis has even previously allowed us to provide dates for a few rock art sites (Keyser and Lycett 2019; Lycett and Keyser 2017; 2021).

Here, the use of the PCo seriation method enabled us to suggest some dates for particular scenes and styles at DgOw-32 (Figures 23, 24). Initially, we note that humans with modified V-neck style bodies—either those drawn with a V below a horizontal line used to indicate the upper torso or those showing an X to demarcate the upper body (Figures 13, 26)—apparently occur early in Historic period rock art in this region. Both of these types have been recorded at DgOw-32 and also at a handful of other sites elsewhere at Verdigris Coulee and at Writing-on-Stone Provincial Park. One of these other sites, DgOv-57, has been previously dated to the period between A.D. 1820 and 1850 by PCo analysis (Lycett and Keyser 2017). At DgOw-32 our PCo analysis dates two scenes with this same style of human to this same period (Figures 23, 24).

More generally, our analysis indicates that DgOw-32 was relatively heavily used by Historic period artists through the first three quarters of the 19th century. Specific scenes fit well with those painted on Blackfoot robes in the decades both just before and just after A.D. 1850. However, it is equally apparent that the activities of these artists ceased just prior to—or coincident with—the onset of reservation life, since the PCo analysis finds no examples that fit in the cluster of robes dating from the late 1880s through the 1920s. This contrasts to the main Writing-on-Stone area (in the present Provincial Park), where three panels at two

different sites have been dated to the post-reservation period (Keyser and Kaiser 2023; Klassen et al. 2000; Lycett and Keyser 2021:15-16). This absence of the latest Plains rock art at DgOw-32—and the corresponding scarcity at the better-known area downstream in today's Provincial Park—accords with the dramatic changes in the lifeways of Blackfoot peoples that occurred at this time, sharply curtailing patterns of behavior that had been practiced for centuries. This, along with the earlier stylistic changes we documented at DgOw-32, underlines the crucial importance of chronology for understanding corresponding changes in the rich corpus of Plains rock art, and its link to the wider societal changes experienced by the various peoples that produced these images (Lycett and Keyser 2019a, 2019b, 2021).

END NOTES

1 The two additional shield bearers identified at DgOw-32 in the current study would easily be classified as one Verdigris style and one Blackfoot style warrior.

2 There are a few exceptions to this generality, mainly as a result of the retention of large-size shields by Missouri River village tribes. These are discussed in detail by Keyser (2010).

3 One possible exception is an 1852 ledger drawing by Comanche chief, Yellow Wolf, in which both he and his opponent wear long garments. The opponent's garment appears to have a hood and may be a capote, but Yellow Wolf's garment could be body armor. Possibly further research will shed additional light on this, but this is the only example of which we are aware that might be such personal body armor at this late date.

ACKNOWLEDGMENTS

Several colleagues have aided and encouraged us during our research at DgOw-32. Jack Brink (recently deceased) took us back to the site in 2010 for the first time since Keyser's initial visit in 1976, and over the course of many years he provided hundreds of documents, photographs, and references—many of which were instrumental in our study of the site. Likewise, Michael Klassen also visited other Verdigris Coulee sites with Keyser in 2001 and has always generously shared his photographs, tracings, and site notes from this and numerous other sites. His photographs form the basis for several of our photo-tracings in this article. Bob Dawe was the person who helped plan the project at DgOw-32 with Keyser and accompanied us to the site in 2019. Finally, Mark Willis was our drone expert—from permitting to piloting—without whom we simply could not have undertaken this.

Others also assisted throughout the project. Megan Berry spent many hours expediting the permitting process and made sure we could actually conduct the research in 2019. David Minick and Tom McCormick accompanied us in the field. Ali McCallister, Sueanne Jansen, Becky Steed, and George Poetschat assisted with motif classification during laboratory sessions.

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A CARVED SEAL FIGURINE FROM ADEL, MONTANA

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INTRODUCTION

SINCE ITS INCEPTION, *Archaeology in Montana* has intermittently featured short articles regarding curios (e.g., Brumley 2012; Feyl 1966; Helmick and Davis 2011; Hoy 1969; Kingsbury 1987; Malouf 1962; Stallcop 2000). While most of the artifacts reported lack contextual integrity and an understanding of their history or purpose, recording these unusual items helps preserve some of the information they retain and allows for comparative research if similar items are located. Herein we continue that tradition with hope that it will inspire others to share unique or odd cultural items that are largely unknown and are lingering in private or government collections.

Many years ago, possibly in the 1970s, Jane G. Hibbard discovered a partially buried, carved seal figurine in a pasture on her family ranch at Adel in west-central Montana. The artifact was found in a meadow at the west side of a reach of Middle Creek. Geographically, the find is at the southeast flank of the Adel Mountains (Figure 1). It was situated at an elevation of approximately 4,980 ft (1518 m) above sea level. Jane collected the item she dubbed "fish stick" and translocated it to her home where she placed it on a wood-fueled cookstove used for decorative purposes. Subsequent inspections of the find locality have revealed no additional cultural material.

Most who commented on the artifact feel it was manufactured for maritime tourism in the late 19th or early 20th centuries. How it came to be abandoned in a remote field in Montana is as much a mystery as its origin and travel history. Without a radiocarbon date, or some way to demonstrate provenance, its age will remain speculative. The artifact is sufficiently distinctive that it is described and discussed herein in the event a similar figurine is located elsewhere.

Figure 1. General location of Hibbard's carved seal find in Montana.

HISTORIC SETTLEMENT OF THE FIND LOCALITY

Although the Adel locality seems remote, a search through the Bureau of Land Management's General Land Office Records Website revealed

that the area was settled by the 1890s. John B Swarbrick was issued homestead patents in 1900, 1904, and 1909 for most of the section where the bone artifact was discovered (BLM 2023a). An additional homestead patent was issued in 1911 to James G. Wiederhold for a small area at and adjacent to (south of) the carved seal find locale (BLM 2023b). Around 1911 or 1912, two Belgian stockholders of the Belgo-Montana Company made a trip to Montana and purchased land for their corporation that included the carved seal find locality. They established a ranch that received the moniker of "Wooden Shoe", in part because most of the ranch employees were from Holland. At mealtime, the men would leave their wooden shoes lined up on the porch (Cascade Historical Committee 1970:143-144).

The 1962, 1:24,000 scale topographic map shows two buildings designated as "Wooden Shoe Camp" approximately 0.5 miles (700 m) northwest of the carved seal find spot, and the "Middle Creek Camp" 0.8-mile (1400 m) northeast. The 1893 GLO Survey Plat shows these buildings as well as an unnamed cabin 0.3 miles (700 m) northeast of the carved seal find locality.

In 1919, the Wooden Shoe Ranch was put up for sale and the stockholders returned to their homeland. By February 1920, the ranch was purchased by Sieben Livestock Co (Cascade Historical Committee 1970:254-255). While the land where the carved seal was discovered has been owned by the Sieben and Hibbard families since 1920, the current generation has no reason to believe their parents or grandparents knew of this artifact before its re-discovery in 1975. The historical record demonstrates that several people lived near the artifact find from ca. 1890 until Henry Sieben purchased the land in 1920. The carved seal could be associated with any of those former occupants, or some other explanation is entirely possible too.

DESCRIPTION OF THE CARVED SEAL FIGURINE

The large figurine is the image of a prone seal with its head held up (Figures 2-4). It is designed to lay flat on its underside. The medium on which it is carved is a heavy bone (probably a flat bone) from a large marine mammal. Currently we believe that the bone is from a whale. The base/underside of the artifact, as well as the front and rear flippers, utilize the flat and smooth surface of the bone's periosteum while much of the rest of the body of the figurine is exposed red marrow cancellous tissue. The cancellous tissue cells are quite large compared to those found in the flat bones of bison or domestic cattle.

The artifact measures 12 inches (30.5 cm) in length by 3.75 inches (9.5 cm) at its widest point

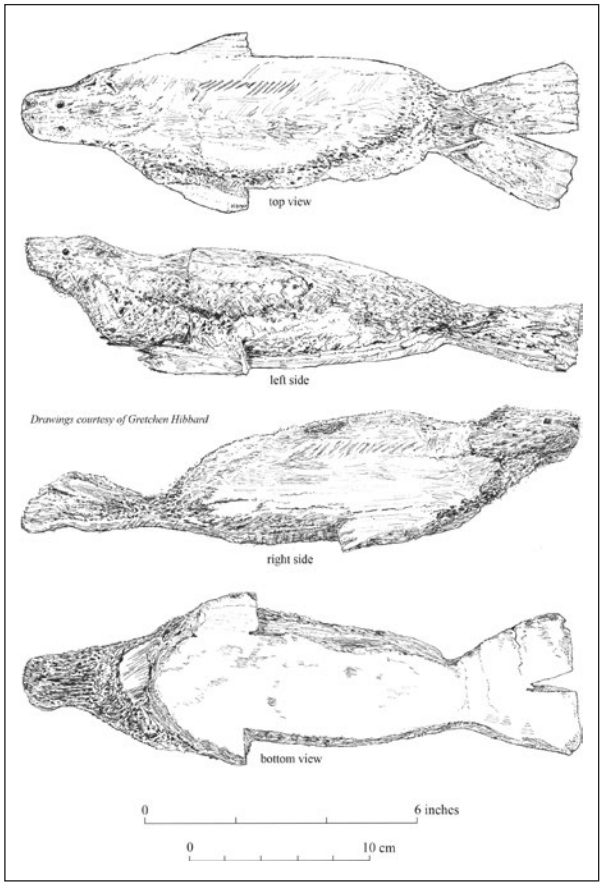

Figure 2. Scaled line drawings of Hibbard's carved seal.

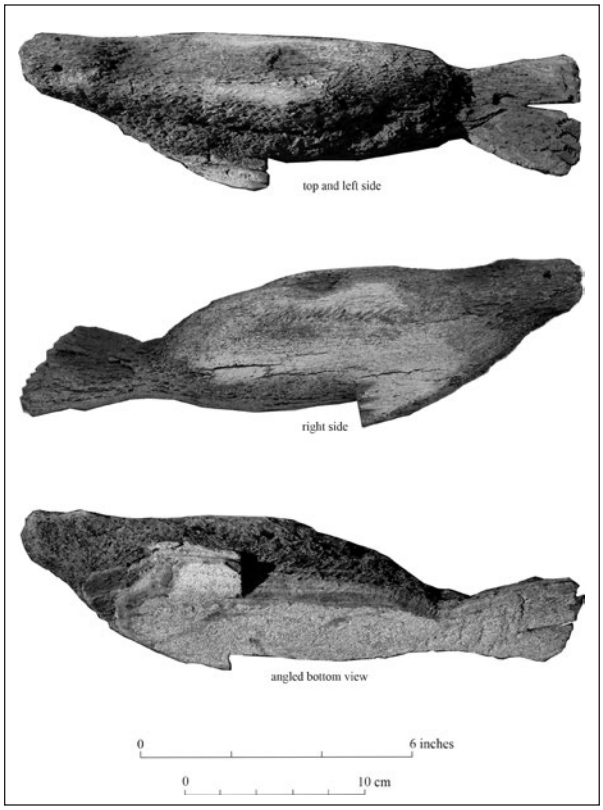

Figure 3. Side, top and bottom photographs of Hibbard's carved seal.

Figure 4. Angled frontal view of Hibbard's carved seal.

by 3 inches (7.6 cm) at its highest point. The artifact weighs 13.2 ounces (374.22 grams). The eyes and nostrils are drilled holes approximately 1/8 inch (3 mm) in diameter. The eye holes are shallower than the nostril hole at 3/32 to 1/8 inch (2-3 mm) in depth. The left nostril hole is approximately 3/16 inch (3 mm) in depth 1/8 inch (2-3 mm) in depth. The right nostril hole has largely exfoliated so only a faint impression still exists. The eye and nostril holes are not symmetrical and tend to taper with depth. This suggests that neither a metal drill bit nor commercial manufacturing process was used in construction of the figurine. The figurine is suffering the effects of being exposed to the elements for an unknown number of years before it was discovered and brought indoors in 1975.

Several individuals familiar with marine mammal osteology and coastal archaeology were consulted on the find. All lean toward the material being whale bone (Robert Ackerman, John "Jack" Horner, Jr., R. Lee Lyman, Dave McMahan, George Oberst, Dan Parrott, Tom Roll pers. comm. 2005). Most of those consulted also lean toward the artifact being a late 19th century or early 20th century maritime figurine made for the tourist trade. None believe the piece is associated with precontact Native Americans. There is merit to this position as it appears that a metal rasp or file was used to make serial, linear grooves in the piece, and

also to shape the flippers. No one consulted had seen an object sufficiently similar in appearance. The consensus is it was likely purchased at or near a port in either western Europe or the east or west coasts of America—including Alaska. A match could neither be found on the internet, nor in Dorothy Jean Ray's classic book on Eskimo Art (Ray 1977).

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ORGANIZATIONS THAT SUPPORT ARCHAEOLOGICAL AND HISTORIC PRESERVATION WORK IN MONTANA

THE EXTREME HISTORY PROJECT

CRYSTAL ALEGRIA
MARSHA FULTON

"HISTORY ISN'T PRETTY." At The Extreme History Project headquarters, we say this at least once a day. In our work we uncover the hard truths of the historical past with a goal to interpret this history in a way that is useful and relevant for those of us living today.

Founders Marsha Fulton and Crystal Alegria started working on what would become The Extreme History Project in 2009. They were both interested in the history of Fort Parker, the First Crow Indian Agency located near present day Livingston, Montana (Figure 1). This place called to both of them for different reasons and they converged in tracking and documenting the history of this significant place. As they traveled through Montana researching the history of Fort Parker, they had conversations that encompassed larger ideas and philosophies surrounding the current state of public history and archaeology in the U.S. These conversations through long stretches of the Montana landscape were deep, intense, and paradigm-shifting. It became apparent that it was important to bring Fort Parker history to the public, but it also became imperative to bring other marginalized histories to the surface as well, so The Extreme History Project was born.

Figure 1. The Extreme History Project Board Member, Shane Doyle, standing in front of an iron teepee at Fort Parker, the First Crow Indian Agency.

Social ills such as cultural and historical trauma, prejudices, historical denial and other issues undermine the fabric of society by creating divisions, anger and hate. Often these problems stem from a lack of understanding and transparency of the underlining history which caused the formation of these conditions. The Extreme History Project looks for opportunities to research and interpret these histories which will lead to a dialogue that fosters healing for individuals, communities and society as a whole. An understanding of our shared history and the complexities which formed our modern society has the potential to ignite an empathy response where only misunderstanding and

Figure 2. Historic walking tour participants standing in front of Bozeman's Story Mansion.

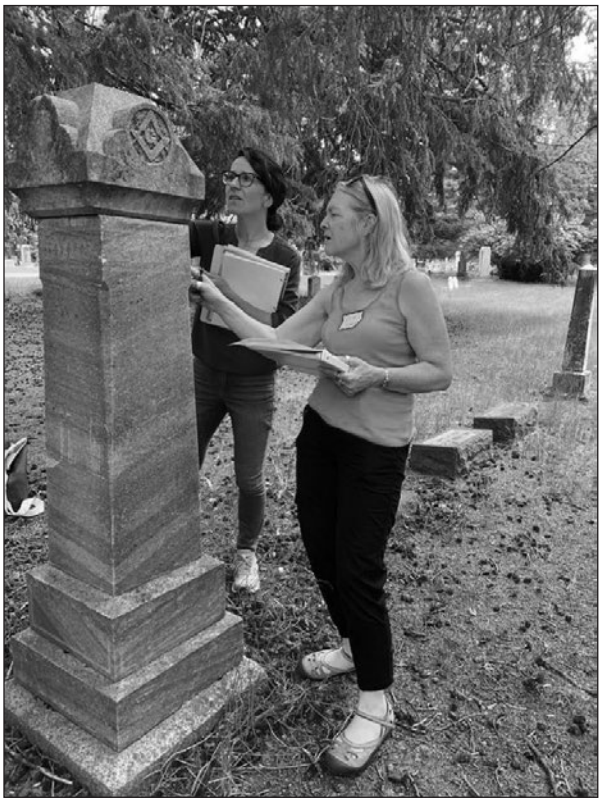

Figure 3. The Extreme History Project's Symbolism in the Cemetery Workshop. Participants looking at headstone symbolism in Bozeman's Sunset Hills Cemetery. Photo courtesy of Charlene Porslid.

antipathy previously existed. This response can lead to building bridges between alienated communities, as well as sharing in the construction of a new social paradigm.

To attain our goal of increased dialogue around historical themes and making history relevant, we bring history to the public in many ways including historic walking tours, bus tours, a lecture series, workshops, The Dirt on the Past podcast, documentaries, oral history documentation, archaeological experiences, presentations on historical subjects, a book club, historic preservation projects, historical research, publications, and other historical programming (Figure 2 and 3). We strive to bring people to places where history happened so they can experience the past and connect with it for deeper understanding.

We believe in community building, collaboration, and creating a model that will inspire others to look at how history has shaped their communities' landscapes and how giving voice to that history can affect positive change. We collaborate with many organizations, universities, and individuals to accomplish this work and hopefully foster new ideas, policy, and ultimately social change supporting inclusion and equity.

To learn more about The Extreme History Project follow us on social media and make sure to check out our website at www.extremehistoryproject.org. And remember, History isn't Pretty but it is so important to know, because it is the very thing that has led us to the most critical concerns that we have in the present.

PRESERVE MONTANA

CHERE JIUSTO

HIKING ALONG A WINDSWEPT RIDGE, a seasoned archaeologist leads a small team who are surveying and monitoring high elevation sites in the Big Belt Mountains (Figure 4). Far above the Helena Valley, there are drive lines and sites that speak of a time long ago when big horn sheep were hunted along the crests of these mountain ridges. Among the crew are the lead archaeologist, two National Forest archaeological staff, a PhD student intern from Oklahoma, and a bone-sniffing dog. The goal of the work is to better understand patterns of life in these mountains thousands of years in the past.

This project is one of many hosted by Preserve Montana (PMT), the statewide non-profit founded in 1987 to save and protect Montana's historic places, traditional landscapes and cultural heritage. The organization was launched by a group of historians, architects, and preservation-minded community leaders to preserve places that hold our stories and shape who we are as Montanans. We serve the entire state of Montana with special attention to endangered historic places of significance and communities where our resources are most needed -- the rural, remote, underrepresented, and underserved. Our mission spans the arc of time and the experience of all people, from places of great antiquity to places of the recent past.

Figure 4. Crew members on the summit of Mt. Edith in the Helena-Lewis and Clark National Forest, July 2022. Photo courtesy of Meghan Dudley.

Figure 5. Participants in the PMT's 2016 Red Lodge area Preserve Montana Road Show toured the Beartooth Highway in vintage Yellowstone Buses.

From those beginnings, Preserve Montana has grown to be a regional leader in the realm of historic preservation, working with many partners – from agencies and local officials to communities, other non-profits, and private owners – to better understand and preserve outstanding historic places throughout the state. Our approach involves an innovative blend of Advocacy, Education, Documentation, and Restoration & Training – four distinct program areas that focus on recording, celebrating, and preserving Montana's past.

Among the flagship efforts have been award-winning books on barns and schoolhouses, the documentation of two dozen battlefields that had not been fully recorded, and recordation of the more than 800 historic schoolhouses that still remain on the Montana landscape. Building on a base of thorough research and collaboration with agencies, native tribes and communities, we have produced touring conferences, interpretive plans, the Explore Montana mobile app, feasibility studies on endangered properties, and National Register and National Historic Landmark listings from Butte to Lame Deer, for places deserving of recognition and preservation (Figure 5).

At the heart of this work has been a long-standing commitment to education by Preserve Montana and its staff and board. Whenever possible, our projects combine active program work with educational opportunities for students, interns, professionals seeking new skills, and volunteers. This has given us the chance to host dozens of community workshops and collaborate with a diverse circle of faculty and students from 16 colleges and 10 countries.

Most recently, we are expanding our work with historic properties through an ambitious three-year initiative to adopt, move and refurbish the 1890s-era Baxendale Schoolhouse as a training center for restoration carpentry and traditional building skills (Figure 6). When

Figure 6. Preserve Montana will open the Baxendale Restoration Center for Historic Trades pictured here on the western edge of Helena, in summer 2023. Photo courtesy of DKAL Architecture/Preserve Montana.

we open the doors to our schoolhouse this summer, it will house a workshop for teaching disappearing historic trades skills. Our new Big Sky Restoration Crew will be based here, a corps-program for able young Montanans to work alongside skilled restoration specialists to learn carpentry, masonry, window restoration and more as they help to stabilize and preserve Montana heritage properties.

To round out these efforts, PMT has long advocated for important institutional funding – including preservation dollars for such places such as Virginia City and Bannack, and notably, the passage of the Montana Museums Act in 2019 which created significant funding for museums and iconic buildings across the state. From great homes like the Daly Mansion and the Moss Mansion, to unique public buildings such as the Fort Peck Theatre, to small town museums in Libby and Havre, grant funds are now spread throughout the state, preserving heritage and sparking economic vitality as they are awarded.

For more information, to become a member, to support our good work, or join in on a project, please visit us at our offices in downtown Helena, or online at www.preservemontana.org; and follow us on Facebook and Instagram.

Ann Johnson Receives Lifetime Achievement Award

PATRICK J. RENNIE

THE MONTANA ARCHAEOLOGICAL SOCIETY (MAS) recognizes Dr. Ann Johnson of Kalispell, Montana, for a distinguished archaeological career (Figure 1). Ann has been a member of the Montana Archaeological Society (MAS) since 1964 and attended her first MAS meeting in Great Falls in 1966. She was President from 2001-2002, and ably served as editor of *Archaeology in Montana* for 28 years (1990, 1995-2022). During her 58 years with the MAS, she authored or co-authored 33 articles for *Archaeology in Montana*.

In addition to the previously mentioned *Archaeology in Montana* articles, from 1970 through 2022 Ann authored or co-authored numerous articles on Plains archaeology in *Southwestern Lore, Plains Anthropologist, Saskatchewan Archaeological Society Newsletter, American Antiquity, Park Science, and South Dakota Archaeology.* She also authored or co-authored three book chapters, and a monograph as a *Special Publication of the South Dakota Archaeological Society, Number 1*.

In her youth, Ann joined the Milk River Archaeological Society (ca.1964) and is the last surviving member. The MRAS was instrumental in investigating and documenting several important sites in northern Montana including Wahkpa Chu'gn (24HL101), Timber Ridge (24BL101), Snake Butte Petroglyphs (24BL105), and the Keaster site (24PH401).

Ann received her B.A. and M.A. degrees from the University of Montana (1970 and 1972) and a doctorate in Anthropology from the University of Missouri-Columbia in 1977.

Ann Johnson accepting the Lifetime Achievement Award.

She worked at the Office of the Colorado State Archaeologist from 1976-1978, the Bureau of Land Management-Casper District from 1978-1980, and the National Park Service from 1980-2008. Ann's time with the Park Service is probably best known from 1994-2008 when she served as Yellowstone National Park Archaeologist and later the Chief of Cultural Resources.

While Ann's regional archaeological interest and expertise is in the American Great Plains and adjacent mountain areas, she is probably best recognized as an expert in ceramics and archaeological cultures of the past 3,000 years from

these regions. In recent years Ann has pursued her interest in sourceable volcanic toolstone.

Ann's contributions to archaeology exceed what is highlighted here. In addition to a lifetime of fieldwork, lecturing, instructing and drafting more than 100 cultural resource management reports, Ann served as editor of *Southwestern Lore* from 1981-1990. She was also a Board Member of the Plains Anthropological Society from 1994-1996 and was Research Associate in Archaeology and Adjunct Curator of Archaeology and Anthropology for the Museum of the Rockies, Montana State University, Bozeman from 1991-2000. Additionally, Ann continues to provide peer review for *American Antiquity* and *Plains Anthropologist* article submissions.

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Pamela Bompart Receives the 2023 MAS Conservation Archaeology Award

PATRICK J. RENNIE

THE CONSERVATION COMMITTEE of the Montana Archaeological Society (MAS) nominated Pamela Bompart of Jefferson City, Montana, for the 2023 Conservation Award (Figure 1). Pamela Bompart was first exposed to archaeology in 1950 when Carling Malouf approached Pamela's step-father, James Bompart, about conducting archaeological investigations at the MacHaffie site (24JF4) located on property Mr. Bompart owned. Mr. Bompart recognized the site's importance and provided access for archaeological work to begin in 1951. Richard G. Forbis conducted the 1951 investigative work and the findings became the subject of his doctoral dissertation (Forbis 1955). Pamela recalls visiting Forbis' excavation and from that experience developing an understanding of the national significance of the MacHaffie site. Intermittently she would identify archaeology on the landscape— some of which has since been destroyed through various developments. It was clear to her that Montana's archaeological resources are slowly but increasingly disappearing.

Pamela Bompart accepting the Conservation Award.

Dave Schwab (1986) nominated the MacHaffie site to the National Register of Historic Places and it was formally listed on April 3, 1986. Subsequently, Leslie B. Davis, a student of Richard Forbis at the University of Calgary, desired to re-examine the MacHaffie site. His meeting with Pamela to discuss his academic interest developed into a stronger personal connection. As fate would have it, Ms. Bompart would later marry Dr. Davis and remain enveloped in the world of archaeology. Davis conducted intermittent investigations at the MacHaffie site from 1989 until 2010. Compounding health issues and his passing in 2014 prevented him from completing his work.

A comprehensive study of the MacHaffie site (Rennie et al. 2022) may not have occurred but for Pamela's vigilance, sound judgment, persistence, encouragement, and generosity. Ms. Bompart funded much of the specialized analyses for the MacHaffie research project from 1989 through its completion in

2018. She subsequently donated the cultural material recovered from the MacHaffie site to the University of Montana Anthropological Curation Facility to consolidate those pieces as a single research collection. An unprecedented mark of her generosity was the donation of the MacHaffie site to the Archaeological Conservancy in an effort to protect the site from vandalism and future housing development (Davis 2009). MacHaffie is the first and only Montana archaeological resource donated to the Archaeological Conservancy.

Pamela continues to be involved with the MAS and has donated numerous curios, artwork, and books of Les Davis' to MAS auctions over the past ten years for fund raising opportunities. She has also made substantial monetary donations for continued support of MAS activities. Although many people have an interest in archaeology, Pamela Bompart has made contributions that have resulted in meaningful comparative research and resource preservation. The Montana Archaeological Society is grateful for her interest and efforts.

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HENRY L. ARMSTONG

Friend Of Central Montana History And Archaeology

ANN JOHNSON

HENRY L. ARMSTRONG (March 21, 1927-March 12, 2023), was a well-respected gentleman and historian for the Geraldine community, Chouteau County and beyond. Henry's (aka Hank's) obituary appeared in the *Great Falls Tribune* on March 21, 2023 and contains a detailed telling of Hank's life. In this remembrance, we wish to emphasize his interest in and contributions to cultural resources, especially the history and archaeology of central Montana.

Hank grew up on the Armstrong homestead farm attending school in Geraldine and he developed strong ties to the land and the local people. His lifelong love of music, art, and history began in high school. Upon his discharge from the Marine Corps, Hank returned to help his parents on the farm. Quiet and soft spoken, Hank worked as a crop adjuster, served as a Boy Scout leader and a basketball referee, and as a result, knew everyone in the "neighborhood." Hank enjoyed a wide range of activities including photography, archaeology, genealogy, and research which he applied in site documentation, National Register of Historic Places nominations, and his books on local history. A good example of his curiosity, research skills, and persistence is shown by the "R" stones (Armstrong 1998). Over several decades Hank continued his investigations into their purpose and function. These glacial boulders marked early local roads but as their use stopped prior to 1918, few knew their story.

An intelligent curious person with an active mind, he investigated prehistoric and historic sites in central Montana. One local landmark was Square Butte, which is about eight miles from Geraldine, where he found multiple archaeological and historic sites (Davis et al. 2011; Johnson and Armstrong 1990). Square Butte is an igneous intrusion made up largely of shonkonite. Hank documented the remains of historic mining of the shonkonite. This stone was sought after for tombstones in Great Falls and around the state. Hank documented the history of this quarry, the town of Square Butte whose population was largely tied to the mining, and the local Milwaukee Railroad Depot.

Henry L. Armstrong

This soft spoken man was always willing

to share his information. He became friends with professional archaeologists including Ruthann Knudson, Leslie B. Davis, Ann Johnson, Patrick Rennie, and Steve Aaberg, who valued his expertise on the local cultural resources. It was a treat to go on a tour with Hank who could provide many details of the geology, vegetation, prehistory, and history. He was clearly the go to person for information on central Montana.

When not making a living, Hank spent his life researching and preserving history, doing archaeological exploration, and nominating buildings for the National Register of Historic Places. He was a member of the Geraldine Historical Committee, the River and Plains Society, the Montana Agricultural Museum and Center, the Overholser Historical Research Center, the Montana Farmers' Union, the Montana Archaeological Society, and was the longest standing member of the Montana Historical Society (MHS). He wrote seven books about local history, along with countless articles, and compiled the community history with the Geraldine Historical Committee in two books: *Spokes, Spurs, and Cockleburs* and *Beyond Spokes*. He and his wife Norma were regular attendees at the annual meeting of the Montana Archaeological Society.

In recent years, he volunteered at the Montana Agricultural Museum and Center. He was an expert in searching homestead records. Ann Johnson recalls mentioning that her great grandparents homesteaded near Fort Assiniboine and, not very long thereafter, a packet arrived from Hank showing the land records with their 1880s homestead.

Over the years, Henry received several awards for his work including the State Historic Preservation Award (1997-98); the Montana Farmer's Union Centennial Farm Award (2009); the Montana Historical Society 2015 Heritage Keeper Award; and the Trowel & Pen Award presented by the Montana Archaeological Society (2016). We will miss him.

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