MAMMOTH TRUMPET

Volume 9, Number 1 | Center for the Study of the First Americans | Department of Anthropology
December, 1993 | Oregon State University, Corvallis, OR 97331 | ISSN 8755-6898

WYOMING PETROGLYPHS DATED FROM 11,500 TO 2,000 B.P.

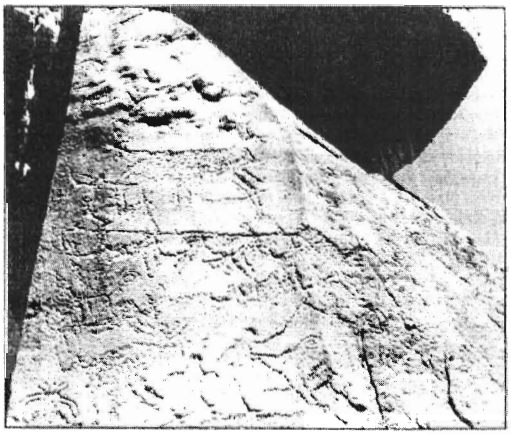
Rock Art Sites Hold Promise of New Information

When Alice Tratebas began working on a plan to preserve ancient rock art in a wooded canyon in eastern Wyoming, one of the first things she did was inventory the petroglyphs carved in its Black Hills sandstone.

Dr. Tratebas, an archaeologist with the Bureau of Land Management in Newcastle, Wyo., was shocked at what she found—creative work dating to more than 11,000 years ago had been defaced by modern Americans.

"People have damaged about 98 percent of the site so far," Tratebas said in a telephone interview. "Probably 17 percent of the 135 petroglyph panels have bullet and buckshot holes in them." Additionally, most of the glyphs are scratched, and some were painted on or colored with crayons.

Paradoxically, well-meaning visitors perpetrated some of the damage. "The most extensive damage is chalking in the glyphs." She notes that the heyday of chalking was back when people were taking black-and-white photographs. They applied chalk to make glyphs more visible. "There was really no need to do this," Tratebas notes. "If you get the right light on the petroglyphs, they will show well in a photograph."



A panel dating to Plains Archaic depicts humans driving game, and a hunter spearing an animal that appears to be snared.

Though soft, the chalk scratched the glyphs. But what is worse, the calcium left behind interfered with one of the promising new high-tech procedures for determining the age of the Black Hills rock art. "That's what is so unfortunate," Tratebas said. "They were interested enough in the site to want to take photographs and study it, but they didn't realize the chalk would destroy data for future scientific studies."

Rock art is difficult to protect. "People virtually always damage rock-art sites. We need adequate education to change their behavior."

Tratebas called in Dr. Ronald Dorn of Arizona State University, an expert on the experimental science of dating surface exposures. Fortunately, the two were able to find glyphs at the site that could be dated; the results have only fueled Tratebas's desire to see the Black Hills rock art preserved. Dorn, a geographer, used two different dating techniques in tandem, accelerator radiocarbon dating and cation-ratio dating.

"We have 32 dates on the petroglyphs so far," Tratebas said. Thirteen of them are ^{14}C dates and the rest are cation-ratio dates. "The oldest date is a carbon-14 date of about 11,500 years B.P."

"At the moment, this may be the major site in North America with so much Paleoindian rock art." That, she adds, makes the Black Hills site extremely important, though she speculates that as dates are determined for more sites, other important Paleoindian sites will be identified.

"Before we had any method to date rock art, archaeologists were really making major inferences, such as assuming that rock-art dates correspond to occupations at the base of a panel. Or archaeologists would excavate buried panels and get carbon from below where the glyph was made. That would be a minimal date, but you are still making assumptions. Were the people living there the same as the ones who made the rock art?

continued on page 6

MOCHANOV TO VISIT U.S.

Prominent Siberian archaeologist Yuri Mochanov will make his first visit to the United States this winter lecturing and meeting with scholars in Seattle, San Francisco, Washington, Denver, Fayetteville, Ark., College Station, Texas, and Corvallis, Ore. **The Center for the Study of the First Americans** has arranged the Dec. 28–Feb. 6 visit by Mochanov, a member of the faculty of the Russian Academy of Sciences at Yakutsk who is director of all research on the Lena River including the astonishing Diring Yurekh site.

Mochanov will be describing findings at the very old Diring site, which he believes proves humans have been living in cold climate since before upper-Paleolithic time. **Mammoth Trumpet** readers should watch local publications for details of Mochanov's public appearances.

OREGON STUDY PROMISES EARLY SITES

Interdisciplinary Approach Yields Pleistocene Clues

The initial phase of the Willamette Valley Paleoindian Project in northwestern Oregon has been completed. The project was initiated two years ago by the **Center for the Study of the First Americans** in an effort to increase limited knowledge of early prehistory of westernmost North America. Principal investigator Robson Bonnichsen and project coordinator Daniel M. Mulligan call it an overwhelming success.

The project relied on extensive public involvement as well as on a broad survey of the geomorphology of the Willamette Valley, which extends approximately from Eugene to Portland, to indicate sites that could relate to the initial peopling of the Americas. Research design relied on three assumptions: that Pleistocene archaeological remains will only be found on Pleistocene-age geological deposits; that if human hunters or scavengers were present, their archaeological remains would be associated with late-Pleistocene mammals; and that discoveries of Pleistocene mammals may have occurred due to site disturbance caused by Euro-American settlement and development of the Valley.

To search for remains of Pleistocene mammals and for records of their discoveries, the Willamette Valley Paleoindian Project did research in 24 museums and other institutions that hold archaeological and paleontological collections and also examined newspapers dating back to 1840. Valley residents were asked to contact the Center if they knew of the discovery of any large bones. The paleontological survey produced records of Pleistocene animals at locations not previously reported and tentatively identified two Pleistocene taxa—pig and musk ox—hitherto not known in the Willamette Valley.

One new site, the Navarro-Leonard site near Corvallis, already has yielded fragmentary remains of sloth and mastodon in tentative association with humans. Further, the research team has found that late-Pleistocene-age landforms have the potential to predict the location of additional Pleistocene paleontological and archaeological sites.

"The late Quaternary record that we are beginning to find is truly remarkable," the researchers

continued on page 2

INSIDE

Montana Site Part of Program On 1st Americans

A television program, "Ice Age Crossings," to air in January on the Learning Channel's series *Archaeology*, will include a discussion by Dr. Robson Bonnichsen, Director of the **Center for the Study of the First Americans,** and depict work at the Mammoth Meadow site in the Rocky Mountains of southwest Montana. The program will examine the likelihood that people first entered the Americas by way of Beringia.

You have three chances to watch the program on the cable Learning Channel. It is scheduled for Thursday Jan. 6 at 8 p.m. EST, and will be repeated the same night at 11 Eastern time. It is to encore Sunday Jan. 9 at 9 p.m. EST.

The graphics director for New Dominion Pictures of Virginia Beach, Va., producer of the series, said she expects "Ice Age Crossings" to be one of the more visually interesting segments of the series. Besides Mammoth Meadow, sites to be featured will include the Mesa site on Alaska's North Slope, which dates human presence at 11,700 years and has been hailed as the earliest well-documented evidence of human activity in the Americas, and Pedra Furada in northeastern Brazil, which contradicts conventional wisdom about the peopling of the Americas by dating human presence back 50,000 years.

Though the Learning Channel has scheduled the program for three times, persons interested in watching it again might want to videotape their own personal copy because there is no certainty that it ever will be shown after Jan. 9. Host for the *Archaeology* series, which features a wide range of cultures and places, is John Rhys-Davies, known for his role in the *Indiana Jones* movies.

CSFA Trip Joins Washington Group On Olympic Coast

Blue skies and the sparkling Pacific Ocean greeted **CSFA** volunteers on a recent archaeologic weekend with the Pacific Northwest Archaeological Society on Washington state's Olympic Peninsula.

We gathered near the mouth of the Hoko River at the property of Dr. Dale Croes, Washington State University archaeologist. There we gathered mussels, barnacles, chitons, sea urchins, snails, and limpets for part of our native American dinner, and we walked to a nearby religious site of the Makah Indians. We also gathered willow reeds to take to a basket weaver. At a spruce grove, we gathered fine spruce roots, which we learned to clean and braid the traditional way into necklaces and bracelets. On the beach, members of the PNWAS showed us how to make stone tools; after trial and error some of us produced tools that could cut, and later we enjoyed a dinner of traditionally baked salmon and our seafood. After dinner Dr. Croes presented a slide show on the history and geography of the region as well as the Makah people who inhabit the region.

The following day we drove to the most northwesterly tip of the contiguous United States, Neah Bay, home of the Makah Tribe. The Makahs have an interesting museum depicting their rich history as whalers, sealers, fishermen, hunters, gatherers, craftspeople, and warriors. We also visited Greg Colfax, a master woodcarver who showed us examples of his work and explained its symbolism. Colfax has been commissioned to create totem poles for many well-known people. We visited Isabell Ides, a master basketweaver. The 93-year-old Makah elder showed us samples of her lovely work and told legends depicted in the designs.

On the third day Vern Hodgson, another PNWAS archaeologist, led a hike to Lake Ozette, the site of important archaeological discoveries made in 1970 at the site of a Makah village.

–Joyce Pytkowicz, Volunteer Coordinator

Oregon Study

continued from page 1

conclude in their report to the Oregon State Historic Preservation Office, which supported the project. They note that most of the paleontological and early archaeological sites are wet sites that preserve seeds, wood, charcoal, hair and bones in their stratigraphy. "The investigation of wet sites with preserved organic remains promises to contribute to a detailed understanding of the cultural and environmental history of the Willamette Valley and westernmost North America."

The Willamette Valley, the 208-m-long (130-mile) structural depression between Oregon's Cascade Mountains and Coast Range, is predominantly an alluvial plain varying in elevation from about 136 m south of Eugene to 3 m at the Columbia River in Portland. The valley floor consists of a series of terraces, the youngest near the river, but details of its stratigraphic development remain ambiguous because of the complex geological history. A dominant influence was a series of Pleistocene floods that occurred when enormous glacial lakes spilled into the Columbia River and water carrying icebergs, sand, silt and suspended clay backed up into the Willamette Valley. One event created a temporary lake with shorelines more than 200 m in elevation. Studies suggest there were two distinct phases of catastrophic flooding, one between about 40,000 to 35,000 years ago and another from 18,000 to 11,000 years ago. The floods, undoubtedly disastrous to all life in the valley, left distinctive deposits including fine clays and exotic glacial boulders.

In initiating the study, the **Center** appealed to the public for clues for information about paleontological and archaeological discoveries on private and public lands. Local and regional newspapers responded to press releases about the project, and

BOARD HONORS JO ANN HARRIS, WELCOMES 4 NEW MEMBERS

For the second time this year, the Advisory Board of the **Center for the Study of the First Americans** has conferred the H. Marie Wormington Award upon a departing chair. Meeting at Oregon State University in October, the Board granted the award to Jo Ann Harris for her crucial role in moving the **CSFA** to Oregon State University and reorganizing it to improve effectiveness in research and disseminating knowledge about the peopling of the Americas. Harris, a New York attorney with an intense interest in archaeology, was obliged to resign her position on the **CSFA** board upon becoming head of the Criminal Division of the U.S. Justice Department.

After reluctantly acknowledging the resignations of Harris and Roy Gallant, a Portland, Maine, astronomer and author, and granting Harris the Wormington Award in recognition of her outstanding individual contributions to the understanding of early American prehistory, the board voted to welcome four new members. They are:

- **Michael Chamness,** an insurance executive and financial planner from Madras, Ore., who also is a bronc rider as well as being a member of Oregon State University's College of Liberal Arts Development Council.
- **Gerald M. Fritts,** a mortgage banker from Kirkland, Wash., who is board chair and a founding member of the Pacific Northwest Archaeological Society. He was active in the Circum-Pacific Conference 1989 and in negotiating the Shared Principals agreement with the Colville Confederated Tribes that was important in settling the dispute over the Richey-Roberts Clovis site in East Wenatchee, Wash.
- **Jerry Running Foxe,** Cottage Grove, Ore., vice-chairman of the Coquille Indian Tribal Council and tribal representative for archaeological excavations by the Oregon State University, the University of Oregon, the Oregon Highway Department, the U.S. Bureau of Land Management, and the U.S. Forest Service.
- **Alan L. Schneider,** a Portland, Ore., lawyer who, as a member of the Oregon Archaeological Society, developed an educational program for avocational archaeologists. He is the author of a new book, *A Guide to Northwest Archaeology Laws.*

"Even though we've lost outstanding board members, I'm very excited about the strength of our new board members," said Robson Bonnichsen, **CSFA** director, who noted that the new members have added vitality to the **Center** and already have presented resolutions that will impact First Americans studies.

Anne Stanaway, a Lebanon, Pa., media producer who had been vice chair, took over leadership of the Advisory Board. Referring to Harris's elevation to head the federal Criminal Division as she called the board meeting to order, Stanaway quipped: "Now she's in charge of vice and I've got the chair." While under Clinton Administration rules Harris is not permitted to serve the **CSFA,** she remains committed to her interests in archaeology and expects to return to work with the **Center** after her tenure in the Justice Department.

Bonnichsen said he looks forward to the time Harris has straightened out the country and can return to the **Center.** "Jo Ann Harris's development of a sound charter and bylaws at her own expense will provide a long and lasting framework for continued operation of the **Center,"** he said. He also praised Harris for her "calm and reasoned approach and her dedication in moving us from Maine."

Initiated in 1989, the H. Marie Wormington Award is presented periodically to recognize outstanding individual contributions to the understanding of early American Prehistory. The award is named in honor of Dr. Wormington, curator emeritus of the Denver Museum of Natural History, and a leader in the study of America's earliest prehistory. She is author of the influential book *Ancient Man in North America*, and is a member of the **CSFA**'s Scientific Council. At its spring meeting this year, the **CSFA** conferred the Wormington award on Christopher Pratt, who had served as co-chair of the Advisory Board. Like Harris, Pratt had been instrumental in reorganizing the **CSFA** and finding it a receptive new home at Oregon State University.

MAMMOTH TRUMPET

The Mammoth Trumpet (ISSN 8755-6898) is published quarterly by the **Center for the Study of the First Americans,** Department of Anthropology, Oregon State University, Corvallis, OR 97331-6510. Second-class postage paid at Corvallis, OR 97333.

POSTMASTER: Send address changes to:
Mammoth Trumpet
Oregon State University
CSFA/Weniger 355
Corvallis, OR 97331-6510

Robson Bonnichsen	Director and General Editor
Don Alan Hall	Editor, **Mammoth Trumpet**
Bradley T. Lepper	Editor, **Current Research in the Pleistocene**
Rebecca Foster	Assistant Director
Joyce Pytkowicz	Volunteer Coordinator
C & C Wordsmiths	Layout and Design

The **Center for the Study of the First Americans** is a non-profit organization. Subscription to the **Mammoth Trumpet** is by membership in the **Center.**

publicity from news media attracted much interest, which public lectures augmented. Citizens proved to have strong interest in cultural and natural history of the region; many came forth with artifacts and fossils, which have been incorporated into museum collections. One particular call came from Ted Leonard, who operates a ranch and vineyard in Kings Valley west of Corvallis. Leonard produced a huge vertebra, with tendons still attached, of what proved to be a mastodon. The bone was unearthed in the process of creating a cattle-watering pond on the farm. The pond was excavated in the spring of 1991, and a year later the vertebra was discovered when Candy Navarro, ranch foreman, was excavating in the pile of soil removed from the pond site.

Initial archaeological examinations of soil excavated in pond construction have revealed a sloth mandible, part of a human humerus, and sticky clay rich in organic remains including wood, charcoal, hair and bone fragments. Stratigraphy suggests that colluvium from nearby hills has buried a pond that existed in early-Holocene and late-Pleistocene time. All that evidence prompts the **Center** to urge archaeological testing of the Navarro-Leonard site.

Public interest in the project resulted in a number of other leads to likely paleontological and archaeological sites, and reports found in local newspapers produced many others. Susan Van Laere, a **Center** volunteer, headed the project's archival research. "Utilizing newspapers as primary sources when determining new locations for Paleoindian sites proved fruitful," Van Laere wrote in the project report. She said nine of 23 articles identified in the project provided directions clear enough to permit location of the areas while five others required a record search beyond the newspaper article. Nine more gave only general locations, but she believes they can be found. She recommends more searching through old newspapers for clues to Pleistocene sites.

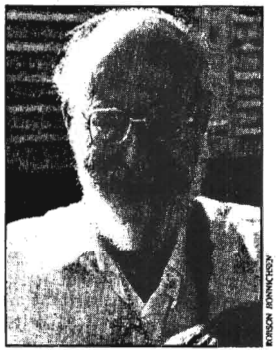
Museum research also proved fruitful, producing a data base of pertinent information, but in summarizing this phase of the project, Scott Jones, Oregon State University graduate student, suggested that the real importance of the research might be the ties that were forged with people around the Valley. "The importance of developing close ties with the local communities cannot be underestimated," Jones wrote.

Mulligan, an Oregon State University graduate student, detailed the project's archaeological survey, which utilized a composite map including geomorphic surfaces as well as data from previously recorded sites. Approximately 248,640 acres were identified as high-probability areas, as were 148 km (92 miles) of streams. After field inspections, Mulligan and other investigators conducted ground surveys of 211 acres and rafted 106 km of valley streams. In the process, five prehistoric sites were discovered and documented, and four Pleistocene vertebrate paleontological localities were recorded and investigated for human association. Willamette Valley sites older than 2,000 years are rare.

Though the Willamette Valley Paleoindian Project was successful in producing new sites and definite clues that likely will lead archaeologists to other new sites, a sobering lesson from it was that time, as well as development, continues to take its toll on sites. A mammoth site, discovered by a boater in July 1992 in the bank of the Willamette River, yielded a weathered mammoth tooth; bleached bones were visible in the bank. But when members of the project team returned to analyze it in June 1993, only a steep-cut river bank remained.

–DAH

The Quest for First Americans



An interview with Alan Bryan

Editor's Note: *Archaeologist Alan Bryan recently retired from teaching after 30 years at the University of Alberta. He received bachelor's and master's degrees in anthropology from the University of Washington and then spent a year working on what he describes as one of the first cultural-resource management projects ever concocted, a survey for the Pacific Northwest Gas Pipeline. The job, which involved walking much of the distance from southwestern Colorado to the British Columbia border north of Bellingham with his partner, Don Tuohy, gave him experience, and provided enough money to go to Harvard, where he completed his doctorate. He continues to share a research laboratory with his wife, archaeologist Ruth Gruhn. Bryan and Gruhn have worked on many sites together, including Wilson Butte Cave in Idaho and several sites in Central and South America. Their recent publications include the book* Brazilian Studies, *published by the* ***Center for the Study of the First Americans****. On the occasion of his retirement, we asked anthropologist Dr. Kathryn Ross to interview Dr. Bryan for the* ***Mammoth Trumpet****. She reached him by telephone in Edmonton, and the following is an abridged version of their discussion.*

MT Tell us how your interest in archaeology developed.

AB I became an archaeologist because I was intrigued with the problem of the "coming of man into America"—that was the title of a talk given by Prof. Froelich Rainey, who was a visiting professor at the University of Alaska at Fairbanks. It was 1942 and I was 13 at the time. I discussed this with him years later and he remembered this talk.

After high school I went into the Army; then when I had completed my service, I went to college at Pacific Lutheran College in Tacoma on the GI bill. I had been learning the printing trade in high school, and I planned to become a journalist. But when the Introductory English professor said to write a term paper on the topic of my choice, I recalled that talk in Fairbanks years before and decided to write about that. I couldn't find any sources where I was at the time and I wound up in Seattle at the University of Washington, where I was told to go see the chairman of the Department of Anthropology, Erna Gunther. She recognized my enthusiasm on this question and suggested I should transfer to the University of Washington to anthropology. So I did. I think that was the best decision I ever made.

MT At the time you entered anthropology what were the major questions about the peopling of the Americas and to what extent do you think those questions have been answered?

AB When I was a student at the University of Washington, I realized that the problem of the peopling of the Americas was really an important problem. Most archaeologists sort of avoided it—they worked with certain assumptions and they didn't worry about origins. In fact, I was told that it didn't really matter when people came to America, and we have a pretty good idea, anyway, that it must have been just at the end of the Pleistocene. Unfortunately, I don't think we've made much progress on these questions because the same assumptions that prevailed at the time I entered the field still dominate our models of the peopling of the Americas. Most archaeologists still believe that the first peoples came through the ice-free corridor and that these initial groups had to have an upper-Paleolithic level of technology to get through the Arctic. They argue that Clovis peoples were the first recognizable culture south of the corridor, and that everything dated earlier than Clovis must somehow be wrong.

It's certainly true that Clovis is early because there are at least a dozen Clovis mammoth kill sites well dated to between 11,200 and 10,900, so it is the best-patterned set of early sites, but I think it is mainly because that pattern is all that people look for. The overwhelming fascination with Clovis big-game hunters has always been a problem that hinders research on the more fundamental question of the first people.

This limiting focus on Clovis has lead to acceptance of many misleading assumptions that have never been properly tested. In my opinion, the exciting popular assumption of the specialized big-game hunter chasing mammoths across Beringia with a spear is baloney. This whole emphasis—you know, the intrepid hunter, the great American who conquers the New World with a spear—I think plays to the desire for this kind of mythology that Americans have maintained throughout their history. Unfortunately, such assumptions have guided the whole research effort for the last 50 or 60 years.

MT Did you and your wife accept positions at the University of Alberta to be near the ice-free corridor?

AB Yes, we assumed that Alberta, which is in the heart of the hypothetical corridor, would be the very best place to find evidence of people before they got into the continental U.S., so we were very excited to come to Edmonton. We made a very extensive survey of the province of Alberta in 1964, the summer after we moved here. We found some interesting sites, which we followed up on in the next four or five years. Two of them are definitely early, but by 1968 we realized that the assumption we had made that Clovis should be abundant here was wrong. As a matter of fact, Clovis points are very rare in this area. Although squat triangular fluted points are fairly common, there are only one or two Clovis points from Alberta and they were found in southern Alberta.

We decided then that the best thing for us to do was go south of the ice—south of where the glaciers had destroyed or buried the earliest sites. I had a Land Rover delivered to New York, and in 1969 and 1970 we drove through Central America, took the ship from Panama to Venezuela, and then drove down the Andes and back through Patagonia and into eastern Brazil. This was quite exciting. We visited essentially all early sites in Central and South America that were known at that time, and made a lot of connections with people in various countries that led to further work later on. We still have that Land Rover.

Ruth was very much interested in the Maya Indians and she had, by this time, started teaching Middle and South American ethnography and archaeology at the University of Alberta, and she wanted to live in a Maya Indian community. While Ruth was observing Indians in Chichicastenango, Guatemala, I was crawling up and down the barrancas. I located quite a few sites that appeared to be potentially early, but the most promising were way up on the Continental Divide. I found some very intriguing preclassic pottery and quite a bit of flaked stone, including points. Two years later, we went back and spent two seasons excavating Los Tapiales, which turned out to be a Clovis site. We had applied for a grant, and when we got it, we hired a local crew of Maya Indians. They were probably the best crew I've ever had. They'd walk 3 miles from their villages up to work at 10,000 feet elevation, very cold and rainy, work all day and then walk home again. We got several dates, but the best date associated with a fluted-point base was about 10,700 years, or about 200 years later than Clovis in the states. I think that's reasonable for the movement of fluted points that far south.

MT Was it the technology or the people that moved? And how long *have* people been in the Americas?

AB I believe that by the time Clovis fluted points developed—and I think that Clovis developed in North America, probably in southeastern North America on the Gulf Coast—that essentially all of North and South America was already populated by other groups of people. And in some places these other groups also developed bifacial projectile-point technology to take advantage of local herd animals under stress at the end of the Pleistocene. Tom Lynch thinks that the fact there are fishtail fluted points quite far south means that Clovis people picked up their socks in Texas or Arizona and got themselves clear to Argentina in 200 years or less, and I just cannot believe this. This does not make sense because they've got to go through jungle on the way. You get into Central America and it's damned hot all the time. The average daily temperature in Managua from month to month varies from 26 to 28 degrees centigrade, which means you're up to 40 very frequently in the daytime and down to 20 at night. And it was hot, even in the Pleistocene. If migrants came down out of the cool mountains of Guatemala and even northern Nicaragua, they would be practically down to sea level. The only mountains are isolated volcanos. You don't have ridges of mountains, so you have to adapt to the heat. Besides that, a lot of the animals they had been hunting never made it through. Bison and mammoth stopped there—they never got any farther. And I expect that a major reason they didn't, besides the heat, is because of various new parasites. You get into the tropics and you have a tremendous increase in debilitating parasites. Those parasites are going to affect humans as well as animals. This is just a total break in the ecosystem people from interior North America would have known. Why would they go another 300 or 400 miles to an unseen mountain range in Costa Rica in order to continue their trek? I just cannot see a rapid migration of people going from Texas to Patagonia in 200 years and traveling through so many radically different ecosystems people would have had to adapt to. I think it's much more likely that what you had is people going down the coast and slowly expanding into the interior, up the rivers, but mainly staying on the coast and gradually adapting to new ecosystems, and expanding southward over a very long period of time.

I might mention the thesis of one of my former students, John Alsoszatai-Petheo, who just got his Ph.D. this last year. It is a very complex thesis, but one of his major points, going through biology, is simple enough: The rate of human reproduction and infant mortality is fairly well known; and if you take fairly conservative estimates of the rate of biological increase, and you assume there were 10,000,000 people at the time Columbus arrived—in fact, there were probably 10,000,000 in Mesoamerica alone—there's no way people could have come as late as 12,000 or 13,000 or even 20,000 years ago. It had to have been earlier for there to have been that many indigenous Americans at the time Columbus arrived.

The other aspect of this is that the best claims for something early are in South America. Monte Verde in humid subantarctic Chile is 13,000 years old, but

During a trip to Siberia Alan Bryan talks with his host, prominent Russian archaeologist Yuri Mochanov.

[Tom] Dillehay has not given up on an earlier locality, which he has dated at 33,000. He is going to go back and get more information. Up in arid northeastern Brazil you have Pedra Furada, which is dated now beyond the range of radiocarbon—more than 45,000 years. They have thermo-luminescence dates that go back to 47,000 years. And this is a stratified site and all the dates are consistent right on through. And throughout, with the exception of one bifacial projectile point up near the surface, which is 8,000 years old, there is no bifacial flaking.

MT What do you see as the earliest migratory route into the Americas?

AB I don't really like the word "migration." Migration implies that people were moving intentionally. This is the way we think about it because most of us are immigrants and that's how *we* did it—we picked up and moved. But in the case of the peopling of a new continent, there's no reason to move beyond the ecosystem that you know well, unless you have population increase. When their ecosystem seems to be overpopulated, then a few families—younger families—will bud off and move into an area that they may have hunted or gathered in occasionally. The movement is going to be slow or gradual, and they are going to stick to the ecosystem and to the plants and animals they know best. They aren't going to move from the actual coast into the interior, which is quite a different environment in most areas. They may go there to hunt or gather something—explore a little bit—but they're not going to move there.

Ruth became a proponent of the coastal route for the peopling of the Americas before I did, and she has now convinced me that she's right. Actually, Knut Fladmark at Simon Fraser University argued first that the coastal route was more viable than the interior route through the ice-free corridor. (See **Mammoth Trumpet** 8:4 "Mollusks, Not Mammoths: The Case for a Pacific Rim Migration.") However, I don't agree with Fladmark on certain points. He argued persuasively that environmental conditions would not have prohibited movement of people along the Northwest Coast during the final glacial advance. I think the fact that nothing has been found along the coast that could explain the sudden development of Clovis on the Great Plains is the main reason his excellent review of the late glacial ecosystems of western Canada has generally been ignored. I think he was correct about the route but too conservative about dating. If they had come down before the last glacial advance, there would be plenty of time to explain the origin of Clovis. Actually, nothing has been found in the corridor either that would explain the origin of Clovis. In fact, available dates suggest that fluted points were moving north from south of the ice-free corridor as the glaciers melted, so the origin of Clovis must have been somewhere south of the glaciers.

The coastal area presents a very rich and viable ecosystem. You've got not only fish and shellfish and land mammals, but sea mammals and sea birds, and you have lots of berries and other edible plants. You can have this viability right at the edge of the ice. In fact, sea mammals and other animals live right on and under the ice. So, I think it is very likely that the first people did come down the coast rather than the interior. Unfortunately, the whole southern coast of Alaska, British Columbia, and Washington was glaciated until quite late, about 10,000 or 12,000 years ago. So the only places you can look for early sites on that whole coast are the few tiny areas that were not covered by ice—on the Queen Charlotte Islands, Kodiak, and the Fairweather Islands. And nobody has actually searched those areas looking for early stuff, but even if they did it would be very difficult because of the vegetation cover. It would be just a fluke if you found anything on the Northwest Coast. It really is an imposing problem.

MT What do you believe are likely to be the most exciting areas of research, geographically and technologically, in the next decade?

AB I expect the most interesting evidence to appear will be in Latin America because the archaeologists there do not accept the North American assumption that Clovis was the first. They just ignore us and continue to report sites that are older than Clovis and without bifacial flaking. Back when I was at Harvard, Gordon Willey gave me an opportunity to work on a shell mound in Brazil, so I spent a year in Brazil, three months digging the site and the balance of the time in Rio writing up the results. This experience was important because it taught me quite a few things, though it wasn't an early site. For one thing, even in relatively late contexts in certain parts of the world, you do not get bifacial projectile points. I got big bifaces, things that look like handaxes in the Old World, but these turned out to be preforms for ground axes and not preforms for projectile points, which you get in North America.

One of the most exciting sites Ruth and I visited on our Land Rover tour was Talma-taima in Northern Venezuela. We visited there with José Maria Cruxent in 1970, and then we stopped by in 1976 and he enticed Ruth and me to stay for six weeks and excavate with him. This was when we excavated the juvenile mastodon and found the El Jobo projectile point right in the pelvic cavity and other artifacts in direct association as well. The animal had been butchered, and this is, as far as I know, the only definite megamammal kill site in South America. But the interesting thing here is that the dates from this site indicate this animal was killed 13,000 years ago, 2,000 years earlier than Clovis, and with a simple willow-shaped projectile point—very thick in cross section, almost cylindrical, bullet-shaped—quite different from Clovis. This, and many other sites in South America,

indicate that the general assumption that Clovis was the first is wrong.

I think that DNA analysis and the work on mitochondria and other genetic clues are going to be very important in the next decade or two. And analysis of coprolites is still important. But one of the most exciting things in the field is what is being done with hair. Hair preserves very well in certain environments. It is better than bone or any other normally perishable material. The fact that you can date hair and get an actual radiocarbon date on it is going to be very important. I know sites where you get some bone and wood and there's no stone at all. So what do you do when you run into a situation where the bone and wood and shell aren't preserved and you get no stone? But there are sites where you may get human hair, which would prove the presence of humans, along with rocks which were used but not necessarily flaked.

MT What are the most significant errors that North American archaeologists have made?

AB They don't know how to recognize some of the earlier sites because of their lack of experience with anything except bifacially flaked materials. It's very interesting. There is a Czech archaeologist with quite a bit of training in middle and lower Paleolithic in Czechoslovakia, and he went to Calgary to get a doctorate. He found two sites right in the city—deeply buried—clear artifacts—below glacial deposits that are not yet dated. Without his training in European Paleolithic, he would have overlooked them, as have many other archaeologists. Most North American archaeologists don't have the training and experience to be able to recognize really early sites in deeply Pleistocene stratigraphic situations.

MT What are the most important questions to be answered in North American Archaeology?

AB The question of technology—material culture—is the first thing. This is the primary question. Not *when* did people come, but what *technology* did they bring with them. I think that most Latin American archaeologists realize that it did not include bifacial projectile points. The assumption by North Americans has been that the technology had to be upper Paleolithic in order for people to survive in the high Arctic. But people *did* live in the high Arctic, in very cold climates, with a lower-Paleolithic technology. And if that's the case, we should be looking for a lower-Paleolithic level of technology in the New World. It doesn't mean that it is as early as lower Paleolithic in the Old World. We have to determine the actual antiquity here, but that's what we should be looking for.

The exciting popular assumption of the specialized big-game hunter chasing mammoths across Beringia with a spear is baloney.

I've gone to Siberia twice, and to Japan and north China, looking at Paleolithic sites. One of the assumptions has been that there's nothing early in northeastern Siberia, that the earliest evidence for people there is 15,000 or 16,000 years. But now with the Diring site [on the Lena River in Siberia], that has been disproved. Yuri Mochanov, the very same archaeologist who found Dyuktai, which had been the earliest so far, has found this site which is a *minimum* of 200,000 years old and may well be older (**Mammoth Trumpet** 7:3 "Siberian Site Defies Theories on Peopling"). I've spoken with several geologists who say it *has* to be *at least* 200,000 years old. But North American archaeologists are ignoring the site because Mochanov is saying that it is a million years or more. Mochanov is generally recognized by Russian archaeologists as one of the best field workers in the country. He cannot be ignored. He may be wrong on the date. I expect he's wrong—he's pushed it back a little too much, but nevertheless, it is at least 200,000 years old and it is located in the coldest part of the northern hemisphere, which means that even if people were up there in an interglacial, it still would have been cold in the winter. It means that people were adapted to very cold climates much earlier than North American archaeologists have assumed, and they must have had some cultural adaptation to the cold climate that early. So the assumption that it took an upper-Paleolithic technology in order to survive in far northern latitudes has been tested as an hypothesis, and it is wrong.

MT What's your advice to young archaeologists?

AB Every archaeologist should get experience in several areas. Don't get stuck in one area. I think that most young archaeologists believe this is where the jobs are: You get a job doing CRM [cultural-resource management], at a university, or you become a state or provincial archaeologist or work for the state archaeologist. My advice? Broaden your perspective. Get experience in different parts of the world.

Too many North American archaeologists today don't know how to recognize some of the earlier sites because of their lack of experience with anything except bifacially flaked materials. I think this is a major problem for most North American archaeologists; they don't have the training and experience to be able to recognize really early sites in deep Pleistocene stratigraphic situations. They don't know how to recognize tools unless they are bifacially flaked and especially bifacially thinned, like a projectile point. So they wouldn't recognize anything that would be called lower Paleolithic in the Old World. There are quite a few North American archaeologists who have worked on handaxe sites in Africa and Europe. But handaxes are bifacially flaked and well shaped, and there's no question that those are artifacts; but if you get into areas where there are no handaxes, there's no bifacial flaking at all and you're dealing only with pebble tools and simple retouched flakes, then they start doubting what they're looking at. It's difficult to look at some fairly recent sites in China, maybe only half a million years old, and say that these are real artifacts. Lewis Binford had that problem. He looked at the simple Choukoutien stuff and said, "Well, it's not cultural."

I think there should be more students who are questioning our models about the peopling of the Americas. I would hope there would be a greater proportion of students going into the field who thought this question about the early movement of peoples into the Americas was important. There really aren't any professional archaeologists in North America intentionally searching for really early sites right now except Ruth, me, and Rob Bonnichsen. But they need to set up these assumptions with which we've been working as testable scientific hypotheses. I think we could use the scientific method to better avail, and I think we could disprove a number of these hypotheses that have been accepted as true, and that have dominated our models for too long.

MT What are your plans now that you're retired?

AB I'm retired from teaching but I'm certainly not retired from field work. I'm looking forward to my 45th consecutive field season. As I said earlier, to find early sites you have to go south of the glaciated areas. Ruth and I have come to the conclusion that you've got to get far south on the Pacific coast, and you should look in caves. Well, there aren't any caves near the coast anywhere in the United States. There are a few tiny rockshelters in California. But, from Cape Mendocino south all the way to Baja California, you have tectonically raised marine terraces—that is, part of the continental shelf, or very near the original continental shelf, say 15,000 years old, that may be exposed and not under water. I've made three trips in the last two years looking at these caves and raised marine terraces in Baja California. We have chosen certain rockshelters for further work. There are so many that I'm sure this will keep us busy for the rest of my active career. This is a way to test our hypothesis that the earliest people were coastally adapted and that they moved slowly down the coast and up the rivers secondarily. So, Ruth and I plan to return to Baja California in May.

New Books

***Clovis Settlement Patterns* by Joseph M. McAvoy, 172 pages, 100 figures, 13 tables; Archaeological Society of Virginia, Box 340, Courtland, VA 23837**

The result of 30 years of studies of the Clovis culture in southeastern Virginia, this book represents Part 1 of the Nottoway River Survey. The author has searched the area centered upon the well-known Williamson Clovis site, made test excavations, inventoried farmers' collections and interviewed collectors. The book identifies five principal lithic sources and traces the distribution of distinctive cherts from quarries in the study area to more than 20 sites over a distance of 40 miles with Paleoindian components. It also records locations of random finds of Paleoindian artifacts, reviews all significant observations, summarizes settlement patterns and the local Clovis population.

***America's Ancient Treasures* by Franklin Folsom and Mary Elting Folsom, 480 8x10 pages, 318 halftones, 122 line illustrations; University of New Mexico Press, 1720 Lomas Blvd. N.E., Albuquerque, NM 87131-1591**

The fourth edition of this highly praised travel guide to U.S. and Canadian archaeological sites and museums of prehistoric peoples has been revised and expanded. It describes all North American archaeological sites that have been prepared for public view, and provides profiles of museums and collections.

***Ancient American Inscriptions: Plow Marks or History?* by William R. McGlone, Phillip M. Leonard, James Guthrie, Rollin W. Gillespie and James P. Whittall Jr., 240 pages, illustrated; Early Sites Research Society, P.O. Box 303, Sutton, MA 01590**

A comprehensive and critical work on the epigraphic aspects of pre-Columbian contact, the book analyzes the controversial subject of ancient inscriptions in the Americans. It attempts to separate supportable evidence from fakery and details what the authors have found to be valid and invalid.

Discovery of Elephant Rib Provides Valuable Date

A rib bone from a Pleistocene elephant recovered last year near Holmdel in Monmouth County, N.J., has been dated at 12,470 ± 260 years B.P. The date, achieved from collagen from the carefully recovered bone, is considered the first reliably aged Quaternary fossil in the area. David Parris, curator of natural history at the New Jersey State Museum in Trenton, explains that while remains of Pleistocene megafauna are not unusual in New Jersey stream deposits, this probably is the first case of such a bone being recovered from its original stratum of deposition. Collectors Joe and Sandy Camburn discovered the elephant rib in situ and carefully recovered it to avoid contamination that would distort radiocarbon dating. Fluted Paleoindian points have been discovered in the vicinity, and Parris says the State Museum is investigating possible connections.

TWO METHODS USED TO DATE ROCK VARNISH

How can rock art withstand the ravages of sun, rain and bitterly cold winds for thousands of years and still exist for researchers to study?

Part of the answer is rock varnish, a thin but very hard crust that forms over the surfaces of exposed rock. The varnish is made as oxides of manganese and iron, concentrated by the action of bacteria and perhaps other organisms, act as a kind of mortar that links clay minerals that have been blown or washed into the rock surface.

Before the varnish has a chance to completely cover the rock surface, however, microorganisms such as lichen, cyanobacteria and fungi grow on the rock surface and actually penetrate into the rock. Additionally, other types of organic material settle on the surface. As the varnish spreads, it seals the organic material underneath.

How this organic material can be dated is described in a recently published paper by co-investigators Ronald Dorn and Margaret Nobbs. One of the techniques—radiocarbon dating by accelerator mass spectrometry—takes advantage of the fact that organic carbon can be retrieved from under the varnish.

Radiocarbon dating raises the question as to whether the organic carbon that is sampled is the same age as the petroglyph. The assumption is that the dating clock is set when the petroglyph is chipped into the rock's surface. The action removes the old varnish and organic carbon beneath it and exposes a new surface. New carbon accumulates on the surface and eventually is sealed in by new varnish. By this theory, the dates yielded are minimum ones, because the carbon being tested is younger than the petroglyph.

However, investigators cannot rule out the possibility that the process of creating the rock art did not remove all the older carbon. So carbon taken from a petroglyph may predate the rock art.

Because of the uncertainty, Dr. Dorn uses other dating techniques to cross-check ^{14}C results, and, in turn, he uses ^{14}C dating to cross-check the other techniques.

One of the other techniques used on samples from the Black Hills rock-art site is cation-ratio dating, a method that assigns relative or calibrated ages to rock varnishes. It is based on the theory that a ratio of positively charged ions—cations—of potassium plus calcium to titanium decreases with age. A "cation-leaching" curve can be produced by measuring the cation ratio at sites in the region with known exposure ages. The cation ratios in unknown samples are then compared with this curve and a calibrated cation-ratio age is assigned. Although the method remains controversial, cation-ratio dating provided an important cross-check on one of the oldest radiocarbon dates from a Black Hills petroglyph.

Dr. Alice Tratebas, Bureau of Land Management archaeologist, offers this example of cross-checking: one of her panels produced a ^{14}C date of 11,155 ± 70 B.P., while a nearby glyph, probably the same scene, produced a cation-ratio date of 11,100 ± 900.

And an important advantage with the cation-ratio method is that it is less expensive. Each cation-ratio test costs about $100 whereas accelerator mass spectrometry ^{14}C tests on petroglyph varnish cost about $750 each.

–Tom Weller

Petroglyphs

continued from page 1

"We're just starting to get direct dates, and they may revolutionize rock-art studies," Tratebas said. "Maybe we will start to incorporate rock-art data into archaeological research. In the past it has been a fringe area."

Although it is not exactly a secret, Tratebas does not wish to disclose the location of the canyon that contains the 135 petroglyph panels. "Part of it is on private land and all of the access is private," she said. "It is up to the landowners how much viewing the public can do." She said people can damage the site by merely walking on it. "It's not a site that you can develop for public visitation. It is a site that should be a scientific preserve."

Tratebas is more than happy to describe what she has found there: The glyphs are solid pecked figures. Some look freehand, as if someone took a sharp rock and pecked out an animal shape directly. Others have a regular outline and look like indirect percussion. Many panels appear to have hunting themes. Some have animals running to the viewer's right and humans behind, as if they are driving game (photo, page 1). The panels depict a variety of hunting methods, mostly cooperative hunting by small groups.

Besides revealing the age of the glyphs, Tratebas said the dating results are helping her in another aspect of her study. "I'm working on mainstreaming rock art into archaeological studies in two ways. The first is placing it into the interpretations—looking at what the rock art tells you about prehistory, comparing that with what we know from the excavation record, and melding the two together. The second is using archaeological techniques to study rock art. One thing I did was an attribute analysis."

The site poses some mysteries.

For this analysis, Tratebas collected information on the attributes depicted on the panels and then used a statistical method called principal-components analysis. "This method has been used in archaeology for a long time, but it has hardly ever been used on rock art.

"Through the dating project, we established a 9,000-year time span for the petroglyphs that starts at the beginning of the Paleoindian period as presently defined and extends to the end of the Plains Archaic, at about 2,000 years ago. Then we have an abrupt end to this petroglyph tradition." She says a variety of later rock-art types occur throughout the Black Hills region, with some of it found in the canyon.

Tratebas said the analysis broke up the site's 9,000-year time span and provided indications of how the petroglyphs changed through time. The result was patterns that stair-stepped through time. Certain motifs or themes were depicted in the earliest panels, but through time they shifted to other motifs or themes. Two patterns began before 11,000 years ago. One focuses on elk in static positions, as indicated by straight legs. Sometimes the animals have ball-shaped feet. Associated stick humans, which have oversized hands and fingers, appear to be calling game (photo, right). The petroglyphs give a perspective of millennia for a practice that the excavation records only in isolated evidence. As an example Tratebas cites the medicine post, presumably used by the shaman to call game, at a Colorado bison-kill site, and a shaman's structure at another site.

The other early pattern has mountain sheep and canids in association with leaping animals. This pattern suggests that Paleoindians used canids in hunting, another practice that continued into the Plains Archaic, according to the petroglyph records.

A pattern that began before 9,000 years ago shows increased emphasis on humans. Anthropomorphs shown in profile have oval-shaped bodies and often bent knees that suggest dancing. Depictions show costuming imitating the animals or a shaman's experience of transforming into an animal. The animal species depicted change through time, and by the Plains Archaic, the petroglyphs focus on deer and antelope. There are round-bodied humans that are assisted by canids and are driving or trapping game. Antelope are associated with hunting structures that resemble corrals and nets (depicted as lines of half-circular loops) and stick humans that have two-feather or horned headdresses.

ALICE M. TRATEBAS

This panel of straight-legged animals was dated to the Paleoindian period. It depicts a shaman standing on the back of an animal, possibly signifying game calling or the power to control animals.

Ability to date the panels clarifies the analysis because you know where the patterns fall in time. The statistical analysis also permitted Tratebas to test the dating method internally in the rock art. "Once you do the analysis and see how the patterns fall out, you can look at the dates and see if they scatter all over or form neat clusters." Happily, Tratebas says, it turned out that dates for each pattern formed clusters.

Tratebas's work has led her to pose intriguing questions about the Native Americans who carved the petroglyphs thousands of years ago. "A major question is why we have a shift through time in the kinds of species that are depicted." Identifying animals depicted in petroglyphs is not always easy. "It's sometimes hard to distinguish, say, an elk from a deer on the basis of antlers." Because antlers and horns are usually fairly elaborate in the petroglyphs, they are the most crucial attributes for identifying the animal species.

The site is posing some mysteries. Several animals look like they could be caribou, but Tratebas says it's hard to be sure. "There is a lot of variation in caribou antlers." Another mystery is the relative rarity of bison. Two dated panels with bison are from Archaic rather than Paleoindian times. "One panel with bison has early-Archaic dates, but we cannot date the bison itself because it is badly chalked. A direct date on a bison from another panel falls in the middle Archaic."

That information seems to contradict knowledge gathered by conventional archaeological means. Theories based on excavated sites are that Paleoindians specialized in hunting bison, while Archaic people shifted to a variety of other animals. This leaves the intriguing question: "Why are the few bison we have in the Archaic and not in the Paleoindian?"

Tratebas cautions that animals depicted in rock art may not have been the ones the artists actually hunted for food. "It's very hard to put specific interpretations on whatever symbolism is used in rock art," she said. "It is easier to work with rock art when you have present-day people who are descended from those who made the rock art and who still have the same ceremonies and thought system." The elk and mountain sheep of the Paleoindian panels may be symbolic of something other than hunting or relate to hunting on a symbolic level.

North America is particularly rich in rock art, and Tratebas notes that careful research on rock art could play an important role in the debate about the

peopling of the Americas. "Widespread over the West there is a lot of rock art that has solid-pecked, small-sized figures in what look like hunting scenes. A lot of these petroglyphs are younger, but some could be old." Regarding the Black Hills petroglyphs, she poses the question: "Is this a regional style?"

It is a fascinating question to Tratebas. "Do we have rock art in an early time frame that is similar over a wide area—like Clovis points are somewhat similar over a wide area? Or do we already have a regional style here in the Black Hills, and can we expect different styles in other areas? It's something we don't really know because we don't have enough dated rock-art sites for comparisons. Maybe we have well-established regional styles that are over 11,000 years old. If so, should we expect an older, ancestral style that is more widespread? This line of thought leads to the question of whether people were in the Americas longer because you would have to go back further in time to find a more widespread style." But that, Tratebas cautions, is a difficult question for researchers to answer, especially when there are so few data.

In light of dates of North American rock art, Tratebas wonders about rock art in the ancestral land of Paleoindians, presumably Siberia. "Is there any rock art that is similar enough that we could speculate about rock-art ideas people might have brought with them into the New World? Or if there are no close comparisons, should we speculate that the petroglyph style developed here?" She poses the possibility of collaborative research with Russian scientists to seek differences and similarities between Siberian and American rock art. "Since we're really just starting to get dates on rock art around the world, we probably won't be able to make many comparisons until we get more sites dated."

Tratebas suggests that the study of rock art can yield important insights into the people who created it. "Rock art is basically telling you something about the thoughts of a people. Maybe that gets you a lot closer to what the people were like, than, say, studying their campsite or their bison kill site. To be able to get this kind of information about prehistory is definitely exciting."

As an example she notes that the Black Hills petroglyphs appear to show that game calling spanned thousands of years (and likely was brought into the New World from Siberia). In contrast, archaeological excavations have disclosed only a few discontinuous records that provide the same information about such a thought system. Again she refers to the two sites where a medicine post and a shaman's structure were found.

Tratebas is continuing her survey and documentation of the Black Hills petroglyphs. When it is complete she will devise a plan for their protection. Because it is so easy to destroy, Tratebas says all rock art in a region should be considered before decisions are made about which sites should be developed for the public. "We should not just take the site that has the most scientific value and develop that one, because damage by people always results from visitation."

Site protection, she warns, must be started now, "before the scientific value of these sites is completely gone."

–Tom Weller

SUGGESTED READINGS

ON Wyoming Petroglyphs

Dorn, R., and M. Nobbs 1993 New Surface Exposure Ages for Petroglyphs from the Olary Province, South Australia. *Archaeology in Oceania* 28:18–39.

Dorn, R. I., P. B. Clarkson, M. F. Nobbs, L. L. Loendorf, and D. S. Whitley 1992 New Approaches to the Radiocarbon Dating of Rock Varnish, with Examples from Drylands. *Annals of the Association of American Geographers* 82:136–151.

Whitley, David S., and Ronald I. Dorn 1993 New perspectives on the Clovis vs. Pre-Clovis Controversy. *American Antiquity* 58:626–647.

Diversity in Bone, Taphonomy Research Evident in Presentations at Conference

The remarkable diversity of studies devoted to alterations of bones as they are found—or might be found—in archaeological sites was evident from the papers presented at the Bone Modification Conference Sept. 26–30 in Hot Springs, S.D. The conference, the eighth meeting of Working Group 1 on Bone Modification, sponsored by the Archaeology Laboratory of Augustana College and the Mammoth Site of Hot Springs, was organized into sessions covering seven different aspects of bone modification.

Beginning a session on bone modification as indication of changes in human diet, George Frison, University of Wyoming anthropologist, described evidence that Paleoindians hunted the camel, *Camelops*, on the High Plains of North America 10,000–11,000 years ago. Several archaeological sites in Wyoming have proven to hold camel bones. A tibia fragment found at the Agate Basin site near Wyoming's border with South Dakota was modified into a flesher, a tool used to remove meat from bone.

In a session on biological, chemical and mechanical alteration of bone, Dixie West and Larry D. Martin of the University of Kansas discussed invertebrate trace fossils in the archaeological record. They have observed modification of bone by dermestid beetles in Paleoindian sites and declare that these are among several species of insects that modify bones in a predictable fashion. Because their studies indicate that conditions necessary for these hide- and flesh-eating beetles is quite restricted and seldom attained in archaeological sites, they suggest that insects may prove useful in determining seasonality. "Although the study of successional sequences of insects on modern carcasses is of little aesthetic appeal," they note in their published abstract, "it may prove a potentially useful, as of yet untapped, tool for contributing to seasonality studies and formation processes at archaeological sites."

Joaquín Arroyo-Cabrales of the Paleozoology Laboratory at Mexico's National Institute of Anthropology and History, and Eileen Johnson of the Museum of Texas Tech University, described bone taphonomy in San Josecito Cave, Nuevo Leon, Mexico. Thousands of bones of late-Pleistocene age were removed from the cave when it was excavated 50 years ago by personnel from California Institute of Technology, and most are curated at the Natural History Museum of Los Angeles. Fewer than 5 percent retain provenience data. Photo documentation indicates the bones were disarticulated, jumbled and not perfectly preserved. Arroyo-Cabrales and Johnson reported on their own excavation of the cave and their analysis of the faunal assemblage from the Cal Tech excavations. (Taphonomy is defined as study of the passage of faunal remains from the biosphere to the lithosphere, that is, all those processes that transport and alter bone after an animal's death.)

The researchers found rodent and carnivore gnawing, manganese staining, weathering, and burning—possibly caused by fires used for drying by the Cal Tech excavations—in the Los Angeles County Museum assemblage. Faunal material from their own excavation of lower levels in 1990 is still being analyzed, but the investigators reported that most of the bones they recovered were not articulated and there was little rodent gnawing. Some found in 1990 were burned, a condition that cannot be explained by the fires of the earlier expedition. "The greater majority of bones are complete . . . but several are incomplete and refitting was rarely accomplished." They found manganese staining, a blue-green staining possibly caused by copper, and compression, probably due to the sediment load. "Overall," they report, "the San Josecito Cave bone material mainly shows physical and chemical taphonomic factors, rather than biological ones."

In the same session Vivian G. Scheinsohn and José L. Ferretti of CONICET, Buenos Aires, Argentina, reported on mechanical properties of bone tools in Tierra del Fuego. After performing a series of mechanical tests on bone samples representing raw materials—cetacean, pinniped, avian, and guanaco—used by prehistoric Fuegan people, they concluded that bones selected for producing certain tools were "those that best fit the conditions imposed by the tool's function."

In the following session on human cultural modifications as taphonomic indicators, Eileen Johnson of the Museum of Texas Tech and Maria Gutierrez of La Plata National Museum of Natural Science, Argentina, presented a preliminary report on Holocene taphonomy of an extensive deposit of guanaco bones exposed in a river bank of the Quequén Grande River in the Necochea District of Buenos Aires Province. The bones, parts of 20 animals of various ages, were in stratified lacustrine deposits of early-Holocene age, and preliminary indications are that the bone piles were not the result of water accumulation. The bones, found in three piles, suggest the site, called Paso Otero 1, is the first excavated kill/butchering site on the Argentine Pampas. Johnson and Gutierrez reported that cut marks on the bones were relatively rare; they had not yet been confirmed through analysis with a scanning electron microscope.

Besides cut lines, analysis of the surface features of the bones indicates root etching, rodent gnawing, soft-sediment abrasion, solution pitting, desiccation split-lines, laminar spalling and carnivore gnawing and tooth punctures. The investigators were particularly interested in the carnivore modifications, because the largest known carnivore on the Pampas in the Holocene is the small pampean fox unlikely to have chewed the bones. Johnson and Gutierrez suggest that the discovery "raises the controversial issue of whether or not pre-hispanic dogs occurred on the pampas."

Ingo Kraft of the University of Munster, Germany, described a puzzling concentration of bison bones at Isernia La Pineta in central Italy, a middle-Pleistocene site that has been dated to 750,000 B.P. Preliminary research has located more than one hundred simple artifacts in association with thousands of animal bones. Bones, chiefly bison, are in excellent condition and show no indication of being transported to the site by water. Curiously, most of the bison bones represent undesirable, rather than nutritious, parts of the animals. "It is very likely that Isernia represents a refuse pile near a not-yet-discovered habitation site," Kraft reported in his published abstract. He contrasted the site with bison-kill sites in Saskatchewan, Nebraska, and elsewhere, and suggests that animals transported to the site were butchered and garbage deposited there. Kraft said that the relatively small number of intentionally fractured bones and the lack of bone artifacts also support the argument that the site represents refuse.

In the following paper, Lawrence C. Todd of Colorado State University, and Matthew G. Hill and George C. Frison, of the University of Wyoming, updated bone modification patterns at the Casper site in Wyoming, which originally was described by Frison in a 1974 monograph. The investigators reported that there is more evidence of non-humanly produced modification, particularly by carnivores, than was originally reported. However, they said that there also is an excellent record of food-processing activities by humans. "Of particular interest is evidence that many of the limb bones were processed for marrow removal as complete, articulated units instead of being dismembered, defleshed and then processed," they reported. They noted evidence that bones may still have had large muscle masses attached when marrow was extracted.

A paper on the culture of butchering by Dienje M. E. Kenyon, of Indiana University of Pennsylvania, concluded the session on bone modification as an indicator of changing human diets. Kenyon argued that butchery should be seen as a cultural activity and thus subject to the same anthropological scrutiny as other cultural events.

Genevieve LeMoine of the University of Calgary presented an argument for bone and antler modification techniques as cultural indicators. She reported that her studies of bone and antler technology among two groups living in the Mackenzie Delta region of the Northwest Territories indicate that despite general morphological similarities in bone and antler tools between the two groups, the processes of manufacture are quite different in every

way from initial reduction to final shaping of tools. LeMoine suggested that attributes of reduction techniques and other aspects of manufacture have the potential to provide spatial and temporal boundaries of prehistoric cultures.

In the same session, bone modification as human cultural indicators, Saskia Bott and Pierre Cattelain of SEDARC, Treignes, Belgium, described a Pleistocene reindeer-antler deposit in Belgium that may have been a tool-processing site far north of the period's usual human habitations. Previous work at the site, initially excavated to Neolithic levels in 1904, largely ignored lower Pleistocene levels, which have been dated from about 12,000 to 16,500 B.P. Predominant is "an incredible accumulation" of parts of antlers that had been shed by females or very young males. The investigators suggest that groups of hunter-gathers, expert in reindeer ecology, traveled from base camps in more hospitable climates far to the southwest to obtain raw material for tools. "They . . . knew perfectly well where to easily collect shed antlers on their way north at the beginning of summers," Bott and Cattelain wrote.

A concluding session covered various tests of wear patterns in archaeological specimens. Hugo G. Nami and Vivian G. Scheinsohn of CONICET, Buenos Aires, Argentina, described their analysis of "retouchers," bone tools used to finish stone tools by pressure flaking. They analyzed the use-wear patterns and manufacture marks of experimental retouchers and compared their marks with those found on archaeological bone tools.

Jeanette L. Mobley-Tanaka and Janet L. Griffitts of the University of Colorado described their studies of spatulated humerus tools, usually characterized as "fleshers," and notched ribs and scapulae, usually characterized as yucca processors. Under high-powered magnification they compared archaeological tools with an independently developed experimental collection and concluded that notched ribs are, in fact, yucca-processing tools, but that the spatulated humeri were used for a variety of activities involving both plant and animal products. Their study indicates that different materials do leave distinct and identifiable use wear on bone that can be observed in archaeological assemblages.

In a separate paper, which concluded the conference, Griffitts presented results of an experimental study of use wear on bone tools. The study involved 31 experiments using deer and bison bone and involving a variety of contact materials and motions. The experimental activities were assumed to be within the range of prehistoric inhabitants of the Southern Plains. Utilizing high-power optical microscopy, her observations of use wear on the experimental bones were used to analyze bone tools recovered from a late-Prehistoric bison processing site in west-central Texas. She reported that although not all materials leave diagnostic wear on bone tools, the investigation shows that use-wear on bone tools can be distinctive. While cautioning that more research is needed, she reported that certain archaeological tools could be tentatively identified.

Organizers of the conference were L. Adrien Hannus, Lynette Rossum and R. Peter Winham of the Archaeology Laboratory, Augustana College, and Susanne Miller of EG&G Inc., Idaho Falls, Idaho.

–DAH

Soils Conference

The 2nd International Conference on Pedo-Archaeology will meet April 7–9 at the Ramada-Townhouse hotel in Columbia, S.C. Host of the event, the University of South Carolina's Institute of Archaeology and Anthropology, is seeking a wide variety of papers dealing with soils in an archaeological context. Topics are to include paleosols and stratigraphy, effects of bioturbation on sites, soils and agriculture, anthrosols, landscape reconstruction, Pleistocene-Holocene boundary, and trace-element analysis. The three-day conference includes a field trip to geo-archaeological sites. The organizers require titles, abstracts and a $75 registration fee before March 1. Address inquiries to Albert C. Goodyear, SCIAA-USC, 1321 Pendleton St., Columbia, SC 29208.

COMMUNICATION

Warm Mineral Springs Site under Threat

Some of you affiliated with the **Mammoth Trumpet** already are familiar with the remarkable archaeological history of Warm Mineral Springs here in southwest Florida, and the discoveries by Col. William Royal of 11,000-year-old human and faunal remains on a ledge 40 feet below the water surface. Warm Mineral Springs virtually became the birthplace for underwater archaeology in 1959 when Col. Royal found a human skull with a preserved brain still intact in a sediment layer subsequently dated to 10,000 years B.P.

Less well known to those outside this area are the therapeutic benefits of the warm, heavily mineralized water. Warm Mineral Springs attracts an international clientele because of its reputation for healing victims of arthritis, rheumatism, and other chronic ailments. Col. Royal and I believe that legacy, as well as undiscovered archaeological remains both above and below the water surface, are now facing a severe threat.

Until now, the two-acre Springs pond and 80 acres of surrounding property have remained reasonably undeveloped, and the pastoral character of the landscape has remained intact. Now, however, the company that has owned the Springs for the past 40-odd years has put the property up for sale and unveiled a plan that would forever devastate this one-of-a-kind site. The plan calls for construction of a 280-room hotel, 246 one- and two-story villas, 40,000 square feet of retail space, 60 additional units for convalescent care, 1,700 (!) parking spaces, new roads, and artificial ponds on the site. Most of the property is presently graced by grassy fields and beautiful old oak trees, but these will be but a faint memory if this intensive development plan is approved.

Besides obliterating the ambiance of the site, we believe this plan endangers the aquifers that feed the Springs and the archaeological remains in the uplands areas. Unfortunately, the owners are in the real-estate business and are treating the property simply as a commodity to be sold for maximum profit. To this end, they have proposed to have the neighboring city of North Port annex the Springs property in order to obtain municipal water and sewer services, which they believe would make the property worth their asking price of $4.5 million. If annexation is approved, the stage will be set for the desecration of one of the most important archaeological sites in all of America.

Our only hope in saving this site is to put pressure on the local and state officials who will be deciding its fate in the coming months, probably sometime early in 1994. I'm sure many of you are aware of other such sites that have been destroyed over the years; this terrible trend must stop. It would be a great help to our cause if some of you could write us a note expressing your concerns about this construction plan. We endorse an alternative plan for a small health clinic on the property that would emphasize self-therapy and naturopathic remedies and **NO ONE** living on the property. We will pass on copies of your letters to the appropriate authorities.

Chris Sheehan
410 Sebastian Road
Warm Mineral Springs, FL 34287

UPCOMING CONFERENCES

Jan. 5–8—Annual Meeting, Society for Historical Archaeology/Advisory Council on Underwater Archaeology, Vancouver, B.C.
Contact: SHA/CUA Program Chair, Dept. of Archaeology, Simon Fraser University, Burnaby, B.C., Canada V5A-1S6. (215) 898-4000 Fax: (215) 898-0657.

Feb. 18–23—Annual Meeting, American Association for the Advancement of Science, Hilton and Towers Hotel, San Francisco.
Proceedings to include:

- "Comparative Linguistics and Historical Relationships," Feb. 21, organized by Johanna Nichols of UC Berkeley and Lyle Campbell of Louisiana State University, examining relationship of linguistics to history, archaeology and cultural anthropology.
- "Calibrating Human History: The Impact of New Methods of Dating," Feb. 23, organized by Frank Hole of Yale, which will examine entry of humans to the Americas and other key events.
- A three-day seminar, "Evolution and Extinction," organized by John Weihaupt of the University of Colorado-Denver, Feb. 21–23, the final day of which will deal with human impacts on Pleistocene and contemporary extinctions.

Contact: AAAS/Meetings, 1333 H St. NW., Washington, DC 20005. (202) 326-6450 Fax: (202) 326-4021.

March 4–6—Archaeology of the Hudson Valley Conference, New York State Museum, Albany.
Abstracts due Dec. 10. Contact Cheryl Claassen, Anthropology, Boone, NC 28608 (704) 262-2295.

March 17–20—Annual Meeting, Central States Anthropological Society, Kansas City.
Contact: Martin Ottenheimer, Dept. of Sociology, Anth. and Social Work, Kansas State University, Manhattan, KS 66506-4003. (913) 485-2703 Fax: (913) 532-6978 E-mail: omar@ksuvm.ksu.edu.

April 6–9—Annual Meeting, Northeast Anthropological Association, Geneseo, NY.
Contact: Sue Roark-Calnek and Russell Judkins, Anth. Dept. SUNY, Geneseo, NY 14454. (716) 243-0856.

April 7–9—Second International Conference on Pedo-Archaeology, Columbia, S.C.
Deadline for submitting papers, March 1. Contact: Albert C. Goodyear, S.C. Institute of Archaeology and Anthropology, 1321 Pendleton St., Columbia, SC, 29208. (803) 777-8170 Fax: (803) 254-1338.

April 7–9—Annual Meeting, Southwestern Anthropological Association, Las Vegas, NV.
Contact: William Jankowiak, Department of Anth., UNLV, Las Vegas, NV, 89154. (702) 739-3610.

April 8–9—Integrating Archaeological Demography: Multidisciplinary Approaches to Prehistoric Population, Sponsored by Center for Archaeological Investigations, Carbondale, IL.
Deadline for abstracts, Dec. 10. Contact: Richard R. Paine, CAI, Southern Illinois U., Carbondale, IL 62901. (618) 549-4009 Fax: (618) 453-5037 E-mail: rpaine@siucvmb.

April 20–24—59th Annual Meeting of the Society for American Archaeology, Anaheim, CA.
Contact: SAA, 900 Second St. NE, Suite 12; Washington, DC 20002.

May 17–21—International Conference on Tree Rings, Environment and Humanity: Relationships and Processes, Tucson, AZ.
Contact: International Conference, Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ 85721. (602) 621-2191 Fax: (602) 621-8229.

May 23–29—Symposium on Paleoindians and the First Americans, Museum of Natural History of San Rafael, Mendoza, Argentina.
Contact: Committee on the Symposium on Paleoindians and the First Americans, Archaeology Division, Faculty of Natural Sciences and Museum-UNLP, Paseo del Bosque s/ no, 1900 La Plata, Argentina. Fax: 54 (21) 257527 or C.C. 275, (7630) Necochea, Argentina, Fax: 54 (0262) 21209.

May 30–June 4—American Rock Art Research Association's International Rock Art Conference, Flagstaff, AZ.
Contact: ARARA, P.O. Box 65, San Miguel, CA 93451-0065. (805) 467-3704 Fax: (805) 467-2532.

Aug. 25–Sept. 2—45th Arctic Science Conference, Anchorage, Alaska, and Vladivostok, Russia.
Themes include Natural Resources and Environmental Changes, Recent Discoveries about Beringia, Development and Adaptation of People and Culture, and Communication and Information Exchange. Deadline for abstracts: Feb. 10. Contact: Dr. Gunter Weller, Geophysical Institute, University of Alaska, Fairbanks, AK 99775-0800, E-mail: gunter@dino.gi.alaska.edu; Fax: (907) 474-7290.

Oct. 18–22—Rewriting the Pacific: Culture, Frontiers and the Migration of Metaphors, Davis, CA.
Deadline for abstracts: April 30. Contact: Kay Flavell, Critical Theory, University of California, Davis, CA 95616. Fax: (916) 752-8630.

November, 1994—International Symposium on Pleistocene/Holocene Boundary, Mendoza, Argentina.
Contact: Marcelo Zárate, Centro de Geología de Costas y del Cuaternario-UNMP, Castilla de Correo, 722 Correo Central, 7600 Mar del Plata, Argentina.