



MAMMOTH TRUMPET

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Kennewick Man Decision Upheld!

The Native American Graves Protection and Repatriation Act (NAGPRA) defines "Native American" as "of, or relating to, a tribe, people, or culture that is indigenous to the United States." That definition does *not* apply to the 9400-year-old skeleton of Kennewick Man, according to the unanimous decision announced February 4 by a 3-judge panel of the U.S. Court of Appeals for the Ninth Circuit. The decision sets aside the ruling made by former Secretary of the Interior Bruce Babbitt that Kennewick Man is Native American and therefore must be turned over to a coalition of tribes. The scientist plaintiffs *Bonnichsen et al.* are now free to proceed with proposed studies of the remains, which promise to yield invaluable information on the origins of the earliest Americans. **Brad Lepper** (right), who has kept us informed of developments over this 7-year legal struggle, explains the significance of this court decision in our lead story on **page 1**.



The Center for the Study of the First Americans fosters research and public interest in the Peopling of the Americas. The **Center**, an integral part of the Department of Anthropology at **Texas A&M University**, promotes interdisciplinary scholarly dialogue among physical, geological, biological and social scientists. The **Mammoth Trumpet**, news magazine of the **Center**, seeks to involve you in the peopling of the Americas by reporting on developments in all pertinent areas of knowledge.

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KENNEWICK MAN DECISION UPHELD BY COURT OF APPEALS

The U.S. Court of Appeals for the 9th Circuit has upheld the decision of the district court affirming that the remains of Kennewick Man "are not Native American human remains within the meaning of NAGPRA (Native American Graves Protection and Repatriation Act) and that NAGPRA does not apply to them." Accordingly, the court ruled that scientists who challenged the government's decision to give the remains to a coalition of Native American tribes may proceed with their proposed studies of the skeleton. This is a tremendous victory for the scientists and a setback for government officials and Native Americans who sought to extend NAGPRA's reach into a virtually unlimited antiquity.

The court's decision, written by Judge Ronald M. Gould, is logical, concise, and well written. After establishing the scientists' right to challenge the former Secretary of the Interior's decision to turn the bones of Kennewick Man over to a coalition of Native American tribes, the court zeroed in on what it regards as the crux of the dispute: Is Kennewick Man a "Native American" for the purposes of NAGPRA?

NAGPRA Definition: "Native American"
NAGPRA defines "Native American" as "of, or relating to, a tribe, people, or culture that is indigenous to the United States." Former Secretary of the Interior Bruce Babbitt, in developing regulations for

implementing NAGPRA, altered the definition to "a tribe, people, or culture indigenous to the United States." The change may seem trivial, but omitting those two small words, "that is," made a world of difference. The phrase "that is" is in the present tense. Without it, the definition of "Native American" may encompass human remains that relate to any tribe, people, or culture that ever existed within the bounds of the modern United States, regardless of whether or not they now have any living members.

The government's attorneys made it clear to the court during oral argument that, under the Department of Interior's interpretation, there was no limit on how old human remains might be to be covered by NAGPRA. Even Adam and Eve, if Eden had been located somewhere in the United States, would be considered "Native American" (MT 19-1, "Major Decision: Kennewick Man Case"). In a footnote to the decision, the court observed that "the government's unrestricted interpretation based solely on geography, calling any ancient remains found in the United States 'Native American' if they pre-date the arrival of Europeans, has no principle of limitation beyond geography."

The court decided this was not "what Congress had in mind. Nor does the legislative history support NAGPRA coverage of bones of such great antiquity." This decision is supported by Ryan Seidemann who,

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The discovery of "a very large Columbian mammoth" has drawn an interdisciplinary team from TAMU—and crowds of Clute residents.

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C. Wayne Smith wrote the book on using polymers to preserve organic materials. Now his lab at TAMU is making giant strides in remote imaging and non-tactile sculpture.

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Alpine slopes attracted caribou, and hunters followed them. But freshly thawed caribou dung—a lot of it—can make the search for artifacts unpleasant.

in an article appearing in the fall 2003 issue of the *West Virginia Law Review*, concluded that NAGPRA's "legislative

history is virtually devoid of references to material older than AD 1492" (MT 18-3, "Congressional Intent: What Is the Purpose of NAGPRA?").

The court concluded that the phrase "that is" was a crucial part of the definition of "Native American" and revealed Congress's intent to limit the scope of NAGPRA to presently existing tribes and their more or less immediate ancestors. The government's attorneys had defended the Secretary's reformulation of the definition of "Native American" as appropriate and entitled to "Chevron deference" (MT 19-1). Chevron deference is the latitude courts generally accord to agency interpretations of statutes those agencies are charged with implementing. But Chevron deference only applies if a statute is ambiguous and the agency's interpretation is reasonable. The court decided the Secretary's interpretation of "Native American" was at odds with the plain language of NAGPRA, which, with the phrase "that is" in its proper place, explicitly requires that "human remains bear some relationship to a *presently existing* tribe, people, or culture to be considered Native American."

According to the court, "NAGPRA mandates a two-part analysis." First, there must be a determination as to whether the remains are Native American. "If the remains *are not* Native American, then NAGPRA does not apply." If, on the other hand, the remains are determined to be Native American, then the second part of the analysis involves establishing which person or tribe is most closely affiliated with the remains.

In further support of its conclusion that NAGPRA requires human remains to be related to a presently existing tribe, people, or culture, the court contrasted NAGPRA's definitions of "Native American" and "Native Hawaiian." Whereas "Native American" is defined in relation to the United States, a political entity that dates back to 1789, "Native Hawaiian" refers to descendants of the "aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawaii." This clearly suggests that Congress's use of the present tense was deliberate and that "Native American" refers to "tribes, peoples, and cultures" that exist in modern times and not to those that existed

in the distant past, but no longer exist.

The court concluded that NAGPRA's definition of "sacred objects" reinforced the view that the scope of the statute was limited to essentially modern tribes, peoples, and cultures. "Sacred objects" are defined as artifacts used in the practice of an American Indian religion by present-day peoples.

Finally, the court observed that "the Secretary's interpretation would mean that the finding of any remains in the United States *in and of itself* would automatically render these remains 'Native American.'" If this were true, then the part of the definition that referred to human remains "relating to" a tribe, people, or culture would be making a meaningless, or at least a superfluous, distinction. For the phrase to make any sense, it would have to distinguish remains found in the United States from remains found

elsewhere, that is, outside the United States. And since Congress could not claim to have jurisdiction over human remains found in another country, the Secretary's interpretation could not be correct. Human remains must either be "of . . . a tribe, people, or culture that is indigenous to the United States," or they must bear a demonstrable relation to such a contemporary indigenous group.

The U.S. Court of Appeals for the 9th Circuit rejected the Secretary's revised definition of "Native American" as unreasonable. As a result, Kennewick Man is denied automatic consideration as a Native American for the purposes of NAGPRA. The court then moved on to consider whether there was any compelling evidence to establish that he is related to a tribe, people, or culture "that is" indigenous to the United States.

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Elisa Lazo, graduate student at TAMU Department of Anthropology, holds menu board in front of Asiel's mandible and ulna.

Texas Mammoth Is a Scientific Prize and a Crowd-stopping Local Event

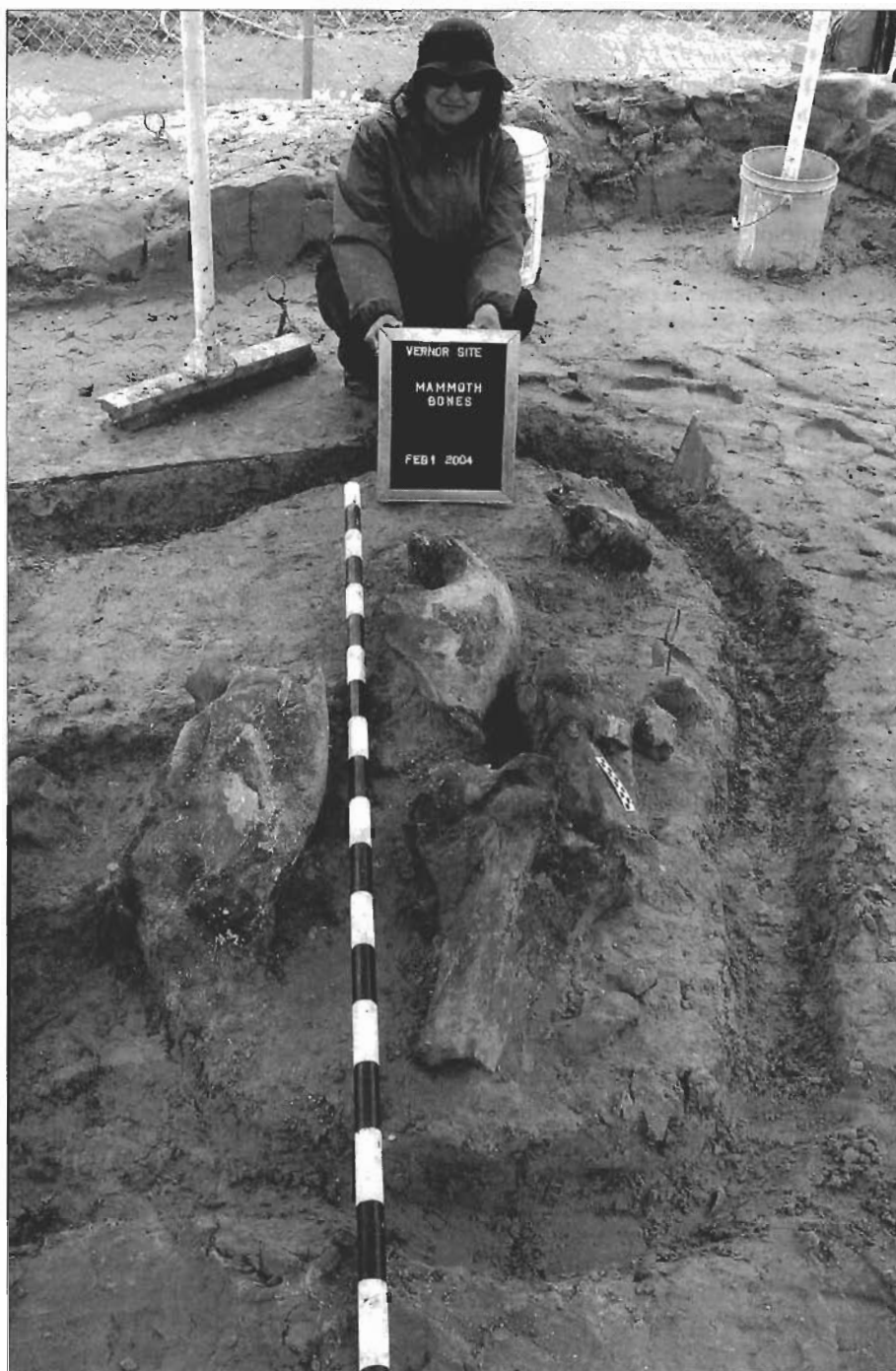
REMAINS of a very large Columbian mammoth and unusually large amounts of plant material and macrofossils have been uncovered at the Clute mammoth dig in southeastern Texas. A surprising outpouring of support and interest from this Gulf Coast community has made the project possible, says Robson Bonnicksen, archaeologist and project leader.

The discovery was made late last year

in a large gravel, sand, and sediment pit owned by Vernor Material and Equipment Company, Inc. at Clute, about 50 miles south of Houston. Joe Kimble, an employee at the sand pit, discovered the first tusk in November while operating a backhoe. They nicknamed the animal it came from "Joe Mammoth" in his honor. Later that month, he came across additional tusks from a larger animal the Vernors named "Asiel."

Dr. Bonnicksen says he was told a Superbowl broadcaster was glimpsed wearing a "Free Joe Mammoth" T-shirt. "So I guess what we're doing is freeing Joe the Mammoth," he says, chuckling.

An interdisciplinary research team from TAMU Departments of Anthropology and Geography has been assembled to study the unique fossil record uncovered in the pit, near where the Brazos River empties into the Gulf. The team



ALL PHOTOS: ROB BONNICKSEN



includes Bonnicksen, geoarchaeologist Mike Waters, paleoecologists Vaughn Bryant, Jr. (Anthropology) and Rob Dull (Geography), paleontologist Darryl de Ruiter, and conservator C. Wayne Smith (see "Freezing Moments in Time" in this issue). The interdisciplinary team has been collecting samples since the second week of January.

In addition, Johnney Pallan has recruited fellow members of the Brazosport Archaeological Society to assist in all phases of the project. Brian Miles, a trustee of the Brazosport Museum of Science and Technology, is serving as project coordinator among the principal participants.

Mammoth remains exposed by careful excavation include two tusks, an ulna, a complete mandible, an isolated maxillary tooth, and skull fragments. A mass of hairlike tendrils, which was widely reported to be mammoth hair after Bonnicksen initially said it was a possibility, proved to be root material. The remains were lying near a log, which yielded an age of $38,000 \pm 2000$ RCYBP.

There is no evidence of human association with the remains.

Asiel's tusks are 11–12 inches in diameter, so there is some speculation he may have been a bull. "Clearly it's a fully developed animal," says Bonnicksen. Asiel and Joe are tentatively identified as Columbian mammoths, cousins to the woolly mammoth. Columbian mammoth are known to have lived in the region, though no complete dated remains had been found on the Texas Gulf Coast. Some two dozen have been found near Waco, Texas, dated at 28,000 years old.

A formidable task of excavation

The gravel pit in the past has yielded fossil remains of horse, bison, turtle, fish, and a possible giant beaver. The mammoth remains were found 35 ft below the surface in a thin deposit of silts, sand, and clay balls. Immediately below the fossils is an erosional hiatus in the clay that had been cut by the Pleistocene Brazos River. A deposit of marine clay that likely dates to 120,000 yr B.P. lies below the fossils. The river ripped into the fossil deposit and re-deposited the bones, interleaving oyster shells and other older marine sediment. Consequently, only a small portion of the animal is present.

The mammoth remains may have caught the attention of the public and the media, but the richest aspect of this dig may well be oft-ignored plant and macrofossil data. "We had palynology people down last week," Bonnicksen reports, "and Vaughn Bryant, who's written for the *Mammoth Trumpet*, said he'd never seen any place in Texas with so many plant

remains. . . . It's a pretty unique 40,000-year-old Ice Age environment." At least three and probably five graduate theses will come out of the project.

It was raining Feb. 10, when the Trumpet talked with Bonnicksen, and he was concerned about plaster jackets they had applied the previous Sunday. The water table in the area is high, and any rain floods workers out of the bottom of the pit.

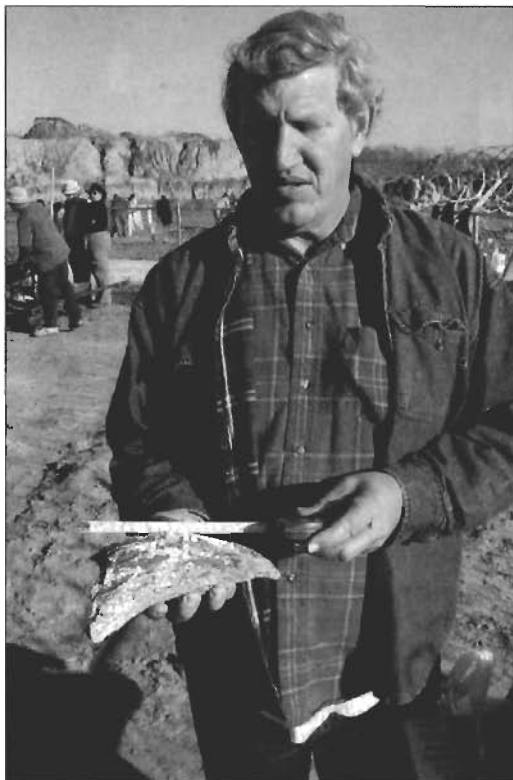
The bones, according to Bonnicksen, are showing cracks and are fairly friable, having lain below the water table for so long they are super saturated and encrusted with sandstone. "We couldn't get any preservative to penetrate," he said in our interview. "We have to do a lift today . . . [and] may have to get pumps down there. We're not out of the field yet."

Bonnicksen rates the Clute mammoth find a fantastic and unusual experience. "This has been a wonderful experiment in running a community-based research project," he says. "We had absolutely phenomenal community support. We usually write grant proposals to fund our digs, but you have no time to do that with an accidental discovery like this."

Support from many sources

Ruth Foreman, a close friend of the Vernor family, was a tremendous asset in enlisting community support for the project; she was instrumental in locating local restaurants who fed the dig's crew, and she found lodging for students in the homes of members of the Vernor family. Kenny Vernor, who heads the family business, has been enthusiastic about the dig. The Vernors called archaeologists right away and fenced off the dig area. Throughout the project they have been open, friendly, and supportive. "The Vernors really were our liaison with the community," says Bonnicksen. He credits them with finding financial and in-kind support for the project. Conoco Phillips footed large housing bills for the crew. Other community members and the Brazosport Archaeological Society also provided assistance. More than 25 students from TAMU have helped with the excavation.

Randy Vernor holds a bison horn core found in the Vernor pit.




The city of Clute, population roughly 26,000, contributed costs for around-the-clock security, "a big amount in a small community budget," Bonnicksen notes. He was especially gratified when these security measures paid off. During the



Elisa Lazo behind
Asiel's mandible,
tusks, and ulna.

first week of the project, police arrested a man who entered the dig site by crawling under three fences at the Vernor's 65-acre pit. Later, three young men attempting to cross the 6-ft-high double-stranded barbed-wire fence protecting the excavation area were also apprehended by a Clute security officer and are now passing time in jail.

The Clute Visitor's Bureau conducted tours of the site for 1800 visitors over two weekends, and many grade-school and

The final products of this project will include scientific papers, public talks, and use of scientific knowledge to develop public exhibits for the Brazosport Museum of Natural Science. 

—Ellen Saunders

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◀ Fenced excavation area around the mammoth dig. The tent protects the skeletal elements.

▼ Right half of Asiel's mandible.



home-school students visited the site while crews were excavating. "The excitement and interest of the public and young people in this project have been particularly gratifying," Bonnicksen notes. "Our public outreach efforts were made possible by cooperation among the owner [VME], a corporation [Conoco Phillips], a municipality [Clute], the local archaeology Society, and faculty and students from a state university [TAMU], and a local museum. We are looking forward to completing the science."

USE WEAR—the wear on the cutting or scraping edge of a stone tool with use— isn't a new subject for researchers. In fact, according to Jim Wiederhold it's a subject that received a lot of attention in the '70s and early '80s. But the extensive literature search he has done for his master's thesis in anthropology at TAMU on use wear in stone tools used to process animal hides points up a shortcoming common to most studies that have been done. Too often the researcher employs artificial and unrealistic techniques to test a hypothesis—despite the fact that the methods and conclusions may be totally unrelated to the way tools were actually used by early Americans.

Wiederhold's approach is a radical departure from most of those seen till now. To his way of thinking, the only realistic way to test the effect on an endscraper of scraping a fresh bison hide is to scrape a fresh bison hide. It's a common-sense, hands-on approach. By the time he finishes an experiment in the field, his hands can be pretty gory—but he's confident of his conclusions.

What is leather?

The first order of business in Wiederhold's thesis—which he has been working on for more than four years off and on—is to straighten out the terminology. What, for example, is tanning and what is not tanning? He says the term has been so misused in literature that it has become a confusing issue to most people. "Tanning," he notes, "has been used loosely to describe scraping a hide or even stretching a hide out before working it, but it actually defines a specific process." That's the thrust of the first part of his thesis, to

describe exactly what is required to convert a green animal skin to a usable product and to explain in detail several paths the process can follow to make various end products.

Most of the previous use-wear studies he finds wanting, a point he makes using straightforward language. "They've been pretty poor to my way of thinking," he

he charged so much a pound for the meat and took the hide as partial payment. Young Jim's job was to drag hides out to a shed in back, where he would spread them, salt them, and stack them until they were sold to a leather wholesaler. It was probably natural that he became interested in how primitive people converted a hide into usable leather. He has worked

Use Wear: A Hands-on Study

says, "because of the confusion about what is hide processing and what is not—what is actually required to convert that green hide to usable leather, and what is just fluff."

Wiederhold is a no-nonsense fellow with a deep, resonant voice—like a fog horn in a rain barrel—who doesn't hold truck with groundless abstractions, and he speaks with the assurance that comes from many years of experience in processing animal hides. His first encounter with animal hides came as a child, when his father owned a butcher shop. When he butchered an animal for a customer,

cattle hides and, yes, even bison hides, but by far his greatest experience has been in brain-tanning deerskins. "When I'm done with them," he says matter-of-factly, "they're a good product." In brain-tanning, a technique that was practiced by early Americans, the brain of the animal is kneaded into the hide. Fats and oils in the brain tissue make the hide soft. Wiederhold is quick to point out that brain-tanning doesn't actually "tan" the hide. That's done by smoking; aldehydes in smoke stabilize perishable collagen in the derma, the durable part of the animal hide.

The Story of Leather

A green hide (one freshly removed from the carcass of an animal) is largely water. To prevent decay from bacteria and enzymes, the hair and flesh substances must first be stripped from the corium; in primitive societies, this is done by scraping. Then to preserve the corium, collagen, a protein that is present in the form of interlaced bundles of fiber, must be

stabilized; this crucial step in the operation, properly called "tanning," converts the stripped corium to durable leather.

Among early Americans and other primitive cultures around the world, the knowledge of how to preserve animal skins was kept a jealously guarded secret



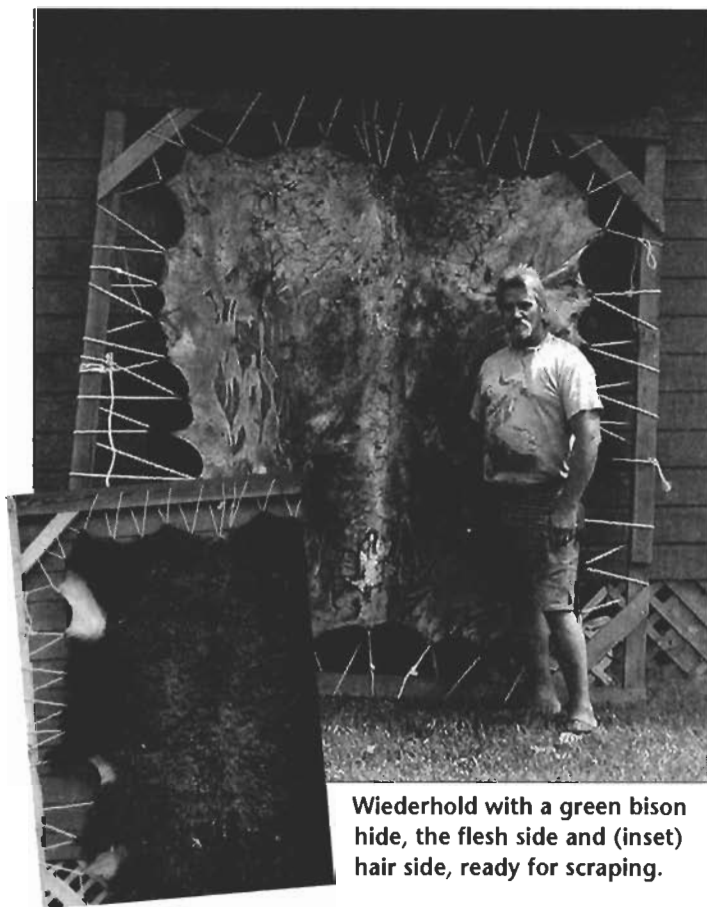
epidermis
(hair side)

corium,
or derma

adipose tissue
(flesh side)

within the immediate family. Usually the sequential tasks in the process—some can be quite grueling—were performed by females.

Although he has dabbled in tanning hides using oak bark and leaves (their tannic acid gives us the expression "tanning"), he is most experienced in brain-tanning deerskins. "You wouldn't believe how the product turns out," he tells us. "Deerskin becomes like flannel, heavy cotton flannel, the softest clothes you could want . . . unless," he quickly adds, "you get rained on." What's more, early Americans achieved equally remarkable results, a fact that's verified by artifacts found in museum collections.



Wiederhold with a green bison hide, the flesh side and (inset) hair side, ready for scraping.

ALL PHOTOS: JIM WIEDERHOLD

Working hides the early American way

In the second part of Wiederhold's thesis, he collects data on the effects on stone tools of processing hides. "I do that in a certain kind of way," he explains. "What I'm looking for is not so much to create use wear on stone tools, but to actually create a usable hide product." He thinks that's where a lot of previous use-wear studies have fallen short: too many researchers set out to create use wear on stone tools using artificial means. They might, for example, rub a scraper over a piece of tanned leather for so many minutes or so many strokes, then inspect the tool under a microscope to determine the wear—and wonder why their conclusions don't agree with those arrived at by another researcher who fleshed a green hide with the same kind of tool.

Wiederhold has little patience with scientists who collect data in what he considers illegitimate ways. He stresses that "what is needed is a good analog to past behavior." In other words, a


COMING CONFERENCES

April 7–10 2004 meeting of the Alaska Anthropological Association. More than a dozen researchers will present their ice patch research results. Archaeologist Ruth Gotthardt, part of the ice patch research team, is program coordinator for the conference. It will be held in Whitehorse, Yukon Territory. The meeting is sponsored by the anthropologists at the Heritage Resources Unit of the Government of Yukon.

Contact: For more information, check either the AAA Web site www.alaska.net/~oha/aaa/2004meeting.html or the Yukon Web site www.yukonheritage.com/alaska_anthro_conference.htm

May 28–31 2004 annual meeting of the American Rock Art Research Association will be held in Nuevo Casa Grandes, Chihuahua, Mexico. The weekend will begin with a reception at the Paquime Museum and archaeological site in Casas Grandes. Reports on rock art research will be presented Saturday, May 29, at Hotel Hacienda. Field trips are planned to visit Mata Ortiz and rock art sites in the region.

Contact: For more information or to present a report check Web site www.ARARA.org Host hotel is Hotel Hacienda, e-mail hotelhacienda@prodigy.net.mx

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meaningful experiment for him is one that duplicates the conditions and methods that existed hundreds or thousands of years ago. In studying use wear on stone tools, his purpose is to work hides with endscrapers *with an eye to creating a useful end product*. "Whatever use wear comes up," he says frankly, "that's what's there."

For scraping hides, he makes hafted endscrapers just like those used by early Americans, similar to a modern scraper used to remove peeling paint before applying a new finish. "An elbow-shaped haft works best," he notes. In actual use early Americans may have made them of wood or elkhorn, but probably not bone, since bone doesn't naturally grow in the right shape and would therefore require extensive reworking.

He describes scraping a hide as a two-handed operation that takes a lot of muscle. "You have to strike a hard blow to start peeling off waste matter," he says, "either on the hair or flesh side." Typically he peels off a strip about ¼-inch wide in a continuous piece as long as possible. The scraper edges have to be rounded to prevent cutting or scratching the hide. As you would imagine, scraping an entire hide can take quite a while. "Once you get the technique down and have done a few, it's not as bad as you might think. Nevertheless," he concedes, "it's hard work, very labor-intensive." He adds wryly, "Which is why it was usually relegated to women." Say what you will about early Americans, all evidence indicates they weren't particularly sensitive to women's rights.

It's hard to imagine experiments surpassing in realism the extensive field operations Wiederhold has accomplished to collect data on use wear. He has butchered four bison, *three using stone tools*, and laboriously processed the hides using the same tools and techniques early Americans would have used. "I didn't use the tools past the point of being too dull to use," he explains. "I tried to be real practical about it." In every case he

Scrapers, the tools of Wiederhold's ► trade, made of knapped stone lashed to a wooden haft with leather—exactly the way they were made for thousands of years. The scraper on the right is about 8 inches long.

Scraper heads, well used by Wiederhold—under entirely realistic conditions—and ready for microscopic examination for use wear. The head at lower right is about 3 inches long. ▼



Comparing tools of early hide-processing experts

After amassing extensive empirical data, Wiederhold set out to compare the condition of his tools with actual tools recovered from an archaeological site.

Since his thesis deals with use wear in general and not tools from a particular early American culture, he wanted to compare his results with tools from the Toyah tradition, which dates to the late-prehistoric period in Texas when bison were plentiful. However, at that time the Gault site in central Texas was attracting

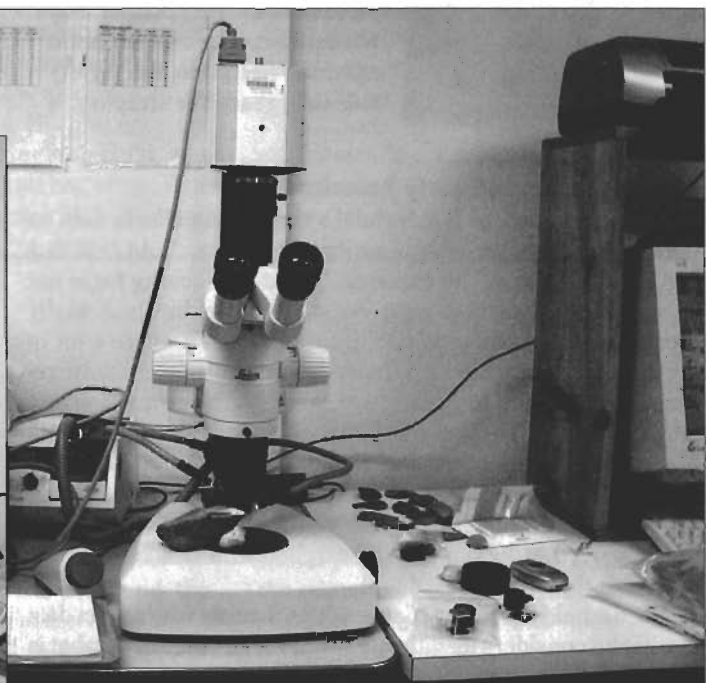
considerable attention at TAMU, and Professor Harry Shaffer, chairman of Wiederhold's thesis committee, suggested he use Gault scrapers for his comparative study.

In hindsight, Wiederhold agrees that Gault was a good choice. Cultural occupations at Gault, like those at Lubbock Lake Landmark in the Southern High Plains (MT 18-4, "Lubbock Lake"), span the entire archaeological history of Texas from the Pleistocene to first contact with Europeans. Doubtless a principal attraction for early Americans was Gault's extensive deposits of fine toolstone—of such high quality, in fact, it is quarried today by avocational knappers.

From his observations it appears to Wiederhold that Gault was probably a retooling site, where early knappers discarded exhausted tools and collected raw material to make new ones. Worn-out scrapers are the clue; all the dozen or so scrapers he examined were past their use life. Gault scrapers are similar to Wiederhold's, but smaller and slightly different in shape. Most are what he calls spurred scrapers; somewhat smaller than a typical endscraper, they have spurs that project beyond the lateral edge. "When you find them," Wiederhold declares, "it's a sign it's a Paleoamerican site." Previous researchers have wondered about the significance of the spurs. Wiederhold's studies suggest

covered from an archaeological site. Since his thesis deals with use wear in general and not tools from a particular early American culture, he wanted to compare his results with tools from the Toyah tradition, which dates to the late-prehistoric period in Texas when bison were plentiful. However, at that time the Gault site in central Texas was attracting

The Leica microscope, the pride and joy of the CSFA lab, (below) with Wiederhold in the driver's seat.



they are probably an accidental result of sharpening and likely indicate the tool was nearing the end of its useful life.

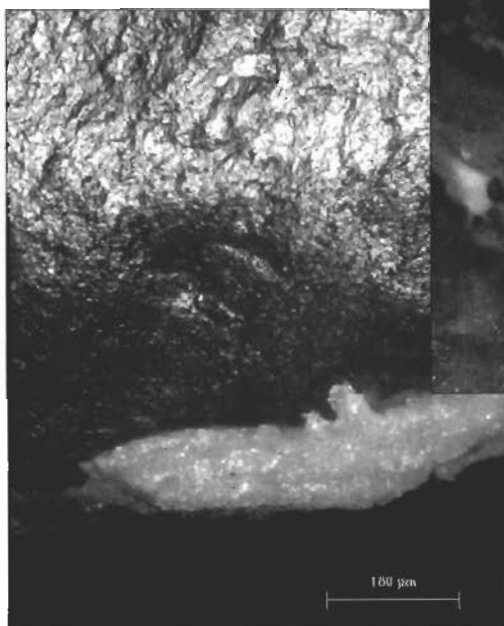
The right tool for the job

Several years ago Wiederhold's thesis work was getting bogged down because the Anthropology Department at TAMU lacked adequate microscopes for examining the condition of the edge of a stone scraper. "They had only low-power stereo 'scopes of less than 100 power," he remembers. His literature search told him other researchers were using more powerful instruments capable of 400X–500X magnification, especially useful for examining polish. "That's a whole can of worms right there," says Wiederhold. "There's a lot we don't know about polish. One of the things I'd like to look at further in my research, once this thesis is over, is the nature of polish and how it's laid down."

But first, his thesis. Desperate for access to better microscopes, he wound up driving back and forth to Austin to use those at Texas Agricultural Research Laboratory, a round-trip of about 180 miles from his home near College Station. Then he heard that the **Center for the Study of the First Americans** was moving to TAMU from Oregon State University, and he had several conversations with CSFA director Rob Bonnicksen, who told Wiederhold of his plans to establish a lab and asked Wiederhold's thoughts about use wear. Wiederhold remembers thinking, "Yes, finally somebody is here who is as interested as I am about this research." When Dr. Bonnicksen started shopping for microscopes, he invited Wiederhold's suggestions about capability and features that would be especially useful. At that point Wiederhold put his thesis work on hold, determined to wait for the arrival of better equipment at TAMU.

Leica is the instrument they selected, and now Wiederhold has a new friend for life. "They've got a new technology that's just great," he exclaims. The reason he's ecstatic is because Leica solved the problem encountered when studying stone tools, the inability of a conventional microscope to focus on all points of an irregular surface. With a microscope of

even modest magnification, say, 100X, because of the limited depth of field only 10 percent of the entire field may be in focus. Leica solved the problem by marrying the microscope with a computer, which drives a motor that adjusts the height of the objective platform. In a typical viewing session, Wiederhold sets the highest and lowest points in the field of view and selects the number of slices needed to capture all depths in between. The smart microscope then records a series of images, each time adjusting the height of the sample at precisely the increment of a slice, for example,



Dixon of the Anthropology Department. As he puts it, "Everything changed at that point."

What are his plans for the future? What he'd really like to do is continue what he enjoys doing right now, use-wear studies. He has found a niche as a microscopist, with the result that he occasionally works on contract for Bonnicksen examining points, hair, and other minutiae. Most of all he longs to indulge his childhood yearning to study old methods, "to figure out how people did things back in those days." And what better way is there to

▲ Suspected depositional polish on the remnant of a step fracture seen through the Leica microscope at 100X magnification.


◀ The same process on a rounded tool edge at 200X magnification.

20 microns. In a session it may accumulate 25 or 30 images. The Leica then combines the images into a composite view "with all the depth of field you could ever want," says Wiederhold. "It looks just as if you're looking at it with your naked eye."

Archaeology by the back door

Jim Wiederhold is quick to admit he didn't follow the usual career path taken by archaeologists—he never collected arrowheads or other artifacts as a child. He worked in construction most of his adult life and got his bachelor's in the '70s as a sort of insurance policy. When he started experiencing health problems in recent years he decided it was time to cash in the policy. Originally he started graduate studies at TAMU with the intention to get a certificate to teach history. Then he met Professor Bruce

figure it out, he asks, than to practice experimental archaeology? "How do you figure out what these scrapers were used for? You work a hide. Woodworking too, any number of things that will create this use wear we're looking at."

Reluctantly he admits that the English and Europeans are way ahead of us in America. They started practicing experimental archaeology much earlier, and their programs are far more extensive than ours. Jim Wiederhold is working hard to catch up. 

—JMC

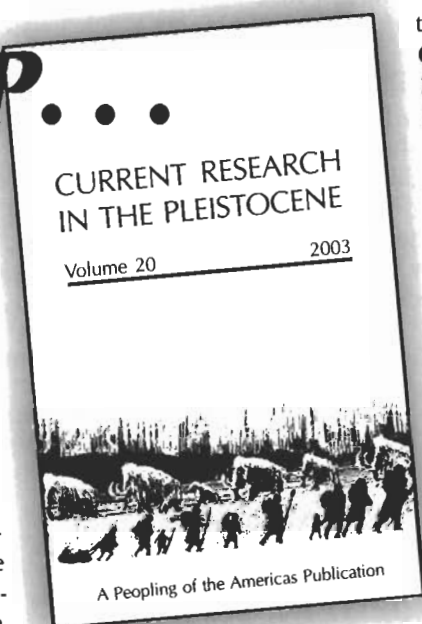
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A New *CRP*...

MAMMOTH TRUMPET readers have a chance to revisit old friends and peer deeper into sites you've been introduced to in these pages. In the new issue of *Current Research in the Pleistocene*, volume 20, you'll find these in-depth articles on familiar issues:

- "Paleoamerican Remains from the East Texas Gulf Coast," by Robert d'Aigle and Nataliya Hryshechko ("The Brazoria Woman," MT 18-2)
- "Recent Application of Optically Stimulated Luminescent (OSL) Dating at the Nipper Creek Site (38RD18), South Carolina," by Albert Goodyear, Steven Forman, and John Foss ("Luminescence Dating of Quaternary Sediments," MT 18-3)




■ "Late-Pleistocene Humans at Bonneville Estates Rockshelter, Eastern Nevada," by Ted Goebel, Kelly Graf, Bryan Hockett, and David Rhode ("A Beachfront Getaway in Nevada," MT 18-3)

■ "Cranio-metric Relationships of Paleoamericans and Archaic Indians," by Deborah Cunningham and Richard Jantz ("When Science and Politics Collide," MT 17-3 and -4; "Shedding Dead Weight of the Past," MT 17-4)

■ "Size Variation in Southern Plains *Bison antiquus* from Lubbock Lake and Cooper," by Patrick Lewis, Briggs Buchanan, Eileen Johnson, Leland Bement, and Laura Gruss ("Lubbock Lake," MT 18-4)

■ "Ontolo (8JE1577): Another Early-Prehistoric Site Submerged on the Continental Shelf of NW Florida," by Brian Marks and Michael Faught ("Rethinking Clovis Origins," MT 18-4)

There are more than 50 articles in this newest edition of the yearbook, which recounts discoveries in the Pleistocene and early Holocene. Use the form on the rear cover of this issue to order your copy. 

And a New *CRP* Editor

IT SEEMS ONLY NATURAL that editorial control of the CSFA yearbook *Current Research in the Pleistocene* should pass from Mike Waters of TAMU to Ted Goebel of the University of Nevada, Reno. Each is executive director of a program of the Archaeological Research Fund endowed by Joe Cramer ("A Campaign to Find the First Americans," MT 18-1)—Dr. Waters of the North Star Program, Dr. Goebel (rhymes with cable) of the Sundance Program. What's more, they are longtime research collaborators. Probably the reason they work well together is because their areas of specialization dovetail nicely. "Ted's a lithics specialist and archaeologist," Waters explains, "and I provide the geological and dating expertise."

Waters is relinquishing the editorship after only one year. "I always considered myself the editor-in-transition" he says. When the **Center** moved into its new home in College Station, Waters took up the slack when Brad Lepper departed as editor. Waters and Rob Bonnicksen have always felt that having a prominent scholar outside the **Center** serve as editor is best for the health and growth of *Current Research in the Pleistocene*. The new editor, Ted Goebel, brings vitality and impressive scholarship to the journal.

Not that Goebel's plate isn't full enough with the duties of an associate professor at UNR. "Things I do here besides run the

Sundance Program include advising graduate students, master's and Ph.D. students in prehistoric archaeology," he tells us. He also teaches "quite a bit." That glib phrase takes in graduate seminars in lithic technology and environmental archaeology, which combines geoarchaeology and faunal-floral analysis of archaeological materials. And a class in the archae-




Outgoing *CRP* editor Mike Waters (left) and incoming editor Ted Goebel flank a Siberian folksinger who participated in festivities honoring the scientists' visit about 1996.

ology of the Great Basin of North America. And seminars on the peopling of America and the archaeology of Eurasia with colleague Gary Haynes. And he also serves as the department's undergraduate coordinator, which means he advises all undergraduates in the anthropology major.

A daunting workload. Nonetheless Goebel looks forward to taking on this new responsibility of editing *Current Research in the Pleistocene*. He has no plans to shake the timbers of this

well-established edifice—*CRP* is now in its 20th year. For volume 21, at least, he plans to maintain the familiar content. After that, he says, "We'll see." He holds open the possibility of enlarging the international content in view of recent exciting discoveries of possible Clovis and pre-Clovis human occupations in Central and South America. Siberia and Eurasia may also receive more attention in the pages of future issues of *CRP*.

After all, Siberia is a place Goebel knows something about, probably even more than the Great Basin of North America, his present home base. When he did his graduate work at the University of Alaska in Fairbanks, he excavated and analyzed stone artifacts from several Nenana complex sites, the 11,000-year-old complex in central Alaska. For his doctoral dissertation, he researched the transition from the middle to the upper

Paleolithic in Siberia. "He's got the contacts to bring in the Russians," Waters notes, "which would be really great. And Ted speaks Russian really well"—although Waters warns that Goebel probably won't admit it. Most of all, Goebel brings impressive scholarship. Waters puts it simply: "If you want to know anything about the Siberian Paleolithic, there's only one person to call." 

—JMC

Waters and Haynes Share the Kirk Bryan Award from GSA

Every year the Quaternary Geology and Geomorphology Division of the Geological Society of America gives the Kirk Bryan Award to the author of a published paper of distinction that advances the science of Quaternary geology, geomorphology, or a related field. Co-winners of the 2003 award are Mike Waters of TAMU, Associate Director of CSFA, and Vance Haynes, Professor Emeritus of the University of Arizona (UA), for their paper published in 2001 in *Geology* (29: 399–402) titled "Quaternary Arroyo Formation and Climate Change in the American Southwest."

In his citation, Lee Nordt of Baylor University remarks that the paper is deceptively short, "a mere four pages. From data collected during a period of nearly 40 years, it represents a synthesis of over 200 radiocarbon ages and numerous stratigraphic descriptions from several major drainage basins."

This paper is truly a milestone in geoarchaeological research, for it puts an end to a debate that had continued for over a century about the causes of arroyo formation in the Southwest. "People have debated the role of climate in prehistoric arroyo formation," Dr. Waters explains, "and the role of overgrazing and human impact on historic arroyo cutting." Even in recent times there have been efforts to link arroyo cutting and filling to fluvial responses and other complex factors. All in all, a huge mass of literature has accumulated on theorized causes of arroyo formation.

Waters and Dr. Haynes, who was his mentor at UA, showed conclusively that climate was the driving force in arroyo formation. "Even the historic arroyo cut-

ting would have occurred anyway," says Waters, "even without the human impact, because climate drives arroyo cutting and filling."

The long road to discovery

This project had its start in the '60s, years before Waters started his graduate work under Haynes. Over the years Haynes, as

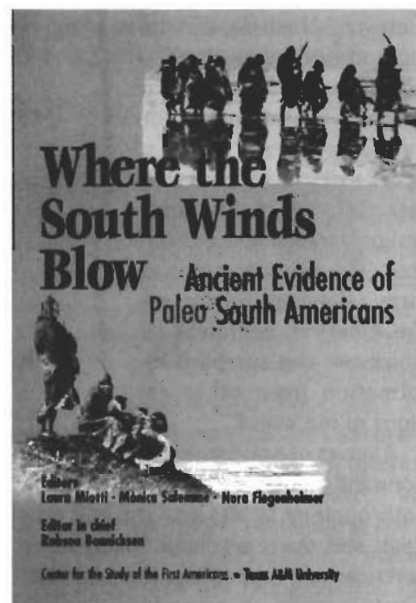
continued on page 20

NEW! from CSFA

Where the South Winds Blow: Ancient Evidence of Paleo South Americans

Laura Miotti, Mónica Salemme, and Nora Flügenheimer, editors

WHERE THE SOUTH WINDS BLOW is a collection of new papers about the earliest archaeological discoveries in South America. The editors are leaders of a new generation of competent young scholars who are conducting careful research in seeking to understand the peopling of southern South America. The early prehistory of South America is poorly known by the English-speaking world. This edited volume, translated from Spanish, contains 21 short and "pithy" papers documenting some of the most important recently investigated early archaeological sites in South America. These papers, which report poorly known Paleoamerican complexes and excavation of sites older than 11,000 radiocarbon years before present, cover issues in geoarchaeology, geochro-



nology, Pleistocene extinction, and paleoecology. Collectively, these studies report new empirical evidence important for understanding the peopling of South America, including new dates suggesting that South America was occupied by Clovis times. Future attempts to explain the peopling of the Americas will have to take this new evidence into account.

—Copy from the rear cover
ISBN 1-58544-363-8 \$25.00

DAF/INAH 2nd International Symposium

Early Humans in the Americas 2nd Circular Mexico City 6-10 September 2004

The Physical Anthropology Direction of the National Institute of Anthropology and History (INAH), through the Organizing Committee, will host this Symposium to invite researchers to share with colleagues from different countries and disciplines recent studies of the early peopling of the Americas.

A forum will be created for discussing current theories on migration routes, biological affinities, and the antiquity of humans in the Americas. Its objective is to design a methodology for dating evidence and to adopt criteria for morphological studies of the cranial and postcranial human skeleton. The ultimate goal is to form a database for the entire American continent by which we can compare information from other regions of the world.

A series of oral presentations and plenary sessions, which will be held at the Museum of Anthropology in Mexico City, will provide an opportunity for frank and open academic dialogue on the prehistory of the Americas and related topics, including:

- new dates for the antiquity of humans in the Americas;
- possible migration routes to the American continent and within the continent;
- environmental conditions during the late Pleistocene/early Holocene in the Americas (paleoclimate, geology, flora and fauna, etc.);
- genetic and morphological characteristics and affinities of early populations in the Americas.

Registration

To participate as a presenter, send the tentative title of your

presentation and its corresponding abstract (max. 200 words) to the Organizing Committee before 30 June 2004, together with the following information for each author:

- author's name, institution, e-mail address, mailing address, and telephone;
- audiovisual support required (projector, Powerpoint, etc.).

Papers will be selected by peer review for publication in a special volume to mark this event.

Participation Fee

The fee for guests, presenters and attendants, is \$100 (U.S.) or the equivalent in Mexican pesos. The participation fee also entitles you to a copy of the published volume of abstracts of the symposium.

The Many Faces of Early Mesoamericans



*San Vicente
Chicoloapan*



Penon III



Tepexpan



Texcal



Tlapacoya I

SILVIA GONZALEZ

For more information, contact:

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Organizing Committee

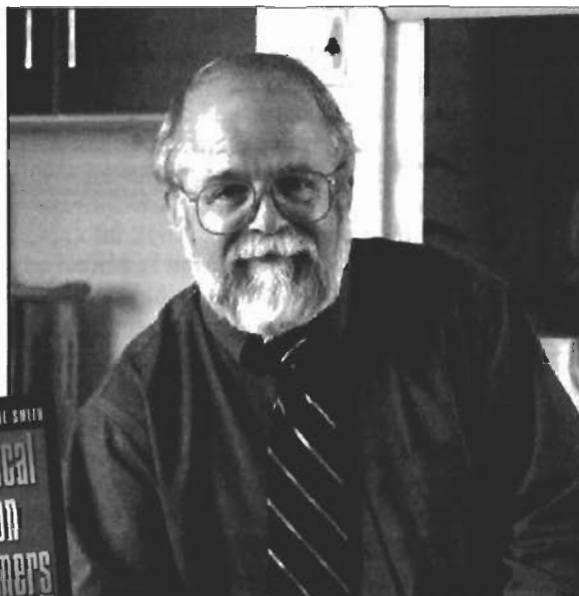
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Freezing Moments in Time:

C. Wayne Smith *and the art of* Archaeological Conservation



ALL PHOTOS: C. WAYNE SMITH

IF ARCHAEOLOGY'S STRUGGLE to preserve fragile cultural materials were a war, C. Wayne Smith would be a general. As Director of the Archaeological Preservation Research Laboratory (APRL) at TAMU, Dr. Smith uses a variety of materials and techniques to conserve, preserve, and replicate artifacts that might not otherwise survive. By fine-tuning existing technologies and helping to invent new ones, he and his colleagues at APRL are making life easier for scientists and conservators everywhere.

Good conservation strategies are absolutely critical to the archaeological profession, simply because the materials that tell us the most about behavior—the archaeologist's Holy Grail—either don't preserve well under most circumstances, or remain extremely difficult to collect and conserve if they *are* somehow preserved. While lithics and ceramic will always remain important indicators of past lifeways, it's the organic materials—like food waste, wood, hides, bone and antler tools, and hair—that tell us the most about what extinct peoples were doing, creating, and eating. Fortunately, as time and technol-

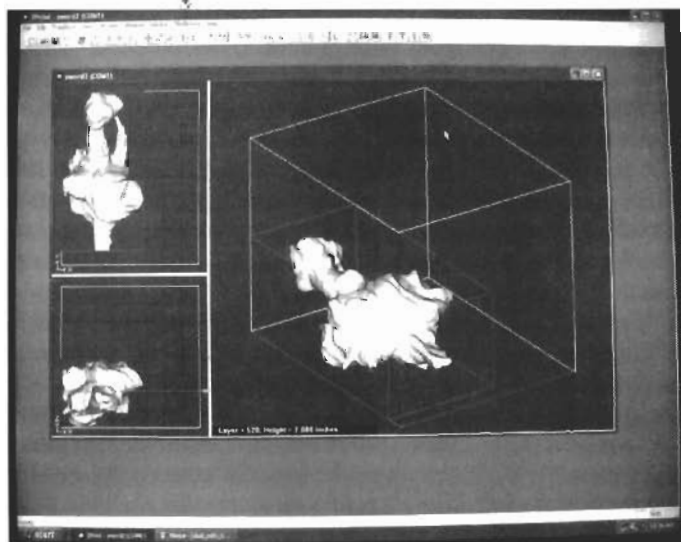
ogy march on, professionals are acquiring new and subtle ways around traditional problems (although we're still waiting for a reliable *digbot*—what we'll probably call a digging robot if anyone ever invents it). After investing thousands of valuable hours studying the problem, pioneering researchers like Smith have, in recent years, made great strides in stabilizing and conserving organic materials that survive the ravages of time, burial, weathering, and site formation processes.

Smith began his career as an undergrad at the University of Western Ontario, combining archaeology with an interest in wood preservation. As a graduate student at TAMU, he focused primarily on nautical archaeology, particularly the special challenges involved in preserving waterlogged artifacts. In addition to studying shipwrecks in the Great Lakes, Smith participated in large-scale excavations at Port Royal, Jamaica, carried out by the Institute of Nautical Archaeology (INA)—another research branch of TAMU's Department of Anthropology, considered by many the flagship of American nautical archaeology institutions.

Needed: methods for working in imperfect conditions

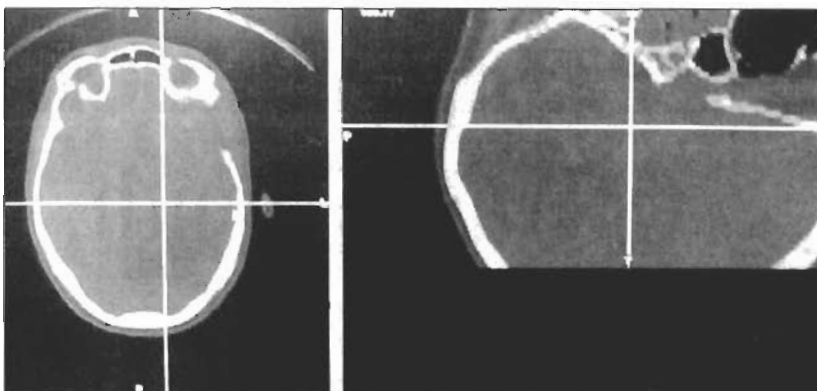
His interest in conservation work was reinvigorated by his experiences in Port Royal, where he and his colleagues quickly became aware of one overwhelming reality: that per-

Three-dimensional scan of a sword hilt prior to replication.



Scan of a skull imbedded in matrix.

fect conditions for artifact preservation simply don't exist. Most of the processes they'd been taught had more exceptions than not; some methods worked only with certain types of artifacts, and then often under rigorous conditions that didn't exist where the fieldwork was being done. The ideal scenarios weren't even an issue—they were impossible. As Smith puts it, "We had to come up with better treatment strategies for the real world, as opposed to the ideal world." Eventually his investigations led him to look into applying sugars and other bulking agents to preserve waterlogged wood, and to speculate about the possibilities of



using advanced silicone oils called "hydroxyl-ended polymers" to preserve these and other organic materials.

Soon his research was pushing the envelope of conservation science, going beyond the facilities available at TAMU: he was dealing with tough, specific questions in polymer chemistry that couldn't be answered in a traditional university setting. Frustrated, he took the best course that came to mind: he called the corporate headquarters of Dow Corning in Midland, Michigan, and spoke at length with the executive in charge of Polymers Research and Development, unaware that this was the sort of thing a graduate student didn't do. The Dow Corning scientists, taken with his work, flew him up for a visit. After he earned his Ph.D. in 1995, they invited him back to perform post-doc work. "There I was," Smith recalls fondly, "this anthropologist oddball coming in to apply polymer chemistry to material culture, at the top polymer chemistry center in the United States and probably the world."

Announcing an absorbing book by a distinguished author!



Peter L. Storck, Royal Ontario Museum archaeologist and curator emeritus, chronicles a 30-year search for the archaeological record of early Paleoindians in Ontario in *Journey to the Ice Age: Discovering an Ancient World*. A major theme of the book concerns the use of a geological and landscape-oriented approach for discovering archaeological sites and investigating specific questions about early Paleoindian land use and cultural

adaptations at the end of the Pleistocene. Because Storck relates his work to historical and current knowledge of early Paleoindians in all North America, the book is also a valuable continental overview of the subject for both students and the general public. Storck candidly discusses his failures as well as his successes and thus provides a captivating autobiographical account of his work and the spirit in which it was done. Best of all, it's a book, says Storck, that "was written for the general public."

Journey to the Ice Age is published by the University of British Columbia Press in association with the Royal Ontario Museum: 384 pages, 62 images, hardcover, \$39.95 (U.S. dollars). For more information or to order your copy visit the UBC Web site at www.ubcpress.ca or contact UBC Press, 2029 West Mall, Vancouver, BC, V6T 1Z2; telephone (604) 822-5959; e-mail: info@ubcpress.ca



A polymer for every need

Whether they considered him an oddball or not, Dow Corning was fascinated by his research; archaeological conservation was hardly a use they'd expected for their polymers. After providing Smith with excellent post-doc training and steering him through the difficult questions he needed to answer, Dow Corning sent him back to TAMU with the assistants, materials, and equipment he needed for the experiments he wanted to try. Smith spent a great deal of time thereafter in labs, creating the polymer chemicals specific to each type of material he wanted to preserve, from wood to bone to flesh. Usable conservation materials already existed, but they preserved materials in ways that were unnatural. Take, for example, human cadaver tissue. For centuries, researchers have known how to adequately preserve human tissue, but for most of that time there haven't been real controls over the types of preservation that could be done. "If I wanted skin to be supple and feel skin-like, I wasn't able to do that," Smith states. "If I wanted vascular tissues to be elastic and mobile, they were not. I wanted to be able to make the materials feel like they were supposed to feel." Standard conservation materials simply weren't up to the task, so Smith had to create substances that were.

In the long, slow process of experimentation that followed his post-doc fellowship, Dow Corning helped Smith better define the types of polymers to be used for conserving specific types of materials. They spent years creating various polymers, first determining the base chemistry that would give

them the results they wanted and then applying those results to test materials. For each genre of material (wood, bone, glass, pottery, paper, leather, basketry), the polymer teams did a variety of experiments to home in on the base parameters of what would work best. In the end, they crafted a much broader range of materials than had previously been used in conservation, addressing all the scientific necessities while highlighting the artistic inevitabilities of artifact conservation and preservation. "One of our mandates is to fine-tune existing conservation processes," Smith emphasizes. "A second is to develop new conservation technologies and improve upon the old ones. Third, we try to expand the real chemistry of the applications we develop to applications throughout anthropology, and later throughout the rest of the organic world."

Their work has yielded a number of patented materials and processes used throughout the industry. In fact, substances and techniques resulting from APRL's work are currently used to preserve and stabilize items in museums, in medical environments, and in various medical and biological teaching labs.



Smith's book on the subject, *Archaeological Conservation Using Polymers: Practical Applications for Organic Artifact Stabilization*, is the standard reference tome for polymer conservation methods and has been well received in the field.

Like many academicians, Smith's schedule is a busy one. Not only is he the Director of the APRL, he's also an Associate Professor, holding down the INA Faculty Fellowship. In addition to conservation topics, he pursues interests in Caribbean archaeology, Caribbean culture studies, visual anthropology, and digital imaging, and he participates in various joint international research projects. Under his guidance, the APRL is in the process of conducting a number of intriguing research projects, from Egyptian mummy tissue studies to the conservation of artifacts collected from the shipwreck of the *La Belle*, one of French explorer La Salle's vessels. It's a demanding job. As Smith points out, "Every artifact is unique. Each has its own unique problems and challenges, and each needs your help *right now*." But he seems to savor the challenges; his passion for his work is palpable.

Work like Smith's has begun to transform the profession. Today's field archaeologists are more likely to take conservation into account and bring conservators into the fieldwork from its earliest stages, because the initial triage and management of fragile artifacts—especially bone—greatly affect what happens to them in the lab. For example, at this writing Smith is working closely with TAMU archaeologist Rob Bonnicksen and students excavating a mammoth skeleton on the Texas Gulf Coast, a find that has produced bone that needs to be conserved (see "Texas Mammoth" in this issue). At an estimated 38,000 years old, it's highly unlikely this find is associated with ancient humans in any way, but its rarity makes it an exciting find.

Techniques for the 21st century:

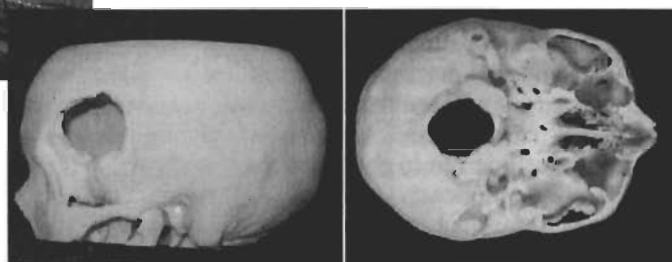
Remote imaging and non-tactile sculpture

In addition to traditional conservation, Smith has made significant strides in applying three-dimensional imaging and modeling to archaeology in his newly created Wilder 3-Dimensional Research Laboratory. The research in these fields is just as far

advanced as what they've done with hydroxyl-ended polymers, but it seems less rooted in hard science, almost like something out of science fiction. Basically, modern technology enables researchers who have the proper equipment to make a 3-D "photocopy" of just about any object. It's not quite as advanced as Star Trek's replicators, but it's getting there: it's now possible to take a CAT or MRI scan of an artifact within any sort of surrounding matrix,

◀ The Z-Corp Technology copier equipment in the Archaeological Preservation Research Laboratory at TAMU.

▼ Side view (left) and bottom view of replicated skull. Note the reproduction of fine detail on the surface and within the cranial cavity.



such as a concretion, and then use off-the-shelf digital imaging software to separate the matrix from the artifact on screen. Once the "cleaned" 3-D visualization is available, a physical model of the artifact can be created on a 3-D printer before the conservation process has even started! In one instance, Smith and his team were able to scan a fragile skull still embedded within a block of sediment and use these techniques to produce a clean physical model, complete with all the skull's tiniest features.

Although it's not widely known, 3-D replication of objects is no longer first-generation technology. Early 3-D copiers employed the principle of stereolithography, which uses lasers to

continued on page 20



A medium-sized ice patch in south Yukon. All the black material on the ice is recently melted-out caribou dung. Three field researchers are visible on the slope.

ALL PHOTOS: GOVERNMENT OF YUKON

Nature's Freezer Yields Look at Ancient Hunting Grounds

The first of a 2-part story on archaeology in the Yukon

A WOMAN'S CURIOSITY, the habits of caribou, and a warming trend have combined to provide archaeologists with an increasingly clear picture of a narrow slice of prehistoric life in the northern reaches of the Americas.

A sheep hunter out in the Yukon alpine in 1997 noticed a foul-smelling dark band at the base of a ice patch. She pointed it out to her husband, a biologist. He recognized the source of the odor, but he was baffled. They were looking at a foot-thick pile of freshly composting caribou dung in an area where no caribou had lived for at least 70 years. Later he found a small fragment of an atlatl dart shaft at the site, with sinew and a bit of feather fletching still attached. He gave it to Yukon Heritage Department archaeologists, who submitted it for radiocarbon dating, expecting it to be no

more than a couple of hundred years old.

The radiocarbon date came back at 4300 RCYBP.

Thus began ice patch archaeology in the Yukon. During this last field season, Cody Joe, a student intern from Champagne and Aishihik First Nations, spotted a fragment of an atlatl dart freshly freed from the ice that later dated at 8360 RCYBP, making it the oldest ice patch artifact by 1,000 years found to date, according to Yukon archaeologist Greg Hare. (Note that all radiocarbon dates in this article are uncalibrated.)

At the same ice patch, Cody Joe also found a leather bag sewn with sinew and with laces still woven through slits. The bag, partially deteriorated because it had been exposed for a few years, was block lifted—complete with the rocks it was on and the sediment beneath it—and taken to Whitehorse. "The only thing we've

done with it is take a small sample for dating," says Hare. It returned a radiocarbon date of 1430 RCYBP. Another sample of the bag was sent to the Ancient Biomolecules Centre at Oxford University for DNA analysis in the hope of finding plant, animal, or human DNA that might indicate the bag's use.

Broad interest brings many partners

Hare, based in Whitehorse, Yukon, is part of a team of researchers that includes Ruth Gotthardt, a fellow archaeologist with the Yukon Heritage Department; Valery Monahan, the department's conservator; Sheila Greer, Champagne and Aishihik First Nations archaeologist; Rick Farnell, regional caribou biologist (his department provides a large part of the funding); Erik Blake, glaciologist and president of

Icefield Instruments, also based in Whitehorse; and Diane Strand, heritage officer for Champagne and Aishihik First Nations.

The ice field discoveries have also sparked interest ranging from researchers at neighboring University of Alaska to geneticists from Oxford University in England. University of Alberta anthropology student Vandy Bowyer has switched her doctorate focus to study the pollen and plant macrofossils found within the ice fields. Smithsonian bird researcher Carla Dove is identifying the feathers from the weapons' fletching and is studying the frozen birds, now housed at a University of Alaska lab.

The Kwanlin Dun, Kluane, and Carcross-Tagish First Nations have added their support and partnership to that of the Champagne and Aishihik.

"In the Yukon, we try very hard to integrate research into the needs of the First Nation community," says Hare. First Nation field assistants participate in archaeology surveys and digs, and elders are consulted to interpret sites and artifacts and to find new sites. It's a partnership that has resulted in much knowledge, cooperation and trust. "It's a multi-disciplinary project, and it's directed by the immediate interest of a number of different groups. First Nations, geneticists, biologists, archaeologists—there seems to be something there for a lot of people who're interested in the past," Hare explains. "It's one of the challenges of the project as well as the satisfying aspects."

The ice patch finds have also significantly changed the course of Hare's work. A lithics archaeologist, Hare had become accustomed to trying to interpret the past by looking primarily at stone tools and debitage. He's gratified by the luxurious good fortune of having complete 8000-year-old hafted darts in his freezer to study. "It's quite a new experience," he admits, "with material coming out of the ice patches, to be looking at entire organic implements, weapon systems and things like that."

Caribou refuge, a hunter's haven, and a logistics nightmare

Why do you find human artifacts and heavy deposits of caribou dung on remote rocky mountaintops?

Caribou don't like flies. Or heat. So in July and August, they seek relief from both by climbing up to the remaining snow clinging on mountain slopes. Hunters know that now, and apparently hunters knew that more than 8,000 years ago.

"It's quite remarkable," Hare explains. "If you're up on the

ice in the places where caribou still exist today, the caribou are very fixated on getting onto ice. If you're there on a very hot day, they'll walk between you and the helicopter to get to the ice. They're maintaining a distance of 50 to 60 meters, but they're very focused on staying on the ice. From a hunter's perspective, it's like meat in the grocery store."

So what's melting out of the ice is 5,000 to 8,000 summers' accumulation of droppings from overheated, fly-weary caribou—and the darts, arrows and butchering debris left behind by hunters. Primary processing of the kills took place on the ice; surveyors have found evidence of butchered caribou, bison, wapiti, sheep, and mountain goat.

The summer residence for caribou isn't exactly an archaeologist's dream of a dig locale. "If you were in the alpine in early July it would be snow-covered," says Hare. "If you come back in early September, everything is snow-covered again. So your window of opportunity is really three or four weeks in August, when last year's snow has melted, and early September, when this year's snow begins to fall." Understandably such conditions make it very difficult in terms of field logistics. "You never know if there is going to be a field season," says Hare frankly. "You have to just wait for the weather. That's



◀Champagne and Aishihik researcher Cody Joe with newly discovered leather bag, dated at 1400 years old.

▼Close-up of leather bag, showing leather drawstring.



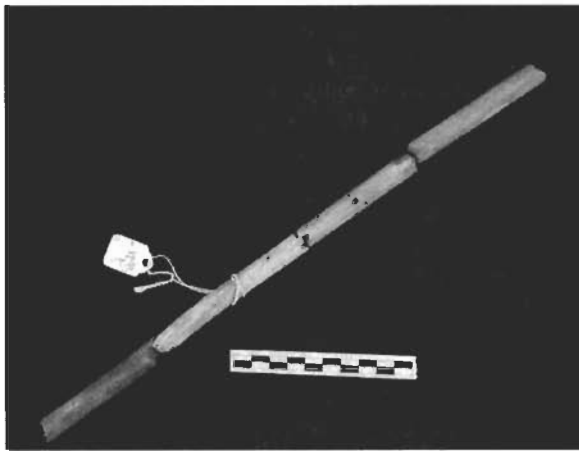
one of the difficult parts for researchers coming from other areas. We've had researchers come in the past, waiting for snow to melt—and it didn't happen."

Given the short time available and the number of sites now known—17 in the Yukon alone, and a number of new sites discovered in Alaska this summer—field survey has been the most effective tool. "It's very difficult to work through the dung," Hare notes

in a masterpiece of understatement. "We've tried in some cases screening it, but it hasn't been effective." To hunt through a one-kilometer stretch of thawing manure for what might be one artifact is, he admits, a daunting and inefficient task. He concludes tersely, "If the artifacts aren't lying on the surface it's very, very difficult to find them."

Dropped by helicopter in three-person teams (generally an archaeologist, a biologist, and a First Nations researcher) onto a remote mountainside for a few hours at a time, surveyors risk being isolated by high winds or a rapidly moving storm that would prevent the chopper's return. The dung-laced ice is

Medial section of an atlatl dart, dated at 8,360 RCYBP.




mucky; moreover, surveyors face the more mundane olfactory discomfort created by the newly thawed droppings, which Hare calls "the smell of success." The reason is if you're in a place where you get that strong, rich organic smell, then, he says, "you're in an area that's just in the process of melting. So you're likely to find something fresh or newly exposed."

The rewards are intact organic materials: Entire darts. Ancient arrows with antler points still attached with sinew. Arrow and dart shafts, pieces with feather fletching under sinew wraps. Small mammals, ancient pollen, birds. A complete lanceolate spearpoint, apparently coated with red ocher. A leather pouch. Since 1997, researchers have recovered 150 different artifacts that range in age from 90 RCYBP to 8360 RCYBP. "That's a tremendous time depth for the same activity to be constant," Hare emphasizes. "It speaks for great continuity for the entire Holocene in the Yukon."

Surveyors brought back more than 600 large mammal faunal remains, more than 100 mummified small mammals and birds, samples of pollen, and pollen and plant macrofossils from within the dung. They're also looking at isotope potentials within the ice. "We have also run more than 130 radiocarbon dates on artifacts, faunal elements, small birds and mammals,

and caribou dung," says Hare, who boasts of a very well dated chronology through the Holocene.

Radiocarbon dates coming back suggest that people were up in the high alpine very shortly after the end of the Ice Age. "You see the unglaciated areas of the Yukon were quite quickly colonized by people," he explains, "and a pattern of land use was established that persisted for many thousands of years afterward."

Right now Hare is waiting for the results of analyses on plant macrofossils and pollen found within the ice. Others on his team are studying the genetics of caribou to see what changes have taken place in caribou populations over time. Hare readily admits that a lot of this work is in early stages. Helicopter time and radiocarbon dating are the two most expensive elements of the research. Principal support has been from the Department of the Environment, Government of Yukon, and a variety of research partners. 

—Ellen Saunders

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Kennewick Man Decision Upheld

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Kennewick Man is not a "Native American" under NAGPRA

The court examined the voluminous administrative record and determined that "no reasonable person could conclude by a preponderance of the evidence on this record that Kennewick Man is 'Native American' under NAGPRA." The court observed that "scant or no evidence of cultural similarities between Kennewick Man and modern Indians exist." The court added, in a footnote, that the opportunity of gathering additional evidence of cultural similarities appears to have been deliberately foreclosed by the Army Corps of Engineers, who buried the site under two million tons of earth and rock "to prevent additional remains or artifacts from being discovered."

The court found that the Secretary's "only evidence, perhaps, of a possible cultural relationship between Kennewick Man and modern-day American Indians" was drawn from the oral traditions of the tribes in the coalition. The court ultimately discounted this evidence, however, because the "ac-

counts are just not specific enough or reliable enough or relevant enough to show a significant relationship of the Tribal Claimants with Kennewick Man."

The court did not address the many other issues in this complicated case, because once it determined that Kennewick Man was not a "Native American" for the purposes of NAGPRA, all the other issues became moot. For example, particular determinations of cultural affiliation are irrelevant if the remains are not covered by the law.

Reactions to the Decision

Reactions to the court's decision have been pretty much what you'd expect. The scientists are elated, the government non-committal, the Native Americans frustrated and bitter. Robson Bonnicksen, Director of the **Center for the Study of the First Americans** and one of the scientists who took the government to court, told the BBC that it was "a terrific decision." In a separate interview with the *Seattle Post-Intelligencer* Bonnicksen said, "This is a win for science, for openness and against an attempt at censorship." C. Loring Brace, another of the scientists, told the Associated Press that the decision was "wonderful news." Rob Roy Smith, the attorney who represented the

Colville Tribe, claimed, in the same AP story, that the decision was "a great injustice." In a statement on their Web page, the Confederated Tribes of the Umatilla Indian Reservation expressed concern "about the ability of NAGPRA to protect Native American burials and remains, as intended by Congress." Their statement also says the tribes have not yet decided whether they will appeal the decision. Marley Hochendorfer, a spokesperson for the Nez Perce Tribe, told the *New York Times* that "the tribe is reviewing the decision and is considering all avenues." The tribes may appeal it to the Supreme Court, or choose to request that a wider panel of judges from the 9th Circuit review the decision. The burden will be on them to show how this court panel has erred. The government attorneys also are studying the decision.

NAGPRA and Kennewick Man

The court's decision is a resounding affirmation of Judge Magistrate Jelderks's district court ruling (**MT 18-1**, "Judge Rules Scientists Can Study Kennewick Man"). Together these decisions constitute strong precedents that protect the rights of scientists to study ancient human remains in the United States. NAGPRA established the rights of American Indians to reclaim the remains of their ancestors, but according to the court's interpretation, NAGPRA does not extend rights of ancestorship to remains of unlimited antiquity. The court affirmed that "the exhumation, study, and display of ancient human remains that are unrelated to modern American Indians was not a target of Congress's aim, nor was it precluded by NAGPRA." NAGPRA was

intended to strike a balance between the sometimes competing, but equally legitimate, needs of museums, scientists, and educators on the one hand, and Native Americans on the other.

The 9th Circuit Court, in the opening paragraph of its opinion, recognized that Kennewick Man is "one of the most important American anthropological and archaeological discoveries of the late twentieth century." An editorial in the *Las Vegas Review-Journal* for February 6 observed that "for the revelations such discoveries provide about the origins of us all, this lucid decision should stand."

This case is by no means over. The government or the tribal coalition may appeal this decision. It is, however, a significant victory for science and it adds considerable weight to the body of legal precedent defending the rights of scientists to learn the stories of these visitors from ancient times. If neither the government nor the tribes appeal the decision, the scientists will begin working with the Army Corps of Engineers to implement their study plan. The government and tribes have several months to decide whether to file their appeals.

The full text of the 9th Circuit Court's decision can be viewed on the Friends of America's Past Web page www.friendsofpast.org. Anyone with an interest in the case should read this eloquent decision in its entirety.

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The opinions expressed in this article are those of the author and do not necessarily reflect those of the Ohio Historical Society, with whom he is employed as a Curator of Archaeology.

NEW! from CSFA

Projectile Point Technology and Economy: A Case Study from Paiján, North Coastal Peru

Claude Chauchat and Jacques Pelegrin,
principal authors

THE PAIJÁN CULTURE, whose lithic industry manufactured exotic projectile points, is a poorly understood Paleoamerican tradition. Contemporaneous with the famous Folsom culture in North America, it is known from open-air sites and one rockshelter spread over 1000 km of the Peruvian coastal desert.

Claude Chauchat and his research team present a detailed archaeological case study of the Cupisnique region at the Pampa de los Fósiles locality on the north coast of Peru. This volume uses the *chaîne opératoire* approach, originally developed in France for studying flaked-stone tool assemblages. Stone tool assemblages are characterized as a succession of technical actions beginning at the moment of raw material acquisition and continuing through manufacture, utilization, and final abandonment of tools. The *chaîne opératoire* approach,

Projectile Point Technology and Economy A Case Study from Paiján, North Coastal Peru

Claude Chauchat • Jacques Pelegrin • Cesar Delvalle-Rios
Sandra Escobar Delgado • Tania Ingersoll-Rios
With an Appendix by Cesar Delvalle-Rios • William Starna • Philippe Ponsard
Foreword by Jacques Vichet
Translated from French by Megan O'Hare
Center for the Study of the First Americans at Texas A&M University



applied to the study of a surface lithic workshop area at the site of Pampa de los Fósiles 14, Unit 1, documents raw material use at flaking loci and describes cores, flakes, flake tools, limaces, bifaces, and lithic reduction practices of the Paiján site occupants. The structure and employment of flaking areas are presented in plan maps, and stages of bifacial production are inferred from archaeological remains. Refitting studies and lithic technology experiments based on site patterning provide insights into tool production decisions and spatial patterning of workshop activities. Steps used in creating a Paiján point are illustrated through lithic replication experiments. In addition to providing a detailed

history of stone tool flaking activities, the investigators combine raw material acquisition patterns with regional survey data to infer mobility models for the Paiján people. This amply illustrated volume will excite prehistoric archaeologists, lithic technologists, and knowledgeable readers.

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Kirk Bryan Award

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part of his research into Lehner, Murray Springs, and other Clovis sites, had worked out the alluvial stratigraphy of the small drainages and arroyos in the San Pedro Valley of southern Arizona. Waters investigated the Whitewater Draw while studying under Haynes, and after receiving his doctoral degree he continued to expand Haynes's database of stratigraphic sections and radiocarbon dates for rivers and arroyos in the region.

The clue to the causes of arroyo formation came after Waters did extensive study on the Santa Cruz River, which is much larger than most arroyos in the region. (An arroyo, Waters explains, is a desert stream that's dry most of the time and only flows after a heavy rain. It forms by incision into a valley floor, usually with very steep sides. Channel cutting migrates back from the head cut where the stream originates, carving a deep gorge as it travels. Over time the channel fills with sediment.) When they compared Waters's research with other studies, Waters noticed a striking simultaneity in channel downcutting of arroyos, small and large alike. "What I noticed," Waters remembers, "is that the record of arroyo cutting and filling of the Santa Cruz River, which is a large arroyo, mimicked the Holocene arroyo record in the San Pedro Valley in terms of when these arroyos were cutting and when they were filling. And we got our heads together and

decided to write this paper." By demonstrating a one-to-one correspondence in cutting and filling between small arroyos emptying small drainage basins and much bigger arroyos like the Santa Cruz River with its great drainage basin, they showed that arroyo formation is synchronous. "The only thing that can control something like that," says Waters, "is climate."

Climate is the engine that drives arroyo formation, and El Niño is the spark plug

After showing the synchronicity of arroyo cutting and filling, Haynes and Waters correlated arroyo formation with climate changes in the distant past. Drawing from such diverse data sources as pack rat middens, vegetation records, and especially studies published on El Niño frequencies, they discovered the striking fact about arroyos in the Southwest: they are a mid-Holocene phenomenon. "They really took off around 4000 RCYBP," says Waters. "Arroyos just kept cutting and filling multiple times." Not surprisingly, this is when El Niño, the Southern Oscillation, first took hold. There appears to be a direct link between arroyo cutting and filling, climate change, and the occurrence of El Niño.

This landmark paper isn't the result of a *Eureka!* moment of inspiration. It's the culmination of Haynes's 40-year career of careful investigation, which was continued by Waters. In their acceptance speeches of the Kirk Bryan Award, mentor and scion graciously acknowledge the other's contribution. 


C. Wayne Smith

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solidify photosensitive resins in a vat, building up the object in layers within the resin. The new generation of 3-D copying, as epitomized by APRL's Z-Corp Technology copier, replicates the object in plaster within a bonding material; each layer is one four-thousandth of an inch thick, so thin that a human hair is too large for practical comparison. Once the piece is finished, you dig it out of the plaster, shake off the excess, and you have a perfectly detailed 3-D model. All marks, grooves, cuts, and other surface features are reproduced faithfully. It's time-consuming, but not terribly so. A small artifact can be copied in an hour and a half; a larger piece—skull-sized, for example—takes as much as 3½ hours.

The advantages of this type of digital manipulation and replication are easy to imagine. First, it gives conservators a good mental template of the artifact before conservation, and it helps to preserve the artifact. Once 3-D visualization is complete, precise measurements can be made easily and safely using "electronic calipers" within the program. Less obviously, the technology offers a whole range of other possibilities, including the ability to reproduce missing parts to complete a model or display; to replicate one-of-a-kind artifacts and human remains, like the australopithecine Lucy, so that students can actually hold them in their hands and study them up close; to get long-distance access to materials for study or reference collections; even to help develop excava-

tion strategies for fragile artifacts. It may even be possible to use the technology to conduct long-distance research in ethical ways when some artifacts and sites are not otherwise accessible.

As revolutionary as it is, Wayne Smith emphasizes that his work isn't about rewriting the basics of artifact conservation; he's the first to admit that his new conservation polymers, for example, aren't the be-all-and-end-all of archaeological conservation. "We've never told anyone that silicone polymers are a panacea," he cautions. "Our research isn't about replacing old technologies; it's about adding tools to the conservationist toolkit." He's more interested in helping to expand the field, providing other scientists with new and improved ways to derive as much information as possible from what they study. "What it comes down to is this: if we don't relate an artifact back to human act, or regional act, we haven't told its story. The important thing for archaeologists and conservators in the future is telling a much better, more accurate, more real story, based on the technology we can bring to bear." 

—Floyd B. Largent, Jr.

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