

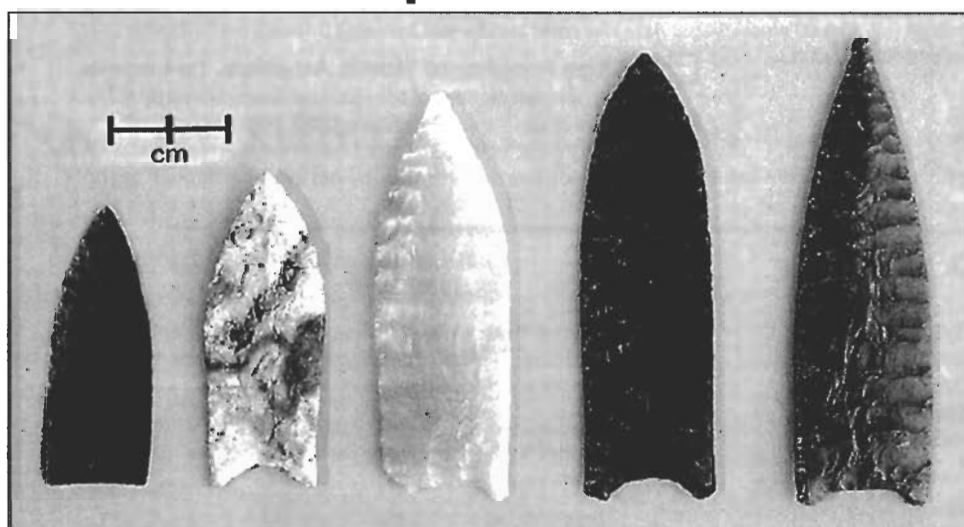


MAMMOTH TRUMPET

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Center for the Study of the First Americans
355 Weniger Hall, Oregon State University
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Clovis Contemporaries



Existence of distinctly different technological traditions in the Americas dating to the time of Clovis is evidence that Clovis people do not represent a single founding population, three well-known archaeologists argue. Our report begins on **page 5**. These five projectiles from Montana's Mill Iron site (**page 8**) are not Clovis, but they date approximately to the same time.

The Center for the Study of the First Americans fosters research and public interest in the Peopling of the Americas. The **Center**, an integral part of **Oregon State University**, promotes interdisciplinary scholarly dialogue among physical, biological and social scientists. The **Mammoth Trumpet**, news magazine of the **Center**, seeks to involve you in the late Pleistocene by reporting on developments in all pertinent sciences.

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Footprints or Ripples?



MARGARET A. JODRY

Immigrants who moved across Beringia would have found wet landscapes such as this, along the Kobuk River in northwest Alaska, difficult to negotiate on foot except when the water was frozen—perhaps as in the stylistic rendition in our logo above. Archaeologist Pegi Jodry, noting that today's Native Alaskans travel around this area in water craft, suggests that archaeologists should consider that Paleo-Americans may have been proficient at making and using boats. **Article page 17**

INSIDE

5 The implication of Clovis contemporaries

Existence of technological traditions dating to Clovis time indicates Clovis people were not a single founding population. Three archaeologists analyze the evidence and conclude that the Americans were peopled more than once by different human groups.

8 Analyzing Goshen

Archaeologist George Frison reviews the discovery and analysis of a tradition that dates to the age of Clovis.

11 Alaskan origins?

Archaeologist Ted Goebel looks to Alaska for the predecessors of Clovis.

13 Fluted points in the far north of New Hampshire

Conventional wisdom said fluted points didn't belong in the North Country of New Hampshire, but some dedicated and well-trained volunteers have confirmed a Paleoindian presence dating to soon after glaciers melted.

2 Human biologists are refining data that relate to peopling of the Americas

20 Coming conferences

New Biological Research May Influence Theories

Several promising new directions in biological approaches to First Americans research were evident in papers presented at the April meetings of the Human Biology Association and American Association of Physical Anthropologists in San Antonio. These studies ultimately may influence theories on the peopling of the Americas; however, much of this re-

search represents work in progress. The research includes studies using ancient and modern DNA and skeletal studies of populations of the Americas and Asia, past and present. Some is new research, but some is a continuation of projects that have been reported in previous issues of the **Mammoth Trumpet**.

Two presentations by Argentinean sci-

entists provided insights into genetic differences between modern and early human populations of northern Argentina. The team of D. A. Demarchi and A. J. Marcellino of the Cátedra de Antropología of the Universidad Nacional de Córdoba, and G. M. Panzetta-Dutari and C. C. Motran of the Departamento de Bioquímica Clínica of the same university, studied DNA sampled from several groups in northern Argentina. Using mitochondrial analysis, by which genetic researchers study the hereditary but non-chromosomal molecules of DNA found by the hundreds in the mitochondria of cells, they focused on the diagnostic restriction sites and the 9-base-pair deletion in region V of mitochondrial DNA, or mtDNA. (The tiny, circular mtDNA mol-

Search Is On for New Editor


The Center for the Study of the First Americans is seeking an editor for the **Mammoth Trumpet** starting in October. It's a fascinating part-time position for the right person. The current editor operates under personal-services contracts with the CSFA and Oregon State University Foundation.

The candidate must be interested in the scientific challenges of the initial peopling of North and South America. A good understanding of science and the scientific process is necessary. An understanding of, and some experience in, one or more specific fields including archaeology, anthropology, paleontology, geology, human biology, paleoecology would be useful.

"It's been a great experience," says Don Alan Hall, who will retire the editorship Oct. 1 after nine years. "I've gotten to work with dozens of fascinating and wonderful people, but the fact is that I'm burning out. The **Trumpet** needs new ideas and new energies."

The candidate should have some knowledge of journalism and an interest in making complex subjects accessible to the widest possible audience. She or he should have a good knowledge of electronic communications and digital production techniques, and have the ability to work well (and remotely) with printers, desktop publishers, writers and graphic designers, as well as scientists—both amateur and professional.

The candidate must be able to organize schedules to assure each issue is delivered, properly labeled, to the post office on schedule. Knowing how to get

necessary tasks accomplished can be more important than knowing how to do them. Contact: **Editorial Search**, CSFA, 355 Weniger, Oregon State University, Corvallis OR 97331. 



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ecule is more than 16,000 subunits in circumference and each subunit is known as a base pair or bp.) In their paper, "Mitochondrial DNA Haplogroups in Amerindian Populations from the Gran Chaco," the Argentineans reported finding all four major lineages (haplogroups A, B, C, and D). The highest frequencies were B (35 percent) and D (37 percent); C (11 percent) and A (10 percent) represented lesser frequencies; however, 6 percent of the more than 150 individuals in their sample did not fit into any known categories. Their findings are similar to those from other studies in the region and thus suggest similarity among contemporary local groups.

A related paper by three of the same investigators (Demarchi, Marcellino, and Panzetta-Dutarré), plus S. E. Colantonio of the Cátedra de Antropología of the Universidad Nacional de Córdoba, reported that the 9-bp deletion, which helps to define haplogroup B, was not present in any of their 24 samples of ancient DNA from Argentina, some of which are as old as 8,000 years. For their samples they used a number of materials

including teeth, hair, and bone. They reported that other DNA studies of ancient South American material similarly lack lineage B. Their work with these materials and interpretation of the findings are continuing.

A Linguistic-Genetic Paradox

Kansas scientists reported to the Human Biology Association on gene-frequency data from two populations of Asia and America that are apparently linked by linguistic data. An article ("Linguistic Evidence Suggests Point of Origin for Na-Dene," *Mammoth Trumpet* 15:1) reported linguist Merritt Ruhlen's suggestion that linguistic analysis indicates a link between North America's Na-Dene speakers, now largely in the Northwest but also in Oregon and in the Southwest, and Yeniseian speakers, the Kets of Central Siberia. However, Kets and Na-Dene speakers were found to be very different genetically. The Kets were genetically similar to groups of central Siberia that speak very different languages, while the Na-Dene speakers were most similar to other local groups from North America.

Researchers K. Melvin, R. Rubicz, and M. H. Crawford of the University of Kansas concluded that at least in this case linguistic similarity did not predict a biological or genealogic relationship. Ruhlen's hypothesis, they concluded, may pertain to ancient cultural relationships, but genetic data may reveal more about recent biological relationships.

Evidence from the Roof of Asia

Two teams of DNA researchers, with a long history of working with DNA from modern populations to learn more about the genetic heritage of North American peoples, reported on findings involving data from the Himalayan region. Tibet and Nepal are on the periphery of today's East Asian populations, but this geographic area was crossed by old trade routes that have linked East Asian populations with peoples of Siberia and South Asia and, more distantly, with Middle Eastern, African, and European populations. Because of the remoteness of the high Himalayan areas there is the possibility that some groups in Tibet and Nepal may have preserved some biologi-

America Past, America Present: Genes and Languages in the Americas and Beyond

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Aspects of the prehistory of the Americas currently remain little understood, with suggested dates for the first human colonization varying widely between 40,000 and 14,000 years ago.

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C. Loring Brace makes craniofacial measurements of a skull in his laboratory at the University of Michigan.

cal features or genetic traits similar to the populations dispersing from north Asia into the Americas.

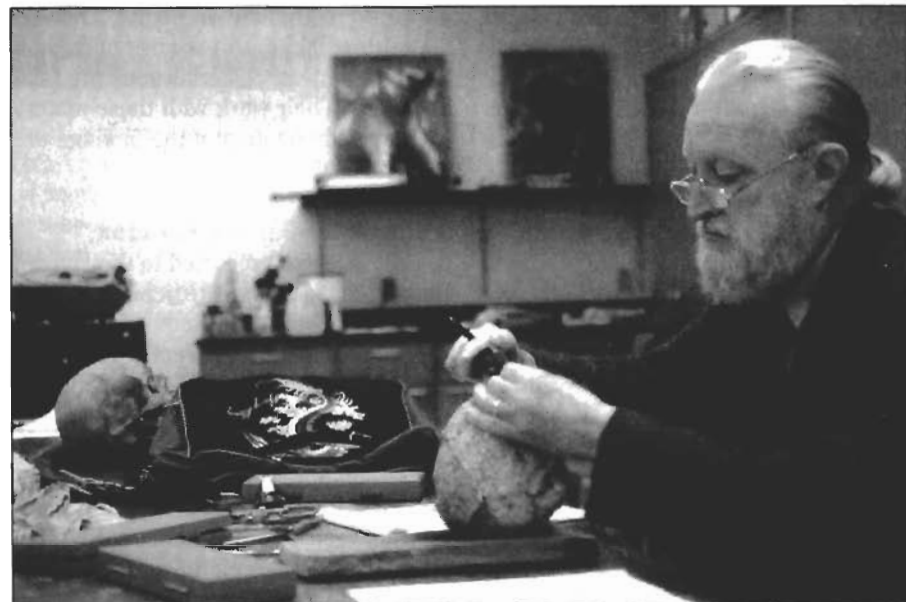
Andrew Merriwether of the University of Michigan delivered the paper "Mitochondrial DNA Sequence Variation in a High Altitude Population in Tibet" for his team, which included B. Kemp of the University of California at Davis and C. M. Beall of Case Western University. In 354 DNA samples taken from a population of 773 persons in one village near Lhasa, 108 independent maternal lineages, including 69 unique haplotypes, were identified. The team made comparisons with other Asian samples from Mongolia and other parts of China. The researchers found all the lineages common in North America as well as some that are unique to Asia. The Tibetans' DNA lineage frequencies shared some features with samples from Mongolia. Dr. Merriwether also discussed issues related to teasing apart the two possible reasons for similar patterns: common ancestry and recent gene flow.

Catherine Panter-Brick, a human biologist at the University of Durham, U.K., has studied energetics and children's growth in Nepal for a number of years.



DON ALAN HALL

Now she has teamed with geneticists T. G. Schurr of the Southwest Foundation for Biomedical Research and D. C. Wallace of Emory University. Dr. Schurr presented their preliminary data from Nepal to the Human Biological Association. Their paper, "Mitochondrial DNA Varia-



UNIVERSITY OF MICHIGAN

tion in Nepalese Populations: Genetic Differences among Himalayan Ethnic Groups," is based on small samples from three ethnic groups that are affiliated with Tibeto-Burmese (Tamang and Ghale) and Indo-European (Kami) language groups. For this report, the scientists focused only on haplogroups that also occur in North America. Schurr said that haplogroups A and C were found in the Tamang sample, and A in the Ghale sample, while both B and C were found in Kami. Unlike Tibetan haplogroup data that Schurr used for comparison, all

that the peopling of the Americas was a much more complex process than had previously been thought. Analysis of additional Asian populations, farther distant from routes directly from Asia to the Americas, could help to clarify dispersals and population movements.

Brace and Colleagues Report on Research

C. Loring Brace of the University of Michigan has been studying craniofacial

Geneticist T. G. Schurr ►
of the Southwest Foundation for Biomedical Research answers audience questions at the Clovis and Beyond Conference. Beside him is session moderator D. Gentry Steele, Texas A&M human biologist.

◄ **Physical anthropologists**
Michael H. Crawford of the University of Kansas, left, and Richard Jantz of the University of Tennessee discuss research at the Clovis and Beyond Conference last fall.

three of the Nepali samples included individuals with some haplogroups commonly observed in Europe. Earlier research reported by Schurr, for example in his paper "A Molecular Anthropological View of the Peopling of the Americas" given at the Clovis and Beyond Conference in Santa Fe last fall, has suggested



DON ALAN HALL

measurements of both living and prehistoric populations to understand settlement of the Americas. Dr. Brace gave a preliminary report on his work at the 1998 CSFA Peopling of the Americas Conference in Portland, Oregon ("Charting the Way into the Americas," **Mammoth Trumpet** 14:1). This work by Brace and some colleagues is now bearing
continued on page 20

Clovis People Weren't Alone— And Probably Weren't The First Americans

*Archaeologists Believe the Evidence
Suggests Settlement by Different Groups*

ALL SMITHSONIAN INSTITUTION ILLUSTRATIONS COURTESY OF DENNIS STANFORD

EXISTENCE OF SEVERAL DISTINCTIVE technological traditions in the Americas dating to the time of Clovis is an important line of evidence indicating that Clovis people do not represent a single founding population. Three archaeologists—Robson Bonnichsen of Oregon State University and Dennis Stanford and Margaret A. Jodry of the Smithsonian Institution—summarized this evidence in a presentation at the Clovis and Beyond Conference in Santa Fe last fall. They conclude that archaeological data suggest that the Americans were peopled more than once by different human groups.

"We have identified several major patterns that appear to be Clovis in age," said Dr. Bonnichsen, who presented the paper, "Clovis and Non-Clovis Traditions West of the Mississippi." It was one of several presentations at the conference that analyzed what is known of Clovis, the cultural tradition named for a town in New Mexico and known to date from approximately 10,800 to 11,500 radiocarbon years ago. Bonnichsen and his coauthors described three other traditions dating back to Clovis time that have been identified in western North America: Northern Paleo-American in the Alaska-Yukon area, Intermountain Lanceolate in the Plateau and Great Basin, and

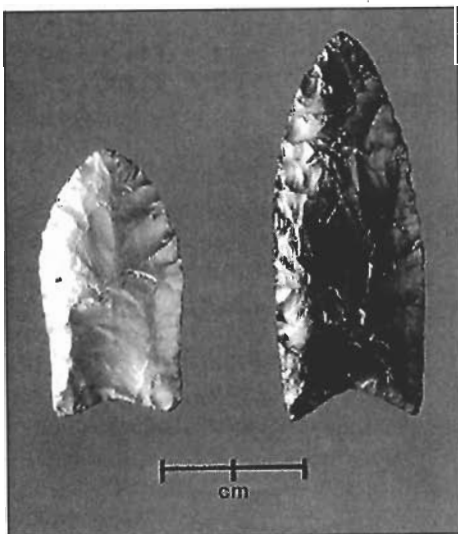
Goshen-Plainview on the High Plains along the flanks of the Rocky Mountains.

After reviewing theories of the colonization of the Americas, Bonnichsen, who is director of the **Center for the Study of the First Americans**, summarized what is known of Clovis, a tradition known for its exquisite craftsmanship. "They had a very effective hunting technology using foreshafts and fluted points." The presenters showed the conference distribution

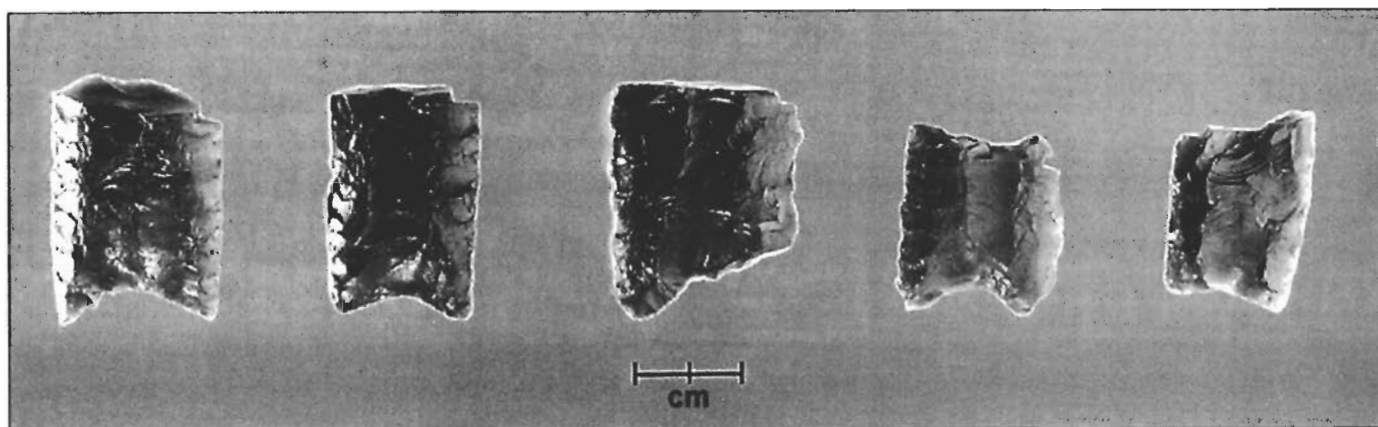
maps indicating the location of Clovis sites. "You can see that there is a concentration in the Plains and Rocky Mountain flank area, but Clovis occurs in every state in the United States," Bonnichsen said.

The Clovis people had a very interesting and well-developed technology, he said, as he emphasized the beauty of Clovis artifacts with slides of points from the East Wenatchee, Wash., cache. "These are some of the finest Clovis points that have been found. They're exquisitely made."

Clovis These two projectile points are from the Lange-Ferguson site in South Dakota.



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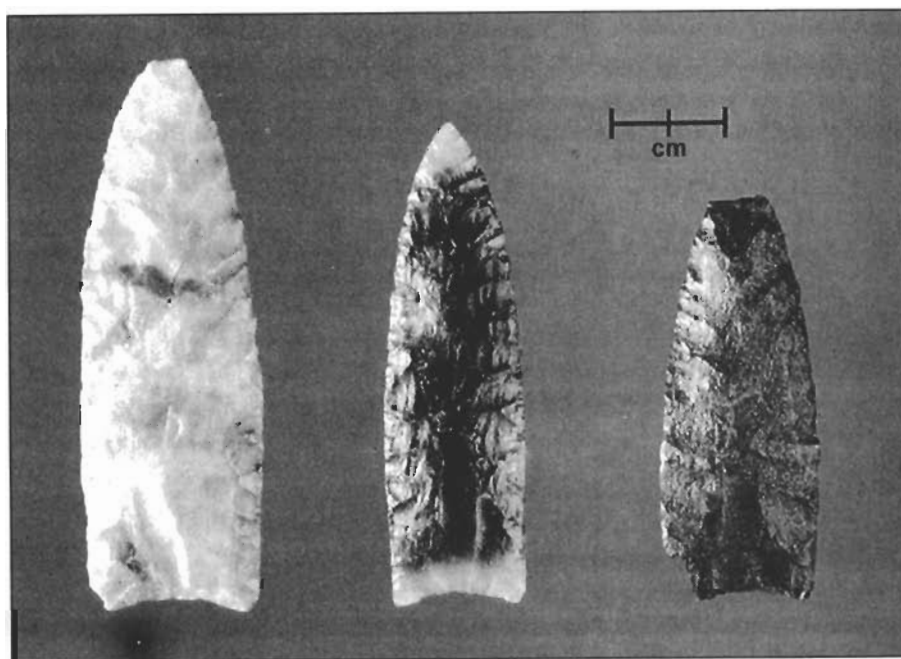
Clovis Five fluted-point bases, top, are from the Borax Lake locality of California; the three points, right, are from the Domebo site in Oklahoma; the seven artifacts, lower right, were recovered by the El Llano Archaeological Society expedition at the Blackwater Draw site in New Mexico.

Noting that Clovis technology included blades, he said that they made specialized tools from the blades and showed a slide of a spokeshave endscraper that he referred to as "a Swiss Army knife" of its time.

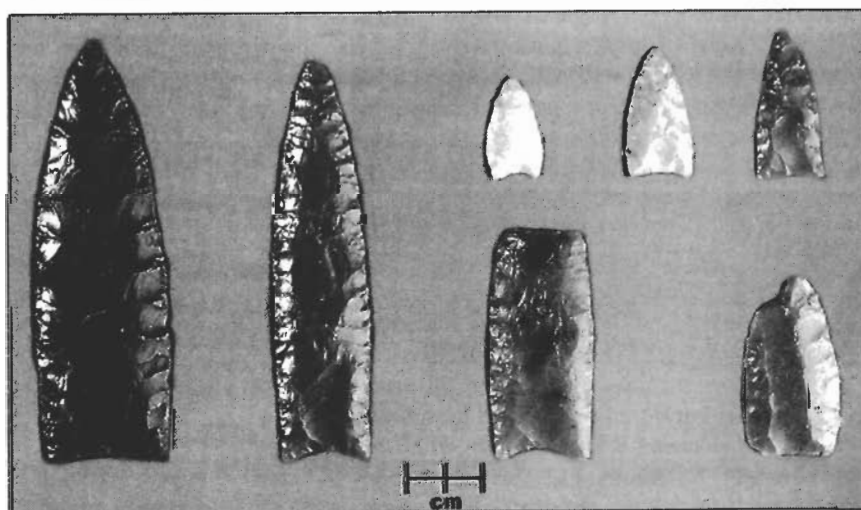
Lithic technologists such as Bruce Bradley have pointed out that Clovis flint-knappers used a thinning technology in which they would often take large flakes off the entire surface of a blank or point. Bonnicksen said the technique could produce large thin, flat bifaces that could be used as knives or modified into points.

Clovis people were also known for their exquisite bone working, said Bonnicksen, showing slides of some examples. He went on to note that they also liked beautiful raw material including quartz crystal. The Clovis tool kit, he continued, included: 1) bifacially flaked fluted points, 2) large bifaces, 3) blade cores, 4) blade cutting and scraping tools, 5) graters, 6) endscrapers and occasional burins, 7) red ochre, 8) engraved stones, 9) flaked bone, bone foreshafts and bone points, and 10) high-quality flints, quartz crystals, obsidian and other materials. Probably no single Clovis site contains all of these.

"We know that there are a number of different site types that are assigned to the Clovis pattern—habitation sites, kill sites, caches, and there's even a single



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burial site, the Anzick site." Bonnicksen noted that there is a strong orientation towards big-game hunting in many regions. "Certainly there is ample evidence they were hunting animals the size of

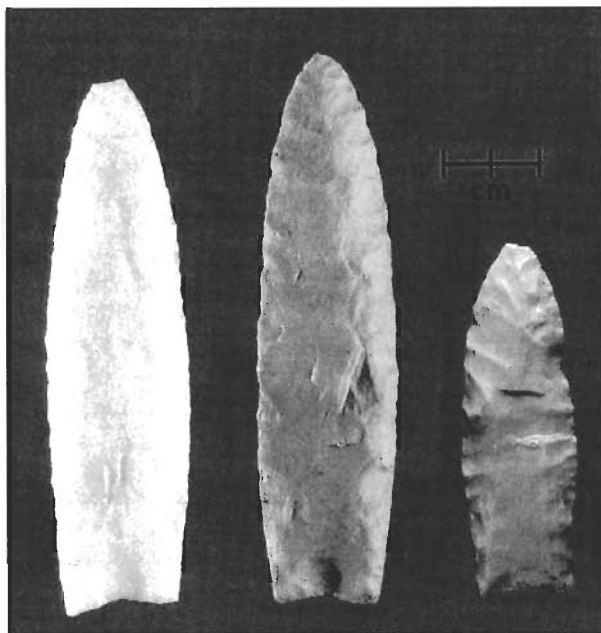
mammoths and mastodons," he said, "but that doesn't mean they weren't foraging for other things." There appears to be regional variation in Clovis adaptive patterns, he said. Undoubtedly Clovis is as

sociated with mammoths and bison, but in Texas, for example, there's association with small mammals, and in the Northeast it's likely that Clovis people hunted Caribou."

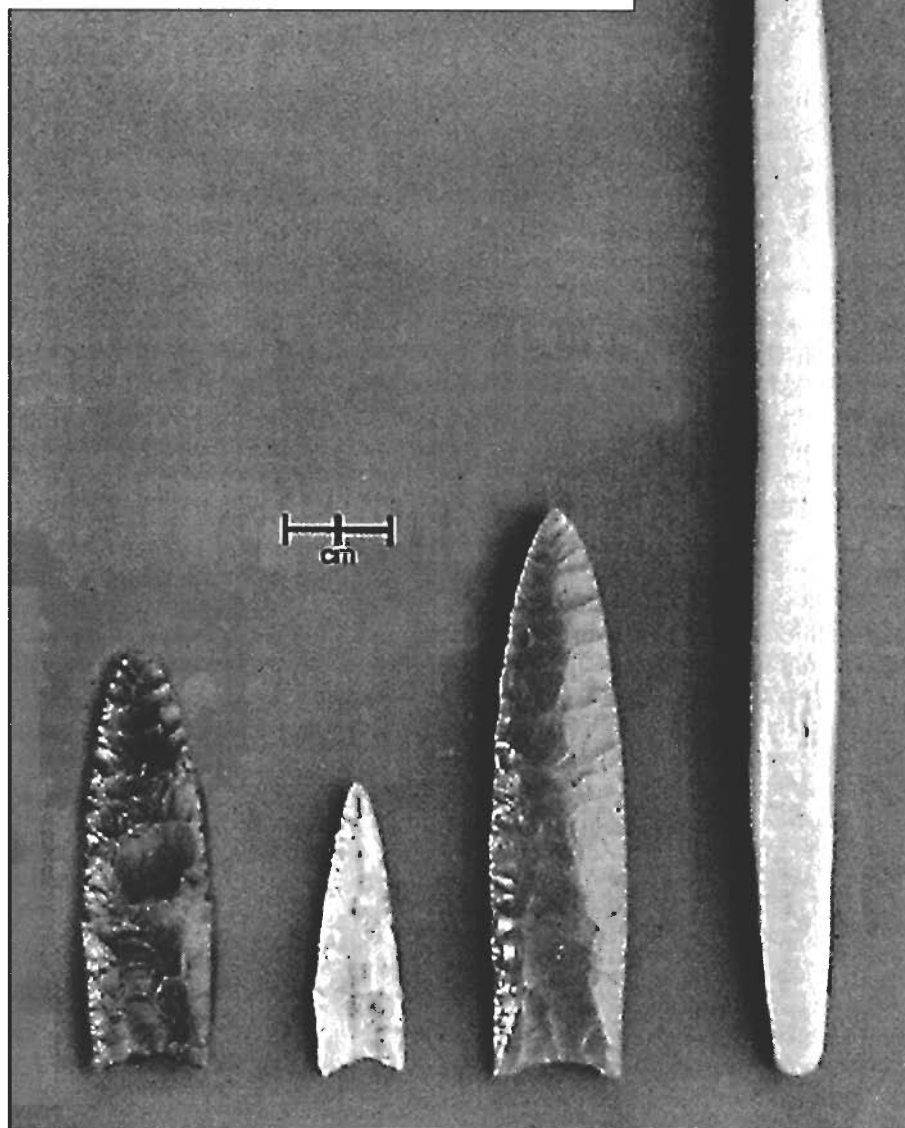
The Goshen-Plainview tradition has been found in sites along the east flank of the Rocky Mountains and out onto the Great Plains. "Goshen is the northern name and Plainview is the southern name," Bonnicksen said. "We've lumped those together because the points look very much alike." Showing slides of Goshen and Plainview points, he said that much of the knowledge of the tradition is based on the work of George Frison (page 8; also "The Frison Effect: A Career That Has Illuminated Plains Archaeology," *Mammoth Trumpet* 11:2). "You can see that these points are rather reminiscent of Clovis," Bonnicksen noted, pointing to details in the slides projected on the big screen in the Sweeney Center auditorium. "They're exquisitely made," he said, noting the thinness of the points, their lack of fluting, and their deeply indented bases. Slides of points found at a site in the Middle Park site in Colorado and the Plainview site in Texas illustrated similarities in the points from region to region.

"Typical tool kits include lanceolate points with concave bases with multiple basal thinning flakes—bifaces with reduction technology similar to Clovis." After noting that some Goshen tools were made on blades such as spurred gravers, Bonnicksen said that Goshen is not as well known as Clovis; however, the tradition appears to be associated primarily with the hunting of bison. Dates extend from about 11,300 radiocarbon years ago until approximately 9,000, he said. "It seems to cover that whole late-Pleistocene transition."

Moving on into the Intermountain Lanceolate tradition of the Intermountain West and Great Basin, Bonnicksen said that the points have been referred to in archaeological literature by several names including Parma, Western Stemmed, Western Pluvial Lake, and Haskett. "What they have in common is the fact that they're long, lanceolate points." As an example, he showed a slide of stemmed points from a site in Idaho's lower Salmon River Canyon ("Cooper's Ferry Spear Cache One of NW's Oldest



Clovis The bone shaft and three projectiles, below, are from the Blackwater Draw site in New Mexico, where Clovis artifacts were first identified. At left are three beautiful projectiles from the Miami site in Texas.



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Frison Describes Discovery of Goshen Complex

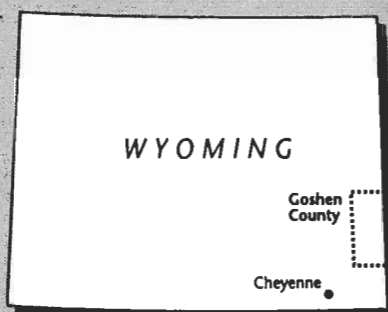
GEORGE C. FRISON, the scientist perhaps most closely associated with the Goshen complex, presented the Clovis and Beyond Conference audience a detailed account of the discovery of this early Paleo-American cultural tradition.

"The term Goshen is tied to the Hell Gap site in eastern Wyoming," he began, tracing the discovery of that site to 1959 and 1960, when George Agogino, now professor emeritus at Eastern New Mexico University, had a temporary appointment at the University of Wyoming and led an active group of young field archaeologists who became known as Agogino's Raiders. "Hell Gap is a large site,"

Dr. Frison, professor emeritus at the University of Wyoming, explained, noting that four localities extending for approximately a kilometer along Cottonwood Creek yielded Paleo-Indian cultural materials.

Initial findings at Hell Gap made it evident that the site had the real potential to answer questions concerning Paleoindian chronology, and the National Geographic Society responded with long-term support. Investigators from Harvard University and Wyoming started work there in 1962. The brother-sister team of Henry and Cynthia Irwin were the principal investigators, and C. Vance Haynes of the University of Arizona was the geologist and Agogino was a consultant.

"On the last few days of excavation in 1966, a cultural level produced tools, debitage, and a projectile point first thought to be Folsom," Frison told the audience shortly after he had been recognized by Clovis and Beyond organizers as Paleoarchaeologist of the Century. "After a close look, they decided, 'Well, it looks like it is underneath the Folsom level, so it must be Clovis.' A few days later, they decided that it was neither Folsom nor Clovis." The investigators called it Goshen for Goshen County, Wyoming. If the team had packed up three or four days earlier that season, Frison mused, "we wouldn't be saddled with the name Goshen." However,



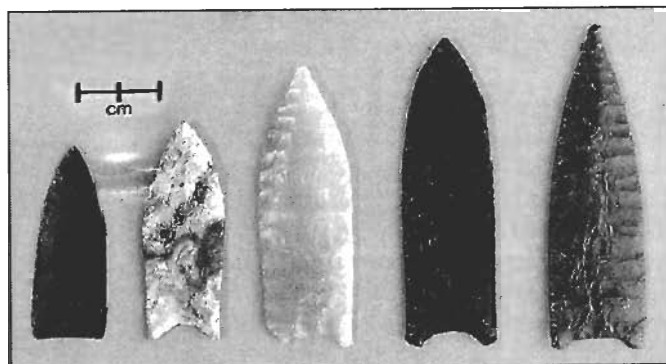
Goshen-Plainview The Mill Iron site in Montana yielded these five projectiles.

Sites," *Mammoth Trumpet* 13:4). "These are some of the older points from the Intermountain Lanceolate tradition," Bonnicksen told the conference. "They have some affinities with Lind Coulee points."

Intermountain Lanceolate points are found at many localities in the West, he said, and are far more common than fluted points. Showing slides of specimens from CSFA collections, he pointed out the long stems and noted that grinding of stems may be evident. Frequently, stems of broken points are made into burins. Even points from a single Intermountain Lanceolate site may exhibit considerable variability in their bases, varying from slightly concave to convex. "So you've got a lot of variability in the forms of these points," he said. "They're often associated with crescents, which are distinctive." Bonnicksen said that nobody knows what crescents were used for.

Radiocarbon dates for Intermountain Lanceolate sites span a great depth of time, starting in Clovis times but persisting into much later periods. Three that appear to be of Clovis age, Bonnicksen said, are Cooper's Ferry in Idaho, and Fishbone Cave and Smith Creek Cave in Nevada.

"It would appear that these people adapted to a number of local environments and habitats," he said, noting that there have been associations between Intermountain Lanceolate cultural materials and ecotones, marshes, lakesides, and other environments. "These people were exploiting lands and fish and local game animals, waterfowl. There was not the strong emphasis on big-game hunting."



Bonnicksen then turned to what he believes is one of the most complicated regions, the Alaska-Yukon area, which was not glaciated during the last Ice Age, and the tradition he calls Northern Paleo-American. He reviewed a variety of sites from Mesa on Alaska's North Slope to On Your Knees Cave on Prince of Wales Island far south in the Alaska panhandle, and showed slides depicting many examples of artifacts. From Nenana complex sites in central Alaska were examples of a variety of bifacially flaked points, some with stems and some without. He noted that the complex includes concave-base points, Chindadn points, and quite possibly microblades, "although there's some contention about this point."

Alaska, Bonnicksen said, has more than 50 fluted-point sites. The fluted points, which tend to be smaller than a lot of the fluted points from the conterminous United States, might have been associated with caribou hunting, according to some investigators. Often the points have multiple flutes that extend most of their length.



he conceded that sooner or later the puzzling typology—neither Folsom nor Clovis—would have appeared.


There were no radiocarbon dates possible from those initially discovered Folsom-Goshen levels at Hell Gap, but the investigators estimated that Goshen dated around 10,700 to 11,000 years ago. Harvard teams put in five seasons of work at Hell Gap. "It was a project that produced a staggering amount of data," said Frison, who eventually became more involved with the site himself. He said the chronology from the Hell Gap site has withstood the test of time and continues to be refined. He showed slides depicting cultural levels ranging from Clovis at the bottom up through Goshen, Folsom, Agate Basin, and several later Paleoindian traditions.

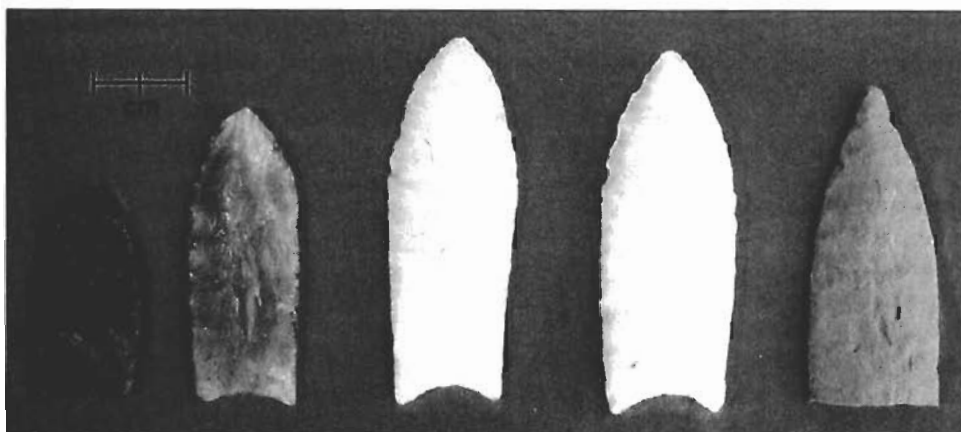
Frison also described the discovery and investigation of the Mill Iron site in southeastern Montana, which further defined the Goshen tradition. Radiocarbon dates associated with Goshen were mostly older than 11,000 years, some more than 11,500, but some less than 11,000. "I can't think of any good reason that we have to kick out the older dates," Frison said, although he suggested that there was a good possibility that the oldest could be the result of burning old logs. Such dates mean that Goshen is at least as old as the oldest Folsom evidence, and the older Goshen dates place the tradition solidly into Clovis time.

Frison told of other discoveries. At the Carter/Kerr-McGee site in Wyoming's Powder River Basin, he and his team found

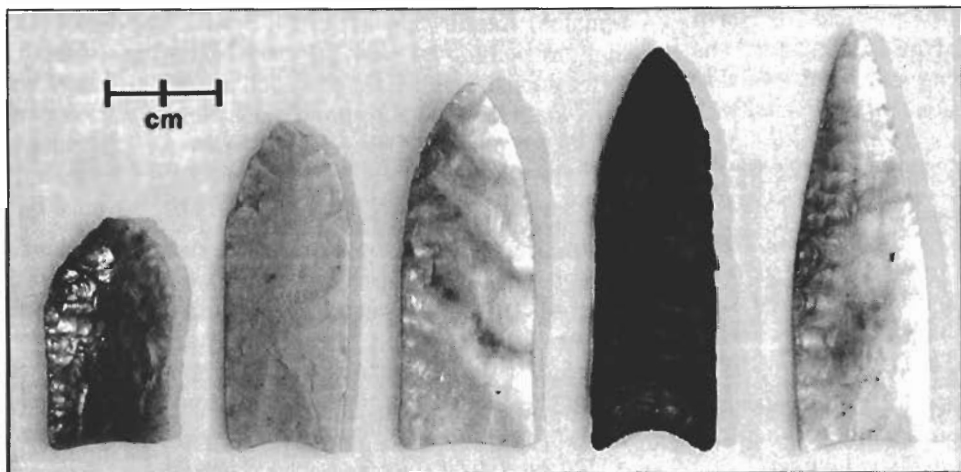
cultural material beneath the Folsom level. "We tentatively called it Clovis," he said. "Now I'm pretty sure it's Goshen." Frison and his colleagues, including C. Vance Haynes of the University of Arizona, honored by Clovis and Beyond organizers as "Geoarchaeologist of the Century," decided that the answer to the riddle of Goshen might be found by additional research at the Hell Gap site. Though the depth of the Goshen level has made it impractical to expose more Goshen material, the work has yielded a number of radiocarbon dates. "Now we have a whole sequence of dates and we're adding to them all the time," Frison told the conference audience.

Other apparent Goshen sites described by Frison included one in Colorado's Middle Park, nearly 8,600 feet in elevation. Radiocarbon dates there are in the 10,400- to 10,200-year range. He reported that another site, in Wyoming's Bighorn Mountains, yielded a very typical Goshen point associated with a 10,000-year-old date.

"Where does Goshen fit in?" Frison asked. "I don't know." But he suggested that Goshen is both older and younger than Folsom. "If these dates are correct, it looks like Goshen could have been around for a long time." Frison agrees that the Goshen tradition seems identical with Plainview, the Paleo-American tradition from the southern High Plains named for a site near Plainview, Texas. "I know no one seems to care for the term Goshen-Plainview," he told the Santa Fe audience, "but they certainly look similar." 

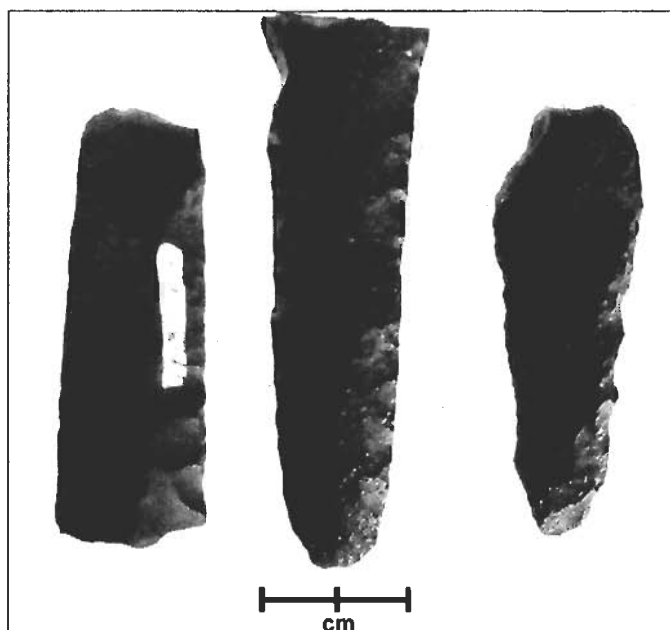


Goshen-Plainview The five artifacts at left came from a site over 8,000 feet in elevation in the Middle Park area in Colorado; the five below are from the Plainview site in Texas.

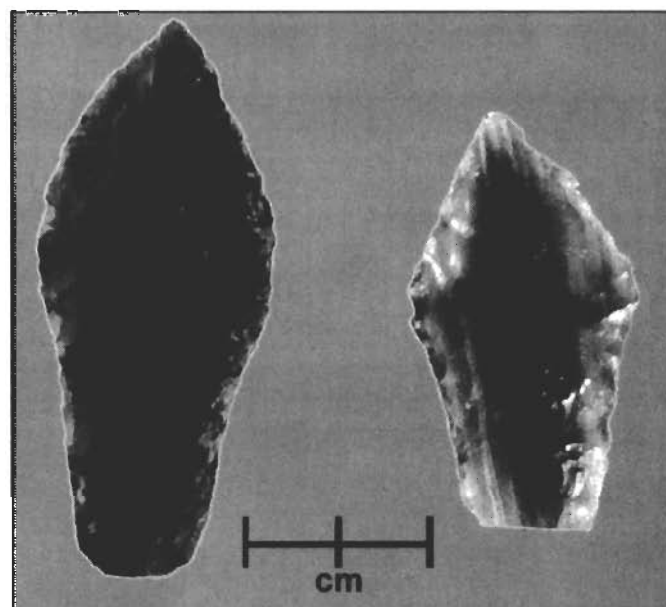
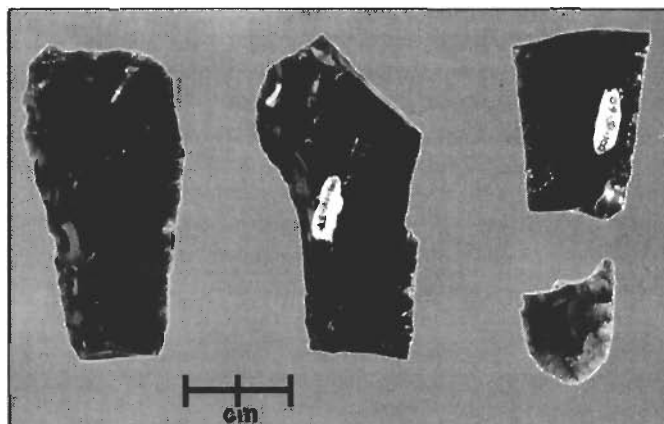


"This is a new and very interesting Paleoindian complex that's now just been worked up," he said, showing a slide of artifacts from a site known as Irwin's Sluiceway. Material from this site, worked by Dr. Stanford, includes large leaf-shaped points believed to date back to approximately 11,100 years ago.

"Another site that's very interesting is On Your Knees Cave on Prince of Wales Island, work being conducted by Jim Dixon and colleagues." Bonnicksen described the site where human remains more than 9,000 years old were discovered ("Ancient Alaskan Bones May Help to Prove Coast Migration Theory," *Mammoth Trumpet* 12:4) and showed slides of some artifacts recovered there. "This site is obviously later than Clovis, but it's about the only thing that we presently have on



Intermountain Lanceolate All these stemmed lanceolate points are from various sites in the Great Basin.




the Northwest Coast." He showed an artifact from the site's 9,200-year-old level that appears quite similar to the Western Stemmed Lanceolate points, and a worked caribou bone from the same locality dated to 10,300 years ago.

From Alaska's far north, Bonnicksen showed slides of the Mesa site worked by Michael Kunz and Richard Reanier ("Mesa's Tools Linked with Lower 48," *Mammoth Trumpet* 10:4). "They have found lanceolate points there that are very similar to some of the Agate Basin types that have been found on the Great Plains. Early dates from Mesa range back to about 11,700 years, initially causing much discussion that Mesa represented a long-awaited discovery of a precursor to Clovis, but most archaeologists are skeptical (Goebel sidebar).

"Clovis is a very interesting phenomenon," Bonnicksen concluded, "and I think that there are several competing hypotheses that could be used to explain Clovis." The presentation outlined five possibilities:

- That Clovis represents an *in situ* development which originated in North America and spread across existing North American populations. The spread of the Clovis pattern was facilitated by "climate forcing" during a drought involving profound biotic change. People adapted by intensifying their technology.
- That Clovis culture originated in the Southeastern United States out of a pre-Clovis complex, perhaps the kind of materials that are found at Meadowcroft Rockshelter, Pennsylvania, and Cactus Hill, Virginia, and they spread *westward* across North America. This is closely allied with Stanford's North Atlantic hypothesis (*Mammoth Trumpet* 15:2), which proposes boat crossings of the North Atlantic.
- That Goshen-Plainview people share a common ancestry with Clovis (the Clovis Connection hypothesis) and the sites represent an early adaptation to bison hunting.

- The Pacific Rim hypothesis, which suggests that the lanceolate point origins and the Intermountain Lanceolate pattern may represent people coming out of Asia. "Connections are very tenuous," Bonnicksen said, "but ancestors of Intermountain Lanceolate people could have come along the Pacific Rim during the last Ice Age." The Intermountain Lanceolate culture originated in the west during the Clovis drought, and Bonnicksen noted, "early western skeletal remains, Kennewick, Wizard's Beach, and Spirit Cave mummy point to an Asian ancestry." Showing a slide of an Ainu canoe, he suggested that such a craft could have been used in the late Pleistocene to move along the biologically productive continental shelf. "This is a very rich ecological area," he said, indicating the North Pacific rim on a map, "it is an area that is logical for people to have expanded into."
- The northern Paleo-American hypothesis, which holds that groups crossed the Bering Land Bridge at different times when sea level was lower and there wasn't too much glacial ice. Alaska's Nenana complex, Bonnicksen said, appears to be related to the Dyuktai microblade complex of northeast Asia. "It is likely that fluted points and lanceolate point patterns may have originated in the Great Plains and moved up the ice-free corridor to Alaska in late Ice Age time." 



'One-Arrow Hypothesis' Retains Supporters

ARCHAEOLOGIST TED GOEBEL offered the conference audience a more traditional explanation for the diversity in stone-tool technology outlined by Bonnicksen, Stafford, and Jodry. The University of Nevada-Las Vegas scientist, who has done much research in Alaska and Siberia, believes that Alaska offers sufficient evidence of Clovis origins. In a Clovis and Beyond presentation titled "Ice Age Beringia and Human Colonization of the Americas: A New View from the North," he carefully detailed the archaeological evidence from Alaska sites including Mesa on the North Slope, and those in Central Alaska that represent the Denali and Nenana complexes.

Mesa, once heralded as the oldest proof of humans in the Americas, may actually be young enough to represent evidence of Great Plains traditions moving north with the melting of glacial ice, he said. Showing a slide depicting more than two dozen radiocarbon dates from the Mesa site, Dr. Goebel emphasized that the majority range between 9,800 and 10,200 years ago. A few dates in the 11,500- to 11,700-year range, he noted, received the most publicity ("Mesa's Tools

Linked With Lower 48," Mammoth Trumpet 10:4), but he suggested that those probably are the result of old wood being burned in Mesa-site hearths. "Remember we're talking about the Arctic part of Alaska here where even today there are very few trees." The idea that Mesa's artifacts are no greater than 10,000 years old supports the hypothesis, voiced by Stanford, Bonnicksen, and others, that many Alaskan artifacts indicate a northerly movement of cultural traditions that may have originated on the Great Plains. Mesa projectiles, for example, resemble Agate Basin points from High Plains sites.

Goebel gave a detailed description of several Alaskan sites that document the Denali complex and the older Nenana complex. "The Denali complex seems to be an early-Holocene phenomenon," he said, and added that north Alaska sites, such as the Mesa complex, and sites along the southeast Alaska coast seem also to date to right around 10,000 years ago



Archaeologist Ted Goebel of the University of Nevada-Las Vegas speaks to the Clovis and Beyond Conference.

and younger. "So what we're starting to see is that as the Holocene began around 10,000 years ago, there was quite a bit of complexity in the archaeological records of this state," he said, indicating a map of Alaska. The only archaeological evidence that dates to before 11,000 years ago—to the time of Clovis—is the Nenana complex, discovered in the lowest levels of sites such as Dry Creek and Moose Creek ("Expedition Affirms Significance of Moose Creek Site," Mammoth Trumpet 12:4) in the Nenana Valley, and Broken Mammoth in the Tanana Valley ("Tanana Sites Connect Alaska with Eurasia," Mammoth Trumpet 10:4).

"Is there a Clovis ancestor in Alaska?" Goebel asked rhetorically. He noted that Clovis generally dates from between 11,300 and 10,900 years ago, although the Aubrey site in Texas may date to about 11,500 years ago. Similarly, he said, "the Nenana complex in the Nenana Valley in places like Walker Road, Dry Creek, and Moose Creek seems to date from about 11,300 and 11,000 years ago. So right now, I think we can say with certainty that the Nenana Complex in the Nenana Valley is contemporaneous with Clovis."

But then there's the Broken Mammoth site, where the oldest Nenana material has been dated to about 11,800 years ago—it is several centuries older than Clovis. "Do the Nenana and Clovis industries look anything alike?" he asked. "I think they



Northern Paleo-American These are examples of Nenana-complex artifacts from Alaska. The one on the left is a Chindadn point.

SMITHSONIAN INSTITUTION PHOTO SERVICES

do. When you consider some of the basic technological parameters at these sites, you'll find that both of them are upper Paleolithic in a sense, where you find blade as well as flake tools being manufactured. Also, when you look at some of the tool forms that characterize the Nenana complex, and you stack them up with type artifacts of the Clovis complex, you find they're very similar." Goebel illustrated his point with slides of artifacts.

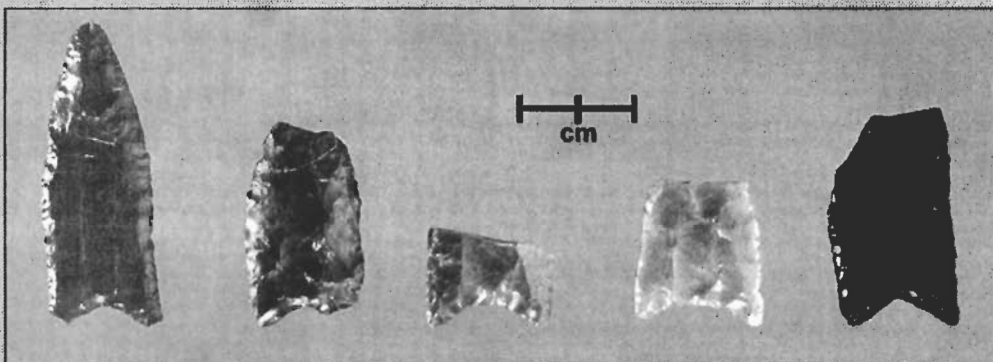
"The main distinction that we can make between the Nenana and Clovis complex is the fact that Nenana does not

tion. "This might explain the Mesa complex," said Goebel, "and it might explain the fluted points in Alaska, but I don't think it explains Walker Road and the Nenana complex. These Nenana complex sites are as old as Clovis and maybe a little bit older."

Another is the "coastal model," or Pacific-rim Hypothesis. "I can envision some people colonizing the coastal parts of Beringia and periodically moving into the interior regions," he said.

The third hypothesis he offered is the Clovis-first model,

BOTH: SMITHSONIAN INSTITUTION PHOTO SERVICES



Northern Paleo-American
The five artifacts above are examples of Alaskan fluted points; the four below are from Irwin's Sluiceway site in Alaska.



have these fluted points that are edge ground. So how big of a deal is that?" he asked, and then offered:

"To me that is not a very big deal," he said. "To me it is an indication perhaps that if the Nenana complex did give rise to Clovis, then the fluted-point technology of Clovis has something to do with the mammoth." Previously in his presentation, Goebel emphasized that there is no evidence that humans coexisted with mammoths, so perhaps, he suggested, there had been no need to have fluted projectile-point technology. "But once these folks arrived out on the High Plains around 11,300 years ago," he suggested, "this new technology very rapidly evolved in response to that new adaptive problem."

"Is there a Nenana-Clovis connection? I think there is," he said and then offered the conference audience three hypotheses that might explain it.

One is the "back wash model," suggested in the Northern Paleo-American hypothesis, the last of the five offered to the conference earlier in the Bonnicksen-Stanford-Jodry presenta-

tion, which many Clovis and Beyond presenters had discounted, several suggesting that there probably had been multiple colonizing events—many arrows on the maps that depict hypothetical migrations into the Americas. The Clovis-first model, said Goebel, "is the most parsimonious explanation for the similarities, technologically and typologically, between these pre-11,000-year-old assemblages in Alaska and western North America. One arrow instead of many." However, he said he believes much more archaeological work needs to be done in Alaska to support or refute his view. "We need to get out of the Nenana and the Tanana valleys and find archaeological sites elsewhere in Beringia and try to test some of these models," he said, noting that E. James Dixon, for example, is doing so in his archaeological examination of limestone caves in the Alaskan panhandle ("Ancient Alaskan Bones May Help to Prove Coast Migration Theory," *Mammoth Trumpet* 12:4). Goebel urged that similar efforts be made in north and central Alaska as well as in nearby parts of Siberia. 🌐

—DAH



RICHARD BOISVERT

Paul Bock points to the place on the root ball of a toppled tree where the discovery of a Paleoindian artifact led to the identification of the Jefferson III site near the northern New Hampshire town of Jefferson. A similar discovery a year earlier had resulted in the confirmation of a Paleoindian presence in the area soon after glacial retreat—possibly at the time of the profound Younger Dryas climatic change.

Northern New Hampshire Takes Pride In Its Unexpected Fluted-point Sites

A TERRIFIC STORM raged through New Hampshire's White Mountains in the fall of 1995, displacing limbs and leaves and overturning trees. After the storm, Paul Bock's curiosity led him into the woods behind his home in the northern New Hampshire town of Jefferson to see what the wind might have unearthed. Bock had become fascinated with archaeology; he was a volunteer in the State Conservation and Rescue Archaeology Program and had undergone some of the program's training.

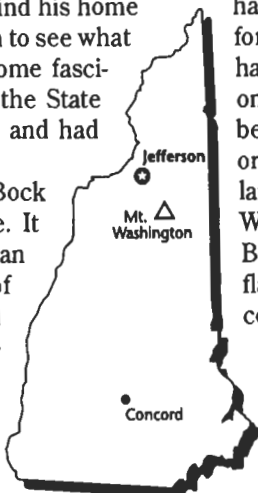
In the upturned roots of a toppled spruce tree Bock found a small, flat, sandy-colored piece of stone. It would have been merely another piece of rock to an untrained eye, but Bock knew the significance of his find—it was the lower portion of a fluted projectile point. Following the training he'd received from Richard Boisvert, New Hampshire deputy state archaeologist who facilitates a highly successful program for volunteers, Bock slid the point into a plastic bag and attached a piece of tape marked with the word "fluted" to the spot where he found the artifact. Then he contacted his

friend Ed Bouras, an archaeologist from Portsmouth, N.H., with the news.

Bock and Bouras, a stone worker, artist, and flintknapper, had done some testing in the Jefferson area. They were formulating a research question based on artifacts Bock had found on the surface the previous spring—debitage on the surface of an area that had been logged the year before. These seemed to be of possible Paleoindian origin, but conventional wisdom did not view the highlands of northern New Hampshire as a Paleoindian area. With full cooperation of the property owner, Bouras and Bock had made six test excavations, recovering 50 to 60 flakes and a bifacially flaked stone tool that was later confirmed to be a preform for a fluted point.

They had reported their discovery to Dr. Boisvert, who naturally was dubious. Fluted points didn't belong in the North Country, and he doubted that they had enough artifacts to establish a site in Jefferson. No previous evidence had confirmed Paleoindian presence in the area.

Now, would the fluted point from the uprooted tree be



Ed Bouras, left, of Portsmouth, and Richard Boisvert, New Hampshire deputy state archaeologist, at a State Conservation and Rescue Archaeology Program field school.



RICHARD BOISVERT

enough evidence? Bock took his discovery 100 miles south to Concord to show it to Boisvert. When Bock arrived at the lab, Boisvert's jaw dropped.

The piece of stone filled a gap, and Boisvert recognized that Jefferson was a Paleoindian site—the first in the northern part of New Hampshire. Subsequent research, much of it involving Boisvert and volunteers including Bock and Bouras, has revealed at least eight sites in New Hampshire with paleo components including three at Jefferson, and proved the Jefferson area was a toolmaking and lithic-procurement site used by people 10,000 to 11,000 years ago. The Jefferson sites are, says Boisvert, “highly unusual—possibly a unique Paleoindian manifestation in northern New England.” Their artifacts have been defined as the Israel River complex.

“Jefferson is clearly the most important site in the state,” says Bob Goodby, an assistant professor of anthropology at the University of New Hampshire. “The artifacts found there are changing our understanding of Paleoindians.”

“Archaeologists work their entire lives and never encounter a site like we’ve got going up in Jefferson. It’s a big deal,” says Steve Bayly, another field archaeologist trained by Boisvert through the State Conservation and Rescue Archaeology Program.

Since Bock’s initial

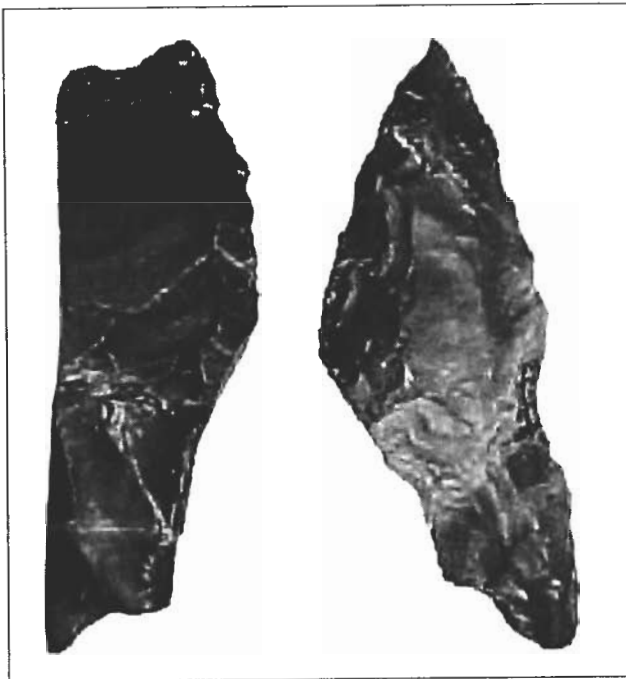
find in 1995, Boisvert and a cadre of volunteers have excavated three sites in the Jefferson area including Jefferson I (27-CO-28), which covers approximately one acre; Jefferson II (27-CO-29, also known as the Nevers site), approximately 15 acres; and Jefferson III (27-CO-30), approximately 10 acres. Boisvert says finding three sites within a square kilometer is “off the scale. It’s like rolling sevens six times in a row.” The Jefferson site, one of the largest Paleoindian sites in New England, opened a new dimension of Paleoindian research in New Hampshire. The materials retrieved there have more than doubled the data on Paleoindian culture in the state. And more evidence may be uncovered, Boisvert says. The acreage estimates are based on known sites and exclude space between sites and outlying areas. It is one of the larger paleo sites, and its significance is further enhanced by its position. “The sites are situated on ablation till rather than on

outwash or aeolian sands that typify nearly all other Paleoindian sites of this region,” Boisvert says. “The sites are located partially on hillsides that slope from 10 to 20 degrees. This is highly unusual, as sites from any prehistoric period rarely occur on such slopes.”

The sites are perched on top of a raw material that Boisvert identified as a flow-banded rhyolite. This Jefferson rhyolite was initially thought to be Mount Jasper rhyolite from Berlin, N.H., 30 km to the east, material that has been found in archaeological sites in Maine and Massachusetts as well as New Hampshire. After lab analysis involving detailed comparisons by X-ray diffraction, the Jefferson rhyolite was found to differ subtly in composition from Mount Jasper stone. Boisvert and his teams have not located the Jefferson rhyolite bedrock. Glacial action may have pulled pieces of the material from outcrops and deposited them in the local till. Whether the material was found on the surface or in streams, these were what he calls “full-service sites.”

Archaeologists have also found many exotic lithic materials at the Jefferson sites. Basal fragments of fluted points made from exotic cherts, recovered in close proximity to channel flakes, and fluting failures made from the local rhyolite strongly suggest the Paleoindians replaced their damaged projectile points there. “It appears that the tools made from exotic materials were entering the site as completed implements that were either resharpened on site or discarded as they came to the end of their use-life,” Boisvert says. Jefferson’s stone artifacts indicate that the people had access to Munsungun chert outcrops 300 km to the northeast in Maine, and tool-quality stone from Jefferson was taken at least 320 km to the south to Neponset, Mass. Their tool kits of these exotic materials were augmented by artifacts of local rhyolite manufactured on site.

Volunteer crews sifting soil through eighth-inch screen recovered 12,000 small sandstone-colored flakes in one excavation block at the Nevers site. So far they’ve found 18,000 to 20,000 flakes within the entire 3-site Jefferson area. The sheer density identifies this as a primary manufacturing site—a toolmak-



RICHARD BOISVERT

Two artifacts recovered from the Jefferson III site. On the left is the double-based “point” that Richard Boisvert believes must be the work of a student knapper. On the right is the most complete point discovered at the site. About 4½ cm long, both are fashioned of Munsungun chert.

ing workshop. Boisvert says it is rare for to find evidence in early sites of artifacts being made from beginning to end at one spot. He says Paleoindian people usually worked tool stone to a certain level of manufacture at the source, then carried the preforms elsewhere for finishing. "The site in Jefferson gives us a wonderful opportunity to look at the whole manufacturing process."

Boisvert says Paleoindian knappers were very particular about what kind of stone they used and went to great lengths to

contemplating the strange artifact, he decided the only "sober explanation" was that it was the work of a rookie stone knapper who used a broken fluted point for practice. "It's the only reasonable explanation."

Boisvert and his crews have found two types of fluted points at the sites. One dating to between 10,800 and 10,500 radiocarbon years resembles Bull Brook or Gainey points with parallel sides and a deeply indented base. The other, slightly younger, resembles Barnes points with flared basal corners and shal-



RICHARD BOISVERT

get it. "The Jefferson rhyolite is an igneous rock," Boisvert explains. "It's similar to granite, but it cools at a much quicker rate, which results in a finer grain. It flakes in a very predictable fashion just like glass. It breaks according to the direction that you hit it from. A lot of rocks don't do that—they just crumble when you hit them. These produce a nice, sharp flake and that flake will travel across the rock. It's just right for making fluted points."

Archaeologists aren't sure why Paleoindians made fluted points or spent enormous effort to make them perfect. Some projectile points are almost paper thin. Of course, paleo knappers experienced failures—many of the points found were broken during the fluting process. Later people didn't take such care when making fluted points.

Boisvert encountered a puzzling artifact, a fluted projectile with two bases and no tip. "At first it didn't make sense. I just kept turning it over," he said. One end was completed with basal grinding. The other was also fluted, but lacked the finishing touches. "I had to go and sit somewhere quiet." After

At the Jefferson II, or Nevers, site, Lucinda McWeeney, Yale University paleoecologist, takes soil samples for botanical analysis under the watchful eyes of Jefferson elementary school children. K. D. Rafferty, left, a Plymouth State College student and volunteer in the New Hampshire State Conservation and Rescue Archaeology Program, is a tour leader for student groups.

lower indented bases. Many of these exhibit multiple flaring that creates "ears," and multiple flutes—one on top of the other or side by side.

Contributing to the research potential at Jefferson is its single-component nature—Boisvert is confident that all the artifacts found are Paleoindian. "To date, there is no evidence for any occupations by later prehistoric people," he says. All the artifacts, flakes, and residual shatter at Jefferson were left by the Paleoindians. Boisvert admits that is a dangerous assumption to make, but his words are backed with the experience of four years of extensive work in Jefferson. "Had there

been anything later, I think we would have tripped over it by now."

His crews have excavated 123 square meters of material in small blocks and test pits besides 223 shovel test pits, each 50 cm square. Except for historic debris within the soil plow zone, all artifacts yet recovered are Paleoindian. Perhaps some later cultural material has been missed, Boisvert acknowledges, but he is confident that from top to bottom the teams' methods have been painstakingly thorough. "It's almost beyond my imagination," he says, that there were later occupations that haven't shown up. "It could be we haven't found them yet, but after four years I'm confident it's exclusively Paleoindian."

Jefferson investigators have found more than just tools made for hunting. There is evidence of bone and antler tool manufacture and use of delicate retouched flakes, possibly for making clothing. The assemblage now includes scrapers for processing hard organic materials like wood and bone as well as soft organic materials like hides and plant material.

Evidence suggests to Boisvert that Jefferson people came more from the west than the south. Comparing projectile-point styles, he sees greater similarity to artifacts found in the Great Lakes region than those found in Virginia or Pennsylvania. "It's more of a Western origin than a mid-Atlantic or Southeastern one."

In the Next Issue

What is **SCRAP**? It's New Hampshire's highly regarded State Conservation and Rescue Archaeology Program, which trains volunteers to do "professional" archaeology.



Artifact assemblages suggest to Boisvert that complete families resided at Jefferson. He says the size of the encampment, the complexity of the tool kits, and the arrangement of the tools and activity areas indicate gender-specific behavior or the presence of children. "A small, tight campsite with only a few artifacts that only relate to weapon maintenance would suggest an all-male hunting party or a one-night stopover," Boisvert explains. "A large area, with distinct activity areas that would include not only hunting-related gear but also hide preparation, plant-food preparation, clothing manufacture and ceremonial activity, would suggest a larger group, probably a family. Extended kin are always a possibility."

Boisvert believes that Jefferson's occupants were migrants, making seasonal rounds to take advantage of what was available in abundance. He acknowledges that it is impossible to tell if multiple family groups returned to the same spot each season or if smaller groups shifted their living areas slightly from time to time giving the illusion of more family units.


Boisvert surmises the sites were deliberately located near a strategic corridor through the White Mountains, possibly in a position to intercept the caribou migration. "The headwaters of the Israel River meet the uppermost reach of the Moose River, which flows to meet the Androscoggin River approximately 25 km to the east. Together the two valleys form one of the very few corridors of travel in an east-west direction through New Hampshire," Boisvert says.

Several research questions remain for Boisvert to answer, and most involve the paleoenvironment. What was life like for Jefferson people? He is looking for evidence of game resources and exploitation of plant resources, most difficult due to the limitations of the data.

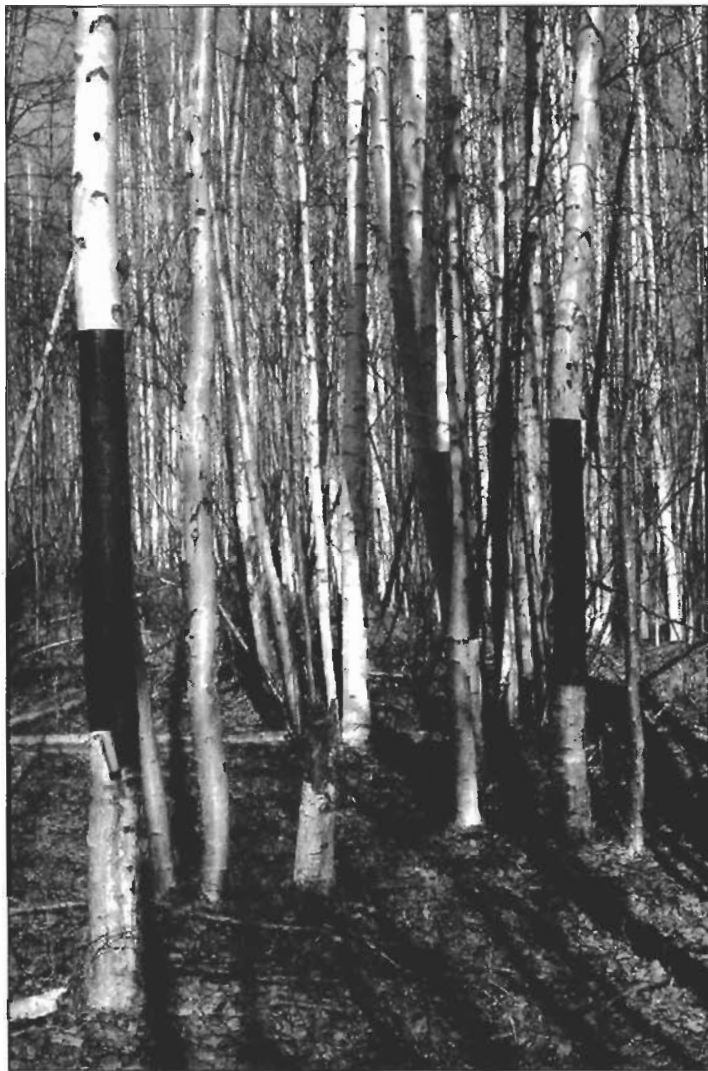
Boisvert also wants to know if the people were present during the brutally cold Younger Dryas period. Glacial ice that covered New England melted back between 12,400 and 12,000 radiocarbon years ago, retreating north of Jefferson into Quebec as the climate warmed. Then after more than 1,000 years, the Younger Dryas period brought a climate reversal to near-glacial conditions. This reversal corresponds roughly to the time the Jefferson sites were occupied. Boisvert wants to know if the Paleoindians were present throughout the entire 1,000 years or were there only during a brief climatic flicker, say 40 or 50 years. Did they come or leave when the weather got bad? Were people present before the reversal? After it? Is there a temporal gap in the occupation of the site?

Sediments taken by scientists from Cherry Pond, one kilometer from the site, should help answer paleoenvironmental questions. Lucinda McWeeney, a prominent Yale University paleoecologist, is doing extensive analysis of the cores from that and other sites in the area. Her objective is to identify plant remains and to date radiocarbon samples of the Paleoindian period so that scientists can compare the Paleoenvironment and cultural record within a confined area. Boisvert says the preservation of materials within Dr. McWeeney's cores is excellent. "I've seen leaves, twigs, and insect bodies that have to be 11,000 years old that look like they fell yesterday."

Many people continue to be involved with research on Jefferson's Paleoindian sites, and Boisvert is proud that it has been predominantly a New Hampshire project rather than one where outside investigators swoop in to do the research without involving the local community and leave without sharing the information locally. "We are careful to avoid that."

Some outside help has been welcome. The Archaeological Conservancy, a nonprofit organization dedicated to acquiring and preserving archaeological sites all over the United States, purchased Jefferson II, the Nevers site, from Alfred and Judy Nevers who cooperated by reducing their selling price. There is much community support, encouraged by extensive reporting in the *Coos County Democrat*, a newspaper published in Lancaster, N.H. Local residents have provided access to private property so that State Conservation and Rescue Archaeology Program field workers can map sites and excavate test pits. Boisvert frequently holds community forums, lectures, and discussions in the area on the Israel River Paleoindian complex. 

—Nancy Eichhorn



Birch trees were stripped of their bark for canoe building. What evidence of such activity might remain in the archaeological record?

Boats or Footprints?

Archaeologists Urged to Consider Water Craft

WHETHER OR NOT the first humans arrived in the Americas by boat, archaeologist Margaret A. Jodry believes that models of early culture in this hemisphere must consider the use of water craft.

"Pedestrian models have long dominated our thinking in Paleoindian studies," said Jodry, speaking to the Clovis and Beyond Conference last fall in Santa Fe.

"If we're going to model Paleoindian mobility," she said in concluding her presentation, "we cannot afford to disregard the implications of transportation aids such as water craft." Jodry, known as Pegi to her colleagues, is with the Paleoindian/Paleoecology program in the Smithsonian Institution Department of Anthropology in Washington, D.C. Her presentation was part of the conference's look at the future of research.

Jodry emphasized the antiquity of boats. "For people to reach Australia," she told the conference audience, "they had to traverse a deep-water, open-sea crossing of 65 to 100 kilometers depending on the point of time we're talking. Yet there is uncontested evidence for the peopling of Australia 40,000 or

50,000 years ago." She cited other examples of early sea travel including a 170-kilometer voyage to the North Solomon Islands by 28,000 years ago, the crossing to Okinawa from the Asian mainland more than 32,000 years ago, and sea crossings to Japanese islands at least by 15,000 or 20,000 years ago.

By Clovis time, she said, there had been well over 20,000 years of research and development in water craft. The sophistication of that knowledge may suggest not only that America's first settlers came by sea but that water craft played an important part in the lives of many of the earliest Americans. Jodry thinks it quite understandable that Canadians have been the leading proponents of the coastal-entry model. "In the Pacific Northwest or in northwest Alaska where I worked," she said, "the realities of getting around a landscape filled with rivers and lakes without any form of water craft seems a remote possibility." And although regular use of water craft by the earliest Americans may seem more remote on the Plains, that isn't the case in places with plenty of lakes, ponds and marshes, such as northeast Arkansas or Florida.

The long-dominant theory that the First Americans walked into the mid continent between continental and mountain glaciers has tended to encourage a terrestrial bias among American archaeologists. "It seems to have taken the closing of the Mackenzie Corridor, theoretically speaking, to get some people on board with seriously looking at coastal entry models," Jodry said. Inland, she added, pedestrian models of Clovis mobility still

have a high incidence of large Clovis sites along the major rivers," she noted, adding that rivers are emphasized in settlement studies. However, archaeologists have been reluctant to theorize on the use of boats on the rivers. "I don't know what to think," Jodry said, emphasizing the undeniable fact that Clovis people, or at least Clovis sites, were on both sides of all the rivers. "They must have been fabulous swimmers," she quipped, and went

area," she noted, and the great number of blade cores, blades and other kinds of tools recovered there suggest a long-term use of the locality. Behind this site, she said, there is a high ridge that affords a good view across the river. Mark Norton, one of the site's investigators, suggests that because the ridge offers a view of a broad plain that could have offered good grazing for large herbivores, it likely was used as a hunter lookout. "It's one of his ideas, a working hypothesis if you will, that they could sight animals from the top of that ridge, come down, and get in boats to cross the river and hunt."

In another example, she noted that the lithic material used by Clovis people at the Thunderbird site in Virginia comes from a quarry source that's across the Shenandoah River from the site. "When the investigator, Bill Gardner, takes you around Thunderbird—from the site to the quarry—you go by boat. It doesn't mean that Clovis people did, but it makes you wonder."

Turning to ethnographic evidence, Jodry noted that northern hunters employ boats at places where caribou cross rivers and she suggested that such a hunting strategy may have been used during Paleoindian times in the Northeast.

"Now the difficulty here, of course—and I know what you are all thinking—is that finding innovative means of assessing the former presence or absence of water craft is a difficult proposition." She went on to acknowledge the difficulty archaeologists face in attempting to understand the various uses that Paleoindian groups may have made of boats. "I certainly don't suggest that it's going to be easy to find this kind of evidence, but just because it's not easy doesn't mean that it is not important in our thinking."

Showing slides depicting construction of both bark and dugout canoes, she continued challenging the conference audience. "The remains of boat construction are often ephemeral at best, but if we were to be so lucky as to recover evidence of boat framing preserved in alluvial clay somewhere, would we recognize it?" If archaeologists have not considered the possibility of boats, she said, would they be likely to discover evidence of one?

"What if we began to see a line of small

'Boats should not be ignored by archaeologists.'

Margaret A. Jodry, known as Pegi to colleagues, addresses the Clovis and Beyond Conference on the future of archaeological research. She is with the Paleoindian/Paleoecology program in the Smithsonian Institution Department of Anthropology in Washington, D.C.



DON ALAN HALL

do dominate and archaeologists tend to ignore travel on river systems and lakes.

She reviewed several early sites known to North American archaeologists that suggest the use of, though no direct evidence for, water craft. Along the West Coast are island sites that clearly imply the use of boats, but inland are many sites that suggest water craft might have been used in the procurement of food or stone for tools.

"By 11,000 to 10,000 years ago several archaeological sites indicate the use of the California Channel Islands and the islands of southeast Alaska," she said, citing the findings of colleagues including Madonna Moss, Jon Erlandson, and E. James Dixon. Such evidence also occurs at Paleoindian-era sites inland, she added, citing work of Peter Storck and others at island sites in Lake Huron and Lake Algonquin. "People were using some kind of water craft to get out onto these islands."

She asked her audience to consider Clovis sites east of the Mississippi. "We

on to argue that when archaeologists are thinking about life in the past, they need to consider boats. She went on to describe evidence from several sites including the Shawnee-Minisink Clovis site on the Delaware River.

Showing slides of that site, she noted that one of its hearths that yielded radiocarbon dates of $10,940 \pm 90$ and $10,900 \pm 40$ years before present also contained charred fish remains. "Clovis fishing techniques are uncertain, and whether or not they're land or boat based is also unknown," she conceded, but she argued that it is important to consider how water craft may have factored into the efforts to hunt, to fish, to travel, to acquire stone and move it around, and to maintain kinship and social alliances.

She turned next to the Tennessee River, on what is now Kentucky Lake, and showed slides of the Carson-Conn-Short Clovis site in Tennessee ("Sites in Tennessee Suggest Clovis Originated in East," *Mammoth Trumpet* 8:2). "There's a very large lithic outcrop in this

little holes?" she asked. Would they be ignored or would we make an effort to see if they might lead to the discovery of a framing feature that could indicate a canoe or boat? She suggested that if the concept of water craft is not even in our repertoire of thinking, we might overlook the clues. She emphasized by the slides she showed that very little might remain of boat-making activity.

Most likely, direct evidence will continue to elude us," she said, showing a slide of bark peeled from a birch tree in Alaska. "You're not going to find anything like that," she added, because neither the bark nor the peeled tree would not be preserved in a Paleoindian-era site. Further, she emphasized with an illustration of an Australian tree from which a single piece of bark had been peeled to serve as an expedient boat, water craft can be quite simple. The Australians, she explained, tie the ends of the bark together "and go right on down the billabongs."

"We're not going to find such evidence," she said, but she


suggested that archaeologists should think about the use of expedient boats including craft fashioned of animal hides stretched over willow frames.

And there are more elaborate boats to consider. As an example, she showed slides of large wooden canoes that Makah people of Washington's Pacific Coast are making in a resurgence of their cultural tradition. Depicting the construction of a large wooden-hulled canoe, she pointed out the metal woodworking tools the Makah people are using as they teach their young people how to make these canoes. "So I look at this," she said, of the Makah's metal tools, "and try to translate it into some kind of chipped stone assemblage." Archaeologists, she suggested, might ask themselves what kind of woodworking tools might we *expect* to find if, indeed, the culture represented by a site utilized wooden-hulled craft such as dugout canoes?

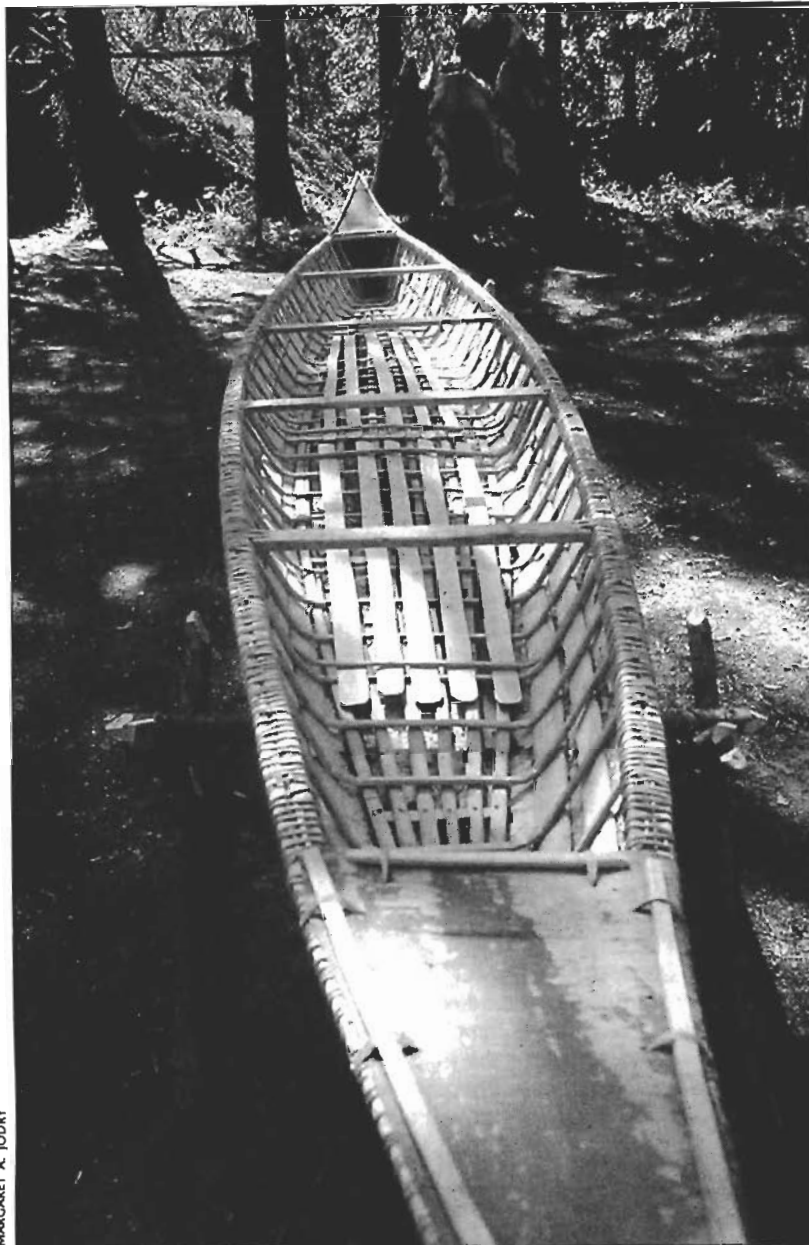
Jodry applauds the suggestion by Dan Morse and others that large Dalton adzes might have been used in the manufacture of dugouts. "I think this is really an interesting idea," she said, adding that use-wear and residue analysis on some large Dalton adzes, which had been hafted, suggest that they were used on charred wood. Their use on charred wood, while not conclusive evidence, is consistent with the manufacture of dugout canoes, and suggests a possibility that should be considered. She said a dugout recovered in Florida 7,000 years ago is the earliest example in North America of such water craft.

Explicitly taking water transportation into consideration in the analysis of distribution and movement of stone materials may provide scientists with new ideas, she said, noting that researchers often study lithic materials recovered from a site by analyzing the amount of material, the distance that it moved, and the amount of tool attrition and core attrition taking place to get a sense of how far and fast people might have been moving between sites and source areas. If water craft were used for logistical trips to procure and transport tool stone, archaeologists' pedestrian-based mobility models as inferred from raw-material analysis might need to be revised.

"I'm not suggesting that all Paleoindian people used water craft or even that they would use it in the same way either within a culture or between cultures or within or between areas," she said, but she emphasized that boats, as well as the possible use of pack dogs, should not be ignored by archaeologists.

"Seas and rivers represent potential corridors of connection linking local groups with networks of neighbors and hunting and transport opportunities," she concluded. "I'm suggesting that we should raise the theoretical ante and keep open the possibility of water travel, and even more than that, we should proactively develop means to test this hypothesis." 

An Athabaskan birch-bark canoe is pictured at a Canadian village in June 1989. Would the construction of such a craft leave any archaeological record?



MARGARET A. JODRY

New Biological Research

continued from page 4

ing fruit. Witness two papers presented at this spring in San Antonio—"A Comparative Craniofacial Analysis of 24 Asian and Pacific Populations Using the Neighbor-Joining Method" by N. Seguchi and C. L. Brace, and "New World Branches, Old World Roots: A Craniofacial View of a North Asian Homeland" by A. R. Nelson, University of Michigan, and D. Tumen, Mongolian Academy of Sciences.

Physical anthropologists study human variation by making many standard measurements of skulls from known populations and compiling the numbers in computer databases they analyze by statistical methods. Brace's team, in addition to using data they gathered themselves, have used measurements from other researchers. Further, their database has grown with measurements from newly excavated Jomon skeletal material from Japan, and with skeletal studies from Mongolia from a number of different cultural and archaeological periods. The papers by Brace's group examined similarities among Asia's many diverse ethnic groups—a topic much broader than the peopling of the Americas; however, these analyses should contribute to models of the peopling of the Americas and of Australia and perhaps the much more recent settlement of Polynesia. Both papers used multivariate techniques and produced a series of graphs based on "multivariate distances," which are succinct abstractions of overall similarity between pairs of populations.

Interpretations of these findings generally support the conclusions of a paper Brace presented in a February peopling of the Americas seminar at the American Association for the Advancement of Science meetings. In that paper, Brace reported that American Indian people have come from several different Asian populations that arrived by way of multiple migrations. Brace says that possible migratory routes within Asia and ultimate dispersals to the Americas are suggested from his research.

Upper Cave Crania Studies: Implications for Americas

A new analysis of the three "Upper Cave" skulls of late-Pleistocene age discovered more than a century ago near Beijing, China, was presented at the San Antonio meetings. The skulls caused a great stir among anthropologists at the time of their discovery, and reanalyses continue to prove interesting. They were unusual in that they were found close together but appear to show great morphological differences. This paper, "Within-Group Human Variation in the Asian Pleistocene: An Assessment of the Three Upper Cave Crania," was presented by Deborah L. Cunningham of the University of Missouri and Daniel J. Wescott of the University of Tennessee; it used a computer program developed by Richard Jantz of the University of Tennessee. The report assessed differences among the three crania and between each and a group of 30 reference populations. The authors conclude that none of the crania fits comfortably into modern groups; that late-Pleistocene populations in Asia seem to have greater variability than modern ones (even though these three individuals likely were not from a single family as early scholars thought); and that modern populations likely have less within-population diversity than Pleistocene peoples.

Other analyses of the Upper Cave crania have reached similar conclusions and thus created a framework for understanding recent findings that Paleo-American crania differ among themselves and from living populations of Asia and the Americas.

The results of the new analysis of the Upper Cave skulls conform to findings reported by Jantz and Douglas W. Owsley of the Smithsonian Institution in their paper "Ice Age Humans in Asia and the Peopling of the Americas," presented last fall at the Clovis and Beyond Conference in Santa Fe. Jantz and Owsley focused particularly on the craniometric studies of the Buhl Woman, dated at 10,675 years B.P., but they placed her features within the context of variation in other late-Pleistocene, early-Holocene Paleo-Americans. 📍

—Roberta L. Hall

COMING CONFERENCES

Aug. 21–25 3rd International Meeting on Phytolith Research, Royal Museum of Central Africa, Belgium.

Contact: L. Vrydaghs, Royal Museum of Central Africa, B-3080, Belgium. Fax: 32-2769-4202; mphytor@afriamuseum.be.

Oct. 5–7 27th Great Basin Anthropological Conference, Ogden, Utah.

Contact: Steven Simms, GBAC Chair, Anthropology, Utah State University, Logan UT 84322-0730. 435-797-1277; ssimms@hass.usu.edu (www.hass.usu.edu/~gbac2000).

Nov. 8–12 33rd Annual Chacmool Conference, Calgary, Alberta.

"Art for Archaeology's Sake: Material Culture and Style across the Disciplines." Contact: Marc Zender or Calla McNamee, Dept. of Archaeology, Univ. of Calgary, Calgary, ALB T2N 1N4.

Dec. 4–7 La Colonización del Sur de America Durante la Transición Pleistoceno/Holoceno, La Plata, Buenos Aires, Argentina.

Contact: Laura Miotti, Museo de La Plata, Paseo del Bosque s/n, (1900) La Plata Argentina, miotti@netverk.com.ar; lmiotti@museo.fcny.unip.edu.ar.

2001 TBA 4th Meeting, Bird Working Group, International Council for Archaeozoology, Krakow, Poland.

Conference on all aspects of bird remains in archaeology. Contact: Zbigniew M. Bochenski, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Slawkowska 17, 31-016, Krakow, Poland, bochenski@isez.pan.krakow.pl; http://www.isez.pan.krakow.pl. 📍

Send conference notices to Mammoth Trumpet, CSFA, 355 Weniger Hall, Oregon State University, Corvallis, OR 97331