MAMMOTH TRUMPET

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PALEOINDIANS KILLED BISON IN ROCKIES

In Unexpected Location, Bones and Points Found

High Rocky Mountain slopes of north-central Colorado are scenic but not particularly hospitable to humans at all times of the year. Yet Middle Park, an area surrounded by high mountains that includes the town of Kremmling, was home to a number of Paleoindian peoples. Recent examination of a bison-kill site there is yielding additional information about the activities of those people.

GEORGE FRISON

Excavation of bone bed at Jim Chase site in Colorado.

Middle Park, hemmed in on three sides by Continental Divide peaks and on the west by the Gore Range, is near the headwaters of the Colorado River. The area is open, vegetated mostly by sage and bunch grass with the addition of aspen, pine and fir on north slopes. A

"At least as old as Folsom would be my guess."

local avocational archaeologist, Jim Chase of Granby, found a variety of lithic tools in the region. A discovery of large bones prompted him to contact George Frison, an archaeologist at the University of Wyoming who is an authority on Clovis, Folsom, Goshen and other Paleoindian tool typologies. Frank Rupp, district archaeologist for the Bureau of Land Management, helped in every possible way to initiate an investigation.

The Jim Chase site is near Kremmling on a fairly steep slope at about the 8,700-foot level—not at all the sort of a site where Frison expected to find a large Paleoindian bison kill. "When I looked at it I didn't think there was any way in the world there could be any bison bones of any age in place." Frison brought in James Miller, an archaeologist who is completing work on a doctorate in geology at Wyoming. Frison and Miller determined that the slope was an old slump that had a slight depression behind

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How Old *IS* Clovis?

An Interview with C. Vance Haynes

ONE THEORY of the earliest colonization of the New World holds that Clovis peoples entered into the "lower 48" states approximately 11,500 years ago. Many archaeologists have long maintained, as well, that Clovis represents the first migration into this hemisphere. While the existence of proto and pre-Clovis cultures remains the subject of controversy, the earliest dates for the distinctive Clovis fluted point and its associated lithic and bone assemblage have remained relatively secure at 11,500 years B.P.

Evidence from several sites, among them the recently reported Paleo Crossing site near Akron, Ohio, (see **Mammoth Trumpet** 7:4 *Investigations at Ohio Site Push Back Dates For Clovis*) suggests, however, that the Clovis repertoire of tools may have originated well before 11,500 B.P. The Paleo Crossing site is especially interesting because of the extensive area (2½ acres) under investigation, a lithic collection including thousands of tools and flakes and at least 24 Clovis fluted points, the variety of lithic source materials suggesting extensive trade networks or wide ranging resource exploitation, evidence of structures, and, in particular, a date for charcoal samples from a post hole of 12,250±100 B.P.

This site, with its evidence of structures dated by the University of Arizona's National Science Foundation Accelerator Mass Spectrographic Radiocarbon Facility at more than 12,000 B.P., raises several interesting questions. Is this the site that will once and for all change archaeologists' opinions about the earliest appearance of Clovis industries? Is it further evidence that the Clovis technological repertoire

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MAMMOTH WAS BUTCHERED IN WISCONSIN

Cuts on Bone in Museum Lead Investigators to Site

Fragmental specimens of bone and tusk in the Kenosha Public Museum recently led investigators to the remains of an adult mammoth that had been butchered on the shore of a small glacial lake. Archaeologist Dan Joyce, curator of collections and exhibits at the museum and one of the principal investigators of the project, says the mammoth bones display many clear indications of butchering.

At the conclusion of the excavation begun Aug. 3 in Paris Township, Kenosha County, Wis., Joyce, Dr. David Overstreet of the Great Lakes Archaeological Research Center in Milwaukee, and David Wasion, an avocational archaeologist, had recovered an almost complete skeleton of a large woolly mammoth, *Mammuthus primigenius*, probably a male. It is believed to be the first butchered mammoth found east of the Mississippi River. In addition to obvious slash marks made by the knives of Ice Age hunters, the bones were scattered and stacked, and some were broken in the fashion typical of prehistoric butchering. Red ocher was found at the site. Bones of the great beast, which may have been killed or merely scavenged by Paleoindians, were within 2½ feet of the surface.

Joyce speculates that the animal, which could have weighed eight tons, may have become stuck in mud at the edge of the lake when it became prey to Paleoindians. The bones people left behind after their feast were buried in moist clay, which protected them from deterioration. The site, just seven miles north of the Illinois state line and about that distance from the shore of Lake Michigan, became a marsh that gradually filled in.

The site also revealed remains of a spruce forest dating to the time of the mammoth. Trunks and branches of the trees, as well as spruce cones, were found in excellent condition. Further details about the environment that existed when mammoths inhabited the area will come from pollen and snail shells recovered in the dig.

Joyce and his colleagues were not surprised that the mammoth had been butchered because they had previously found obvious cut marks on one of its

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INSIDE

CSFA, OREGON STATE UNIVERSITY WORK TO EXPAND CENTER'S REACH

Oregon State University and the **Center for the Study of the First Americans** are working together to significantly expand the Center's programs of bringing together knowledge relating to the peopling of North and South America. Underlying expansion activities is a fund-raising effort in which matching money, available from the State of Oregon, until Dec. 31, will double each dollar donated to the Center.

Currently unfolding under the **Center**'s aegis is a program to maximize the flow of data from Siberia, whence the First Americans may have migrated. Director Robson Bonnichsen is working on plans for a permanent exchange program with Russian scientists. Bonnichsen visited Russia in August as part of a combined economic-relief and scientific tour. He observed significant archaeological discoveries and projects including the Diring site, which has parallels to the famous Olduvai Gorge in East Africa. (See **Mammoth Trumpet** 7:3, *Siberian Site Defies Theories of Peopling.*) Diring is claimed to be as old as 3 million years, and while Bonnichsen can't confirm such antiquity at this site 2,500 miles west of Anchorage, Alaska, he is convinced that it is very ancient and important to understanding of the peopling of Earth's high-latitude areas and the peopling of North America.

As a result of his visit to Siberia, a branch of the **Center for the Study of the First Americans** is being developed with Russia's International Academy of Natural Sciences under the direction of Yuri A. Mochanov, the prominent archaeologist who is the principal investigator at the Diring site. Bonnichsen and his Oregon State University colleagues are looking forward to collaborating on joint Russian-American projects.

On the domestic scene, OSU President John V. Byrne has announced two expansions, involving staffing and physical space for the Center's laboratories and offices. The **CSFA** is in the process of hiring an Assistant Director to oversee fund raising and daily operations of the office and labs. What's more, thanks to completion of a major construction project on the Oregon State campus, the **Center** has been able to move into greatly expanded quarters. The **CSFA**'s new space is in Weniger Hall, a large science facility in the central part of campus. The office is now in Weniger 355. Fully equipped laboratories adjoining the office suite provide space for storing and analyzing the Center's ever-growing collections of lithic and faunal materials and for expansion of special areas such as the analysis of hair.

Addition of the Assistant Director will enable the **Center** to continue to pursue professional ties with scientists in Siberia without restricting its research at Mammoth Meadow in Montana, and to fully implement its new program of seeking more Pleistocene megafauna sites here in Oregon's Willamette Valley. The additional position also will allow the Center to expedite its publication program, which has been responsible for a number of highly significant books as well as journals and, of course, the **Mammoth Trumpet.**

From the outset of the partnership between OSU and the **Center** it has been the University's goal to work to complete the **CSFA** endowment. This endowment has been a high priority for the OSU Development Office and as such, Oregon State made the **Center** eligible for state matching funds for the budget year that ended July 1, 1992. In a further effort to fulfill the endowment, President Byrne recently announced that OSU is extending the matching period through the end of 1992. That means that every dollar the **Center**'s friends and members contribute before Dec. 31, will effectively become two dollars toward furthering the **Center**'s ambitious research goals. Contributions made to the **Center**'s endowment through the OSU Foundation are fully tax deductible.

Current Research Issues Its 10th Call for Papers

Brief reports on research in any subject touching on the peopling of the Americas are being sought for Volume 10, *Current Research in the Pleistocene.* To be included in the edition, all papers must be received by the **Center for the Study of the First Americans** in proper form no later than March 1.

Manuscripts should be no longer than 750 words in length, or 400 words with one figure. Six general categories of reports will be published: archaeology, physical anthropology, lithic studies, taphonomy-bone modification, methods and paleo-environments, which includes plants, invertebrates, vertebrates and geosciences. Since space in the journal is limited to about 65 papers, the earlier the submission, the better chance it will have of being published.

Authors are asked to submit papers on computer disc in ASCII along with two double-spaced copies. Information for contributors is available on request by writing to *Current Research in the Pleistocene,* **Center for the Study of the First Americans,** 355 Weniger Hall, Oregon State University, Corvallis, OR 97331.

Mammoth Trumpet readers can keep in touch with the **Center**'s many scientific endeavors through its publications, and can support its work either by taking part as a volunteer researcher or by making a direct contribution to support the **Center**'s continuing quest for answers to one of the great scientific riddles of our time. Readers should note that it is important to the **Center** and to OSU to make financial commitments before year's end.

President Byrne called recent efforts by Bonnichsen and others to aid Siberian people as a bright spot amid Oregon State's financial problems. Byrne complimented Bonnichsen for working with farmers, manufacturers and various agencies to secure aid for Siberian people in need. Lee Strandberg, an associate professor of pharmacy at OSU, joined Bonnichsen in the project by securing antibiotics and other basic medicines. Largely as the result of their relief efforts, a 100-ton cargo plane left the United States in June carrying the food and medical supplies to hospitals, orphanages and needy individuals in the cities of Krasnoyarsk and Kemerovo.

YOU CAN SEEK CLUES TO 1ST AMERICANS

If you would like to participate in the continuing search for clues to the First Americans, consider joining in the 1993 First Americans Expedition at Mammoth Meadow, Mont. Volunteers will take part in two 2-week sessions in July and August at the site in a picturesque valley on the eastern slope of the Continental Divide.

Final arrangements for the eighth field season at Mammoth Meadow have not yet been made, so this is a good time for interested people to get their names on the list for information about the project. Volunteers camp near the 7,000-foot site and spend their days working at the excavation or in the mobile laboratory. Meals are prepared and served in a well-equipped mobile kitchen. Evenings are often devoted to presentations in the dining shelter by the scientific staff.

The site is near a rich source of tool-grade chalcedony, which was used for thousands of years by people from both the Great Basin and the Plains. Human utilization of the site dates to before 11,000 years ago. The site has produced a wide variety of tools and a large assemblage of faunal remains including hair, thousands of years old, both from humans and an extensive variety of late-Pleistocene animals. The site was termed Mammoth Meadow when a piece of mammoth bone was found on the surface in 1985. Although mammoth hair has been discovered during the excavations, no more mammoth bone or tusk has been unearthed.

For information on becoming a First Americans Expedition volunteer, write the **Center for the Study of the First Americans,** 355 Weniger Hall, Oregon State University, Corvallis OR 97331.

Tents and campers at Mammoth Meadow base camp surround a well-equipped chuckwagon with shelters for dining and lab work.

MAMMOTH TRUMPET

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Welcome Clovis Cache Accord Avoids One Troublesome Issue

Commentary

Settlements in the long-standing dispute over the Richey-Roberts Clovis site in East Wenatchee, Wash., probably will serve—for better or for worse—as a model for future interactions between professional archaeologists, governmental agencies, native American groups, amateur archaeologists, property owners and other interested parties.

One aspect of the agreement placed the site's unknown horde of latent scientific information into the care of the Washington State Historical Society. Further, the Pacific Northwest Archaeological Society agreed to respect beliefs of members of the Confederated Colville Tribes, a pact that left some old-school archaeologists grumbling that their colleagues had sold out scholarly responsibilities, and one that may have left some native Americans suspicious that agencies or lawyers will seek loopholes. Yet Mary Thompson, the Washington State Historic Preservation Officer, probably voiced the opinion of most archaeologists when she told the **Mammoth Trumpet** that, given the importance of the site and the emotions of the people involved, "we think the agreement is the best that could have occurred."

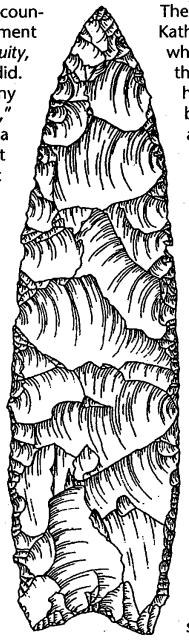
If this welcome accord has any unfortunate repercussions, they might well be attributable to the precedent of placing a price tag on information. It is not a new problem, and it is one that is likely to be confronted wherever spectacular artifacts are involved in misunderstandings about property rights, religious freedom, and scholarly responsibilities.

The Buffalo, N.Y., Museum of Science, which had held the magnificent East Wenatchee Clovis creations, returned them to the landowners earlier this year. The landowners later donated them to the Washington State Historical Society, an act which allows them to deduct the appraised value from their income taxes. Cash values ranging from $40,000 to $250,000 have been placed on the points, which are as remarkable in design and craft now as they were at their creation more than 11,000 years ago. Further, the society paid the landowners $250,000 for rights to future excavations, which, it was agreed, will not take place for at least 15 years. The Historical Society is designing a museum in downtown Tacoma that will display the artifacts, among other things. There, they will be available for study and can no longer be considered commodities.

The East Wenatchee discovery was made in May 1987 when workers at R&R Orchards were excavating for a sprinkler system on a terrace 200 m above the Columbia River. Before the digging stopped they had unearthed 19 stone tools including six Clovis points up to 22 cm (8½ inches) in length. Owners Mack and Susan Richey and Rich and Joanne Roberts soon grasped the significance of the discovery. An archaeological excavation took place that year, and a subsequent one in 1988 drew many Clovis authorities; the list of participants read like a Who's Who of archaeology (see **Mammoth Trumpet** 5:2, *Of Apples and Archaeology*). One called it the most important Paleoindian discovery of the century; another ranked it with the New Mexico excavation that gave Clovis its name. Volunteers at the site included members of the Colville Confederated Tribes.

People had differing interpretations of the discovery. Some contended it was merely a cache of tools, while others suggested that it was a hunting shrine, the last resting place of a chief, the site of a flint knapper's hut, or the site of a shaman's tent.

Gradually the excitement and good spirits of the initial excavations broke down into unprofessional suspicions, territoriality, and even threats of violence. As Mathew Dick Jr., a Colville tribal councilman, said in a joint report on the agreement published in the Dec. 1991 journal *Antiquity*, everything that could have gone wrong did. "In retrospect, it's hard to pinpoint any single thing that caused all the problems," said Dick. In the same report, Dale Croes, a Washington State University archaeologist and executive secretary of the Pacific Northwest Archaeological Society, noted that archaeologists had never before thought of writing specific principles of cooperation with indigenous peoples.



The text of the agreement, "Shared Principles," appears on two pages of *Antiquity*, specifically spelling out the relationship between the archaeological society and the Colville confederation. It recognizes tribal sovereignty over burial sites and includes ceremonial or funerary items associated with burials in its definition of human remains. It concedes all artifacts discovered during joint excavations as property of the Colvilles unless the tribe has made other agreements with landowners or others. Further, it provides the archaeological society up to two years for scientific research and testing of artifacts. Fragmented animal bones, charcoal and mollusk shell are not considered artifacts.

After the agreement was struck, and after the artifacts had been turned over to the Historical Society, the Colville people and other participants gathered at the site for a healing ceremony. According to Jeff Mangel of the Pacific Northwest Archaeological Society, the Sept. 26 ceremony was a time for all who had been affected by the events at the site to come together "in respect, in prayer, in seeking, in vision, in harmony, in need, and in hopes of making peace with their participation." Mangel said the Clovis study seemingly had been "crushed and swept aside by forces more entrenched and more canny in the ways of political process."

"What the ceremony reinforced in me," Mangel said, "was that it is critically important that each of us, as advocates of archaeology, struggle toward a personal understanding of how we came to be involved and what we were trying to do. And, perhaps more importantly, a sense of why, on a more cosmic level, we were drawn into this complicated web of ethics and politics, science and tradition, avarice and reference, unity and disharmony.

"It is difficult for many of us to comprehend the depth of feeling that Native Americans have surrounding the remains and the possessions of their 'ancient' ancestors; we who structure our perceptions in Time are slow to understand that another's reverence for 'a bunch of old artifacts' may be based very much in the Here-and-Now of a less Time-ful world view." Mangel went on to suggest considering how Euro-Americans might feel if a group of powerful aliens came to Earth and, in a benevolent attempt to understand the prevailing American world view, began to scientifically ransack every church, temple, mosque, synagogue and graveyard.

As the September ceremony proceeded, wind with 60 mph gusts brought smoke from a wildfire that was consuming expensive homes across the Columbia River in Wenatchee. Colvilles and non-Indian participants, including Mangel, could readily accept the fire as a metaphor for the curse of intolerance.

The ceremony included a reading by Kathryn Womer, a Colville tribal member who had been on hand at the beginning of the scientific excavation. Womer described her vision of how a prayerful warrior had buried the Clovis points—his "Friends"—and she referred to the points' curse: "We do what we do today to honor and respect our ancestors. We do this to protect ourselves and those unaware of the danger. To those who continue to wrest all they can ignobly we leave you our Friend's curse . . . of which our people know nothing worse . . . until you hear the Friend's voice to do the right choice, this burden of sorrow will follow all and theirs that disregard."

Archaeologists are uncomfortable with curses. The opposite of curses—understanding and cooperation—obviously are necessary if information is to be gathered and shared for the benefit of all. The real curse of the Clovis Cache might well be the placing of monetary values on information.

Because this is the information age, it might seem that information should have cash value. But how can we judge the value of any single piece of archaeological knowledge? How much should a record left by Clovis people be worth? How much is a scholarly publication worth? What is the value of an assemblage of tools that forms the basis of a Master's thesis?

If the beautiful Wenatchee creations are worth a quarter-million dollars, what is the value of a worn, broken base of a fluted point that positively establishes the antiquity of a particular site? Or what is the worth of a tool that clearly links its maker and user to a long-extinct animal? Is there a dollar value to the visible creative technique that establishes the identity of a lithic creation? And what is the value of the remains of a long-extinct beast? Does an ancient tooth have extra value if it reveals details of an animal's life and the season of its death?

Though we value information highly, it is a mistake to attempt to assess the monetary worth of scientific information. While artists and craftspeople in contemporary society can place specific values on their labors, it is impossible to put a price tag on information obtained about ancient cultures, whether the information is stored in beautiful artifacts or in plain or broken remnants.

SUGGESTED READINGS

ON Paleoindians Killed Bison in Rockies

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ON Mammoth Was Butchered in Wisconsin

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PALEOINDIANS OF PATAGONIA USED PLEISTOCENE ANIMALS

Archaeologist Updates Findings 'From the End of the Earth'

Nowhere is the riddle of the First Americans more puzzling than in the cool, windswept landscape of Southern Patagonia. Where the southern extremity of Argentina meets the Magallanes province of Chile, the environment is hostile. Ten thousand years ago the climate was utterly bitter, yet it was home to humans who preyed on Pleistocene animals.

Who were these people who lived at the margins of the era's great glaciers? Could they really have come from the opposite end of the Earth, braving Beringia's icy cold, and migrating the length of two continents through torrid deserts and steaming tropics to kill and eat large animals at the southern extremity?

Hugo Nami, an archaeologist from the temperate comfort of Buenos Aires, Argentina, is finding clues to the Paleoindians of Patagonia. Although the search is difficult, he is confident that scientists are beginning to understand the adaptation of early people to the difficult environment and its resources. Nami has been working at archaeological sites in Patagonia since 1979.

"Now we have a broader picture of the people who lived in the Pleistocene-Holocene transition," said Nami during a recent visit to the Center for the Study of the First Americans at Oregon State University. He reported that in the last decade nine new archaeological sites have provided clear archaeological evidence that people lived at least 10,000 years ago in Patagonia. "And they are showing much variability in their adaptive strategies concerning their exploitation of animals and lithic technologies."

"Even today the living conditions are very hard," says Nami, adding that it must have been much harder at the end of the Pleistocene. As recently as 8,000 years ago the large Tierra del Fuego Island was connected to the South American mainland by glacial ice. Inhabitants of southern Patagonia's archaeological sites such as Cueva del Medio in Chile lived in periglacial conditions.

Today, guanacos graze the steppes along with sheep, imported by European settlers, but the guanaco (*Lama guanicoe*) dates to Pleistocene times and is the only surviving Pleistocene fauna. Guanacos were the principal resource for all hunter-gatherers who have lived in Patagonia for 9,500 years. Nami notes that archaeologists, even those from Patagonia, have long held that the guanaco has always been the principal resource of peoples of the region, but now we know that some long-extinct Pleistocene mammals were exploited by Paleoindian populations.

The knowledge that Pleistocene fauna was utilized by humans goes back to the 1930s when Junius Bird of the American Museum of Natural History found the first evidence of the use of the American horse (*Hippidion*) by early residents of Patagonia. Bird's discoveries, establishing the presence of Paleoindians in southern South America, came from excavations in Cueva Fell and Cueva Pali Aike in Chile's Magallanes province. In 1985, Nami was invited to excavate Cueva del Medio, about 100 km to the west, and he went to work seeking the human occupations that Bird had first uncovered in the 1930s.

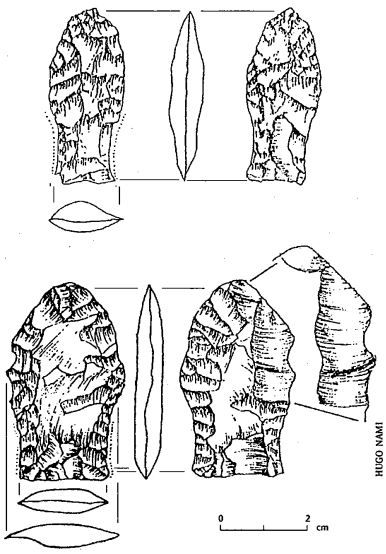
Caves of southern Patagonia such as Cueva del Medio and Cueva Mylodon were formed in conglomerate rock, while others such as Cueva Fell, Cueva Pali Aike and Cueva Don Ariel are in basalts. Cueva del Medio is almost 100 m deep, 40 m wide and its ceiling is 6 m high—not a claustrophobic space in which to work. Nearby Cueva del Mylodon, widely publicized for its extensive records of giant sloth discovered a century ago, is almost twice as large. These are true caves and not rock shelters, although Nami has investigated a rock shelter called Pedro Cárdenas near Cueva del Medio and found occupations dating to 7,500 years B.P.

After five archaeological expeditions that excavated nearly 70 square meters of sediment, Nami has learned much about Paleoindians of Patagonia and the animals that nourished them. Cueva del Medio has proven rich in information, yielding "very clear" associations between early humans and Pleistocene animals. Nami's discoveries and those made by other archaeologists included faunal remains of three new species of Pleistocene mammals in Patagonia: a very small American horse (*Hippidion saldiasi*); and two extinct camelids, *Lama gracilis* and a much larger *Lama sp.*, large relatives of the guanaco. Bones contained obvious indications of cutting and percussion. In Cueva del Medio, there were seven hearths with various artifacts and faunal remains around them. Tools included fishtail points.

Nami is interested in the earliest human occupations in the area, and his search has taken him to the same archaeological units, the same geomorphological elements and the same environment that harbored Bird's initial findings. In the Pali Aike area, Nami also has excavated Cueva Don Ariel, farther east and quite near Fell's and Pali Aike caves, although on the Argentine side of the border.

His recent trip to North America included four days of studying the collections at Bird's institution, the American Museum of Natural History in New York. Since the last **Mammoth Trumpet** report on Nami's sites (see **MT** 5:3, *From the End of the Earth*) he has almost 20 new radiocarbon dates on southern Patagonia's human occupations ranging from 9,500 to 12,290 years B.P. He is sure the oldest date is spurious; the likely median for Cueva del Medio is 11,000 years, he said. Dates were taken from materials in the hearths. He is also doing archaeomagnetic dating, consulting with Dr. Daniel Wolfman in the Archaeomagnetic Dating Laboratory at the Museum of New Mexico in Santa Fe.

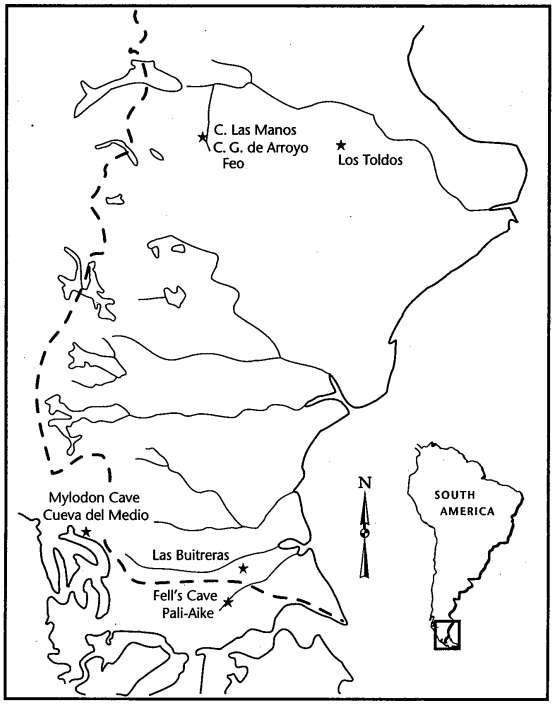
Archaeologists from Bird to the present have found most of Patagonia's records of Paleoindians in caves, but that does not mean that the first Patagonians were exclusively cave dwellers. Archaeology of the region, however, is almost exclusively from caves.



Fishtail points from Cueva del Medio in southern Chile.

"This is our problem," Nami says, smiling. "A strong bias, I think." The bias is understandable. "It is very difficult to find a stratified open-air site," he explains. "Not impossible, but very very difficult." There is only one, in the Pali Aike area of Patagonia. The harsh climate has eliminated virtually all other signs of early humans and their animal resources. Caves, though, have preserved such materials. "It is almost sure you find something in the caves," says Nami.

"I think that in Patagonia people lived only occasionally in caves," says Nami, noting that Cueva del Medio contained only seven hearths, very rare usage considering that the caves contain a record that includes the complete time span of Paleoindian occupation of the area. "I think that the occupation of the cave was for very very short periods of time by different people." And Nami doesn't believe that caves were used seasonally. He hopes to interest a colleague in studying clues to the seasonality of occupation of the caves.



Some of the excavation of Cueva del Medio was difficult, however, because rockfall had to be removed to get to the Paleoindian surfaces. The principal area of occupation was in the middle part of the cave, although there were archaeological findings near the entrance and the most recent expedition there discovered extinct fauna in the deepest part.

The search for information about Paleoindians has yielded much paleontological information about the Pleistocene-Holocene transition. That was approximately 10,000 years ago, although extinct animals have been found in strata dated as recently as 8,000 years B.P. at Arroyo Seco in Buenos Aires Province near the city of Tres Arroyos on the Argentine Pampas.

In his years of investigation of Patagonia's Paleoindians, Nami has practiced flint knapping techniques to help understand the differing technologies, but he emphasizes there still is much to learn. "There is much variability in the shapes of the fishtail points." Some have flutes and some have only basal thinning. Yet, he notes, different forms may be found side by side in the same cave. Tool material is mostly local, from glacial deposits.

The principal challenge for Nami is looking for the very earliest human occupations. "I put a strong emphasis in the progress concerning the earliest occupations."

–DAH

Vance Haynes

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"I'm not trying to win any arguments. Where the truth lies is what my drive is all about, not defending any fixed concepts."

– C. Vance Haynes

developed in the east, as many archaeologists have argued, only later spreading into the High Plains and western regions of the country? And if Clovis predates the brief Two Creeks Interstade, a warm cycle about 12,000 years ago, how does this affect current theories of migration into and within North America?

One of the principal critics of attempts to push back the date for Clovis has been Dr. C. Vance Haynes Jr., who holds an appointment in both the Department of Anthropology and the Department of Geosciences at the University of Arizona. Haynes, who was one of the first to write about the mammoth hunters and their associated industries and who remains one of the foremost authorities on Paleoindian archaeology, has long held that the earliest Clovis sites are reliably dated no earlier than 11,500 B.P. He has for several decades suggested that archaeologists be held to a demanding standard of scientific proof when claiming any earlier date.

Haynes' belief that Clovis represented the first Upper Paleolithic-like "culture" or complex in the New World has its basis in evidence from a dozen or so stratified Clovis sites that all date to between 11,500 and 10,950 years B.P. Big-game hunters, pursuing mammoth and other large game, were only then able to exploit for the first time the territory opened up by the retreating Laurentide and Cordilleran ice sheets. Given Haynes' consistent position on this topic, we asked him to comment on the Ohio site.

In a telephone interview from his Tucson office, Haynes said he has been following activities at Paleo Crossing but he finds the site does not yet offer conclusive evidence of a date earlier than 11,500 B.P. Several samples of charcoal were dated, he told us, explaining his reluctance to accept the pre-12,000 B.P. date because of its geological nature, with two subsequent populations of dates, one at about 12,000 B.P., and the other at about 10,800 B.P.

Haynes says the problem with the Paleo Crossing site is that the occupation is shallow, as are many of the eastern Clovis sites, located less than a meter below the surface. The strata from which Clovis points have been recovered are located directly on a glacial deposit on top of which there is organic matter. David Brose, principal investigator at Paleo Crossing, informed Haynes that the carbonaceous material from this surface is geological. Thus the single pre-12,000 B.P. date from Paleo Crossing is not the proof that will change Haynes' long-established position on the dates for Clovis. "Instead you have two statistical populations of radiocarbon dates that could be archaeological or the result of natural fires. If one is cultural I'd guess it is the one at 10,800 B.P., just like several other eastern fluted-point sites that have been dated. If you look at the data we have, 11,500 B.P. is still the earliest you can push it back. Maybe that's telling us something."

Asked whether there was work in progress elsewhere which might change his mind on this issue, Haynes identified current excavations at the Johnson site on the Cumberland River near Nashville, Tenn., which he believes is more promising and may well yield the proof he needs to accept a pre-12,000 B.P. date. The site is being excavated by John Broster of the Division of Archaeology, Tennessee Department of Conservation.

Washing out of the river bank at the Johnson site are various features, including hearths and Clovis artifacts, as well as materials from later periods. It is a deeply buried site with an entire sequence for the early Archaic. Below the Archaic materials are Clovis pre-forms and projectile points. With the three dates they have already obtained, Broster feels fairly confident that the site is very close to 12,000 years old, if not older. Haynes also believes the date for one of the hearths, at a little over 12,000, looks very reliable. Haynes visited the site and observed a spruce-cone scale, identified by Owen K. Davis of the University of Arizona, in a feature dated at 11,900±110 that also contained two Clovis pre-forms and one Clovis projectile point. Material from a second Clovis site on the Tennessee River being excavated by Broster may also be quite old. Broster has sent samples to the Arizona NSF Mass Spectrographic Radiocarbon Facility for dating.

Nevertheless, for Haynes, there is a persisting problem with the Johnson site similar to that at the Paleo Crossing site: the presence of background carbon in the alluvial unit. He suggests that dating of individual lumps using the accelerator technology to determine clusters of dates may help.

Asked about other recently excavated Clovis sites of interest, Haynes said that the East Wenatchee, Wash., site was the first to come to mind. "It is far and away the most spectacular thing that's been found and is potentially the most important, but we don't know what's there yet." While there are no C-14 dates yet for Wenatchee, "it's just as good as dated because [Dr. Peter J.] Mehringer has very clearly done an incredible job of determining that those artifacts were laid on Glacier Peak ash. And we know that that particular variety of ash is dated at about 11,200 B.P." Mehringer is a Washington State University anthropologist and geologist whose specialties include paleoclimates and palynology.

JEFF HARRISON/UNIVERSITY OF ARIZONA

Dr. C. Vance Haynes is not out to shoot down an early Clovis date, he merely is displaying a Sharp's breech-loading rifle similar to those used by Gen. George Armstrong Custer in conflicts with the Sioux in Eastern Montana. In addition to being a recognized authority on the peopling of the Americas, Haynes is deeply involved in historial archaeology of the Custer Battlefield area and has become expert in 19th-century weapons research.

One of the assumptions that is often a part of the late Pleistocene New World entry model is that early migrants brought the fluted-point technology with them. When asked what the possibility of a pre-12,000 B.P. date might do to theories about entry and migration, Haynes replied that he believes there still is not enough information to know where the fluted point originated, but he seems to have dismissed the idea that the earliest peoples brought fluted-point technology with them. Walker Road site, a multicomponent site in central Alaska, appears to Haynes as evidence of a Clovis industry without the Clovis fluted point and suggests the fluted-point technology originated elsewhere and later spread north into Alaska.

According to Haynes, Ted Goebel, the principal excavator at the Walker Road site, examined several classic Clovis artifact assemblages in Arizona and New Mexico and concluded that the assemblage at Walker Road was very similar to Clovis. Goebel and colleagues, in the book *Clovis: Origins and Adaptations*, refer to the Walker Road site as possible evidence of the "northern remnant of the same initial peopling event" which resulted in the Clovis fluted point. In any case, the Walker Road site is further support of a founding Paleoindian migration after 12,000 B.P.

Another assumption which generally follows from the model of late entry and dispersal, is that the peoples who developed the fluted point dispersed rapidly across the continent, moving into the 48 states, Mexico and northeast Canada, encountering no other groups of people, exploiting a variety of eco-niches, but focusing on the mammoth. Asked to explain how such a rapid dispersal might have occurred, Haynes says he thinks of the creators of Clovis tools as explorers. "The drive was to discover new territories, and in sparsely populated or unpopulated areas, to try to figure out whether anyone else was around. They were carried away by the opportunity to see what was over the next hill."

One of the problems which Haynes recognizes is that it is difficult to define the geographic, chronological, and technological parameters of Clovis. Though there is a fairly consistent basic Clovis tool kit, which includes the fluted projectile point, end scrapers, spurred end scrapers, gravers, and tools of bifacial thinning flakes, in some areas there are more blade tools, in others there are associated bone and ivory tools, and in others still what appear to be drills. This is evidence that Clovis peoples were "generalized opportunists," Haynes says, exploiting a variety of environments, using whatever resources were available. They were adapting to a variety of eco-niches, responding to changes in available resources, though, where possible, maintaining the preference for mammoth clearly seen in the Plains and in the west.

What of substantial variations in the fluted-point technology? we asked. Do they represent a variant of Clovis or another technology altogether? Does the change in technology represent a substantial change in adaptations and hunting strategies?

"If you find the Clovis point, it is, by definition, a Clovis site. However, there are Clovis sites without the Clovis point [as in Alaska's Walker Road site]. In the east you have a lot of points that are called Clovis which are really post-Clovis. They're the same age equivalent as Folsom and the fluting technology is not like Clovis. They're more like Folsom. One of the problems which complicates the discussion is that what is a Clovis point for one person, is post-Clovis for another," he says, implying that many of these problems will not be worked out until we have a great deal more information about Paleoindians.

Haynes is beginning to accept the notion that the Western Hemisphere could have human occupation earlier than Clovis. "It's pretty hard to disregard the evidence from Monte Verde [Chile]," he said. "It's overwhelming. They have structures, they have hide, they have footprints, they have sophisticated tools, and they have some of the crudest tools I've ever seen. That makes me look back at Taima-Taima [Venezuela]. When it comes to the bifacial projectile points, well, the closest thing to it is the Monte Verde material." The dates from Taima-Taima are about 13,000 to 14,000 and those at Monte Verde are about 12,000 to 13,000 B.P.

Wherever these discussions and future discoveries may lead us, archaeologists will have to continue to meet Vance Haynes' strict standards of proof. "If there is something that's going to be greater than 12,000 years," he cautions, "it's very important to be certain of it."

–Kathryn Ross

Bison Bones

continued from page 1

it. The configuration of the slope probably resulted in the site's being preserved rather than being lost to erosion.

The unlikely site produced a number of weathered bones. Mandibles indicated that remains of at least 15 bison were there. "There was no question of human association," Frison said in a recent telephone interview. Although the bones were in too poor a condition to allow the Wyoming team to detect cut marks, the percussion marks were obvious. Impact points on long bones indicated that they had been broken deliberately. "The bone has really been leached—just almost powder."

The bison bones were under as much as one meter of overburden and all were degraded. "But there is good evidence of green-bone breakage. We can pretty well identify impact cones." Frison says that common elements were long bones broken on both sides of the joints.

Dating the bones is proving difficult because there is little or nothing suitable for radiocarbon analysis. So far, Frison has been more successful at dating the bone bed by the old-fashioned technique of analyzing the stratigraphy and associated lithic materials, but the quest for radiocarbon dates is continuing. Frison is confident that the material is between 10,000 and 11,000 years old. "At least as old as Folsom would be my guess."

Identity of the bison also is problematic, although Frison says the animals clearly were a Pleistocene species and not the smaller and later *Bison bison*.

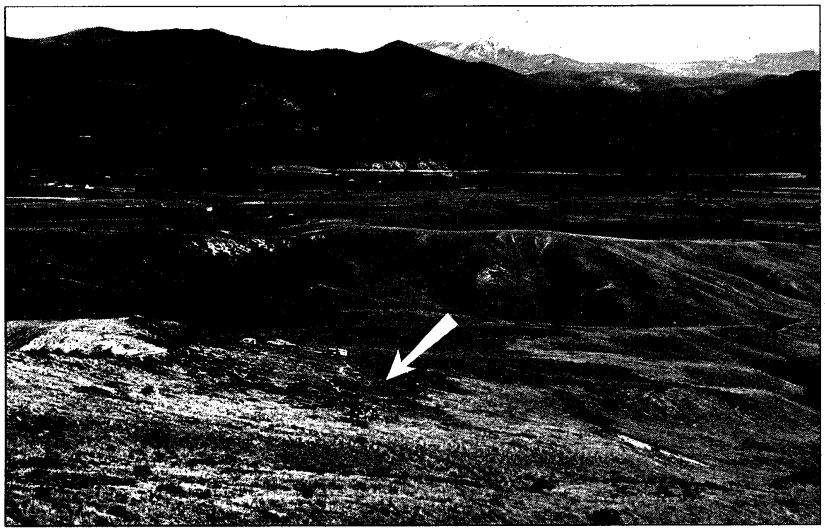
"You would swear the same flint knapper had to have made all of it."

"It's either going to be *occidentalis* or *antiquus*," says Frison, adding that the site produced one badly decomposed horn core. The only faunal remains found in the site were of bison.

While there are questions about the exact antiquity and species, there is no question about the season. Analysis of teeth by Lawrence Todd of Colorado State University indicates that bison at the Jim Chase site were killed in autumn. While the altitude and terrain might make it seem unlikely that bison would over-winter in Middle Park, Frison does not rule it out. "Maybe they were yarding up there. The elk get by there today; I don't know why bison couldn't get by there, too. Cattle do pretty well up there."

Initially he was surprised to find proof of Pleistocene bison so high in the mountains, but Frison can readily imagine how they were hunted and killed. Noting that there now is a major game trail coming up the slope within 15 meters of the site, he speculates that people drove the animals up the steep slope, which would have left them out of breath and easier prey for the spear-wielders concealed at the top of the ridge. When Frison conjectures about Paleoindian hunters, he does so from the perspective of a hunter who has used wooden spears with Clovis-style points to dispatch African elephants (**Mammoth Trumpet** 2:3 *George Frison: Elephant Hunting*). Although wildlife officials with high-powered rifles organized and led the herd-culling hunts in Zimbabwe's Hwange National Park, Frison learned from his 1985 and 1986 experiences that Clovis weapons carefully hafted with sinew to wooden shafts will penetrate the hides and vital organs of living elephants—experimental proof that early Americans could indeed have dispatched mastodons and mammoths.

Frison says that the Paleoindian point that Jim Chase initially found at the site looked more like a Plainview point than any other type of tool. Later, other people dug around the edges of the bed of bison bones and came up with the distal part of a point.



GEORGE FRISON

Overview of Colorado's Middle Park looking east toward the crest of the Front Range. Arrow indicates the Jim Chase site.

Frison made his initial investigation in the fall of 1990 with help from Eric Ingbar and Marcel Kornfeld from the University of Wyoming. "We got in there and found bone in place. We did find one projectile point. The base was gone, but it was technologically and morphologically identical to one we had found up in the Mill Iron site in Montana. Also, of course, it looked very similar to the one or two Goshen points that came from the Hell Gap site." The Goshen Paleoindian cultural complex was first recognized at the Hell Gap site, Goshen County in southeast Wyoming, in the early 1960s; the Mill Iron site, Carter County in southeast Montana, was excavated in the 1980s.

The site also produced several pieces of basalt. "Big heavy choppers," says Frison. "Some had been shaped a little bit." Also there were several flake tools, most made of local materials. Frison explains that there is plenty of high quality quartzite within 20 km of the site and that the site itself has a tool-grade chert from a geologic formation named for a local stream that apparently caused problems for early settlers—Troublesome Creek. The point Jim Chase found was made of Troublesome chert, a clear-to-milky material. "They used that extensively." Early hunters there also used a red chert that comes from near the town of Craig, 95 highway miles northwest.

When Frison conjectures about Paleoindian hunters, he does so from the perspective of a hunter who has used wooden spears with Clovis-style points to dispatch African elephants.

"We had hoped to find more projectile points in place, but didn't do it until this fall." Fortunately, the 1992 find was the base of a point. "Again it was identical to the Mill Iron material and Goshen material from Hell Gap. You would swear the same flint knapper had to have made all of it."

While Frison has not been able to get a satisfactory date for the Goshen level, new information may await next season's investigation at a site not far from the Jim Chase bison kill site. Frison is hoping to find clearly separate Folsom and Goshen levels there. "That would be very nice. There's no doubt that the Goshen level was always under the Folsom level at Hell Gap."

Frison is clearly enthusiastic about Colorado's Middle Park, a region little more than 100 miles south of the University of Wyoming's Laramie campus. "There seems to be a lot of Paleoindian material," he says, noting that besides evidence of Folsom and Goshen typology, the area also contains a small kill site of Cody age, about 9,000 years ago. "There's Folsom all over—at least a half a dozen little Folsom sites in the immediate area." And there's another area within a quarter of a mile of the Jim Chase site that has produced both Goshen and Plainview typology with some evidence of fluted point manufacturing.

"Those people were getting up in the mountains, there's no doubt about it. There must have been a lot of bison." *–DAH*

Books to Focus on Technology

TUCSON—The University of Arizona Press has established a new book series titled "Culture and Technology" that will feature an anthropological viewpoint. To be directed at a broad audience, books in the series are to consider ancient as well as recent technology.

Coming:
Tennessee Report

Material from the Johnson site on the Cumberland River east of Nashville (see "How Old is Clovis?" on page 1 of this issue) has been dated at about 12,000 years old—the oldest found in Tennessee. In our next issue, the **Mammoth Trumpet** will report on this and other early Clovis sites being investigated by John Broster of the Tennessee Division of Archaeology.

20th Alaska Conference

Proposals for papers or posters for the 20th Annual Conference of the Alaska Anthropological Association, scheduled for April 8–10 in Anchorage, must be received by January 8. Theme of the session is anthropology of the future with a focus on studies that show the applications of anthropology to solving contemporary problems. Proposals and abstracts should be directed to the conference chair: Theresa Thibault of the National Park Service, 2525 Gambell, Anchorage, AK 99503. The fax number is (907) 257-2510.

CLOVIS AGE CONFIRMED FOR MIDLAND WOMAN

The previously contested age of one of North America's oldest-known human skeletons has been confirmed to be 11,600 ± 800 years old through a uranium-thorium analysis technique used at Southern Methodist University in Dallas.

Dr. Curtis R. McKinney made the age determination for the Midland Woman using cranial and rib fragments found in 1953 near Midland, Texas. The test results confirm that she is the oldest dated human in the Americas, said McKinney, who presented his findings Oct. 26 at the annual meeting of the Geological Society of America in Cincinnati.

While uranium-thorium analysis is more than 20 years old, recent research has improved scientists' understanding of the way bones age in relation to their uranium and thorium content. McKinney was able to use that new understanding to re-date the Midland Woman's bones. His analysis is based on uranium radioactive decay as measured by alpha spectrometry. After death, bones begin to absorb uranium rapidly. The absorption process can slow or sometimes stop, depending on environmental chemical conditions. As uranium 234 decays, it forms thorium 230, and the estimate of the age of bones is based on the ratio of uranium 234 to thorium 230, McKinney explained.

"Our main achievement has been confirming the Clovis age of the Midland Woman with this technique," he said. "The average age of the remains is 11,600 plus or minus 800 years. It means the Midland Woman was related to the earliest ancestors of every Indian who lives today, and she is very likely the only representative of those who created the Clovis cultures, McKinney said.

Questions about the antiquity of the Midland Woman have concerned scholars for some time. For example, in their recent statistical analyses of Paleoindian skeletal remains, physical anthropologists D. Gentry Steele and Joseph F. Powell of Texas A&M University omitted measurements of the Midland Woman from their sample even though they thought the specimen was quite old. (See **Mammoth Trumpet** 7:2, *Paleoindian Skeletal Data Re-Examined.*)

Test results confirm that she is the oldest dated human in the Americas.

The bone fragments were discovered in June 1953 in a blowout between sand dunes about six miles southwest of Midland by amateur archaeologist Keith Glasscock of Pampa, Texas, who has been credited with making this important contribution to American anthropology. Glasscock contacted Dr. Fred Wendorf, who is now the Henderson-Morrison Professor of Prehistory at Southern Methodist's anthropology department. Wendorf excavated and analyzed the remains in collaboration with the late Dr. Alex D. Krieger of the University of Texas and the late Dr. Claude C. Albritton, a professor of geology and dean of the faculty at Southern Methodist, and Dr. T. D. Stewart of the Smithsonian Institution. The Wendorf team placed the age of the remains at older than 10,000 years based on the strata in which they were found, and on radiocarbon dating of material from the same strata.

The site of the discovery is covered with shifting surface sand, which initially caused some scientists to question Wendorf's age for the bone fragments. They suggested that the fragments might have been more recent, but had dropped into the older strata as the soil surrounding them was blown away. Wendorf defended the before-10,000 B.P. date because of the results of microchemical analysis that was performed on the bone fragments. The analysis revealed unique similarities to other datable animal bones found in the same strata.

Recent testing has confirmed Wendorf's findings. McKinney performed the analysis while he was a doctoral student at SMU's geological sciences department and Institute for the Study of Earth and Man. He now is director of geologic research at the Center for American Archaeology in Kampsville, Ill.

The Midland Woman is thought to have been about 30 years old when she died and was buried. The site is now arid, receiving less than 14 inches of precipitation annually, but at the time she lived, the climate was humid and cool; a marsh or shallow stream attracted wildlife to the area. The Wendorf team found the remains of turtles, rodents and extinct species of horse, camel, antelope, peccary, wolf, mammoth and sloth in the area.

UPCOMING CONFERENCES

March 25–27—Northeastern Anthropological Association, Annual Meeting, Danbury, CT.
Contact: Laurie Weinstein-Farson, Anthropology, Dept. of Social Sciences, Western Connecticut State University, 181 White St., Danbury, CT 06810. (203) 797-4093.

April 8–10—Alaska Anthropological Association, 20th Annual Conference, Anchorage, AK
Deadline for papers, Jan. 8. Contact: Theresa Thibault, Conference Chair, National Park Service, 2525 Gambell, Anchorage, AK 99503. (907) 257-2431 Fax (907) 257-2510.

April 14–17—American Association of Physical Anthropologists, Annual Meeting, Toronto, Ontario.
Contact: Jere Haas, Division of Nutritional Sciences, 211 Savage Hall, Cornell University, Ithica, NY, 14853-6301. (607) 255-4419.

May 18–21—Conference on Computing for the Social Sciences, Annual Conference. Urbana, IL.
Contact: Bruce Tonn, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6207. (615) 574-4041.

July 26–31—15th International Conference for Caribbean Archaeology, San Juan, PR.
Topics include prehistoric and historic archaeology. Contact: Miguel Rodriguez, Instituto de Cultura Puertorriquena, Apartado 4184, San Juan, PR 00902-4184. (809) 724-1844.

Aug. 17–23—Seventh International Conference on Hunting & Gathering Societies, Moscow, Russia.
Deadline for abstracts: April 15. Contact: Linda Ellana, Department of Anthropology, University of Alaska, Fairbanks, AK 99775. (907)474-6751 Fax (907) 474-5817.

Aug. 23–31—International Symposium on the Origins and Evolution of Ethnocultural Processes in Asia, Novosibirsk, Russia.
Deadline for abstracts: March 1. Contact: Academician Anatoly Panteleevich Derevyanko, Institute of Archaeology & Ethnography SD RAS, Acad. Lavrent'yev Avenue, 17, Novosibirsk-90, 630090, Russia (RF) USS. Fax 007-383-235-7791.

Sept. 27–30—8th Meeting, Working Group 1 on Bone Modification, Hot Springs, SD.
Pre-registration prior to Dec. 31 suggested for this international conference at the Mammoth Site, 60 miles south of Rapid City, SD. Contact: L. Adrien Hannus, 2032 S. Grange Ave., Sioux Falls, SD 57105, (605) 336-5493, Fax (605) 336-5299, or Larry Agenbroad, Dept. of Geology, Box 6030, University of N. Arizona, Flagstaff, AZ 86011. (602) 523-2379.

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Mammoth

continued from page 1

bones at the Kenosha Public Museum. A distal end of a femur and several tusk fragments had been unearthed when the owners of the site were installing drainage tile in 1964. The ditching machine was cutting an 18-inch-wide trench when it hit the well-preserved bone. Farmer Franklin Schaefer, recalling the incident, told a newspaper reporter that the operator was thrown off the machine by the impact of hitting the bone. Schaefer donated the find to the Kenosha Public Museum and nobody thought much more about it until Joyce and Wasion were studying the collection several months ago. They found obvious cut marks not only on the Schaefer specimen, but on proboscidean bones from two other nearby sites. There was not enough of the Schaefer mammoth in the museum to identify its species. (See **Mammoth Trumpet** 6:4, *Accidental Discovery Offers Evidence of Mastodon Butchering.*) Joyce said the cut marks on the museum bones were so obvious they were almost difficult to believe.

Fortunately, an amateur archaeologist, Phil Sanders, had drawn a sketch map of the site where the ditching machine had unearthed them. Armed with that treasure map, financed by a grant from the U.S. Department of Interior through Wisconsin's Division of Historic Preservation, and with the blessing of the property owner, Joyce, Overstreet and Wasion began their hunt. A few days after starting the excavation, they found more bones, which proved to be the butchered mammoth. In spite of the unseasonably cool and rainy season, a trove of valuable scientific information was recovered. Overstreet, the project archaeologist, said as of mid November that a "ton" of material taken from the excavation remained to be passed through eighth-inch screens. He said that little lithic material has yet been found—only a few microflakes.

Careful study of evidence found with the mammoth bones, including radiocarbon dating and palynological analysis, will answer many questions about the Schaefer site, one of several megafauna and Paleoindian habitation sites in southeastern Wisconsin and northeastern Illinois. Research by Joyce and his colleagues should add to the understanding of how mastodons and mammoths coexisted in the same region. It has been suggested that the two Ice Age species exploited quite different environments, but remains of both have been found near the western shore of Lake Michigan. Mammoths were grazers, having great flat teeth for grinding grasses, while mastodons were browsers with rugged teeth for processing leaves, twigs and shoots of trees and shrubs. Joyce says excavations at the Schaefer site will continue. The bones will be studied for further information on the animal's health and how humans exploited it. Kurt Hallin of the Milwaukee Public Museum, an expert on Ice Age mammals, is a consultant. Joyce said consultations also will be made with Dr. Russell Graham and Dr. Jeffery Saunders of the Illinois State Museum. Both are recognized as experts on human-mammoth interactions in the Late Pleistocene. *–DAH*

CHRIS FONS/GREAT LAKES ARCHAEOLOGICAL RESEARCH CENTER

Mammoth bones in situ at Schaefer site. Note tile ditch.

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'Origins' Symposium Scheduled in Siberia

An international symposium titled "The Origins and Evolution of Ethnocultural Processes in Asia" has been scheduled from Aug. 23–31 in Novosibirsk, Russia. Deadline for registration is Jan. 10.

The symposium is sponsored by the Institute of Archaeology & Ethnography of the Siberian Division of the Russian Academy of Sciences, which plans to publish the abstracts as well as a guide book of the field excursions. The field trips, scheduled for Aug. 26–30, will focus on the stratigraphy and archaeology of the basic open-air and cave sites in the Altai Mountains. Participants will take part in excavations and will get acquainted with collections from sites that represent all the archaeological periods of the region.

Plenary sessions will be in the House of Scientists in Akademgorodok (Novosibirsk) on Aug. 23–25. Problems to be covered: 1. Races, ethnographic and archaeological cultures; 2. Autochthonous development and migrations; 3. The continuity of tradition in the cultures of the Stone Age of central, middle and north Asia; 4. Asia and the problem of Levallois; 5. Some problems of the conservation and of the use of historical and cultural landscapes; 6. Microblade industries of the Pacific Basin.

Cost for symposium and field trip is $1,000, which includes hotel, meals, helicopters and other transportation. Participation for the plenary sessions only is $450. Participants must make their own arrangements for transportation to and from Novosibirsk. Registration and information is available from Academician Anatoly Panteleevich Derevyanko, Institute of Archaeology & Ethnography SD RAS, Acad. Lavrent'yev Avenue, 17, Novosibirsk-90,630090, Russia (RF) USS. The fax number is 007-383-235-7791. While registration is required by Jan. 10, abstracts, three pages or less in Russian or English, will be accepted until March 1.