



MAMMOTH TRUMPET

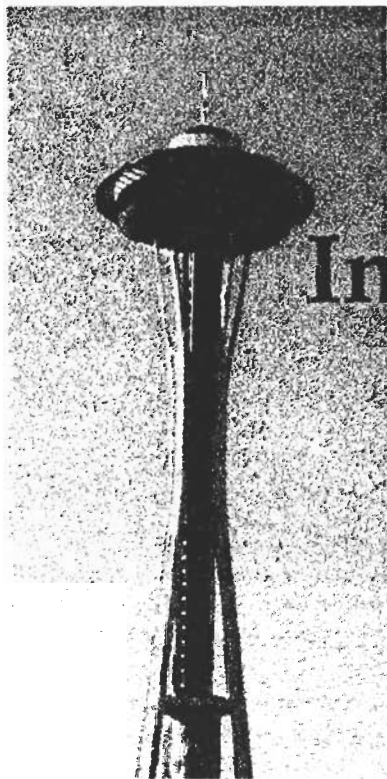
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Center for the Study of the First Americans
355 Weniger Hall, Oregon State University
Corvallis OR 97331-6510

After Monte Verde

Peopling of the Americas received extra attention at the Society for American Archaeology's 63rd Annual Meeting this spring. The first SAA since Monte Verde was recognized as breaking the Clovis barrier included more than three days of sessions and symposia relating to Paleo-Americans.

We begin our report on page 1.



In the Spotlight at Seattle SAA

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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THE AMERICAS AFTER MONTE VERDE

SEATTLE—"Paleo" held center-stage for much of the 63rd Annual Meeting of the Society for American Archaeology here in late March. At this first "post-Monte Verde" meeting, hundreds of archaeologists attended the six half-day sessions devoted to studies relating to the Americas of the late Pleistocene.

Most of these sessions were in the largest ballroom in the downtown Washington State Convention and Trade Center—testimony to professional interest in the myriad academic problems associated with research on ancient human presence in the Americas. Paleo-American sessions convened in more modestly sized meeting rooms often were crowded to capacity.

Many archaeologists whose work has been featured on these pages participated in four days of sessions. In all, almost one hundred presentations were made on the era frequently reported on in the **Mammoth Trumpet**, and though we can't begin to report on the details or scope of all of these in this issue, we hope to characterize the direction of Paleo-American archaeology at the beginning of what many at Seattle were calling the post-Monte Verde era. We are reporting on some of the subjects, themes, ideas and academic arguments in this issue, and hope we can cover others later.

Although Monte Verde itself, the celebrated Chilean site dating back at least 12,500 radiocarbon years, ("Life in Ice Age Chile," **Mammoth Trumpet** 1:1, "Pre-Clovis Evidence Accepted," **MT** 12:2) was not the subject of a formal presentation, it was on the minds of many participants. Most voiced acceptance, or at least recognition, of its pre-Clovis timing. However, the controversy over pre-Clovis Americans, and the Monte Verde site in particular, obviously has not ended.

Arguments Aren't Over

In their continuing analysis of the ages and origins of Clovis and other Paleo-era sites in the Americas, Anna C. Roosevelt and colleagues ("Clovis Clarification: A Follow-up," **Mammoth Trumpet** 13:1) rejected the Clovis-first hypothesis in favor of initial entry by a coastal-wetland culture that made and used triangular stemmed points. They base their argument on analyses of lithic assemblages in Asia and the Americas, and they suggest entry of the Americas occurred only 12,000 radiocarbon years ago. Thus their paper—by Roosevelt of the Field Museum, John Douglas and Linda Brown of the University of

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Some Highlights from SAA Seattle:

- Coastal entry is likely
- Clovis-second theories
- Late-entry still favored
- Ice-free corridor theory dead?
- Climate change drove extinctions

August Symposium to Focus on Coast Hypothesis

A one-day conference on the Pacific Rim hypothesis for the peopling of the Americas has been scheduled Saturday, Aug. 22, in Portland, Ore. Organized by Robson Bonnicksen, Director of the **Center for the Study of the First Americans**, Oregon State University, and Ruth Gruhn, Professor Emeritus, University of Alberta, the conference is being sponsored by the **CSFA** and the Oregon Museum of Science and Industry. It is being held in conjunction with the exhibit "Missing Links—Alive!" which will be at the museum until Sept. 7.

The tentative program includes scientists who have been the foremost proponents of the coastal theory of the peopling of the Americas.

Dr. Bonnicksen will open the session with his perspective of the role of the Pacific Rim hypothesis in understanding the peopling of the Americas. Rolf Mathewes, Simon Fraser University paleoecologist, will provide an overview of changing environmental conditions that may have influenced human population movement from Asia to North America.

Physical anthropologist C. Loring Brace of the Museum of Anthropology at the University of Michigan will analyze evidence related to the human skeletal record. A specialist in human evolution, he is a leading authority on the northeast Asian skeletal record. E. James Dixon, curator of archaeology at the Denver Museum of Natural History, who has spent many years searching for early archaeology sites in the far north, will analyze human occupation on the Alaskan Pacific Rim. His presentation will include his own new research in perspective of the history of the search for early maritime sites in Alaska ("Ancient Alaskan Bones..." **Mammoth Trumpet** 12:4).

Darrell Fedje of Parks Canada is to review human occupation on the British Columbia Coast. Recent research in the Queen Charlotte Islands has led to the discovery of uplifted terraces with associated archaeological remains that may represent some of the earliest evidence for human occupation on the Northwest Coast. Michael Moratto, California State


University-Fullerton archaeologist and authority on human occupation of the Pacific Rim, will summarize current knowledge about the peopling of the West Coast of the U.S. from Washington to southern California.

Dr. Gruhn, who also has long championed the Pacific Rim as the logical route of entry into the New World, will draw on her extensive knowledge of archaeological research from Meso-America and South America to summarize the earliest evidence for maritime adaptation along the southern Pacific Rim.

Knut Fladmark, Professor of Archaeology at Simon Fraser University in Burnaby, British Columbia, will be one of two discussants who will conclude the

conference. Considered the "grandfather" of the Pacific Rim hypothesis because of his articulate scholarly papers produced during his long involvement with theory, Dr. Fladmark will evaluate recent research.

University of Kentucky archaeologist Tom D. Dillehay, specialist in South American archaeology and the excavator of the famous Monte Verde site, is expected to be a second discussant. Dillehay will be able to bring his unique South American perspective to the conference.

Registration for the conference will be \$25, which will include entry to "Missing Links—Alive." The exhibit's Portland appearance is the first in North America. Besides state-of-the-art animated reconstructions, the exhibit has artifacts dating back 35,000 years. For registration or exhibit information phone 503-797-4677 or consult the museum on the Worldwide Web, www.omsu.edu. 



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Robson Bonnicksen Director and General Editor

Don Alan Hall Editor, **Mammoth Trumpet**
e-mail: dhall@orst.edu

Bradley T. Lepper Editor, **Current Research in the Pleistocene**

Alice L. Hall Office Manager

C & C Wordsmiths Layout and Design

World Wide Web site <http://www.peak.org/csfa/csfa.html>

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The Americas after Monte Verde

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Montana, Ellen Quinn and Judy Kemp of the University of Illinois, and Susan Weld of Harvard—challenges the antiquity of the Monte Verde site. “The most parsimonious interpretation,” said Brown, who presented their paper at a symposium on pre-Clovis occupation, “is that the Monte Verde samples are contaminated by old carbon sources.”

Symposium discussant E. James Dixon of the Denver Museum of Natural History agreed that Monte Verde “throws a ringer” in interpretive models, but he took issue with the dismissal of Monte Verde dates. “I personally believe the work there was done very well and the dating is probably correct, but additional dating wouldn’t hurt.”

Dillehay Cautions Critics

Monte Verde’s principal investigator Tom Dillehay, who first surveyed the site in 1976, was a discussant in a later symposium on the Pleistocene-Holocene transition in North America. Referring to the criticism, the University of Kentucky archaeologist said that his critics had “never been to the site, never read the book, and never seen the artifacts.” He expressed his wish that colleagues would be more cautious in the way they treat archaeological evidence.

Jonathan C. Driver of Simon Fraser University, a discussant in still another SAA session, criticized the way in which the Monte Verde site finally gained acceptance of the archaeological community. “I think that any discipline that relies upon the opinions of six people as a panel of blue-ribbon experts has got some serious methodological problems, if that’s the basis for decision-making about when humans entered the New World,” he said. Driver cited the extreme example of leading scientists accepting the authenticity of Piltdown man, a hoax perpetrated early this century when a human skull was combined with an ape’s mandible. “That’s casting absolutely no aspersions on Monte Verde,” he assured the assembled archaeologists, “I just wanted to use it as an example.” He said he had not yet been able to read Dillehay’s much-heralded book on Monte Verde because his library did not yet have it.

Though presentations in Seattle offered diverging views on timing of the earliest entry to the Americas, a consensus for conservatism was evident. Theories that were offered tended to focus on the quickest possible way for people to get to Chile 12,500 years ago. Few, if any, archaeologists were advocating the much earlier dates—perhaps 20,000 to 40,000 years ago—proposed by some genetic and linguistic research.

Late Entry Remains Popular

“I’ve noticed that just about everybody at this symposium assumes a post-15,000 B.P. entry,” said Driver in his summation of a session on early population movements in the Americas. The same could be said about the other Paleo-American sessions. “It seems that some people got into America several centuries before Clovis,” said Stuart J. Fiedel, “perhaps at the beginning of the Bølling warming period around 14,700 calendar [12,600 radiocarbon] years ago.” Paleoeologist Carole Mandryk put



DON ALAN HALL

American paleo-archaeology was a cover story for *Seattle Magazine* when leading prehistorians were in town. To produce the magazine’s cover, Jerry Gay, a prominent Seattle photojournalist, herded three participants in a symposium on the Pleistocene-Holocene transition outside to photograph them against some of the city’s newest architecture. From left to right are Gary Haynes of the University of Nevada-Reno, D. Gentry Steele of Texas A&M University, and C. Vance Haynes of the University of Arizona.

the most likely time between 14,000 and 12,000 radiocarbon years ago. Others, including archaeologists who have come to accept the coastal-entry route, are being even more conservative, rejecting Monte Verde dates and sticking with dates similar to those long accepted for Clovis.

There were exceptions. In a poster session on North American Prehistory, Richard MacNeish, Donald Chrisman, and Geoffrey Cunhar reported dates that included 19,000, 32,000, 36,000 and 51,000 years ago in their analyses of human modification of animal bones in the pre-Clovis layers of Pendejo Cave, New Mexico. Their poster depicted some of Pendejo’s bone tools and evidence of marrow recovery from animal bones.

The “radiocarbon-years” scale remains archaeologists’ preferred method to express ages of early sites and possible dates

for human arrival in the Americas. At last year's SAA meeting, Fiedel urged colleagues to use recalibrations of radiocarbon chronologies when considering late-Pleistocene and early-Holocene peoples because the corrected (or calendar) dating actually lengthens the critical Pleistocene-Holocene boundary period because of plateaus and reversals in the radiocarbon dates during Clovis and Folsom times ("Corrected Radiocarbon Calendar Can Clarify Peopling of the Americas," *MT* 12:4). Time references at SAA for settlement of the Americas, however, were almost universally uncalibrated dates.

Comparisons Difficult

Calibrated dates potentially could illuminate theoretical interpretations of the routes people used to get from Beringia to the earliest-known sites across the Americas, but the difficulties in comparing and interpreting calibrated and non-calibrated dates thus far seem to have persuaded scholars to stick with conventional radiocarbon years. South American specialist Thomas F. Lynch noted that only radiocarbon years appear in the archaeological literature.

Although he expressed support of some form of coastal entry, Lynch, a vocal critic of Monte Verde dates, told a symposium on Pacific maritime adapta-

tions that Monte Verde's bola stones look Archaic, not Paleoindian. Lynch said he supports Clovis dates no older than 11,100 to 9,800 years B.P.


While many presentations expressed preference for the coastal-route theory, the ice-free corridor theory is far from dead, and is favored by some as a route for Clovis-culture people. Like uncalibrated radiocarbon years, the ice-free corridor remains much a part of the archaeological theories of early Americans. Even some presentations expressing a preference for coastal entry included the obligatory slide of a map of North America with arrows indicating the theoretical migration route from Beringia south-eastward along the eastern side of the Mackenzie and Rocky mountains. Other presentations at SAA's American prehistory sessions presented the ice-free corridor more or less as a straw man to vanquish in favor of what they consider a more realistic theory.

Scenarios Focus on Migration

Arguments at SAA about Paleo-American movements tended to involve the actual migration of populations and not simply the spread of technology through existing populations. In that sense, spread of archaeological evidence was viewed more as people on the move, perhaps in some cases as suggested by the Mam-

moth *Trumpet* masthead. Presentations tended to avoid more complex interpretations that tend to be offered by geneticists and linguists.

There was considerable focus, including a half-day symposium, on the causes and impacts of late-Pleistocene extinctions. This subject we shall have to save for a later issue. Studies and models indicate great environmental change, but the appearance of humans, whether as hunters or scavengers, remains an issue to be considered and debated. Scientists voiced little support for the theory that hunters were primarily to blame for the disappearance of Pleistocene megafauna.

Perhaps the biggest source of agreement at SAA was that this is a fascinating time to be involved with research on the peopling of the Americas. 

—Don Alan Hall

SUGGESTED READINGS

ON Post-Monte Verde

Lepper, Bradley J. 1997 Dillehay Breaks the Clovis Barrier! *Current Research in the Pleistocene* 14:vii-viii.

Gibbons, A. 1997 Monte Verde: Blessed but Not Confirmed. *Science* 275:1256-1257.

Meltzer, D. J. 1997 Monte Verde and the Pleistocene Peopling of the Americas. *Science* 276:754-755.

Between SAA sessions, Tom D. Dillehay, University of Kentucky archaeologist and principal investigator of the Monte Verde site in Chile, talks with the University of Alberta's Alan L. Bryan, right, an archaeologist who has long

argued that evidence supports pre-Clovis peopling of the Americas. Below, a poster presentation by Donald Chrisman, Richard MacNeish, and Geoffrey Cunhar, all of the Andover

Foundation for Archaeological Research, displays evidence from New Mexico's Pendejo Cave indicating probable artifacts from layers dating from 13,000 to 51,000 years ago.



BOTH: DON ALAN HALL

Coastal-Entry Model Gains Support As Ice-free Corridor Theory Fades

THE COASTAL-ROUTE THEORY is "in."

Many of the scientists giving presentations at Seattle SAA meetings on the prehistory of the Americas now agree that the first people may well have arrived from Asia along a North Pacific coastal route. This is a big departure from the long-dominant consensus that the first Americans arrived through an inland ice-free corridor onto the plains of what is now Alberta and Montana. Some scholars presented evidence and others called for more research on this challenging archaeological problem.

"We can no longer afford to disregard the coastal route due to the difficulty of investigating it," said paleoecologist Carole Mandryk of Harvard University at the conclusion of her detailed presentation contrasting the merits of a Pacific-rim route with the ice-free corridor route. Dr. Mandryk declared the ice-free corridor theory all but extinct, though she conceded the possibility that Clovis people could have come that way.

Archaeologists are reviewing what they've learned from past efforts and are looking harder at new and untried research strategies. One SAA symposium, organized by James B. Richardson of the Carnegie Museum and Daniel H. Sandweiss of the University of Maine, was devoted specifically to marine adaptations on the Pacific Coast of the Americas at the end of the Pleistocene. The session provided no direct evidence that the earliest humans arrived in the Americas by sea, but its participants presented a number of clues that could help in the quest to solve the mystery.

Strategies include the study of geo-

logic uplifts that have kept some paleo-shorelines above sea level, study of caves near the coast, analysis of bathymetric data and undersea cores, and stable-isotopic data that reveal whether ancient people had a marine or a terrestrial diet. The coastal-migration model assumes a marine adaptation with people subsisting to a considerable degree on seafood ranging from shellfish to marine mammals.

E. James Dixon of the Denver Museum of Natural History reported that the 9,300-year-old human bones discovered in a cave on the southeastern coast of Alaska were those of a person who had a marine diet. The site was discovered during a survey of caves in unglaciated portions of the Alaskan coast. ("Ancient Alaskan Bones May Help to Prove Coast

any agricultural system. When did coastal people first arrive? Massive changes in the relative positions of land and sea are hiding a direct answer. Carlson said that little bone, which is needed for isotopic analysis, has survived much more than 6,000 years on British Columbia's coast.

Marine adaptations of Pacific Coast peoples have traditionally been studied to determine when they moved from interior to coastal diets, *not* the other way around. The assumption has been that the first Americans arrived by way of an interior ice-free corridor and eventually—long after Paleoindian times—found their way to the coast where they learned to utilize coastal resources. Now it is possible to examine the issue from a marine perspective.

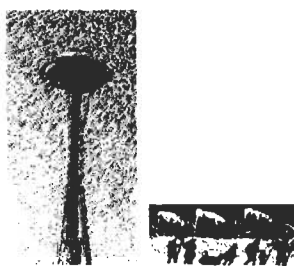
The long-dominant interior-corridor theory is supported by the fact that the earliest sites of Clovis and later traditions have been in the interior. Carlson cited the evidence of two ancient skeletons from the Northwest interior, one dated to 8,150 years ago from British Columbia's interior, and another, the Buhl woman from farther south in Idaho, dated to more than 10,000 years ago. He noted that isotopic analyses show that these two ancient inland individuals had little marine protein in their diets. Further, marine-based food—salmon—first came to people up the Northwest's rivers sometime before 5,000 B.P.

Isotopic data from the British Columbia coast, Carlson said, indicate that people lived on a marine protein diet as far back as there is evidence for occupation. However, the earliest human remains from the British Columbia coast date to less than 6,000 radiocarbon years ago.

New evidence from the coast of Southern California also offers little or no support for the theory that early coastal people were descendants of the makers of Paleoindian fluted points. Richard Fitzgerald reported on a single-component shell-midden site in San Luis Obispo County that dates to 10,300 radiocarbon years ago. A lithic assemblage of milling equipment, core tools, and hammerstones indicates a subsistence heavily dependent on vegetable processing (charred seeds of seven edible taxa were recovered) and shellfish collection.

SAA

SOCIETY FOR AMERICAN ARCHAEOLOGY



Migration Theory," **Mammoth Trumpet** 12:4).

SAA's session on early West Coast maritime adaptations moved southward from Alaska to British Columbia's earliest archaeological sites and a synthesis presented by Roy L. Carlson of Simon Fraser University. Dr. Carlson said that early hunter-gatherers became expert in the exploitation of marine resources and eventually developed a sedentary, village-based cultural system as complex as

Known as Cross Creek, the site was found on a Pleistocene terrace that was covered with alluvium early in the Holocene. It is now almost 10 kilometers from the coastline, but was nearer to an ancient estuary. Oxygen-isotope studies indicate that shellfish were gathered throughout the year. Archaeologists Fitzgerald and Terry Jones, his co-author, believe the site "represents a broad-based coastal gathering culture that is partially contemporaneous with Paleoindian cultures." Further, they find it unlikely that the Cross Creek people descended from big-game hunters recently arrived on the coast.

"It was the Plains location of the earliest Paleoindian sites that first focused attention on the ice-free corridor area as a possible migration route," said Mandryk, whose presentation was part of an SAA symposium on early population movements in the Americas, organized by Georges E. Pearson and David R. Yesner. Geological and paleoecological research in the 1980s had indicated there was unglaciated land between the Cordilleran glaciers on the west and the vast Laurentide ice sheet on the east and north during much of the late Wisconsin. Mandryk's own studies indicated that the southern third of this corridor was open until about 21,000 years ago, but that it remained a non-viable environment until almost 12,000 years ago ("Paleoecologist Finds Corridor Ice-free but Forbidding," MT 7:2).

Recent work by Canadian geologists in the Mackenzie Mountains, said Mandryk, indicates that the northern portion of the corridor was blocked by Laurentide ice by 30,000 years ago (**Suggested Readings:** Jackson and Duk-Rodkin). Mandryk,

who has long stressed that a corridor free of ice is not necessarily "open" to human hunters, told the symposium that it blocked population movements from 30,000 until at least 12,000 years ago. Further, she said, "the latest geological data reporting coalescence during glacial maxima indicate the corridor was a feature of deglaciation—that is, the environment was created by amelioration and glacial retreat during post-glacial times."

"The ice-free corridor... could not have been the route of travel by Monte Verde ancestors."

"The ice-free corridor as traditionally defined was not available until 12,000 years ago and therefore could *not* have been the route of travel by Monte Verde ancestors," she said. "The implications of non-

accessibility of the corridor prior to 12,000 years ago are that archaeological sites south of the borders of the ice sheets dating prior to 12,000 years ago are either (1) evidence of migration prior to the establishment of the environmental barrier or (2) remains left by people who arrived in the New World via some other route—for example, the coastal or interior British Columbia route."

"The reality of Monte Verde forces us to consider these possibilities," said Mandryk.

"We need to seriously consider the coastal route for the initial migration of humans into the Americas. The coastal route has long been championed by a handful of researchers who believed that the route represented more favorable environmental conditions and required less technical innovation. It is, however, rarely seriously considered by the majority of New World archaeologists." Speculating on why the coastal route has been considered implausible, Mandryk said it has commonly been

dismissed as either unlikely or impossible to test because archaeological sites of pertinent age are presumed drowned by rising sea level, "which are, of course, two separate issues and one does not preclude the other," Mandryk told the symposium.

She said that when the coast has been dismissed as a non-viable route, it has usually been on the basis of conditions during the late-Wisconsin glacial maximum. She said, however, that during post-glacial ice retreat, the coast route provides evidence of accessible landscapes and environmental viability.

Mandryk summarized recent work by several researchers on glacial and climatic history, sea-level changes, archaeology and anthropology of the Northwest Coast (**Suggested Readings**).

She cited several examples of climatic amelioration at the end of the Pleistocene. Alaska's Cook Inlet was deglaciated 16,000 years ago, and coastal ice south of south-central Alaska is believed to have retreated by 16,000–14,000 years ago in most areas. Colonization by pioneering vegetation followed quickly. "Data from the Alexander Archipelago support the



Carole Mandryk, left, talks with two members of the audience during a break in the symposium on the peopling of the Americas.



existence of extensive unglaciated coastline allowing for continuous habitation by ground-based bears and other mammals throughout the entire Wisconsin period" (Readings Heaton et al.). Further, she said that most areas that were ice-covered during the late Wisconsin maximum, approximately 23,000–19,000 years ago, were ice free by 15,000–14,000 years ago.

"Farther south in coastal British Columbia," Mandryk told the symposium, "a deep sea core supports earlier indications from the Queen Charlotte Islands that the glacial maximum in this area was older than 15,000–16,000 years ago, and deglaciation of the outer shelf was complete by 13,000 years ago. New evidence demonstrates that large areas of dry land were exposed between the Queen Charlotte Islands and the mainland due to the forebulge effect of isostatic depression from the Cordilleran ice sheet" (Readings: Josenhans et al.). Research using undersea cores and hydrographic mapping indicates that lower sea levels and local rising of land produced extensive offshore banks east of the Queen Charlotte Islands that were free of ice between 13,000 and 10,000 years ago. "This landscape was not a barren, icy land but was a vegetated environment of willows and sedges with lakes, rivers, extensive beaches and eventually forests," she said.

On the northeastern side of the Queen Charlottes, a non-arboreal vegetation as-

semblage was in place 16,000–12,000 years ago, she said (Readings: Mathewes 1989). New data from other sites along the now-submerged continental shelf off of the British Columbia coast indicate that biologically diverse and productive non-arboreal shrub communities were widespread during late glacial times when large parts of the adjacent mainland were buried under ice.

Mandryk cited anthropological evidence as well as geological and paleoecological evidence. "Oral histories of

bank levee deposits, deltas, lakes, streams, and beaches now as much as 153 meters under the sea shortly after glacial retreat. "Levee deposits of different ages and at different elevations have been recognized and could be sampled to determine the relative age of these drowned river systems," said Mandryk, adding, "Significantly, this landscape was available for humans one to two thousand years earlier than any interior ice-free corridor, creating a viable alternate migration route into the New World."

New evidence from California offers little support for the theory that early coastal people were descendants of fluted-point makers.

Northwest Coast people clearly describe post-glacial environments and events—a treeless land with sea level much lower than the present, and exposed land where there is none now; a land consisting of only water, ice and a narrow strip of shoreline. The arrival of forest vegetation 12,000 years ago suggests these stories predate 12,000 years."

Geomorphological analysis of bathymetric data cited by Mandryk reveals a drowned landscape that included meandering and migrating rivers with river-

Mandryk offered a challenge to archaeologists by suggesting there is a good chance that archaeological sites might have been preserved by rapid burial caused by extremely rapid rise in sea level beginning 10,300 years ago. For now, however, she agrees there is no archaeological evidence to support Pacific Coast migration of the first Americans.

"Acceptance of the likelihood of early coastal inhabitants will alter where and how we search for archaeological evidence on the first Americans." Noting that known coastal archaeological sites date to little more than 10,000 years ago, she argued that shouldn't be seen as a validation of the ice-free corridor. "The absence of archaeological evidence on the coast dating prior to 11,000 years ago should not by default be seen as supporting the ice-free corridor as a more likely migration alternative," said Mandryk, "since the corridor itself lacks any archaeological evidence prior to 11,000 years ago—a point often overlooked."

"Clearly there are abundant data indicating the coast was physically accessible, the climate was not particularly severe, and terrestrial vegetation was present 14,000 years ago," she told the symposium. "There doesn't appear to be any *a priori* reason a maritime-adapted, bifacial-tool-using population couldn't have migrated along the south coast of

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SUGGESTED READINGS

ON Coastal Route

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- Jackson, L. E. Jr., and A. Duk-Rodkin 1996 Quaternary Geology of the Ice-free Corridor: Glacial Controls on the Peopling of the New World. In: *Prehistoric Mongoloid Dispersals*, edited by T. Akazawa and E. J. E. Szathmary, pp. 214–227, Oxford, New York.
- Josenhans, H., D. W. Fedje, R. Pienitz, and J. Souton 1997 Early Humans and Rapidly Changing Holocene Sea Levels in the Queen Charlotte Islands—Hecate Strait, British Columbia, Canada. *Science* 277:71–74.

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- Mandryk, C. A. S. 1996 Late-glacial Vegetation and Environment on the Eastern Slope Foothills of the Rocky Mountains, Alberta, Canada. *Journal of Paleolimnology* 16:37–57.
- Mann, D. H., and T. D. Hamilton 1995 Late Pleistocene and Holocene Paleoenvironments of the North Pacific Coast. *Quaternary Science Reviews*, 14:449–471.
- Mathewes, R. W. 1989 Paleobotany of the Queen Charlotte Islands. In: *The Outer Shores*, ed. by G. G. E. Scudder and N. Gessler, pp. 75–90, Queen Charlotte Museum Press, Skidegate.

ARCHAEOLOGISTS who are willing to consider evidence other than the archaeological record are likely to support a much earlier time for the peopling of the Americas than those who rely solely on hard, archaeological evidence. SAA's symposium on the pre-Clovis peopling of the Americas included presentations using geography, the distribution of languages, and the ranges of Pleistocene mammals as clues to the antiquity of the human presence in the Western Hemisphere.

The linguistic and faunal concepts aren't new, but the new consensus that there were Americans who predated the Clovis culture provides scientists such as Richard A. Rogers and Larry D. Martin the impetus to refine and renew arguments that people lived south of glacial ice that covered much of North America toward the end of the Wisconsin period. Archaeologist Rogers, formerly at the University of Kansas and now with a branch of the U.S. Department of Agriculture, has been analyzing the distribution of American languages; paleontologist Martin of the University of Kansas analyzes Pleistocene fauna. In separate papers, they explained to the symposium chaired by Alvah Hicks and Rogers why they believe people must have been in North America at the time of the last glacial maximum, more than 18,000 radiocarbon years ago.

"Languages are the result of historic processes," said Dr. Rogers, citing the pioneering historical analysis of linguist Edward Sapir early in the century. He said Sapir realized that the basis for modern historical linguistics is the fact that languages differentiate over time, and as they differentiate, languages tend to diverge and split up into other languages. In time—just how much time is open to debate—language groups diverge even further so that languages become mutually unrecognizable.

"Edward Sapir realized that as languages diversify, the longer they were in a geographical area the more diverse they would become," said Rogers. "You look at the range of a group of related

languages," he added, indicating a map he had projected on a large screen, "and the area that shows the greatest diversity has a very high probability of being their homeland."

Further, as languages continue to diverge and there are many language groups that don't seem to be related, it is likely that the area has been occupied for a very long time, he said. In other words, a region that has many appar-

or are peripheral to it," Rogers said. "This suggests that language groups were present when glacial ice was here 18,000 years ago, and that they diversified, and that they've had less time to move into glaciated areas."

To get a picture of North American languages through time, Rogers considered the distribution of more than 200 languages relative to four separate stages of deglaciation. The majority of these, 135, were distributed in the area unglaciated during the Wisconsin glacial maximum. Fifteen were distributed in areas unglaciated or deglaciated by 12,000 years ago, 13 in areas deglaciated after 12,000 years ago, 12 in the area deglaciated between glacial maximum and 12,000 years ago, 12 in the area deglaciated between glacial maximum and 10,000 years ago, and 11 in the area deglaciated

after the maximum but before the present. None was found in areas deglaciated after 10,000 years ago. "All languages isolated in that area," Rogers said of the most recently deglaciated region, "can be shown to extend back into the areas that were deglaciated earlier."

"That suggests to me—clearly—a movement into progressively younger areas where [languages] do not have enough time to diversify." He displayed a graph charting through time, beginning with the glacial maximum, both the number of exclusive languages per million square miles and the percentage of exclusive languages in an area. The lines for number and percent were nearly identical.

"What I'm suggesting is that Wisconsin glacial ice left a readily discernible imprint on Native American languages and *not* just in the glacial maximum spread, but in the retreat. This is fascinating because it has lots of implications," Rogers told the symposium. "The obvious one suggests that human beings were already present 18,000 years ago."

Comparing evidence from linguistic studies with late-Wisconsin glaciation is known as barrier dating. "Barrier dating," Rogers explained, "says that if you

Non-Archaeological Evidence Suggests People South of Ice

ently unrelated languages is not likely an area that has been populated relatively recently.

Building on this linguistic principle, Rogers has taken information from linguists on geographical locations of languages and mapped them. He showed the SAA symposium his most recent results depicting the diversity of languages that existed in the Americas at or before the time of Euro-American settlement. Referring to a particular map of North America projected for his audience, Rogers explained the pattern of dots scattered unevenly across it. The dots, he said, represented linguistic homelands—places that ethnographic and linguistic information has suggested were the sources of the languages.

The map showed a concentration of dots along the Pacific Coast and across the South. Another map depicted North America 18,000 years ago. "It is interesting to note that more than 60 percent of North America north of Mexico was covered with glacial ice." It was apparent that the dots—each indicating linguistic homelands—were primarily outside the glaciated area.

"If you take these reconstructed linguistic homelands," he noted, "all of them fall clearly outside the glacial ice

had a barrier in the past, say, a glacier, a changed seacoast, a giant lake, something like that, which disappears and yet still seems to control boundaries of some linguistic, cultural, or biological phenomena like gene frequency, then it is very probable that those differences extend back to the time the barrier existed."

After citing the evidence left by North America's glacial barrier, Rogers offered the example of a hypothetical late-Pleistocene-Holocene lake in South America. The lake, said to have covered much of the Amazon basin, is quite controversial, he said. Some scientists argue that it was Miocene in age and others insist that it was a grassland, not a lake. Rogers believes that the distribution of fish in the Amazon basin is a persuasive argument that a lake existed.

"There are fish that can't survive in the main channels, yet they are found at upper ends of a great deal of rivers that aren't connected. The only way they could have gotten there," he told the symposium, "is if a lake had existed and they swam through the lake and into the upper

*"The implication is that
human beings were
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way did they come?"*

I think it's pretty obvious."

reaches." When the lake drained away, the fish were left in upper reaches of unconnected rivers. Rogers said recent research has suggested three differing lake levels, the oldest dating into the late Pleistocene between 35,000 and 10,000 years ago. The youngest level may have drained as recently as 2,500 years ago.

For Rogers, the lake represents a testable hypothesis for barrier dating. Mapping the presumed locations of linguistic homelands in South America, he demonstrated that none appears in the central area of the hypothetical lake. "In many ways, this is similar to what we saw

with glacial ice in North America," said Rogers.

Linguistic evidence, he continued, provides clues to the movements of peoples. The location of linguistic homelands and the directions of diversification can point the directions of migrations.

"One of the big questions now in North American archaeology is how did



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people come into the New World," said Rogers, mentioning the hypothetical ice-free corridor and the coastal routes. Then he returned to his illustration of North America on which language homelands were plotted as dots. "Look at that map," he said, noting the evident concentration of dots along the Pacific Coast from British Columbia into Northern California. "Where do you think people were the longest? Which way do you think they came? I think it is pretty obvious."

Rogers's map locating South America's language homelands did not show quite the concentration of dots depicted on his North America map, but it did show a pattern that bordered Atlantic and Pacific Oceans and avoided the hypothetical Amazon-basin lake. Rogers suggested that people migrated southward along the west coast of North America as far as Panama, and then many people chose to follow the Atlantic coast into South America.

Paleontologist Martin told the pre-Clovis symposium that if there were people in North America long enough that they occupied Ice Age environments, they should be expected to have adapted to those environments. "Their distribution should, in some way, reflect the Pleistocene distribution of plants and animals."

Martin described his work mapping assemblages of animals that tended to co-occur during the Ice Age. He then compared his faunal distributions with

maps a colleague had made of Ice Age vegetation complexes. "I discovered something that's not particularly surprising—the animals and the plants are distributed almost exactly with each other." He showed one map marking the ranges of Pleistocene animals and another showing ranges of Pleistocene vegetation. His *Symbos-Cervalces* faunal province, marking the range of a group of animals including woodland musk ox (*Symbos*), stagmoose (*Cervalces*), yellow-cheeked vole, giant beaver and others, matched the spruce taiga vegetation regime of the same era.

"You can see that the Pleistocene fauna fits almost exactly within the spruce forest line." Not at all unexpected, Martin said, but he did get a surprise when Richard Rogers saw his maps and asked him where he got the maps of North American Indian languages. As it happened, the calculated range of the Algonquian language group was almost the same as Martin's *Symbos-Cervalces* province—in the eastern mid-continent.

"From this, we can speculate where the major Indian language groups may have been in the Ice Age." Martin went on to say that Ice Age biogeographies seem to explain the distribution of languages, while the modern biogeography does not.

"As the ice melted and we shifted from the Ice Age climate to the Holocene climate," Martin told the symposium, "people began to redistribute." Algonquians moved north into areas formerly occupied by continental ice—areas that had become spruce taiga. It's the same sort of environment they started out in, he said.

Turning to human groups believed to have arrived in North America later, Martin traced Arctic tundra habitat, which is the home of people speaking Eskimo-Aleut languages. "We can see the Eskimo-Aleuts will sweep across the north in the tundra environment, an environment similar to where they were in the Ice Age." Then Martin showed a map of Na-Dene speakers moving south from coastal Alaska with the retreat of glacial ice and advancing spruce forests.

With the exception of its Southwestern population, Martin said, Na-Dene people occupied an area that closely coincided with the range of a group of ani-

imals that included the snowshoe hare and pine martin.

"It's interesting," he said, "because these animals are in a distribution they could not have had during the Pleistocene because that area was occupied by continental ice. So since the Pleistocene—during the Holocene—these animals have expanded their ranges... and have formed a distribution almost identical to that of the Na-Dene." He called the correlations "ideas of great power," because they carry the important implication that languages maintain some sense of identity for a very long period of time.

Martin suggested that languages could maintain certain broad categories of identity for 15,000 years. "It's not an absolutely insane idea, because you have to remember that pharaonic Egyptians maintained a recognizable identity for almost halfway back to the end of the Pleistocene." Make that simply a language within the Semitic group, and "who knows how far we could recognize Semitic languages as a group."

Biogeographical areas such as those defined by Pleistocene animal remains might be viewed as behaving like cultural regions, Martin concluded, "and as such may be important to archaeologists."

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Coastal-Entry Model

continued from page 7

Beringia and down the Northwest Coast between 14,000 and 13,000 years ago.

"Acceptance of the Monte Verde site implies a fundamentally different history of the colonization of the New World than the Clovis-first model. Clearly Clovis was not first and we need to think differently about who was," she added, suggesting that it may well have been people from the maritime region of Japan or northern China who traversed the south coast of Beringia after about 14,000 years ago.

Mandryk noted that climatic events and glacial movements would have affected the timing of the coastal route. The Bølling warming interval between 13,000 and 12,000 radiocarbon years ago would have improved conditions along the route. Later re-advances of the southern Cordilleran glacier would have blocked the route, but she said those final Ice Age thrusts came after people already were at Monte Verde. Meanwhile, North America was ready to receive Clovis people.

"With the initial population movement down the coast followed by slow diffusion eastward into the continent," said Mandryk, "the interior would have remained relatively empty and available for the arrival and/or development of Clovis, whether they first came via an interior ice-free corridor or were a backwash from the south derived from descendants of the earliest coastal groups."

Mandryk doesn't rule out an earlier migration into Americas, but "it remains unlikely," she says. Theoretically, environmental conditions would have made coastal migration possible prior to the growth of Alaskan glaciers 23,000 years ago. However, she noted that the oldest accepted archaeological sites in western Beringia are no older than 25,000 years, and evidence points to a southern shift of populations throughout the Northern Hemisphere between 20,000 and 18,000 years ago. She says that Asians probably did not expand north and eastward into Beringia until after 16,000 years ago.

"If, however, there were humans living on the southern Beringian coast between 25,000 and 23,000 years ago, which of course we lack evidence of, they theoretic-

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cally could have moved east and then south along the coast prior to the deterioration of the environment."

Mandryk concluded by slamming the door on the ice-free corridor: "The traditionally preferred ice-free corridor route into North America was inaccessible between 30,000 and 12,000 years ago whereas the long-neglected coastal route was not only accessible but biologically productive during the critical interval between 14,000 and 12,000 years. Not only is the coastal route *not* implausible, it is the most likely and only possible post-glacial route available to Monte Verdean ancestors. As often argued, the initial coastal entry model has greater explanatory power than the traditionally accepted model—incorporating current data, especially the critical points of human presence in Chile 12,500 years ago, closure of the ice-free corridor between 30,000 and 12,000 years ago, and a viable and accessible coastal route."

Several papers in the SAA session on early Pacific coastal adaptations examined evidence—and where to look for it—from Meso-America, Ecuador, and Peru. Noting a lack of late-Pleistocene or early-Holocene archaeological evidence along the coast from California to South America, Barbara Voorhies of the University of Colorado said "somebody ought to go study it." She suggested surveying that coast's relatively few rocky headlands and sea caves, and recommended attention be paid to headlands near narrow places on the continental shelf and to the continental shelf itself. 

—Don Alan Hall

Pleistocene Wetlands Probably Provided Plenty of Vegetables for Paleo-Americans

Paleo-Barbie Demonstrates Harvest

PERHAPS THE MOST UNUSUAL PRESENTATION at SAA's Paleo-American sessions included snacks for the audience, an underwater dance by a Barbie doll, and a hypothesis for which there can be no direct archaeological evidence. The paper also provided food for thought.

Portland, Ore., researcher Melissa Darby told a Paleo-American Studies session that late-Pleistocene Americans were surely influenced by widespread abundance of the food source *Sagittaria latifolia*—wapato—in wetlands produced by melting glaciers. She demonstrated the desirability of wapato root by providing samples that she had harvested in a rural Portland wetland and baked.

"I have found that wapato is nutritious, highly palatable, easy to harvest, and highly productive." She argued against the supposition that Paleoindian people relied almost solely on a diet of meat.

"There has been a meat-biased view of hunter-gatherer subsistence, especially in late-Pleistocene environments. There is a view that in the northern latitudes, no plant foods were consumed during the winter months, and the dietary intake was solely reliant on animal protein and fat." Darby went on to cite nutrition research that indicates that there are problems with a diet high in protein and low in carbohydrates, and that shows a need for fats or carbohydrates to enhance a meat diet.

"So I'm going to say it right here: the Paleoindians of North America were eating some plant food of one kind or another." Because of wet conditions of terminal Pleistocene time, she



Melissa Darby offers bite-sized slices of wapato, roasted in aluminum foil, to her audience.

argued that wapato is a likely candidate for that plant food. It remains very common along the lower Columbia river in Washington and Oregon. "In this environment tubers were harvested by wading in shallow water where it grows," Darby said, explaining that by stirring up the muddy substrate with the feet, a wapato gatherer releases the plant's tubers, which float to the surface. She showed slides of the growing plant.

"Last October, I harvested 5,480 kilo-calories, about 112 wapato, in a 30-minute period. They floated to the surface."

To illustrate the harvest technique, Darby produced a fish bowl of water containing wapato tubers buried in gravel. Then, to the obvious amusement of the audience, she used a paleo-costumed Barbie doll to trample the underwater sediments, causing the wapato to float. Further, she noted that at least one



Paleo Talk

Exchanges of ideas continue informally during a break in a Society for American Archaeology symposium on the peopling of the Americas. Amy Dansie of the Nevada State Museum, center, listens to D. Gentry Steele of Texas A&M University, far right. Behind them Donald K. Grayson of the University of Washington, left, speaks with James C. Chatters of Richland, Wash. Chatters, the anthropologist who carried out the initial investigation of 9,300-year-old Kennewick Man, gave a paper on possible implications of the discovery. Steele gave a paper describing the morphological affinities of two other ancient American skeletons that are in the care of the Nevada museum.


of the tubers remained on the bottom, illustrating that not all of them float at any one time. She said some stay down, assuring continued growth, and added that the more the plant is disturbed by harvesting, whether by waterfowl or humans, the more it grows. The U.S. Army Corps of Engineers, she said, considers it a noxious weed because it impedes water flow.

Shortly before the SAA meetings Darby returned to the wetland where in 30 minutes last October she had harvested 112 wapato. This time, she was able to find only 16 to 18 in the same length of time—just enough to bake for her possibly squeamish audience. She said the spring harvest probably was small because her wapato marsh had been heavily fed upon by swans and geese. However, she noted that had she been living close by the patch, as many native people have done, she probably could have discouraged waterfowl depredation.

*"It can be eaten raw or
cooked in hot ashes."*

"I have found that it stores well fresh or dried. It can be eaten raw or cooked in hot ashes." She said her samples had been baked for 15 minutes in a 400-degree oven. Tubers average between 35 and 75 mm in length, and weigh about 10 grams when fully mature, and small ones are as edible as large ones. "It does not need to be ground, trimmed, peeled, sliced, diced or processed in any way," she said.

Archaeologists can't count on finding clues to wapato use in the form of rock-lined ovens, fire-cracked rock or ground-stone tools. Darby can't point to any proof that Paleoindians ever tasted the stuff, but she's confident it grew abundantly at the conclusion of the Ice Age.

"I think that as the glacial ice was melting and there was a lot of water in the environment, there was a lot more wapato. I don't have any proof that the Native Americans of that time were eating wapato," she concluded, "but there was a lot available." 

—DAH

Tribal Members Active at SAA Even at Pre-Clovis Symposium

Members of Native American tribes took an active role at the Seattle SAA meetings, even in sessions that focused on the distant "First Americans" or Paleoindian period.

Joe Watkins, first speaker in the symposium "Pre-Clovis Human Occupation of the Americas," advocated that archaeologists pay attention to tribal stories and use them to interpret archaeological data; he also discussed some limitations they may present. As he discussed the implications of migration theories among Native American tribal groups, Watkins, who is with the U.S. Bureau of Indian Affairs, stressed the heterogeneity of views among American Indians.

The typology he used to discuss this category organizes the heterogeneity of views into three groups—conflict, compromise, and concurrence.

Conflict: For some native groups, working with archaeologists to discover when and how the Americas were colonized is antithetical to their world view. To them, Watkins said, "We were always here." Such a view leaves little room for compromise with the archaeological record, he said, citing the controversy surrounding the "Kennewick Man" as an example of such a situation.

Compromise: His second category refers to tribal stories that include migrations, in the recent or distant past. Such stories can offer opportunities for working with archaeologists in pursuit of shared goals of learning about prehistory. Watkins said that Southwestern tribes such as Hopi and Zuni may be examples of compromise, for although there is potential for conflicting judgments about the past, there also is potential for compromise.


Concurrence: Examples of the third possibility are tribal migration stories of groups such as the Choctaw who tell of people migrating from the North and West across a large river.

Watkins emphasized that his categories are by no means exhaustive, but he told the symposium that archaeologists

can benefit greatly by studying tribal-origin stories. Archaeologists, he said, should see the utility of the stories, and neither assume them wrong nor accept them at face value. He noted that archaeologists currently are focused on doing things that serve tribal people, and he encouraged the continuation of these efforts. He called his typology a framework for observations and said it was not meant to be taken too seriously, but his main message was that archaeologists and Indian people can work with each other and learn from each other.

Alaskan Herbert Anungazuk, with the National Parks Service in Anchorage, invited the audience to visit his "beautiful, but unforgiving" environment. Throughout the presentation, his own dedication to his environment, and his affection for it, were evident. Anungazuk's picture of his land was particularly poignant in this symposium because it provided an image of the same environment in which those who became the "pre-Clovis" people must also have been at home.

In an eloquent, sometimes poetic paper, titled "To Live in Indigenous Ways is Living in Conscience," he discussed problems of his people's land. Pollution has had a harsh effect, he said, and social problems result from the loss of traditional skills needed for subsistence and survival in the far north—construction of watercraft that can get you home across icy water in winter, and management and maintenance of sleds and dogs—and the introduction of alcohol and other drugs.

Tribal members were active at SAA in other ways. Cultural resources officers of tribes displayed posters and presented papers, and some sessions aimed at exchanging perspectives with the goal of improving relations between archaeologists and Native American communities. Most of the presentations and sessions were concerned with archaeology of the recent past, where continuity exists between the contemporary tribal community and archaeological resources. 

—Roberta L. Hall

CLOVIS SECOND:

Considering a Relationship with 'The Other'

A growing consensus that Clovis people were not the first Americans is inspiring archaeologists to come up with theories to explain the relationship of the fluted-point makers with earlier inhabitants. One approach might be to consider Clovis a distinctive technology that spread through interaction between newcomers and earlier people. The SAA symposium on Pleistocene-early-Holocene population movements in the Americas heard another interesting hypothesis proposed by Stuart J. Fiedel.

Fiedel, archaeologist and author of *Prehistory of the Americas*, sees Clovis as people who came through the ice-free corridor and spread quickly over two continents. Their distinctive tools diversified first into traditions including Folsom in the west, Cumberland in the east, and fishtail points in South America. In the process, Fiedel argues, Clovis people replaced the earliest Americans, represented by the people of Monte Verde, the Chilean site that dates to 12,500 radiocarbon years ago.

Clovis descendants, Fiedel told the symposium, reached Patagonia around 10,700–11,000 radiocarbon years (or about 12,900 calendar years) ago (**Mammoth Trumpet** 12:4 "Corrected Radiocarbon Calendar Can Clarify Peopling of the Americas"). Speaking of the South American fishtail points, Fiedel said "stylistic and technological derivation of these points from the Clovis tradition is

clear and indicates these people were Clovis descendants."

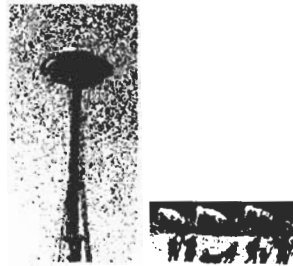
Rapid Spread of Thule People

He believes it took only 600 to 700 years for Clovis hunters to populate North America. "In the same time span, one population trekked some 4,000 miles to Tierra del Fuego." Such speed isn't difficult to understand, says Fiedel, if one considers a much more recent migration—the well-documented occupation of the Alaskan Thule culture of Greenland and Labrador, where it replaced the long-resident Dorset culture.

"There is no disagreement on either



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the dates or the cultural process involved," Fiedel told the symposium. "The Thule culture, ancestral to recent Inuit or Eskimos, developed on the west coast of Alaska and spread by swift coastal migration into northern Alaska and to Greenland and Labrador. Thule people traversed this distance, 1,500 to 2,000 miles, in less than 150 years between 900 and 1050 A.D." They completely replaced the Dorset people, who had occupied the Arctic coast for 1,500 years.

"Whether there was face-to-face contact between Dorset and Thule, or Dorset collapsed suddenly due to environmental change and Thule moved into the vacuum, remains uncertain," he said. "The main point I wanted to make concerns rapidity of movement. Thule people covered more than 1,500 miles in 100–150 years, sloughing off sufficient population along the migration route to fill the intervening territory and to create a physical, archaeological record."

Alberta to Mexico in 1,300 Years

Fiedel noted that the Clovis spread from Alberta to Mexico would have been about 1,300 miles. "They could have done that in less than 100 years." He went on to suggest that they had trekked through the ice-free corridor in only a matter of months, leaving no archaeological record.

In the case of both Thule and Clovis, the movement seems to have been a response to ameliorating climate. Thule movement came during a warm period and the Clovis movement, he said, probably came during a period of dramatic warming that began about 14,700 calendar (12,600 radiocarbon) years ago. By the time of the cold Younger Dryas period 12,900 (10,700 radiocarbon) years ago, said Fiedel, Clovis descendants were everywhere in North America.

"Maximal Clovis expansion in North America occurred at a time of climatic stress, in the Intra-Allerød Cold Period 13,250–13,100 [calendar] years ago and the ensuing 200-year warm period that created a drought in the Southwest." Fiedel presumes that the population was thinly scattered across the landscape.

Noting that Cree-Athapaskan inhabitants of subarctic forests have population densities of about one person in 80 square miles, he theorizes that it would have taken a population of about 125,000 Clovis descendants to "fill" the unglaciated portions of North and South America. "Assuming doubling per generation, about every 20 years, it takes 160 years for an initial population of 500 to reach this size."

Archaeologically Instantaneous

In the archaeological record, Fiedel told the symposium, such a dispersal of people, whether Clovis or Thule, would appear to have been instantaneous, or "within one sigma time frame."

"This Thule-Clovis analogy can be carried further," Fiedel told the symposium. "Thules specialized in whale hunting, Clovis specialized in mammoths." Both left distinctive hunting tools by which

continued on page 20

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WHAT ARE THE IMPLICATIONS for all of this?" asked Michael F. Johnson at the SAA symposium on peopling of the Americas. "It's pretty hard to say." Johnson, archaeologist with the Fairfax County (Virginia) Park Authority, was describing archaeological evidence for pre-fluted-point tool makers in southeast Virginia. He has been working for five years at the Cactus Hill site on the Nottoway River in Sussex County, about 45 miles southeast of Richmond.

In a real sense, Johnson has been conducting a separate but parallel investigation with Joseph M. McAvoy and the Nottoway River Survey ("Simple Tools, Hearth Found Beneath Clovis Horizon," *MT*:11:4) at the site, which is at a sand mine owned by a forest products company. Because of looting by collectors looking for artifacts made from the area's beautiful blue, cream, and milky-jade chert, chalcedony and glassy quartzite, Cactus Hill is a severely threatened site. Much of the site, located on a stable dune of silty sand, has been quarried to improve logging roads, or has a bombed look because of craters left by looters.

Since 1993, Johnson, McAvoy, and their teams of trained volunteers have been carrying out meticulous salvage operations at Cactus Hill, named for the prickly pear cactus that cover the ground there. Independently, they have been in-

vestigating slightly different parts of the site. The area is a remote part of a 1,400-acre hardwood tree farm owned by Union Camp Corp., which has cooperated by halting sand quarrying, trying to deter looters, and encouraging archaeology.

In 1994, McAvoy's team recovered

81590). More recently, a flotation sample of very fine carbon particles recovered by McAvoy produced a date of $16,670 \pm 730$ (Beta 97708).

Johnson told the SAA symposium that, after reviewing these discoveries, the presence of artifacts below Cactus Hill's

Blades Found Below Clovis Open Window On Unknown

charcoal from a hearth associated with Clovis artifacts that yielded a date of $10,920 \pm 240$ years B.P. (Beta 81589). Then in a level below the Clovis they found a simple type of tools and charcoal that dated $15,070 \pm 70$ years B.P. (Beta

well-defined Clovis level drew him back to the site in 1996. He described the recent geology, which consists of wind-blown sands and silts. Lower levels are characterized by lamellar banding—thin layers of iron-rich silt separated by well-defined layers of sand.

With the new-found importance of the site and the end to the sand quarrying, the already careful excavation strategy became even more meticulous. "We refined our methods," Johnson said, "down to five-foot sub-squares and half-inch sub-levels, and we started plotting everything from early Archaic down. *Everything*—charcoal, concretions, pebbles—you name it, we plotted it."

In level nine of the northeastern corner of the excavation block, where they had previously found Clovis material, Johnson reported that they found a quartz fluted preform base and several larger flakes in good context, but little else. "We were in an area of the site where there had been less activity," he explained. The objective of their strategy was to examine parts of the site less likely to have been disturbed by more-recent prehistoric activity and modern looters.

After his Seattle presentation, Johnson, left, shows a Cactus Hill blade to Gary Haynes of the University of Nevada.



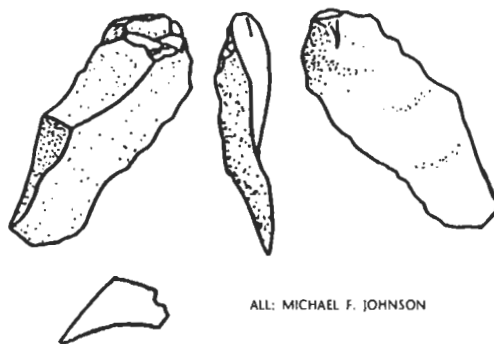
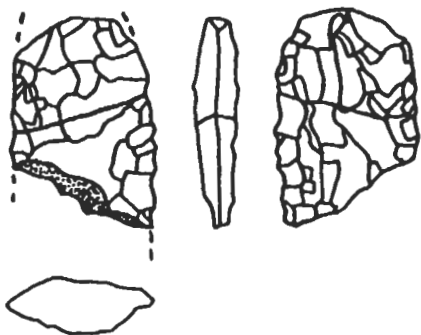
DON ALAN HALL



At the bottom of level 13 (eight inches below Clovis) was a quartzite blade "sitting straight up." Johnson said that he initially assumed it had come down from a higher level, although it came from undisturbed lamellae. However, a few feet away in the top of level 14, they found the top of the point. Shortly thereafter, five inches away from that, they found the point's midsection, including all but a small portion of the base.



Two pieces (left, drawing below) of a broken point from Cactus Hill's block A, square 24, level 14 fit together perfectly. For Johnson, the presence of such "cross mends" within features indicate site integrity. At right is a blade (and its drawing below) from the same pre-Clovis level. The drawings are actual size.




ALL: MICHAEL F. JOHNSON

"I knew we were into something else," he said. The excavation had gone nine full inches below the last Clovis materials.

"We proceeded to another blade, another blade, and another blade," said Johnson, as he clicked the slide projector's remote-control button. He noted that the artifacts, mapped top and bottom, all touched 48 inches below the site datum in the same 10-foot square of their excavation. He showed a diagram locating various features and showing the horizontal distribution of the artifacts. The point fragments and blades were in a rough six-and-a-half-foot-long line oriented with the crest of the dune. The diagram also showed piece-plotted charcoal, holes left by a rodent and a looter, and one small chert flake. "This material

Referring to the symposium's subject, pre-Clovis migration patterns, Johnson reminded his colleagues how little is known about the earliest Americans. "I don't know whether we're dealing with a proto-Clovis or not, but it does look like there's something technologically earlier here. As for how they got here—how they got to the Southeast—I do not know, and how old or when they arrived, I don't know."

He said Cactus Hill evidence has opened a window on the unknown. "We need to expand and do more survey work in the area and find a second site."

Johnson expects to be working at Cactus Hill for at least two more years. 

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NORTH WITH THE THAW?

Clues to Ice Age Albertans Prove 'Only' 13,000 Years Old

PALEOINDIANS definitely were in Alberta's Bow River Valley near the end of the Pleistocene, but not as early as University of Alberta researchers had thought, archaeologist Alan L. Bryan reported at an SAA session on Paleoindian studies. It also appears these early Albertans may have been moving north, into a gradually opening ice-free corridor, not south.

Dr. Bryan's conclusions came from the continuing study of sediments and artifacts from till underneath an Ice Age lake in the upper Bow River Valley in Calgary. In announcing confirmation of tools at the sites, Bryan also suggested that his team's research—coupled with most recent geologic evidence on glaciation—shows that scientists need to rethink the ice-free corridor hypothesis, which holds that Paleo-American hunters first swarmed into the New World at the end of the Pleistocene. Some archaeologists maintain that Paleoindians used the ice-free corridor as a freeway south from Beringia into southern Alberta as recently as 12,000 years ago. But this is not early enough to explain earlier sites in the Americas and, further, Bryan said: "It now appears the hypothetical corridor remained closed in the north from 30,000 years ago until after 11,000 years ago. Only sometime after 11,000 years ago, then, could people again move between the Great Plains and eastern Beringia."

A surface of stony till is exposed where glaciolacustrine beds have been removed at the Varsity Estates site in Calgary.

Support for an early-entry model is strengthened by the 12,500-year-old Monte Verde settlement in Chile, Bryan told the SAA session. People and other animals could have freely moved along the ice-free corridor from Siberia and Alaska through the Yukon and onto the Great Plains east of the Rocky Mountains before 30,000 years ago, he added, as he recapped recent geological research on glaciation in the eastern Yukon and western Northwest Territories.

The fact that projectile points similar to Great Plains Paleoindian types appear in the interior of Alaska supports the hypothesis that Paleoindian hunters were expanding northward—rather than southward into the Americas—as the corridor opened, Bryan said. That conclusion also fits his present working hypothesis for the Paleoindian presence and

direction of movement through his sites buried under Glacial Lake Calgary.

Bryan focused his SAA paper on his team's continued examination of evidence from excavations that have been carried on since 1990 in glacial till deposits under the terminal Pleistocene lake on Calgary's western edge. Excavators have recovered artifacts such as flakes, cores, and pebble tools, some found in situ on or in the till, which is below more than 20 meters of lake sediments. Combined with the earlier interpretation of glacial evidence, these discoveries had suggested that people had been there more than 20,000 years ago ("Pre-Glacial Site in Alberta Suggests Early Human Presence" *Mammoth Trumpet* 10:2). Investigators originally assumed that Lake Calgary was dammed by Laurentide glacial ice estimated to have reached Calgary about 20,000 years ago. They also assumed that people occupied the till surface after the Bow Valley Mountain glacier had retreated.

Further examination of the site, however, changed the researchers' understanding. Work at Varsity Estates, which is named for the residential development on the plateau above it, included expansion of excavation and water-screening of till material. Bryan explained that the till yielded 150 small granite pebbles that came not from the Rocky Mountains but from the Canadian Shield.

"Barring earlier Laurentide glaciation in the area, for which there is little evidence, this indicates the Laurentide Glacier must have been in contact with the



RUTH CROHN

Cordilleran Glacier before it started to melt back."

The new evidence suggests that the till containing some of the artifacts was exposed only briefly before the lake formed over it at what Bryan and his colleagues now believe was about 13,000 years ago. "So the site is not nearly as old as we originally thought."

Though earlier excavations at Varsity Estates and two related sites there produced a wide array of possible tools, more extensive excavation of Varsity Estates in 1996 and 1997 also confirmed "definite stone artifacts within and on the surface of the till, which is late Wisconsinan in age," Bryan said.

The most striking of the artifacts is a quartzite cobble chopper recovered at a depth of 72 centimeters below the surface of the till. He said the tool exhibits "heavy differential use wear on its distal working edge created by more than five overlapping unidirectional flake scars to create a symmetrical convex edge." Most of the 11 pieces categorized as scrapers exhibit differentially worn flaked edges—wear

from geologic context. The researchers had hoped to get a thermoluminescence date from a sand lens deposited below the artifacts. They were unable to do this because the sand apparently had not been exposed to sunlight necessary for the process to work, according to Ruth Gruhn, who with Jiri Chlachula was a co-

be unique for the number of artifacts contained in its till, Bryan is convinced there are similar sites to be found. He and his team are considering the possibility that people exploring the margin of melting glaciers may have crossed the Bow Valley Glacier while traveling along ice-free areas on the eastern slopes of the moun-



ALAN L. BRYAN

An investigator holds a pebble tool found about 70 cm deep under till at Varsity Estates.


author of the paper Bryan gave. Dr. Gruhn said the sand apparently had been deposited under the receding glacier rather than in sunlight. ("Measuring Energy Trapped in Stored Electrons," **Mammoth Trumpet** 9:3 has information on thermoluminescence dating).

Bryan told the SAA session that study of the sites will continue. This field season, the researchers were expecting to focus on another site in the complex where in 1994 Dr. Chlachula found stone artifacts eroding from gravel deposits in a disturbed slope face. During that preliminary study the team sought to establish an age for the site and correlate it with Varsity Estates and a third related site.

Although the Varsity Estates site may

tains—a hypothesis Bryan said needs to be confirmed with more research.

"What we can say for sure is that artifacts occur within—as well as on—glacial till that was subsequently covered by a glacial-ice-dammed lake. The geologic context is definite, but the interpretation of this contact is debatable—a terminal Pleistocene age has been agreed upon, and we still hope to date the deposits."

Archaeologists must remain open to exploring all possibilities in the search for North America's first inhabitants, Bryan concluded. "We must look for more sites in late Pleistocene geological contexts and not restrict the search to surficial and post-glacial contexts." 

—George Wisner

SAA

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that was evidently caused by use. The team also recovered 13 graters, four of which had been resharpened after heavy use by removing a flake from the ventral surface of the grater spur.

Although it appears that a considerable amount of tool flaking occurred, Bryan noted that his team recovered only one pebble hammerstone showing signs of use. More than 500 flakes with prominent bulbs were recovered, only one of which was retouched, so natural flaking of their edges did not occur. They also have recovered from the site hair samples, which have not yet been tested.

Overlying sediments contained insufficient organic material from which to obtain dates that could help provide chronometric age of the artifacts, leaving researchers with a relative date derived

Mammoth Conference Scheduled Next May

The Second International Mammoth Conference "200 Years of Mammoth Research," will be held next year in The Netherlands. The conference is being organized by Natuurmuseum Rotterdam (Natural History Museum of Rotterdam) and is scheduled for May 16–20, 1999.

There will be three themes: 1) evolution and phylogeny, 2) paleoecology and paleogeography, and 3) dwarfing and extinction. Organizers are inviting papers and posters within the broad limits of the central themes. Contributions are to be published by Natuurmuseum Rotterdam as a special volume of the journal *DEINSEA*.

The First International Mammoth Conference in 1995 in St. Petersburg, Russia, had a broad scope with contributions about mammoths and related fauna. Proceedings of this first meeting are being published this year as a special volume of *DEINSEA*.



COMING CONFERENCES

Aug. 23–29 Eighth International Congress of the International Council for Archaeozoology (ICAZ '98), University of Victoria, Victoria, British Columbia.

Contact: Conference Management, Division of Continuing Studies, PO Box 3030, Victoria, BC, V8W 3N6
e-mail: morourke@uvic.ca
<http://www.uvcs.uvic.ca/conference/admin.htm>

Sept. 3–6 Alta Conference on Rock Art II. Alta, North Norway.

Contact: Knut Helskog, Tromsø Museum, Tromsø U, 9037 Tromsø Norway. e-mail: knut@imv.uit.no

Sept. 5–7 15th Biennial Meeting of the American Quaternary Association, Hotel Krystal Vallarta, Puerto Vallarta, Mexico.

Contact: Socorro Lozano Garcia, Instituto de Geología, Universidad Nacional Autónoma de México, Ciudad Universitaria, Apartado Postal 70-296, 04510, Mexico DF Mexico. Fax 52-5-5500-6644, e-mail: AMQUAMEX@servidor.unam.mx

Oct. 1–4 10th Mogollon Archaeological Conference. Silver City, New Mexico.

Contact: Cynthia Ann Bettison, Western New Mexico University Museum, PO Box 680, Silver City NM 88061. 505-538-6386 e-mail: bettison@iron.wnmu.edu

Oct. 14–17 56th Annual Plains Anthropological Conference, Bismark, ND.

Contact: Fern Swenson, State Historical Society of North Dakota, 612 E. Blvd. Ave., Bismark ND 58505. 701-328-3675 e-mail: ccmil.fswenson@ranch.state.nd.us

Nov. 2–8 IV Jornadas de Arqueología de la Patagonia, Río Gallegos, Argentina.

Contact: INAPL, 3 de Febrero 1370 (1426), Buenos Aires, Argentina. e-mail: rafa@bibapl.edu.ar

Nov. 11–14 55th Annual Southeastern Archaeological Conference, Hyatt Regency, Greenville, SC.

Contact: Ken Sassaman, SRARP, PO Box 600, New Ellenton, SC 29809. 803-725-1130, e-mail: sassamank@garnet.cla.sc.edu

Nov. 12–15 31st Annual Chacmool Conference, University of Calgary, Calgary, Alberta.

Contact: Conference Committee, Dept. Archaeology, Univ. of Calgary, Calgary AB T1N 2N4. e-mail: nicholls@acs.ucalgary.ca

March 24–28, 1999 64th Annual Meeting of the Society for American Archaeology, Sheraton Chicago.

Contact: SAA, 900 Second Street NE No. 12, Washington, D.C. 20002-3557. 202-789-8200. Fax 202-789-0284 e-mail: meetings@saa.org

May 16–20, 1999 2nd International Mammoth Conference, Natuurmuseum Rotterdam, The Netherlands.

Contact: Natuurmuseum Rotterdam, P.O. Box 23452, NL-3001 KL Rotterdam, The Netherlands. Fax: 31-10-436-43-99 e-mail: mammoth@nmr.nl

Send conference notices to Mammoth Trumpet, 620 Northwest Witham Drive, Corvallis, OR 97330.

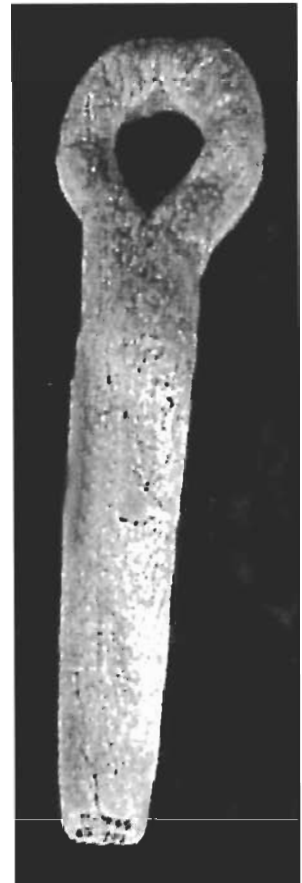
Communication

Spear Straightener or Spinning Tool?

Recently the television series *Nova* presented a program on mammoths and the archaeology of the late Pleistocene. Among the items depicted from widely dispersed sites was a tool about 30 centimeters long, consisting of a shaft about three centimeters in diameter widening on one end into an eyelet about five centimeters in diameter. The narrator identified this tool as a "spear straightener," apparently a sort of paleolithic wrench, used somehow to turn crooked sticks into straight ones.

There are several reasons to question that interpretation of this tool. First of all, straight sticks are simply not difficult to find where forests grow naturally. Even the ordinarily gnarled Arctic tree-line birch produces long, straight water-sprouts in good summers. It seems a little contrived to imagine Pleistocene people wrenching crooked sticks into straight ones, when one could find quite adequate straight sticks, ready for the taking.

Second, wood is not an especially plastic medium. It cannot be extruded, of course. With boiling, or with heat and steam treatment, wood can be molded, but the "spear straightener" is the wrong tool for that. In order to be effectively heat-formed, a piece of wood must be placed, evenly hot and wet all the way through, into a mold, and held in that position until dry. Because of its structure, which is a fiber embedded in resins, wood is prone to "memory" and will try to regain its original form unless it is carefully molded and dried completely. A wrenching or extruding action with a "spear straightener" would be completely ineffective in producing straight spear shafts. It might be useful to knock twigs off straight branches in some sort of mass-production of spear shafts, but that idea beggars the imagination.



Mammoth-bone shaft straightener, about seven inches long, from the Murray Springs site, Arizona.

PETE BOSTROM



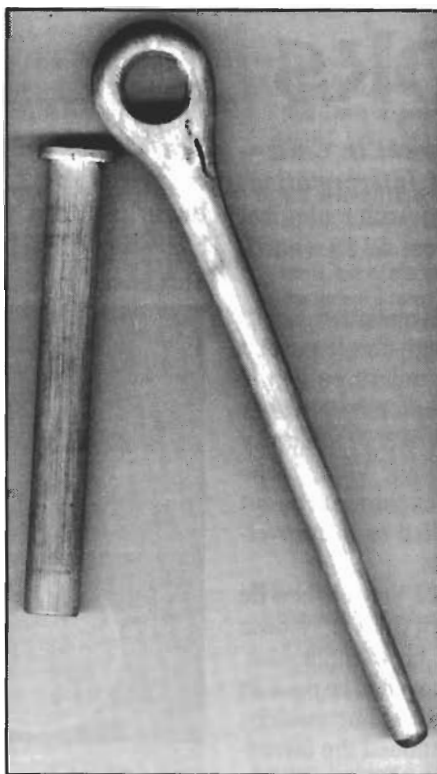
Third, if "spear straighteners" were a sort of prehistoric dowel cutter, one might expect them to show some wear marks from being fitted with a blade for shaving the dowel. This too rather defies the imagination. A reasonably skilled woodworker can produce a quite acceptably round, smooth, straight shaft with no more elaborate a tool than a spoke shave. There is no need for a levered tool as elaborate as the "spear straightener".

So what is this thing?

I propose that the artifact heretofore interpreted as a "spear straightener" is actually part of a two-part tool used for spinning coarse hair into rope. The shafted eyelet is virtually identical to a tool still used in Iceland for this purpose. Though the tool is now used mostly by artist-craftspersons, its use was familiar to many, if not most, farmers in Iceland well into this century for spinning rope and cordage out of the mane and tail hair of horses. It was an alternative to a large, heavy drop spindle, which seems to have been a little more common.

The tool, known by the delightful name of "madman" or "mad spindle" (*vitleysingur*, or *vitleysa snældi*), consists of a handle with a stop on one end, around which the shaft-and-eyelet part rotates.

It is probably necessary here to define a few terms in order to be able to explain how a madman is used. A "rolag" is the English-language term (out of Irish) for a cylinder of hair that is ready for spinning. A "roving" is a long strand of unspun string, in which the hairs have been pulled into a more or less parallel structure. Neither the rolag nor the roving has any tensile strength, as they have not been spun yet. "Insertion of twist," the actual spinning process, is the action which both binds the hairs into a string and imparts strength.



Wooden madman showing handle, about 18 cm long, and spindle or spinner, about 30 cm long. The spinner, whirling like a madman when in use, spins and collects the spun fiber.

To spin rope with the "madman," coarse hair is first prepared for spinning by washing and drying it. The next step is either to roll a loosely structured pile of these hairs into a large rolag, or to pull them into a roving. Both traditions are known in Iceland; it seems to be a matter of the spinner's preference which one uses. If using a rolag, it is necessary to fasten it down somehow. A roving can be worked from a loosely rolled loop.

The end of the roving, or a few hairs from a rolag, are tied to the shaft of the shaft-and-eyelet tool. It is also possible to begin with a "starter" cord, to which the unspun hair is attached by the spinning action in a kind of controlled

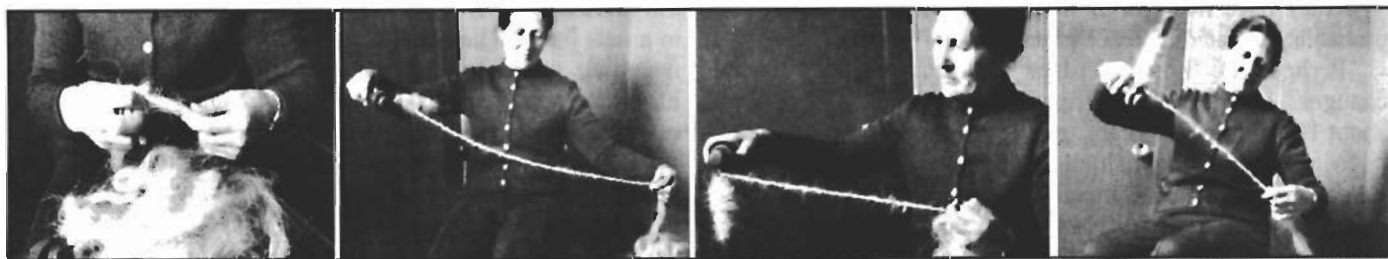
tangle. The spinner then spins the tool around its handle, inserting twist into the cord. Most spinners spin with the madman in the right hand, feeding the unspun hair into the twist of the cord with the left, but both tool and process are completely ambidextrous. After a meter or so of rope is formed, the spinner stops and winds the cord around the shaft of the madman's shaft-and-eyelet component. A skilled spinner can resume the spinning without any bulge or weak spot in the cord.

If the "spear straightener" was in fact the working part of a madman, it should bear some wear marks that show the effects of spinning up against the stop on the handle, and wear marks within the eye that bear witness to its spinning against the handle. It might show some slight wear around the middle of the shaft where the cord was attached, and wear either parallel to the length of the shaft, or polishing where the ball of cord was slid from the shaft at the completion of the spinning.

—Louise Heite, Reykjavik, Iceland
lheite@eldhorn.is

Dr. Heite is an archaeologist and textile artist who has been living in Iceland for the past nine years. She imports Icelandic wool into the United States and operates an annual week-long wool camp in Iceland, at which various wool-related crafts are taught. 🍷

These pictures from the journal of the Islandic Home Industries Council depict a madman in use. First the hair is gathered into a cylinder or loose strand that is tied to the shaft and then the spinning begins. In Icelandic tradition, most cords are respun into at least a two-ply cord.



HUGUR OG HÖNDI/JOHANNA KRISTJANSDOTTIR

New Books

Monte Verde: A Late Pleistocene Settlement in Chile—Vol. 2, The Archaeological Context and Interpretation, by Tom D. Dillehay. Smithsonian Series in Archaeological Inquiry, 1997, 1,071 8½ x 11-inch pages, \$155 (hardcover).

Dillehay's persuasive defense of the much-maligned South American site that has at last broken through the long-solid Clovis barrier will undoubtedly become a milestone in the prehistory of the Americas. Most of the 22 chapters were either written or co-authored by Dillehay, the University of Kentucky archaeologist who has been working with Monte Verde material since the mid 1970s. His first Monte Verde volume came out in 1989 when the site was still being discounted as "controversial" by many North American archaeologists.

Dillehay had become involved with Monte Verde when he was on the faculty of the University of Southern Chile at Valdivia and some large bones were brought in for his identification. One thing led to another, and Monte Verde proved to be the sort of site that changes an archaeologist's life. Fortunately, Dillehay was up to the challenge, and he continued the investigation in spite of criticism and lack of funding.

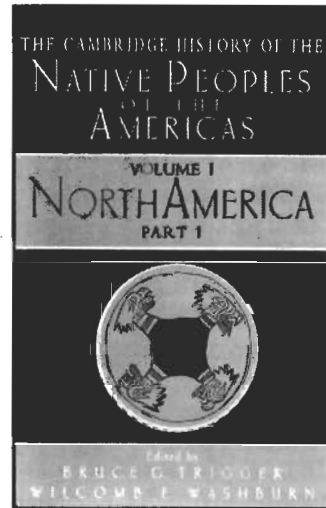
Individual chapters of this book detail the site and stratigraphy, the radiocarbon chronology, research methods, organic preservation, feature context, the wood assemblage, the hut remains, cordage, integrity of use surfaces, present-day plants of the area and their significance, a model of ancient plant procurement, the integrity and distribution of the archaeological collection, lithics and related analyses, faunal remains, soft-tissue analysis, cut marks and other features on bones, and site activity patterns. Further details appear in the 26 appendices. Size and complexity of the volume meant years of production time, a period in which Dillehay says he altered his own thinking about the complexity of the peopling of South America.

Dillehay's *Monte Verde* Vol. 2 should keep any **Mammoth Trumpet** reader fascinated for many months.


The Cambridge History of the Native Peoples of the Americas Vol. 1, Bruce G. Trigger and Wilcomb E. Washburn, Editors. Cambridge University Press, 1996, 1,064 6 x 9-inch pages in 2 volumes, \$99.95 (hardcover).

This boxed set is part of a series that also includes a volume on Meso-America and one on South America. Together they are a comprehensive history of Native Americans from their arrival in the Western Hemisphere to the present.

Relatively little is devoted to the actual peopling of the Americas; however, a 75-page chapter, "The First Americans and the Differentiation of Hunter-Gatherer Cultures," by Dean R. Snow of Pennsylvania State University, examines the evidence for the arrival of humans in the Americas and the subsequent development of hunter-gatherer societies in North America.



Archaeological Investigations of Site 44SX202, Cactus Hill, by Joseph M. McAvoy and Lynn D. McAvoy. Virginia Dept. of Historic Resources, 1997, 482 8½ x 11-inch pages, 95 photographs, 57 tables, and 78 drawings. \$22.50 plus \$3 s/h (softcover).

Here is the latest available on Cactus Hill, Virginia's culturally stratified Archaic/Paleoindian site with both a Clovis and pre-Clovis occupation. Besides work by the McAvoy's, the book contains appendices by Cheryl A. Hold, Gerald H. Johnson and Kevin B. Jones, Michael F. Johnson, James P. McAvoy, Lucinda McWeeny, Margaret E. Newman, C. Margaret Scarry, and Thomas R. Whyte. 

Clovis Second

continued from page 13

they are known—Thule a characteristic harpoon and Clovis a stone projectile with fluted bases for hafting. Because both were hunting cultures, he suggests high status for successful hunters who may have had two or more wives, thus increasing the probability of rapid increase in population.


"Perhaps the Monte Verdans couldn't cope with climate changes," said Fiedel, referring to an Antarctic cold reversal about 14,000 calendar years ago. He suspects otherwise.

"More likely, the fishtail-point makers and the Monte Verdans were in direct competition for the same habitat and the intruders succeeded in displacing the residents." He went on to speculate that the presence of an earlier population might actu-

ally have promoted the spread of Clovis descendants—possibly their dispersal might have been slower if they had entered virgin territory.

Perhaps, Fiedel suggested at the conclusion of his presentation, the Clovis-second hypothesis might even help explain the characteristic fluted style of Clovis points.

"If there were a precursor population already in place when the Clovis expansion occurred, the fluted points have to be seen in a new light." Though the fluting may have assured secure fastening of the point to the spear or foreshaft, it may have taken on greater significance, he added—perhaps spiritual or magical.

"But now we must wonder if it also served an important social function—as a stylistic marker by which Clovis people distinguished themselves from 'the other.'" 

—Don Alan Hall