

MAMMOTH TRUMPET



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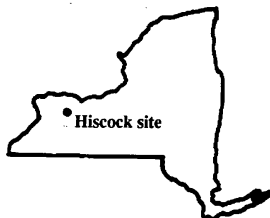
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SEASONS OF LIFE IN WESTERN NEW YORK

"Most people in eastern North America don't really perceive the regions in which they live as being represented in the archaeological record," explains Dr. R. Michael Gramly, Curator of Anthropology at the Buffalo Museum of Science. "So much emphasis has been placed on Paleoindian finds from the High Plains of the American West that people think Paleoindians were confined to that area." He smiles and adds, "We know this is not the case."

Gramly has good reason to smile. This past summer, hard work and careful excavation at the Hiscock site in New York paid off when a Buffalo Museum of Science team recovered a reworked Clovis-like Paleoindian point from beneath a mastodon bone. Last summer's find marked the seventh year of systematic investigations at the site, which is located in western New York, Genesee County, near the small town of Byron. Although previous excavations produced two other fluted points and the proximal end of a scraper, the stratigraphic situation of these tools was such that a true human-mastodon association was in doubt, at least until now. The discovery of the point provides incontrovertible evidence linking early human activities with the large proboscideans; the only mastodon site east of the Mississippi River and north of Florida to do so.



During the last few years, the stratified site has yielded a profusion of animal remains, including the bones of at least six mastodons. And amazingly, "We can put California condor in the late Pleistocene-early Holocene landscape of the Hiscock site." This, Gramly explains, is a very important find because condor bones were known only from the southern region of the United States, prior to the discovery. "Now we know that, at least perhaps seasonally, there were condors gliding in the skies of New York State." Another important discovery consists of "tight little spheroids of feathers." These, when frozen and teased apart by avian paleontologist Dr. David Steadman of the New York State Museum, proved to be the perfectly preserved feathers of

grebe, a water-loving northern bird. Similar feather balls, recovered from an overlying, more recent layer, were identified as Baltimore Oriole, a bird generally associated with woodlands. "It's a sort of stratigraphy in feather balls," observes Gramly.

Although the Hiscock site is very important for what it tells us about the late Pleistocene-early Holocene fauna of eastern North America, Gramly is equally excited about what it can tell us of the people of that time. The fluted point found last summer is extensively reworked, with a graver on one corner. This, along with reworking observed on the previously recovered tools, leads Gramly to believe that Hiscock was a scavenging site rather than a place where mastodons were hunted and killed. This, he says, "Opens up a whole door on site use."

Ironically, but for a passing reference to this locale in an archaeological text, it is unlikely that any of these discoveries would have been made. The Hiscock site began its contemporary existence as a cattail swamp on the farm of Mr. Charles Hiscock. In 1959, while using a backhoe to make a pond from the swamp, Mr. Hiscock found several large bones that were later identified as mastodon. He informed the Buffalo Museum of Science, which responded by sending a small team of excavators to the site. During the ensuing week-long investigation, the researchers recovered additional mastodon bones, as well as those of other animals. Wood which overlay the bones was subsequently radiocarbon dated to about 10,500 years ago.

Although initially very excited about the wealth of bones at the site, the excavators decided to discontinue the dig because of the apparent lack of human-associated materials. The bones removed during the 1959 excavation sat in the museum until 1961 when, understandably disappointed, Mr. Hiscock asked for their return. He placed the bones in a little shack behind his house—a sort of shrine to the past on a small upstate New York farm.

There matters rested until 1982, when Gramly entered the picture. While rereading *The Archaeology of New York State* by Dr. William Ritchie, Gramly noticed a reference to the site, which mentioned the dates of the fossil remains. Intrigued, he contacted Mr. Hiscock, who was "very happy

*"I don't see this as a kill site
in any classic sense.*

*It's something completely different
— a scavenging site. Something I'm
not sure we even suspected existed!"*

we wanted to come out. This was a bit of unsolved business for him."

Mr. Hiscock allowed Gramly and his crew to breach the dam of the spring fed pond he had made, then pointed out the approximate location where the original team had worked. After the water drained, the archaeologists began excavating a test pit, using snowshoe-like devices to walk on the still-in

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Mature mastodon tusk in situ, lying on cobble horizon at base of spring deposit. Its distal (right) end extends 45 cm further into ancient spring vent, at the right edge of which was found the humerus of a California condor. The nearly complete skeleton of a wapiti (probably Holocene) lies within the concave curve of the tusk, in spring vent deposits. (Photo courtesy of R. Laub).

A VISIT TO THE UPPER PALEOLITHIC SITES OF EUROPEAN RUSSIA: A US - USSR CULTURAL EXCHANGE

by C. Vance Haynes, Jr.
Professor of Anthropology and Geosciences
University of Arizona, Tucson

Editor's note: Last summer, a group of American archaeologists traveled to the Soviet Union, visiting several Upper Paleolithic archaeological sites. This journey marks the first phase of an exchange program between US and USSR archaeological specialists, designed to facilitate better understanding and cooperation between researchers in the two countries.

Dr. C. Vance Haynes, Professor of Anthropology and Geosciences at the University of Arizona, contributed the follow-

ing account of the Soviet site tour. Professor Haynes is a specialist in geoarchaeology and radiocarbon dating. He is America's foremost authority on the Clovis culture.

On 10 July, nine American archaeologists (J. Adovasio, L. R. Binford, B. Bradley, L. Davis, D. Dincauze, G. Frison, V. Haynes, D. Meltzer, and O. Soffer), along with British archaeologist, Clive Gamble, met in Leningrad for a three day conference with Soviet colleagues prior to going into the field to visit their Upper Paleolithic sites. The exchange between the two academies of science is being led by Olga Soffer and George Frison in the USA and V. M. Masson and N. Praslov

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NEW DISCOVERIES AT MAMMOTH MEADOW, SOUTHWESERN MONTANA

Imagine that one day long ago a jeweler set up shop and began to work. Sitting at a bench near the window, the jeweler hammered precious metals into rings and bracelets and necklaces, and set gemstones in delicate settings of gold and silver. As the jeweler worked, bits of the gem stones fell to the floor. Our imaginary jeweler had no need to sweep up the precious gem stones, because right outside the shop door there was an unlimited supply of them. Therefore, the scraps lay undisturbed.

Now let's make a few changes to this imaginary scene. Let's change the jeweler's pliers into hammerstones, and the gemstones into flakes of brightly colored fine-grained chalcedony—layer upon layer of them. Let's lift away the walls and roof of the jeweler's small, solitary shop, so that our jeweler-turned-flintknapper works in the open air. Finally, let's multiply the shop many times over until hundreds of workshops cover many acres.

If you can imagine this, then you have a pretty clear mental image of the South Everson Creek and Black Canyon Quarry and Workshop Complex in southwestern Montana. For hundreds of acres, the hillsides are littered with flakes and significant concentrations of quarry and workshop debris that fell to the ground as flintknappers made their tools. Layer upon layer of debitage extends deep below the surface of the ground, reaching back through history to the time of the earliest inhabitants of North America. Throughout the area you can see that the land has been disturbed. Small hollows lie beside mounds of earth, the remains of the prehistoric mines from which the ancient workers dug chalcedony, the raw material of their craft.

What the flintknappers left behind is now being studied by Dr. Robson Bonnicksen of the Center for the Study of the First Americans. Bonnicksen has led excavations at the site for the past four summers. "The excavations have uncovered a continuous, 11,000-year sequence of human occupation," he says.

Bonnicksen chose the site after an extensive search in Montana. He explains, "I wanted to find a research locality in which we could make a contribution to early American

prehistory." In 1985, working with Bureau of Land Management (BLM) archaeologist John Taylor, geologists Mort and Joanne Turner, and archaeologist Dick Reinhart, Bonnicksen looked at 19 different sites. At Everson Creek, they found lots



Earthwatch volunteer Diane Laetz assists in mapping the Mammoth Meadow stratigraphy. (Photo courtesy of R. Bonnicksen)

of surface material, he says, "and there were terraces, many with artifacts on them. Some of those artifacts looked like they could be typologically old. So we decided to focus there." Over the ensuing years, the BLM continued to assist Bonnicksen by providing survey and testing money, and, later on, logistical support including trailer houses and other equipment.

In 1986, Bonnicksen went back with a small team and dug test pits, which yielded lanceolate points. One day, while surveying next to the creek, the team came across a fragment of mammoth bone at the mouth of a badger hole. "We dug a test pit there right on top of the badger hole," Bonnicksen recounts, "in hopes of finding the rest of the mammoth."

Although no further remains were found, the site was named Mammoth Meadow in its honor.

In 1987, Bonnicksen returned to the site, this time with larger teams that included Earthwatch volunteers. The teams dug six new squares beside the original test pit, and began excavations at two nearby mines. During that summer, "We found out how incredibly time-costly the project is. We found that Mammoth Meadow was an extraordinarily rich workshop producing up to 24 gallons of flakes per 10 cm level in a two-meter square... It took a lot of time to learn how to work there. We didn't make any huge advances in '87 other than to realize what we were up against: long-term time investment and a big project."

On the last working day of the summer, Earthwatch volunteer Susan Carlson, working in a test pit at a depth of 110 cm, found what appeared to be a Goshen point, although Bonnicksen now hesitates to call it that. In addition, a Cody point had been found earlier in the summer. "We knew we had an important, deeply stratified site," Bonnicksen recalls.

In 1988, the excavations continued to produce many artifacts and features including "hearths, flintknapping furniture, and so forth," Bonnicksen says with a smile. The flintknapping furniture, found at a depth of 80-85 cm below surface, consisted of a stone for the flintknapper to sit on, an abrading stone, and a stone anvil. The 1988 session also uncovered a Cody Complex living surface and drove the initial test pit to a depth of 235 cm. At this depth, the excavation reached a layer of boulders below the groundwater table, and water had to be pumped out of the pit. "We found human-made flakes that went down to 1.6 meters below the surface," Bonnicksen reports. "What it told us is that, for whatever reason, there were human-made flakes down in the late Pleistocene gravel."

Finally, during the summer of 1989, the Earthwatch teams finished the six pits of Mammoth Meadow, now called Mammoth Meadow I, excavating them to a dense layer of

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CORRECTIONS AND COMMENTS

In Volume 5-3, page 2, lower left photo, the man on the right was mistakenly identified as Richard Morlan. This gentleman was instead Mike Johnson, County Archaeologist of Fairfax County, Virginia. We offer our sincere apologies for the mix-up.

Also, due to extraordinary circumstances, the Lubbock Lake 50th Anniversary Celebration has been rescheduled for October, 1990.



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AN OVERVIEW OF SUMMIT '89: INTERVIEW WITH ALAN BRYAN

During a quiet moment at the May World Summit Conference in Orono, we took the opportunity to ask archaeologist Alan Bryan his views on the conference and on the peopling of the Americas question. A Professor of Anthropology at the University of Alberta, Edmonton, Dr. Bryan has devoted four decades to archaeological field research, most of it relevant to the question of the peopling of the Americas. He is the author of numerous publications and has conducted excavations at many sites throughout the Americas, including Smith Creek Cave, Nevada; Los Tapias, Guatemala; Taima Taima, Venezuela. Professor Bryan most recently reexcavated at Wilson Butte Cave, Idaho, with his wife, Ruth Gruhn.

Mammoth Trumpet: Dr. Bryan, what do you think Summit '89 accomplished?

Alan Bryan: The conference brought together archaeologists from many parts of the Americas who are concerned with the problem of the peopling of the Americas, as well as colleagues from Russia, China, and Japan. I think this was very important, as the Northeast [Asia] is where Native Americans must have come from. There was a good representation of researchers involved in the peopling of the Americas question.

MT: Would you say there was a general consensus at the conference that there was a pre-Clovis occupation in the Americas?

AB: I think the majority of people came away with that feeling, yes.

MT: Earlier in your archaeological career, what was your opinion on a pre-Clovis occupation?

AB: I guess I have always thought that there was something older than Clovis. However, I did for a long time believe that Clovis was probably a later immigration, separate from other immigrations. I now believe that it is an indigenous development in southern North America, and that it is time we examine new models, as well as seriously look for evidence of early humans in North America. That is, if there were people in South America by 30,000 years ago, then there must be earlier sites in North America. There have been claims for such sites, particularly in California, but professional archaeologists have largely ignored them as they have not yet been properly published.

MT: What are some of these sites?

AB: The Wooley site on Santa Rosa Island is one of them and the Charles Brown site in San Diego. Also, personally, I think the evidence from Calico has to be examined more carefully. One of the problems is that a lot of the Calico materials presented to archaeologists [at conferences] years ago were not artifacts, but pseudo-facts. There are some real artifacts there too, but so far none of them have been properly reported on. I've seen artifacts from these three sites and their stratigraphic contexts appear to be old.

MT: What are some of the major questions that remain unanswered by the Clovis entry model?

AB: Well, the Clovis-is-earliest model just does not explain any of the material that was presented at the conference for South America, nor does it explain much of the material that was presented for North America. It explains what happened on the Plains and in the eastern Woodlands, but essentially nowhere else.

MT: It doesn't explain the contemporaneity of the South American sites?

AB: No, because there's such diversity in South America. Even if you stick with the 12,000 or 13,000-year-old South American material (e.g., Taima Taima, Venezuela; the Abriense industry in Columbia; Los Toldos, Argentina; Monte Verde, Chile) and ignore the earlier, the material is so diverse,

and none of it has anything to do with Clovis.

There is one site on the peninsula of northern Venezuela which has three or four points that look sort of like Clovis, but it's an undated surface context. I think that Gerardo Ardila and José Oliver evaluated the site properly when they said that this material is undoubtedly later than El Jobo. Of course

there are people who would argue that this is evidence of the Clovis-is-first model, and that Clovis must have stimulated development of El Jobo. It is possible that these Clovis-like points are derived from

Clovis, but we have no real evidence that they are associated with migration. It may be simply diffusion of a technological tradition.

I think the dated evidence is quite clear that Magellanic "fishtail" points started from the south and moved north, and that they acquired fluting somewhere, probably in Ecuador. You then get fluted fishtail points on up through Central

America and into Mexico. One such point from Mexico dated 9,400 years ago. So we appear to have diffusion of two technological traditions—one, the "fishtail" form, moving from the south to north and the other, fluting, from the north to south—with fluting applied to the "fishtail" form in the middle.

MT: Why do you think there's so much resistance to possible pre-Clovis sites?

AB: Because the Clovis-is-first model seemed to explain everything so well. It seemed so reasonable and it's entrenched—nearly everybody accepted it. If your perspective is limited to central North America it makes sense. If your perspective is the High Plains, Eastern Woodlands, and even west of the Rockies, it seemed to make sense. But as I tried to explain in my paper [at the conference], it doesn't really explain an important body of material from the Great Basin.

The radiocarbon dated evidence for fluted points in the Great Basin and immediately adjacent areas begins only around 11,000 years ago and persists until about 8500 years ago. Now, fluted points could have come in earlier, 11,500 years ago or so, but there is no good evidence for that. On the other hand, stemmed points—the kind that are made for insertion into a socketed haft rather than onto a split-stick shaft, like the thin-based fluted points—are well-dated at three sites (Fort Rock Cave, Danger Cave, and Smith Creek Cave) in the Great Basin at more than 11,000 years ago. At Smith Creek Cave, more than a dozen dates on different materials indicate that the occupation by peoples who made stemmed points was between 10,000 and 12,000 years ago.

That is, occupation was fully contemporary with Clovis,

but they never used fluted points in Smith Creek Cave.

One possible hypothesis is that people used different points for different purposes. This hypothesis could be tested by using the Young and Bonnichsen model to determine whether the same people removed flakes in the same way to form these

different shapes. I doubt, though, whether this hypothesis is correct because the Dietz site in Oregon quite clearly shows two different occupations at the same site. There is a concentration of fluted points—over a hundred of them—out on the flat, and a concentration of stemmed points up on a higher terrace. This certainly indicates that people occupied the site at different times, and the evidence does not suggest that it was the same people. Unfortunately, there's no radiocarbon dating on this site.

MT: Dr. Guidon suggests that in order to find old sites one must conduct large excavations and dig deeply.

AB: This may be the case in certain areas, obviously in the area that she's working in. She didn't make the point that she has three nearby sites that are dated older than 13,000 years ago. In one of them (Toca do Sitio do Meio), a few kilometers away from Pedra Furada, she reached 15,000 years before hitting heavy roof fall. That site looks like it could be even older than Pedra Furada.

I think personally that the evidence suggests that people must have been in America a lot longer than most archaeologists have believed. Changing the accepted model is a very difficult process. It was quite obvious at the conference that the confirmed skeptics are not going to accept anything earlier than 12,000 or 15,000 years old anywhere south of the continental ice sheets because they are committed to the "Clovis-is-earliest" model. However, I think that the majority of the conference participants were convinced that it is time to look at alternative models, and to reexamine the evidence from many sites in the light of those models.

SUGGESTED READINGS

On Seasons of Life in Western New York

Fisher, D.C. 1988 Season of Death of the Hiscock Mastodonts. In *Late Pleistocene and Early Holocene Paleoeology and Archaeology of the Eastern Great Lakes Region*, edited by R.S. Laub, N.G. Miller, and D.W. Steadman, pp. 115-125. Bulletin of the Buffalo Society of Natural Sciences 33. Buffalo, NY.

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On New Discoveries at Mammoth Meadow, Southwestern Montana

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On A Visit to the Upper Paleolithic Sites of European Russia: A US - USSR Cultural Exchange

Soffer, O. 1985 *The Upper Paleolithic of the Central Russian Plain*. Academic Press, Orlando.

On An Overview of Summit '89: Interview with Alan Bryan

Bryan, A.L. (editor) 1978 *Early Man in America from a Circum-Pacific Perspective*. Occasional Papers No. 1, Department of Anthropology, University of Alberta, Edmonton.

Bryan, A.L. (editor) 1986 *New Evidence for the Pleistocene Peopling of the Americas*. Center for the Study of Early Man, University of Maine, Orono.

"It is time we examine new models, as well as seriously look for evidence of early humans in North America."

"I think personally that the evidence suggests that people must have been in America a lot longer than most archaeologists have believed."

"At Smith Creek Cave, more than a dozen dates on different materials indicate that the occupation by peoples who made stemmed points was between 10,000 and 12,000 years ago. That is, occupation was fully contemporary with Clovis..."

(Continued from page 1)

The test pit yielded extensive mastodon remains, a section of caribou antler, and some deer bone. "I was very elated about this site," Gramly recalls, "because I knew that if we could get this much bone from a test pit, the idea of what else might lie there was truly staggering. There was a good possibility that the site contained a veritable treasure of Pleistocene or early Holocene remains."

"It was apparent to me," Gramly continues, "that this was more of a paleontological than an archaeological site. I knew there would be a very high return of bone and a low return of artifacts, so I consulted Dr. Richard Laub, the paleontologist-geologist at the museum, and tried to interest him in the project. He's a specialist in Devonian corals and had never done any straight paleontological digging. To his credit, he shifted gears, went out to the site, and began excavating near the 1982 test pit. And he's been doing it ever since!"

Gramly credits the success they've had at the site to the careful excavation techniques used by the team. All excavated material is screened, with selected samples passed through 1/8 inch mesh. He believes that human evidence in these large paleontological sites is frequently overlooked, or, in some cases, destroyed by crude excavation techniques. "There have been numerous mastodons and other Pleistocene creatures found in New York State. I've always felt that we've given rather short shrift to these discoveries. One has to approach these sites with caution and apply standard methods of archaeological techniques to their investigations."

One of the reasons behind the large representation of animals in the Hiscock site lies in its location. The site occurs on a neck of land that was likely a thoroughfare between two glacial lakes during the late Pleistocene. Conceivably, this "isthmus" also acted as a natural corridor in channelling seasonal animal migrations north to Lake Ontario. "This is an area," notes Gramly, "where you would expect heavy animal traffic."

The site itself is in a football field-sized hollow surrounded by gravelly knolls. In one corner of the depression, a spring bubbles into a small channel. Even today, the site is perpetually wet, and pumps must be run continuously to permit excavation of the site. In the past, the spring may have served as an important source of minerals and water to animals living in the region. "Minerals in the water and anaerobic bacteria," Gramly adds, "probably have something to do with the good preservation of the organic material that we find there. The sulphur environment is inimical to oxidizing bacteria and other organisms that eat bone and wood."

The question of preservation is an important one, since it is so extraordinary at Hiscock and because bone is so often lacking at Northeastern sites. "It's true there is no preservation of organic remains in the high ground situations," Gramly explains, "but we do get preservation in inundated sites. These inundated sites preserve well because bone has an organic fraction to it which is amenable to decay under oxidizing conditions. If you exclude the bacteria that live in aerobic conditions, there is no reason why bone cannot

endure, and wood also."

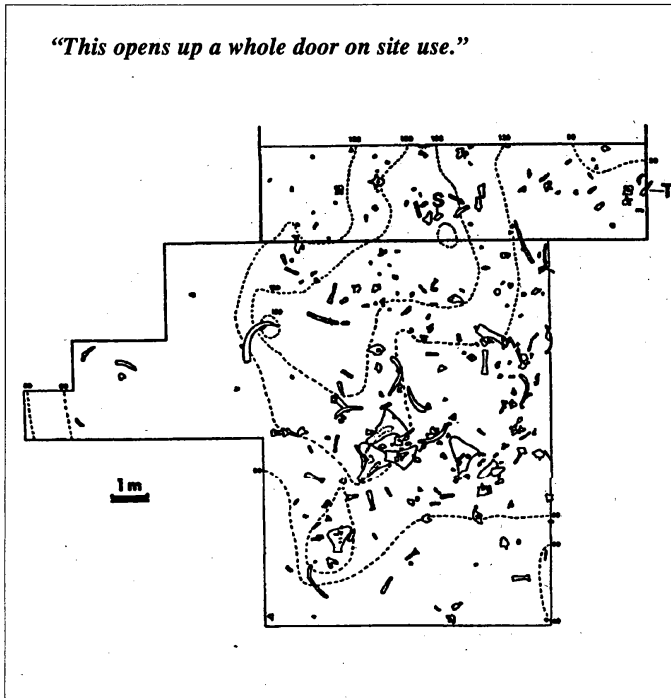
There are, according to Gramly, many other localities similar to the Hiscock site scattered throughout New York. "New York is very low-lying and very well-watered. But we just don't look down into the low grounds often enough. We probably have in New York State as great a potential for discoveries of human-associated material with Pleistocene-early Holocene animals as anywhere else in North America. It's just that we haven't utilized this potential. And now we're beginning to do that."

Stratigraphically, the site is underlain by a sterile, boulder-embedded clay. Immediately above this sterile deposit is a slightly silty-sandy facies, which is where Dr. Laub and his volunteers have found most of the mastodon and other late

Gramly emphasizes that the excavators must be very careful when digging to pinpoint exactly where a find comes from—the woody layer or the underlying older stratum. "It takes great skill in excavation and constant monitoring. Dr. Laub is at the site all the time." During the crucial early years at the site, Dr. Norton Miller of the New York State Museum and Dr. Steadman assisted in working out the complex stratigraphy.

Because it is so wet, one of the inherent difficulties at the Hiscock site is the possibility of stratigraphic mixing. As Gramly explains, "Wood falls through the muck and sinks. Early in the excavation, we found, for instance, a very nice fluted point which lay within the sandy facies. Unfortunately, it was surrounded by a lot of wood which probably is

"This opens up a whole door on site use."



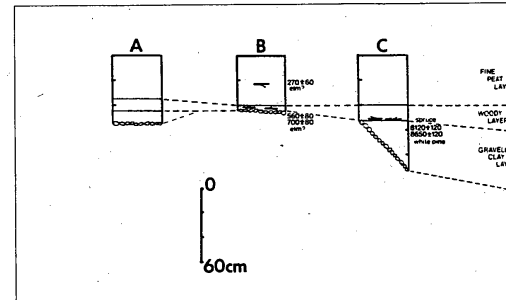
Map of main mastodon bone concentration as revealed following 1988 field season. Areas excavated in 1988 are shown along the upper portion of the diagram. Contours are of the level on which the mastodon bones lie—the top of a unit of light gray silty clay containing cobbles. The bones are contained in spring deposits overlying this level. Contour interval is 30 cm. S = juvenile mastodon shoulderblade. T = tusk tip. (Courtesy of R. Laub).

The pride that Hiscock felt in the discoveries on his farm is shared by the surrounding community.

Pleistocene-early Holocene faunal remains. Contained within and above this layer are floral remains—twigs from Jack pine, tamarack, and spruce trees—that have been radiocarbon dated to about 11,000 years ago.

Interestingly, Dr. Laub and his colleagues observed that some of these twigs seemed to occur in similar-sized, loose spheroidal masses. "But then," Gramly says with a hint of amusement in his voice, "we have a zoo in town with elephants. We began to look at some of their droppings, as well as at scientific papers published on the digested remains of plants by proboscideans, and Dr. Laub realized they were mastodon droppings or intestinal remains."

The layer above the "droppings" consists of woody earth about 30 to 40 cm thick, which, says Gramly, "represents a more recent period when trees were dropping into the water." Essentially Holocene in age, this level contains a wealth of animal bone, including deer, elk, passenger pigeons, hawks, and wild turkeys. Finally, above this woody layer and extending to the surface is a very recent level consisting of a "black, sulphurous muck."



Stratigraphic columns along a transect from margin of site (near deepest area). Positions, ages, and identifications of C-14 wood sam



Richard S. Laub (Geology Division, Buffalo Museum of Science) holding a mastodon podial bone in 1989. Laub directs the excavation of the Hiscock site. (Photo courtesy of R. Laub).

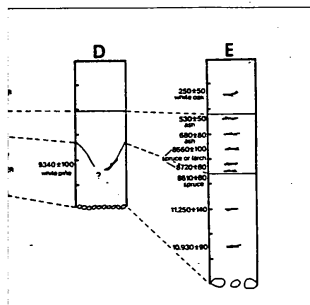
more recent in age." The proximal portion of the end scraper was from the juncture of the woody layer and the underlying sandy facies; a second fluted point came from the upper black muck. "But the third one—the one that was found this year—was recovered from the deeper portion of the site, beneath mastodon remains and in the sandy facies!"

"The interesting thing," Gramly muses, "is that I almost knew what it was going to be. The two fluted points we found previous to last summer's find were both extensively reworked. The first was used as a knife or graver. The second, the proximal portion of a point, is flaked on the snapped edge with the corners retouched into gravers. These points did not end their life as instruments of death, but as household tools.

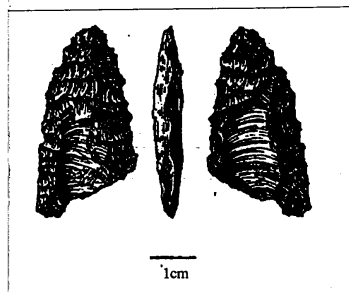
The scraper also shows signs of use as a graver." True to his prediction, last summer's find exhibited extensive reworking.

The site, Gramly believes, represents an area frequented by animals that died natural deaths, with the artifacts—"these exhausted, much reused fluted points"—used in processing activities. Tusk studies by Dr. Daniel Fisher of the University of Michigan suggest that the likely season of death for most of the mastodons was in the late winter-early spring, a time when food shortages are most acute.

"I don't see this as a kill site in any classic sense," Gramly says. "It's something completely different—a scavenging site. Something I'm not sure we even suspected existed!"



Left side of mastodon bone concentration) to the right are shown. (Courtesy of R. Laub).



Reworked fluted point from beneath mastodon bone. (Courtesy of M. Gramly; Drawing by S. Quimby).

south-central Pennsylvania, along the Susquehanna River, there is a very large archaeological site known as the Shoop site." Analyses of the stone tools from this site suggest that almost all of them are made from a New York chert. "Not far from the Hiscock site, hardly more than 15 miles as the crow flies," Gramly continues, "is a tremendous quarry-workshop site of the same Paleoindian phase as we see represented at Hiscock. And, just a few miles south of this workshop site, we have large quarries—escarpments—where this chert is obtained. This is the same type of chert that is found on the Shoop site. We also find, at some of these New York sites, tools made of stone from Pennsylvania sources. If the Paleoindians were seasonally transhumant [practiced a seasonal round], it would seem to me that these people would stop at the Hiscock site, for there was great bounty there for the taking."

Of course, if people were visiting the Hiscock site for bone or ivory, one would expect to find tangible evidence—cut marks or peculiar breakage patterns—on the bones themselves. "Well, we have seen such things. But," he emphasizes, "we're very cautious." Given the huge amount of bone recovered from the site, he says, "there's always the possibility that natural damage may mimic patterns made by humans."

The researchers are also examining the bone from the site for traces of canine bite marks. "Dog," explains Gramly, "has been domesticated in the world for at least 12,000 years. I'm inclined to believe that the exploitation of the formerly glaciated, rather rigorous areas of northern North America could not have been carried out without dogs." He adds, "If you have dogs, you have to feed them. The Hiscock site would have had a tremendous abundance of animal flesh

lying around for the taking. This is all very speculative, but I still feel that one day we'll find dog was present at the Hiscock site."

Happily, time is on his side. Teams have been digging at the site since 1982 and plan to go on digging indefinitely. "We're just getting into this," he remarks enthusiastically. Charles Hiscock, who passed away in 1987, bequeathed the land containing the site to the Buffalo Museum of Science; the Museum then purchased some of the surrounding land.

The pride that Hiscock felt in the discoveries on his farm is shared by the surrounding community. Nearly all of the work on the site has been done by volunteers, many of whom are local residents. A number of volunteers have even gone on to careers as professional archaeologists. Gramly tells of a teenage boy who volunteered and later became a paleontology major in college, as well as older men and women who left established careers to return to school. "If it's the first time you've ever dug in your life," Gramly smiles, "and you find a mastodon femur, that's going to affect you for a long time."

The Hiscock site will be affecting Gramly's life and the lives of others for a long time to come. One of the first meticulous long-term investigations of a late Pleistocene-early Holocene site in northeastern North America, Gramly views the site as a sort of laboratory. "It's going to provide a lot of insight into methods for later investigators who want to dig similar types of sites," he notes, an idea which pleases him almost as much as those first few bones pleased Charles Hiscock.

—Sandra Jacobs

(Continued from page 1)

A VISIT TO THE UPPER PALEOLITHIC SITES OF EUROPEAN RUSSIA: A US - USSR CULTURAL EXCHANGE

in the USSR. The Soviet contingent is to visit the USA in 1991. After presenting papers on the archaeology, geology, and paleoecology of sites and cultures on both sides of the Atlantic, we began our tour by visiting the Kostenki-Borshchevo region near Voronezh.

At Kostenki 11, the 19,900 yrs B.P. bone bed of level 2 has been preserved for permanent display in a concrete building. The circular arrangement of mammoth bones, particularly lower jaws and long bones, and the distribution of artifacts and hearths is convincing evidence of an Upper Paleolithic structure.

Stratigraphic diagrams, maps, and artifacts were on display on the landing surrounding the exposed living floor. Glass fronts had been removed so we could handle and photograph the artifacts. A test pit in one corner of the display exposes a 40 cm lower cultural layer that produced a radiocarbon date of 21,800 yrs B.P. on "bone coal" (charred bone), the same type of material that produced the date on the upper occupation level.

From Kostenki 11, we drove by bus to a prominence overlooking the Don River to the east and Parkov Ravine to the north and west. Many of the famous Kostenki sites (1, 14, and 18, in particular) were pointed out to us. After lunch in the field camp, we spent several hours examining the new excavations at Kostenki I. We were permitted to inspect the living floor, and I was invited to collect radiocarbon samples wherever I thought best for dating at the NSF-University of Arizona Facility for Radioisotope Analysis. Two were collected; one of good charcoal from level 3, and one from a distinct hearth in level 1 that may be charred bone rather than charcoal.

We flew to Bryansk, 15 July, on our private Aeroflot 2-engine jet with crew, bussing southward to Pogor on the 16th to visit the Sudost River site of Yudinovo. Olga and George were presented with a traditional honor of a loaf of bread and salt.

The mammoth-bone bed at Yudinovo is under about 2.5 m of reworked loess of an alluvial fan on the first terrace 9 m above the river. Four radiocarbon dates on charred bone range from 12,300 to 15,640 yrs B.P., with mammoth teeth

"THE BIG CHILL" COMES TO THE BUFFALO MUSEUM OF SCIENCE

The crowd watches enthralled as the giant ground sloth browses peacefully, her tongue plucking a leaf from the surrounding shrubbery. A small sound from the infant clinging to her side breaks into her feeding reverie. For a moment, the mother sloth gazes down reassuringly at her young one before resuming her endless feeding.

Time travel? Not exactly. But at the Buffalo Museum of Science, prehistory is coming to life as visitors enter "The Big Chill: Return of the Ice Age." This unique exhibition focuses on the climate and creatures of the Pleistocene—ten thousand to two million years ago. A wonderful blend of education, entertainment, and straight science, "The Big Chill" offers something for everyone.

Return to a time when thick sheets of ice covered much of the Northern Hemisphere and huge Ice Age mammals roamed the earth. Visit a reconstructed caribou-hunting encampment, where "Paleoindians" relate tales of how humans lived during the Ice Ages. Learn how glaciers form and explore theories of the earth's future climate. Or view exhibits featuring materials from the Lamb and Hiscock sites, two of New York's oldest archaeological sites.

Undoubtedly, the animated robots, manufactured by Dinamation International, Incorporated, of Los Angeles, California, will fascinate young and old, alike. Modeled after extinct Pleistocene animals, these life-sized replicas move their heads, tails, and even take steps! Triumphs of modern technology, the robots are controlled by computer-regulated air cylinders. Changes in the computer program enable the models to move in different patterns; digitized recordings reproduce the sounds these animals might have made. A short film on Ice Age mammals and explanatory slides on the construction of the robots set the stage for this spectacular display, which features, in addition to sloth; woolly mammoth, woolly rhinoceros, sabertooth cat, and glyptodont.

These and many other temporary exhibits are sure to delight viewers of all ages. So if you have the opportunity, step back to the Ice Age and visit "The Big Chill."

The Buffalo Museum of Science is located at 1020 Humboldt Parkway, Buffalo, New York and is open daily 10:00-5:00 (Wednesday and Friday 10:00-10:00). For additional information call the Ice Age "Cold Line" (716) 893-BRRR. Exhibition ends December 31, 1989.

dated at 13,640 ± 200 yrs B.P. At Soviet scientist L. A. Abramova's invitation, I collected a small radiocarbon sample from the bone bed.

After visiting the local museum built by the cooperative at Pogor, we were wine and dined by the coop chairman. We also stopped at a small church en route to see the grave of Tolstoy. I never fail to be charmed by the colorful Russian wooden houses with the ornate details on window casements, doorways, and eaves.

At the Bryansk museum, we examined artifacts from the upper Paleolithic site of Khotylevo II, dated 24,000 to 25,000 yrs B.P. on charred bone and teeth from a 20 cm-thick layer with charcoal (?) and fire pits. Large blades have ground isolated platforms and some microblades are denticulated and backed. Also, there is much ornately carved bone and

(Continued on page 6)

(Continued from page 5)

"The Upper Paleolithic of European Russia represents a relatively high degree of technological sophistication and adaptation to varied climatic regimes over about 25 millennia."

ivory, as well as mammoth tusk semi-fabricates. The nearby site of Khotylevo I has a Middle Paleolithic level with a few bifaces and large classic Levallois cores. Again, show cases were open and we were allowed to take platforms of artifacts outside for photographing. Jim Adovasio, being of Ukrainian descent, was presented with a battlefield find that appears to be a Prussian steel helmet.

July 16th, we flew to Donetsk, visiting the bison (*Bison priscus*) kill site of Amvrosieka the next day. The site is in a small ravine and buried by reworked loess (Dauphine loess). It is believed that several seasons or events are represented, but not over as much time as three radiocarbon bone dates would indicate ($15,250 \pm 150$ yrs B.P., $20,620 \pm 150$ yrs B.P., $21,150 \pm 340$ yrs B.P.).

We returned to Donetsk to fly Aeroflot to Kishinev, traveling by bus

northwest to Soroki.

July 18th, we visited the stratified multi-component site of Kosouts, situated in slope-washed loess on the first and second terraces of the Dniester River. Charred bone radiocarbon dates range from ca. 16,000 to 19,000 yrs B.P. for the main occupation layers, which overlie fluvial sands. Most of the bone is of reindeer.

At the suggestion of Soviet archaeologist Elia Borzyak, two lumps of charcoal were collected from the sand alluvium (unit 6) below the main occupation levels. Geologist Adamenko explained the terrace sequence of the Dniester River as having three late Pleistocene and five Pleistocene terraces. The flood plain has two levels; the older dating ca. 10,800 yrs B.P. The latest mammoth remains in the region are ca. 14,000 yrs B.P. at the Ataki site, but the cultural remains are bone and ivory artifacts that may have been scavenged or subfossilized at the time of manufacture.

The next day was again spent at the Kosouts site, observing the artifact collections from there and the nearby pre-Pauldorf site of Klimautsi, located 60 km up-river on the third terrace. The Pauldorf soil, under 2 m of Dauphine loess, is about 70 cm thick and dates 25,000 to

32,000 yrs B.P. Another cultural level occurs above the Pauldorf soil. A mammoth bone structure, 12 m in diameter, was discovered at Klimautsi during the construction of a kindergarten. Many bone artifacts were laid out for us to discuss, handle, and photograph.

Before leaving Soroki, we were marvelously enter-

tained by the Soroki Dancers. To complete the ethnic exchange, Louis Binford took center stage and treated all to a coal miner's lament, acappella.

On 20 July, we flew Aeroflot to Moscow. The next day, we were bussed to the Upper Paleolithic burial site of Sungir at Vladimir. Three charcoal radiocarbon dates for Sungir are 24,000 yrs B.P. After presentations by Soviet colleagues at the site, we visited the museum in Vladimir where many of the truly spectacular artifacts were put on special display for our visit. Basically thinned, triangular bifacial points like those from Kostenki occur at Sungir, as well as bifacial foliates. The most spectacular artifacts from the site are long, slender ivory points, or pointed cylindrical rods, found with the two human burials. One is over 2 m long.

The 22nd was spent visiting the Kremlin and Red Square

Once again, we had complete freedom to handle, sketch, and photograph any of the artifacts, including very delicate bone tools. That evening the western contingent hosted a dinner to honor our Soviet hosts and colleagues.

In every respect, the trip was an outstanding success and provided us all with many new thoughts and a better understanding of the Upper Paleolithic of European Russia. The Soviet scientists are making important strides in archaeological procedures, and interdisciplinary collaboration at sites appears to be excellent. A minor criticism is that attempts to correlate all of the sites on the basis of regional stratigraphic frameworks is hampered in part by regional differences in stratigraphic schemes and their interpretations. The resolution of radiocarbon dating of cultural levels has so far been too imprecise for reliable correlation on the basis of radiocarbon

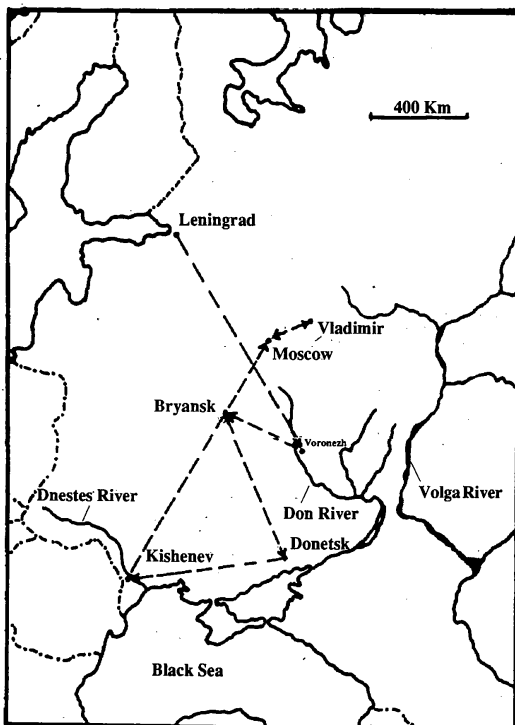
dates alone. Whereas charred bone is considered to be a notoriously poor material for radiocarbon dating by western standards, there simply is no wood charcoal at many sites. The next approach to radiocarbon dating at such sites should be an attempt to obtain specific amino acid dates on well-preserved unburned bone.

Regarding lithic technology, some sites have microblades, some macroblades, and most have both. Pointed blades are common to many sites and shouldered points on blades occur at several sites. Kostenki I, level 5, and Sungir have similar triangular bifacial projectile points. If the dates of 33,000 yrs B.P. at Kostenki and 25,000 yrs B.P. at Sungir are correct, they imply that this type of projectile point was in use for at least 8000 years. In any case, refined bifacial flaking goes back to at least 30,000 yrs B.P. in this part of the world. The quantity, quality, and variety of worked bone and ivory is outstanding. Pregnant female figurines appear to be common, as are decorative designs on bone and ivory tools. Red ochre apparently played an important role in ceremonial affairs, particularly human burials. All things considered, the Upper Paleolithic of European Russia represents a relatively high degree of technological sophistication and adaptation to varied climatic regimes over about 25 millennia. These people appear to have been every bit as advanced as their contemporaries farther west in Czechoslovakia and France. A question yet to be answered is where

"Where can we show our colleagues Paleolithic sites with the degree of preservation and protection displayed by some of the Soviet Paleolithic sites?"



(From left) Olga Soffer, George Frison, Louis Binford, Elia Borzyak, and C. Vance Haynes examine bone and antler tools from the pre-Pauldorf site of Klimautsi, located 60 km up-river from Kosouts. (Photo courtesy of C. V. Haynes)



Map shows areas visited by American archaeologists during recent Soviet Union site tour.



Soviet scientist N. Praslov explains Kostenki I to (from left) C. V. Haynes, B. Bradley, L. Davis, G. Frison, C. Gamble, L. R. Binford, O. Soffer, and (far right) J. Adovasio. (Photo courtesy of C. V. Haynes)



Mammoth bone house at Kostenki 11. (Photo courtesy of C. V. Haynes)

in the morning and Moscow University in the afternoon, where Dr. M.D. Gvozdozer showed us more spectacular bone and stone artifacts in the Museum of Anthropology. These are from the 16,000 to 23,000-year-old Avdeev site on the Sejm River, 250 km WNW of the Kostenki-Borshevo region.

did this sophistication originate?

The organization for the trip was outstanding and the accommodations excellent. The luggage of the participants was so well handled that we soon realized there was no need to fear

(Continued on page 7)

UPCOMING CONFERENCES

December 27-30, 1989 American Society of Zoologists Joint Annual Meeting, Boston, MA

Contact: Mary Adams-Wiley, Executive Officer, American Society of Zoologists, 104 Sirius Circle, Thousand Oaks, CA 91360 Tel. 805-492-3585

December 27-30, 1989 Archaeological Institute of America, Annual Meeting, Boston, MA

Contact: Joan Bowen, Director, AIA, 675 Commonwealth Ave., Boston, MA 02215 Tel. 617-353-9361

January 11-13, 1990 Society for Historical Archaeology, Tucson, AZ

Contact: Edward Staski, Program Chair, Department of Sociology/Anthropology, Box 3BV, New Mexico State University, Las Cruces, NM 88003

March 22-25, 1990 Language and Prehistory in the Americas Boulder, CO

The conference will treat current issues in diachrony and genetic classification of the languages native to the Western hemisphere. Contact: Professor Allan R. Taylor, Department of Linguistics, Campus Box 295, University of Colorado, Boulder, CO 80309-0295 Tel. 303-492-2912

March 29-April 1, 1990 Northeastern Anthropological Association Annual Meeting, Burlington, VT

Contact: Stephen Pastner, Program Chair, Department of Anthropology, University of Vermont, Burlington, VT 05405-0168 Tel. 802-656-3884

April 2-6, 1990 International Symposium on Archaeometry, Heidelberg, Germany

Symposia include: dating of organic and inorganic materials; prospecting; provenance studies; technology; mathematical and statistical methods; one-day theme session on chronology and environment of early man. Contact: Archaeometrie, E. Pernicka, Max-Planck-Institut für Kernphysik, Postfach 10 39 80, D-6900 Heidelberg, Federal Republic of Germany

April 4-6, 1990 Climate Change on the Great Plains, Lincoln, Nebraska

Contact: Ken Dewey, Center for Great Plains Studies, 1213 Oldfather Hall, University of Nebraska, Lincoln, NE 68588-0314

April 16-20, 1990 Materials Research Society Spring Meeting: Material Issues in Art and Archaeology San Francisco, CA

Contact: Pamela Vandiver, Research Physical Scientist, Smithsonian Institution Conservation Analytical Lab, Museum Support Center, Washington, DC 20560 Tel. 301-238-3700

April 18-22, 1990 Society for American Archaeology, 55th Annual Meeting Las Vegas, NV

Contact: SAA, 808 17th St. NW, Suite 200, Washington, D.C. 20006 Tel. 202-223-9774

April 19-22, 1990 American Association of Geographers Annual Meeting Toronto, Ontario, Canada

Contact: AAG, 1710 16th St. NW, Washington, D.C. 20009 Tel. 202-234-1450

May 21-25, 1990 International Council for Archaeozoology, 6th International Conference, Smithsonian Institution, Washington, D.C.

Special session: Approaches to Faunal Analysis: Past, Present, and Future; also regular sessions; one- and two-day workshops.

Contact: ICAZ, Dept. of Anthropology, MMNH, Smithsonian Institution, Washington, D.C. 20560

May 28-June 1, 1990 Sixth International Conference on Hunting and Gathering Societies Fairbanks, AK

Contact: Linda Ellanna, CHAGS 6, Anthropology Department, University of Alaska, Fairbanks, AK 99775

June 4-6, 1990 First Joint Meeting CANQUA/AMQUA, Waterloo, Ontario, Canada

Contact: Alan V. Morgan, General Chairman, Waterloo 1990, Quaternary Sciences Institute, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario Canada N2L 3G1 Tel. 519-885-1211(X-3231)

July 1-7, 1990 Society for the Study of Evolution Annual Meeting St. Louis, MO

Contact: Dr. Barbara A. Schaaf, SSE Executive Vice-President, Department of Biology, Washington University, St. Louis, MO 63130 Tel. 314-889-6822

October 8-12, 1990 Fifth Australasian Remote Sensing Conference Perth, Australia

Contact: Golden West Conventions, PO Box 411, West Perth, Western Australia 6005

(Continued from page 6)

its going astray. The organizers of the exchange deserve a high degree of praise and gratitude for creating a milestone in US-USSR cultural exchange. No small part of this is due to the unique position, ability, and character of Olga Soffer.

Now the American side is faced with the problem of matching Soviet efficiency and organization. This will not be easy, considering the statistical probabilities regarding airline schedules and baggage handling! And where can we show our colleagues Paleoindian sites with the degree of preservation and protection displayed by some of the Soviet Paleolithic sites? This exchange is titled "Upper Paleolithic and Paleoindian Adaptation," yet there are no on-site archaeological displays in America other than classical sites and a few Archaic sites.

Presently, the best exhibition is that at Hot Springs, South Dakota, where Larry Agenbroad has done a remarkable job in obtaining local support for a fabulous and exciting display of mammoth bone. Whereas the site is without cultural remains, it is nevertheless of archaeological interest for just this reason, as it is the same age as the Upper Paleolithic sites of the Old World. It brings home the fact that if people were in the New World at this time, they were very few in number, essentially invisible archaeologically.

Between now and the Soviet visit in 1991, if a Paleoindian site with an existing living floor or bone bed could be opened up, it would be an ideal site to show our Soviet colleagues. The closest similarities to the Soviet Upper Paleolithic sites were the remarkable bone beds at such sites as Blackwater Draw, Jones-Miller, Hudson-Meng, Colby, and Olson-Chubbuck, but all have been removed with no on-site display remaining.

In spite of the efforts and desires of a few individuals, no Paleoindian sites have ever been preserved for posterity and provided with an interpretive center. This is the most neglected phase of our national prehistoric heritage and one that would have tremendous popular appeal.

MAMMOTH TRUMPET

...Upcoming Conferences
...New References and Resources
...Suggested Readings
...and more

SPECIAL OFFER FROM THE SMITHSONIAN THE ARCTIC OCEAN AND ITS COAST IN THE CENOZOIC ERA

A.I. Tolmachev, editor

This volume is concerned with problems of the origins, evolution, and paleogeography of the Arctic Ocean and its coast during the Tertiary and Quaternary periods. Much emphasis is placed on the evolution of modern Arctic flora and fauna, both terrestrial and aquatic. These problems are discussed on the basis of hydrological, paleontological, biogeographical, climatological, and archaeological data in 84 brief papers originally presented at the All-Union Symposium on the Cenozoic History of the Polar Basin and Its Influence on the Development of the Landscapes of the Northern Territories, held in Leningrad in 1968.

To order, multiply the number of books ordered by the shipping rate to their destination. Make checks payable for that amount (U.S. funds only) to: the Center for the Study of the First Americans; address: 495 College Avenue, Orono, Maine 04473. Include your name and shipping address. Please allow 6-8 weeks for delivery.

Originally printed in Russian in 1970, this book has recently been translated into English and published by the Smithsonian Institution Libraries in cooperation with the National Science Foundation with funds made available by the Foreign Currency Program. Through special arrangement with the Smithsonian Institution, the Center for the Study of the First Americans has obtained a limited number of copies of this book, which we will distribute on a first-come, first-served basis while supplies last. The book itself is free. You pay only the shipping and handling. Inside U.S. - \$3.00, Canada - \$5.00, Mexico - \$7.00, outside North America - \$13.00.

NEW REFERENCES AND RESOURCES

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(Continued from page 2)

river rocks and clay, at a depth of 120-130 cm. In addition, the teams moved up the hill from Everson Creek. At this location, called Mammoth Meadow II, a backhoe dug trenches to expose deep stratigraphy that could be compared with that of the Mammoth Meadow I pits.

Perhaps the most interesting find of this past summer was the further excavation of the Cody layer, which was first exposed in 1987 and 1988. Named for a site near Cody, Wyoming, this complex is dated between 10,500 to 9,300 yrs BP at other sites. The density of the lower component of the Cody layer at Mammoth Meadow — up to 5-10 cm in places — suggests extensive use of the Everson Creek Quarries during Cody times.

There are two major classes of Cody projectile points: Eden points and Cody points. Eden points are long and narrow, with a center ridge, diamond cross-section, and a distinctive pattern of parallel flaking. These points are 3.5 to 6 inches long. In contrast, Cody points have a wider blade, a small stem, and basal edge grinding, but not a diamond cross-section. Some archaeologists believe that Cody points were hafted knives, while Eden points were lanceolate points that were set in a socket and haft system for hunting large game animals.

In addition to projectile points, the Mammoth Meadow Cody complex yielded large end scrapers, and, Bonnichsen says, something new: "Blade cores and blades. These people made blades reminiscent of those of the Upper Paleolithic in

a site where they made thousands of artifacts," Bonnichsen says.

In addition to tools, the excavations of the Cody layer uncovered three patches of red ochre. Ochre, a pigment derived from hematite, or iron oxide, was often used by prehistoric peoples in ceremonial ways. The excavations produced isolated tools covered in red ochre, including two points. Bonnichsen suspects freshly made tools were coated with red ochre before they were exported from the quarry.

At the Mammoth Meadow II test excavation, one of the trenches contained a concentration of blades and flakes covered with red ochre, while in another, the team found charcoal from a surface hearth with ochre on both sides of it. Bonnichsen believes people may have been putting red ochre in the hearth. "So I was left wondering whether they were processing red ochre, and that's what the charcoal-ochre association signified, or if the charcoal and ochre had somehow gotten mixed. I suspect that they may have been processing the ochre in some way."

Because there are potential local sources of red ochre, Bonnichsen is going to have the ochre from the site analyzed chemically to try to trace it back to a given source. "It seems to occur on the site in pockets," he says. "My feeling is that there are little patches where people processed the ochre and then dipped their tools in it. We found a lot on the blades and flakes, but also, we found real concentrations, patches 30 or 40 cm across and 5 to 8 cm thick. My initial hunch is people were giving tools life. Red is a very emotional color, and red ochre almost always signifies life and blood. Another equally plausible explanation, suggested by flintknapper, Gene Timus, is that the ochre was used as an abrasive for platform preparation."

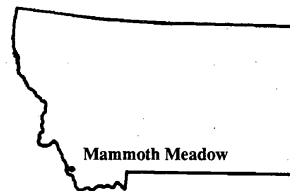
At the end of the summer, team members packed the artifacts, bone, charcoal, and other samples and shipped them to the University of Maine. Some of these samples are being analyzed at the University, while others have been sent to various specialists throughout the country. The kinds of studies underway include radiocarbon and thermoluminescence dating, and pollen, sediment, soil, lithic, faunal, and hair analyses. The multidisciplinary scope of these investigations will enable Bonnichsen and his team to reconstruct the environmental history of the site, as well as look at human adaptation through time.

This winter, Eric Grimm of the Illinois State Museum in Springfield will take pollen core samples from lakes near the site area to determine vegetational changes in the immediate region. Geologists Mort and Joanne Turner, Institute for Arctic and Alpine Research, Colorado, are currently studying the glacial geology of the region to better understand the history of climatic change in the site area, while soil and sediment analyses by Marvin Beatty of the University of Wisconsin will provide insights into the depositional context of Mammoth Meadow. Hair-analysis expert Charles Bolen is presently identifying hair samples collected from the site. These samples will add more information about the kinds of fauna in existence at different times in the Everson Creek area.

Three University of Maine graduate students are also involved in the project. Diane Douglas is examining changes in tool styles and production patterns through time at the site; Art MacWilliams is comparing two quarry sites from the Everson Creek locale; and Bill Stanyard is studying artifacts from the Cody complex level at Mammoth Meadow.

The information from these studies will be brought to bear on the central question of how prehistoric peoples adapted to environmental change. Ultimately, Bonnichsen says, the question is "How do we track these people through time? Part of what we want to do is look very carefully at the full inventory of artifacts and the techniques used to make artifacts. The shapes of tools change, and once they change, how do you track something if the forms aren't similar? You can't, so you have to look at technology."

"There are distinctive ways tools are made. We can look



Mammoth Meadow

at the thinning procedures on bifaces, at how the scrapers were made, how cores were set up, and compare assemblages from each level with both earlier and later peoples. Ultimately in lithic technology there are hundreds of decisions to be made. A place like Everson Creek provides a record of the history of decision-making and how people made artifacts.

"The question is, 'Do you get changes in decision-making that correlate with major climate changes?' Climate change drives shifts in the biota, and you would assume that technology would shift then. That's one of the key hypotheses we're looking at."

Speaking of the Cody layer in particular, Bonnichsen notes that "The Cody complex contains thousands of tools. The lower component of this level will have been laid down in a short period of time. So we're going to get some definitions for Cody

in one geographic area in terms of the range of variability in Cody artifact production, and we can compare that with earlier and later time periods. . . . This is the beauty of working with these workshops, because you get big samples of the full range of tool producing behavior from core preparation to the completion of finished artifacts."

As with virtually all archaeological sites, the South Everson Creek and Black Canyon site is vulnerable, and not just to human maltreatment. The site is in the middle of cattle country, and the cattle that roam over the site cause severe damage. Graduate student Diane Douglas took flakes made by Bonnichsen's own modern-day flintknapping and laid them out in ten study plots. In seven of the plots, over 30-40% of the flakes were broken, and some were displaced as far as fifty feet by cows.

Unfortunately, the site is also vulnerable to the damage done by some human beings. "We are working with the Bureau of Land Management to protect the site," Bonnichsen says. "The BLM is ultimately the guardian of archaeological remains on public lands. . . and they're developing a cultural resource management plan to protect and conserve the site."

In addition, "The site is not fully protected, that is, mining law takes precedence over cultural resource management law. Because this region is experiencing a Twentieth Century gold rush, we put mining claims on the site." These claims will protect the site from anyone mining it.

Noting that looters in the past few years have "potted"

the site, pulling artifacts from the walls of the pits, Bonnichsen says, "It just points out how big a job we have to educate people about the importance of archaeology. How else are we going to learn about our human heritage?" - Nancy Allison



A Cody point from Mammoth Meadow. (Photo courtesy of R. Bonnichsen)



Graduate student Diane Douglas and Earthwatch volunteer Richard Fullerton remove a wall at Mammoth Meadow. (Photo courtesy of R. Bonnichsen)

Europe. The blade cores are preformed for the removal of blades up to 15 cm in length. Wide blades were selected for biface production. A lot of bifaces made in this fashion are broken, and these will be refitted."

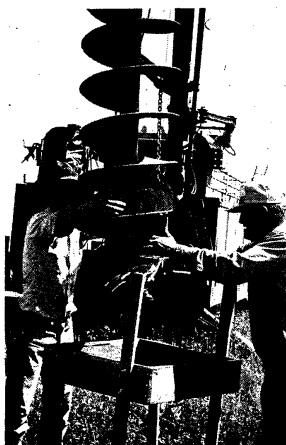
Because Cody and Eden points have been found in a series of bison kill sites, some archaeologists believe the Cody peoples specialized in hunting bison. Bonnichsen notes that the points found at Mammoth Meadow I and II were recovered in association with deer, elk, and beaver, as well as the remains of a large form of bison. This does not disprove the theory that the Cody peoples specialized in bison hunting: "Just because we have these taxa at our site doesn't mean they [the Cody people] were not primarily bison hunters."

The Cody peoples are especially interesting to archaeologists because they lived right after the time of the extinction of the large mammals — mammoths, horses, camels, giant sloths, and other megafauna. The extinction of these large mammals began approximately 14,000 yrs BP, with some animals surviving until about 10,800 years ago.

Different theories exist to explain the demise of these mammals. While some scholars believe they were hunted to extinction by the prehistoric peoples of America, Bonnichsen believes that, although humans can not be eliminated from the equation, the extinction was probably caused by a drastic change in the climate of North and South America. This change took place at the end of the last Ice Age. According to Bonnichsen, the culture of the Cody people was a post-extinction response.

Bison survived the extinction, but their competitors — mammoth, horse, and camel — did not. The development of new grasslands and elimination of competition allowed bison populations to expand. During this time, people devised new adaptive strategies—finding alternative sources of food and developing new technologies.

What makes Mammoth Meadow unique is that it is the place where the Cody hunters went to gear up before they went on bison hunts. This is different from the usual Cody site, where archaeologists may find a handful of tools. "We're looking at a place where people came before they went out on the communal game hunts, and we're looking at



George (right) and Leo Cremer use a power auger to explore for deeply stratified sites. (Photo courtesy of R. Bonnichsen)