WYOMING PETROGLYPHS DATED FROM 11,500 TO 2,000 B.P.
Rock Art Sites Hold Promise of New Information

When Alice Trotbaas 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. Trotbaas, 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 drained by modern Americans.

"People have damaged about 98 percent of the site so far," Trotbaas said in a telephone interview. "Probably 17 percent of the 155 petroglyph panels have bullet and backstab 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," Trotbaas notes. "If you get the right light on the petroglyphs, they will show well in a photograph."

Though not, 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," Trotbaas 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."

Trotbaas called in Dr. Ronald Dorn of Arizona State University, an expert in 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 Trotbaas's desire to see the Black Hills rock art preserved. Dorn, a geographer, used two different dating techniques in tandem, accelerator radon-argon dating and carbon-14 dating.

"We have 12 dates on the petroglyphs so far," Trotbaas said. "Thirteen of them are C14 dates and the rest are radon-argon dates. The oldest date is a carbon-14 date of about 11,500 years B.C."

"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. Now, archaeologists would excavate burial panels and get carbon from below where the glyph was made. That would be a minimal date, but you are still making assumptions. We're the people living there the same as the ones who made the rock art."

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. 20-Feb. 6 visit by Mochanov, a professor of the Faculty of the Russian Academy of Sciences at Yakutsk, who is director of all research on the Lena River including the astonishing Divin Yurak site.

Mochanov will be describing findings at the very old Divin site, which he believes proves humans have been living in cold climate since before upper-Paleolithic time. Mochanov 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. MacMillan call it an overwhelming success.

The project relied on extensive public involvement as well as on a broad survey of the prehistoriography of the Willamette Valley, which extends approximately from Eugene to Portland, to identify sites that could relate to the initial peopling of the Americas. Research design relied on three assumptions that Pleistocene archaeological remains would 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 15 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—pap and musk oxen—thought not known in the Willamette Valley.

One new site, the Navarro-Lenard site near Corvallis, already has yielded significant remains of Late and Middle Pleistocene mastodon in tentative association with humans. Further, the research team has found that late-Pleistocene age, he notes, was the potential to predict the location of additional Pleistocene paleontological and archaeological sites.

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

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Montana Site Part of Program On 1st Americans

A television program, "Ice Age Crossings," to air in January for the newly formed Channel's series of "Cultural Archaeology," will include a discussion by Dr. Robert Botticelli, 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 8:00 p.m. EST and will be repeated the same night at 11:00 p.m. EST and Sunday Jan. 9 at 9:00 p.m. EST.

The graphics director for New Dominion Pictures of Virginia Beach, Va., producer of the series, said he expects "Ice Age Crossings" to be one of the more visually interesting segments of the series. Besides Mammoth Meadow, sites to be featured include Montana's Ice Age sites and Alaska's North Slope, which has 11,700-year-old remains of humans. The series has been dated to 13,000 years ago.

The Learning Channel has scheduled the program for three times, persons interested in viewing it again might want to videotape their own personal copy. Because there is no certainty that it ever will be shown again 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 archaeological weekend with the Northwest Archaeological Society in Washington state's Olympic Peninsulas.

We gathered near the mouth of the Hoko River at the property of Dr. Dale Cross, Washington State University professor of anthropology. There we gathered mussel, abalone, clams, crabs, shrimps, snails, and fish, part of our native American dinner. Then we walked to a nearby religious site of the Makah Indians. We also gathered willow reeds to take to a basket weaver. At sunrise, we gathered sunflower seeds, which we learned to clean and dry the traditional way into flakes and brinse.

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. Cross gave a slide show on the history and geography of the region and 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 language that is dying as their rich toolkit, such as whales, seals, fishers, hunters, gatherers, craftpeople, and warriors. We also visited Greg Colfax, an artist-archaeologist, who showed us an ancient tool kit and explained its symbolism.

Colfax has been commissioned to create神色 poles for many well-known people. We visited Hobart ideas, a master builder-chef. The 81-year-old Makah elder showed us samples of her lovely work and told legends depicted in the designs.

Anne Sanaway, 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.

-Joyc Pytkowicz, Volunteer Coordinator

Oregon Study concludes in their report to the Oregon State Historic Preservation Office, which supported the project. They note that most of the paleontological and early archaeological work was on 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 better understanding of the cultural and environmental history of the Willamette Valley and westernmost North America.

The Willamette Valley is a 200-mile-long 120-foot-deep structural depression between Oregon's Cascade Mountains and Coast Range, is predominantly an alluvial plain lying in elevation from about 130 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 geologic history. A dominant influence was a series of Pleistocene floods that occurred when enormous glacial lakes spilled into the Columbia River and water carried icebergs, sand, silt and suspended clay back 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 distinctiv deposits including flooddrains and estuaries.

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 national 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 Worthington Award upon a departing chair. Meeting at Oregon State University in October, the board awarded the medal to Jo Ann Harris for her crucial role in moving the CSFA to Oregon State University and reorganizing it to improve its effectiveness in research and disseminating knowledge about the prehistory of the Americas.

Harris, a New York attorney with an intense interest in archaeology, was obliged to resign her position on the CSFA board at the end of 1990 because of the Crimal Division of the U.S. Justice Department.

After reluctantly acknowledging the resignations of Harris and Roy Gallant, a Portland, Maine, attorney and founder of the Center, the board voted to welcome four new members. They are:

-Michael Chamness, an insurance executive and financial planner from Madison, Ore., who also is a board member 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 and in 1988 organized the Shared Principal agreement with the Colville Confederated Tribes that was important in settling the dispute over the Richley-Roberts Claims site in East Wenatchee, Wash.

-Jerry Running Fox, 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. Bureau of Reclamation.

-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.

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

Anne Sanaway, a Louisiana, 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, Anne Sanaway 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.

Botticelli 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 lasting and lasting framework for continued operation of the Center," he said. He also plans to honor Harris for her "calm and rational approach and her dedication in moving us from Maine.

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

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The Quest for First Americans

An interview with Alan Bryan

Editor’s Note: Archaeologist Alan Bryan recently retired from teaching after 36 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 reported to the National Register of Historic Places. The job, which involved walking much of the distance from southwestern Colorado to the British Columbia border north of Bellingham with his partner, Don Tushy, 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, anthropologist Ruth Grub. Bryan and Grub have worked on many sites together, including Wilson Butte Site in the 1970s, a collection of ancient sites in 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 man into America”—that was the title of a talk given by Prof. Fredrich 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 Introduction 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 able to see the chairman of the Department of Anthropology, Emer Guttner. 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 archaeology in the 1950s was about what the early peoples did and how 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 mammal kill sites well dated to between 11,100 and 10,900, so it’s the best evidence for 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 led 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 some oval 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 visit existed to 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 Indian life in the Peten, 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 way up was on the Continental Divide. I found some very intriguing preclassic pottery and quite a bit of faired 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 miles from their villages up to work at 15,000 feet elevation, very cold and rainy, work all day and then walk home again. We got several dates, but the best one was a radiocarbon date of about 17,000 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** What was 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 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 fluted flint points quite far south means that Clovis people picked up their socks in Texas or Arizona and got themselves clear to Arkansas 200 years or less, and I just can't 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 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 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 volcanoes. 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 depending on 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, was the development of various new parasites. You get into the tropics and you have a tremendous increase in debilitating parasites. These parasites are going to affect humans as well as animals. This is just a total blank. People who go in from colder, drier 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.

**MT** The thesis of one of my former students, John Abtsosat-Petneh, who just got his Ph.D. last year. It is a very complex thesis, but one of the major points, I think, is that there is a conflict between 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, 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 be earlier than that. We have to have been out of South America. Monte Verde in humid subtropical Chile is 13,000 years old, but... During a trip to Siberia Alan Bryan talks with his host, prominent Russian archaeologist Yuri Mochnavan.

**AB** We 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—juveniles of families—will break off and move into an area that they may have hunted or gathered in occasionally. The movement is going to be slow or casual, and they'll be more adapted 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. They will go 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 Mammoth: The Case for a Pacific Rim Migration.") However, I don't agree with Fladmark on certain points. We 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 we're right about the route but too conservative about dating. If you have 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 quite likely that the 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 these 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 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 the University of Arizona, we would go from site to site, hunt or gather something—explore a little bit—but they're not going to move there.
indicate that the general assumption that Clovis was the first is wrong.

I think that DNA analysis and the work on mitochondrial 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 mummified hair. Preservation varies 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, accurate 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 find sites like that? But the 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 tools 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 evidence with animals. And except for bifacially flaked material, there isn't any really interesting. There is a Czech archaeologist with a lot of training in middle and lower Paleolithic in Central Europe. This is the kind of guy who needs to get a degree. He found two sites right in the city—deeply buried—clear artifacts—below gravel deposits—and he is 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 recognize early sites in deep 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 whether 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 be and live there. 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, which means 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're looking for.

I've gone to Siberia twice, and to Japan and northern 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 old. But now with the Drongor site [on the Lena River in Siberia], that has been disproved. Yuri Mochanov, the very same archaeologist who found Dzyahilei, which had been the earliest to far so forth, has found this site which is a minimum of 200,000 years old and may well be older (Mammoth Trumpet 7:3 "Siberian Site De- fies Theories on Peopling"). I've spoken with several other experts 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 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. This means that even if it 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 northland 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 are jumping on the idea of cultural-resource management, at a university, or you become a state or provincial archaeologist or work for the state ar- chaeologist. My advice is: look at your perspective. Get experience in different parts of the world.

Too many North American archaeologists don't know how to recognize some of the earlier sites because of the technology. They are not used to looking at 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 early sites in deep Pleistocene stratigraphic situations. They don't know how to recognize tools unless they are bifacially flaked and easily bifacially flaked. I think that's the problem. 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 is no question that they are older, 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 a half 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 people into the Americas was important. There really are no professional archaeologists in North America intentionally seeking for really early sites right now except Ruth, and me, and Bob 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 scien- tific 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 con- clusion 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 teotically raised marine terraces—that is, part of the continen- tial shelf, or very near the original continental shelf, say 15,000 years ago. This is only being 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 hypothe- sis that the early people were 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.
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 up of manganese dioxide, which is contributed by the action of bacteria and perhaps other organisms, as a kind of mortar that binds clay minerals that have been blown or washed into the surface.

Before the varnish has a chance to completely cover the rock surface, however, microorganisms such as 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 rock surface beneath it.

How this organic material can be dated is described in a recently published paper by co-investigators Dr. Bart Simon and Margaret Nobbs. One of the techniques—radio carbon dating by accelerator mass spectrometry—takes advantage of the fact that organic carbon can be retrieved from the varnish. Radio carbon 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 rock varnish is set and that the petroglyph is chipped into the rock's surface. The action removes the old varnish and organic carbon beneath it and exposes the new surface. New carbon accumulates on the surface and eventually is sealed in by new varnish. By this theory, the dates yielded are minimum years, 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 of the older carbon. So carbon taken from a petroglyph may predate the rock art.

Because of the uncertainty, Dr. Bart Simon and Black Hills rock art expert is called cross-checking carbon dating, which assigns relative or calibrated ages to rock varnish. It is based on the theory that a radiocarbon-dated sample may not have been exposed to the atmosphere at all. The carbon in the samples is then compared with the average for the period and a calibrated carbon-to-carbon ratio is assigned. Although the method remains controversial, carbon dating provided an important cross-check on one of the oldest radiocarbon dates from a Black Hills petroglyph.

Dr. Alice Trabas, Bureau of Land Management archaeologist, offers this example of cross-checking: one of her panels produced a chip date of 11,555 ± 70 B.C., while a nearby glyph, probably the same scene, produced a carbon date of 11,500 ± 100 B.C.

And an important advantage with the carbon-to-carbon ratio is that it is less expensive. Each carbon-to-carbon test costs about $100 whereas accelerator mass spectrometry tests on petroglyph varnish cost about $750 each.

—Tom Weiler

NEW VIDEO

Mammoth Meadow: An Archaeological Quest for the First Americans

Petroglyphs

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"We're trying to get this area, and they may revolutionize Paleoindian art," Trabas 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, Trabas 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 it is on 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. "Having a look at a rock site that you can develop for public visitation. It is a site that should be a scientific preserve." Trabas is more than happy to describe what she has found: The glyphs are solid pecked figures. Some look good, but if someone took a sharp rock and peeked out an animal shape directly. In this case there are two rock art panels that I found a few years ago in a tract of land I own that was described as being a typical Paleoindian site.

Besides revealing the age of the glyphs, Trabas said the dating results are helping her in another aspect of her work. "I'm working on mainstreaming rock art into archaeological research in two ways. The first is placing it into the interpretations—looking at what the rock art tells you about prehistoric, comparing that with what you 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 a site analysis study.

The site poses some mysteries.

For this analysis, Trabas collected information on the attributes depicted on the panels and then used a statistical method called principal-component 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 10,000-year time span for petroglyphs that starts at the beginning of the Paleoindian period as presently defined and extends to the end of the Plains Archaic, at about 2,500 years ago. Then we have an age gap equal to this period of time. She says a variety of later rock art types occur throughout the Black Hills region, with some of it found in the canyon.

Trabas said the analysis broke up the site's 10,000-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 tails shaped like a fan, and stick humans, which have oversized hands and fingers, appear to be calling or driving (photo, right). The petroglyphs give a perspective of millenium for a practice that the excavation records only in isolated evidence. As an example Trabas cites the medicine post, presumably used by the Shoshone 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 cattle in association with human figures. This pattern suggests that Paleoindians used canids in hunting, another practice that continued into the Plains Archaic, according to the petroglyph records. One pattern that began before 6,000 years ago shows increased emphasis on humans. Anthropomorphs shown in profile have oval-shaped bodies and often bent knees that suggest squatting. 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 tend (depicted as large, half-circular loops) and stick humans that have two- or four-footed hooves.

Ability to date the panels clarifies the analysis because you know where the patterns fall in time. The statistical analysis also permitted Trabas to test the dating method internally in the rock art. "Once you do the analysis and put it in a book, it's sometimes hard to distinguish, say, elk from a deer on the basis of antlers." Because antlers and horns are usually fairly elaborate in the petroglyphs, they are among the most crucial attributes for identifying the animal species. The site is posing some mysteries. Several animals look like they could be calves, but Trabas says it's hard to be sure. "I see 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 new bison we have in the Archaic and not in the Paleoindian?"

Trabas notes 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 what we see 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 patterns." 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 Trabas notes that careful research on rock art could play an important role in the debate about the importance of Paleoindian art in the region.
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 contexts was evident from the papers presented at the Bone Modification Conference Sept. 26-30 in Hot Springs, S.D. The conference, sponsored by the American Antiquities Program Group 1 on Bone Modification, sponsored by the Archaeological Laboratory of Augustana College and the Mammoth Site of Hot Springs, was organized into sessions focusing on seven different aspects of bone modification.

Beginning a session on bone modification as indicator of lithic behavior, in its title, George Frison, University of Wyoming anthropologist, described evidence that Paleolithic hunters bedelled the caribou, Camolos, on the High Plains of North America 20,000 years ago. Since, he said, “remains are really just starting to get dated on rock art around the world, we probably won’t be able to make many comparisons until we get more sites included in this project.”

Trabets 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 little closer to what the people were like, than, say, studying their campsites or their bone 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, stratigraphic 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.

Trabets is continuing her survey and documentation of the Black Hills petroglyphs. When it is complete she will devise a plan for their protection. Because they are so easy to destroy, Trabets says the rock art in a region should be considered before decisions are made about which sites should be developed. “If there is no oversight, it wouldn’t just take the site that has the most scientific value and develop that one, because damage by people always results from visitation.”

Suggested Reading

**On Wyoming Petroglyphs**


Whitley, D. S. 1992 The Uses and Abuses of Fish, Archaeology in Geology 24:459-463.

**Trabets**


**Whitley**

way from initial reduction to final shaping of tools. LeMoine suggested that attributes of reduction tech-