



MAMMOTH TRUMPET

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Center for the Study of the First Americans
Department of Anthropology, Texas A&M University
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A New Wind from the South Shakes Clovis

This skeleton of a young woman lies under more than 50 ft of water in a Yucatán *cenote*, or sinkhole. She last entered the cave, however, during the Ice Age, when it was high and dry. These submerged sites are yielding startling results for skindiver archaeologists—megafauna remains, lithic artifacts, and human skeletons like this one, which, if the dating proves accurate, may be the oldest Paleoamerican yet found. Our story on exciting discoveries being made by young Mexican archaeologists begins on **page 8**.



EL MUSEO DEL DESIERTO

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A Tribute to Robson Bonnicksen

*and his
efforts toward
understanding
Paleoindian
America*

by James S. Dunbar



Rob (right) meets with
Florida river diver to
inspect underwater finds.

ALL PHOTOS: JAMES S. DUNBAR

IN 1983 the fledgling Aucilla River Prehistory Project began with little funding but enthusiastic expectations. The project's mission was to investigate one or more inundated river channel sites known to contain Paleoindian artifacts and late-Pleistocene megafauna re-

mains. S. Dave Webb of the Florida Museum of Natural History in Gainesville and the author with the Bureau of Archaeological Research in Tallahassee were the founding members of the project.

Starting in 1987 the National Geographic Society supported the Aucilla River Prehistory Project with yearly grants. In 1990 the Division of Historical Resources, Florida Department of State, awarded a survey and planning grant. Beginning in 1994 the Division of Historical Resources awarded four major special-category grants, which saw the project through to its conclusion.

The primary objective of the Aucilla River Prehis-



Mastodon tusk 1.7 m long
in the Ichetucknee River.

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Canadian scientist Hendrik Poinar is wrestling heretofore unobtainable information from human and animal coprolites—but he has to put up with bad jokes along the way.

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tory Project was, first, to conduct test excavations on certain sites to determine which, if any, had site components with stratigraphic integrity;

Rob meets Col. Bill Royal (far left), who discovered the Warm Mineral Springs site.



second, to thoroughly investigate a site that did. By the end of the first field season the Page-Ladson site met the criteria for further testing.

Prior to the Aucilla River Prehistory Project, archaeologists had largely ignored river channel artifact concentrations including very large accumulations of Clovis, Suwannee, and Simpson projectile points. After all, river channels are dynamic erosive environments and many professionals assumed the potential of in situ context was negligible. A paradigm shift in thinking was needed, and it was going to require a number of outside professional supporters. There were two early supporters of the Aucilla River Prehistory Project. One was C. Vance Haynes, and the other Rob Bonnicksen.

About the same time we realized that Page-Ladson had good site potential was also around the time that Rob Bonnicksen initiated the Center's public outreach efforts. Rob contacted me about the possibility of visiting a Florida underwater Paleoindian site, being careful to point out that he was no scuba diver. After some back-and-forth planning we decided to do two things; first was to take an inspection tour of the shallow river channel located in Ichetucknee State Park; second, to organize a meeting and invite river divers who had knowledge of underwater concentrations of artifacts and fossils. With the plans set we met in the fall of 1983.

Sometimes it pays just to be lucky, and that's exactly what happened. During our trip up the Ichetucknee River we found a mastodon tusk partly exposed but still partly embedded in a sediment column. The tusk was in plain view of everyone on board. The Ichetucknee River originates from one of Florida's largest first-magnitude springs, and the water in its channel is gin-clear. No need for diving—the tusk was about 7 ft below our boat, and its tan color contrasted with the whitish gray sediment. Because the tusk had been partly exposed by ero-

sion, it was excavated, mapped, and recovered about a week after Rob's visit. Not only did the discovery amaze us both, more importantly it also greatly impressed upon attorneys with the Bingham Trust that the fledgling Center was off to a good beginning.

After our river tour we traveled to White Springs, Florida, to hold the first-ever River Diver Conference on the grounds of the Stephen Foster Memorial; I suppose you could say we were *Way Down upon the Suwannee River*, and who else better to invite than a

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Mammoth Trumpet, Statement of Our Policy

Many years may pass between the time an important discovery is made and the acceptance of research results by the scientific community. To facilitate communication among all parties interested in staying abreast of breaking news in First Americans studies, the **Mammoth Trumpet**, a science news magazine, provides a forum for reporting and discussing new and potentially controversial information important to understanding the peopling of the Americas. We encourage submission of articles to the Managing Editor and letters to the Editor. Views published in the **Mammoth Trumpet** are the views of contributors, and do not reflect the views of the editor or Center personnel.

—Michael R. Waters, Director



group of river divers? It was off-season at the Stephen Foster Memorial, so we pretty much had the place to ourselves. About 100 people from all over the state attended, and many, but not all, brought with them artifacts and fossils found in rivers. It was an educational experience for the river divers as well as for Rob and me. The preservation of bone and ivory, nonexistent in most land sites, is common underwater. There were numerous Paleo points and other artifacts to be photographed and stories about underwater experiences to be told. Seeing the volume of material in one place was noteworthy, but our effort to document the finds was inadequate. There were too many things to document and too little time to do it. After an old-fashioned picnic of homemade barbecue with all the fixings, it was Rob's turn to wow the audience with a flintknapping demonstration. He almost made a Clovis biface the size of the largest one recovered from the East Wenatchee cache before breaking it. He warned everyone that the preform he was working had developed a flaw, and sure enough, the tip parted company with the base just where he said it would.

In 1989 the first results of investigations for the Aucilla River Prehistory Project were published in *Bone Modification*, a volume edited by Rob and Marcella Sorg. The chapter contributed by S. David Webb, Dan Cring, and myself was entitled "Culturally and Naturally Modified Bones from a Paleoindian Site in the Aucilla River, North Florida." In 1991 I was again called on and authored a second, broad-picture chapter about the distribution of Florida Paleoindian sites in *Clovis: Origins and Adaptations*. Edited by Rob and Karen Turnmire, it was the second volume published by the Center for the Study of



◀ Divers from Florida Bureau of Archaeological Research and FSU map the mastodon tusk.

▼ Underwater video crew documents the Ichetucknee mastodon tusk.



the First Americans to spread the word about Paleoindian sites, many of which are located in wetland and underwater settings.

By May 1991 the iron was hot and the Aucilla River Prehistory Project had gained a fair amount of notoriety as a result of its discoveries and the publications they had spawned. It was time to assemble an advisory group to help guide our future direction. Dave Webb did a superb job of assembling an advisory group of eminent scholars that included:

- Rob Bonnicksen, Archaeologist, Center for the Study of the First Americans
- C. Vance Haynes, Geoarchaeologist, University of Arizona
- Joe Donoghue, Geologist, Florida State University
- Barbara Hansen, Quaternary Palynologist, The Pollen Connection
- Al Goodyear, Archaeologist, South Carolina Institute of Archaeology and Anthropology
- Pat Shipman, Biological Anthropologist, Penn State University
- Dennis Stanford, Archaeologist, Smithsonian Institution
- George Frison, Archaeologist, University of Wyoming
- William A. Watts, Palynologist, Trinity College, Dublin, Ireland.

continued on page 20

Diver inspects mastodon tusk during Rob's visit.

WITH THE HELP of diabetic research, an innovative Canadian researcher has painstakingly sifted out the details of a few First Americans' meals. And much of his work is with really, really old human evidence of the most basic kind—fecal material.

Hendrik Poinar is a molecular evolutionary geneticist and biological anthropologist at McMaster University in Hamilton, Ontario. His lab is currently investigating the history of the HIV and chimp viruses, genetics of giant sloths and modern tree sloths, and the domestication of New World dogs from samples found in British Columbia.

Dr. Poinar, 35, received the 2004 Petro-Canada Young Innovator Award. His father, George Poinar, is a retired Berkeley professor known for his work with amber-preserved insects and their DNA. The younger Poinar knows three languages, has researched and taught in Germany, Spain, Italy, Canada, and the U.S., and has been widely published. For his doctorate he studied under Svante Pääbo of the University of Munich, who in 1985 was the first to recover (from a 2,400-year-old mummy) ancient human DNA. In the year and a half Poinar has been at McMaster, he has landed four major grants that among other benefits have provided him a state-of-the-art molecular archaeology lab.

Research fraught with nuisances

Poinar dismisses objections to his use of the term "coprolites" to describe the desiccated ancient fecal matter from which he has extracted DNA. "People tend to think of coprolites as mineralized, like dinosaur coprolites, as stones," he explains, although they clearly aren't stones. "That's why a lot of people in the literature sort of chastised us and said, 'Well, you really should call them paleo-feces.' And that's fine, if we want to be academic, that's fine, okay."

His airiness may stem from the fact that he has, after all, heard every pun, witticism, and bon mot possible about... well, to put it bluntly... human crap. "How's your Ph.D. feces?" he recites wearily. "Yeah, I've heard them all." Off-color jokes are the only thing about his research for which he lacks fire. His work is characterized by enthusiasm for his field,

delight in taking on massive challenges, and a commitment to excellent science.

Poinar became intrigued by coprolites while he was working in Germany on his doctorate in molecular genetics at the Ludwig Maximilians Universität München. His attention was caught by artifacts and remains from Gypsum Cave in Nevada, which included Ice Age coprolites. When he discovered other researchers had written off the coprolites as useless, he was hooked. "It's very easy for people to criticize stuff that's out

Ancient DNA

is a tough nut to crack



CHANTALL VAN RAY, MCMASTER UNIVERSITY

there," he says, "to say, 'Ah, you can't do that because I can't reproduce it.' Or for people to say, 'I tried this fossil ten times and it didn't work.' Those are the ones that are the most interesting to me, because they didn't work."

Poinar takes very little at face value. When he's looking at research that he thinks should have provided more data, he wants to know what methods, techniques, and equipment the

researcher used. He asks, How did you do it? What were your techniques, and how sensitive are you, and what's your limit of detection? If you can only detect a thousand molecules, how do you know you're not missing the hundred that are still in there? "That's what I find even more interesting," he confides, "the challenges like that, where people are clearly determined these don't have any more molecules in them . . . and then we go in and show that if you know what you're looking at and you understand the chemistry of preservation there's a lot more there." Before Poinar, scientists didn't step back and look at

stubbornly solid in all his experiments as well. But he was convinced that mitochondrial DNA should have survived in the compounds—he envisions them as sandwiches—even if only as fragments. He traveled to Scripps Institute and the University of Bristol Biogeochemistry Center for specialized training in amino acid geochemistry, racemization kinetics, stable isotope chemistry, geochemistry, and pyrolysis gas chromatograph mass spectrometry, all the skills he needed for the work ahead.

"It was a sort of long drawn-out frustration of why these things looked so good morphologically, macroscopically, but never yielded DNA," he recalls. Even today, he admits, exactly how DNA is preserved in fossils is still "a big black box." Some cases, like bone, that at first seem straight-

Ground sloth coprolite 20,000 years old from Gypsum Cave, Nevada, juxtaposed with pieces of chocolate because, says Poinar, "the chemistry is very similar between the two."



the chemistry of the preservation *first*, then go ahead with actual DNA experiments.

For Poinar the greatest joy comes when someone says it clearly can't be done. "And then," he says matter-of-factly, "we come in and say 'No, it can, and we can reproducibly show you why, and how.'"

A tricky puzzle to solve

The problem Poinar faced was that the coprolite samples had composted just enough to form humic compounds, like organic materials in soil. No one yet had cracked the actual composition of many of these compounds, and they remained

forward turn out not to be straightforward at all. "It *seems* to be that the DNA is adhering to the hydroxyapatite," he explains, "that this is actually preventing microbial degradation of small pieces, that if you demineralize the bone one can elute these small pieces off."

In organic materials that are rich in metabolites and sugars like skin and feces—especially from a herbivore that eats plants loaded with carbohydrates—a condensation reaction occurs, a cross-linking reaction called the Maillard reaction. Maillard products result when sugars break down under heat; in cooking, they account for golden brown bread crusts and the flavor of roasted beef. In the human body, the effects are

DNA: A Primer


*The following paragraphs summarize important principles found in David Stepp's excellent book, **Reconstructing Human Societies With Molecules**. Ancient & Modern Genetic Clues Point to One Early Migration. Articles in **Mammoth Trumpet** vol. 12, No. 3 (1997) may also help demystify the science involved in Poinar's work.*

Although deoxyribonucleic acid (DNA) was first successfully extracted from ancient animal tissues in 1984 and from ancient human tissue the following year, ancient DNA was still so rare and fragmentary that it was quite difficult to study. In the late 1980s, a "Xerox" for DNA was developed, the polymerase chain reaction (PCR). PCR separates the double-stranded DNA molecule, isolates the segments to be copied, and then produces strands of DNA identical to the original. The process can be repeated almost an unlimited number of times, so researchers can make many copies for analyses.

Mitochondrial DNA is different from the DNA that contains an

organism's genes on chromosomes. mtDNA molecules, which contain only 37 genes arranged in a circular pattern, are found not in the nucleus but in another cellular structure called the mitochondrion. Because each cell contains many mitochondria but only one nucleus, mtDNA is much more common and thus more likely to be preserved. Its shorter sequence of genes also makes it much easier to map. In fact, the genetic information of the whole mtDNA has been completely sequenced.

mtDNA has other advantages over nuclear DNA. It is inherited only through the maternal lineage and does not rearrange itself as do nuclear genes on the chromosomes. Its higher mutation rate makes mtDNA a good evolutionary clock; it is easier to measure the genetic changes of mtDNA lineage through time.

Nearly all modern Native American populations have mtDNAs belonging to only four primary mtDNA lineages that were brought to the New World by their founding Asian ancestors. These lineages, distinguished by four different "markers" along the mtDNA genome, have been designated haplogroups A, B, C, and D. A fifth founding mtDNA lineage in Native Americans clusters statistically with a known Asian mtDNA lineage when compared with Asian samples. A Siberian haplogroup, still under investigation and thus identified as "X," may cluster with this fifth lineage. 

Teasing Information from Human Coprolites

The identification of mtDNA from three early Americans was a ground-breaking endeavor that involved significant lab work; the 2001 paper has ten authors from seven labs in three countries.

The samples were pulled from 1½–2 m below the surface in lens 13 of an undisturbed latrine block in Hinds Cave, Val Verde County, Texas. Radiocarbon dating by AMS yielded ages of 2165–2370 RCYBP. Initial plant, pollen, and faunal identifications were made by Vaughn Bryant of Texas A&M University and Kristin Sobolik of University of Maine. Gas chromatography analysis suggested excellent preservation of plant tissues and the presence of both di- and monocotyledonous plants, meat remains, and Maillard reaction products.

Plant material

Labwork determined the fecal matter came from three individuals related to modern Native Americans whose diet included hackberry, oak, species of the ocotillo, sunflower, elm, nightshade, buckthorn and legume families, rats, fish, yucca or agave, and sheep. DNA analysis, which identified plant material

Native American feces approximately 3,000 years old from Hinds Cave, Texas. They are roughly the size of a man's fist.



KRISTIN SOBOLIK, UNIVERSITY OF MAINE

at the order and occasionally at the family level, found the samples included Liliales (an order that includes yucca), Asteraceae (sunflower family), Ulmaceae (elm family), Fagaceae (oak family), Solanaceae (nightshade family), Fabaceae (legumes), Fouquieriaceae (ocotillo family), and Rhamnaceae (buckthorn family). All are represented by climate-adapted, edible species that grow in the Hinds Cave region.

Two clones found in the samples were similar to families within the order Zingiberales, unlikely given its tropical nature (it includes bananas and gingers). The database may be missing the proper family. Microscopic analysis of the samples by

Bryant and Sobolik confirmed the presence of Liliaceae, Fabaceae, and Ulmaceae. Also found was Cactaceae (cactus), which was not identified by DNA analysis.


Faunal material

Two samples provided nonhuman, nonplant clones; those were sequenced and also identified by comparing with a database. From one sample, 11 sequences indicated a member of the genus *Ovis* (possibly a contaminant from domestic sheep or possibly meat from a bighorn). From another, sequences were identical to pronghorn antelope and cottontail rabbit; physical remains support that finding. Microscopic analysis gave a different dietary picture. A squirrel bone, bones and teeth from a

cotton rat and packrat, and the spine and scales from a bony fish were found.

Human genetics

Mitochondrial DNA analysis indicated the DNA present in one sample was from haplogroup B. The other two samples contained DNA from haplogroup C, but from two individuals.

For detailed results of the analysis of the coprolites, see "A molecular analysis of dietary diversity for three archaic Native Americans," *Proceedings of the National Academy of Sciences (USA)*, April 10, 2001; volume 98, no. 8, 4317–4322. 

harmful. High levels of glucose in the blood of diabetics can combine with hemoglobin in red blood cells, eventually creating sticky masses called advanced glycation end products (AGEs), which trigger problems such as cataracts and early aging. Poinar first detected volatile fragments indicative of a Maillard reaction during his experiments at the University of Bristol.

A breakthrough in modern diabetic treatment provided Poinar's long-sought key. Phenacylthiazolium bromide (PTB), a salt that strips AGEs from blood vessels by breaking the glucose-amine cross-links, was under investigation in New

York. He added PTB to his samples to see if it would break the compound apart and free the mtDNA.

And it did.

He still doesn't know why it works, or if other salts might have similar unleashing properties. But seeing the mtDNA sequence finally appear—after years of struggling to prove it could be done—was an elating moment for Poinar that made up for many, many frustrating ones.

His long search gives him empathy for his graduate students, for he understands their disappointment and frustration. He spends much of his time acting as a cheerleader, but

he doesn't have much use for "downers" on or off his staff.

A personal, critical view of science

The elder Poinar taught Hendrik the value of work-as-joy. He supported Hendrik's early investigations into medicine, which included job shadows with his pediatrician and observing surgeries performed by an orthopedic surgeon, the father of a high school buddy.

Poinar recalls his father saying, "I don't care, Son, what you do . . . as long as you enjoy what you do. It can be collecting trash, it can be doing marine mammalogy, it can be surfing, but just be so enthusiastic about what you do that whenever you're around people who don't know what you do, by the time they leave they say, 'I want to do that job. He's got the best job in the world!'" The lesson took hold. Says the younger Poinar today, "I try to live that."

Poinar got a lot of attention—some of it downright unenthusiastic—for a piece he cowrote with Alan Cooper, published in *Science*, with the testy headline, "Ancient DNA: Do It Right or Not at All." The title was Cooper's. Poinar says he had other suggestions "nowhere near as fun as Alan's title, but not nearly as aggressive or arrogant, either." Poinar has since authored "The Top Ten List of Criteria of Authenticity for Ancient, Forensic Archeological Samples" and "Theoretical and Experimental Considerations on the Recovery of DNA and Viable Organisms from Ancient Ice and Permafrost." But he sticks by his earlier criticisms.

Poinar is a straight talker who believes unyielding principles should govern scientific inquiry. "You use science and it has to be reproducible," he says, "it has to follow criteria, it has to meet strict guidelines, you have to have the proper controls." He has little patience with researchers who approach their task unprepared. "A lot of anthropologists and paleontologists were coming at this without having any knowledge of molecular biology," he declares.

His varied interests have led him to immerse himself in many different subdisciplines. He recalls advice from every quarter telling him to specialize. It had the opposite effect on him. "Every time people would specialize," he says, "I would step back, take a step further back. . . . I wanted the big picture. I wanted the fine picture as well, but I wanted not to miss the big picture."

This is a scientist with a realistic appreciation of his strengths and weaknesses. There are vast areas of specialization in which Poinar feels eminently comfortable; in other areas he has to be content "to know who to contact, what experiments they're doing, to be able to know that somehow what they're doing may be applicable to what we're doing." New and wonderful things grow out of such collaboration.

People ask him, Why are you talking to chemists? Why are you talking to engineers? He answers, "My joy is to really be able to communicate with these people, not go there and look at them as if they're speaking Chinese, but to go to them and say, 'Look, this is our fundamental problem and this is what I want to get at. How would you approach this problem?'" At some point down the road—it could be a day, it could be six months—there will a meeting where he'll say, "That's it—we've hit it. This is the new door. And now we're going to go

through it together." Collaboration not only gains Poinar friends and colleagues, it stands to gain him a new method. With that, he says, "Who knows where that's going to take you!"

The leap from diabetes research to ancient DNA structure is typical of the man who decided against a career in orthopedic surgery because, he confesses, "I couldn't do hip after hip after hip . . . it really bored me absolutely to tears."


Hard-fought battle pays off

Those long-awaited mtDNA sequences allowed Poinar to identify those lumps from Gypsum Cave as coprolites of the now-extinct giant sloth.

Later, Poinar obtained coprolite samples from Hinds Cave in Texas, a site excavated in 1975 and 1976 by Harry Shafer and Vaughn Bryant of Texas A&M University. Dr. Bryant identified the pollen and microfossils in the coprolites with his graduate students, which included Kristin Sobolik. Poinar was able to genetically type the humans who had left the deposits behind and determined the samples came from three people of Native American descent (see sidebar); identification was possible because body cells from the digestive tract are eliminated with undigested food. Poinar finds plant material especially interesting because it enables researchers to identify food plants, including those that might have been used as teas and medicines, something not possible by other means.

He has submitted for publication a new article, "Sex and Diet from Archaic Native Americans," and last year he received a three-year, \$250,000 grant to study sex, diet, and migrations of Archaic hunter-gatherers from the southwestern U.S.

For Poinar, genetic research is a way to travel back in time to find answers to questions about the past that can't be found in contemporary populations with modern biology and anthropology as tools, whether the journey is 30 to 50 years back to understand the origin and evolution of HIV; 10,000 to 30,000 years back to understand the relatedness of ground sloths and the modern tree sloth; or 100,000 to 400,000 years back to look at genes from proteins that are preserved in Neanderthal remains.

This summer he'll be in Siberia helping to excavate and collect samples from frozen mammoth for genetic work. He's currently working on two books that span the generations. One, for his daughter's age group, is a children's book on poop; the other, which he is coauthoring with his father for Princeton University Press, describes the benefit of "time travel" via the molecules found in fossils. 

—Ellen Saunders

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Early Humans South *of the* Border

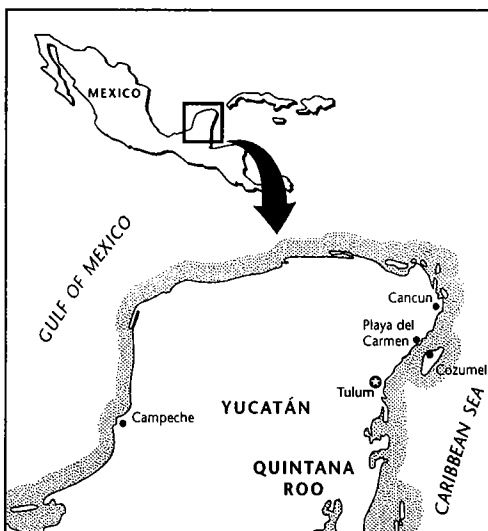


González being lowered
into one of the caves.

EL MUSEO DEL DESIERTO

New finds *from the* Yucatán Peninsula

IN SEPTEMBER 2004, two Mexican scientists created a buzz in the First Americans community with their announcement that they had recovered ancient human skeletons from submerged caves on the Yucatán peninsula, near the Mayan ruins of Tulum. Arturo González González of Coahuila's Museo del Desierto and his partner, Carmen Rojas Sandoval from Mexico's Instituto Nacional de Antropología e Historia (INAH), presented their findings at a conference in Mexico City called "El Hombre Temprano en América" (MT 20-1, "Early Humans in the Americas"). While truly old human remains are always a rare and welcome discovery, what rocked the conference attendees was an associated radiocarbon date: the oldest skeleton dated from $11,760 \pm 60$ RCYBP (about 13,000 CALYBP). If that date proves to be accurate, then the



Yucatán skeletons are the oldest human remains known for the Americas—predating even the Clovis culture of North America.

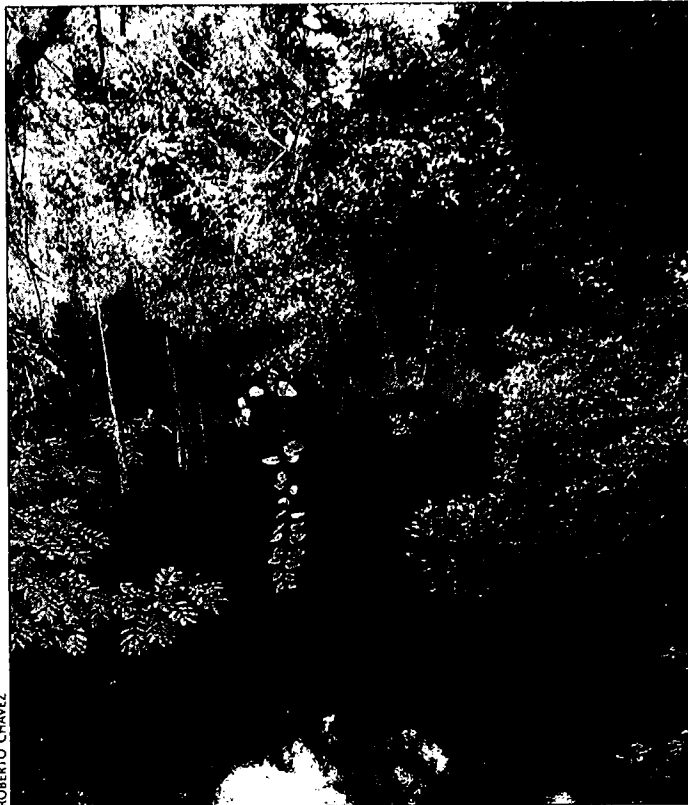
The lowdown on Latin America

Clovis, the oldest confirmed culture in the New World, has been convincingly dated to about 11,000–11,500 RCYBP. The consensus among most First Americans researchers is that humans first entered the New World from Asia no earlier than about 13,500 calendar years ago, probably by crossing over the Bering Land Bridge, a dry-land corridor that connected Asia and North America during the last Ice Age. Researchers in the "Clovis-First" camp believe that these were the direct ancestors of the Clovis people, who then proceeded to spread across a New World otherwise barren of humanity.

But a few sites in both North and South America have produced radiocarbon dates older (sometimes far older) than the accepted Clovis range. Many purported pre-Clovis sites can be explained away by careful examination, but others aren't so easily dismissed. By the 1970s, some researchers had begun to suggest that the Clovis people had encountered, and displaced,

other populations when they arrived 11,500 radiocarbon years ago. For decades, few researchers took these arguments seriously. Then, in 1997 came an astonishing announcement: a blue-ribbon panel of archaeologists had concluded that a swampy pre-Clovis candidate called Monte Verde was a true pre-Clovis site, with radiocarbon dates averaging 12,500 RCYBP—a thousand years earlier than Clovis. While it would have been amazing enough if Monte Verde had been located in North America, the site lay much farther south—in Chile.

Monte Verde is hardly the only Latin American site for which great antiquity has been claimed. Pedra Furada headlines a series of Brazilian cave sites where the remains of Pleistocene fauna have been recorded in close association with human remains and suspected stone tools. Similarly, archaeologists have been asserting pre-Clovis ages for some of the sites in the Central Valley of Mexico for more than half a century. Valsequillo, near the city of Puebla, is one of the best-known Mexican pre-Clovis sites, and recent work by Joaquín Arroyo-Cabral and his INAH colleagues has strengthened its claim (MT 19-3, "Megafauna of Mexico"). In 2003, Silvia González of Liverpool's John Moores University concluded that an assemblage of skulls found in the vicinity of



Mexico City a century ago are the oldest in the Americas, dating from about 12,000 RCYBP.

Naturally, the veracity of all these findings has been challenged. Even the authenticity of Monte Verde has been questioned, most definitively by Clovis-First proponent Stuart Fiedel. However, none of these sites can be easily explained away, and with the Yucatán finds, Latin American scientists suddenly have more ammunition to wield in their struggle for the recognition of Latin American antiquity. If the date of the Yucatán skeleton is correct, then southern Mexico may well have been one of the first places humans came ashore in the Americas.

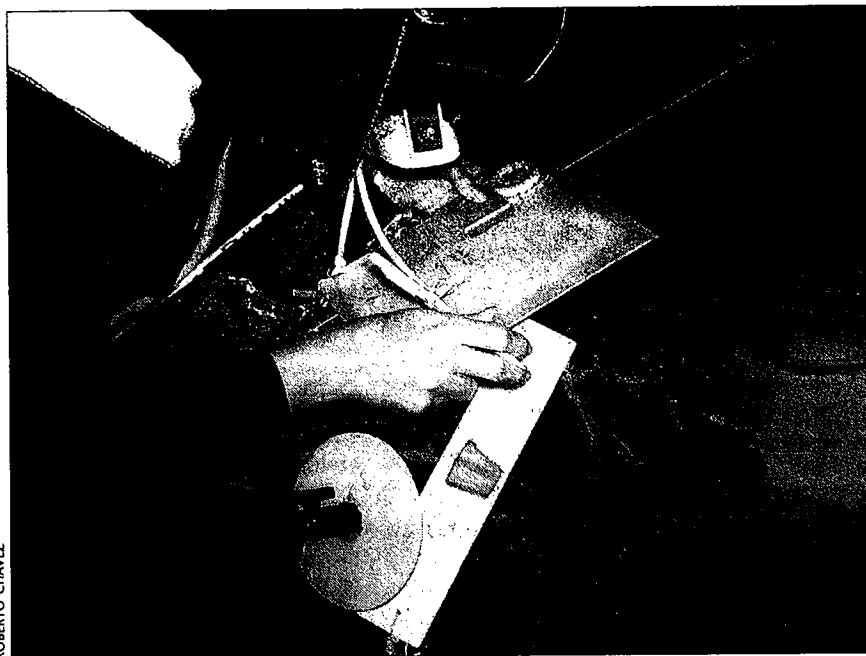
A typical Yucatán *cenote*, or sinkhole.

The natural wells of the Yucatán

During the last Ice Age, much of Earth's water was locked up in the polar ice caps and habitable lands extended much farther out onto the continental shelf than they do today. As the glacial ice melted 8,000–9,000 years ago, global sea levels rose as high as 400 feet. For that reason, nearly all sites occupied by peoples living in Ice Age littoral zones are now inundated. To learn anything about coastal populations of that period, it's often necessary to strap on diving gear and venture out into the depths.

In 2001, archaeologist/paleontologist Arturo González and archaeologist Carmen Rojas Sandoval, both currently students in doctoral programs, led an expedition to the Quintana Roo side of the Yucatán Peninsula, not far from the island of Cozumel and the Mayan city of Tulum. The coast between Playa del Carmen and Tulum is known for the *cenotes*, or natural wells, that pockmark its limestone karst topography. Along with Rojas, González—who has a special interest in the peoples and fauna of the terminal Pleistocene—came looking for ancient skeletons hidden in the extensive underwater cave systems that branch off the *cenotes*.

González and Rojas have served since 1999 as co-directors of a project known as "Atlas Arqueológico Subacuático para el Registro, Estudio y Protección de los Cenotes en la



Underwater archaeologist Sandoval works in one of the submerged Yucatán caves.

Proboscidian remains being recovered from one of the submerged Yucatán caves.

Península de Yucatán" (Underwater Archaeological Atlas for the Registry, Study, and Protection of the Natural Wells of the Yucatán). The project was undertaken as a joint effort between the Subdirección de Arqueología Subacuática (Underwater Archaeology Subdivision) of INAH (the National Institute of Anthropology and History of Mexico), Rojas's institution, and the Desert Museum of Saltillo, Coahuila, where González serves as director. González, an avid diver since his youth, had long heard other divers' tales of the skeletons they found in the *cenote* caves. Eventually, he convinced dubious Mexican officials of the immense archaeological value of these caves and talked them into financing a systematic study of their contents and extent.

Since most of the cave systems in the Yucatán lie more than 50 feet below current sea level, they've been submerged since the sea level rose at the end of the last Ice Age. That they were dry at one time is obvious, given the extensive stalactite and stalagmite development in the caves, which could not have occurred once they were flooded. These conditions make the *cenote* caves ideal natural laboratories for studying conditions during the terminal Pleistocene. "These sites were sealed at end of the Pleistocene," González points out, "and will allow us, by means of systematic and serious study, to answer many of our questions about the prehistory of America."

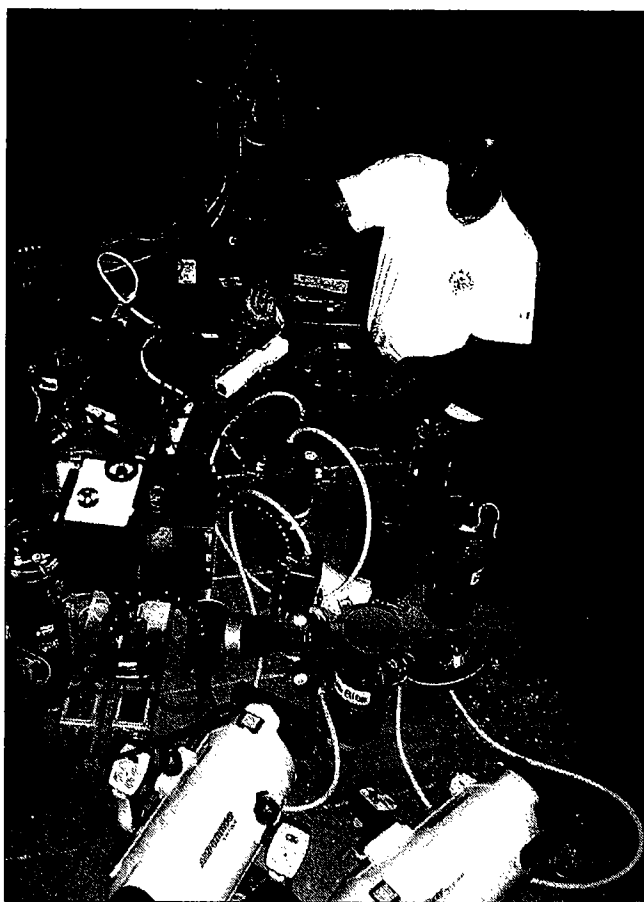
The registry of the Yucatán *cenotes* was one of the first systematic archaeological explorations of submerged caves in history. The project design and the scientific methods necessary to work in these exotic cave contexts were developed by a team of underwater archeologists at INAH, in collaboration with explorers and cave divers familiar with the caves. "The collaboration of local cave explorers, diving instructors, and diving associations proved very helpful in the development of these investigations, as well as the protection of the sites," says González. In the Tulum region, professional diver Jim Coke informed González of the loca-

Cave diver trainer Jeronimo Aviles prepares cameras and lights for a dive.



EL MUSEO DEL DESIERTO

tions of several cave sites where human remains could be found. Coke, who had drafted the first maps of the local underwater cave systems, collected a bone sample from one of the finds, which later came to be called "Las Palmas." According to a radiocarbon assay conducted by the University of Georgia, it dates to about 8,000 RCYBP — making it one of the oldest human finds in the Americas.



A Test of Perseverance

Over the course of the 2001 and 2002 field seasons, González, Rojas, and their interdisciplinary diving team were rewarded with three ancient skeletons from sites they named Naharon, El Templo, and Las Palmas. Concerned about protecting the finds from vandals and plunderers, González and Rojas will not disclose the location of the sites except to say that the entrances to the cave systems are within 15 miles of the city of Tulum. None of the sites was easy to reach: Naharon, for example, came from a spot more than 1,200 ft deep into a cave and 75 ft below the surface. This site produced the skeleton of a female 25–30 years old. El Templo yielded the remains of an adult male about the same age as Naharon, while the Las Palmas skeleton was that of a female 40–50 years old. The explorers also found evidence of large fires, as well as the remains of camels,

ALDO CASTRO

horses, and elephant-like proboscideans. One site yielded lithic material interpreted as stone tools. Although each human skeleton was about 90 percent complete, the bones were in very fragile condition when found, requiring precise recording and very careful excavation. Back in the lab, the fragility of the bones made it "a great challenge" to stabilize and preserve them. The process took more than two years.

The excavation procedure itself was a grand feat of perseverance, which wouldn't have been possible without recent advancements in scuba technology and a lot of old-fashioned hard work. Just getting to the sites and working within the contexts they encountered was incredibly difficult. In the case of Naharon, the excavators had to make their way through a twisting corridor for 40 minutes before reaching

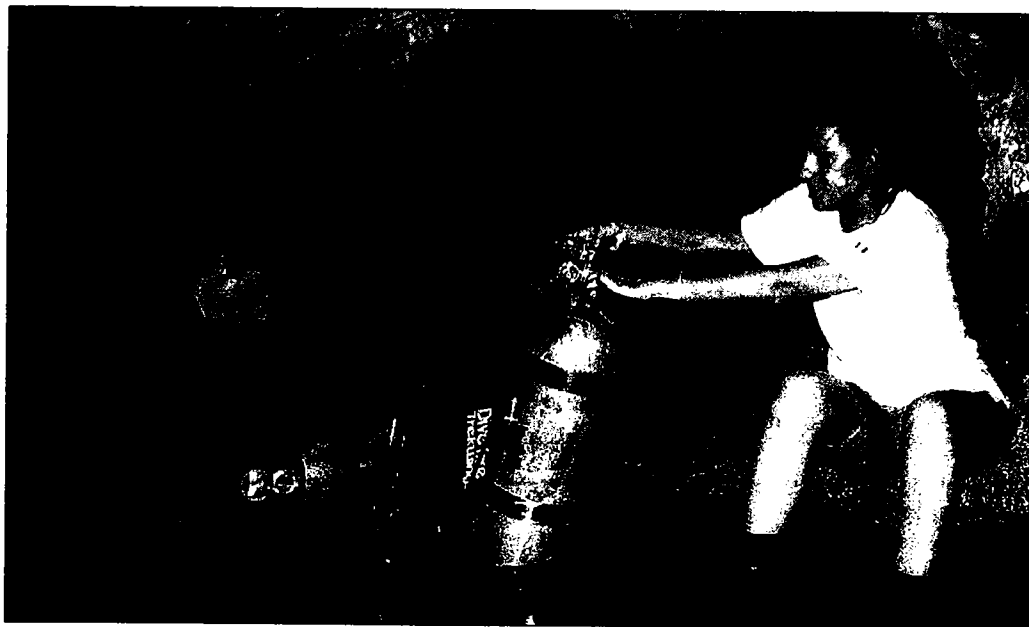
Lab of the University of California, Riverside (who also dated Kennewick Man) derived a date of $11,760 \pm 60$ RCYBP from a bone sample, or about 13,000 CALYBP. When González and Rojas revealed their preliminary data at the Mexico City symposium in September 2004, they were careful to call attention to the fact that their bone date should be viewed as tentative. "The organic fraction of collagen was very low," González points out, "so it is necessary to treat this result with caution." That said, a completely different dating method, one that measures uranium-thorium proportions, produced a similar date.

Within hours, the Yucatán findings were making headlines in scientific bulletins across the world, both in print and on the Internet. Conference attendees were quietly excited, and what

controversy there was remained muted. Stuart Fiedel noted that if the date were confirmed, it would be the oldest radiocarbon date ever obtained for a human bone from the Americas. However, he also emphasized that it still fits within the Clovis range, if only barely. González and his colleagues are cautiously optimistic about their discoveries, which soon will be published in more detail in the journal *Nature*.

When asked if the Yucatán

Archaeologists González and Sandoval at the entrance of a submerged cave in the Yucatán.




PATRICIA CARILLO

the site; this left them only 20 minutes for excavation, followed by a 40-minute exit and 20–60 minutes of decompression before they could return. This doesn't even take into account the logistical difficulty in maintaining all the necessary matériel.

The contexts in which they were found indicate that Naharon, El Templo, and Las Palmas are very old indeed. The locations and conditions of these finds make it clear that the skeletons didn't just come from bodies dumped into the *cenotes*; they must have been deliberately put where they were found. "Their positions, and the distances from the entrances of the caves to the sites where they were found, could only be possible if the skeletons were deposited there by other humans when the caves were dry," declares González. "The evidence suggests that people walked these caves when the sea level and water-table were at least 60 meters (200 feet) below their present levels." This could have occurred only during the last Ice Age. The association of the human remains with late-Pleistocene faunal material, mostly from animals now extinct, only strengthens his argument.

Charcoal found with one of the skeletons was dated to earlier than 10,000 RCYBP. The really exciting date, however, came from the skeleton itself. R. E. Taylor of the Radiocarbon

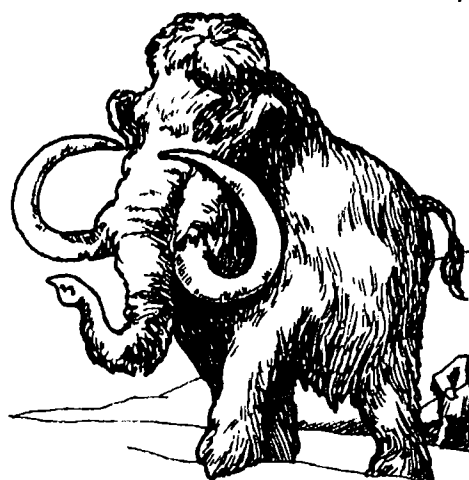
skeletons are pre-Clovis, González responds carefully: "It is difficult to be able to say whether these women and men are pre-Clovis, or were members of a Clovis group. The results of the dates agree with Clovis times." Where the Yucatán people might have come from is difficult to say, González admits. If the bone date is correct, they were living in southern Mexico at a time when the Clovis people were just starting to disperse across North America. It's hard not to wonder if they weren't already there, the descendants of earlier arrivals. 

—Floyd B. Largent, Jr.

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CLOVIS

in the Southeast

Technology • Time • Space

October 26–29, 2005
Columbia Metropolitan Convention Center • Columbia, South Carolina

PROJECTILE POINT distribution studies over the last decade have borne out what many archaeologists have observed—more fluted points are found in the East than in the West. Furthermore, the Southeast has far more fluted points than the rest of the country. Ironically, although the Southeast may have the greatest number of fluted points including Clovis, there has never been a conference convened specifically to investigate Clovis culture there and the implications for its origins—until now.

The Clovis in the Southeast conference will scientifically explore the Clovis Culture and its origins within the southeastern United States, addressing such issues as Clovis origins, dating, geoarchaeological issues, and Clovis technology and site variation across the regions. We encourage the public to attend and learn from the presentations. Since most of the stone tools made by Clovis and other Paleoindian cultures have been found by and are in the possession of private collectors, the public will also play a major role by displaying Paleoindian artifact collections of scientific importance. This conference will showcase these important artifacts to scientists and give them the opportunity to educate collectors and other interested members of the public.

The Columbia Metropolitan Convention Center, which can accommodate up to 1,000 people, will host programs, exhibits, and traditional scientific presentations for three days and nights. The conference will conclude with a bus trip to South Carolina's Big Pine Tree and Topper sites. Both sites have Clovis occupations, and Topper also boasts a substantial pre-Clovis occupation.

Organized by

The Southeastern Paleoamerican Survey
 College of Arts & Sciences, University of South Carolina
S.C. Institute of Archaeology and Anthropology
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The Paleoindian/Paleoecology Program, National
 Museum of Natural History, Smithsonian Institution

Department of Anthropology, University of Tennessee

SPEAKERS include David Anderson, Michael B. Collins, I. Randolph Daniel, Jr., Jim Dunbar, Elijah C. Ellerbusch, H. Blaine Ensor, Steven L. Forman, John E. Foss, Christopher Gillam, Albert Goodyear, C. Andrew Hemmings, David S. Leigh, Darrin L. Lowery, Joseph M. McAvoy, A. D. Pickering, Thomas W. Stafford, Jr., Dennis Stanford, Ken Steffy, Kara Bridgman Sweeney, Michael R. Waters, David S. Webb, and Stephen J. Yerka.

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Conference Web site with details on conference agenda ■ symposium focus ■ speakers ■ displays and exhibitions ■ hotel information ■ on-line registering

www.clovisinthesoutheast.net/



text only

JOURNEY TO A NEW LAND / EN ROUTE VERS UN NOUVEAU TERRITOIRE

V/M/C

VIRTUAL MUSEUM CANADA

PRIMARY LEVEL ELEMENTARY LEVEL MIDDLE SCHOOL LEVEL SECONDARY LEVEL POST SECONDARY LEVEL FRANÇAIS

CYBERSPACE AND THE PEOPLING OF THE NEW WORLD

People first arrived in the Americas at least 12,000 years ago. The timing of their arrival and the route by which they traveled are not known. Some believe they came from Siberia to the Pacific Coast by boat down the coast. Others believe they came from the north, crossing the land bridge between Asia and North America. Still others believe they came from the south, crossing the Isthmus of Panama. The site explores these and other theories and presents a variety of ideas that have been proposed to resolve them.

Some dates in this website are expressed in radiocarbon years (years BP), which are not the same as calendar years. Click on [Radiocarbon Dating](#) to learn how radiocarbon dating works, and the difference between radiocarbon years and calendar years.

SIMON FRASER UNIVERSITY



Log on to www.sfu.museum/journey and you're greeted with this feature-rich home page of "A Journey to a New Land"

AS LONG AS THERE HAVE BEEN MUSEUMS, their staffs have been faced with a challenge: How do you make your subject palatable to the audience, without the presentation coming across as either deadly dull or irrelevant? This was the task faced in late 2003 by Barbara Winter and her team of Web site developers at Simon Fraser University of British Columbia. The SFU team had decided to tackle a particularly difficult archaeological issue, to educate their audience with an accurate, up-to-date, and—above all—attention-grabbing portrayal of the peopling of the Americas. Most demanding of all, the site had to appeal not just to one segment of the populace, but to the widest audience possible. Dr. Winter, archaeology professor and director of the SFU Museum of Archaeology and Ethnology, found the prospect a welcome challenge. "I like to explore new ways of getting complex ideas across to students," she explains.

The topic the SFU team chose to explore in creating their Web site, "A Journey to a New Land," is surely one of the most complex in modern archaeology. The origins of the First Americans is a subject steeped in controversy, even after more than a century of continuous research, and it remains one of the field's most enduring mysteries. What we're sure of is this: Sometime before 12,000 years ago, small bands of nomads made their way

from southeast Asia into North America. They appear to have represented the vanguard of at least three distinct human migrations over the next 8,000 to 9,000 years. By the time Europeans encountered them in the late 15th century, their descendants had spread to every corner of both North and South America and had populated most of the nearby islands as well.

There's still no agreement about when or how the First Americans crossed from the Old World to the New. While we have some robust theories, they remain only theories, and some of them contradict each other on significant points. Some researchers don't even agree that the First Americans were Asians—vocal minorities suggest origins ranging from the European Solutrean culture to an influx of Australoids or Africans by way of South America. Others argue for a more piecemeal origin, with small groups entering the Americas from various parts of the world.

Using 21st-century technology to explain prehistory

The SFU team addressed the question of Native American origins using one of our society's most advanced tools, the Internet. The museums and universities of Canada recently banded together to create the Virtual Museum of Canada (www.virtualmuseum.ca), a rich compendium of on-line exhibits covering diverse topics in science, nature, history, society, arts, leisure, transportation, and industry; the new First Ameri-

cans site seemed a natural for the concept. A generous financial investment from the Department of Canadian Heritage brought it to fruition.

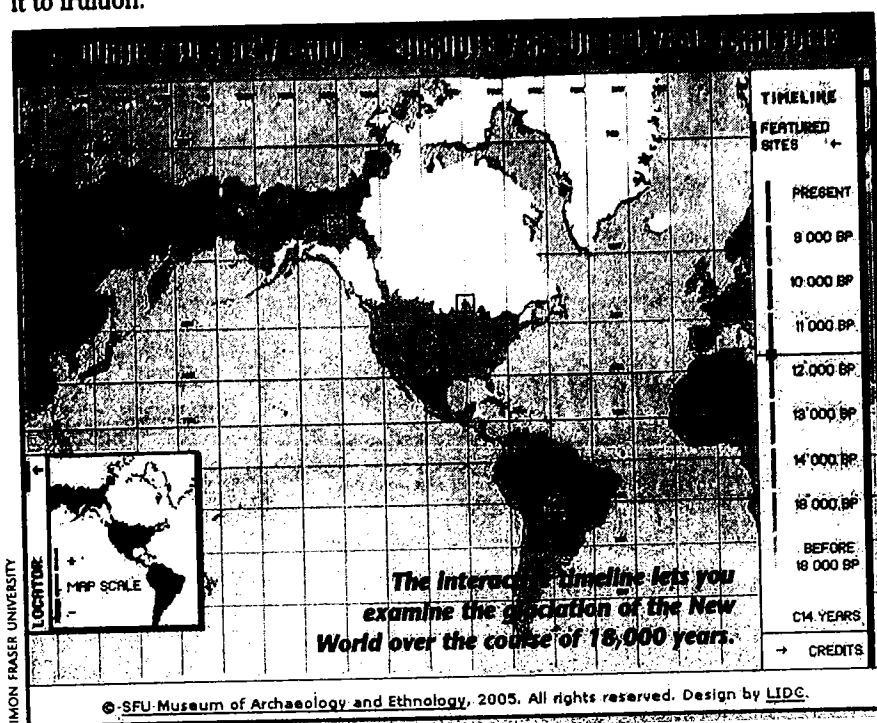
offer greetings in their native tongues on high-quality Quick-Time video clips. "The welcome speeches on the home page reflect an aboriginal tradition of welcoming visitors onto home territory," says Winter. "The three individuals featured in the welcome speeches were great supporters of the project." Dr. Eldon Yellowhorn, whose Blackfoot name is Oathkoatskinaa, offers a welcome from the Blackfoot Nation; Dr. Ethel Gardner (Stelómethet), speaking in Halq'emeylem, welcomes viewers to the territory of the Stó:lō Nation; and Elroy White, a graduate student in the Department of Archaeology who carries the name Xanius, speaks in the language of the Heiltsuk Nation.

Site explorers are also presented with a variety of options for study, ranging from the most basic levels to the highest: primary (pre-school), elementary, middle school, secondary, and post-secondary. Each section is written in a style and with a vocabulary appropriate for its audience. Other links take the visitor to a wealth of video files, photos, interactive games, illustrations, and even teacher's resources. There's also an interactive timeline, which provides graphic information on glaciation, specific archaeological sites, and events

on the affected continents between 18,000 CALYBP and the present. You can zoom in on specific regions. Watch Beringia grow and shrink as you play with the sliding time-scale. Or experience simulations that illustrate the advance and retreat of the glacial ice in Canada's Fraser Valley and throughout the New World. It's fascinating to watch mile-thick ice sheets advance and retreat in CGI time-lapse.

Learning made fun

Then there are the games, which are fun and also manage to sneak in a little education on the side. They range from simple

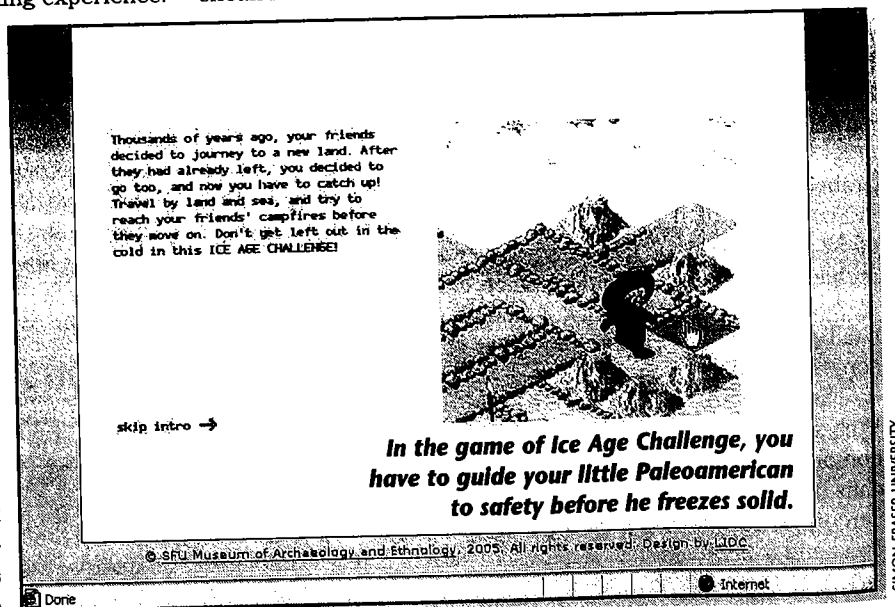


"A Journey to a New Land"—log on at www.sfu.museum/journey/—went live in January 2005, after more than a year of development. It's an extensive, lavishly illustrated multimedia exploration of the primary theories regarding the peopling of the Americas, designed for audiences from preschool to grad school. The site is currently available in both official languages of Canada, French and English, and the team has even bigger plans for the future. "We are hoping to develop other languages," Winter says. "The Japanese translation is furthest along." There's even a plain vanilla text-only version for those who prefer (or are stuck with) an imageless surfing experience.

A Web site unlike any other

The World Wide Web is littered with educational sites, but no other explores Paleoamerican origins in such a way or in comparable depth. Because of the unique nature of "A Journey to a New Land," the development team used no specific models while constructing it; although it's based solidly on archaeological theory and fact, it's wholly a product of the team members' fecund imaginations. According to Winter, "The site arose out of intense discussions and a desire to do something different."

They succeeded in spades. Visitors to the home page are greeted by a portrait of a determined-looking Native American couple set against a backdrop of glacial mountains. Further welcome comes from three First Nations members, all faculty or students of SFU, who





The short-faced bear (*Arctodus simus*) inhabited open grasslands and tundra in western North America during the last Ice Age. A powerful predator, it measured over three meters tall when standing upright, and may have hunted prey as large as bison and horses.

A short-faced bear surveys his territory.

[More illustrations/reconstructions](#) ▼

→ [credits page](#)

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sticker and memory games for the youngsters to more challenging fare, like a jigsaw puzzle and the most original and complex of the lot, Ice Age Challenge. This game requires you to guide a tiny parka-clad fellow from one fire to another, accompanied by jaunty theme music. Depending on the level, he might ride in a hide boat, walk across tundra, or explore a cave. When you finish a level, the little guy jumps for joy; but fail to get him there before his body temperature drops too low, and he freezes into a solid block of ice. Some of the levels are marvelously complex, and throw in hazards like wild animals and holes in the ice. If you make it through, you're rewarded with a unique prize. "I'm not much of a gamer myself — the Ice Age Challenge always turns me into an ice cube before I get very far," Winter admits with a laugh. "I think the graphic artists and programmers who created the games did a brilliant job." Their brilliance is further demonstrated by the illustrations salted throughout the site, which abounds with portraits of Native American men, women, and children, views of the various environments, and illustrations of the creatures the First Americans might have encountered.

Equal billing for competing theories

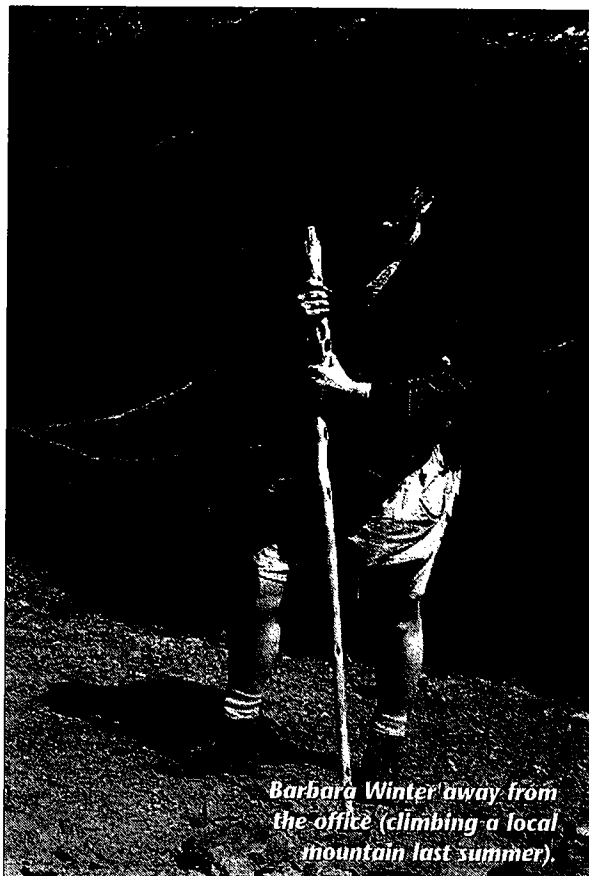
The framework supporting all these features is a detailed discussion of the two leading theories of Paleoamerican origins, the famous Beringian theory and the Coastal

Route theory. The Beringian theory proposes that humans simply hiked across dry land connecting North America and Asia during the last Ice Age, when sea levels were unusually low because of all the water locked up in glaciers. The Coastal Route theory hypothesizes that the First Americans were maritime explorers who followed the Northwest Coast of North America until they found an ice-free path into the new continent. "A Journey to a New Land" presents evidence for and against both theories, providing a well-balanced, unbiased examination of the peopling of the Americas. (For the record, Winter is a supporter of the Coastal Route theory).

Of course, there are other theories, some plausible and some little more than fanciful daydreams, but the development team didn't want to confuse the issue any further than necessary. "We wanted to really get into the topic with stunning graphics, simulations, and animations," Winter points out. "Having too large a topic would have diluted the message." The biggest challenge, Winter says, was appealing effectively to the wide audience they wanted to reach. "Getting the idea of 'did they come by sea or by land?' across to a preliterate or literate video gaming audience in the preschool and elementary sections was a challenge," she admits.

The site supports its theoretical framework with solid research conducted, and explained, by SFU archaeologists, geologists, and other scientists. "Their expertise really makes the site," says Winter. Indeed, the video clips in which the scientists explain their research and its background are an especially popular feature. The geology and geography related to the peopling of the New World is particularly relevant to the site's information-dense secondary and post-secondary curricula.

The other sections, however, don't suffer from lack of attention. In fact, the most distinctive feature of the site remains its multilevel edu-



Barbara Winter away from the office (climbing a local mountain last summer).

BARBARA WINTER

cational approach—it's a rare site that appeals to all levels of study. This approach "arose from a recognition of the varied audiences of museum Web sites," explains Winter. "The multilevel structure of the site came out of discussions I had with David Kaufman, the Director of the Learning and Instructional Media Center (LIDC) and my co-applicant on the project. We did the instructional design of the site incorporating spiral curriculum theory. I think it works well."

The general public agrees with her. In its first few months of life the site received more than a million hits from visitors all over the world. The site has also garnered a good deal of media attention and was featured at a recent "Museum and the Web" conference. All this popularity delights Winter, who's quick to credit her creative team with the site's success. "I think the key to the success of the project was the advisory panel," she notes. "Their input was invaluable."

Prominent among the advisory panel members were educators from all levels, as well as representatives from the Stó:lō Nation and community museums. The scientists profiled in the site's video clips also supported the effort. The site's actual content, including the games, was developed by undergraduate seniors. Janice Graf, who acted as researcher, writer, and project coordinator, headed the development team. "Jan did an amazing job of keeping us all on track and organized," says Winter. "The students were creative and worked very hard." The graphics and games were created by the "amazingly creative and skilled" folks at the Media Production Group of David Kaufman's LIDC. The site has won awards in interactive design competitions and was feted at the recent Canadian Archaeological Association conference, winning an award for educational programming.

What's next?

Despite their success with "A Journey to a New Land," Winter and her team aren't resting on their laurels. In fact, they haven't yet finished all they have planned for the Web site. In addition to the continuing translation efforts, the Web site text and illustrations have been compiled into a book that will soon be published by SFU's Archaeology Press, and

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CURRENT RESEARCH IN THE PLEISTOCENE

Volume 21

2004



A Peopling of the Americas Publication

they've boiled the story down into an undergraduate-level PowerPoint format. The PowerPoint presentation features the animations, illustrations, and video clips that have made the site such a hit with the public. Winter encourages interested parties to contact her about either the book or the presentation.

What's next for the SFU development team? Winter is currently pursuing funding for a new project, which she describes as focusing on "the other side of the 'peopling the New World' story." While it's important to tell the story of the archaeology, she believes, it's also important to "provide a forum for First Nations to give their take on it as well." The next site, if funded, will focus on the Stó:lō and the Squamish Nations. Elaborating on her plans, Winter says, "We will feature Xay:tem, an ancient Stó:lō site in the Fraser Valley. Dr. Linnea Battell, Director of the Xay:tem Interpretive Center, has wonderful ideas that have developed out of her years of experience in presenting interpretive programs for school children. Her Web site can be seen at www.xaytem.ca"

Winter unselfishly gives credit to col-

leagues who contributed to the success of the SFU Web site. "Deborah Jacobs and the staff of the Squamish Education Council are our other partners for this next site," she says. "They have created wonderful educational resources and cultural learning curricula in the Squamish language. Rudy Reimer, a graduate of the SFU Archaeology program and of Squamish heritage, is a key player. Other First Nations partners include Rick Oullett and the Jasper Park Metis.

"Squamish is next door to the Whistler ski area and has spectacular terrain," boasts Dr. Winter. "The visuals we will develop on this site will be amazing. I guarantee it!"

—Floyd B. Largent, Jr.

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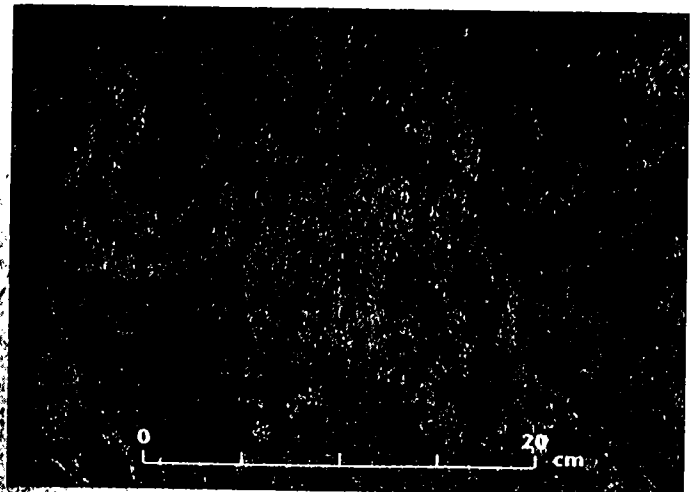
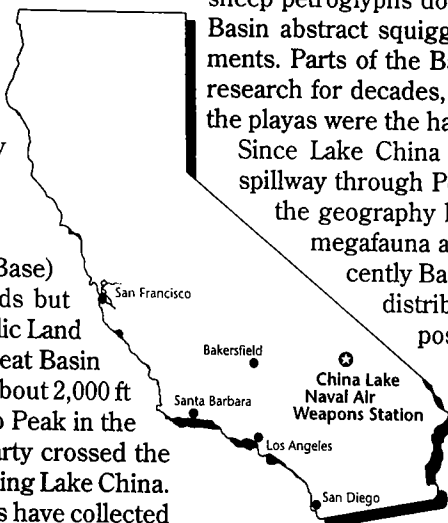
Proboscidian & Petroglyphs!

by Russell L. Kaldenberg

THE VALUE of volunteers never ceases to amaze me. During the last weekend of February 2005 Carol Ormsbee, Jerry Grimsley, and Steve Swartz, using hand-held GPS units, spent their daylight hours in the mountains bordering the China Lake Naval Air Weapons Station, accurately charting several previously undocumented sites and photographing petroglyphs. When they downloaded their digital photographs they found they had an image that resembled a proboscidian (mammoth) and a rake-shaped form that on close examination resembled a hairy equine.

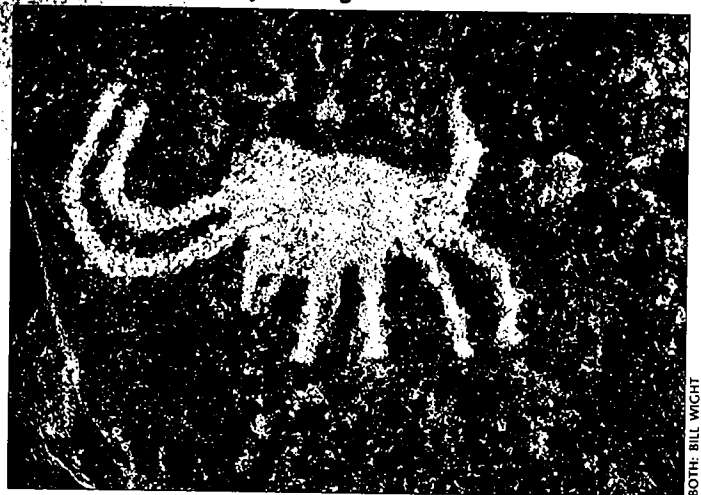
The geography

China Lake Naval Air Weapons Station (the Base) was created in 1944 from some patented lands but primarily from public lands as a result of a Public Land Withdrawal. It contains 1.1 million acres of Great Basin and Mojave Desert, ranging in elevation from about 2,000 ft above sea level to nearly 9,000 ft at Maturango Peak in the Argus Mountain Range. In 1849 the Manly party crossed the north range after they left Death Valley, traversing Lake China. For decades archaeologists and paleontologists have collected fossil remains of megafauna among the many playas. Others have focused on the millions of petroglyphs that are scattered



▲ Unretouched photo of mammoth-like image.

▼ Photo enhanced by Bill Wight.



BOTH: BILL WIGHT

throughout the basalt cliffs. The famous Coso-style bighorn sheep petroglyphs dominate the landscape, along with Great Basin abstract squiggles and rectilinear and curvilinear elements. Parts of the Base have been the focus of Paleoindian research for decades, and Webb in 1992 found evidence that the playas were the habitat of *Mammuthus columbi*.

Since Lake China and Lake Searles and the connecting spillway through Poison Canyon are situated on the Base, the geography lures scientists who hope to find paleo-megafauna associated with archaeological sites. Recently Basgall conducted an intricate study of the distribution of Paleolithic fossil remains and possible associated cultural items; deflation of the soils, however, makes it difficult to confirm the relationship much beyond a definite maybe. In a recent conversation with Basgall, I discussed the potential of finding rock art someplace where it would be least expected, but close to areas on Lake China that have yielded cultural implements and fossils. Rock art researcher Alice

The "mammoth" and "equine" petroglyphs, with possible man-made modifications of the basalt table rock.

Trabates theorizes that rock art depicting Pleistocene megafauna should be present in places like China Lake but may be repatinated to such an extent that it is difficult to recognize.

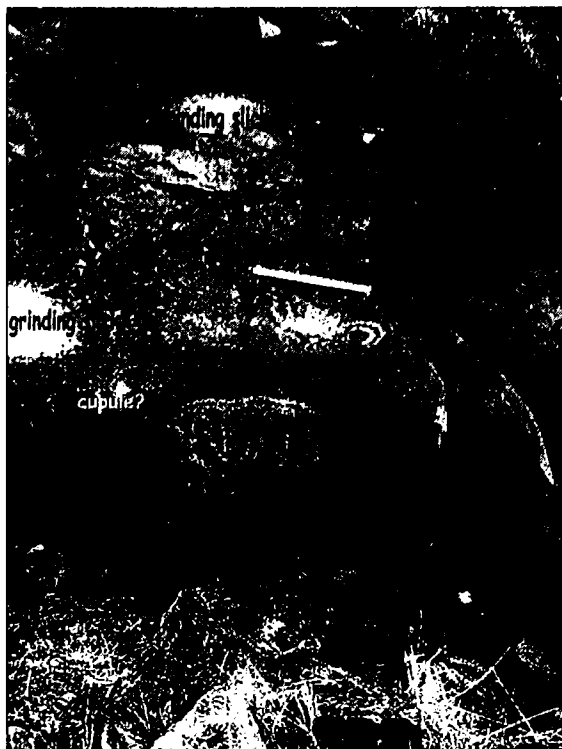
The site

During the weekend of March 5 volunteers and a small crew of additional archaeologists spent about two hours attempting to relocate the site using GPSS and photographs of the elements. After visiting several locations they located the site containing the possible depiction of megafauna. It lies at approximately 5,000 ft elevation on the western flank of the Argus Range approximately 20 km from Lake China. The vegetation is Joshua tree woodland. Sites in the area tend to be on basalt uplifts dissected by east-west drainages flowing into Lake China and, at the divide, into Panamint Valley.

The site contains numerous petroglyphs amid structures formed of large table-like basalt boulders surrounded by stacks of rocks that may have served as hunting blinds or shelter for shade or solitude; the rocks range from basketball size to massive ones that had to be lifted by several quite strong individuals. This is one of several dozen loci within the Echerron Valley immediately west of the Argus Mountain Range. It may be associated with the Carricut Lake petroglyphs discussed by Grant, Pringle, and Baird in 1967, although these particular loci aren't mentioned and weren't mapped by them.

The lightly patinated mammoth-like figure is on the top of the basalt table rock. The body, which faces north, measures approximately 33 cm from the tip of the curved tusks to the tip of the upturned tail; from the bottom of the feet to the top of the head is approximately 23 cm. It has upturned tusks, what appears to be a hairy bib between its front legs, a large crested head, and the hump characteristic of mammoth.

Unaltered photo of petroglyphs resembling equine and elephant.



Except for the fact that hair isn't depicted, the image resembles the mammoth that appears in Wright and Martin, Figure 3, number 2 (see "Suggested Readings").

The equine-like figure, which lies on the edge of the table rock approximately 110 cm from the mammoth-like figure, is well patinated. Length is approximately 53 cm, height is 24 cm. The animal faces west. It appears to be browsing, with its long tail hanging loose.

The other associated petroglyphs are curvilinear abstracts with various degrees of patination.

Opinions vary widely

Photographs of the petroglyphs were sent to 62 individuals interested in rock art. Opinions of 48 ranged from a definite maybe to exuberance at finally seeing what they had labored to find over their entire careers. Six individuals failed to respond. Eight respondents either were quick to dismiss the images or saw in them something else—a charging bighorn sheep, a bighorn sheep with horns protruding from its rump, a Santa's sleigh, an amorphous blob, a "Not You!!!" or a Great Basin rake-form instead of a horse. Interestingly, only two respondents thought the "equine" was not a horse; both thought it resembled the traditional rake design.

Where do we go from here?

Better documentation is needed. Both trips to the petroglyph location were undertaken merely to chart the distribution of

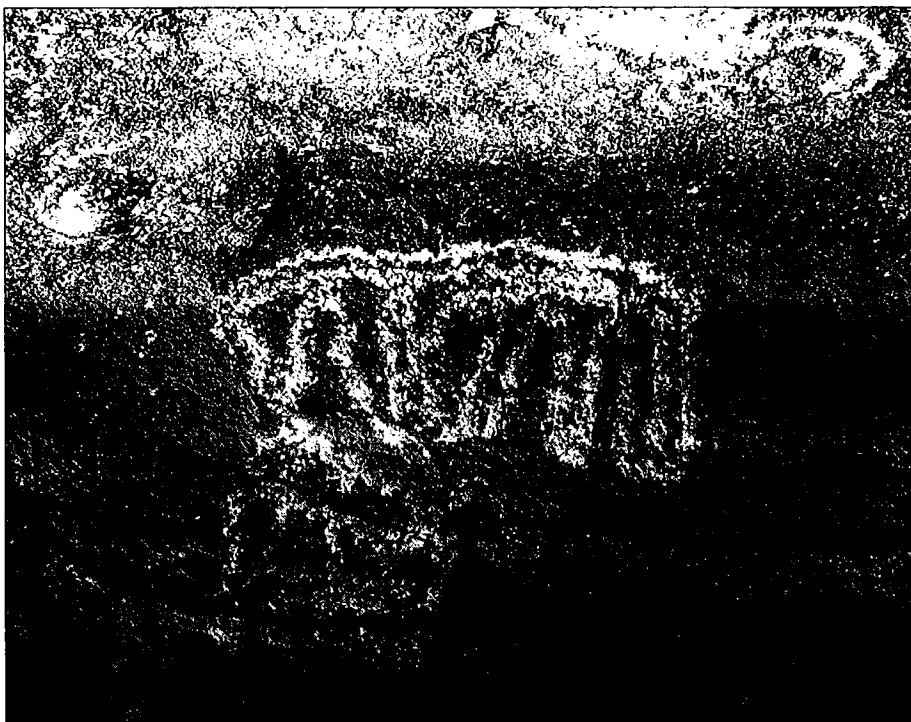


PHOTO BY RUSSELL L. KALDENBERG; FEATURES DISTINGUISHED BY BRECK PARDOAN

RUSSELL KALDENBERG

petroglyphs. The next step is to thoroughly document the loci and to examine the ubiquitous basalt flow to detect any additional possible Pleistocene megafauna. Presenting a paper at a professional conclave is important, and so is creating a poster so that authorities can examine the evidence and render their opinions on this potentially important discovery. 🌐

Suggested Readings

Davis, E. L., ed. 1978 *The Ancient Californians: Rancholabrean*

Hunters of the Mojave Lakes Country. Natural History Museum of Los Angeles County, Science Series 29:1-193. Los Angeles.

Fox, J. W., C. B. Smith, and K. T. Wilkins, eds. 1992 *Proboscidean and Paleoindian Interactions*. Baylor University Press: Waco, Texas.

Grant, C., J. W. Baird, and J. K. Pringle 1968 *Rock Drawings of the Coso Range*. Maturango Museum Publication No. 4. Ridgecrest, CA.

Whitley, D. S., and R. I. Dorn 1987 *Rock Art Chronology in Eastern California*. *World Archeology* 19:150-164.

Wright, H. E. Jr., and P. S. Martin 1967 *Pleistocene Extinctions: The Search for a Cause*. Yale University Press.

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Petroglyphs of bighorn sheep in Upper Renegade Canyon, China Lake, including one with crocodilian facial features. At least one local Native American source believes petroglyphs sometimes told stories. Since comedy was an important feature of storytelling, the image with unusual facial features could be telling a funny story.



About the author Russell L. Kaldenberg received his master's degree from San Diego State University, where in 1974 he excavated the Rancho Park North site, a Paleoindian site dated to 9,000 yr B.P. Kaldenberg spent 1972 working with François Bordes and Jean Phillip-Rigaud in southwest France. From 1976 to 2003 he worked in the Bureau of Land Management in positions ranging from Field Archaeologist to Regional Archaeologist. He then served ten years as California State Archaeologist for the BLM. He was appointed to the State of California Historical Resources Commission by then Governor Wilson and served for four years. He is a former president of the Society for California Archaeology and recipient of the Mark R. Harrington Award as well as numerous awards presented by the Bureau of Land Management and avocational societies. Considered the founding father of the California Site Stewardship Program, he received the Governor's Historic Preservation Award for developing the program.

Since 2003 Kaldenberg has been the archaeologist, Native American specialist, and paleontologist for China Lake Naval Air Weapons Station in the Mojave Desert in California. Sites attributed to the early peopling of North America have been found at Lake China and reported variously in the spillway between Lake China and Lake Searles. Kaldenberg is studying those sites and contracting their thorough investigation.

A more scholarly version of this report will appear in the 2005 edition of *Current Research in the Pleistocene*.

Kaldenberg at Coso Rock Art National Historic Landmark.

A Tribute to Robson Bonnicksen

continued from page 3



The advisory group also included the late Benjamin Waller, a noted scuba diving instructor and river diver. Ben and Don Serbousek, another river diver, had found a number of Paleoindian artifacts in Florida rivers and wanted professional archaeologists to investigate certain river locations. Another of Ben's claims to fame is that he was Lloyd Bridges's stunt double in the 1950s TV series *Sea Hunt*. Don also took part in early underwater TV scenes, where he acted as a safety diver for mermaids. Don always believed he had the better duty. Both these men believed that certain river locations contained important archaeological sites, and they stood in the background and gave us great encouragement.

The results of Aucilla River Prehistory Project investigations at the Page-Ladson (pre- and post-Clovis components), Sloth Hole (pre-Clovis, Clovis, and post-Clovis components), and the Ryan-Harley (Suwannee-point component) are now in press. And yes, the **Center for the Study of the First Americans** via Texas A&M Press is one of our supporters, as are the University of Nebraska Press and Springer Press. Thus a barrage of investigations is due to be available by or around January 2006. These publications represent hard hours of work and love for the subjects of Southeastern Paleoindian archaeology and late-Pleistocene paleontology.

The importance of Rob's visit and support should not be underestimated. Yes, some underwater sites in Florida had gained notoriety prior to the 1980s, namely Warm Mineral and Little Salt Springs, but they were located in quiet water settings in a geographic location far from the major concentrations of Paleoindian finds. The great majority of Paleoindian sites and diagnostic artifact recoveries are in or adjacent to north and central Florida river basins. On land the soil is usually too acidic in the Southeast; therefore there is no bone



(clockwise from top left) Rob gives a flint-knapping demonstration for river divers; displaying his semi-finished biface; in a contemplative mood.

preservation, only stone tools. But in the river basins it's a different story. Bone and sometimes botanical preservation abounds. Heretofore, river sites have suffered from the erroneous assumption that flowing water destroyed everything. Rob was among a handful of our critical supporters. As a result of Rob's visit and his follow-up support for river channel archaeology, we know there is real archaeological potential in these flowing water environments and it promises to be a dominant factor in the future of Paleoindian research for decades to come. While I miss the pleasure of his company, I will never forget the importance of his accomplishments as director of the **Center for the Study of the First Americans**. We have come a long way, baby, yet there is still so much to be learned! Thank you. 🍷

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New Perspectives on the First Americans, Bradley T. Lepper and Robson Bonnicksen, editors. This collection of papers on Clovis and pre-Clovis archaeology surveys the breadth of intellectual ferment in First American studies, a field that is seeking to reconcile itself with changing scientific developments in an evolving social and political context. 2004. 242 6-by-9-inch pages. Paperback (ISBN1-58544-364-6) regular price \$25.00 CSFA member price \$20.00

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Where the South Winds Blow: Ancient Evidence of Paleo South Americans, Laura Miotto, Mónica Salemme, and Nora Flegenheimer, editors. Some of the most important recently investigated early archaeological sites in South America are documented in 21 short papers translated from Spanish. The reports of Paleoamerican complexes and excavations of sites older than 11,000 RCYBP cover issues of geoarchaeology, Pleistocene extinction, and paleoecology, with generous illustrations of site locations, excavations, and artifacts. 2003. 174 6-by-9-inch pages. Paperback (ISBN 1-58544-363-8) regular price \$25.00 CSFA member price \$20.00

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Taphonomy: A Bibliographic Guide to the Literature, Christopher P. Koch, editor, is a valuable guide to investigators in archaeozoology, paleoanthropology, and paleontology. Taphonomy provides more than 1,200 bibliographic entries plus author and keyword indexes. 1989. 67 pages. Paperback (ISBN 0912933-05-4) ~~\$17.00~~ until 12/31/05* \$4.25

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