

MAMMOTH TRUMPET



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Renowned archaeological sites in widely separated parts of Alaska reveal disparate perspectives on human occupation between 12,000 and 11,000 years ago when two continents were connected. The Mesa site on the northern slopes of the Brooks Range represents the Paleoindian tradition; Broken Mammoth site in the Tanana lowlands north of the Alaska Range in east-central Alaska represents quite different traditions.

What is being discovered at these sites and what can it tell us about the peopling of the Americas? Two of the principal investigators give us their views.

2 VIEWS OF BERINGIA

TANANA SITES CONNECT ALASKA WITH EURASIA

Yesner Sees Antecedents to Paleoindian Cultures

Approximately 60 miles southeast of Fairbanks, Alaska, the Broken Mammoth site sits atop a bluff that overlooks the Tanana River. A multidisciplinary team headed by David R. Yesner, anthropologist at University of Alaska Anchorage, and Charles E. Holmes, of Alaska's Office of History and Archaeology, conducted extensive excavations there from 1990 to 1993, and they are continuing their analysis. Broken Mammoth and two nearby Tanana lowland sites, Mead and Swan Point, were

continued on page 12

MESA'S TOOLS LINKED WITH LOWER 48

Kunz Finds Evidence of Paleoindian Origin

Sitting high atop a mesa with an unobstructed 360-degree view encompassing a hundred square kilometers of rolling tundra, the Mesa site is a somewhat atypical setting for a North American Paleoindian site. Its location in the periglacial environment along the northern flank of Alaska's Brooks Range engenders the feeling that this site, which is one of the oldest well-documented Paleoindian sites in North America, has not completely emerged from the Pleistocene.

continued on page 6

INSIDE

2 Archaeology offers clues to surviving climate change

*Editor of book on Public Trust
reflects on future of archaeol-
ogy*

4 Earliest American sites will gain Landmark status

*Agency seeking information
before National Historic
Landmark status is updated*

14 Earliest Clovis site revisited

*Dent Mammoth site still
yields clues 60 years after
discovery*

11 Beringia Center planned

3 New Books

19 Memories of an author

*Archaeologist George
Agogino reflects on work of
Franklin Folsom*

Archaeology Offers Clues to Surviving Climate Change

Because archaeological evidence of Ice Age peoples is a finite resource, the care and conservation of all such materials are of crucial importance to First Americans studies. Commercial development, vandalism and natural processes continue to take their toll on undiscovered clues to the distant past, but future discoveries can provide answers to questions that have not been evident in archaeological sites already analyzed.

Ruthann Knudson, coeditor of *The Public Trust and the First Americans*, a new book published by the **Center for the Study of the First Americans** and Oregon State University Press, recently spoke to the **Mammoth Trumpet** about the future of archaeology. She said that First Americans research is capable of

answering questions about human adaptation to global climate change because it addresses environmental factors that influenced the peopling of the Americas.

"First Americans archaeological resources are an irreplaceable record of human adaptation to a pristine natural New World, one not modified by oil spills, nuclear waste, municipal landfills, or acid rain," Dr. Knudson writes in the book. "Interdisciplinary studies [such as First Americans research] provide a unique record of human technological and socio-cultural growth and development and paleoenvironmental conditions. They can provide a significant database for better understanding of relationships between people and their environment in the Arctic."

Knudson has been eloquent in voicing her concern about threats to America's archaeological heritage. Besides being a widely published authority on what is known as cultural resources management, she is an authority on Paleoindian typology. "There is an ongoing crisis in archaeology as things are eroded, collected and developed constantly," says Knudson, archaeologist with the Archaeological Assistance Division of the U.S. National Park Service, research associate at the California Academy of Sciences, and operator of her own archaeological firm.

Those of us who share Knudson's optimism for the potential insights obtained by studying the earliest Americans may well feel immediate concern for this endangered resource. Asked to interpret the current political climate as viewed from Washington, D.C., Knudson says she thinks we are seeing a political re-

continued on page 5

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New Books

The Public Trust and the First Americans, edited by Ruthann Knudson and Bennie C. Keel. Oregon State University Press and the Center for the Study of the First Americans, 355 Weniger, Oregon State University, Corvallis, OR 97331-6510. 212 6-by-9-inch pages. 1995. \$24.95 (paperback).

This new book focuses on the public nature of First Americans resources and on various aspects of their use. It examines the value to all people of archaeological materials.

First Americans are the subject of public fascination and scholarly research. Their archaeological, geological, and paleoenvironmental remains are nonrenewable—once gone, they are forever gone. The use of these resources must be carefully managed—conserving them while at the same time exploiting them to create public information.

The book includes discussions of:

- the Public Trust Doctrine in U.S. law;
- responsibility for First Americans materials;
- relationships among researchers working on First Americans resources that are often publicly managed, and the managers of these resources;
- the legal basis for protecting First Americans resources in the Americans;
- opportunities for educating the public about First Americans; and
- how to pay for First Americans research and protection of these resources.

The editors of *The Public Trust and the First Americans* are both archaeologists for the National Park Service. Knudson is also the principal of her own small one-woman firm, Knudson Associates in Alexandria, Va. Keel is an Adjunct Professor of Anthropology at Florida State University.

The book's 15 chapters are the works of 23 contributors knitted together into a well-organized whole with section introductions by Knudson and Keel. The book is divided into seven sections: public stewardship; the public trust; research guidance; the legal environment; public education; funding; and a summary. Other authors are: Judith A. Bense, Director, Archaeology Institute, University of West Florida; Robson Bonnicksen,

Director, Center for the Study of the First Americans; F. A. Calabrese, Chief, Midwest Archaeological Center, National Park Service; Heather Devine, cultural heritage consultant; Tom D. Dillehay, Professor of Anthropology at the University of Kentucky and the Universidad de Chile, Valdivia; John G. Douglas, Senior Archaeologist, Division of Cultural Resources, Bureau of Land Management; John M. Fowler, Senior Counsel,

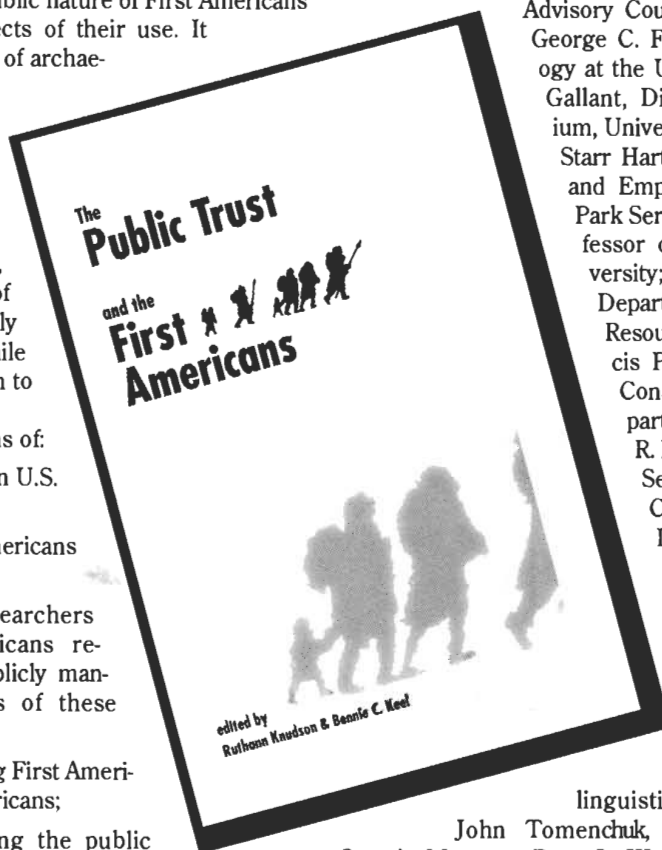
Advisory Council on Historic Preservation; George C. Frison, Professor of Anthropology at the University of Wyoming; Roy A. Gallant, Director, Southworth Planetarium, University of Southern Maine; Leslie Starr Hart, Chief, Office of Professional and Employee Development, National Park Service; Fumiko Ikawa-Smith, Professor of Anthropology, McGill University; Dennis C. Le Master, Head, Department of Forestry and Natural Resources, Purdue University; Francis P. McManamon, Departmental Consulting Archaeologist, U.S. Department of the Interior; Martin P. R. Magne, Chief of Archaeological Services, Alberta Region, Parks Canada; Charles R. McGimsey III, Director Emeritus, Arkansas Archaeological Survey; Dennis Stanford, Chair, Department of Anthropology, National Museum of Natural History; D. Gentry Steele, Professor of Anthropology, Texas A & M University; Allan R. Taylor, professor of linguistics, University of Colorado;

John Tomenchuk, research associate, Royal Ontario Museum; Patty Jo Watson, Distinguished University Professor of Anthropology, Washington University; and Stephen Williams, Emeritus Professor and Honorary Curator of North American Archaeology, Peabody Museum, Harvard University.

Although many of the concepts expressed in *Public Trust and the First Americans* apply to all archaeology, the book's focus is strictly on those faint traces of the earliest Americans and the environment in which they lived.

The book, available by mail from the CSFA (see front wrapper pages of this **Mammoth Trumpet**), grew out of the Public Trust Symposium that concluded the World Summit Conference on the Peopling of the Americas in 1989 at the University of Maine. Knudson and Keel were among the organizers and moderators of that symposium.

continued on page 20



Agency Solicits Information

U.S. Plans Landmark Status for Earliest Americans Sites

If you were given the assignment of designating the most significant Paleoindian sites in the United States, how would you go about it? What criteria should be used in judging the relative importance of archaeological discoveries? What types of data can provide scientists—now and in the future—the maximum amount of information about the earliest Americans?

These aren't hypothetical questions, for the United States is well on its way toward bestowing official status of National Historic Landmark upon a number of Earliest Americans sites. The National Park Service and a committee of the Society for American Archaeology are embarked on a project of information gathering that is designed to analyze a wide range of variables that can be used to select sites that will be recognized as important cultural treasures.

The designation "Earliest Americans" refers to those sites of the greatest antiquity among all the "themes" for sites, districts or buildings to be considered as National Historic Landmarks. There are now 20 "Paleoindian" National Historic Landmarks, the initial 11 of which were chosen after a study coordinated by the late H. Marie Wormington in the 1950s. Subsequently nine more sites were added to the list. All these existing landmarks are archaeological sites, but the new Earliest Americans landmarks category may also include sites recognized by Native Americans as places of origin.

Initial nominations of Earliest Americans National Historic Landmark properties from the new study are scheduled to be ready Sept. 30, 1996, with final nominations due two years later.

Robert S. Grumet of the National Park Service in Philadelphia is coordinating the theme study. Grumet and David S. Brose of the Royal Ontario Museum in Toronto organized a symposium on the

Existing Paleoindian Landmarks

State	Property	Designation Date
Alaska	Anangula District	June 1978
	Dry Creek site	June 1978
	Gallagher Flint Station	June 1978
	Onion Portage District	June 1978
Arizona	Lehner Mammoth site	May 1967
	Ventana Cave site	January 1961
Colorado	Lindenmeier site	January 1961
Illinois	Modoc Rockshelter site	January 1961
Missouri	Graham Cave site	January 1961
New Mexico	Blackwater Draw	January 1961
	Folsom site	January 1961
	Sandia Cave site	January 1961
North Carolina	Hardaway site	June 1990
Oregon	Fort Rock Cave site	January 1961
Texas	Lubbock Lake site	December 1977
	Plainview site	January 1961
Utah	Danger Cave site	January 1961
Virginia	Thunderbird District	May 1977
Washington	Marmes Rockshelter site	July 1964
Wyoming	Horner site	January 1961

project at the annual meeting of the Society for American Archaeology in May. Brose is chair of the SAA Paleoindian theme study committee. Other participants in the SAA session included Francis P. McManamon, Departmental Consulting Archaeologist for the Department of the Interior and Chief of Archaeological Assistance for the National Park Service; Patty Henry, National Historic Landmark coordinator for the National Park Service; David Anderson of the National Park Service; and Dennis Stanford, Smithsonian Institution archaeologist.

In organizing the search for the most

important U.S. Paleoindian sites, Grumet and his team have sought the cooperation of all state historic preservation offices and state archaeologists. States have appointed theme-study coordinators. At least 35 states are known to have developed Paleoindian historic contexts, and information gathering is continuing.

"It is our great desire to get the widest range of participation as possible," Grumet said in a telephone interview from his Philadelphia office. The Park Service is eager to hear from people and is committed to respond to all inquiries, he said.



Preliminary Park Service surveys have found more than 550 archaeological sites and districts with evidence of Paleoindian occupation. Grumet and his team also have been seeking Native American involvement and hope to complete early this fall an organizational framework for a historic-context component on Native American traditional origin sites.

To be able to objectively evaluate sites, the framers of the Earliest Americans theme study have developed a planning framework termed the "historic context" to serve as a foundation for decisions. Though it might appear baffling to a person accustomed to evaluating sites in terms of lithic technology or faunal remains, the criteria conform to general U.S. preservation planning guidelines. Historic contexts organize information about sites into 10 categories: theme, time period, geographic area, related resources known as property types, known and expected resource distributions, evaluation criteria, research needs and questions, research bibliography, planning

goals and priorities, and integration into broader management processes. These, Grumet says, allow us to systematically understand the various values and associations that a property has. And they allow us to then contrast them and try to determine their relative levels of signifi-


Persons wishing to offer information to the Earliest American National Historic Landmark study may write Robert Grumet at the Northeast Field Area NPS, U.S. Custom House, Room 251, Philadelphia, PA 19106, or phone 215-597-0127.

cance—their importance to the American people.

The theme study is designed to elicit information from all parts of the United States and from avocational archaeologists and contract archaeologists as well as from the academic community. "We are in no way limited to the professional or academic communities," says Grumet. He also stressed that the goal of the study

is not to favor any particular scientific theory. "Our attempt is to express the widest range of scientific discourse. In other words, our goal is not in any way to establish a new orthodoxy, but to express at the present time what the state of the study is."

Grumet says another goal of the project "is to create a framework that's supple and flexible enough to maximally incorporate changes over the longest period of time." As new technologies and new discoveries become available, he says, the established process for naming new national landmarks should accommodate them.

As of this writing, the process for getting cultural information for incorporating information on Native American traditional origin sites remains to be worked out. But, says Grumet, "Native American voices are going to be heard in the study. We are going to have an expression of a range of different native views about the earliest peopling of North America." 

Knudson

continued from page 2

sponse to the fact that Americans are expressing fear of federal regulation. The causes are complex, but the core of the reaction, she suggests, includes "a socio-cultural reaction to birth control and women's fuller participation in birth decisions, and their work role."

"An archaeologist friend told me that he was disgusted with all the emphasis on gender and ethics recently and he wanted to get back to archaeological data in publications, but the discussion of the context in which archaeology is done won't go away."

Secondly, she points to a "realization that environmental protection costs money both in lost exploitation opportunities and in clean-up costs." As for current Congressional discussions, she sees the House of Representatives as "full of a lot of relatively inexperienced, locally oriented, fervent, bright young people whose positions will be balanced in significant measure by public reaction, a more traditional Senate, and the White House itself on major issues." An ex-

ample of this was the recent reaction to a House Appropriations Committee move to eliminate the President's Advisory Council on Historic Preservation. But, Knudson reports, on July 13, by a recorded bipartisan vote of 267 to 130, the full House confirmed a national commitment to the council's role in historic preservation.

We asked Knudson if there might be a parallel between the threatened and endangered species under the embattled Endangered Species Act and America's oldest archaeological resources. "I hope there is never a perceived parallel between archaeology and threatened and endangered species," she replied, noting that under the Endangered Species Act the presence of an endangered species brings activities to a halt. "Archaeology has always understood that it must compromise to survive at all." At issue is the nature of the compromise.

She sees the need for better understanding among the public, whose heritage is preserved in the archaeological record; managers, who administer and protect (or destroy) that heritage; and scientists, who describe and analyze humanity's common past. And she urges the archaeological community to con-

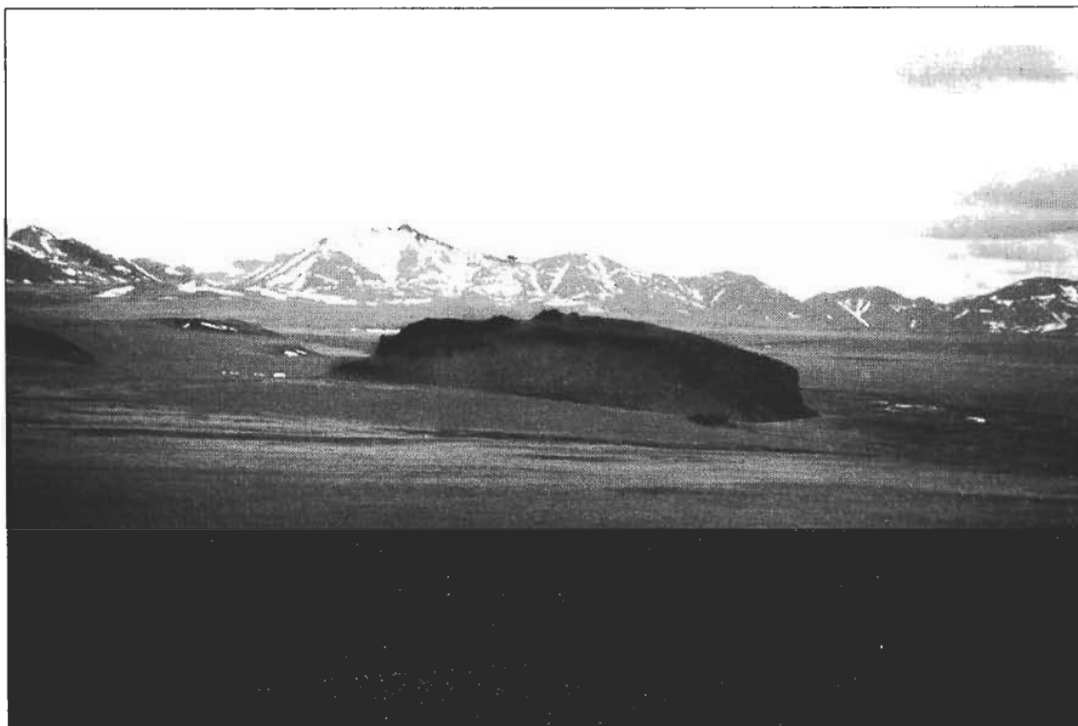
tinue to educate the public concerning scientific and cultural values in archaeological resources. Her 1989 article, "North America's Threatened Heritage" in *Archaeology*, forcefully described her concerns for archaeology's future.

In it she warned that unless significant changes are made, most of all today's North American archaeological deposits will be destroyed by 2050. Threats she cites are all too well known: development, vandalism, and erosion. Even state-of-the-art research, though it produces reports and museum collections, consumes archaeological sites. "We probably can never retrieve all of the site's potential formation," she notes, "and the site is gone." Of particular concern are early sites. "Of the millions of sites in North America, we know of probably fewer than 250 that make a significant contribution to our knowledge of human colonization and adaptation in North America before 7,000 B.C."

Is there any cause for optimism? Knudson answers affirmatively.

First Americans research, she says, offers great opportunities because its interdisciplinary studies analyze human adaptation to extreme climatic changes

continued on page 18



MICHAEL KUNZ/BLM

An aerial view southward toward the Mesa with the Brooks Range in the background.

Mesa Site

continued from page 1

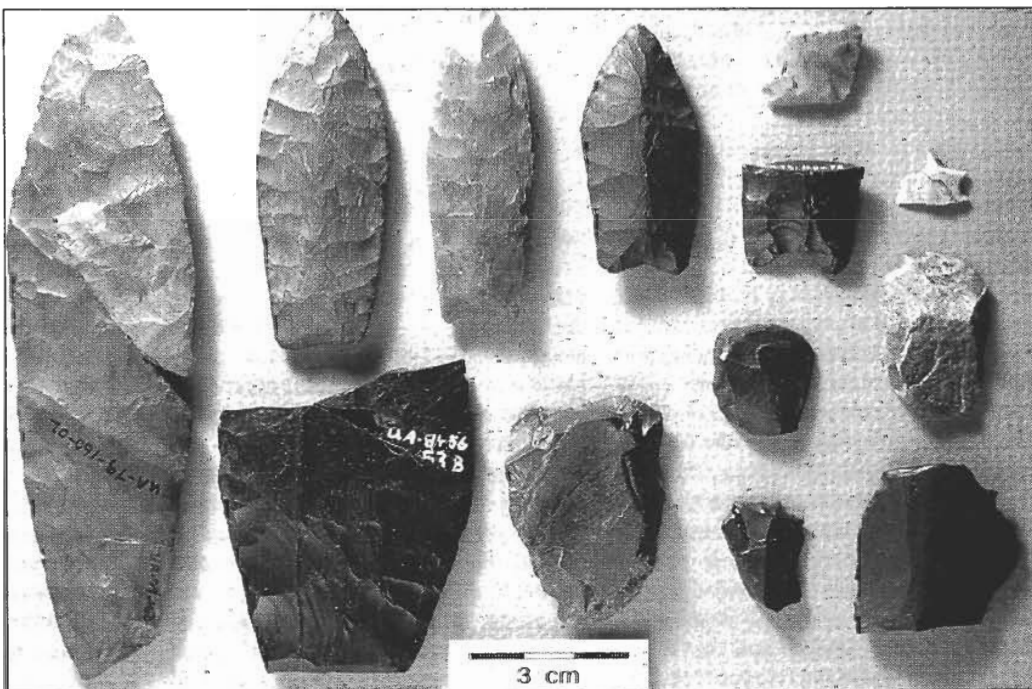
Michael Kunz, who discovered Mesa in 1978, says the site's old date and classic Paleoindian artifact assemblage may cause many archaeologists to rethink

theories of how North America was originally settled by way of the Bering Land Bridge.

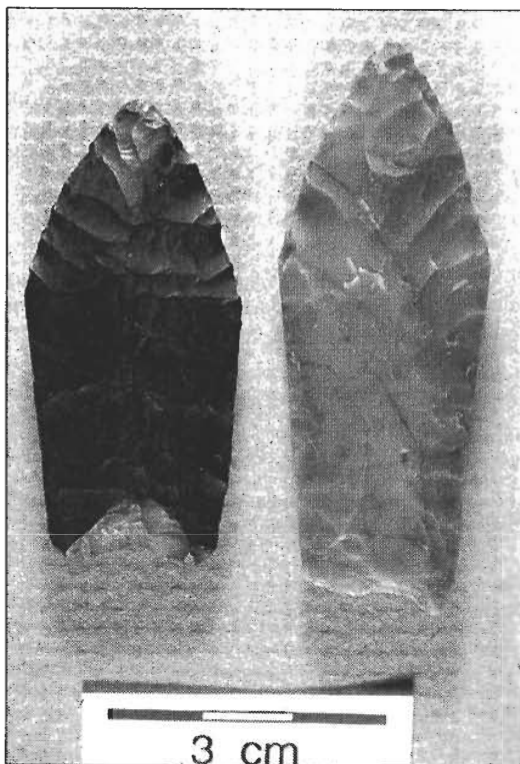
Kunz, a Bureau of Land Management archaeologist, described the discovery of the site earlier this summer in a telephone interview from his office in Fairbanks. It was during cultural-resource

compliance work associated with oil and gas exploration activities in the National Petroleum Reserve-Alaska. Having spent his early career in New Mexico working at such sites as Blackwater Draw and Mocking Bird Gap, he was quite familiar with the appearance of Paleoindian artifacts and assemblages.

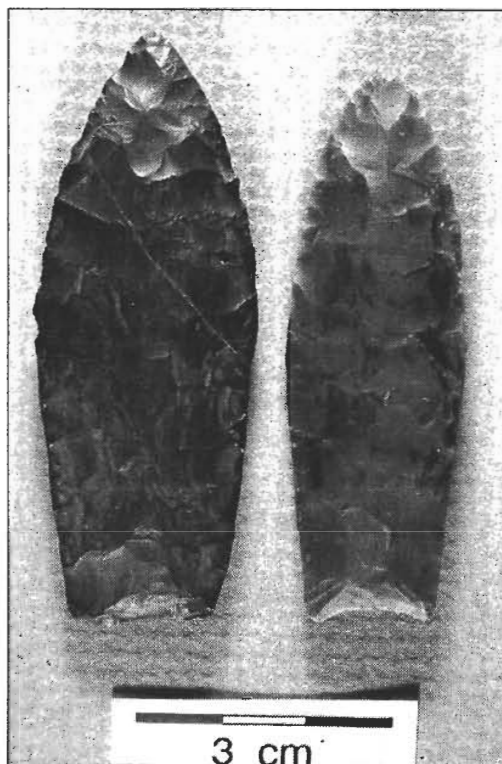
Some components of the Mesa assemblage.



RICHARD REANIER



RICHARD REANIER

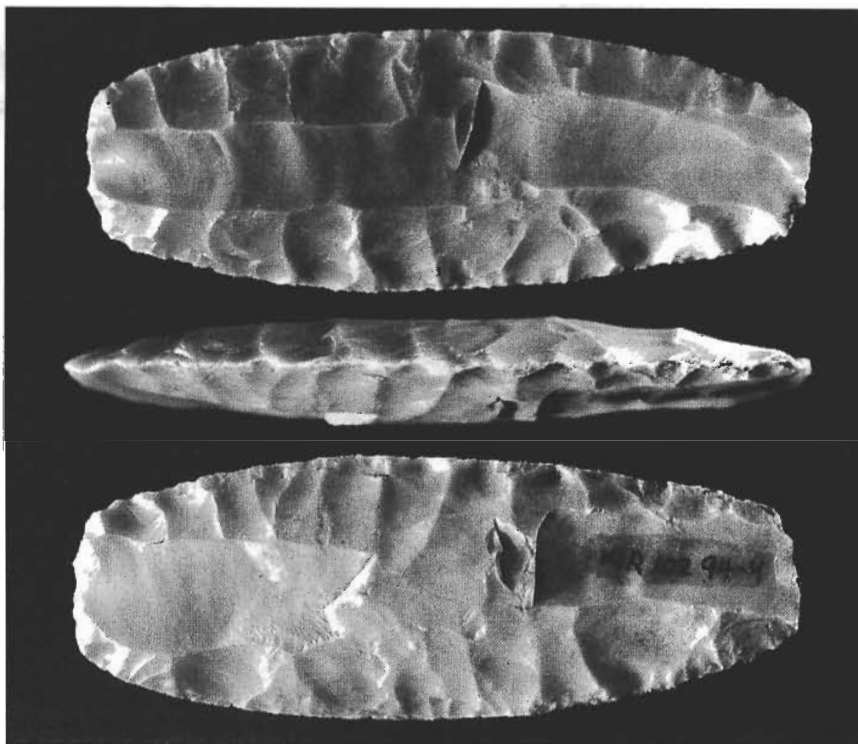


RICHARD REANIER

At far left are two resharpened Mesa projectile points. At near left are two other Mesa projectile points. Below are three views of a fluted artifact from the Mesa site.

"The Mesa site artifacts sure looked like paleo stuff," Kunz recalled. Initial testing of the site in 1979 revealed three hearths each containing a mix of charcoal and cultural material, which was radiocarbon dated to 7,620 years before present. Further testing in 1980 by Kunz and Richard Reanier, of the University of Washington, revealed a near-surface stratigraphic stability uncommon in periglacial environments, and also provided a more complete picture of the cultural assemblage. The 7,620-year date represented a little-known period in Alaska prehistory and was interesting for that reason alone, yet the Paleoindian-looking assemblage nagged Kunz, who does not subscribe to the idea that Mesa represents a "backwash" of Paleoindian culture that developed in the lower 48 states, then migrated north to Alaska.

Kunz and Reanier returned to the site in 1989 to conduct some additional testing and encountered another charcoal deposit with associated cultural material. This time accelerator mass spectrometry (AMS) radiocarbon dating was used, producing a date of 9,730 years before present. Intrigued by what they felt was a more realistic date for the assemblage, Kunz and Reanier have returned to the



PETE BOSTROM

site every year since 1991. Since then they have recovered what Kunz describes as "a classic assemblage of Paleoindian artifacts," including more than 80 lanceolate projectile points, which appear

somewhat similar to points from the Agate Basin site in eastern Wyoming. They have also accumulated 15 radiocarbon dates ranging from 11,700 to 9,700 years before present.

The 11,700-year-old date makes the Mesa one of the oldest well-documented Paleoindian sites in North America. Kunz reports that most of the dates, derived from the charcoal of hearths directly associated with cultural material, cluster around 10,000 years ago, establishing an excellent chronology of site occupation. He says many of the projectile points and other artifacts, all made of chert, have been recovered from the charcoal-soil matrix of the hearths.

2,000 years younger than any other date from the site.

Site Analysis

Kunz emphasizes the classic Paleoindian assemblage discovered at the site by describing the well-made lanceolate projectile points, which exhibit a robust pressure-flaking technique and heavy edge grinding along the lower one-half of the point body. Other tools found at the site are typical of Paleoindian hunting

who have seen the collection, also see the technological similarity to the Agate Basin assemblage. The Agate Basin complex has been dated to 10,500–10,000 years ago. Kunz says that Mesa assemblage's technological and metric similarities to Agate Basin are startling—both were manufactured using a robust pressure-flaking technique in which the horizontally opposed, parallel flakes are purposely terminated along the median ridge. Though Agate Basin points are on

Against a backdrop of tundra and the Brooks Range, five investigators excavate the Mesa site.



"A lot of them exhibit potlid fractures," Kunz said. Potlid fractures occur when chert is subjected to intense heat causing potlid-shaped flakes to spall off. "It appears that these artifacts fell or were cast into the hearths while the campfires were still burning, which establishes a direct link between the artifacts and the material being used to date them. It doesn't get any better than that."

Kunz attributes the discrepancy between the 1979 date (7,620 years B.P.) and the subsequent 15 dates that range 11,700 to 9,700 years B.P. to a laboratory error. Fortunately, a portion of the 1979 sample had been archived and was submitted for accelerator mass spectrometer analysis in 1991, returning a date of 10,060 years B.P. Without the advent of AMS dating, the Mesa researchers would not have been able to date the small archived sample, and the site would have been plagued by a date that was more than

camps and include multi- and single-spurred graters, and thumbnail and spurred endscrapers. The site appears to have been a hunting lookout, says Kunz, but because no killing or butchering of animals took place there, there is no direct evidence of the animals the Mesa people hunted. However, Kunz believes that bison may have been their primary big-game subsistence animal. "You don't need to employ a high promontory for caribou hunting," says Kunz, "and at the time the Mesa people were utilizing the site, we don't think caribou had established themselves very numerous in the region."

A number of leading North American prehistorians, including George Frison, C. Vance Haynes, and Dennis Stanford, have visited the site and examined the artifacts, and, according to Kunz, all agree the assemblage is typically Paleoindian. These archaeologists, as well as others

the average longer than Mesa points—a result of raw-material size, Kunz believes—the range of width and thickness varies less than 2 mm. A limited amount of secondary edge retouch on the points, and resharpening of broken points are traits common to both assemblages. He senses a very strong relationship between the two complexes even though Agate Basin lies about 4,000 miles southeast of Mesa.

Given the ages of the two complexes, the Mesa culture could reasonably be the progenitor of Agate Basin, Kunz says. Agate Basin points differ slightly from the Mesa points in that they tend to have straight to convex bases whereas those from the Mesa site have a shallow concave base, although straight and convex bases do occur.

Despite the site's age, Kunz does not believe the Mesa culture is related to Clovis. Although a fluted specimen has



been recovered from the site, Mesa points differ enough from Clovis style that Kunz is prompted to suggest that Mesa represents a previously unrecognized culture, which may be the source for the plethora of unfluted Paleoindian assemblages that followed and replaced the Clovis and Folsom fluted tradition. The oldest date for the Mesa culture suggests that it may predate Clovis hunters, long thought by many archaeologists to be the oldest inhabitants of North America. Clovis sites have been dated to 11,500 years B.P., and the Mesa culture could possibly be older—and it is found in the most logical place, Alaska.

The Mesa site is not an isolated occurrence. There are three other known sites with Mesa-like assemblages—two roughly 200 miles to the east of Mesa, and another 400 miles to the southwest. These sites have been AMS-dated to between 10,500 and 10,000 years before present.

Few archaeologists doubt the first Americans crossed the Bering Land Bridge from eastern Siberia but have been confounded by the fact that no Siberian culture identified to date has an artifact assemblage technologically similar to those of classic North American Paleoindians, neither Mesa nor Clovis.

Why do we find related cultures between Alaska and Siberia such as the Nenana, but no Siberian parallel to North American Paleoindian culture? And how do findings at the Mesa site affect our understanding of the peopling of the Americas and the origin of North American Paleoindian cultures?

Although we still do not know where Paleoindian culture originated, Kunz suggests that the Mesa findings support the idea that it is a manifestation of the New World and not of Siberia.

"There are no good technological antecedents, or techno-cultural antecedents for the classic Paleoindian assem-



An investigator probes a hearth at the Mesa site.

Lithic artifacts found in hearths at the site exhibit potlid fractures, suggesting that they were there while the fires were burning.

DAN GULLICKSON/BLM

blages in Siberia in the Upper Paleolithic archaeological record," Kunz says. "They just aren't there." He does note that the earliest evidence of people in northeastern Siberia dates to 14,000–16,000 years ago, allowing plenty of time for people to travel across Beringia and to subsequently develop the New World Paleoindian culture. Kunz believes that eastern Beringia (Alaska and the western Yukon) was "a sort of holding pen"—a large, closed environment—for many groups gradually moving back and forth across the continental connection. He does not envision distinct migration surges from west to east, but rather a milling about of people back and forth across Beringia.

Paleoenvironmental studies in the region suggest that late-Pleistocene climate changes occurred in Alaska earlier than farther south. The climate probably was quite chaotic between roughly 11,000 and 10,000 years ago. Lake sediment and tundra-core drilling in the Mesa region, as well as an examination of exposed geologic sections, one a drained lake of Pleistocene age that Kunz and his colleagues call the "Lake of the Pleistocene," indicate the presence of a steppe-tundra environment during late-Wisconsin time. The

fossil record of this time period reveals that most of the large subsistence animals were small-hoofed, lip-feeding herbivores that would not fare well in the relatively grassless, wet tundra and deep-snow environment that was taking over. At the same time, travel routes south, whether coastal or interior, would have been difficult to negotiate. "I don't think

*The site appears
to have been
a hunting lookout.*

people would have just bopped down through the ice-free corridor on a lark," says Kunz. "The mixed 'holding pen' cultures of eastern Beringia must have had a fair amount of environmental pressure on them to cause them to initiate a southward move out of the region. Either that, or our concept of where the continental ice sheets south of Alaska were located is wrong."

To Kunz and his colleagues, all the lines of evidence from the Mesa site sug-

gest strongly that North American Paleoindian culture is indeed a New World development and possibly originated in eastern Beringia or Alaska. These lines of evidence include the environmental information coupled with the classic Paleoindian assemblage found at Mesa with its very old date, and the fact that no similar Paleoindian assemblages are found in Siberia, although other regional assemblages, such as Nenana, do appear cross-continently related.

What Next?

Kunz and the Bureau of Land Management will continue to work at the site for several more years. This summer, Russian archaeologist Sergei Slobodin, who has many years of experience working in northeastern Siberia, was again a member of the Mesa research team. Kunz says communication between Russian and American archaeologists can, for many reasons, leave much to be desired and he believes that working with a Russian archaeologist is the best way—sometimes the only way—to learn about Siberian prehistory and current thoughts and ideas of Siberian researchers. Kunz says such knowledge is crucial to understand-

Excavations have been going on at the Mesa site since 1979. This summer's work unearthed two additional hearths and what may be an atlatl weight.



DAN GULLICKSON/BLM




RICHARD REANIER

Mesa, towering over the archaeologists' camp, center right, provided Paleoindian hunters with an unobstructed, 360-degree view of the Beringian landscape.

ing Upper Paleolithic and late-Pleistocene human activity in the region where the Old World and the New World meet.

To date, less than three percent of the Mesa site's horizontal area has been excavated, and Kunz says he will stop before the 10-percent level is reached. This summer's work consisted of excavation, an intensive mapping project conducted by Steve Durand of Eastern New Mexico University, an assessment of the geochronological resources at Lake of the Pleistocene, and a survey of the surrounding area for sites culturally related to Mesa. Kunz says that although no definite new Mesa sites were found at 63 locations examined, Kris Wenzel, director of the survey, located several good prospects that will be examined in detail next year.

This summer's excavation at the Mesa unearthed two hearths and added more projectile points, gravers, large bifaces, and other nonspecific stone tools to the collection. The most interesting find of the summer, says Kunz, was the discovery of what may be an atlatl weight. 

—David Stepp

Beringia Interpretive Center to Offer Window on Ice Age

The Government of the Yukon has begun transforming the \$3.5 million Yukon Visitor Reception Center in Whitehorse into a window on the Ice Age that officials expect to be a big attraction when it opens in 1997. The development, initial cost of which was put at \$3.3 million, will present the story of Beringia.

According to Jeff Hunston, director of the Yukon Tourism department's Heritage branch, the Yukon Beringia Interpretive Center will tell the story of Beringia through dynamic new exhibits. These will include interactive computers; a new mural depicting the reconstructed Beringia landscape; a Beringia film shown in the center's 200-seat theater; dioramas with reconstructions of ice-age fauna, either skeletal or external models; and exhibits of mummified remains, such as the Last Chance Creek horse and a black-footed ferret from the Sixtymile

River. The heritage branch also plans presentations on how various scientific disciplines extract, analyze and interpret information to tell the story of Beringia. Exhibits on early archaeological sites will be included along with First Nations accounts of Raven's creation of the world and of the ice-age fauna that are part of their traditions.

Hunston said programming will include lecture series, field research expeditions, school sleep-over programs, and temporary traveling exhibits from other scientific institutions. A "Team Beringia" advisory group of scientific researchers and First Nations experts has been put together to support the exhibit planning and implementation program, Hunston said. The team draws expertise from the Canadian Museum of Nature, Canadian Museum of Civilization, Agriculture Canada *continued on page 19*

Broken Mammoth

continued from page 1

particularly valuable repositories of information on the past because of the nature of the soil—two meters deep, conducive to preserving bone, and undisturbed by permafrost, which would have confused the stratigraphy.

Dr. Yesner, a specialist in human ecology and an expert on faunal remains, says his detailed analysis of the thousands of animal bones that ancient Alaskans left at the sites is now about one-half completed. Because of an unexpected artifact discovery, Dr. Holmes and a team were doing some additional geoarchaeological analysis of the Swan Point site this summer. With Holmes was veteran Broken Mammoth investigator Thomas Dilley, a doctoral student working with C. Vance Haynes at the University of Arizona, and Richard VanderHoek, a Ph.D. candidate in anthropology at the University of Illinois.

Radiocarbon dates from Broken Mammoth and related sites have been particu-

larly gratifying to the research team not only because they extend back in time to almost 11,800 years, but because the dates have been in proper stratigraphic sequence and consistent among the individual sites. "And additional dates now," Yesner explained in a mid-summer telephone interview from his office in Anchorage, "reinforce the notion that the earliest occupation is securely dated between 11,000 and 11,800 radiocarbon years ago."

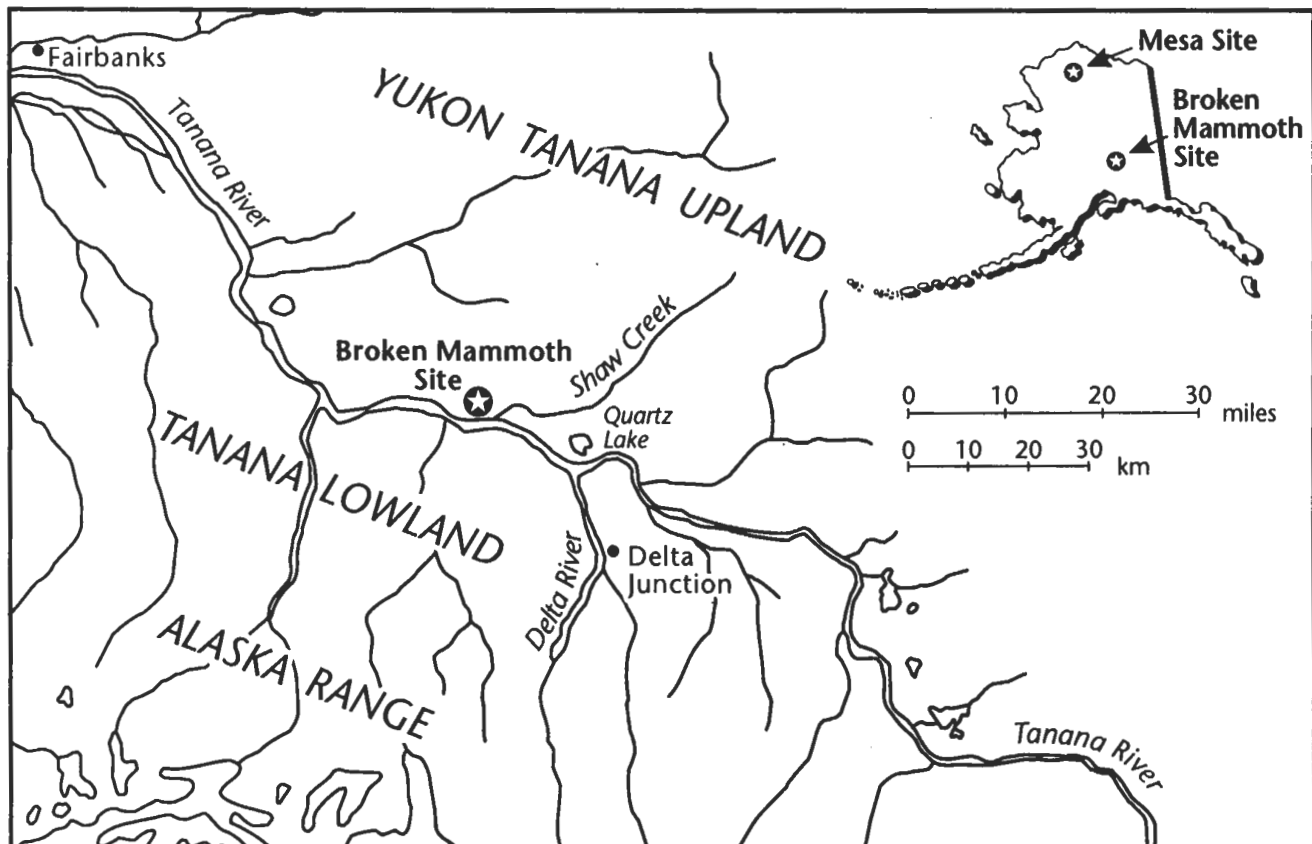
He said new accelerator mass spectrometer dates have narrowed the apparent gap between the earliest occupation and a second one that ended around 9,300 years ago. The second now seems to have begun close to 11,000 years B.P. Investigators believe that the two early occupations and one dating to around 7,500 years ago are evidence of the same cultural tradition occupying all three sites.

It was the presence of microblades in the oldest level that drew team members back to the Swan Point site this summer. The microblades had been found in association with or directly under a piece of

mammoth tusk in a stratum dating to about 11,700 years ago. "That puts us squarely within the Nenana complex dates," Yesner said, noting that the Nenana complex is supposed to be free of microblades. Tools or weapons employing microblade technology consist of small lithic cutting surfaces set into slots of a wooden or bone shaft. Perhaps, Yesner noted, the presence of microblades at one of the central Tanana Valley sites indicates that different activities took place there.

Microblades had been found in later occupations of the Broken Mammoth site, but the earliest occupation is considered to be affiliated with Nenana complex. Microblades in strata dating to Nenana complex time will require theoreticians to do some explaining. Should archaeologists change their definition of the Nenana complex, or should the earliest occupation of the central Tanana sites be assigned another, perhaps new, cultural affiliation?

The mammoth ivory that gave Broken Mammoth its name has been assumed to



Location of the Broken Mammoth site in the middle Tanana Valley, Alaska.



have been scavenged by the ancient hunters long after mammoths had disappeared from the area. For example, tusk material from an 11,000-year-old human occupation at the Broken Mammoth site produced a radiocarbon date of 15,800 years ago. At the nearby Mead site a sample of tusk was found to be 17,000 years old. Yesner and Holmes had felt confident that mammoths were long gone before the hunters came, but a new date from the Swan Point site makes that less clear.

"The AMS date that came back on the mammoth ivory there is about 12,050 radiocarbon years," said Yesner. That puts it within about 300 years of the earliest occupation. "While that's still earlier, it's getting closer." Yesner says that Holmes is beginning to wonder if mammoths might have lived in the area after 12,000 years ago, and he notes that they survived until later in Siberia. Perhaps, Yesner offers, humans and mammoths did coexist when sea level rose to cut Beringia into Siberia and Alaska and there was something of a cloistering of the elephants and the people that led to the mammoths' extinction. He remains to be convinced that they coexisted at Broken Mammoth.

Yesner's detailed analysis of the abundant animal bones from the sites leads him to have doubts about the impact on Alaskan fauna of the so-called Younger Dryas interval, the last serious gasp of the Pleistocene that returned glacial conditions to much of Earth. "Other workers in the interior of Alaska are suggesting a downturn of climate that may have impacted early people in Alaska." But Yesner doesn't see a significant change in the faunal record in central Tanana Valley sites.

"If you're going to suggest that a little after 11,000 years ago there was some kind of climatic downturn, I think you'd really be hard-pressed to prove it in the faunal inventory that we have." Broken Mammoth's calcium-carbonate-rich loess soil was almost perfect for preserving bone (*Mammoth Trumpet* 7:1 "Bones Reveal Paleoindians' Way of Life"). Bison and elk are the main species in the faunal record, and there are caribou and bear as well. The continuing analysis is revealing carnivores, too: Arctic fox and dire wolf. From the beginning, research of the sites

has challenged people's thinking about America's early hunter-gatherers because of the number of small mammal bones represented in the faunal assemblage.

"We have several species of microtine rodents—the voles and lemmings—as well as shrews, picas, hares, and ground

*Earliest occupation is
securely dated between
11,000 and 11,800
radiocarbon years ago.*

squirrels," Yesner said. While his analysis of bones deposited in the two early occupations doesn't seem to indicate a very severe Younger Dryas episode, he has found a notable change in the assemblage.

Birds are plentiful in the lowest level, but are largely absent in later levels. He thinks he knows why: "I think that is a reflection of seasonality." Some of the birds seem to have been immature, indicating occupation during the nesting season. If not an indication of seasonality, then whatever made all the birds available in the earliest period changed. "It's hard to say," Yesner said as he pondered possible alternate explanations. "Maybe

*"In 1993 we came up
with what I would
call a hunter's kit."*

there were differences in the dynamics of the Tanana River." The easiest explanation, however, is that the river was frozen when the sites were being used, so the valley's abundant waterfowl would have been far to the south, perhaps on Puget Sound or California's Central Valley. But not all birds are migratory.

As his meticulous, bone-by-bone analysis reaches its halfway point, Yesner is finding more evidence of smaller birds such as ptarmigan. His research also is yielding ever-higher counts of small mammals. The work, Yesner concedes, is

time-consuming, "but I think it is really bringing much more understanding."

"What I'm interested in doing now is to compare some aspect of bison and elk exploitation from these early Alaskans with people on the other side of Bering Strait. I want to see what commonalities we can draw in terms of certain patterns of hunting of those species."

Not all bones discovered at Broken Mammoth were the refuse from meals—there are tools as well. "We not only have the eyed needle and bone toggle reflecting clothing manufacture, but in 1993 we came up with what I would call a hunter's kit—a mammoth ivory point, foreshaft and handle." Red ocher colored the point, which was fashioned of ivory already 3,000 years old. "These bone tools are fleshing out details of the bone-tool industry of the Nenana complex," said Yesner.

"I think they indicate that there was a fuller range of activities in terms of hide working, skin sewing and so on." And Yesner also believes they are creating linkages with classical Upper Paleolithic industries of Eurasia and linkages to similar material from the lower 48 states.

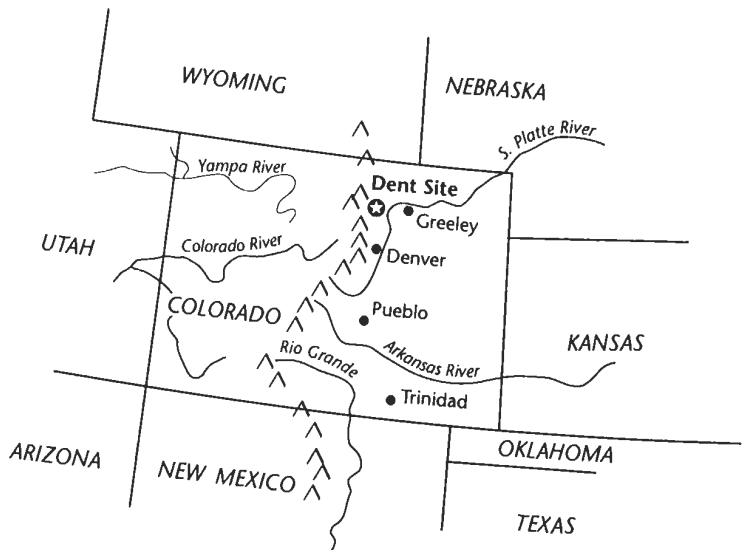
"I'm more convinced that there is a reality to the argument that Roger Powers and Ted Goebel and others have been making that these really do represent the earliest industries that we have in North America with antecedents to classic Paleoindian in the lower 48." He suggests that the Northern Fluted Point tradition represented by other sites are "descendent industries," having derived from Paleoindian traditions far to the south.

"I think that any careful analysis would show these industries technologically as descendent and not antecedent industries to Paleoindian materials of the lower 48. In contrast I think that the Nenana Complex of materials can be seen as transitional in many ways between Siberian or industries of the Russian Far East, which contain in many cases a combination of blade-tool and biface industries."

"We build our theories on what we have at hand, and I'm continuing to argue that the Nenana Complex has the greatest likelihood—given what we have—of representing an ancestral industry," said Yesner, referring to cultures of the more southerly parts of the Americas. 🌐

—Don Alan Hall

***Earliest
Clovis discovery
still yielding clues
60 years after
original excavation.***



Dent Mammoth Site

And renewed investigation promises new answers.

A Columbian mammoth matriarch and her herd that included younger adults, adolescents, and a few babies followed a well-known track toward the river. Their route eastward out of Colorado's Front Range foothills into the rolling plains one autumn day about 11,000 years ago took them down a gradual incline in sandstone bluffs that lined the South Platte River. The animals may have been seeking to drink and bathe in the river, or they may have simply been going to ford the river and graze on the opposite side. Whatever their design, they were approaching an unexpected destiny.

Descending the draw they were confronted by deadly predators, perhaps creatures that they had never before encountered. Armed humans had them trapped in a narrow draw, and in a short time the spear-wielding hunters had slaughtered several members of the herd. Their short-haired elephant bodies all but filled the floor of the draw.

We can do little more than speculate about details of that day. Presumably the hunting party took its fill of meat and perhaps hides, then left the remainder to scavengers. Subsequent rains and snow melt soon buried the bones in fine sediments. Quite possibly another group of mammoths was ambushed and butchered in the same draw. Materials eroding off slopes above not only covered the bones, but they gradually filled the floor of the draw.

In time, America's great elephants disappeared and the draw

they had once used changed. The South Platte River, often heavy with sediments flowing out of the Front Range, cut its broad floodplain deeper into the land, and, little by little, slope wash pared down the surrounding landscape. Smaller animals grazed the land, and were hunted by hundreds of generations of peoples.

Then, no more than 200 years ago, there was an extraordinary event. Something, perhaps a heavy spring thunderstorm after a sudden thaw, dislodged the sediments in that mammoth-graveyard draw. A mass of earth bearing a jumble of big bones slid to the bottom of the draw and came to a halt where it lay undisturbed for another century or more.

This part of the story, which is still being pieced together by Robert H. Brunswig Jr., archaeologist at the University of Northern Colorado, and a multidisciplinary team of scientists, is conjectural. What is known is that a Union Pacific railroad line, built between 1906 and 1909 along the northwest side of the South Platte valley, chanced to pass beside and partly over the bone-bearing sediments.

Some of the big bones caught the attention of local people as early as the 1920s, but did not receive widespread notice until the spring of 1932 when water running out of the gully further exposed them. A railroad worker saw them and told the operator of the nearby depot at Dent, a tiny spot southeast of the town of Milliken and a few miles southwest of Greeley.

The son of the depot operator happened to be a student at Regis College in Denver, and he told his geology professor, Father Conrad Bilgery, about the big bones. The first scientific investigation of what soon came to be known as the Dent Mammoth site was conducted in November 1932 by Father Bilgery and his students.

Among the bones, they discovered a large, basally fluted projectile point of a type that eventually came to represent a culture known as Clovis, because of the Blackwater Draw discovery near Clovis, N.M., four years later. If the cultural significance of the red chert projectile found at Dent had been recognized, all such slender fluted points and the culture that created them would be known now as Dent rather than Clovis.

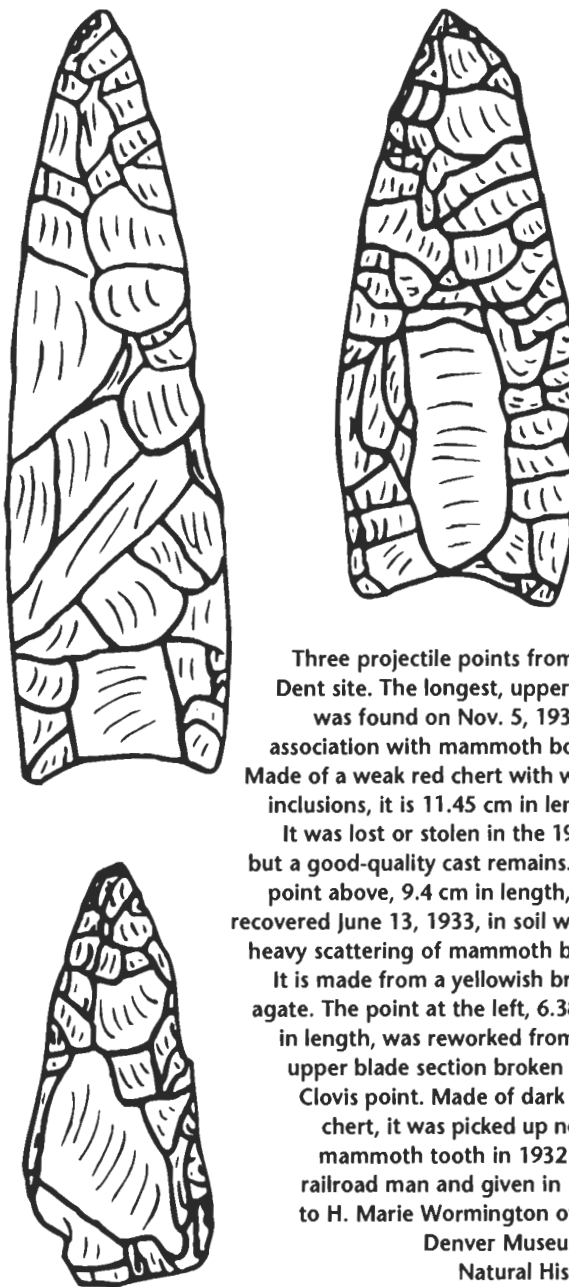
Dr. Brunswig began a renewed investigation of the Dent site in 1987. His analysis of the Dent Mammoth site is gradually building to a scientific climax that promises to bring to light considerable new information on mammoth-hunting cultures and techniques for studying them. New work by Brunswig and his colleagues produced a symposium at the 1995 Society of American Archaeologists meeting in Minneapolis and a book on their research is expected in 1996.

Reinvestigation of this venerable site has immersed Brunswig in much more than archaeology, for the project has involved history of science, oral history, and even historical archaeology, in addition to new techniques in geoarchaeology, paleontology, and computer imaging. Besides obtaining new information from materials excavated at Dent 60 years ago and producing state-of-the-art reconstruction of the site's 11,000 year-old geography, Brunswig is confident that the site still contains undiscovered paleontological, if not more archaeological, materials.

The key to new archaeological finds at Dent, however, lies in the railroad bed which covers its eastern margin. Fortunately, it is not the Union Pacific's main line between Denver and Cheyenne. The line long served the region's agricultural community, principally hauling sugar beets to mills and moving other commodities, but now it gets very little use. Ownership of the line has passed from Union Pacific to the Public Service Company of Colorado, operator of the nearby Fort St. Vrain power-generation station. An experiment in nuclear power that failed, the plant is being converted to conventional fuel. If the utility company had opted to convert to a coal-fired plant, the railroad could have been used to bring coal from Wyoming, but Brunswig said the company decided to use the area's abundant natural gas instead.

If Public Service allows a temporary removal of the railroad, Brunswig and his team will be able to uncover all the remaining bone-bed deposits and analyze them with techniques and skills unheard of in 1932 and 1933. The presence of the railroad has heretofore defined the eastern or down-slope limits to all investigations at Dent, including stratigraphic testing done by a University of Colorado team in 1973.

The 1973 project determined that there was no part of the site left undisturbed by previous excavations except what lay under the railroad. However, the CU project succeeded in developing an undisturbed site profile alongside the railroad tracks. It also turned up more bone including the skull of a juvenile mammoth. Some of the bones were removed for analysis but the skull was wrapped in plastic and reburied where it was found.



ROBERT H. BRUNSWIG JR.

Three projectile points from the Dent site. The longest, upper left, was found on Nov. 5, 1932, in association with mammoth bones. Made of a weak red chert with white inclusions, it is 11.45 cm in length. It was lost or stolen in the 1930s, but a good-quality cast remains. The point above, 9.4 cm in length, was recovered June 13, 1933, in soil with a heavy scattering of mammoth bone. It is made from a yellowish brown agate. The point at the left, 6.38 cm in length, was reworked from the upper blade section broken off a Clovis point. Made of dark gray chert, it was picked up near a mammoth tooth in 1932 by a railroad man and given in 1954 to H. Marie Wormington of the Denver Museum of Natural History.

Prominent prehistorians who were on hand for the brief 1973 project included H. M. Wormington, Joe Ben Wheat, C. Vance Haynes and Frank Frazier.

Haynes, a highly respected geoarchaeologist who provided Brunswig a lot of original information on the site, continues his involvement with the project. Brunswig said Frazier has provided him with all his records and samples. "That's how the whole project started out," Brunswig recalled during a recent telephone interview. For such a well-known site, there was really little to go on. "There were no site records at all," he added. "I mean there were no maps, no field notes, nothing in the way of formal field documentation existed of the 1932-33

Back to the Old Digs

His experience studying the Dent Mammoth site makes Robert H. Brunswig Jr. an advocate for reinvestigating old archaeological sites. "We can very productively go back and study older sites as new methods—new scientific techniques—come on line." There's much to be gained even if records are incomplete, missing or never kept, says Brunswig. But he cautions that one of the biggest problems is that memories fade and participants and eyewitnesses to original excavations can forget details that could aid new research. "Reinvestigating sites, I think, is one important thing we need to be doing—not just going out and constantly discovering new ones."

"There are a lot of sites right now that are being reinvestigated," he notes. In recent decades, archaeologists have left portions of sites intact for future archaeologists to study. And in some cases, Brunswig says with a chuckle, "we are the future archaeologists. It really is a maturing of the discipline."

field work." All that there was to go on was a brief paper by J. D. Figgins of the Colorado Museum of Natural History and an unpublished paper by Father Bilgery, which Brunswig described as a rambling description of Dent and Pleistocene geology of the South Platte. "Early studies were very poorly done and *very* poorly documented." So he turned to people who might remember useful facts.

"I was able to contact a few people who remember things going on there," Brunswig said of early events at Dent. "The land owner was a school child at the time and he remembers going out to the site with his teacher and his classmates." Brunswig also was able to interview a man, now in his 90s, who recalled that people found mammoth bone at Dent in the 1920s. Old photographs are being used, too, but none shows a wide-enough view to be of any use for orienting site features with the surrounding topography. "The only photographic evidence was a film that was done in 1933. That 16mm film showed about five minutes of the site excavations, and actually there are no perspective shots that could put the site into context."

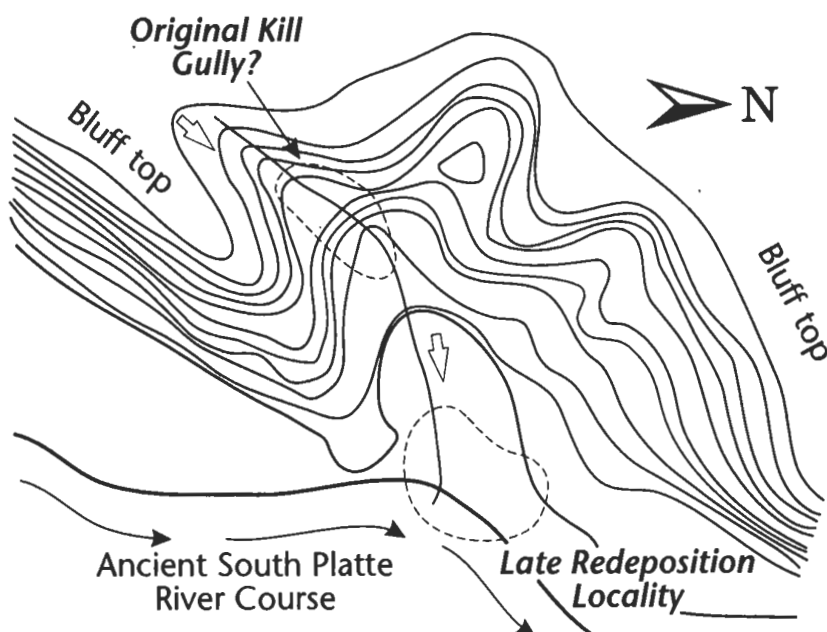
Brunswig said it focuses on people scraping in the dirt and it focuses mostly on the bone.

Besides gleaning what he could from earlier studies of the site, Brunswig and his team have done coring in and around the site, including in the upper part of the draw. And they've put in a test trench.

"Very quickly we decided that there was only one particular small area up there that had any depth at all in it," he said, speaking of the place in the upper draw where he believes the bones and Clovis tools lay until they washed down something less than 200 years ago. That date comes from wood found during the 1973 analysis sealed within the bone bed and radiocarbon dated in 1975. Tests found that the wood was no older than 200 years, probably dating to the latter half of the eighteenth century. However, such a recent redeposition of the bone bed remains hypothetical. Dr. Haynes initially interpreted the Dent stratigraphy as indicating a minimally reworked, largely intact deposit. Brunswig says new analysis of stratigraphy is bringing that preliminary hypothesis into question, and he plans to make additional test trenches for further analysis.

Analysis in recent years has also included Haynes' study of a late-Pleistocene terrace, which helps to determine when the South Platte River abandoned its earlier channel near the base of the Dent draw. The modern river channel now is about 10 meters lower in elevation and almost a mile away. Geomorphological analysis is providing the background for continuing investigation of the mammoths themselves and the people who presumably killed them.

Most of the mammoth bones are stored at the Denver Museum of Natural History, but the skeleton of an adult female from Dent was sent to Pittsburgh's Carnegie Museum in 1936. Jeffery Saunders of the Illinois State Museum began the first effort to catalog Dent Mammoth remains in 1978 as part of his research on mammoth remains from Clovis sites. After study-





ROBERT H. BRUNSWIG JR.

The Dent site as it appears today. Excavations in 1932 and 1933 were in lower right-hand corner of the photo; the suspected kill area is upper-left of center.

ing Dent material in Denver, Pittsburgh and Cleveland, Dr. Saunders determined that 13 individual mammoths were excavated at Dent in the 1930s, and bones found in 1973 probably brings the total to 15 mammoths.

Saunders established an age distribution pattern for the original 13 animals—eight juveniles and five adults. Based on studies of African elephants, four of the Dent adults were estimated at between 22 and 28 years old and one was estimated at 43 years old. Ages of the young included a 2-year-old, two 3-year-olds, a 6-year-old, a 9-year-old, two 10-year-olds and a 14-year-old. These data conform closely with known ages of matriarchal family groups of elephants in Africa where herds are mostly mature females with sexually immature young of both sexes. Male African elephants usually leave the family herd between 12 and 15 years of age.

Brunswig describes the condition of bone from the Dent site as “excellent to good.” The condition indicates fairly rapid burial in the original location as well as in the more-recent redeposition.

Daniel C. Fisher, paleontologist at the University of Michigan, is another specialist who became involved with Dent Mammoth research several years ago. Dr. Fisher has been studying tusks and teeth from the Dent site, analyzing the growth rings, which he uses to extrapolate the season of the year the animals died. His data are helping evaluate whether the animals all died

at once. Though he has reported seasonal fluctuations in dentin in tusks and cheek teeth, he believes the patterns indicate that the mammoths died in autumn.

“His recent research suggests that there may have been at least two kill events—fairly close together,” Brunswig told the **Mammoth Trumpet**. “And so this may have been a traditional—habitual—movement of mammoths through that little corridor across the South Platte. But we’re not certain about that yet.”


Linda Scott Cummings of Paleo Research Labs in Golden, Colo., has been analyzing microscopic plant materials found in teeth of the Dent mammoths. Known as opal phytoliths, these materials form from silica carried by water into living plants. After phytoliths form they are nearly indestructible, and in some cases distinctive shapes can identify the host plant. Phytoliths are left in soil after plants decay, and they’re found in teeth of fossil herbivores. Dr. Cummings has analyzed probable elements in the mammoths’ diet and compared those plants with modern vegetation on Colorado’s High Plains. “These data are giving us very interesting information on both diet of the mammoths and data on paleoenvironment,” Brunswig said.

All the background studies and reanalysis of Dent data are building toward a climax of further excavations at Dent to analyze any and all unexcavated portions of the redeposited bone bed and, perhaps, the upper draw where the kill presum-

ably occurred. Brunswig says plans call for very fine wet sieving of sediments from the bone matrix. "We already have one microflake from sediments that were pulled out of the bone bed," he said, referring to samples taken by Frank Frazier in the 1973 investigation. "That particular microflake matches one of the points."

Brunswig is using a computerized video-capture system to analyze the photographic images made of the 1933 excavation. The five minutes of movie film were converted to video tape. The computer program facilitates the placement of a grid over each image, including the place where, relative to the bones, that one Clovis point was discovered. The images can be rotated to produce a view from directly above.

Another procedure Brunswig plans to experiment with before beginning renewed excavation is ground-penetrating radar. "I think it will work pretty well," he said. "The basal sublayer, the bedrock layer, is fine sandstone. So that ought to show up." Above the bedrock, studies have indicated a varying thickness of South Platte river gravels, which he believes will be evident in radar images. "And then the bone bed ought to be clear—it is fine sediments." Big pieces of bone, theoretically, should show up, he says.

"I feel that we can go back in and excavate the remains of the redeposited bone bed below the railroad track and come up with some pretty good modeling of the taphonomic processes of how the site was formed and redeposited," Brunswig said. Perhaps, he adds, they will uncover new information. "Maybe some more tools below the surface." 

—Don Alan Hall

Knudson

continued from page 5

in the late Pleistocene. Such analysis can provide important information to studies of global climatic and ecological change. The general public and, specifically, the political leaders can relate to this issue.

"While I believe archaeological resources have more scientific, humanistic, and spiritual value than generally is perceived, their apparent inertness and inability to do work means that the average citizen sees them as curiosities but not a significant factor in tradeoffs that do have economic benefit," she writes in the book.

And: "First Americans resources are relatively rare, often not surface evident, and often do not include such spectacular features or artifacts that they acquire an immediate public fan club. They can be conserved only within a Public Trust concept."

What exactly is meant by "Public Trust?" Knudson's chapter "The Public Trust and Archaeological Stewardship" is an easy-to-understand explanation. "Beginning with a leap of faith, as do all ethical positions, I assert that archaeological resources are part of a worldwide public trust, and that they should be used, conserved and/or destroyed only following consideration of that stewardship responsibility," she begins. She goes on to describe the legal concept of Public Trust Doctrine and how

Dent Chronology

1909 Railroad built through Dent.

mid-1920s Local residents find, collect long bones.

spring 1932 Railroad man reports seeing bones eroding from site.

November 1932 Bilgery leads initial excavation.

winter 1932–33 Bilgery notifies Colorado Museum of Natural History.

June, 1933 Museum team excavates more bones. Brief movie made of work.

1935 Adult mammoth skeleton sent to Carnegie Museum in Pittsburgh.

1940s Juvenile mammoth display constructed at Denver museum.

1954 H. Marie Wormington and others visit Dent; local resident subsequently donates third Clovis point to Denver museum.

1963 George Agogino successfully radiocarbon-dates bone.

1973 University of Colorado team tests Dent stratigraphy.

1987 Brunswig and University of Northern Colorado team begin long-term geoarchaeological study.

various legal scholars understand it, and she differentiates between stewardship and trust. Stewardship assumes that archaeological sites are someone's property, but does not deal explicitly with the rights and responsibilities of ownership. The concept of trust goes further; it requires action—a "trustee" of the public's interest. She asks, rhetorically: "Who are going to be the stewards of this public interest?"

Knudson notes that the concept of stewardship in reference to site protection and conservation has been around archaeology for a long time. The public-trust concept, she told the **Mammoth Trumpet**, is a more explicit way of thinking that needs to be internalized by professional and avocational archaeologists and the general public. Unfortunately for archaeological resources, the public trust doctrine has no specific statement in law in the United States and Canada. Current legal national archaeological protection is limited principally to public and Indian lands, as in the U.S. National Historic Preservation Act, the Archaeological Resources Protection Act and the Abandoned Shipwreck Act.

"However, the U.S. Supreme Court's recent ruling in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon* upheld a federal regulation that prohibits habitat modification that injures endangered or threatened species, even on private land. This is an expression of the public trust concept, which is also basic to water and waste-cleanup laws."

Though the doctrine of public trust is a legal one, Knudson

continued on page 20

AUTHOR'S PASSING EVOKES ARCHAEOLOGIST'S MEMORIES

Franklin Folsom, author of books on archaeology and many other subjects, died April 30 at age 87. His passing elicited the following memoir from George Agogino, Distinguished Research Professor, Emeritus, at Eastern New Mexico University. Dr. Agogino worked with Folsom on research regarding the cowboy who now is known for having discovered the initial Folsom site near Folsom, N.M.

I first became acquainted with Franklin Folsom's writing skills when I was studying several caves in New Mexico for possible archaeological sites—the Bureau of Land Management had recently named a cave near Ft. Stanton after me. I bought Franklin's book *Exploring American Caves: History, Geology, Lore and Location* to learn more about cave research.

I met Franklin when we worked together trying to bring George McJunkin out of the realm of folklore into reality in the late 1960s. I had long before decided that McJunkin was a real person, and not a fictional character as some had suggested, and I had visited the Folsom,

N.M., area and obtained a number of interviews with people who knew of McJunkin. I later sent this material to Franklin Folsom, who was a well-established historical researcher and writer with a special interest in archaeology.

Our first meeting established a friendship that lasted until his death. He and his wife, Mary Elting, who often collaborated with him, continued my initial work. They spent several years doing research before publishing *The Life and Legend of George McJunkin, Black Cowboy*, establishing that McJunkin was the man who found the Folsom site in 1908. We were eager to find as much information on McJunkin as possible—a difficult problem because he died in 1922.


Our association taught me better investigative and interview techniques. I was quickly impressed by Folsom's warm and open personality and his dedication to the work of separating facts from folklore. He was more than a friend, he was my teacher in this type of research. We worked together without any conflict; we shared our information and worked with maximum cooperation.

He was a Rhodes scholar at Oxford

University, and he graduated from the University of Colorado in 1928. For a time he worked as a Rocky Mountain guide, an experience that must have developed his walking skills, for he enjoyed walking. At an advanced age he walked across the United States in a World Peace march.

He wrote more than 80 books, some of which made the best-seller list. His books were instructive, but more important, they were able to be read by the general reading public. A number of his books were for children.

His books that helped me most in my field of anthropology included *America's Ancient Treasures*, *Famous Pioneers*, *Red Power in the Rio Grande: The Native American Revolution of 1680*, and *Science and the Secret of Man's Past*. Books written with his wife included *If You Lived in the Days of the Wild Mammoth Hunters* and *The Story of Archaeology of the Americas*.

Though now deceased, Franklin will live for generations in the hearts and minds of all who are interested in speulking or the Indian past of the Southwest. And I will never forget this man or our long association. 

—George A. Agogino

Beringia Center


continued from page 11

ada, Geological Survey of Canada, Yukon Heritage Branch, University of Alberta, University of Ottawa, federal Northern Affairs Program, and First Nation communities in Old Crow and Dawson City. Additional expertise will be provided by the Royal Tyrrell Museum of Paleontology, University of Alaska-Fairbanks, and the Russian Academy of Sciences in Moscow. Visitors to the Beringia Center will be able to participate in special guided tours of the Yukon Historic Resources Center to see scientists working on new Beringia materials and extensive archaeological and paleontological collections from Yukon Beringia.

Development of the Beringia Interpretive Center became possible when the

government decided to move the visitor reception center from its building near the airport to downtown Whitehorse. Yukon officials are striving to tell local people as well as tourists traveling the Alaska Highway about life on the eastern end of the region that long linked Asia and North America. Hunston wants to tell the world that the Yukon's Pleistocene landscape was populated with a varied and rich ice-age fauna: woolly mammoth, mastodon, Jefferson's ground sloth, giant steppe bison, the giant short-faced bear, sabre-tooth cat, American lion, Saiga antelope, western camel, giant beaver, several types of horses, and a wide variety of other mammals, fish, and birds. The Yukon also is proud to point out that archaeological finds such as from Bluefish Caves of northern Yukon establish that human populations were a part of this Pleistocene picture. And he notes that

permanently frozen sediments in Beringia yield not only the fossil bones of former residents, but provide mummified bodies of mammoth, bison, horse and other extinct species. "Arctic lupine seeds from such deposits, which are dated older than 10,000 years, have even germinated," he said.

According to a Yukon government news release, conservation, research, exhibit development, and curation support for the Yukon Beringia Interpretive Center will be provided by the new Yukon Historic Resources Center, housed in a \$4 million structure to be situated adjacent to the Beringia facility. It is to contain archaeology and paleontology laboratories and collections storage. News accounts from Whitehorse say that the new facilities will replace a gopher-invested warehouse where some Yukon fossil collections are now stored. 

Knudson

continued from page 18


does not believe archaeologists need to follow legal journals, but they need to know the law and know their responsibilities to legal requirements as well as to professional ethics. The degree to which professional archaeologists actually consider a conservation ethic and public trust in field work, lab work and publications varies from individual to individual. "The fact that public trust is not standard in undergraduate or graduate archaeological training is an important issue," she says.

In spite of much archaeological "salvage," losses of humanity's ancient traces continue. "Most sites on private lands have no legal protection from destruction, thus approximately two-thirds of the United States is open to unregulated collecting, site destruction, or both," says Knudson, though she notes that some state archaeology statutes apply to private land. Further, she noted that much archaeological information remains unknown. Official archaeological survey records cover no more than seven percent of the United States and five percent of Canada. Of course, cataloging of sites does not in itself provide protection; it could even encourage looters. Knudson says loss of sites through vandalism or looting is common; commercial looting is a critical problem in the Southwest. In Colorado, she says, the U.S. Forest Service estimates that 80 percent of identified sites have been looted or vandalized. She notes further that virtually every canyon-bottom site in Hells Canyon has been vandalized.

"We worry about how to conserve this heritage for our heirs,

and as we worry, we are running out of time," Knudson says. For several years she has appealed for actions. First, she urges legal clarification of the public nature of archaeological resources, and more inventory to provide a better definition of the resource base. Also, she believes we should work for a broader public appreciation for archaeological resources as sources of information about human technology and adaptation over time as well as for an understanding that they are irreplaceable. Finally, she urges scholars to be more firmly committed to the public nature of archaeology.

"We scholars have the responsibility to halt the destruction of our public archaeological heritage," she wrote in *Archaeology*, "and we must make our archaeological research and results available in lay language and relevant to our ever-changing society. We also have to take ethical positions about the cultures whose sites we are disturbing and studying." In the book *Public Trust*, chapters by other authors, as well as by Knudson, enlarge on these points and more.

Knudson argues that cultural resource management will become more interdisciplinary and multidisciplinary in the future and more driven by general concerns about quality of life than about specific preservation issues. It will, she says, be required to provide information usable in directing social, physical and natural resource management to meet goals of sustainability. The tremendous ecological change recorded in First Americans archaeological sites is of great value. She predicts increasing use of heritage resources, not only for quality-of-life activities such as recreation and tourism, but for understanding human adaptations to global environmental change. 

—DAH

New Books

continued from page 3

Late Quaternary Environments and Deep History: A Tribute to Paul Martin, edited by David W. Steadman and Jim I. Mead. Mammoth Site of Hot Springs, South Dakota, Inc. Scientific Papers Vol. 3. Mammoth Site, 1800 Highway 18-Truck Route, Hot Springs, SD 57747-0606. 188 8½-by-11-inch pages. 1995. \$15 (paperback).

This book presents 12 articles from papers first presented at a symposium at Hot Springs in September, 1993, held in honor of Paul S. Martin, Professor Emeritus of Geosciences at the University of Arizona, the Quaternary geologist and paleontologist best known for proposing the hypothesis that human hunters drove big Pleistocene animals into extinction. The contributors bring a broad range of disciplines to focus on the subject of extinctions and environmental change.

Dr. Martin himself opens the volume by reviewing the history of the University of Arizona's Desert Laboratory, where his own work has been centered since the 1950s. Most of the other contributors are Martin's former students. David Steadman, of the New York State Museum's Biological Survey, summarizes his research on the extinction of birds on tropical islands; Eric Mellink of Mexico's Centro de Investigación Científica y Educa-

ción Superior de Ensenada, suggests experimental introductions of exotic herbivores to Sonoran scrub lands where native megafauna have become extinct; W. Geoffrey Spaulding of Dames & Moore, Inc., Las Vegas, describes environmental changes in the Mojave Desert; and Spaulding and Jim I. Mead, Northern Arizona University Quaternary Geologist and longtime editor of the CSFA's annual *Current Research in the Pleistocene*, describe changes in the range of the Pika from Pleistocene to present.

Two chapters involve taphonomy. Steven D. Emslie of the Florida Museum of Natural History, and Gary S. Morgan, of the New Mexico Museum of Natural History, describe bones from a rich Florida sinkhole site that had been the haunt of dire wolves (*Canis dirus*) and Florida cave bear (*Tremarctos floridanus*), and Nikolai K. Vereshchagin, of the St. Petersburg, Russia, Zoological Institute, describes an experiment in visually interpreting mammal bones found in Quaternary deposits.

Steven E. Falconer and Patricia L. Fall of Arizona State University describe human impact, especially tree clearing, on the collapse of civilization in the eastern Mediterranean; Eleanor I. Robbins, of the U.S. Geological Survey, Reston, Va., describes how sedimentological, geochemical and palynological data are used to study ancient wetlands where coal was formed; and David P. Adam, of the U.S. Geological Survey, Menlo Park, Calif., discusses the development of a pollen record in California. 