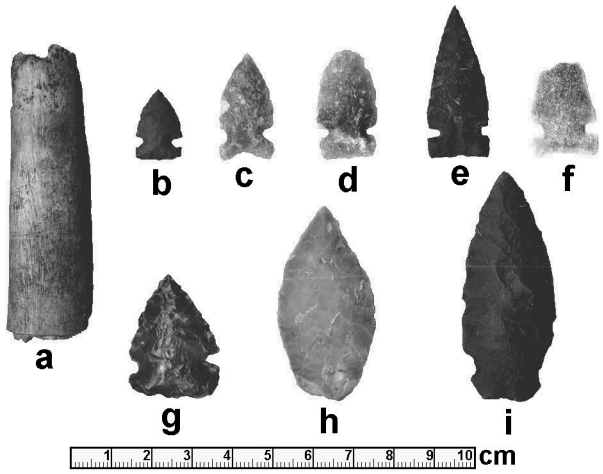
THE WYOMING ARCHAEOLOGIST



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IN MEMORIUM

MARY HELEN HENDRY
1924-2000

Funeral services for Mary Helen Hendry, 76, a long-time Lysite rancher, regional writer and Natrona County school board member, were held Monday, August 7th, 2000 at Memorial Chapel in Casper with the Reverand Bill Moore of the Casper First United Methodist Church officiating. Cremation has taken place and her ashes will be spread alongside her husband's on the family ranch, Clear Creek Cattle Company.

She died July 31, 2000 in Casper after a brief bout with cancer.

Friends remembered Hendry's sharp personality, feisty spirit and wry sense of humor.

She was born Feb. 17, 1924, in Burnett, Texas, the daughter of John and Margaret (Hibler) Cheatham. She grew up in Texas until the family moved to Craig, Colo., where she graduated from high school in 1943. The family moved to Casper in 1948 when her father was transferred to work at the Texaco Refinery.

She married James D. Hendry on Oct. 18, 1950, in Casper. He preceded her in death Dec. 6, 1998.

She had many interests and hobbies. She wrote stories for the Casper Star-Tribute about ranch life and the people she met in the Lost Cabin-Lysite community. The stories were later published in a book, "Tales of Old Lost Cabin."

She also wrote two other books, "Petticoats and Pistols," and "Indian Rock Art in Wyoming."

She was very interested in art and pained several pictures and experimented with different raw materials to turn into pictures. She received a master of fine arts degree from the University of Wyoming in 1972 and was instrumental in starting the Nicolaysen Art Museum in Casper.

Survivors include one son, Robert and his wife of Lost Cabin; two grandsons, J.W. and Jarrod; and one brother, John Cheatham Jr., of California. She was preceded in death by her husband and parents.

Memorials may be made to Wyoming Stock Growers Legal Fund, P.O. Box 206, Cheyenne, Wyoming 82003.

FROM: *Casper Star Tribune*, August 1, 2000, page 1, 10 and August 2, 2000, page B3.

IN MEMORIUM

WINNIE E. BELZ
1919-2000

Winnie Belz, 81, a long time member of the Wyoming Archaeological Society, died October 5, 2000. Cremation has taken place. She was born July 27, 1919, in Chicago, the daughter of John A. Wood and Winnie (Brown) Wood. Her early childhood was in Chicago and Glen Ellyn, Ill.

She graduated from Glenbard High School in 1937. She was in nurse's training at St. Luke's Hospital, Chicago, until her marriage to Carlton W. Belz on Feb. 5, 1944. They moved to Casper in 1944 and had lived there since. She later graduated from Chadron State College in 1963 with a bachelor's degree in education. She retired from the Natrona County School District in 1983 after 23 years of teaching third graders.

Survivors include her husband of Casper; sons, Douglas C. Belz of Rochester, Wash., and John H. Belz of Steamboat Springs, Colo.; five grandchildren; and one great-grandchild. Memorials or remembrances may be sent in care of the Casper Alzheimers Association.

Winnie's infectious smile and kindness touched everyone she met. She always had a kind, positive word for those who crossed her path. Former students, grown now with children of their own, remember Winnie as being a tough teacher, but loved and respected and many of them continued to stay in touch with her.

Winnie and her husband Carl made numerous contributions, both monetary and volunteer, to the Wyoming Archaeological Society and were members for many years. In April of 2000, the Wyoming Archaeological Society presented Carl and Winnie Belz an honorary lifetime membership to the organization in recognition of their years of service, dedication and true friendship to Wyoming archaeology.

The Wyoming Archaeological Society extends their heartfelt condolences and sympathy to Carl Belz and his sons on the loss of their wife, mother, and grandmother. She will be missed.

ANNOUNCMENTS

WYOMING ARCHAEOLOGY MONTH, 2000
THEME: Connecting the Continent:
Obsidian Cliff

September 2000 is Archaeology Awareness Month in Wyoming. This event consists of a series of statewide activities and programs devoted to educating the public about the value and importance of Wyoming's archaeological heritage. It is sponsored by a consortium of professional and avocational archaeologists to promote knowledge and stewardship of our state's cultural resources. The theme chosen for Wyoming Archaeology Awareness Month 2000 is "Connecting the Continent." Obsidian Cliff, located in Yellowstone National Park, was chosen to portray this theme. Obsidian Cliff is an internationally recognized site which symbolizes the ability of archaeology as a discipline to link people through time and space and across cultures.

Yellowstone National Park's Obsidian Cliff Plateau is one of the most renowned sources of obsidian in the United States. The site's obsidian, a shiny volcanic glass, was used in the manufacture of stone tools by past Native American peoples for more than 10,000 years.

The volcanic glass was quarried and made into many types of tools, from simple flake tools used to cut hides or butcher animals for meat, to arrowheads or spear points, to large ceremonial artifacts. The wide temporal and geographic distribution of tools and debris associated with the manufacture and trade of obsidian implements attests to the popularity of this raw material to Native Americans through time.

For archaeologists, obsidian is very useful in providing insights about the lives of past Native Americans. Each geologic source of obsidian has a unique chemical composition of trace elements that can be identified through sophisticated x-ray techniques and other methods. By analyzing the chemical composition of the artifacts and the geologic sources, such as Obsidian Cliff Plateau, obsidian artifacts can be traced to their geologic source by their "chemical fingerprint." Through these techniques, it has been found that prehistoric peoples started using Obsidian Cliff obsidian from earliest Clovis and Folsom times, more than 10,000 years ago, up until the recent past. Historic records indicate that in the early 1800s white explorers and trappers in the Yellowstone region encountered Sheepeater (Shoshone) Indians carrying arrows tipped with obsidian arrowheads.

The special place of Obsidian Cliff in the prehistory of North America is also demonstrated by the wide geographic range of its obsidian. Besides western Canada and all the states surrounding Yellowstone and Wyoming, obsidian has been found in archaeological sites throughout the Midwest, as far east as Ohio, a distance of more than 1,500 miles. The archaeological obsidian found in Ohio mostly belongs to sites of the Hopewell Culture that flourished from around 1,600 to 2,200 years ago. People of the Hopewell Culture built many complex ceremonial centers with large mounds and other earthworks. At these sites a wide range of exotic raw materials from distant locales were collected and traded, including obsidian from Yellowstone, marine shells from the Atlantic and Gulf coasts, and copper from the northern Great Lakes region.

Evidence from the Hopewell sites indicates that much of the Yellowstone obsidian was transported to the Midwest in very large pieces and then made into hundreds of large, beautiful artifacts, some nearly 15 inches long. One piece of obsidian found at a Hopewell site weighed between 25 and 30 pounds, providing some idea of the size of items transported out of Yellowstone.

It is not known exactly how the Yellowstone obsidian actually got to these distant locales, but it is likely that exotic goods moved through overlapping trade networks across the continent. While exotic items such as obsidian may have been the primary goal for the trade, news and information were also likely exchanged, linking peoples occupying the vast distances of the continent. It is probably no coincidence that at the same time obsidian was being transported to the Hopewell groups, there was also an increase in the use of obsidian in the Yellowstone area.

The importance of Obsidian Cliff to the prehistory of the United States is demonstrated by its listing as a National Historic Landmark. This designation emphasizes that such places need to be preserved and

protected so this valuable resource can be available for future generations to study and enjoy. While the unauthorized collection of cultural or natural specimens from Yellowstone has been illegal for more than 100 years, the importance of Obsidian Cliff makes it even more crucial that people are discouraged from this practice. This situation is becoming more difficult to control due to the millions of tourists visiting Yellowstone National Park annually. The cumulative effect of unauthorized collection severely damages this nonrenewable resource.

(FROM:http://spacr.state.wy.us/cr/shpo/cliff.htm. Text by Paul Sanders, Office of the Wyoming State Archaeologist)

2000 WYOMING ARCHAEOLOGY MONTH PROCLAMATION BY GOVERNOR jIM GERINGER

ARCHAEOLOGY is the scientific study of material remains of past human life such as fossil relics, artifacts, and monuments. Archaeology helps us better interpret the material evidence of past human behavior, and gives us some idea about how previous human experiences have influenced and shaped the world we live in today. The building blocks for the future rest on the foundation of the past.

WYOMING'S CULTURAL HERITAGE is one of our most enduring assets. A rich archaeological record is part of this heritage which spans nearly 12,000 years of human occupation, reaching every corner of the state. Citizens are understandably proud of this legacy which is Wyoming's unique signature in the annals of this nation.

WYOMING ARCHAEOLOGICAL AWARENESS MONTH was created to better acquaint the public with the discipline of archaeology, and to help strengthen the enduring bond between past and present in the fabric of human society.

THE THEME for this year's celebration is "Connecting the Continent – Obsidian Cliff." Located in Yellowstone National Park, Obsidian Cliff is a prehistoric stone quarry that supplied human groups with raw material for tools and implements for thousands of years. Scientists have traced artifacts made from this quarry to sites all over North America, truly connecting the distant reaches of the continent.

THE GREATER YELLOWSTONE area is an ideal landscape to study the evolution of cultural behavior in the Rocky Mountain West from prehistoric to modern times. The mining of obsidian, hunting of big game, and gathering of plants for food and medicine all were part of the regional ecosystem since the end of the last Ice Age. They, too, are chapters in the story of Yellowstone that need to be told.

AS WE ENTER A NEW MILLENNIUM, we should reflect on the role of culture in shaping and conditioning the world in which we live. Such curiosity nurtures the human intellect. Just as Obsidian Cliff connected the continent in our distant past, Wyoming's abundant natural resources link us today through tourism and industry.

FOR THESE SIGNIFICANT REASONS, I, JIM GERINGER, Governor of the State of Wyoming, do hereby proclaim the month of September 2000 to be

"ARCHAEOLOGY AWARENESS MONTH"

in Wyoming and urge the people of Wyoming to take part in the activities planned to enhance public awareness of archaeology.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Executive Seal of the Office of the Governor to be affixed this 24th day of August, 2000.

(signed) Governor

ATTEST:
Secretary of State

WYOMING ARCHAEOLOGICAL MONTH CALENDAR OF EVENTS, SUMMER-FALL 2000

WAAM KEYNOTE LECTURE

"Skull Wars – Archaeology and the Battle for Native American Identity," lecture by Dr. David Hurst

Thomas, Saturday, September 30, 2000, 7:30 p.m. at the Buffalo Bill Historical Center, Cody, Wyoming. Wyoming. This lecture will examine the contentious relationships and centuries of conflict between American Indians and the non-Indian people who have studied them. Dr. Thomas has been Curator of North American Archaeology at the American Museum of Natural History in New York City for the past 30 years. He has conducted excavations in the Great Basin, the American southwest and the south-eastern United States, and is the author of several hundred articles and books on North American archaeology. He is a member of the National Academy of Science and served on the founding board of the Museum of the American Indian.

There will be a reception and book signing hosted by the Wyoming Association of Professional Archaeologists on Friday, September 29 from 5:30 to 6:30 p.m. at the Holi-day Inn in Cody. The keynote lecture is free and open to the public.

GENERAL

The Office of the Wyoming State Archaeologist Public Program has two traveling exhibits with text and photographs pertaining to Wyoming archaeology. These can be made available on loan to schools and museums. One portrays Dr. George C. Frison and several of the sites he has investigated. The other covers Wyoming's cultural chronology and selected sites from each time period. If you would like more information on availability, contact Judith A. Brown, Curator, (307) 766-3671; The Office of the Wyoming State Archaeologist Public Program has a list of speakers who would be willing to give a program on archaeology. For more information, contact Mark Miller at (307) 766-5564, mmiller@uwyo.edu.

CASPER

Casper Chapter, Wyoming Archaeological Society. Business meeting followed by a guest lecture; 2nd Wednesday of every month, September through May, at the Career Studies Building, Casper College. For more information, contact Kerry Lippincott, 441 Kirk Avenue, Casper, WY 82601; (307) 235-8952; Lippincott@caspers.net.

CHEYENNE

Cheyenne Chapter, Wyoming Archaeological Society. Meetings held 3rd Thursday of every month, 7 p.m., Laramie County Community College. Field trips are held in lieu of meetings during the summer months. For more information, contact Susan Carlson, (307) 634-0629 or Susan Adams, (307) 632-1273.

F. E. Warren Archeology Interpretive Center, self-guided tour. Open 8-4 Monday through Friday, year-round. From the Visitors Center at the front gate, call extension 2980 for access. For more information, contact Rick Bryant, 90th CES/CEVH, 300 Vesle Drive, F.E. Warren A.F.B., WY 82005; phone (307) 773-3667;RICHARD.BRYANT@ WARREN.AF.MIL.

Wyoming State Museum, history and archaeology displays. 2301 Central Avenue, Cheyenne. Open Tuesday - Saturday, 9 a.m. - 4:30 p.m. For more information on the 2000 Lecture Series, contact Heyward Schrock, (307) 777-7021; hschro@state.wy.us or wsm@state.wy.us.

Foothill-Mountain Atlatl and Primitive Archery Competition, Curt Gowdy State Park (located between Cheyenne and Laramie). July 22-23, 2000. The atlatl contest will be held on Saturday and is open to all ages and genders with registration at 9 a.m. and competition at 10 a.m. The primitive archery contest will be on Sunday, registration at 8 a.m. and competition at 9 a.m. Saturday's event will also include the International Standard Accuracy Contest (ISAC) for atlatls. Approximately 14 contestants from Europe, including the 1998 ISAC winner, Pascal Chaveaux, will be attending. The course is rugged and strenuous. For more information, contact Russell Richard at (307) 772-0550 or Gary and Regina Dodson at (307) 632-0766; wyowinds@aol.com.

CODY

Absaroka Chapter, Wyoming Archaeological Society. Meetings held 2nd Friday of each month, Barling Room, Park County Courthouse, 7 p.m. April and May – Lab training; June through August – Platt Site Field School with Northwest College; July through August – various field trips scheduled; September through November – regular meetings with special speakers on their summer projects. For more information, contact Barbara Nahas Keiry, P.O. Box 725, Cody, WY 82414; (307) 868-2685; nahas@tctwest.net.

Wyoming Archaeological Society annual spring meeting; theme is "Traveling and Trading Thru the Ages." Keynote speaker: Dr. Bruce Bradley, "The Solutrean Solution to Clovis: Did Some Ancient Americans Come From Europe?" April 21-23, 2000; Holiday Inn, Cody, Wyoming. For more information, contact Barbara Nahas Keiry, P.O. Box 725, Cody, WY 82414; (307) 868-2685; nahas@tctwest.net.

Wyoming Association of Professional Archaeologists, fall meeting, 1:00 p.m., Friday, September 29, 2000; Buffalo Bill Historical Center. A field trip is planned for Saturday morning. For more information, contact Craig Smith, (307) 742-3843, csmith@trccos.com or Ranel S. Capron, (307) 775-6108, Ranel_Capron@blm.gov.

DOUGLAS

Woody Creek Site Recording and Testing, Thunder Basin National Grassland, June 25-30, 2000. This is a U.S. Forest Service Passport in Time project that will investigate unexplored areas along the banks of Woody Creek, testing and recording any sites that are located. There are 8 openings for volunteers, 18 years of age or with a responsible adult. Primitive camping is available nearby; camper trailers can access project area if conditions are dry. For more information, contact Ian Ritchie, USFS Douglas Ranger District, 2250 East Richards St., Douglas, WY 82633; (307) 358-4690; iritchie@fs.fed.us.

EVANSTON

Evanston Chinatown Archaeological Excavation and Western Wyoming Community College Field School; July 5 - 28, 2000. Hands-on archaeology, Thursday evening lectures, tours of Chinese Joss House Museum. Professionals, students and volunteers welcome. Sponsored by the Evanston Historic Preservation Commission and Western Wyoming Community College. For more information, contact Jim Davis at (307) 783-6319 or Dudley Gardner at Western Wyoming Community College, (307) 382-1746; dgardner@wwcc.cc.wy.us/wyo_hist.

KEMMERER

Rocky Gap Historic Site Dedication Ceremony, June 24, 2000; 2:00 p.m.; 15 miles north of Kemmerer on Lincoln County Road 306. The Bureau of Land Management will be dedicating an interpretive sign donated by the Lincoln County Historical Society at the Rocky Gap Site on the Historic Oregon-California Trail, where the Dempsey-Hockaday Cutoff diverges from the Sublette Cutoff. For more information, contact Lynn Harrell, Bureau of Land Management, 312 Highway 189 North, Kemmerer, WY 83101; (307) 828-4515; Lynn_Harrell@blm.gov.

LANDER

Excavations at the Sand Draw Landfill Site will be going on May 1-9 and May 15-24, 2000. Sponsored by the Wyoming Bureau of Land Management and the Office of the Wyoming State Archaeologist. Location is about 12 miles south of Riverton, Wyoming. For more information, contact Danny Walker, P.O. Box 3431, Laramie, WY 82071; (307) 766-5565; dnwalker@uwyo.edu or Craig Bromley, Lander Bureau of Land Management; (307) 332-8400; Craig_Bromley@blm.gov.

LARAMIE

The University of Wyoming Archaeological Repository (UWAR) has developed an exhibit on obsidian artifacts found at archaeological sites in Wyoming. This exhibit will join a larger exhibit of obsidian artifacts and can be seen at the UW Anthropology Department museum, May 1 through October 31, 2000; 14th and Ivinson, Laramie.

Fort D.A. Russell Target and Maneuver Reserve Survey and Recording, July 9-15, 2000. This is a U.S. Forest Service Passport in Time project that will be surveying, recording and mapping camps and facilities associated with the military past of the area. There are 10 openings for volunteers at least 18 years of age. Tent sites and RV spaces are available at Hidden Valley Campground. Nearest towns are Laramie (15 miles) and Cheyenne (30 miles). For more information, contact Deana Wood, Medicine Bow-Routt National Forests, 2468 Jackson Street, Laramie, WY 82070-6535; (307) 745- 2308; dwood@fs.fed.us.

Lake Owens Caboose Rehabilitation, September 11-15, 2000. This is a U.S. Forest Service Passport in Time project. There are 10 openings for volunteers who would like to help clean and restore the caboose for future public use. Volunteers will also help with landscaping and trail construction to prepare the site for a premier interpretive location for historic railroads in Wyoming. Basic construction and landscaping skills required. Volunteers may be under 18 if with a responsible adult. The project is located at the Lake Owens Campground and campsites will be reserved for PIT volunteers. Laramie is 37 miles away. For more information, contact Deana Wood, Medicine Bow-Routt National Forests, 2468 Jackson Street, Laramie, WY 82070-6535; (307) 745-2308; dwood@fs.fed.us.

MULE CREEK JUNCTION

The George C. Frison Institute of Archaeology and Anthropology will be working at the Agate Basin site this summer, tentatively planned for June 19-29, 2000. For more information, contact Marcel Kornfeld at the Department of Anthropology, University of Wyoming, Laramie, 82071; (307) 766-3548; anpro1@uwyo.edu or Dr. George C. Frison, (307) 766-5137.

NEWCASTLE

Ancient Trails Chapter, Wyoming Archaeological Society. Meets the second Tuesday of every month. Because meeting places vary, call for details. Monthly meetings focus on guest speakers or ongoing projects, such as excavations and research on historic trails and ghost towns. During the summer, check whether special field projects have replaced the regular meeting. Several field trips are planned for summer 2000. For more information, contact Ange Cregger, Anna Miller Museum, (307) 746-4188, annamm@trib.com; or Dr. Alice Tratebas, Bureau of Land Management, (307) 746-4453, Alice_Tratebas@blm.gov.

"Hell Gap Revisited: Paleoindian Cultural Chronology and Other Problems," presentation by Dr. Marcel Kornfeld, University of Wyoming; October 10, 2000, Newcastle Public Library Meeting Room. Sponsored by the Ancient Trails Chapter of the Wyoming Archaeological Society. For more information, contact Ange Cregger, Anna Miller Museum, (307) 746-4188, annamm@trib.com; or Dr. Alice Tratebas, Bureau of Land Management, (307) 746-4453, Alice_Tratebas@blm.gov.

"The Licking Bison Kill Site," presentation by Michael Fosha, South Dakota State Archaeological Research Center, November 14, 2000, Newcastle Public Library Meeting Room. Sponsored by the Ancient Trails Chapter of the Wyoming Archaeological Society. For more information, contact Ange Cregger, Anna Miller Museum, (307) 746-4188, annamm@trib.com; or Dr. Alice Tratebas, Bureau of Land Management, (307) 746-4453, Alice_Tratebas@blm.gov.

PINE BLUFFS

High Plains Archaeology Project. Stratified campsite with levels extending from Paleoindian to Historic. For schedules or tours, call ahead to the High Plains Museum, (307) 245-9372, or Chuck Reher, Department of Anthropology, University of Wyoming, Laramie, 82071; (307) 766-2208; arrow@uwyo.edu.

ROCK SPRINGS

Sweetwater Chapter, Wyoming Archaeological Society will be sponsoring monthly lectures (usually the last Friday of each month) on archaeology topics and tours to archaeological sites. Excavations will be taking place at a number of sites in Sweetwater County this summer, ranging from Paleoindian campsites to Archaic and Late Prehistoric sites; including the Blue Point site, North Table Mountain Site (Bozovich site), Pine Springs, Krmpotich Site and others. Tours will be guided by local archaeologists on the week-ends. Participants must provide own transportation (4x4 vehicles may be necessary), food, water, etc. For more information, contact Patrick Lubinski, (307) 382-1666 or Russ Tanner, (307) 352-0223.

**"*Peopling of the New World*," lectures by Dennis Stanford and Peggy Jodry, Smithsonian Institution, Washington, D.C. In June, exact date to be announced. Western Wyoming Community College, Room 1302, Rock Springs, WY. Sponsored by the Sweetwater County Chapter of the Wyoming Archaeological Society. For more information, contact Russ Tanner, (307) 352-0223, Russ_Tanner@blm.gov or Patrick Lubinski, Archaeological Services, Western Wyoming Community College, (307) 382-1666.

Project Archaeology Teacher Workshop, June 13-15, 2000. Co-sponsored by Western Archaeological Services, Western Wyoming Community College and the Bureau of Land Management. Classes will be conducted at the College, Room 1223, from 7:30 a.m. to 4:30 p.m. For more information, contact Debbie Braithwaite at (307) 382-1666.

Western Wyoming Community College will again be excavating at the ***Bozovich site***, north of Rock Springs, June 12-26, 2000. Previous investigations at the site documented Paleoindian occupations through Historic contact. Students may enroll for 1-3 credits, based on length of participation; one credit can be earned for each five days of class. In-state tuition is $53 per credit hour. The class will meet daily at 7:30 a.m. at the Archaeology offices on the Rock Springs campus and return to campus at 4 p.m. Daily transportation to the site will be provided. There will be no formal field camp. Lodging will be available at campus dorms at a reduced rate. Rental housing is also available in town. Participants need to be in good physical condition. Rock Springs is located at 6300 ft. elevation and the class will entail strenuous work. For more information, contact Jana Pastor, (307) 382-1666 or jpastor@wwcc.cc.wy.us.

Excavation at the Pine Springs Site near Flaming Gorge Reservoir; tentatively set for June 12-July 10, 2000. One of the more important archaeological sites in southwest Wyoming, it was originally tested in 1963 and extensively excavated in 1964. Radiocarbon dates go back as far as 11,800 BP with the earlier excavations indicating three distinct occupations, containing bison, camel and bighorn sheep. There will be two 10-day sessions. Camping available near the site. For

more information, contact Robert Kelly, Department of Anthropology, University of Wyoming, Laramie, 82071; (307) 766-3135; RLKELLY@uwyo.edu.

Work at the ***Krmpotich Site*** will continue this summer, expanding the excavation beyond the preliminary testing and expose larger portions of the Folsom component. This is a cooperative project between the University of Wyoming and the Bureau of Land Management. Excavations will occur from July 17 - August 23, 2000. For more information, contact Marcel Kornfeld at the Department of Anthropology, University of Wyoming, Laramie, 82071; (307) 766-3548; anpro1@uwyo.edu.

Historic Trails Marking Project sponsored by the Wyoming Bureau of Land Management and the Oregon California Trails Association, August 26-27, 2000. Volunteers are invited to assist the BLM install markers along about 100 miles of the Overland Stage and Cherokee Trails, south and east of Rock Springs, Wyoming. The trails being marked were mid-19th Century transportation corridors and part of the California Gold Rush trail complex. Meet at the Rock Springs BLM Office, 280 Highway 191 North, Rock Springs, WY 82901. For more information, contact Mike Brown or Terry Del Bene, (307) 352-0212; Mike_Brown@blm.gov or Terry_DelBene@blm.gov.

SHELL

Black Mountain Archaeological Project Advanced Field School. This cooperative project between the University of Wyoming, the Bureau of Land Management, and Northwest Community College in Powell, has been investigating several open air sites and approximately a dozen rockshelters in the Big Horn Mountains since 1993. The area is the location of major prehistoric raw material procurement. Excavations at two rockshelters will continue from June 12-July 19, 2000. For more information about the field school, contact Marcel Kornfeld at the Department of Anthropology, University of Wyoming, Laramie, 82071; (307) 766-3548; Anpro1@uwyo.edu.

SUNDANCE

Williams Spring Archaeology Project, July 17-23, 2000. This is a U.S. Forest Service Passport in Time project in the Black Hills National Forest. Ten volunteers are needed to conduct test excavations on this multi-component prehistoric site. Interpretive programs are planned for the evenings. Self-contained camping areas are nearby, as well as campgrounds with toilets and showers near Sundance (20 miles) and Beulah. Volunteers are responsible for own meals. For more information, contact Carol Agard, Black Hills National Forest, Bearlodge District, P.O. Box 680, Sundance, WY 82729; (307) 283-1361; cagard/r2_blackhills@fs.fed.us or Dave McKee, (605) 673-2251; dmckee/r2_blackhills@fs.fed.us.

TENSLEEP

Project Archaeology Teacher Workshop, June 6-7, 2000. Co-sponsored by the Nature Conservancy and the Bureau of Land Management. For more information, contact Nina Veregge, Visitor Programs Coordinator, Tensleep Preserve, 101 Rome Hill Road, Ten Sleep, WY 82442; (307) 366-2671; fax (307) 266-2262.

Tensleep Rock Art Recording Project, June 16-18, 2000. Sponsored by the Nature Conservancy and the Bureau of Land Management. Participants should arrive at the camp after 5 p.m. on June 16th. Families are welcome, but we need to know about children in advance. Housing, kitchen facilities, and showers are provided at no charge. Bring your sleeping bags, pillows, and food. Campers, trailers and personal tents are not allowed and especially no pets!! The project will end by noon on the 18th. For more information, contact Mike Bies at the Worland Bureau of Land Management, (307) 347-5100 or Mike_Bies@blm.gov.

WORLAND

Worland Wyoming History Day for Big Horn Basin 4th graders, May 12th at the Washakie County Fairgrounds from 8 a.m. to 3 p.m. Archaeology presentations and historic era, including fur traders. Contact Mike Bies, Worland Bureau of Land Management, at (307) 347-5154.

COLORADO

Loveland Stone Age Fair; September 23-24, 2000. Special speakers will be Dr. Dennis Stanford, Dr. Peggy Jodry, Dr. George Frison, Dr. Robson Bonnichsen and Dr. C. Vance Haynes, Jr. Pullium Community Building, 545 Cleveland Avenue, Loveland, Colorado. For more information, contact (307) 766-5136.

Work in the ***Middle Park*** area is tentatively set for July 3-12, 2000. The Jerry Craig site was confirmed to be a bison bone bed, dating approximately 9300 years ago with stone tools and production debris present. For more information, contact Marcel Kornfeld, Department of Anthropology, University of Wyoming, Laramie, 82071; (307) 766-3548; anpro1@uwyo.edu.

SOUTH DAKOTA

Shanks Shelter Survey and Excavation Project,

Black Hills National Forest; July 31-August 5, 2000. This U.S. Forest Service Passport in Time project will include survey, site recording and test excavations at rock shelter archaeological sites in the central Black Hills. For more information, contact Juanita Garcia, Pactola-Harney Ranger District, Black Hills National Forest, 23939 Highway 385, Hill City, SD 57745; (605) 574-2534; garcia_juanita/r2_blackhills@fs.fed.us.

State of the Art Heritage Expedition; September 3-15, 2000; Custer, SD. A two-week classroom and field project focusing on rock art sites in the southern Black Hills. A series of interpretive programs will provide an overview of the cultural and natural history of the area. This is a "pay for" fee program. For more information, contact Dave McKee, Black Hills National Forest, RR2, Box 200, Custer, SD 57730; (605) 673-2251; dmckee/r2_blackhills@fs.fed.us.

UTAH

27th Great Basin Anthropological Conference, October 5-7, 2000; David Eccles Conference Center, Ogden, Utah. The conference will host a reception Wednesday evening, October 4th, for early arrivals. It officially opens Thursday morning with sessions continuing through Saturday. Activities, field trips, and speakers are planned. Please visit their web site for conference information, news, abstract submission, links to the convention center and visitor information, and much more as the conference approaches. The web site is www.hass.usu.edu/-gbac2000 and you can address inquiries to: Steven Simms, GBAC Chair, Department of An-thropology, Utah State University, Logan, Utah 84322-0730; (435) 797-1277; ssimms@hass.usu.edu.

WYOMING ARCHAEOLOGICAL SOCIETY ANNOUNCES LOGO COMPETITION

The Wyoming Archaeological Society, Inc. announces a logo competition, open to the public of all ages. The logo could convey all aspects of archaeology: stone projectile points and artifacts, Native American research, historical archaeology, interdisciplinary activities, preservation, and particularly the initials of the organization (WAS). The design should be such that it can be reduced and reproduced clearly for letterhead, journal covers, membership cards, and charters. The winner of the contest will receive a $100 savings bond and a one-year membership in the Wyoming Archaeological Society, Inc. Submissions should be on slides with a short description and mailed to Dr. Mary Lou Larson, Department of Anthropology, Box 3431, University of Wyoming, Laramie, WY 82071-3431, no later than December 31, 2000. Further information may be obtained by phoning Dr. Larson at 307-766-5566 during work hours, or e-mail mlarson@ uwyo.edu. The winner will be announced at the annual meeting of the Wyoming Archaeological Society in Laramie in May 2001.

PRELIMINARY ANNOUNCEMENT FOR JOINT MEETING OF WYOMING ARCHAEOLOGICAL SOCIETY AND WYOMING ASSOCIATION OF PROFESSIONAL ARCHAEOLOGISTS, MAY 4-6, 2001

The meetings will be at Foster's in Laramie, Wyoming. A block of rooms is being held at Foster's for a rate of $60.00 plus tax until April 5. Use 307-742-6611, code WAS to make reservations.

Registration is $20.00 before April 1, 2001; $25.00 after April 1, 2001; $15.00 for students with photocopy of student id. Registrations are fully refundable if cancelled before April 15, 2001.

Banquet is choice of chicken cordon bleu or prime rib at a cost of $18.50 per person. Vegetarian arrangements are possible. Banquet registrations must be made by May 1.

Dr. Payson Sheets from Univ of Colo/Boulder is the banquet speaker.

Those interested in submitting papers should send title and abstracts (150 words or less) to Dr. Danny Walker at dnwalker@uwyo.edu before April 1, 2001.

Laramie chapter of WAS is accepting items for a silent auction and raffle in conjunction with the meeting.

For more information contact Margot Joy at 307-742-2950 or mjoy@uwyo.edu

CHAPTER PROGRAMS AVAILABLE

Each year several requests come into the Wyoming State Archaeologist's office regarding possible programs for monthly chapter meetings. This year we have prepared a list of some of the current research topics that various people are working on, which your membership may be interested in, although it is not an exhaustive list of what may be available from Laramie. These presentations generally include slides and last from 45-60 minutes.

If your chapter is interested in a particular program for an upcoming meeting, please call one of these presenters at the phone number provided. Please also be prepared to discuss any arrangements for audio-visual equipment and funding or travel expenses. Some of these presenters are students with limited resources and often they have no financial support for their research. It is anticipated that you will make all necessary arrangements with the presenter during your phone conversation.

Thank you for your continued interest in the research activities in Laramie. Best of luck with your meeting schedule for 1999-2000.

Rich Adams "Early Man and Rock Art in South Africa." Phone (307)766-5301.

Rich Adams "Pipes and Bowls: Soapstone Artifacts in Wyoming." Phone (307)766-5301.

Rich Adams "Stonewall Buttes: Prehistoric Structures in the Powder River Basin." Phone (307) 766-5301.

Cher Burgess "Looking at Settlers of African Descent in the Black Hills." Phone (307) 742-6417 or (307) 283-1154.

Judy A. Brown "Archaeological Curation at the University of Wyoming Repository." Phone (307)766-5301.

Dan Eakin "Archaeological Investigations on the North Fork of the Shoshone River."Phone(307)766-5301.

Dr. George Gill "The Emerging Picture of Prehistoric Easter Island: Statues, Bones and Burials." Phone (307) 766-6282.

Dr. George Gill "Archaic and Paleoamerican Skeletal Traits: How Caucasoid were the Clovis Hunters and Why?" Phone (307) 766-6382.

Dr. George Gill "Skeletal Injuries Among Frontier Whites." Phone (307) 766-6382.

Dr. George Gill "Changes in Longevity, Violence and Skeletal Biology from the Wyoming Archaic through the Late Prehistoric." Phone (307) 766-6382.

Dr. Robert Kelly "Ethnoarchaeology Among Mikea Hunter-Gatherers of Madagascar." Phone (307)766-3135.

Dr. Marcel Kornfeld "Paleoindian in the High Country: Middle Park, Colorado." Phone (307) 766-5348.

Dr. Marcel Kornfeld "Hell Gap Revisited: Paleoindian Cultural Chronology and Other Problems." Phone (307) 766-5348.

Dr. Marcel Kornfeld "Rockshelters and Chipped Stone Raw Material Procurement of the Bighorns." Phone (307) 766-5348.

Dr. Mark E. Miller "Archaeology, History and the Wagon Box Fight of August 1867." Phone (307)766-5564.

Dr. Mark E. Miller "Early Archaic Pronghorn Hunting in the Upper Green River Basin, Wyoming." Phone (307)766-5564.

Dr. Danny N. Walker "Archaeological Looting in Wyoming." Phone (307)766-5565.

Dr. Danny N. Walker "Searching for Fort William on the Laramie." Phone (307)766-5565.

Dr. Danny N. Walker "1999 excavations Miner's Delight Townsite." Phone (307)766-5565.

Dr. Danny N. Walker "48FR3123: A Late Prehistoric Village Site in the Central Wind River Basin, Wyoming" Phone (307)766-5565.

PUTTING THE BITE ON CRIME

Moab, UT

On April 13, 1996, an individual was observed intentionally scratching symbols on a petroglyph in North Mill Creek Canyon near Moab, Utah. On November 8, 2000, the United States Attorney's Office, District of Utah, accepted a $1,000 settlement in accordance with the Archaeological Resource Protection Act, 43CFR7.16. The settlement payment was given directly to the BLM Moab Field Office (from Bureau of Land Management, National Law Enforcement Office, Weekly Activity Report, ending November 18, 2000.)

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Mickey Hot Springs, OR

In September 2000, a Burns District temporary employee located possible human remains on Public Land near Mickey Hot Springs. On November 6, 2000, archaeologists returned to the scene and found additional human remains. On November 14, 2000, the Burns District Ranger was notified and referred the report to the Oregon State Police (OSP). It is unknown at this time how old the remains are. The OSP are requesting BLM assistance in obtaining carbon-14 dating for the remains (from Bureau of Land Management, National Law Enforcement Office, Weekly Activity Report, ending November 18, 2000.)

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Medford, OR

On March 29, 1998, three subjects were contacted by the Oregon State Police excavating an archaeological site on Public Land under the cover of darkness. Archaeological resources, firearms, and drugs were seized at the crime scene. An investigation was initiated by an Oregon State Office Special Agent assisted by a Medford District Archaeologist. On November 19, 2000, a Federal Grand Jury in Eugene, Oregon, returned a multiple-count Federal Felony Indictment alleging: 1) Unlawful excavation of archaeological resources without a permit; 2) Transportation and possession of an illegal firearm ("sawed-off shotgun"); 3) Felon in possession of firearms; 4) Firearm in possession while in possession or use of a controlled substance (marijuana); and 5) Possession of an unregistered firearm (from Bureau of Land Management, National Law Enforcement Office, Weekly Activity Report, ending November 18, 2000.)

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Gila National Forest, NM

Two Deming, New Mexico, brothers were found guilty of damaging a protected Mimbres dwelling archaeological site. Following a citizen tip from a hiker and an LE&I investigation, James Quarrell, 62, and Michael Quarrell, 66, two brothers from Deming, NM, were convicted in U.S. District Court of excavating and damaging a Mimbres dwelling archaeological site on NFS lands. They were also convicted on related conspiracy charges. Each face up to two years in prison and/or a $20,000 fine. Surveillance operations conducted by LEO's resulted in observation of the Quarrel brothers and Aaron Sera in holes at the site with shovels and other tools. Sera pleaded guilty earlier to defacing an archeological resource. He faces up to one year in prison and/or a $10,000 fine. Sentencing is pending (from Bureau of Land Management, National Law Enforcement Office, Weekly Activity Report, ending November 18, 2000.)

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Near Anasazi Heritage Center, CO

On October 1, 2000, the San Juan Field Office Ranger observed a vehicle parked near an archaeological site, which is located on lands administered by the U.S. Forest Service. Because this site had received extensive vandalism in the past, the Ranger pulled off the road and was able to observe two individuals located in the sage brush on the site. Upon further investigation, the Ranger observed two individuals, one male and one female, digging with small collapsible shovels. The Ranger contacted the two individuals, who immediately stated they thought they were on private land. Although it was 4:30 on a Sunday afternoon, the two individuals were within a 1/4 mile of a major state highway, in plain view, and within one mile of the BLM's Anasazi Heritage Center. The two had excavated a pit approximately 4 feet by 5 feet and 6-10 inches deep. A U.S. Forest Service Archaeologist, who was called to the scene, determined the pit they were excavating contained human remains and was probably an Anasazi burial site. When contacted by the Ranger,

the female, who has a manslaughter conviction in her past, stated "are we in trouble?" U.S. Forest Service Law Enforcement Personnel were contacted and took over responsibility for the investigation (from Bureau of Land Management, National Law Enforcement Office, Weekly Activity Report, ending October 21, 2000.)

NEWS FROM THE GEORGE C. FRISON INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

2001 FIELD PROJECTS

HELL GAP SITE by Mary Lou Larson, Marcel Kornfeld, and George C. Frison

Hell Gap Site investigations comprise the major Institute project this field season. We will initiate excavation of the block separating Locality I and IE which we think contains critical evidence relating to Paleoindian chronostratigraphy. Field work will be from May 28 to June 20. Before the beginning of the field work, volunteers may be needed for the construction of a temporary building over the site and field station maintenance. For more information, call Dr. Marcel Kornfeld (307) 766-3548 (anpro1@uwyo.edu).

MIDDLE PARK FOLSOM STUDY: BARGER GULCH LOCALITY B AND OTHER FOLSOM LOCALITIES by Marcel Kornfeld, Todd Surovell, and Nicole Waguespack

The Frison Institute Middle Park Paleoindain Project (MPPP) will concentrate at the Barger Gulch Locality B. During the last several seasons of exploration, a buried Folsom component was all but confirmed at this site. The limits of the buried component, the integrity and resolution of the component, and the geomorphic context are not yet well known. The 2000 field season will begin to collect data to answer these critical questions about the site. Field work will be from June 25 at least to July 4. Additional sessions may follow if funding allows. For more information, call Dr. Marcel Kornfeld (307) 766-3548 (anpro1@uwyo.edu).

BIGHORN MOUNTAIN ROCKSHELTER RESEARCH: BLACK MOUNTAIN ARCHAEOLOGICAL DISTRICT by Marcel Kornfeld and Judson Finley

Excavation is planned to continue at Two Moon Shelter and BA Cave, the two rockshelters with work in progress at the Black Mountain Archaeological District. The goal is to expose additional cultural and natural strata in the two test units and collect samples for a sedimentological analysis of the shelter deposits. If time and resources allow, mapping and test excavation may take place at other localities in the district. Investigation of the shelters is proceeding in co-operation with Northwest Community College in Powell. Field work will be from July 9 to July 18. Additional sessions may also be added. For more information, call Dr. Marcel Kornfeld (307) 766-3548 (anpro1@uwyo.edu).

BIGHORN MOUNTAIN RESEARCH: PAINT ROCK CANYON ARCHAEOLOGICAL LANDSCAPE by Marcel Kornfeld

Investigations of Paint Rock Canyon Archaeological Landscape will be initiated in 2001. The Landscape is the first in the nation to be placed on the National Register of Historic Places. Paint Rock Canyon consists 38 recorded archaeological sites, 26 rockshelters and 12 lithic scatters, and an additional 36 rock shelters that have not been investigated. Some reports mention a total of 160 shelters in the canyon. The Paint Rock project forms a significant expansion of the Institute's rock shelter research. Field work will begin July 23 and end either August 1 or August 15. For more information, call Dr. Marcel Kornfeld (307) 766-3548 (anpro1@uwyo.edu).

SEMINO'S FORT by Danny N. Walker

Archaeological investigations will be conducted at "Semino's Fort" near Devil's Gate, Wyoming. This Oregon Trail trading post was occupied from 1852 to 1856. The complex of buildings was later reoccupied by employees of the Mormon Church until 1959. The complex is scheduled for reconstruction. The Office of the Wyoming State Archaeologist will conduct the field work in June. For more information, contact: Dr. Danny N. Walker, Assistant State Archaeologist, P.O. Box 3431, Laramie, WY 82071; phone (307) 766-5565, email (dnwalker@uwyo.edu)

STONE FEATURE ARTICLES: ALIGNMENTS, CAIRNS, CIRCLES, STRUCTURES Published in *THE WYOMING ARCHAEOLOGIST Vol.1(1) 1958 - Vol. 42(2) 1998*

by
Leneigh Schriner

Sources used: W*yoming Archaeologist Title and Subject Index 1958 through 1973* by Carlton W. Belz and *Table of Contents of The Wyoming Archaeologist Volumes 3-30* compiled by Frank Zeller

Part I
SORTED ALPHABETICALLY
BY TITLE

A New Note on the Medicine Wheel ; Vol. II, No. 9, p. 2, 1959

A Possible Meserve Site in North Central Wyoming (48JO303); Vol. II, No. 10, pp. 8-12, 1959

A Prehistoric Stone Line Complex From Northwest Wyoming; Eakin, Daniel H.; Vol. 41, No. 1, pp. 1- 13, 1997

A Progress Report Piney Creek Sites, Wyoming 48JO3111 & 48JO312, Frison, George C.; Vol. VIII, No. 3-4, pp. 18-19, 1965

A Pryor Complex Site in the Big Horn Mountains of Wyoming; Edgar, Bob; Vol. IX, No. 2, pp. 14-16, 1966

A Very Unusual Rock Structure, Photographed by Ross Stapp, five miles west of Shoshoni, WY, (photo); Vol. IX No. 4, p. 12, 1966

Archaeological Investigations at 48TE1076:A Walled Structure in Jackson Hole, Wyoming; Walker, Danny; Vol. 30, No. 1-2, pp. 33-37,1987

Archaeological Research in the Glendo Reservoir Area; Steege, L. C.; Vol. I, No. 7, p. 1, 1958

Archeologists Study Old Indian Camp Location (stone circles); Vol. VII No. 3, pp. 5-6, 1964

Bar-C Cairn Line, 48JO302; Vol. 1, No. 5, 1958

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Chalk Hills No. 1 48AB301 (preliminary report); Steege, L. C.; Vol. XII, No. 3, pp. 9-10;1969

Dead Indian Site 48PA551 (preliminary report); Smith, Sharon K.; Vol. XII, No. 1, pp. 23-33; 1970

Dated Stone Circle Sites in Wyoming; Larson, Thomas; Vol. 22, No. 3, pp. 9-17, 1979

Excavated Stone Circles from University Dig near Glendo, Wyoming; Steege, Louis C.; Vol. IX, No. 4, p. 11, 1966

Fortification Site (Mr. Turk, 19 structures); Vol. III, No. 8-9, p. 5, 1960

Grapevine Creek Buffalo Jumps (rows of stone piles, tipi rings); Vol. V, No. 2, pp.11-11b, 1962

Fortified Hilltop Examined; Sweem, Glen & Don Grey; Vol. IV, No. 7, pp. 3-4, 1961

Hadsell Ranch Rock Figure 48FR302 (site report); Baskett, Dave; Vol. IX, No. 3, pp. 17-21, 1966

Indian Campsite Patterns in Southwestern Wyoming; Bozovich, Joe; Vol. 30, No. 1-2, pp. 23-32, 1987

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Phantom Ghosts of the Laramie Mountain Range Country (cairn); Bedish, G. A.; Vol. IX, No. 4, pp. 23-25, 1966

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Preliminary Information on the Society Project at Medicine Wheel Site; Vol. 1, No. 5, pp. 4-5, 1958

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The Arrow at Polecat Bench; Baxter, Dan R.; Vol. 31, No. 1-2, pp. 5-8, 1988

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Part II
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Grapevine Creek Buffalo Jumps (rows of stone piles, tipi rings); Vol. V, No. 2, pp.11- (11b), 1962

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A Very Unusual Rock Structure, Photographed by Ross Stapp, five miles west of Shoshoni, WY, (photo); Vol. IX No. 4, p. 12, 1966

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Tipi rings; Malouf, Dr. Carling; Vol. IX, No. 4, pp. 4-6, 1966

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A Prehistoric Stone Line Complex From Northwest Wyoming; Eakin, Daniel H.; Vol. 41, No. 1, pp. 1- 13, 1997

RECONNAISSANCE SURVEY OF THE BIG HORN COUNTY, MONTANA, BISON JUMP-AND-KILL SITE

BY
Robert Ferris, Gary Anderson, William Payne and Gil Bollinger

ABSTRACT

A Gatchell Museum Field Team conducted reconnaissance surveys of a Bison Jump-and-Kill site in Big Horn County, Montana, on May 15 and July 1, 1999. The Jump is over sandstone cliffs some 3.0 to 4.3 meters in height. That height may have been reduced somewhat by erosion of the past few millennia. Test holes and a two meter long trench yielded numerous bison bone pieces. Many were burned and charred and some showed cut and impact marks interpreted to be of human origin. Evidence of a probable fire cooking/trash pit and temporary camp site for butchering was found in the locale along with a surface-find, small, stone arrowpoint judged to be from the AD 500-1500 time period. Surface bison bone fragments were also numerous and scattered, suggesting previous erosional or human disturbances.

INTRODUCTION

The Native Americans were subsistence hunters whose principal quarry was the bison. There were times, especially in the autumn, before the first snowfalls, that large amounts of preserved meat were needed for subsequent winter use. Before the introduction of the horse, the Native Americans used a "corral" method to secure the required many animals. That method consisted of making two fences of rocks, tree stumps, etc., each a kilometer or more in length and in a converging V-pattern. Indian drivers lured the bison into the "V" and then frightened them into running by shouting and waving robes. The point of the "V" opened into a corral enclosure where the trapped and confused animals were killed. A variation of this method was the bison jump. The converging fences were again used, but instead of a corral, the "V" led to a sheer cliff of some seven or more meters in height. As the stampeding herd plunged over these cliffs, many were killed or injured. The hunters would dispatch the wounded and then begin a process of skinning, butchering and drying the meat. Some Blackfoot and Crow jump areas in Montana cover several acres and extend many feet in depth, showing use over a long period (Mails 1991). There are many Bison jumps on both sides of the Montana-Wyoming border. About 30 kilometers north of the state line is the Kobold site, extensively studied by Frison (1970).

We cannot give a detailed location description or coordinates of the site being reported here at the landowner's request. The study group is a team from the Jim Gatchell Museum in Buffalo, Wyoming. That institution is a regional history museum dedicated to the preservation of the frontier history of the Bozeman Trail - Powder River country. It maintains a modest field research effort in support of its exhibition and education programs. Reconnaissance surveys were conducted on the site on May 5 and July 1, 1999. Additional access was not subsequently available and thus the results obtained are of a necessarily limited nature. However, because of the proximity of this site to the well-studied and documented Kobold jump, it is hoped that a comparison between the two sites will prove useful.

Figure 1: Upper: View of jump, looking east. Jump cliff in far background with cone-shaped outcrops in the mid-foreground. Lower: Closer view of jump cliff. Field team (left to right, Bob Ferris, Gary Anderson and Bill Payne) setting up for survey.

SITE PHYSICAL CHARACTERISTICS

The general site area has a heavy cover of grass and sagebrush that is typical of the northern High Plains. The jump is over sandstone cliffs averaging some four meters in height with variations that range from three to 4.3 meters. Even if this height has been reduced by erosion in the past few millennia, this would still be classified as rather low for a jump. These cliffs are composed of a soft, fine-grained, cross-bedded, light brownish-yellow sandstone capped by a thin-bedded layer of much darker colored and harder sandstone that is a half meter thick. The horizontal extent of the jump feature is approximately 200 meters in a northwest-southeast direction. There are distinctive cone-shaped erosional remnant features (some 4.5-5 meters in height) of the two sandstone strata about 15 meters from the jump base (Figures 1 and 2). Unfortunately, there is considerable evidence of "Potholer" activity, i.e., shallow, randomly spaced excavations,

Figure 2: Bison bone and tooth fragments (upper) and tooth piece close-up (lower) from Area #2. (inch scale).

made by individuals seeking artifacts for their personal collections.

ARCHAEOLOGICAL MATERIALS FOUND

Bison bone fragments and tooth pieces were numerous and widely scattered over the ground surface suggesting previous erosional or human disturbances. These disturbed areas covered at least 30% of the investigated area. Evidence for a probable fire and trash pit was found that included darkened and heat-cracked rocks and burned (charred) bison bone fragments (Figures 3-5). Human usage was shown by many bison bone fragments with cut and chop marks, and a single, side-notched arrow point (2.5 x 1.3 cm; Figure 6). This point was found on the ground surface and appears to be Late Prehistoric in age (500-1500 AD). Clusters of chert and jasper flakes were noted which suggests flint-knapping on the site. A roughly circular ring of granite and sandstone rocks with a diameter of around 5.5 meters was also noted.

To simplify the fieldwork and data recording, the site area was divided into five, roughly equal-width,

Figure 3: Bison bone fragments. Upper = burned. Lower = charred. (cm scale).

Figure 4: Boiling stone, showing surficial and penetrative discoloration from repeated fire-heatings and water immersions.

areas that covered most of the northwest-southeast extent of the site. Area #5 was farthest to the northwest and Area #1 farthest to the southeast. Upper (above the cliff) and Lower (below the cliff) sections were also designated. Ten artifact recovery locations, three test holes and an excavation trench (1.5 x 2.0 meters and 0.75 meters deep) were recorded in the investigations (Figure 7). Data obtained in each collection area are detailed below.

AREA #1 – Upper: none
AREA #1 – Lower: An area of surface water flow during rainy periods here has uncovered some bison bone pieces, primarily ribs and teeth.

AREA #2 – Upper: none
AREA #2 – Lower: Scattered bone, rib, long bone and tooth fragments were found on the surface. This area included the test excavation (described below).

AREA #3 – Upper: Ground surface was covered with sandstone cobbles and small rock boulders suggesting a fire pit's rock ring about 1.5 meters in diameter. No excavations were conducted in this area.
AREA #3 – Lower: Pieces of bison rib were found at one location on the surface. A test hole, 70 cm deep, did not yield any artifact material.

AREA #4 – Upper: A significant amount of flakes were noted here, suggesting a possible work site by a person who could also have maintained a lookout in all directions while working.
AREA #4 – Lower: One test hole, again 70 cm deep, did not yield any artifact material.

AREA #5 – Upper: this area was especially interesting in that it may have had a dual purpose, assuming the topography was similarly contoured when used by the Native Americans. Located at the northwesterly end of the jump area, it has a bank with a steep sloping surface that would funnel any running bison toward the jump cliff. Also in this area, several jasper flakes were found, suggesting a second knapping area some 15 meters from the Area #4 knapping area and the use of jasper instead of chert.
AREA #5 – Lower: Oval, hard, discolored rocks were found and identified as "boiling rocks." This could be a cooking, smoking and steaming area located next to the jump activity. Two test holes, each 70 cm deep,

Figure 5: Upper: Projectile point, surface find. Lower: Cut-and-chiseled bison bone piece. Both from Area #2. (cm scale).

Figure 6: Upper: Lightly flaked, red jasper scraper. Lower: Bison bone pieces cut and chiseled. Both from Area #2. (cm scale).

again did not yield any cultural material.

SITE ARCHAEOLOGICAL STRATIGRAPHY

Three cultural levels, IA, IIA, and IIIA, each separated by a thin, culturally sterile sedimentary layer, were identified in the excavation trench mentioned above (Figure 8). These cultural levels can be described as follows:

LEVEL IA: Eight cm thick. Only a few, probably bison, bone fragments, none charred, were noted. There was probably no cooking here, at least based on the data from the test unit.

LEVEL IIA: 15 cm thick. There were abundant charred bone fragments, many with cut and saw marks, in this level. There were also charred rocks, suggesting a probable butchering-cooking-trash pit area.

LEVEL IIIA: Ten cm thick. Again, there were abundant charred bone fragments with some showing cut and chop marks. Charred rocks were again noted, as a probable butchering-cooking-trash pit area.

COMPARISON WITH THE NEARBY KOBOLD SITE (24BH406)

Frison's (1970) investigation of the Kobold site was thorough, detailed and well reported. He too reported evidence for three jump levels, but they were very different from those being reported here. They were much thicker by a factor of about two. Many projectile points, biface tools, knives and butchering tools, end scrapers, pot sherds and bison skeletal remains were found. The artifact collection was sufficient for Frison to date the layers' use-time with good confidence as extending from the Early Archaic period to the Late Prehistoric period. Thus, his artifact recovery was as rich as ours is sparse.

INTERPRETATIONS AND SPECULATIONS

We interpret our site to be one of sporadic use in Bison jumping while the Kobold site was clearly one of more frequent and routine usage. The time span of use here may also have been more limited, but we have no direct evidence of that except the fact that each layer is much thinner than those at Kobold. Our site has less vertical drop (four meters versus eight meters) and has no rock cairn drive line markers. However, our site is rather wide (200 meters) which would make the drive control of the bison, without converging cairns, easier toward the cliff.

One similarity between the two sites, separated by

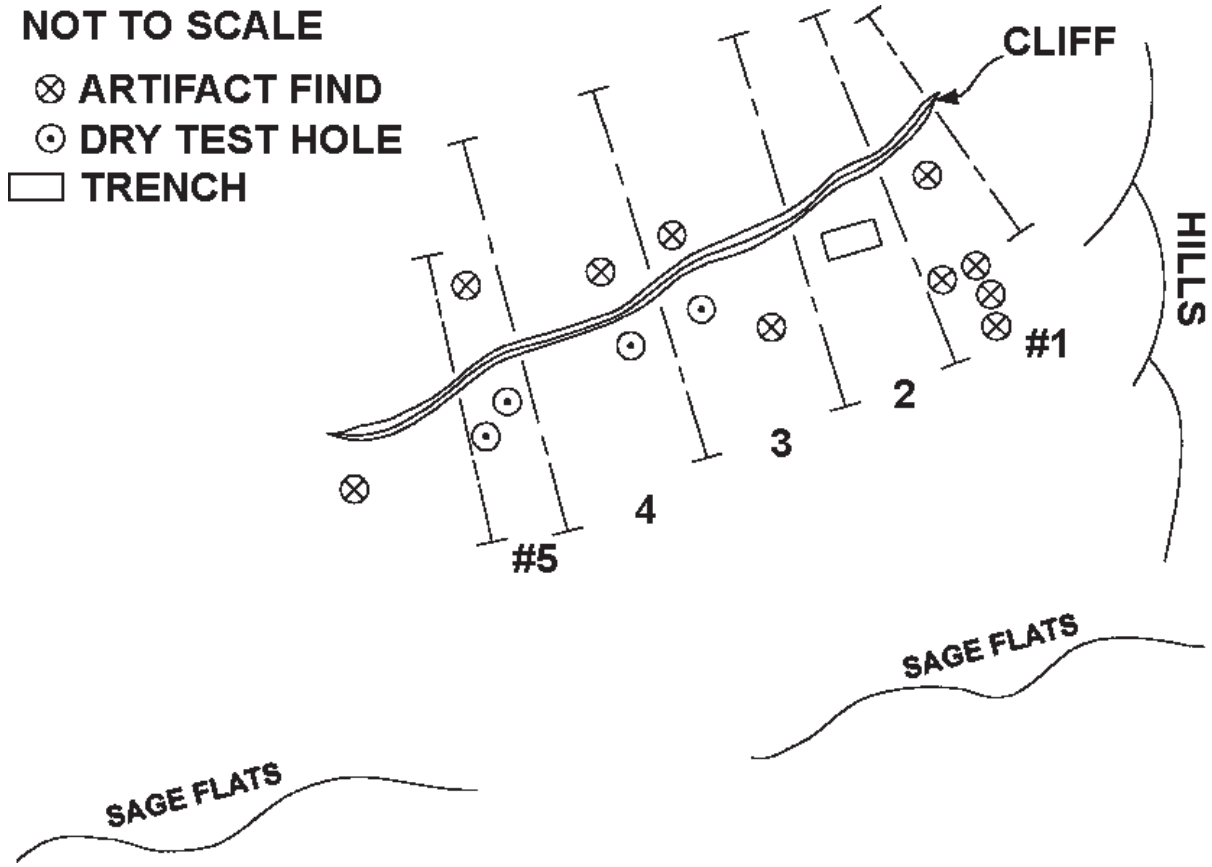

Figure 7: Sketch map of jump site.

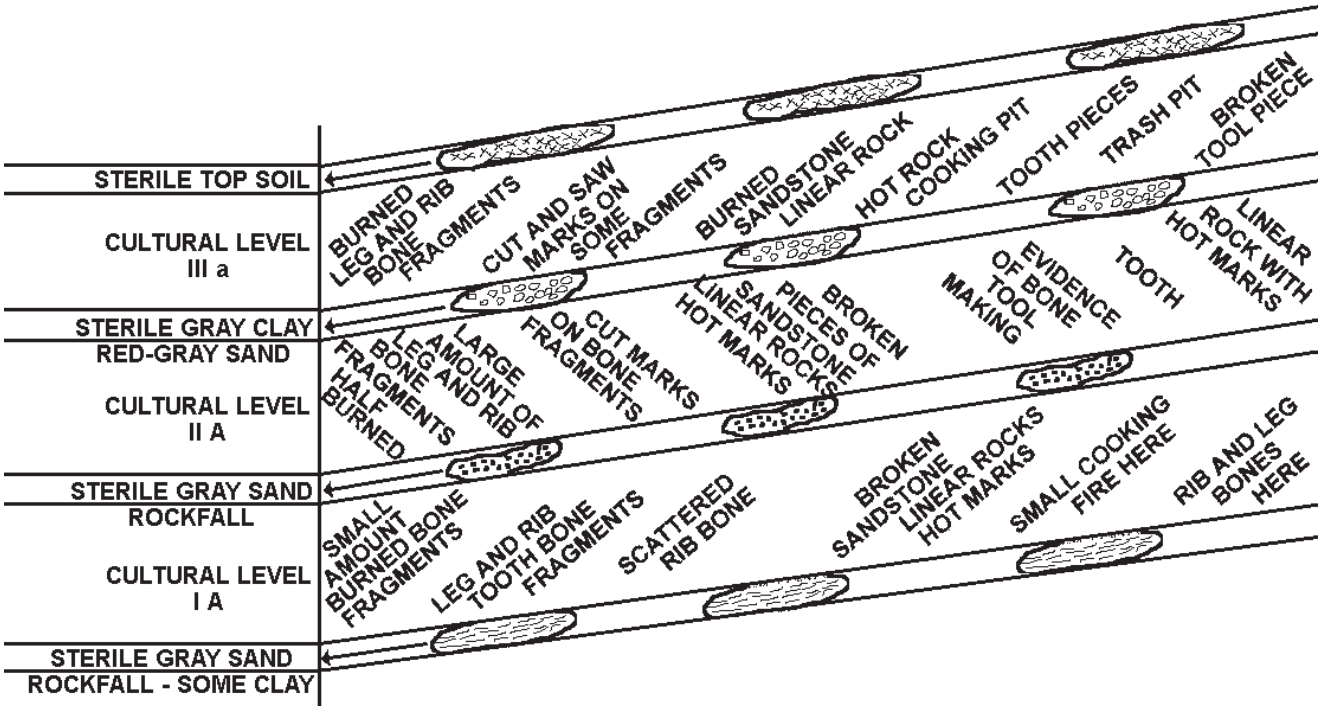

Figure 8: Vertical profile sketch of cultural levels from trench in area #2.

only 24 km, is the frequent presence of charred, i.e., burned, bones and rocks at the two sites. However, we also found evidence for site cooking, e.g., charred rocks and oval "boiling rocks" that were absent in the Kobold levels. This latter characteristic leads us to interpret the site as a probably butchering-cooking-trash pit area at the base of a jump site. The scale of operations here was probably small, and thus the animals were eaten and processed essentially where they fell or were killed.

We can say virtually nothing about a temporal comparison between the sites, as our only dateable artifact, one arrow point, was a surface find and not in situ with the jump-kill materials. Finally, we realize that our failure to give exact site coordinates diminishes somewhat the utility of our report. This is, however, in accord with the wishes of the landowner. We hope that, as previously mentioned, its proximity to a well-reported site will suffice.

ACKNOWLEDGMENTS

We gratefully acknowledge the support of the Jim Gatchell Museum for the fieldwork and of the landowner for permission to do the work on his land.

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THE CACHE HILL SITE (48CA61): A BISON KILL-BUTCHERY SITE IN THE POWDER RIVER BASIN, WYOMING

by
Mark E. Miller and Galen R. Burgett

ABSTRACT

Test excavations at the Cache Hill site (48CA61) in Campbell County, Wyoming exposed a thick bison bonebed in the bottom of an arroyo formed by a first order tributary in the Powder River drainage basin. A radiocarbon date and comparisons with other assemblages show a Late Prehistoric context for the bison kill-butchery event. Current taphonomic and archaeological models for bonebed accumulation, distribution, and dispersal are considered to aid in interpreting site structure. The research potential at this site for contributing to our understanding of bonebed composition and prehistoric bison procurement is critically assessed. In addition, cultural resource management issues relating to bison bonebed excavation and curation procedures are addressed.

INTRODUCTION

The Cache Hill bison kill-butchery site (48CA61) is in the dissected, shortgrass plains of the Powder River Basin in northeastern Wyoming (Figure 1). Bill Barlow, a local rancher and longtime member of the Wyoming Archaeological Society, discovered the site eroding from a dry, tributary arroyo more than twenty-five years ago, and reported it to the University of Wyoming and Office of the State Archaeologist. The site was visited briefly in 1975, but systematic test excavations were not conducted until the summers of 1984 (Miller 1984) and 1985.

The spatial extent of the Cache Hill bonebed is unknown. The site limits were estimated by cutbank exposures in the arroyo channel, limited auger probing, and one test unit. Skeletal elements appear confined to a twenty-meter long segment of an old, north trending arroyo channel about six meters wide (Figure 2). The bonebed may cover an area of 120 square meters or more, and the 1984-1985 excavations probably included less than three percent of the entire site.

Because of the large quantity of bone exposed in the arroyo profile and the time required for careful excavation and detailed recording, only a single 2 X 2 m test unit was opened. The unit was designated H21 in a grid system labeled with alpha-numeric codes and tied into a site datum (at North 100 m, West 100 m) located to the southeast, hopefully placing the entire bonebed in the northwest quadrant of the grid (Figure 2). The grid provenience for the H21 test unit is North 102-104, West 107-109.

H21 was placed over a surface exposure of bone along the west bank of the present arroyo. This unit was divided into 1 X 1 m quads to provide greater provenience control during excavation and mapping. Each meter quad was designated by a letter, beginning with A for the northeastern quad and moving clockwise through the remaining squares, ending with D at the northwestern corner of the test.

One hundred person days of excavation resulted in the removal of approximately 75 percent of the bone observed in the 2 X 2 m unit. The number of days required for excavation illustrates the trend toward finer grained field methodology implemented for bison kill sites in the last twenty-five years (see also Hill and Hofman 1997; Frison and Todd 1987).

Bones were treated in the field with Butvar, a commercially available preservative, but most apparently were too moist to allow adequate penetration. Many specimens broke when they were removed from the bonebed and wrapped in tinfoil for transport to the laboratory. Plaster casts are a more preferable means to protect these delicate specimens.

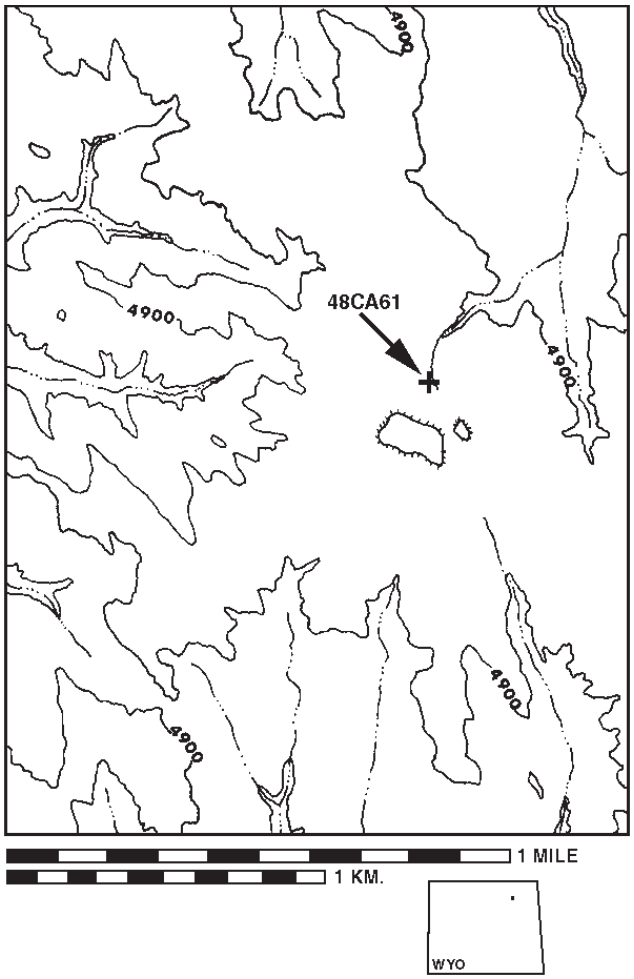

Figure 1: Map depicting location of Cache Hill site in northeastern Wyoming. Arrow points to bonebed in arroyo just north of Cache Hill. North is to top of map.

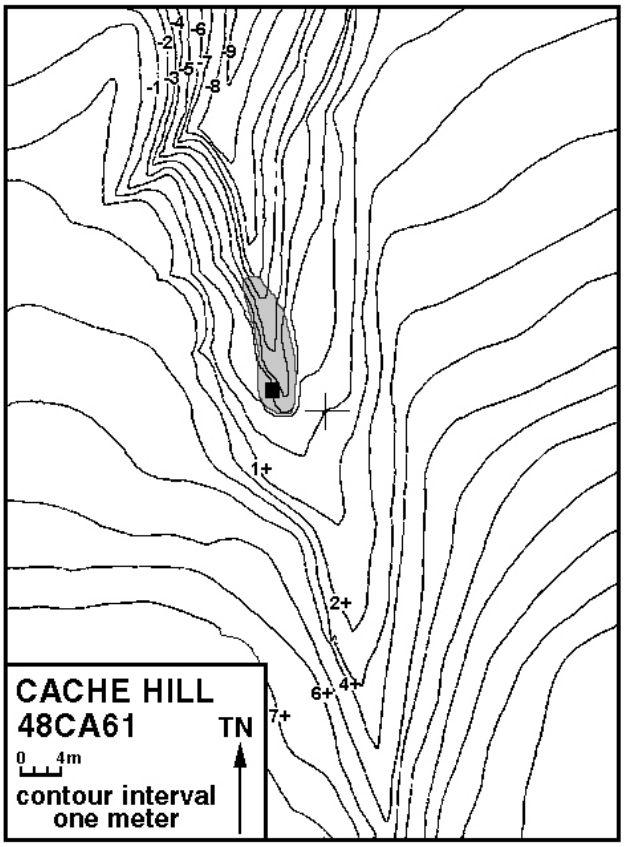

Figure 2: Topographic map of Cache Hill site arroyo. Darkened square is test unit and shaded area represents estimated limits of bonebed.

SITE AGE AND FUNCTION

The proximal portion of a bison humerus was submitted for radiocarbon dating following the 1984 season. It produced a radiocarbon age of 260 ± 100 B.P. (RL-1928, MASCA corrected to A.D. 1610 ± 150), chronologically placing the site near the end of the Late Prehistoric Period (ca. 200-1750 B.P. [Frison 1978:61]).

Frison (1991) has discussed the various forms of communal bison hunting, i.e., natural traps (arroyos, parabolic sand dunes), artificial corrals or pounds, and jumps. He notes all three procurement tactics were employed from Paleoindian through Late Prehistoric times (see also, Bentzen 1962, 1966; Frison 1984, 1991; Frison et al. 1976; Miller 1976). Cache Hill may be a natural arroyo trap, although future investigations may reveal evidence for structural remains. Observations on the geomorphic/topographic attributes of the Cache Hill area do not suggest suitability for, or the presence of, bison gathering areas or drive lines useful in an approach from above, and toward, a jump.

FAUNAL REMAINS

Three-dimensional coordinates were recorded for all bones and bone fragments >2.0 cm on the maximum dimension. General 1 X 1 m quad (i.e., quads A-D) provenience was recorded for bone fragments either too small (<2 cm) for point plotting or those unnoticed during excavation and recovered while screening of matrix sediments. Screening was conducted with 1/4 in. dry screen followed by 1/16 in. wet screen. Many fragments were too small for reliable element identification and inclusion in the minimum number of elements (MNE) and minimum animal unit (MAU) calculations (see Table 1). Although tabulations of fragment frequencies

are not presented here, bones grossly identifiable to an anatomical element included loose whole incisors and premolars, tooth fragments, vertebral pieces, rib blades, costals, long bone shaft fragments, and probable (but not absolutely identifiable) carpal, tarsal, sesamoid, and phalange fragments. A few of the bone fragments were burned and possibly were carried down slope from a nearby processing or camp area.

A total of 1803 identifiable bones were point provenienced and recovered from the site. MNE/MAU tabulations of these bones are presented (Table 1). Mandibles, atlas and axis vertebrae, and central-4th tarsals (scapho-cuboid) are the most numerous bones, but what is of interest is the overall MAU % profile (Figure 3). The profile shows the representation of anatomical elements can be described in terms of their segmentation. The first segment has mandibles, atlas and axis vertebrae and cervical vertebrae. From thoracic vertebrae through the innominates and ribs, there is an under representation of axial elements suggesting attrition from various agents. The MAU % representation of appendicular segments is interesting. The forelimb segment has an uneven representation of some elements, i.e., scapulae, distal humeri, and proximal radii, and metacarpals have greater representations than proximal humeri, distal radii, and carpals. The hind limb elements have much greater representation, particularly metatarsals, than either axial or front limb segments.

The patterning expressed in the Cache Hill profile suggests overprinting by the various agents creating and modifying the bison bonebed. Two other profiles instructive about the Cache Hill assemblage are included (Figure 3). One profile represents the coyote scavenged bison carcasses from a taphonomic study in Wind Cave National Park, South Dakota (Burgett 1990:76-81, 90-91). The other profile is of Nunamiut Eskimo caribou kills in Alaska (Binford 1981:230-231, Table 5.08). Comparing the different profiles shows Cache Hill closely resembles the caribou kill case in the representation of the axial skeleton segment, but then diverges with the forelimb segment and has very little similarity to the caribou kill rear limb segment. Although no statistical tests have been conducted to measure the strength of similarity among the three profiles, it is graphically apparent the Cache Hill assemblage has greater proportional similarity to the Wind Cave bison sample. The comparisons of these profiles, along with other evidence observed on the Cache Hill bones, provide some clues about who did what, and when, to the bison carcasses there. These clues include evidence for carnivore gnawing and butchering patterns.

Cranium	7	7.00	41.2
Mandible	34	17.00	100.0
Hyoid	6	3.00	17.7
Atlas	11	11.00	64.7
Axis	11	11.00	64.7
Cervical Vertebra	46	9.20	54.1
Thoracic Vertebra	71	5.46	32.1
Lumbar Vertebra	38	6.33	37.2
Sacrum	3	3.00	17.7
Sacral Vertebra	10	2.00	11.8
Innominate	10	5.00	29.4
Ribs (proximal and complete)	144	5.54	32.6
Sternebra	1	0.14	0.8
Manubrium	3	3.00	17.7
Caudal Vertebra	46	2.56	15.1
Scapula	15	7.50	44.1
Humerus, complete	11	5.50	32.4
proximal and complete	12	6.00	35.3
distal and complete	16	8.00	47.1
Radius, complete	12	6.00	35.3
proximal and complete	17	8.50	50.0
distal and complete	13	6.50	38.2
Ulna	12	6.00	35.3
Ulnar carpal	16	8.00	47.1
Intermediate carpal	16	8.00	47.1
Radial carpal	16	8.00	47.1
Fused 2nd and 3rd carpal	18	9.00	52.9
Fourth carpal	11	5.50	32.4
Accessory carpal	7	3.50	20.6
Carpal (unspecified)	7	1.17	6.9
Fifth Metacarpal	4	2.00	11.8
Metacarpal, complete	19	9.50	55.9
proximal and complete	19	9.50	55.9
distal and complete	20	10.00	58.8
Femur, complete	17	8.50	50.0
proximal and complete	20	10.0	58.8
distal and complete	20	10.00	58.8
Patella	16	8.00	47.1
Tibia, complete	16	8.00	47.1
proximal and complete	19	9.50	55.9
distal and complete	19	9.50	55.9
Lateral Malleolus	15	7.50	44.1
Astragalus	25	12.50	73.5
Calcaneus	26	13.00	76.5
Tarsal, fused central/fourth	32	16.00	94.1
fused 2nd/3rd	21	10.50	61.8
First tarsal	9	4.50	26.5
Tarsal (unspecified)	2	0.40	2.4
Metatarsal, complete	23	11.50	67.7
proximal and complete	29	14.50	85.3
distal and complete	24	12.00	70.1
First phalanx, prox/comp.	74	9.25	54.4
Second phalanx, prox & comp.	73	9.13	53.7
Third phalanx, prox & comp.	72	9.00	52.9
(all phalanges)	(219)	(9.13)	(53.7)
Sesamoid, proximal	44	2.75	16.2
distal	28	3.50	20.6
unspecified	4	0.17	1.0

Table 1: Preliminary inventory of minimum number of elements (MNE), minimal animal units (MAU), and indexed MAU (MAU%) for post-natal bison from Cache Hill site. Long bone MNE and MAU values calculated only from portions with at least one articular end.

The distribution of cut bone and carnivore gnawed elements also reveals some interesting patterns (Fig-

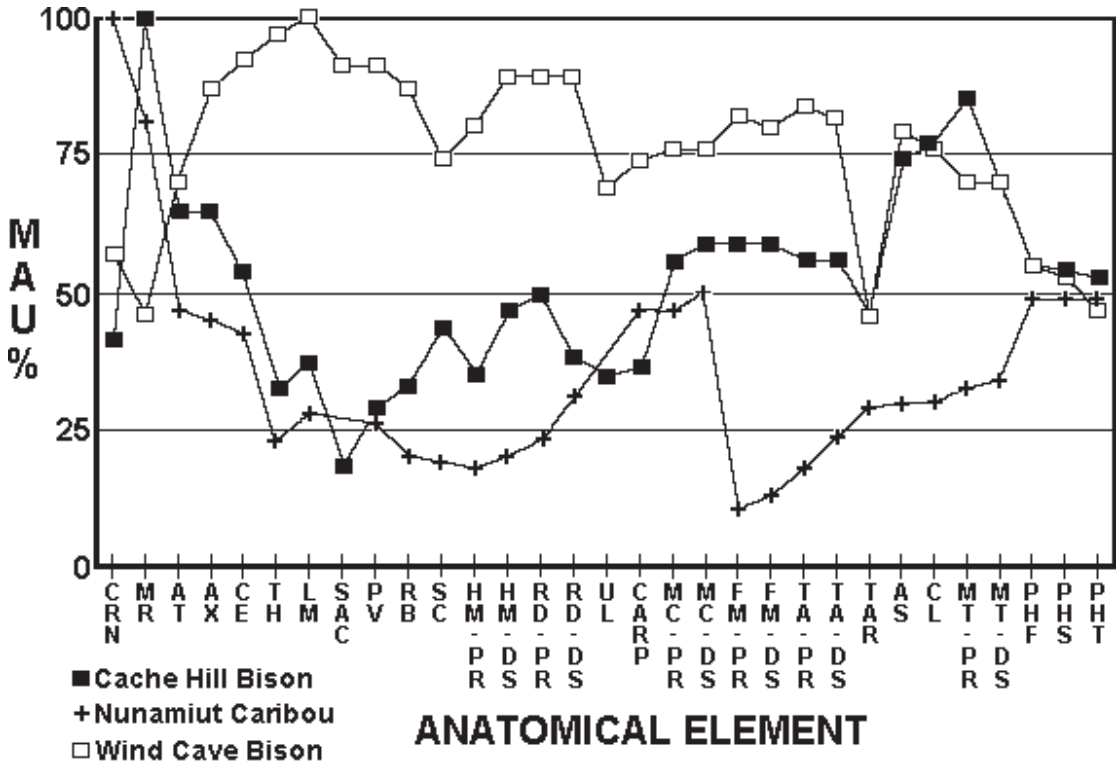

Figure 3: MAU% profiles for the Cache Hill bison kill site, Nunamiut caribou kill sites, and the Wind Cave modern bison mortality sites. CRN-cranium, MR-mandible, AT-atlas, AX-axis, CE-cervical, TH-thoracic, LM-lumbar, SAC-sacrum, PV-pelvis, RB-rib, SC-scapula, HM/PR-proximal humerus, HM/DS-distal humerus, RD/PR-proximal radius, RD/DS-distal radius, UL-ulna, CARP-carpal, MC/PR-proximal metacarpal, MC/DS-distal metacarpal, FM/PR-proximal femur, FM/DS-distal femur, TA/PR-proximal tibia, TA/DS-distal tibia, TAR-tarsal, AS-astragalus, CL-calcaneus, MT/PR-proximal metatarsal, MT/DS-distal metatarsal, PHF-first phalange, PHS-second phalange, PHT-third phalange.

ure 4). Only those bones with obvious modifications were used in this comparison. Carnivores were clearly selecting appendicular elements, primarily proximal humeri. On the bones not removed by carnivores, human made cut marks are more common on axial elements, especially rib blades and vertebrae (Table 2). The axial element cut marks also coincide with the reduced presence of axial elements, particularly the thoracic, lumbar, and sacral vertebra and the innominates, compared with the appendicular segments. Most cut bones occur in the western half of the unit where the shallowest portion of the bonebed may represent the edge of the kill. Carnivore gnawed bone is more widespread, but generally occurs on bones on or near the surface of the midden. No carnivore damage or butchering was present on articulated units in the deepest portion of the bonebed where carcasses may have been inaccessible.

Considerable research has exposed the ambiguity inherent in attribute-based efforts to identify culturally modified bone (Binford 1981; Burgett 1990), so this study is conservative in its assessment of the causal agents responsible for altered bone. In fact, for the present study we have chosen not to classify any modification as chop marks and have restricted this analysis to obvious cut marks. Only twenty-two elements (less than two percent of the point-provenienced assemblage) show obvious cut marks characterized by relatively straight incisions with V-shaped cross-sections. These include ribs, vertebrae, and mandibles. Positioning of cuts is similar to those discussed in previous studies (e.g., Frison 1970), and only cut ribs occur frequently enough to warrant discussion in more detail here.

Cuts occur predominantly on the proximal half of the element below the rib head on the lateral margin of the blade (Figure 5c). Cuts are less frequent on the distal half of the blade and the medial surface of the rib. Most cuts run transverse across ribs and are either

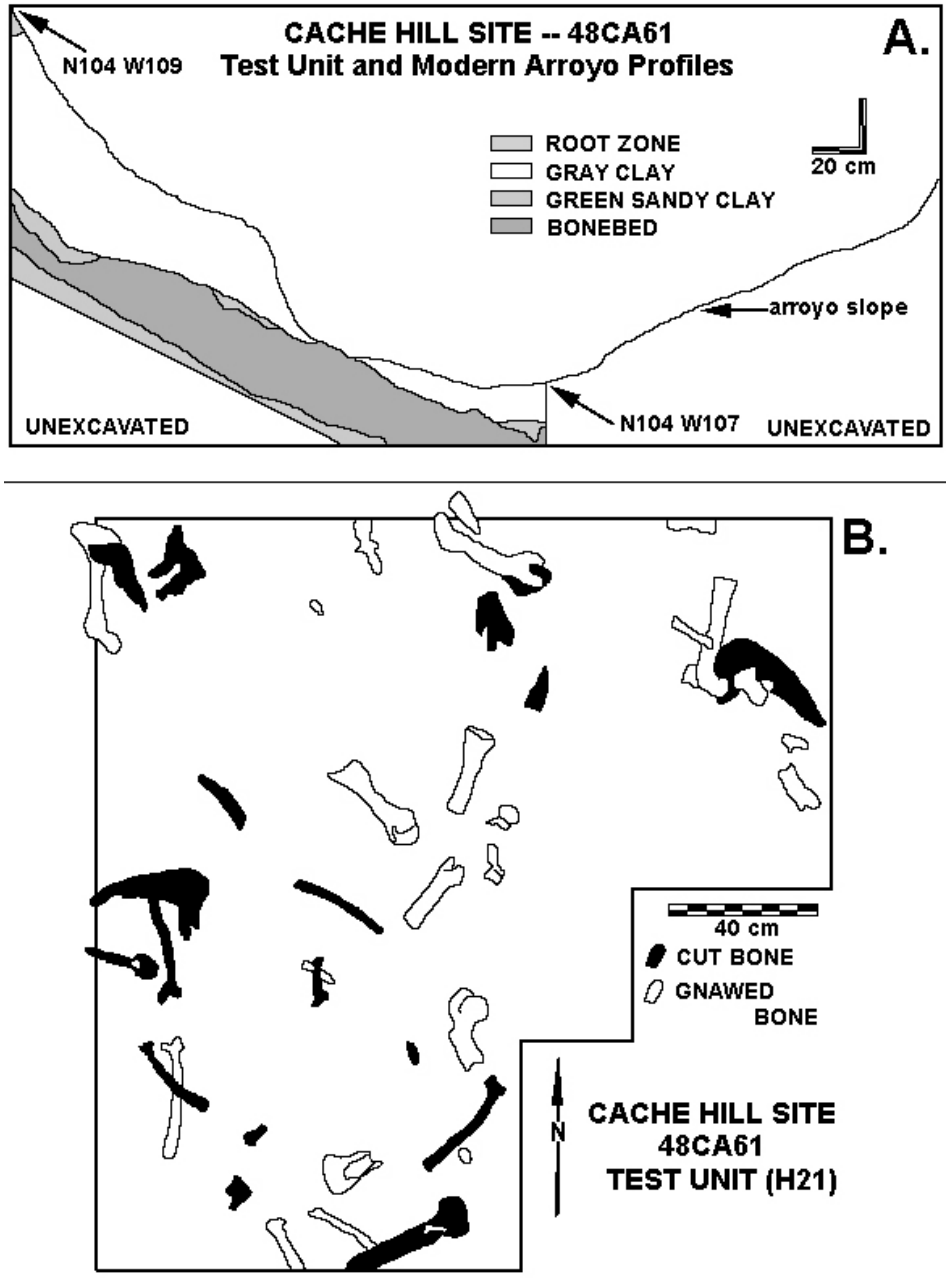

Figure 4: Profile of the bonebed in the arroyo (A), and plan map of the distribution of modified bones from the Cache Hill site test (B).

perpendicular or diagonal to the long axis of the element, but at least one incision is parallel.

Binford (1981:113) identifies three locations for cut marks on ribs occuring during primary butchering activities. Two of these occurrences are present in the Cache Hill assemblage. The most frequent is the transverse cuts across the lateral surface of the ribs on the proximal (dorsal) end (Figure 5b, cut group I). These probably were inflicted when tenderloin was cut from the carcass. Cut group II (Figure 5b) at Cache Hill is similar to cuts described by Binford (1981:113) for removing the distal end of ribs. Some cuts (Figure 5c) on ventral (medial) surfaces near the distal end also occur, but their purpose is unknown. No cuts were found on the head of any rib.

It is suggested several bison in the bottom levels of

ELEMENT	CUTS	GNAWING
Mandible	4	0
Hyoid	0	1
Vertebra	5	5
Rib	12	4
Innominate	0	1
Humerus	0	7
Radius	0	2
Femur	0	2
Metatarsal	1	1

Table 2: Occurrences of bone modification by cultural (cuts) and non-cultural (carnivore and rodent gnawing) agents.

the test excavation are the overkill occuring when herds of bison, or other animals, are taken in a single event. Much of the bone overlying these highly articulated skeletons was the result of butchering activities in or near the excavation unit, and subsequent animal scavenger activity after the humans abandoned the kill site. The most likely scavengers were wolves and coyotes, but the feeding of domestic pack dogs may have also contributed to the animal modified bone recovered from the bonebed.

AGE GROUPS BASED ON MANDIBULAR DENTITION

Thirty-five whole and fragmentary mandibles were collected from the bonebed. All but five, which are still in casts, were used for estimating seasonality. Two of the mandible fragments refit, which limits the total element count to 34. Four mandible pairs are known anatomical mates.

Analytical procedures followed those used by Frison and Reher (1970) at the Glenrock site, and modified during later studies (e.g., Frison 1973, Reher 1974, Reher and Frison 1980, Todd et al. 1996). No attempt was made to measure annual cementum on incisors or enamel height on other teeth, although these may be productive lines of inquiry for future research.

Most mandibles are quite fragmented, a factor complicating estimates of tooth eruption. Due to this fragmentation, seasonality inferences are drawn more from patterns of tooth wear than tooth eruption.

Mandibles were categorized into four immature age groups and a group combining mature dentitions. Life expectancy was not calculated, since only six mandibles come from adult animals.

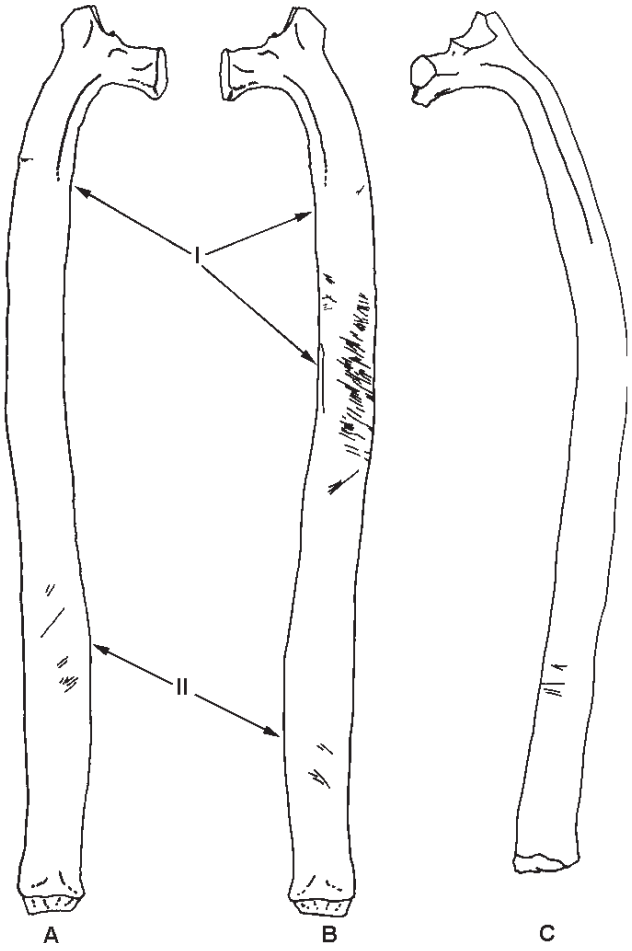

Figure 5: Composite illustration of all diagnostic cut marks on bison ribs, showing proximal (cut group I) and distal (cut group II) clusters. Illustration depicts lateral aspect of right fifth rib (A), lateral aspect of left fifth rib (B), and medial aspect of right fifth rib (C).

GROUP 1: 0.6 YEARS (e.g., FIGURE 6A); SEVEN MANDIBLES

All deciduous premolars are in wear. The cusps are still peaked on dP_4 and the exostylid exhibits only light wear if any at all. M_1 is erupted from two-thirds to nearly the full height of dP_4. Facets I-II (see Frison et al. 1976:38 for terminology) are in light wear, but some specimens show greater wear characterized by a narrow (1 mm wide) continuous line of dentine on anterior surfaces. M_2 is present but unerupted.

GROUP 2: 1.6 YEARS (e.g., FIGURE 6B); EIGHT MANDIBLES

Deciduous premolars are well worn with roots

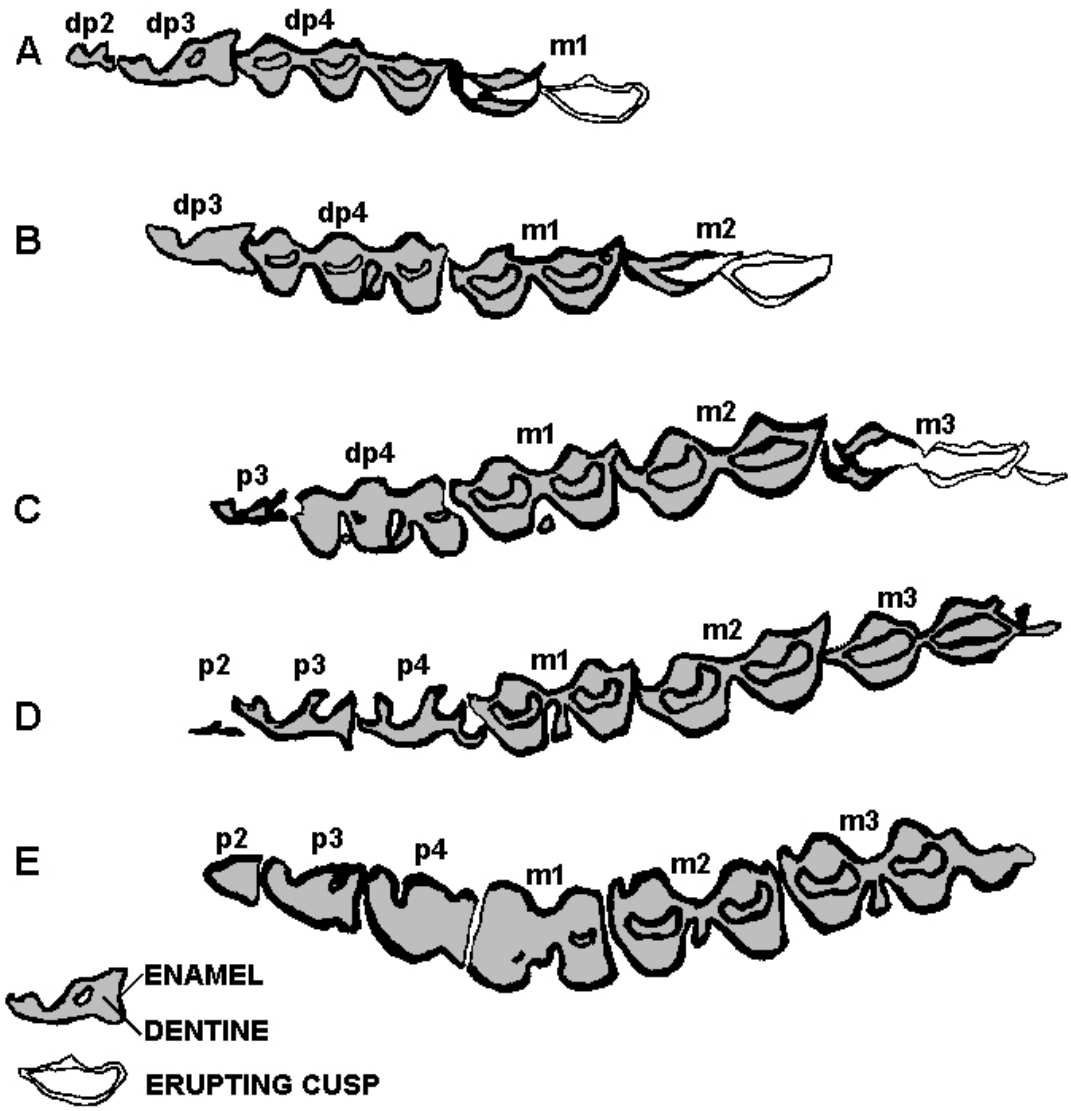

Figure 6: Characteristic wear patterns on selected mandibles from five age groups at Cache Hill site. Group 1 mandible no. H21-773 (A); group 2 mandible no. H21-486 (B); group 3 mandible no. H21-1172 (C); group 5 mandible no. H21-532 (D); and group 6 mandible no. H21-18 (E). All are left tooth rows oriented with medial surface to top of figure.

showing above the alveolus. Cusps are no longer peaked on dP_4 and exostylid wear connects it with the rest of the tooth by a continuous line of dentine. M_1 is erupted and in full wear. M_2 is either fully erupted or nearly so. Facets I-II show either light wear or a continuous line of dentine at least a millimeter wide. M_3 is in bud, but not really erupted above the alveolus.

GROUP 3: 2.6 YEARS (e.g., FIGURE 6C); FIVE MANDIBLES

Two of the mandible fragments in this group refit. The dP_2 and dP_3 usually have been pushed out, or are otherwise missing. The dP_4 may be present though extremely worn. Anterior and posterior cusps of dP_4 are cupped, and the roots are exposed above the alveolus. Two specimens show very light wear on P_3. The exostylid on M_1 is in wear, but generally it is still capped with enamel and separate from exposed dentine on the rest of the tooth. All eight facets on M_2 are in full wear, but the exostylid is unworn. Anterior cusps on M_3 are erupted above the alveolus, yet the hypoconulid is unerupted. Facets I-II are worn on M_3. Light wear may occur on some posterior facets.

GROUP 4: 3.6 YEARS; NO EXAMPLES

The Cache Hill sample does not contain mandibles showing tooth eruption and wear characteristics expected for this group. However, based on other studies, this group is expected to show full wear on M_1 and M_2, and wear on M_3 facets I-VI. No wear is expected on the hypoconulid. The absence of this group in the present collection could be from sampling error, mistakes in grouping due to fragmentation, or a function of herd population dynamics. Perhaps there was a high mortality on calves three years before the Cache Hill site was used. A large sample of less fragmented mandibles is needed to refine this age group model.

GROUP 5: 4.6 YEARS (e.g., FIGURE 6D); THREE MANDIBLES

All deciduous teeth are gone and all permanent premolars are in wear. Wear on M_1 has produced a continuous line of dentine between the exostylid and the rest of the tooth. The M_2 is in regular use but the exostylid is still unworn. Facets I-VIII are in wear on M_3. Light wear is present on facet IX (hypoconulid), barely exposing the dentine. The exostylid and the posterior stylid between the entoconid and hypoconulid are always unworn.

GROUP 6: MATURE ANIMALS (e.g., FIGURE 6E); SIX MANDIBLES

This group includes all specimens from animals 5.6 years old and older. Mandibles were too few and fragmentary for separation into more discrete age groups. All permanent teeth are fully erupted and in regular use. Wear is highly variable due to the representation of more than one age group. Overall, premolars continue in wear and eventually produce a planar surface. The continuous ring of enamel around the dentine also is worn away on the posterior edge of some premolars. Similar wear occurs on the anterior edge of M_1 on some specimens. Deep cupping can develop between P_4 and M_1, and the anterior fossette on M_1 may be nearly worn away. Exostylids on M_2 and M_3 are in full wear and connected to the rest of the tooth by a continuous line of dentine.

SUMMARY

The four immature age groups are discrete with no intermediate specimens. Groups 1 and 2 in particular seem quite distinct. Group 3 is more variable, although teeth are less worn than what is expected for Group 4.

This mandible sample suggests the kill probably took place during the late fall, perhaps sometime in November, if the necessary assumptions about breeding schedules and calving are accurate (see Frison and Reher 1970:46). The calf group (age group 1) may be slightly older than calves killed during the fall at Glenrock, another Late Prehistoric site in Wyoming (Frison 1970).

SEXUAL DIMORPHISM IN CACHE HILL HUMERI AND RADII

Todd (1986) has documented the utility of selected measurements on distal humeri and proximal radii for estimating the sex ratio of bison skeletal populations. His procedures have real merit, particularly when archaeological collections can be scaled against modern comparative specimens of known age, sex and mortality. Analytical samples should be fully mature with respect to epiphyseal fusion so measurements on immature males are not confused with large, mature females. Most of the Cache Hill radii could not be sexed since they are skeletally immature with unfused distal ends. This problem is illustrated below.

Three measurements were taken on distal humeri, and two on proximal radii, to estimate the ratio of mature females to mature males (Table 3). These measurements (see Todd 1986:114-116), when graphically portrayed, illustrate elements grouped according to size.

Eleven fully fused proximal radii were recovered from the excavations (Figure 7A). This bivariate distribution is the weakest of the three for illustrating the difference between male and female elements. Six undetermined specimens, dispersed between four probable females and one probable male, obscure the expected sexual dimorphism in the sample. If the undetermined specimens are discarded, then five mature elements suggest a sex ratio of 80 percent females to 20 percent males.

The first of two bivariate plots on distal humeri is not much more informative (Figure 7B). Thirteen measurable specimens are present including five mature females, five mature males, and three humeri with unfused proximal ends. The most notable distinction with this index is there is a much greater difference in the distal articular breadth (HM7) between males and females than seen in the medial articular breadth (HM14), which overlaps males and females between 40 and 43 millimeters. If this trend is sustained with larger samples, then it may be possible eventually to sex distal humeri with a single measurement (HM7) allowing archaeologists to use specimens too fragmen-

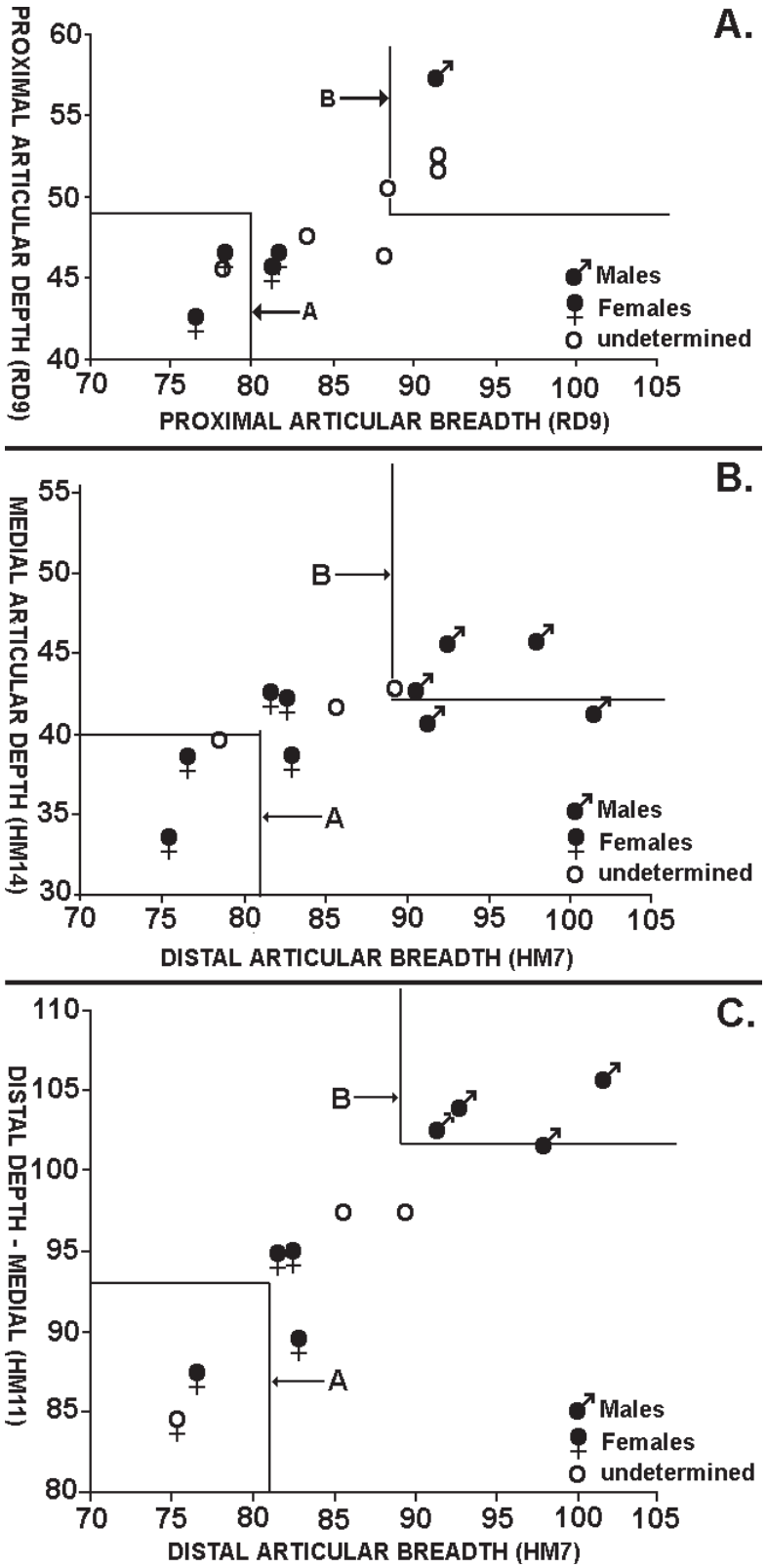

Figure 7: Plot of selected measurements on (A) proximal radii; (B) distal humeri; and (C) distal humeri, from Cache Hill bison. All measurements from Todd 1986. Interior solid line represents maximum range of females and minimum range of males from Todd's (1986) comparative sample.

MEASUREMENT*	N	MEAN	MIN.	MAX.	SD	DIFF**
HM7						
Males	5	94.6	90.1	101.5	4.9	
Females	5	79.7	75.2	82.9	3.5	
Undetermined	3	84.5	78.5	89.2	5.5	
						14.9
HM11						
Males	4	103.2	101.4	105.3	1.8	
Females	5	90.1	84.3	95.0	4.7	
Undetermined	2	97.2	97.1	97.2	0.1	
						13.1
HM14						
Males	5	43.2	40.7	45.9	2.4	
Females	5	39.0	33.3	42.3	3.6	
Undetermined	3	41.5	39.8	42.8	1.5	
						4.2
RD4						
Males	1	91.1	-----	-----	-----	
Females	4	79.4	76.5	81.4	2.4	
Undetermined	6	86.8	78.2	91.5	5.1	
						11.7
RD9						
Males	1	57.1	-----	-----	-----	
Females	4	45.4	42.8	46.5	1.7	
Undetermined	6	49.1	45.7	52.3	2.8	
						11.7

* = all measurements following Todd (1983, 1986). ** = (male Mean) minus (female Mean). SD = Standard Deviation.

Table 3: Summary of selected measurements of bison humeri and radii from Cache Hill site.

tary for medial articular depth.

The next bivariate plot illustrates the greatest difference between fully mature males and females in the sample (Figure 7C). Five females and four males are clearly separated by the HM7-HM11 index. This distribution also more closely approximates the range of males and females from known comparative samples of modern bison, such as those in the UW Department of Anthropology Comparative Osteology Museum (see also Todd 1983:134). Only two of the eleven elements at Cache Hill exhibit unfused proximal ends. When these are discarded, a pronounced bimodal distribution probably reflects sexual dimorphism with a ratio of 56 percent mature females to 44 percent mature males. The sexual dimorphism analysis suggests the herd, or herds, killed consists of mixed cow/calf and bull groups.

ARTIFACTS

BONE TOOL

One cut and snapped bison rib shaft shows extensive polish and striations resulting from heavy use, probably as a handle hafted to a butchering tool (Figure 8a). It is nearly identical to those found at the Big Goose Creek site, another Late Prehistoric bison kill (Frison et al. 1978).

PROJECTILE POINTS

Twenty-three whole and fragmentary projectile points were collected from the bonebed. Two fragments refit, so at least 22 separate projectiles are represented. All but one are side-notched with straight or irregular basal edges (e.g., Figure 8b-f). The only exception is a side and base-notched projectile point (not shown) made from obsidian. One side-notched artifact is a large, reworked specimen that may have been collected from a much older assemblage than used in the Cache Hill operation (Figure 8g). Three fragmentary bifaces are too indistinct to identify the artifact type they represent, but they probably are broken projectile points.

Projectile points are similar to the Plains side-notched type described by Kehoe (1973:60-61), and to other arrow points from other Late Prehistoric kills in Wyoming (e.g., Frison 1970, Reher and Frison 1980:29). The site's uncorrected radiocarbon date of A.D. 1690 fits well within the expected range for this technology.

Most of the weaponry is made from local raw materials available in and around the Powder River Basin, with porcellanite and quartzite predominating. Chert is infrequent, although one specimen may represent a

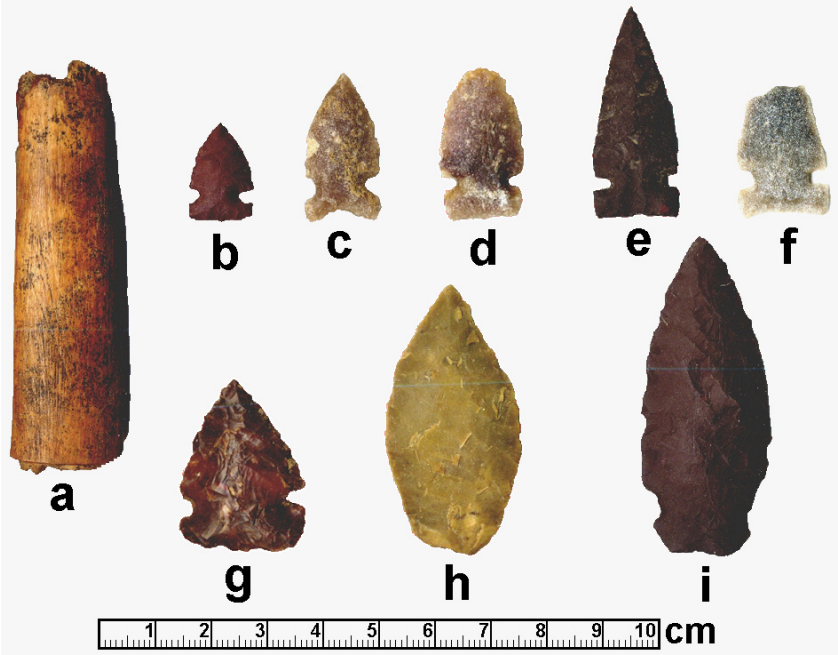

Figure 8: Selected artifacts recovered from Cache Hill test excavations, including bison rib haft (a), selected projectile points (b-g), retouched flake tool (h), and utilized biface (i).

dendritic chert typical of the Hartville Uplift region in southeastern Wyoming.

BIFACES AND STONE TOOLS

One retouched flake tool (Figure 8h) and a utilized biface (Figure 8i) also were found. The biface is notched and may have been used as a projectile on a thrusting spear or lance, since no use-wear typical of cutting activities is present. The other tool is a brown chert flake tool resharpened bifacially.

DEBITAGE

Debitage from tool maintenance and reuse is the most frequently occurring class of chipped stone in the assemblage. A total of 289 nonutilized flakes was recovered. Most are retouch flakes either from bifaces or flake tools. Striking platforms generally are faceted by flake scar remnants from earlier reduction series (see Frison 1968). These flakes are believed to be the result of tool maintenance during butchering activities done on the carcasses in the kill site. However, some flake shatter without platform remnants may be the result of impact breaks on projectile points as they struck the animals.

Although identifying raw material sources from small flakes is difficult (Craig 1983:21), most seem to have been made from local stone derived from the Powder River Basin between the Big Horn Mountains to the west and the Black Hills to the east. Nearly 43 percent are made from porcellanite ranging in color from maroon to gray and almost black (Table 4). More than 39 percent are brown or red quartzites. The rest include translucent chalcedonies and opaque cherts in a range of colors.

SITE STRUCTURE

The bonebed averages about 30 centimeters thick, and ranges in depth from a few centimeters below ground along the upper arroyo bank in the southwest corner of the test unit, to more than 35 centimeters in the bottom of the arroyo at the northeast corner. The bonebed rests on the gray, sandy clay surface of the old arroyo, largely follows its contours, and its surface slopes more than 30 degrees from the southwest corner down to the northeast corner of the test. The actual slope of the arroyo surface, however, could not be obtained since the northeast quadrant of the test unit was not completely excavated. Even so, the actual slope should be at least as steep as the surface of the bonebed and probably steeper.

FLUVIAL TRANSPORT

Frison and Todd (1986:64) have noted differential fluvial transport potential for proximal and distal ribs from mammoth/elephant skeletons. If bison ribs be-

MATERIAL TYPE	QUAD A	QUAD B	QUAD C	QUAD D	TOTAL	PERCENT
Porcellanite						42.6
Maroon	41	1	11	24	77	
Gray	12	1	10	23	46	
Quartzite						39.5
Brown	55	2	19	28	104	
Red	8	0	2	0	10	
Chert						2.7
Gray	0	0	0	1	1	
Brown/Red	3	0	3	0	6	
Black	0	0	0	1	1	
Chalcedony						15.2
Clear/Gray	8	0	1	2	11	
Brown	18	1	7	7	33	
TOTAL	145	5	53	86	289	100.0

Table 4: Summary counts of debitage by material type and one meter quad.

have similarly under increased volume and velocity of channel flow, then water transported ribs should orient with the proximal ends upslope and blades downslope. Such is not so in cut marked ribs in the test unit (Figure 4). While these elements do not rest in the bottom of the channel where runoff may have its greatest effect, they still are in the arroyo and would be susceptible to fluvial transport. Their present position is believed to have been less affected by water transport than other bone elements, and more likely is the result of either repositioning during butchering activities or gravitation downslope.

If a thick bonebed accumulation results from a one-time rapidly buried kill, many bones would not be susceptible to fluvial transport before or following disarticulation. Only upper layer bones and those exposed in vertical, erosional cuts into the bonebed would be "free" enough to reorient with changing drainage patterns. This may be an important factor to consider when comparing the effects of fluvial transport at single animal death sites to those at massive bonebeds.

BONE WEATHERING

The stage of weathering and overall bone condition are uniform throughout the excavation (Figure 9). The upper, skyward surface of bones generally exhibits more and deeper weathering cracks than the lower, groundward surface. In contrast, the cortical surface on the lower aspect of these bones is more exfoliated. Such variation could be the result of microenvironmental conditions produced by the bonebed itself, including changes in the chemical composition of soils and localization of draining body fluids. The topography and exposure of the arroyo also could be influencing factors. Since the pattern of upper surface cracking and lower surface exfoliation occurs throughout the test unit, it can be argued little displacement of bone occurred following the initiation of weathering.

Two explanations for this pattern come to mind. Either a single kill occurred and the entire assemblage began to weather at the same rate, or multiple kills took place and each assemblage was exposed under similar conditions for a similar amount of time. At any rate, the site apparently buried quite rapidly since the upper bones are not significantly more weathered than deeper elements. The elements in the bottom of the arroyo exhibit the least evidence for any weathering.

SPATIAL ANALYSIS

Ethnoarchaeological and actualistic studies have generated several plausible models for understanding site structure in the archaeological record (Binford 1981, 1983). Of particular interest to the Cache Hill study is data on Nunamiut Eskimo sites where herds of caribou were hunted, killed, and butchered. In the ethnoarchaeological situation, butchering at a multiple animal death site produced a circular work area surrounded by discarded waste products (Binford 1983:124). Debitage from tool retouch and resharpening, butchered bone elements, and discarded tools are expected to occur around the work area as by-products of these activities.

Figure 9: Test Unit H21 in progress. General bone condition and weathering is apparent on visible elements.

Additionally, both experimental archaeology (Frison 1978:317) and ethnoarchaeology (Binford 1983:169) demonstrate large animal butchering is a stand up activity. As such, butchering creates larger and more extensive debris scatters than activities done while seated (Binford 1983:165). Carcass by-products and tool maintenance debris can become scattered in a circular arrangement around the main activity center at the animal death site. This spatial distribution might be expected in an undisturbed archaeological context representing a similar type of butchering locality.

Still, this model does not correlate directly with the present distributional patterns at Cache Hill. Most experimental butchering has been at single animal death sites where open space allowed easy access to the carcass. While the ethnoarchaeological record is based both on single animal and multiple animal death sites, the documented events occurred in fairly open, level terrain where topography does not seem to have restricted butchering activities. The published record of witnessed events largely deals with intensive butchering episodes resulting in almost total carcass dismemberment.

In contrast, primary butchering is often present only in the kill area at mass kill-butchery sites (e.g., Todd 1983). Since there is no direct correlate in the ethnoarchaeological literature for activity structure at a multiple animal kill in a confined topographic situation, we must look more critically at the differences between organizational properties in the archaeological record and those observed during actual events.

Some patterns in spatial distribution in the test unit are suggested by the distribution of tool sharpening flakes. Nearly half the debitage was recovered from two square meters of the shallowest portion of the bonebed along the western margin of the test unit. This area is believed to be on the edge of the kill. Even so, over half the flakes were recovered from the partially excavated northeast quad, which is the deepest portion of the bonebed at the bottom of the arroyo.

Several factors could account for this distribution. Certainly, the number of carcasses and steep, sloping

terrain would hamper mobility during primary butchering tasks. As a result, hunters might remove major portions of animals and carry them to more suitable ground beyond the confines of the arroyo for more intensive butchering. Tool retouch flakes could accumulate anywhere in the midden wherever animals were selected for dismemberment and tools became dull from use. The circular arrangement of refuse around butchering areas may not prevail due to the difficulty in manipulating carcasses, in moving about the midden, and in negotiating the arroyo slope.

The increase in flake density toward the bottom of the arroyo could be from downslope movement of chipping debris associated with upslope butchering areas. Many of these flakes are so small they could be easily transported by sheetwash or even gusts of wind.

The distribution, however, also may be a product of activity structure at the site. If certain material types (possibly reduction debris from specific tools) separate out spatially, then it might be argued the distribution is more likely the result of butchering patterns than the natural processes affecting site formation. This must be considered conjectural until attempts are made to refit flakes either to each other or to tool edges.

Unfortunately, too little area was excavated for a statistically meaningful comparison. Present data (Table 4) show the most frequently occurring material types are evenly distributed between upslope areas (Quads C and D) and downslope areas (Quad A). The total volume of excavated area in Quad A is comparable to the combined volume of Quads C and D. Gray porcellanite is more restricted to upslope areas suggesting little downslope movement, while red quartzite is predominant downslope and may illustrate some displacement.

CONCLUSIONS

The Cache Hill test is only a small window into the archaeological record of kill-butchery activities in the arroyo. The sample is too small to make definitive statements about site structure and patterns of human behavior, yet valuable lessons have been learned. Evidence indicates it is a well-preserved, Late Prehistoric kill-butchery site containing a thick bonebed modified by both natural and cultural agents. The degree of bone preservation and high number of articulations in the bottom of the arroyo argue some carcasses were inaccessible to hunters, and the bonebed itself became buried shortly after abandonment. The kill probably took place in the late fall and involved mixed cow/calf and bull groups.

The primary goal of the Cache Hill test was achieved. We intended to experiment with a level of systematic excavation and recording beyond standard testing procedures. Since testing generally produces less detailed provenience of items, investigators who conduct large-scale excavations often have difficulty mapping spatial organization and activity structure across previously tested areas. With careful point proveniencing from the onset of an investigation, a better distributional study will be possible as field investigations progress.

Results of this work suggest some important management implications. Cache Hill is an example of a site type that may occur much more frequently in the region than our current site inventory records suggest. It lies in an environmental setting duplicated by hundreds of thousands of acres in the Powder River Basin. Although there may be few, if any, other Late Prehistoric arroyo traps on record for the area, the actual potential for them in unexplored portions of the region is quite high. In fact, a recent visit to an arroyo near Oshoto, Wyoming revealed two levels of bones that also may be the remnants of another Late Prehistoric arroyo trap (site 48CK58).

Since visibility of these manifestations generally is the direct result of recent headward downcutting in arroyo channels, finding similar occurrences is as dependent on geological processes as on the archeological record itself. Until we learn more about the age of deposits and patterns of erosion, we cannot predict where sites are either buried or exposed. There are too many potential areas in the Powder River Basin with similar settings, and too little systematic inventory, for us to prepare and adopt a predictive model accounting for this site type.

The Cache Hill test illustrates a high potential for successful, large-scale excavation of a Late Prehistoric arroyo trap. No evidence has been found for an artificial pound or corral, but the possibility of one cannot be ruled out. When combined with previous research in the Powder River Basin, the Cache Hill site helps establish arroyo trapping as a long term, regional procurement pattern. As more work is done in this area, archaeologists can study changes through time in the use of arroyo traps, and begin to fill this data gap in Wyoming's archaeological record. One common characteristic in these sites already apparent is the predominance of

local raw materials in the weapon assemblage. This suggests common, nearby lithic procurement areas and restricted territorial movements during selection of stock material for making weapons.

Since the late 1960s, archaeologists have constantly expanded excavation methodology and data recording techniques trying to improve the interpretive potential of archaeological bonebeds (e.g., Frison 1970, 1978; Frison and Stanford 1982, Speth 1983, Todd 1983, Todd et al. 1995). Significant developments include systematic collection and curation of faunal assemblages to allow more detailed laboratory analysis, and three-dimensional proveniencing of bone elements and fragments. These developments are necessary to properly document the context and association of items in archaeological assemblage.

In Wyoming, archaeologists have experimented with meticulous collection and recording techniques at a large camp site assemblage (Todd, Rapson and Ingbar 1985). Here, investigators saved all whole and fragmentary bones after carefully recording several spatial attributes of each. The intent of the Cache Hill test was to apply a very similar methodology to an entirely different site type. The lessons learned from this experiment not only provide insights into prehistoric activities at the site, but reveal important considerations for future excavations at kill sites. They also show the need for innovative management policies to protect these scientific resources when they are discovered on public lands.

Bonebed archaeology requires a distinct set of excavation, recording, and curation procedures. Innovative techniques are needed to fit the magnitude and diversity of information generated per unit area. Experience with the Cache Hill test has prompted us to consider the following procedures the next time we investigate a bonebed:

(1) When excavating within grid units, also dig a 50-cm buffer zone around the periphery of the open grid. This ensures every bone element exposed within the unit can be completely uncovered even if it extends into the unit wall, allowing them to be mapped and collected without risking breakage. Only bones extending into the buffer zone from the open unit should be collected. Bones first exposed only in the buffer zone, and not extending into the grid unit, should be labeled and left for future excavation if the grid pattern is ever extended. Whole elements and only fragments at least five centimeters across might be point-provenienced to speed up the recording process without a significant loss of information. Smaller fragments can be bagged by one meter quad and specific depth range, which still will allow some analysis of spatial distribution.

(2) Due to the quantity of information available in bonebeds and the condition of the bone when it is removed, two recording forms should be used, one for the field and one for the laboratory. The field form should focus primarily on provenience information, spatial variables, and bone element and portion identification. Recording detailed observations of bone modification and other inherent morphological attributes should wait until elements are properly stabilized and cleaned back in the laboratory.

(3) Long term goals in bonebed research *must* recognize the need for specialized warehousing and curation facilities. Collections are massive yet delicate, and care must be taken to preserve them for future study and possible display. Without present curation standards at many institutions today, many early collections would not still be available for reanalysis, and we must continue to improve curatorial techniques. A staffing and financial commitment is needed for repositories to ensure adequate wet lab facilities, storage stacks, controlled environment, adequate space for researching collections, and sufficient display areas for public viewing.

Efforts also should be directed toward ways to stabilize erosion and eliminate vandalism at known bison kills. In the Powder River Basin, we need to consider stabilizing headward erosion in arroyos cutting down into these bonebeds. Some landowners are already making deliberate efforts in this area. Perhaps funding from historic preservation grants could be allocated to researchers to analyze this erosion pattern and its impact to archaeological resources, and to construct sediment traps or similar facilities at arroyo knickpoints. More planning, preparation, and financial support for bonebed research are needed for all phases of investigation if we are to extract the maximum information potential while preserving the archaeological record for future generations.

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