MAMMOTH TRUMPET

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Center for the Study of the First Americans
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Putting a Paleoamerican Campsite to Bed

PAMELA MCKENNEY

Ever since the Sentinel Gap site was discovered in 1998 on the Columbia Plateau, Jerry Galm and Stan Gough of Eastern Washington University have been recovering artifacts and making sense of the life of the people who occupied this spot 12,000 years ago before moving on.

Having learned everything the site can tell us, a crew prepares the Sentinel Gap site for closing (backfilling) on the last day: Dr. Galm (bent over), Stan Gough (wearing hat and glasses); and two students, "part of a most incredible field crew," according to Galm, Dana Komen (wearing hat) and Ann Sharley.

Read the story of this remarkable site and the violent history of the Columbia Plateau on page 4.

The Center for the Study of the First Americans fosters research and public interest in the Peopling of the Americas. The **Center,** an integral part of **Oregon State University,** promotes interdisciplinary scholarly dialogue among physical, biological and social scientists. The **Mammoth Trumpet,** news magazine of the **Center,** seeks to involve you in the late Pleistocene by reporting on developments in all pertinent sciences.

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

Anthropology center brings opportunities to Texas A&M

Texas A&M will become the new home of the Center for the Study of the First Americans when it moves from Oregon State in July, making A&M the only University in the nation with a center to study the first populations of the continent.

Dr. Robson Bonnichsen, the center's director, said the center's purpose is to understand the initial peopling of the Americas through scientific research. He said A&M is an ideal location as the permanent home of the center because of its campus climate.

"Texas A&M is a well-respected and highly diverse modern campus," he said. "The [center] brings an important research focus to the Texas A&M community."

Dr. Mike Waters, associate director of the center and an anthropology and geography professor, said the CSFA will be associated with the departments of anthropology and geography and will be housed in the anthropology building. He said it will attract students because of its educational opportunities.

"Undergraduates will be able to participate in research projects, field experiments and excavations," Waters said. "Graduate students will get master's thesis and Ph.D. dissertation topics from center projects."

Waters said when the center moves to Texas, it will continue publishing a journal, a magazine and books on the peopling of the Americas. It will also sponsor conferences that will be open to the public.

DANIEL SCOTT, COLLEGE OF LIBERAL ARTS

Academic Building and Harrington Tower (*left*), campus of Texas A&M University.

"We will have a nice mix of professionals and interested public," he said. "They will be able to see specimens and artifacts from specific sites."

Bonnichsen said the strategy of the conferences is to bring together the most eminent specialists in the field to plan future research.

"Such conferences are enormously important," he said. "They help set research agendas and scientific standards for specialists in the field."

–Elizabeth Kline
THE BATTALION, *4 April 2002*
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After several months of discussions, Texas A&M University and Director Robson Bonnichsen of the **Center for the Study of the First Americans** have agreed to relocate the **CSFA** to College Station, Texas. The Center will become a unit in the Department of Anthropology, effective July 1, 2002. The Department has 20 faculty members; offers BA, MA, and Ph.D. degrees in Anthropology; and has a strong interdisciplinary focus in environmental archaeology and is ideally structured to support First Americans Studies. Professor Michael Waters, a specialist in geoarchaeology, will become the new Associate Director of the **CSFA.**

The **Center** will continue with its established publication, research, and outreach programs at Texas A&M as well as initiate new projects and programs. The next issue of the *Mammoth Trumpet* will carry articles on new program developments at Texas A&M. Members please note that the Center's new address will be **CSFA, Department of Anthropology, 234 Anthropology Building, 4352 TAMU, College Station, TX 77843-4352.**

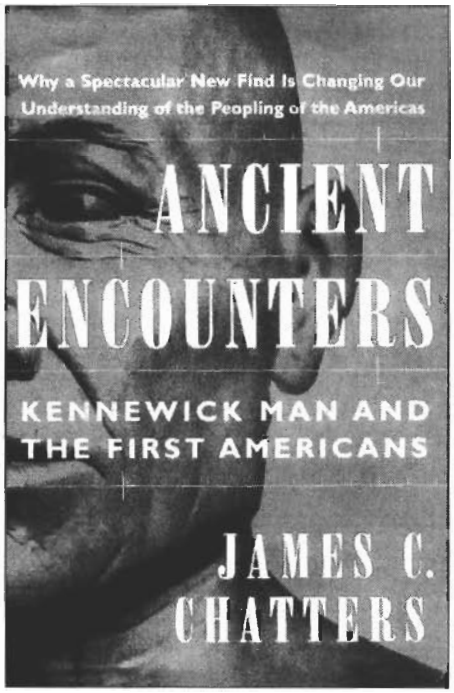
–Robson Bonnichsen

INSIDE

New Books

Ancient Encounters: Kennewick Man and the First Americans, by James C. Chatters. Simon and Schuster, New York, 2001. 303 9¼-by-5¾-inch pages, with index and references in end notes, 7 maps, 1 chart, and 24 grayscale plates. $26.00 (hardcover). Simon and Schuster, Rockefeller Center, 1230 Avenue of the Americas, New York, NY, 10020. ISBN 0-684-85936-X.

There is a lot to say about Kennewick Man, enough to fill three very different books and hours of television documentaries so far. David Thomas wrote *Skull Wars: Kennewick Man, Archaeology and the Battle for Native American Identity* to put the Kennewick case into historical perspective, and investigative journalist Elaine Dewar wrote *Bones: Discovering the First Americans* to explore her personal interest in the politics and mysteries of the past stimulated by the Kennewick publicity. Of the three recent books focused on this ancient human skeleton, only one gives the straight facts regarding the discovery, chain of possession, and scientific analyses performed on him, written by the only person who knows firsthand. Dr. James Chatters presents a tightly edited and cleanly written account of the facts surrounding this controversial find in *Ancient Encounters: Kennewick Man and the First Americans*. As the first scientist to examine the Kennewick skeleton in 1996, Chatters is uniquely qualified to write this basic and valuable overview.



Close to my home

Involved from the beginning with this case because of my experience with the older Spirit Cave Man and Wizards Beach Man, I can say this is a welcome addition to the literature on one of only a few ancient American human fossils. Chatters has deftly combined the detailed scientific issues with a human understanding that any literate person can grasp. He includes his personal opinions and feelings in just enough detail to convey how important these new finds are to the scientists who are trying to save their messages. A competent and well-researched review of the scientific principles behind each study will help other scientists appreciate the new vision of the past revealed by the work of a few specialists. A fact-based scenario of Kennewick Man's life of pain and death provides an intellectual and emotional vision of what the facts tell us about the person. Most of the book reveals scientific and historic issues directly relevant to the Kennewick remains in just the right balance of professional clarity and plain English for the general reader.

Before 1995, a mere seven years ago, the peopling of the new world from southern Asia instead of northern Asia, along the coast using boats or even, just possibly, across the southern Pacific to South America, was a concept not discussed outside a small circle of scientists. Chatters does an excellent job of introducing important new scientific hypotheses related to the earliest Americans, covering almost all the specific lines of data pointing to a new paradigm for the peopling of the New World. When George Gil, preeminent physical anthropologist, told me, "I am not surprised by how old Spirit Cave Man is, I am surprised how young he is!" it all fell into place. The traits in these early skulls, forensically described by the loaded term "Caucasoid," are probably the remnants of the first modern humans to leave Africa, and the Caucasoids retained this set of traits that were modified in most other human populations after the dispersal. Whoever the ancestors of the Australians, Ainu, and Kennewick Man were, they *also* retained the narrower cheek bones, higher forehead, prominent chin, longer skull, and dental traits of these early modern humans. In the Spirit Cave population, the 10,600-year-old Paleo Kid (9,450 RCYBP), a girl nine or ten years old with the same long skull shape as Spirit Cave man, also has a Carabelli's cusp, a Caucasoid trait discussed by Chatters, but he missed this important case in his New World examples.

Another detail missed by Chatters involves the textiles found with the Spirit Cave Man, the Paleo Kid, and the Paleo Homicide remains. He states (page 194): "Beneath the outer twined mat made of tules and hemp cord were two more of the woven hemp blankets." And later (page 269) that Spirit Cave Man was "wrapped in a blanket twined in manner unknown in American after 9,000 years ago." Just to set the record straight, these statements should read: "Beneath the outer twined tule mat were two mats made of split tule and hemp cordage, using a plain weave, *not twined*, and totally unexpected in this ancient time"; and "Wrapped in a plain weave shroud made in a manner that survived after 9,000 years ago in only a few isolated parts of America and in the Ainu of Japan." This is another fascinating part of this story, beyond Chatters's scope.

A new order in peopling of the Americas theories

A few other errors of fact or omission do not detract from the major value of this book, because it is written so directly and honestly. The whole story is what is important. Chatters only hints at the human drama behind this case. Few other potential reviewers would have access to this perspective, so I will focus on what I perceive to be the really important issues documented by Chatters.

Forensic anthropologists are a rare breed. They are the only anthropologists who directly serve humanity in vitally important

ways: bringing justice and closure in the death of loved ones. Medical examiners refer to them to identify individuals from skeletal remains. The forensic scientists in the center of the Kennewick case are equally dedicated; they have a passion rarely seen in science for knowledge and the truth about human prehistory. Only the biological evidence of past human migrations and origins can settle some of the most important questions we ask of our origins. The bones, teeth, and (in rare cases) soft tissues of human bodies are the only hard evidence of past genetic connections around the planet. DNA analysis of ancient remains, although potentially crucial, is not the only access to ancient genetic patterns. The discrete morphological traits and fundamental shape of the skull, particularly the craniofacial region, also appear to document genetic relationships, despite evidence discussed in detail in Thomas's *Skull Wars* that some cranial features change dramatically owing to environmental effects. Chatters demonstrates how these biometric studies support a model for the first American humans very different from that modeled in previous hypotheses.

Several recent television productions address these new scientific discoveries. "The Real Eve" on the Discovery Channel covers new evidence regarding the astonishing shift in our understanding of the human past, fed in large part by data from Kennewick Man, Spirit Cave, and related spin-offs. If it were not for the publicity surrounding Kennewick Man, the world would have lost this rare part of human heritage and the resources devoted to revealing the past resulting from it. Chatters has been criticized, as I was, for speaking to the press before new ideas—which were not ours originally—had been fully reviewed and accepted by the scientific community. As discussed by Chatters, physical anthropologists, D. Gentry Steele, Joseph Powell and Walter Neves in particular, had already published the basic data and issues in peer-reviewed journals; however, no one outside a small circle noticed, or cared what it might mean to reexamine skulls in a new way. Despite what my esteemed friend David Thomas says in his spin on the Kennewick Man issue, *Skull Wars*, this is not racist skull analysis. It is biometrics, a legitimate scientific endeavor. The fact, as Thomas admits, is that specific traits used by today's physical anthropologists do work very well to sort out all modern human geographic groups, whatever term you use to describe them. The method helps law enforcement agencies identify dead bodies.

So when these specialists say the ancient skulls do not match any modern "groups" but cluster near Ainu and Medieval Norse in some combination of traits, they are actually demonstrating that early

continued on page 16

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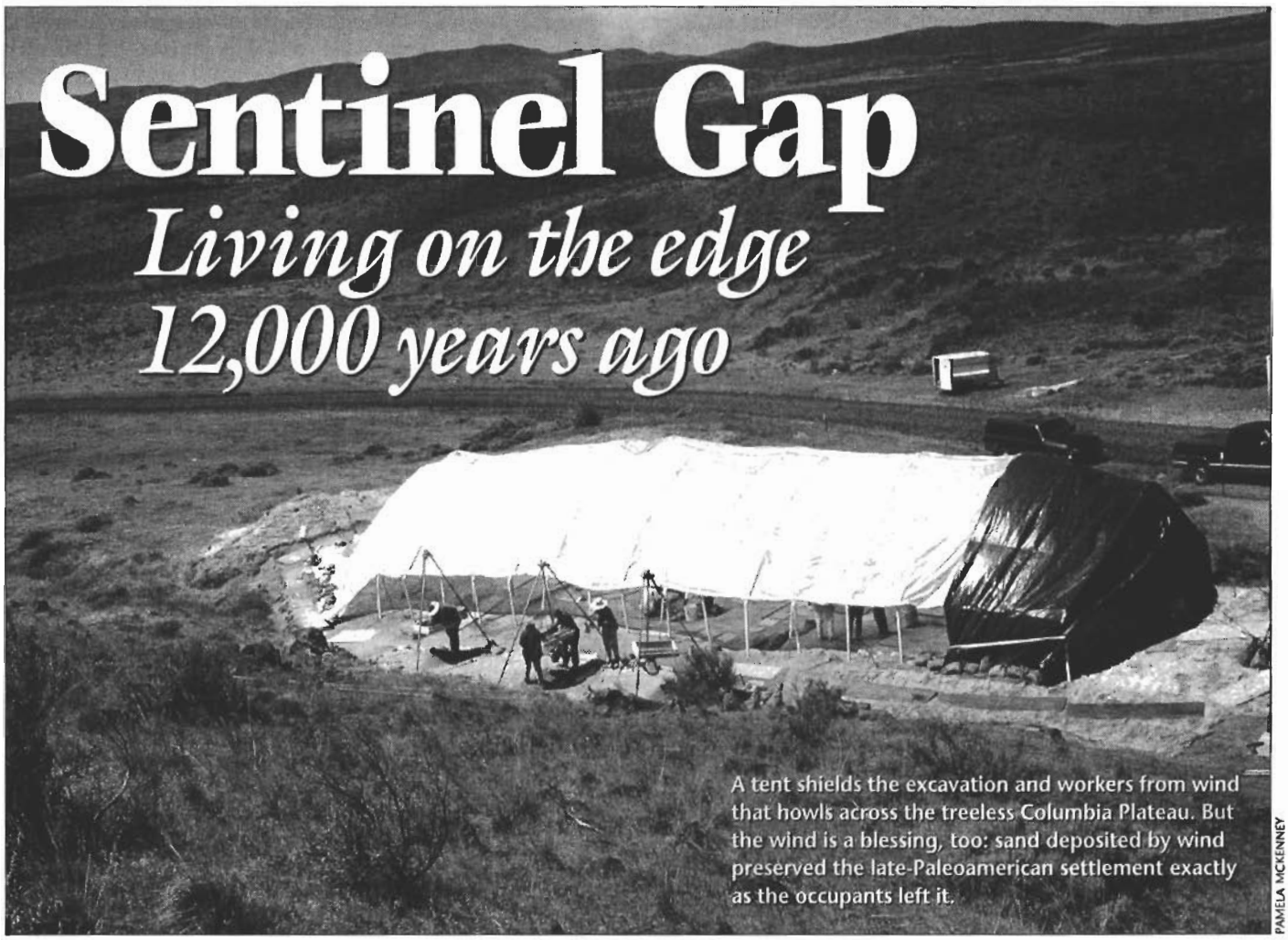
Sentinel Gap

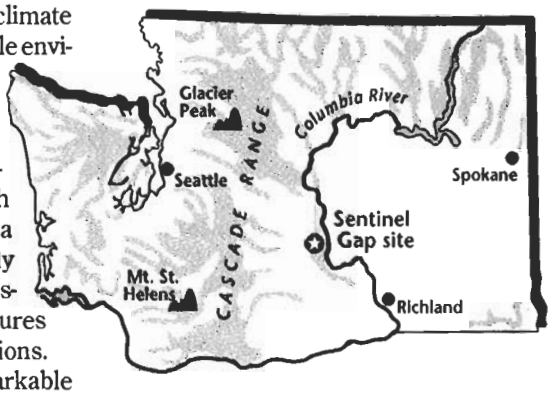
Living on the edge 12,000 years ago



A tent shields the excavation and workers from wind that howls across the treeless Columbia Plateau. But the wind is a blessing, too: sand deposited by wind preserved the late-Paleoamerican settlement exactly as the occupants left it.

PAMELA MCKENNEY

FLOODS—the mightiest ever seen on Earth—and volcanoes are the violent forces that shaped the Columbia Plateau. At the end of the Pleistocene the climate turned hot and dry, creating a hostile environment that grudgingly ceded a living to animals and people. At the Sentinel Gap site, Eastern Washington University archaeologists Jerry Galm and Stan Gough have found the settlement of a people who tried and ultimately failed to master this land. They disappeared, their place taken by cultures better adapted to the harsh conditions.



The Sentinel Gap site is a remarkable snapshot in time. Remarkable, because it's a prize seldom found in North America, a perfectly preserved record of a single term of occupation. Unlike most Paleoamerican sites, which focused on a single activity like butchering or toolmaking, Sentinel Gap has abundant evidence, according to Dr. Galm, "of a mixed social group. Mom, pop, kids, the whole gang were at this place." More than 200,000 artifacts, including tools and ornaments of stone and bone and dumps of lithic debitage, and amazingly well preserved animal remains are locked in by five radiocarbon dates that put the occupation at 10,200 RCYBP, or about 12,000 CALYBP.

Small wonder that Sentinel Gap sparked much interest at the 2002 conference of the Society for American Archaeology in Denver, thanks in large part to a magnificent 4-by-8-ft full-color poster that displayed many of the photos in this article.

Thanks to the military

The Sentinel Gap site lies on the U.S. Army Yakima Training Center, a subinstallation of Fort Lewis, Washington. This area, with large tracts of unpopulated semidesert, is also home to the Hanford site of the U.S. Department of Energy, where nuclear fuel for the first atomic bombs was processed and where substantial quantities of nuclear waste are now stored. The Sentinel Gap site was first described in **CSFA** publication *Current Research in the Pleistocene,* volume 17, identified as Site 45KT1362, its official designation. It was discovered in 1997 by

J. Brantley "Jake" Jackson, a civilian archaeologist then employed by the Army, when he was checking the condition of a dirt road that skirts the Columbia River. Improvements made to the road had altered the drainage of a small unnamed tributary of Hanson Creek, a feeble waterway that in times of severe drought is apt to disappear into the sand and reappear farther downhill. Water moving across an eroded gully had exposed large flakes that caught Jackson's attention. Stan Gough, invited to take a look, agreed that it warranted investigating.

The Army funded a test dig, and in 1998 Gough and his team sank three 1-m-square pits through eolian sand. Down about 80 cm (about 2½ ft), they exposed a cultural level 8 cm (about 3¼ in) thick. It was a lucky shot, because large-scale excavations in 1999 and 2000 showed that the original test pits went right through the heart of the site, which ultimately proved to cover an area of about 82 sq. m (about 880 sq. ft).

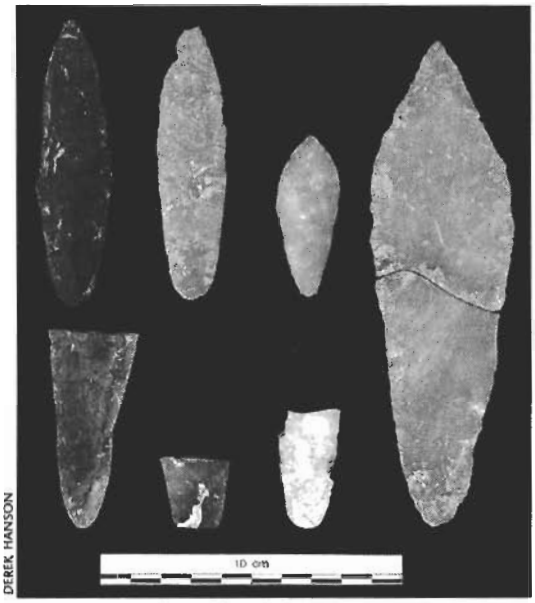
All the earmarks of a base camp

The occupation zone, whose boundary is roughly defined by 13 piles of lithic debris, is amazingly rich in artifacts and features. Two burned areas that may once have been dwellings yielded burned and partially burned artifacts, oxidized sediments, and animal bones. The many kinds of animals implied by bones and antlers—bison, elk, deer, mountain sheep, and small game—bear witness to the versatile hunting skills of the band and their determination to use all the resources available. The varied remains also suggest the site was occupied for an extended period of time. "I can't tell you how long it was," Galm admits, "but it was more than just a few days."

Galm and Gough are excited because evidence shows the people at Sentinel Gap weren't just reducing lithics. "They were doing many other things," Galm emphasizes. He draws a comparison between a deer-hunting camp and a home. "In a camp," he says, "you find task-oriented artifacts. In a home you find diverse artifacts representing a diverse social group."

Knapping with a special twist

Sentinel Gap artisans did, of course, work stone as part of the day-to-day routine; piles of debitage and other concentrations of flakes within the living space bear witness to an ongoing lithic industry. For the most part, stone implements and weapons were made of local cryptocrystalline silica, although Galm and Gough have also found obsidian flakes from cliffs in the Oregon Cascade Range almost 200 miles to the south. Although a few thin bifaces have been found, for the most part their industry was directed to manufacturing thick bifaces. Knives and scrapers appear in the collection, but most of the specimens are bifaces and points that resemble the Haskett type, first found in southern Idaho.



DEREK HANSON

These projectile points, knives, and late-stage bifaces share stylistic similarities with specimens from the Haskett complex in southern Idaho.

PAMELA MCKENNEY

The Columbia River Valley, home to the Sentinel Gap site. Except for the highest ground on the hills in the background, all the land you see was inundated by the late-Pleistocene Spokane Flood.

It's the special way Sentinel Gap knappers practiced their craft, revealed by the flakes they discarded, that sets their technology apart from that of contemporary cultures. Their technique was dictated by the desired end product and by the geometry of the available raw material.

A typical Paleoamerican knapper, before removing the first flake, would form in his mind an image—Galm calls it a "mental template"—of the tool he wanted to make. He would then choose a suitable chunk of toolstone and set about systematically forming a core, which he then refined by percussion and pressure flaking to create, say, the point he had in mind. An experienced knapper surely developed the ability to select a piece of toolstone of just the right size and shape to contain the object defined by his mental template—much the same, perhaps, as Michelangelo's gift for choosing the rough block of marble that contained his David.

Moreover, if while preparing the core a knapper happened to remove flakes of a useful size and shape, he might set them aside and later fashion from them implements like scrapers and burins. Most knappers of the Great Basin and Great Plains cultures practiced this kind of expedient technology. Being resourceful opportunists, they were also quick to seize upon flakes discarded by other knappers.

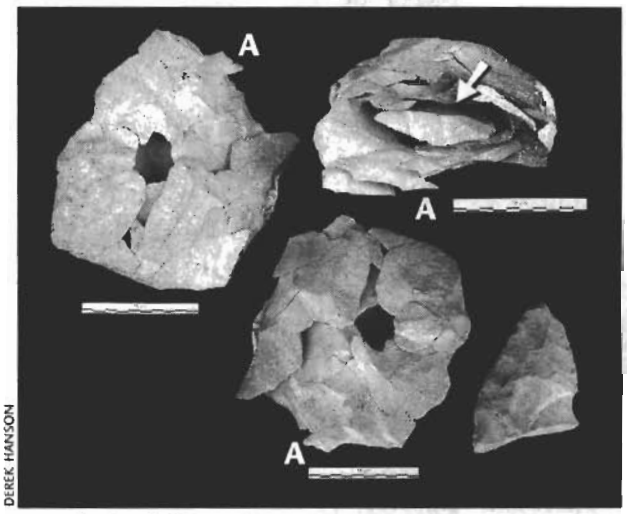
Sentinel Gap knappers worked differently. In the first place, they fashioned large objects, which means they had to start with large chunks of material. Secondly, for the most part they were limited in their choice of raw materials to stream-rolled nodules and local rock. "It's a peculiarity of this kind of rock,"

PAMELA MCKENNEY

Calcium carbonate-cemented flakes (like those in the inset photo) in this lithic debris pile were refitted to form the original nodule. Dumps of lithic debris typically consist of flakes of locally available rock in random attitudes between horizontal and vertical.

Galm points out, "that there are many flaws in it. You get secondary crystallization, all kinds of internal fractures, and weathering into the rock itself. These knappers had to be very clever." Doubtless they formed a mental template of the desired object before starting, but their technique was to reduce the chunk of material along lines of existing flaws and faults. "They're taking rocks apart," Galm explains, "in a way that accommodates the natural flaws. They aren't building a true core. Instead, they're simply reducing the rock and using whatever they come up with."

As Galm notes, it takes a clever craftsman with a certain kind of expertise to produce useful tools under these conditions. The technique is far from efficient, though. Sentinel Gap knappers had no use for big flakes that weren't of the shape that fit their mental template; consequently the debitage dumps contain great quantities of oversize flakes that would have been utilized by knappers practicing a more economical technique.



DEREK HANSON

Like peeling an artichoke, the Sentinel Gap knapper detached flake after flake from a large nodule of cryptocrystalline rock. This composite photo shows three views of the original nodule reconstructed from more than 80 constituent flakes (A indicates the common point on the views). The fragmentary thick biface at lower right is shown refitted at its origin, the center of the nodule (arrow).

Galm and Gough are fully aware of their good fortune in finding a late-Paleoamerican site so well preserved. Craftsmen of later cultures inhabiting the Columbia Plateau would have plundered the stores of useful lithic flakes left by the Sentinel Gap knappers, in effect turning the site into a toolstone quarry. Why didn't it happen here? "Because after the Sentinel Gap occupiers left," Galm explains, "wind-driven sand rapidly capped the site." He notes evidence of very rapid deposition of sand found throughout the excavation, "all kinds of long, intact bones, not gnawed and chewed on the ends. Carnivores would surely have come in behind these folks and cleaned up animal remains." Gough has even found the intact leg bone of an elk, "something you rarely see in this region," Galm points out. "Usually the ends are broken off so the marrow can be extracted." Another clue: many lithic flakes in the dumps were found in a vertical or near-vertical orientation; exposure to the severe winds in this locality would have winnowed the sand around these flakes until most came to rest in a horizontal attitude.

This is a capricious land, which first created out of desolation the opportunity for life to exist, then sealed evidence of the brief episode for 12 millennia.

PAMELA MCKENNEY

Trench 1, one of the stratigraphic trenches dug in the 2000 season, reveals the stratigraphic profile and also fixes the western limit of the occupation level.

Land with a convulsive past

The Columbia Plateau, it turns out, has been alternately creating and destroying itself for millions of years.

Dig down through 80 cm (about 2½ ft) of eolian sand at Sentinel Gap and you come to the occupation zone. Dig down another 25–30 cm (about 10–12 in) and you find the first of three ancient paleosols, evidence of lush vegetation that attracted grazing animals and the people who exploited them.

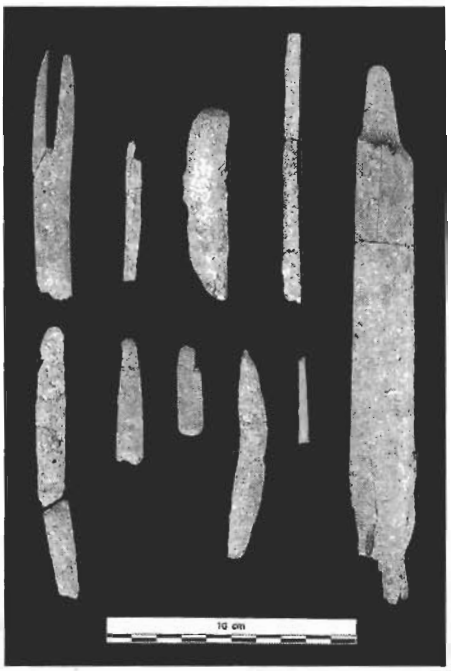
Keep digging, and you pass next through layers of tephra from Pleistocene eruptions of Glacier Peak and Mt. St. Helens, then through alternating layers of fine sand and coarse sediments deposited by flood waters.

Finally, at a depth of 5–5½ m (about 16 ft) below surface you come to great slabs of basalt, the legacy of lava flows of the

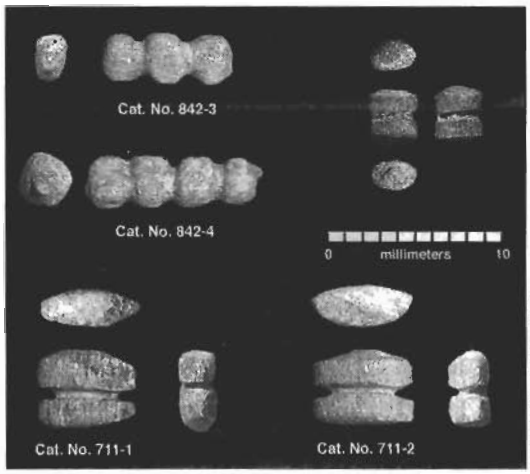
Miocene epoch 12 to 25 million years ago that covered more than 100,000 sq. miles of Washington, Oregon, and Idaho. Repeated flows eventually formed a solid carpet of dense crystalline lava, in places 10,000 ft thick.

Sometime after the lava flows halted, the lava field, like a great dish, became tilted. Today the northeast edge—the area north and east of Spokane—lies about 2,500 ft above sea level, more than 2,000 ft higher than the lowest point near Richland. A gradient of 2,000 ft in 200 miles is the setting for a flood of unbelievable proportions. All that was needed was a lot of water.

That water came at the end of the Ice Age. Enormous volumes of meltwater from the retreating Cordilleran Ice Sheet filled basins and mountain valleys, creating many Pleistocene

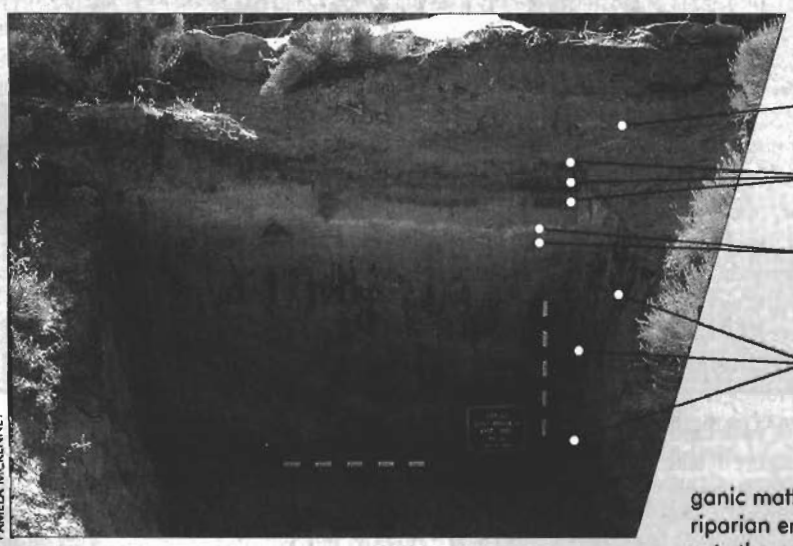


Implements (*left*) of bone and antler include a clothespin-style foreshaft fragment and various pointed and spatulate tools. Sentinel Gap craftsmen were capable of fine work; the smallest ornamental beads (*below*) are only 2 mm in diameter.



BOTH: PAMELA MCKENNEY

Stratigraphy at Sentinel Gap



PAMELA MCKENNEY

Stratigraphic Profile 1 charts the history of the Sentinel Gap site from the present to the catastrophic terminal-Pleistocene Missoula Floods, which obliterated all evidence of earlier ages.

Early Holocene Paleoamericans who occupied the site left a discrete in situ archaeological record of varied base camp activities. Shortly after they left, sheet sands quickly buried the occupation surface. In subsequent years the climate has deprived the site area of moisture needed to build soil rich in organic matter. Net sedimentation in the Holocene has been low, and soil development has been largely limited to precipitated calcium carbonate.

Holocene-Pleistocene Transition The Younger Dryas interval is characterized by A horizons that identify soil rich in organic matter. In semi-arid regions, soils like these only form in riparian environments; relict groundwater redox structures indicate the presence of a local fluctuating water table, which provided the necessary moisture. Vertical orientation of redox structures more than 2 m long suggests the growth of phreatophytic (water-loving) plants similar to willows that currently grow in local riparian habitats.

Sheet sand accumulations interrupted soil development in the Younger Dryas three times.

Terminal Pleistocene Tephra from Mount St. Helens and Glacier Peak was buried by eolian sands.

Between 12,000 and 13,000 RCYBP (14,000–15,500 CALYBP) as many as eight Lake Missoula–origin glacial outburst floods ravaged the Sentinel Gap site. Winds have reworked flood sands episodically until the present.

IN MEMORIAM

ELAINE ANDERSON
1936–2002

Elaine Anderson passed away in Denver on March 26, 2002. She was born January 8, 1936, in Salida, Colorado, and grew up in Denver as the sole offspring of John and Edith Anderson, who preceded her in death.

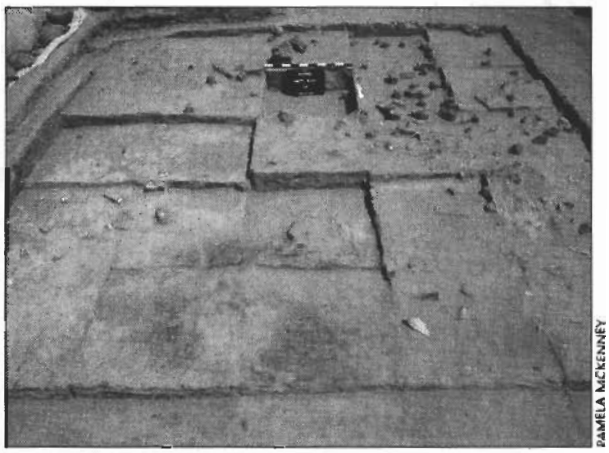
Elaine attended Denver schools and completed her undergraduate degree in 1960 at the University of Colorado at Boulder. Her master's thesis, which she completed in 1965 under the supervision of Dr. Peter Robinson at UCB, was published in 1968 as "Fauna of the Little Box Elder Cave, Converse Co., Wyoming: The Carnivores," in University of Colorado Studies series *Earth Science* 6:1–59. Elaine then went to Helsinki, the first Fulbright Scholar to go to Finland. She studied with Bjorn Kurtén, at the time one of the foremost authorities in the world on Pleistocene mammals. Her Ph.D. was on "Quaternary Evolution of the Genus *Martes*" (*Acta Zoologica Fennica* 130—1970). This study was a thorough biometric and zoogeographic analysis of this Holarctic genus. Elaine continued to publish extensively on Quaternary carnivores, especially mustelids, throughout her life.

After returning to the United States, she worked as a scientific consultant in the Pleistocene Hall at the Museum of Natural History at the Smithsonian Institution. Although more than 35 years old, this exhibit is still one of the most popular at the Natural History Museum. The hall formed the backdrop for a well-known painting by Jay Matternas on the Pleistocene mammals of Alaska that was later published by the National Geographic Society. She worked briefly for the Idaho State University Museum (now Idaho Museum of Natural History) and the Maryland Academy of Sciences before returning to Denver to care for her mother. Following her mother's death, she stayed in Denver and continued to live in the house on Magnolia Street that she was raised in, where she hosted many traveling paleontologists, mammalogists and naturalists as they passed through Denver.

More than a vertebrate paleontologist, Elaine was quite familiar with the modern fauna of Colorado as well as its beautiful wildflowers. However, she is best known for her work *Pleistocene Mammals of North America* (Columbia University Press) that she coauthored with Kurtén in 1980. Not only is this book authoritative, its organization by land mammal ages, localities, and taxa makes it extremely useful. The book also has several indices to sites, taxa (both scientific and vernacular names), and authors. It has become a standard reference for anyone interested in North American Pleistocene fauna and still serves as the bible for Pleistocene mammals of North America. Our copies, like those of many of our colleagues, are threadbare from continual use. Elaine was busy revising this publication when she passed away.

Elaine was associated with the Denver Museum of Nature & Science (formerly Denver Museum of Natural History) since her childhood visits. She formally became involved as a professional in 1984. Elected a Research Associate in 1994, she became intimately involved with the Porcupine Cave Project at its beginning when it was being studied by Tony Barnosky and Don Rasmussen. Following this initial phase of the project, Elaine and several others continued the project as a joint effort between the Western Interior Paleontological Society (WIPS) and DMNS. She thoroughly enjoyed her time at the cave in the summer and was also the leader of the Sunday picking group at DMNS

lakes. The greatest of these was Lake Missoula. Deep valleys in the Rocky Mountains collected meltwater, forming a multi-fingered lake covering 3,000 sq. miles with a volume estimated at 500 cubic miles. At present-day Missoula, Mont., the water was 950 ft deep. At the ice dam near Coeur d'Alene, Idaho (northeast of Spokane), the water was nearly 2,000 ft deep.



PAMELA MCKENNEY

Numerous artifacts, including fragments of a stone pallette and bone implements and ornaments, were found distributed about one of a pair of central burn areas in this block excavated in summer 2000. Many artifacts were encased in calcium carbonate deposits, believed to be soluble salts carried by eolian sands that over time percolated down to the occupation layer.

The ice dam failed many times in the period spanning 12,000–16,000 RCYBP (about 14,000–19,000 CALYBP). Brian Atwater of the U.S. Geological Survey found evidence that the Columbia Plateau experienced 89 great floods.

By far the greatest of these—and as far as we know, the most powerful and destructive flood ever known on this planet—was the Spokane Flood that occurred sometime between 12,400 and

throughout the rest of the year. Many people became hooked on paleontology as a result of participating in this project. Elaine was also instrumental in getting other professionals involved with the project. Her work with Porcupine Cave will be a legacy for many generations of future Quaternary paleontologists.

Elaine has instilled an interest in vertebrate paleontology in many generations of young students, including the two authors. She was an adjunct professor in biology at Colorado State University and also taught a college-credit course on osteology at DMNS. This course was popular with students at all the surrounding universities as well as with volunteers at the museum. As part of this course, Elaine was working with Greg McDonald on a new textbook on comparative osteology. She was also updating *Pleistocene Mammals of North America*.

RICK WICKER/DENVER MUSEUM OF NATURE & SCIENCE

When a person with Elaine's dedication dies prematurely, work is left unfinished. She refused to live idle.

Elaine supervised as Ph.D. candidates Dr. Jan Saysette and Dr. Collen Ramos, and master's student Mary Wisz to completion; Mary went on to Cambridge and is now finishing a doctorate. Elaine, at the time of her death, was supervising Sue Ware for her Ph.D. and Heidi Schutz for her master's.

Elaine also taught courses on bears and wolves at the Yellowstone Institute in Yellowstone National Park and at Churchill, Manitoba, Canada, every summer. Her fondness for mustelids led her into the conservation cauldron of the black-footed ferret recovery effort. During the early 1980s, when many questions about ferret range and potential sites for translocation were being aired, Elaine (and coauthors) drew on more than 300 specimens from 48 museums to address the biogeography and variability of ferrets. This document is still cited frequently today. Elaine was also involved in the annual "Wolf Symposium" and strove to bring together wolf biologists and paleontologists to discuss conservation ideas.

Well before zooarchaeology was fashionable, Elaine helped archaeologists identify faunal remains. She had a love for modern animals and was a volunteer at the Denver Zoo, where she worked with education collections, assisted veterinarians, and cooperated with the Conservation Department. She was always a champion for cooperative efforts between the Zoo and the Museum. Elaine was Associate Editor of *Mammalian Species* (American Society of Mammalogists) from 1995 until her death.

She was elected an Honorary Member to the Society of Vertebrate Paleontology in 2000 and was also a member of the American Quaternary Association. She also served as Adjunct Professor, Biology Department, Colorado State University; Adjunct Professor, EPO, University of Colorado, Boulder; and Research Associate, Earth Sciences, Denver Museum of Nature & Science.

Most importantly, Elaine Anderson was a kind and generous person. She will be sorely missed as a colleague, mentor, and mostly as a dear friend.

A memorial service for Elaine was held at the Denver Museum of Nature & Science on the evening of May 10, 2002.

Russell Wm. Graham, Chief Curator, Denver Museum of Nature & Science

H. Gregory McDonald, Paleontologist, National Park Service

12,700 RCYBP (about 14,500 CALYBP). When the ice dam was breached, the entire contents of Lake Missoula spilled out and flowed southwestward at an unimaginable rate. Through one narrow canyon the velocity reached 45 miles an hour and the maximum rate of flow conservatively estimated at more than 400 million cubic ft per second—equal to 10 times the combined flow of *all* the rivers on Earth!

The flood completely reshaped the face of the Columbia Plateau. It stripped loess that had built up over millions of years since the basalt beds had been formed and swept away blocks of basalt 30 ft across. Canyons were carved in the basalt, and debris was deposited in bizarre patterns. In one area covering 500 sq. miles it lies more than 125 ft deep. In other areas, flood-borne gravel formed ridges of such vast dimensions they weren't recognized until seen in aerial photographs.

After the Spokane Flood the land once more underwent a healing process. Loess, and tephra from Glacier Peak and Mt. St. Helens provided the raw material from which soil is formed. But to build soil you have to have water, and after the late Pleistocene the climate was becoming warmer and drier, a trend that accelerated markedly at the end of the Younger Dryas, about 10,300 RCYBP (12,000 CALYBP), and seems to have occurred at the same time over the entire desert West. The Columbia Plateau was on its way to being the inhospitable semidesert we see today, parched because it lies in the rain shadow of the Cascade Range.

A truncated history

Sentinel Gap owes its existence to a spring or seep that appeared sometime after the Spokane Flood. It made possible the bloom of lush vegetation that attracted game and the wandering people who left their imprint on the Sentinel Gap site before moving on.

History at Sentinel Gap starts at the time of the Spokane Flood. In this stretch

continued on page 20

When Science and Politics COLLIDE

The first of a 2-part series on the controversy surrounding the skeletal remains of early Americans, and the implications for the future of studies of the peopling of the Americas

THE 9,300-YEAR-OLD SKELETON of Kennewick Man was discovered on the banks of the Columbia River in July 1996, and three months later he became the subject of a federal court case. Today, six years later, both sides await the decision of U.S. Magistrate John Jelderks: Is Kennewick Man a legitimate subject of scientific inquiry, or is he culturally affiliated with resident Native American tribes and are his remains thus deserving of burial under the terms of NAGPRA (Native American Graves Protection and Repatriation Act)?

The case has aroused strong feelings. Scientists find themselves aligned against some Native Americans, against three agencies of the federal government, and unfortunately against other scientists.

In the years that the case has been grinding on and on, no one has presented the scientists' argument with a clearer voice than Douglas Owsley, one of the eight plaintiffs. Dr. Owsley, a physical anthropologist with the Smithsonian Institution, responds to his critics with dispassionate persuasion. Behind his reasoned argument, however, is an undercurrent of urgency, for the decision in this case has consequences that reach far beyond the disposition of one human skeleton. Why? Because Kennewick Man is one of a unique group of early Americans and therefore holds answers to how the Americas were peopled, answers we can't find anywhere else. Kennewick Man, Owsley argues, isn't an early Native American. He is morphologically *different* from the four tribes and one band who demand his remains for burial. That difference, Owsley admits, is one we don't understand today. But it's one he is confident we can eventually understand if given the opportunity. The opportunity, if lost in federal court in Portland, Oregon, may never come again.

CHIP CLARK, NMNH, SMITHSONIAN INST.

Owsley and research assistant Kari Bruwelheide in March 2002 working on a forensic investigation in Cadiz, Spain.

To understand Owsley's feeling of urgency, consider all the skeletons of early Americans, historic and prehistoric, that have been unearthed over the years. They number in the thousands. Of that total, *you can count on the fingers of one hand* the ones that share the kind of difference we see in Kennewick Man: Buhl Woman, Spirit Cave Man, Pelican Rapids (Minnesota Woman), Browns Valley, and Gordon Creek Woman. All date to the early Holocene, and therein, Owsley is convinced, lies the mystery to be solved. Today the remains of Gordon Creek Woman lie in a state of limbo while the U.S. Forest Service, which has custody, awaits a request for repatriation from representatives of a Colorado tribe of Native Americans. Fortunately Owsley and colleague Richard Jantz were granted permission to examine Gordon Creek Woman several months ago; likewise data have been collected on Spirit Cave Man, whose remains are vigorously sought by the Fallon Paiute Tribe of Nevada. ***All the other skeletons have been returned and buried.*** And with them their secrets.

We learn by doing

Owsley is no ivory-tower academic. "I can wear different titles," he says. "I'm a physical anthropologist, a biologist by training. The area I specialize in is analyzing human skeletons. My background is along lines of anatomy combined with archaeology."

He sharpens his analytic skills by working in the here-and-now as a forensic anthropologist. Frequently he interrupts his work in bioarchaeology at the Smithsonian to assist law-enforcement authorities; his services are used by police agencies in the District of Columbia, Virginia, and West Virginia. His résumé also lists documenting the contents of mass graves in Croatia; investigating the aftermath of mass deaths among the Branch Davidians in Waco, Texas; and identifying human remains following the September 11 terrorist attack on the Pentagon.

Whether he is working on the body or decomposed remains of a modern individual, or on the skeleton of a person who died hundreds or thousands of years ago, what is common to his activities is the human skeleton. "Techniques start out much the same in modern forensic anthropology and in archaeology," he explains. In a police investigation he makes a detailed inventory, then works to make a positive identification and determine what happened to the victim. In an archaeological setting, he also starts with a detailed inventory, then seeks to

establish demographic details—the age and sex of the individual, for example. The work continues in both investigations in ways that often overlap; whether the subject is a corpse or an ancient skeleton, the goal is to determine the health of the subject and, when possible, the cause of death.

Owsley benefits from his varied activities because "one investigating technique makes you better at the other." The reward of forensic anthropology is immediate feedback that gives him a check on his conclusions and the opportunity to refine his techniques. "In forensic work," he explains, "you might form conclusions about an individual after examining decomposed remains—male, 5-feet-9, age approximately 35, dead about six months." When the subject has been identified, Owsley gets an instant check on his conclusions. "If the person turns out to be 50 years old at death," he notes wryly, "you ask yourself how you missed. And you sharpen your skills for future cases."

Developing the skills needed to analyze skeletons is a cumulative process. After 25 years of practicing forensic anthropology, Owsley has developed impressive skills at analyzing skeletons 10 years old. As an archaeological anthropologist, he applies those skills to skeletons 10,000 years old—itself a cumulative process, because every ancient skeleton tells us something more about the group it belongs to.

An impressive box of tools

Owsley has studied and published on populations around the world, including such diverse groups as Polynesians and Easter Islanders, but he considers himself a specialist on North American populations. His love is the Great Plains—understandable, considering his boyhood in Wyoming. He first studied historic remains from the era of pioneers and trappers, then went further back in time.

In his graduate studies at the University of Tennessee, Owsley first began working with Richard Jantz, his former professor and mentor and now his colleague. Dr. Jantz expanded the database of anthropometric measurements first compiled by W. W. Howells of Harvard University. Today it is an enormous reservoir of information about human beings from every continent. The database for North American samples alone has samples from more than 7,000 individuals, with detailed information on each individual—age, sex, extensive cranial measurements (more about this below), information on the subject's health and dental pathology. Sometimes x-rays and photos supplement the digitized data.

CHIP CLARK, NMNH, SMITHSONIAN INST.

Jantz digitizes a skull. Three-dimensional measurements that define the face and cranial vault are entered into the computer database.

Skulls tell the story

Owsley and Jantz's database is especially valuable when studying early people because through craniometric analysis—comparing skull shapes using powerful computerized statistical techniques—it's possible to track populations over time and space. Skull shape is a reliable predictor of ancestry, since variance is largely influenced by genetics.

Anthropologists have long known that members of a homogeneous population share certain skull-shape features. In the 19th century, when the techniques of measuring skulls were developed, many

Finding Relatedness from Skulls

Your fingerprints are unique, but your skull bears the imprint of your family tree. Genetic information is stored in the shape of your face and skull.

Through a process called craniometric analysis, scientists compare the skull shape of an individual with those of modern populations. Using sophisticated statistical methods, they can determine whether the individual falls within the range of variation of a population group, and if so, which group it is most similar to. It's a powerful technique—and it can yield startling results.

Owsley and Jantz chose four well-dated crania from the early Holocene:

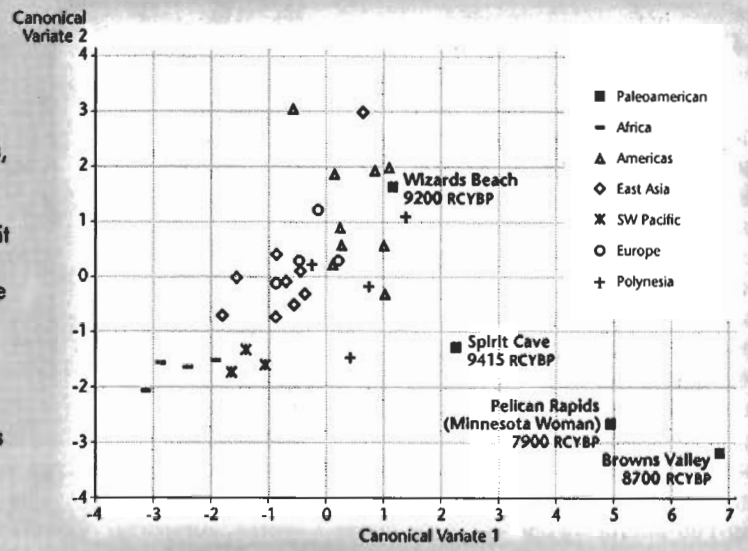
- **Spirit Cave Mummy,** found in 1940 in a small rockshelter near Fallon, Nev.
- **Wizards Beach Man,** found in 1968 in Pyramid Lake, Nev., during a period when the water level was low.
- **Browns Valley,** bones found in 1933 in a load of gravel by an avocational archaeologist in Browns Valley, Minn.
- **Minnesota Woman,** found in 1931 by highway workers.

All these skeletons except Spirit Cave Mummy and Wizards Beach Man have since been repatriated and buried by local Native American tribes, but before the remains were transferred measurements were made of their skulls. Canonical analysis was performed on the cranial data. It's a multivariate statistical procedure that treats each subject exactly the same as samples in the database of world population groups. In this analysis, 25 measurements of the subject skulls describe the size and shape of the cranial vault and face.

Software compares cranial data of the subjects with values in the database and computes the Mahalanobis distance (named for an Indian mathematician), a single number that expresses the distance of the subject from the mean value of the population group, adjusting for variability within the group—in other words, how much the cranial measurement of the subject varies from the norm of the population group. The Mahalanobis distance is therefore proportional to the distance of the subject from the population; the larger the number, the greater the distance. Mahalanobis distance of zero means the subject is identical to the member at the norm of the group for the measurement being compared.

In the figure, Mahalanobis distances are plotted in two independent axes. The horizontal axis (23 percent of total group variation is shown) is a composite of values for vault base width, nose width, frontal flatness, and upper facial forwardness at the nasion. Considering these cranial features, the skeletons from Minnesota are far removed from all modern populations, farthest from African and Southwest Pacific populations. Spirit Cave is also distant from modern populations, though to a lesser degree. The three differ from modern populations in their wider vault bases, narrower noses, flatter frontal bones, and more pronounced upper facial forwardness.

The vertical axis (15 percent of total group variation is shown) is a composite of values for face height including nasal and orbital heights, vault breadth, and parietal length. The Browns Valley and Minnesota Woman skeletons are far distant from modern populations, especially Native Americans, in their low faces, narrow vaults, and long parietal bones.



The skeletons from Minnesota are so far distant from modern populations in both axes—in every cranial measurement included in the analysis—that it's meaningless to try to decide which group they're closest to.

The Spirit Cave Mummy is closer to modern populations (the closest population group is Polynesian-Eskimo). However, in other analyses, comparing other cranial measurements, the Spirit Cave Mummy falls outside the range of variation of all modern populations; it bears no similarity whatsoever to Native Americans and is actually closest to the Ainu, the Japanese aborigines.

Of all the early-Holocene skeletons, only Wizards Beach can be said to be similar to modern Native Americans in the craniofacial measurements considered in this analysis.

Craniometric analysis gives especially revealing results when a Mahalanobis distance is converted to a number that describes the probability that the subject falls within the variability of a population group. Spirit Cave Mummy, Browns Valley, and Minnesota Woman all fail in this regard. There is a very low probability that they belong to any modern world population group.

Most of the earliest Americans (those who were here about 10,000 years ago), as this analysis shows, have skeletal features that are vastly different from those of modern Native Americans and in fact show similarities to Polynesians, Europeans, and the Ainu. Yet skeletons Owsley has studied from more-recent American groups—from Idaho, for example, dating to 6000–7000 years ago—have features that make them instantly recognizable as Native Americans. "Right now," he admits, "we don't understand the relationship between the earliest Americans and later populations. Perhaps it was population replacement, perhaps genetic swamping. It appears there may have been people in the past who simply didn't survive. That's why we have to study people of this time period."

–JMC

measurements were defined. Because of limitations in analytical capability, a number of indices were needed to describe and compare skulls. People were classified, for example, as dolichocephalic (long-headed) or brachycephalic (broad-headed) according to the cranial index, the ratio between the breadth and length of the head; it was determined by observation that most Paleolithic people were dolichocephalic and that the majority of living people are brachycephalic. Forensic anthropology didn't exist. Although a few scientists were busy measuring, there were few practicing osteologists because few people knew about bones. The science of craniometric analysis was slow to grow out of infancy in the 20th century, in part because many scientists doubted the reliability of cranial morphology as a source of genetic information, in part because mountains of data are worthless without powerful computers and software to make sense of it all.

Craniometric analysis has been refined into a precise science. "When we measure a skull," Owsley notes, "we measure a number of different dimensions." One series characterizes the face—the height of the face, including the height of the eyes, nose, and midfacial area. A number of correlated measurements define facial breadth, forwardness, and prognathism. Another series measures the length, breadth, and height of the cranial vault (brain case). Mapping a skull requires a battery of 65 measurements. "And oftentimes," Owsley adds, "we will digitize a skull and make three-dimensional measurements of many more features."

Computers and software that simply didn't exist a generation ago compare the metric data for a test subject with samples from world populations. (Owsley and Jantz's database includes cranial measurements from 33 world populations, including nine western North American Indian groups.) Since this is a statistical process, it deals in probabilities. It cannot tell us with absolute certainty which population group a subject belongs to. Rather, craniometric analysis tells us whether the test subject falls within the range of variability of a recent world population. If so, which group is it most similar to?

Scientists worldwide (but by no means all) accept craniometric analysis as a process just as reliable in inferring population relationships as studying blood polymorphisms, DNA markers, or blood and serum protein. A team headed by Owsley was recently asked by the U.S. Bureau of Reclamation for information on tribal differences; the occasion involves nine Native American tribes, all of whom claim repatriation rights for remains of the Fremont, a tribe that populated Utah about a thousand years ago. The claimants include Paiute, Ute, Hopi, Zuñi, and Shoshone. They all share, says Owsley, "the Native American characteristic, a relatively long face and short cranium. Each has subtle, distinctive features that aren't obvious to the untrained eye but are appreciated after you've seen many." Those distinctive features make it possible to identify them—and to compare them with Fremont craniometric data (Owsley and Jantz's database has cranial measurements for more than 70 Fremont skulls). Jantz and his students (including Owsley) have published extensively on Native American tribal differences in the last 30 years.

Applying the yardstick to early Americans

When craniometric analysis is applied to a handful of early-Holocene American skeletons (see sidebar), the results leap off the page in unmistakable graphic clarity: *there is greater genetic distance, revealed by skull shapes, between the first known inhabitants of North America and present Native Americans than between any two population groups in the world today.* What this means is that Native Americans who claim the skeletons of the earliest Americans—which potentially can give us information obtainable nowhere else on who the first immigrants were and where they came from—cannot prove closer kinship to these ancient people than can anyone else alive today.

One thing we know about Kennewick Man is that he is also an outlier, genetically far removed from any living Native American. We know, because the government was compelled by court order to contract five scientists, including two physical anthropologists, to study the

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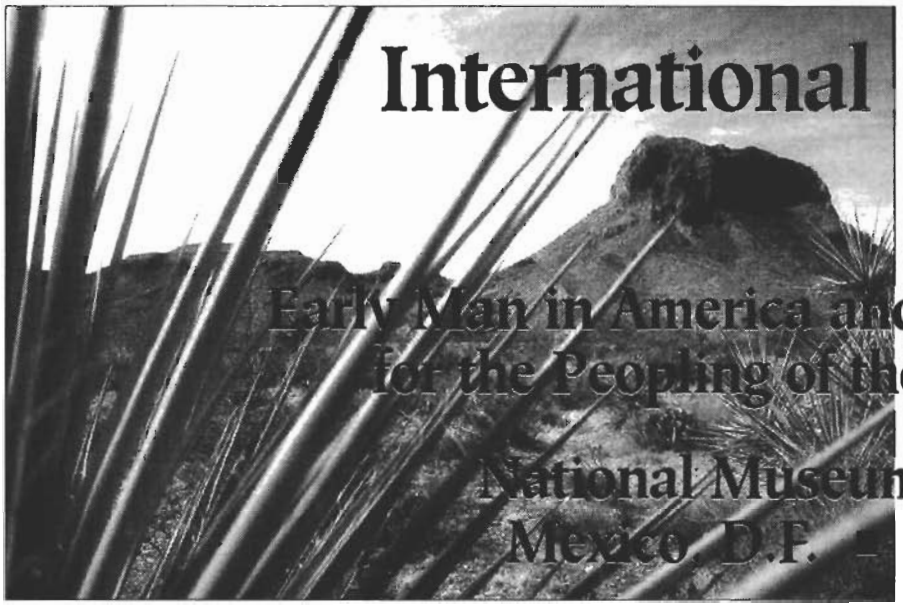

International Symposium

Early Man in America and the Implications for the Peopling of the Basin of México

National Museum of Anthropology Mexico D.F. 7–9 August 2002

The Physical Anthropology Direction of the National Institute of Anthropology and History, through the Organizing Committee, announces this Symposium for the purpose of bringing together, from diverse countries and specialties, researchers studying early human presence in America.

Mexican researchers are organizing this academic event to achieve the following goals:

- to publicize results of radiocarbon dating (^{14}C on bone collagen) of four Paleoamerican specimens from the Basin of Mexico and their craniometric characteristics
- to create a forum to discuss the antiquity of humans in America
- to define and adopt for use a specific methodology to measure Paleoamerican specimens (skull and the postcranial skeleton). The intent is to create a standardized database for the whole American continent, which will make it possible to compare data from other regions of the world
- to initiate a frank and open academic dialogue on the prehistory of America.

Topics

The Organizing Committee invites papers on the following topics: New data about Man's Antiquity in America; Early Humans in America and their possible migration routes through the Continent; Paleoenvironment of the Upper Pleistocene/Holocene in America (geology, flora, fauna, etc. which may have affected human populations); Prehistory in Mexico and in America.

The Symposium will consist of oral sessions and plenary discussions on these topics of American prehistory.

To Register Papers

To participate as a speaker, you must submit to a member of the Organizing Committee the title of the proposed contribution and abstract (max. 200 words) before 30 June 2002, together with the following information *for each author:*

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

Papers will be selected by peer review for publication in a special volume to mark this event. Speakers must submit the final versions of their papers at the beginning of the Symposium in order to ensure publication.

Participation Fee

The fee for presenters and attendants is $110 (U.S.) or the equivalent in Mexican pesos. Payment can be made by deposit to BANAMEX in the name of Direccion de Antropologia Fisica, account number 0165060297; or on the first day of the Symposium at the registration desk. Payment of the participation fee entitles you to a diploma of participation, welcome cocktail, field excursion to areas of earlier settlements of the Basin of Mexico, and the closing dinner.

For a list of recommended hotels, contact:

Direction of Physical Anthropology
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Cactus Hill Passes Midpoint in Multi-year Investigation

*We first reported on the Cactus Hill site in 1996 (**MT** 11-4, "Simple Tools, Hearth Found beneath Clovis Horizon"). Cactus Hill holds promise of being the first site in North America with a verified occupation level stratigraphically lower than Clovis, suggested by charcoal from a hearth radiocarbon-dated at 15,070 RCYBP (about 18,000 CALYBP).*

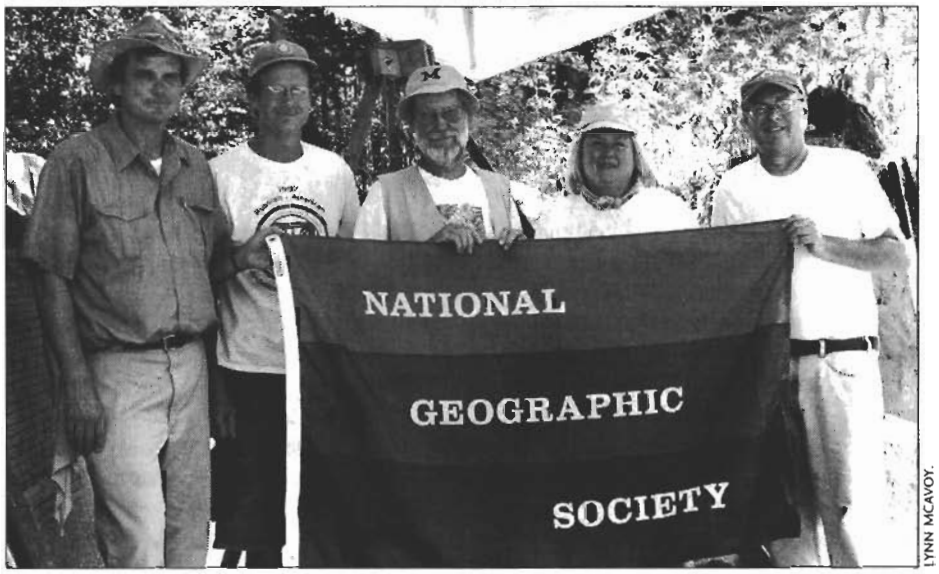
The current work by our Nottoway River Survey at the Cactus Hill archaeological site in Sussex County, Virginia, funded by grants from the National Geographic Society and Virginia Department of Historic Resources, is the third phase of a five-phase project that will be completed in several years. A report on the results of the third phase will be issued to the Committee for Research and Exploration (CRE) of the National Geographic Society in 2003. Results so far are very good.

We began phase three in 2001 to resolve concerns of critics about the 1997–1999 research findings presented in our 2000 report to National Geographic and at the 2000 SAA Annual Meeting.

Our plan involves column analyses, off site and on site, of total phosphorus and phytoliths; carbon-14 and OSL (optically stimulated luminescence) dating of strata, particularly OSL dating of the pre-Clovis Blade level and sterile zone; detailed geoarchaeological, pedoarchaeological, and geomicromorphological studies in search of buried and remnant A horizons (old paleosols) at the critical Clovis and Blade levels; and independent assessment of the site and ongoing research by CRE. We are delighted to report encouraging results in all areas.

The total-phosphorus tests for a second on-site column through the Clovis and pre-Clovis Blade levels identify peaks at the occupation levels and valleys in the "sterile" zones. An off-site column shows consistent, low values of total phosphorus throughout the column. This work was done in James C. Baker's lab at Virginia Tech. Matching phytolith tests are currently underway by Lucinda J. McWeeney at Yale University.

In reconstructing the paleolandscape, NRS team pedoarchaeologist/geoarchaeologist Daniel P. Wagner of Geo-Sci Consultants, Inc. identified several remnant buried A horizons, including a faint one that separates the two deepest strata of human occupation. One buried A horizon, dated by two carbon-14 dates to approximately the Last Glacial Maximum, has been similarly dated at a second location. Charcoal from four levels of iron-clay lamellae in a 12-inch-deep soil column, extending from a Blade level downward to a buried A horizon, produces an accurate, average carbon-14 date consistent with previous dates over the height of the column. All these findings confirm the integrity of the deposit.



LYNN MCAVOY.

At the July 2001 Cactus Hill site evaluation: (*l–r*) NRS team members Dr. Dan Wagner and Dr. Thomas Whyte, Dr. William Farrand, Dr. Lucinda McWeeney, and Joe McAvoy.

To confirm that we have accurately identified morphological boundaries (cultural levels) in the deposit, archaeologist Thomas R. Whyte of Appalachian State University evaluated the cultural level markers positioned in trench #2. His careful excavation of the trench wall profile confirms our boundaries.

James K. Feathers of the University of Washington OSL-dated samples from the Blade (pre-Clovis) level and 12 inches below it. We are pleased to report that these dates closely agree with previous carbon-14 dates. In phase three of the luminescence dating program, now in an early stage, all samples are being processed to determine the effects of naturally occurring radon and the effects of eluviation from fine-particle iron-clay lamellae.

Geomicromorphologist Richard I. Macphail of University College in London, UK, finds broadly stratified archaeological deposits at the Clovis and Blade levels. He also cautiously notes evidence of ephemeral relic soil horizons (old paleosols) at these levels, separated by what we call the "sterile soil zone," which is of a different microfabric. Dr. Macphail's findings appear to corroborate our years of qualitative macroscopic observations. These findings may be the "smoking gun" that proves the case for a stratified, undisturbed Blade level below the Clovis level.

The independent report of geoarchaeologist William R. Farrand of the University of Michigan, special consultant to CRE, finds acceptable the overall stratigraphic integrity of the deposits at Cactus Hill. Dr. Farrand also rates the performance of our research team satisfactory.

We look forward to applying these new, exciting techniques and scientific tools in even deeper levels at Cactus Hill.

–Joseph and Lynn McAvoy
Nottoway River Survey Newsletter
Cactus Hill Site Project—April 2002

New Carbon-14 Dates for Early Humans in Mexico

Mexico is important in the debate on early human presence in America because of its geographical position. Humans must have passed through, either southward from the Bering Straits around 11,500 RCYBP (about 13,500 CALYBP), based on Clovis occupations in southwestern U.S.; or conceivably northward from South America, based on evidence from Monte Verde, Chile, with a minimum occupation date of 12,500 RCYBP (about 14,700 CALYBP).

There are very few directly dated early Americans. Here we report new radiocarbon dates on bone from four Mexican specimens. The two oldest human skulls, late Pleistocene in age, are long-headed (dolichocephalic). Peñon III Woman, the oldest directly dated Mexican, is dated at 10,755 ± 75 RCYBP (about 12,700 CALYBP); Tlapacoya Man is dated at 10,200 ± 65 RCYBP (about 12,000 CALYBP).

In contrast, the skull of Texcal Man is broad-headed (brachycephalic), with an age of 7480 ± 55 RCYBP. The San Vicente Chicoloapan skull suggests the dolichocephalic population existed as late as 4410 ± 50 RCYBP.

The new radiocarbon dates imply at least two waves of human dispersion within Mexico.

A problem when trying to obtain radiocarbon dates on human bone can be the lack of collagen preservation. In Mexico another common problem is that bones are highly mineralized, making radiocarbon dating impossible. We encountered this problem with Metro Man and Chimalhuacan Man. However, we were able to analyze sediments from inside the skulls and in both cases found volcanic ash from known volcanic eruptions. Ash from the Metro Man skull correlates with Upper Toluca pumice, with an age of 10,500 RCYBP (about 12,500 CALYBP). In the case of Chimalhuacan Man, we found a mixture of lake sediments, diatoms, and volcanic ash from Upper Toluca pumice. Therefore we date Chimalhuacan Man at around 10,500 RCYBP, not 33,000 years old as has been suggested previously.

New information gathered from our studies of these Paleoamerican specimens from the Basin of México will be the lead topic for discussion at the International Symposium on Early Man in America, to be held in Mexico City in August. [See the announcement in this issue. Ed.]

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New Books: *Ancient Encounters*

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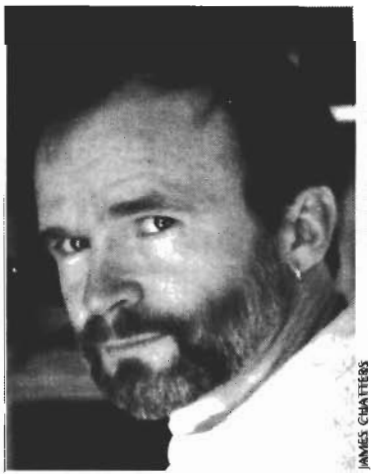
Americans are descended from a group of early modern humans who retained many traits of the original "pre-racial" group that survived the initial African exodus. Why "early southern Asians" (as Gentry Steele calls them) also exhibit some of these traits and northern Asians do not is the subject of a whole new generation of research. *Ancient Encounters* shows that coastal migration from southern Asia would explain a lot of new data, and a lot of old data previously disregarded.

Although he presents a good overview of this approach and the basic data, Chatters does not explore the complex issue of lineage B in mtDNA haplogroups, a mystery yet to be explained. Lineage B is distributed only in southeast Asia and in central America up through the Southwest U.S.; it could be an ancient remnant of this early ancestry, supplanted in all the intervening populations by later migrations of Northern Asians. Chatters does, however, discuss the intriguing lineage X, found in some Native Americans and in some people from the Middle East and Mediterranean area, including the Caucasus mountains, home of the Caucasoids. We were all very excited by these new ideas, especially by the amazing fact that all the new "old guys" were telling the same story, unfolding with new discoveries every few weeks. The diversity of assembled human remains that span 8,000 years is almost as surprising as the fact that they all fall outside the range of modern variations.


JAMES CHATTERS

James Chatters

The political arena

Identifying a new, previously unidentified origin for some Americans is important. Adding human groups to early American lineages has the unexpected result, as Chatters discusses, of creating new political groups with interests in ancient remains. Just before I left the Nevada State Museum, I was astonished by an unsolicited contact from a marginalized group of Paiute Indians who claimed to be Australoids, not Paiutes, and did not think the Paiute have a right to bury Spirit Cave man as their own ancestor. You may wonder why I didn't follow up on this. Well, just as we find ancient remains that address and support new interpretations, the world seems determined to

The 2002 Biennial AMQUA Meeting will be held in Anchorage, Alaska. All technical sessions will be held at or depart from the University of Alaska Anchorage (UAA), host of the 2002 meeting. All field trips will depart from and return to the UAA Housing Center, unless otherwise noted.

Anchorage, a city of 260,000 persons, is the gateway to the coastal communities of the Kenai Peninsula and the interior communities of the Matanuska-Susitna Borough. Rebuilt after the 1964 Great Alaska Earthquake, it is the site of Earthquake Park which commemorates that event, as well as the 8,000-year-old Beluga Point Park and Archaeological Site and the Anchorage Museum of History and Art.

Schedule highlights

Aug 1–3	Inuit Studies Conference
Aug 5–8	Pre-conference field trips
Aug 8	INQUA Beringia Working Group meetings, AHS Auditorium; poster session setup at Lucy Cuddy Center; Conference welcome session and registration, Commons area
Aug 9–11	Technical Sessions
Aug 9	Conference plenary and poster sessions; Open House at Geology and Anthropology Labs, Beatrice McDonald Building
Aug 9	AMQUA business meeting, presentation of Distinguished Service and other awards
Aug 10	Conference plenary and poster sessions; Conference banquet, Alaska Native Heritage Center
Aug 11	Conference plenary session; Dormitory check-out; interior Alaska field trip begins
Aug 11–13	post-conference field trips, including Paleoindian sites in interior Alaska

Questions?

Address questions about Conference registration, posters, submitting abstracts, and field trips to:

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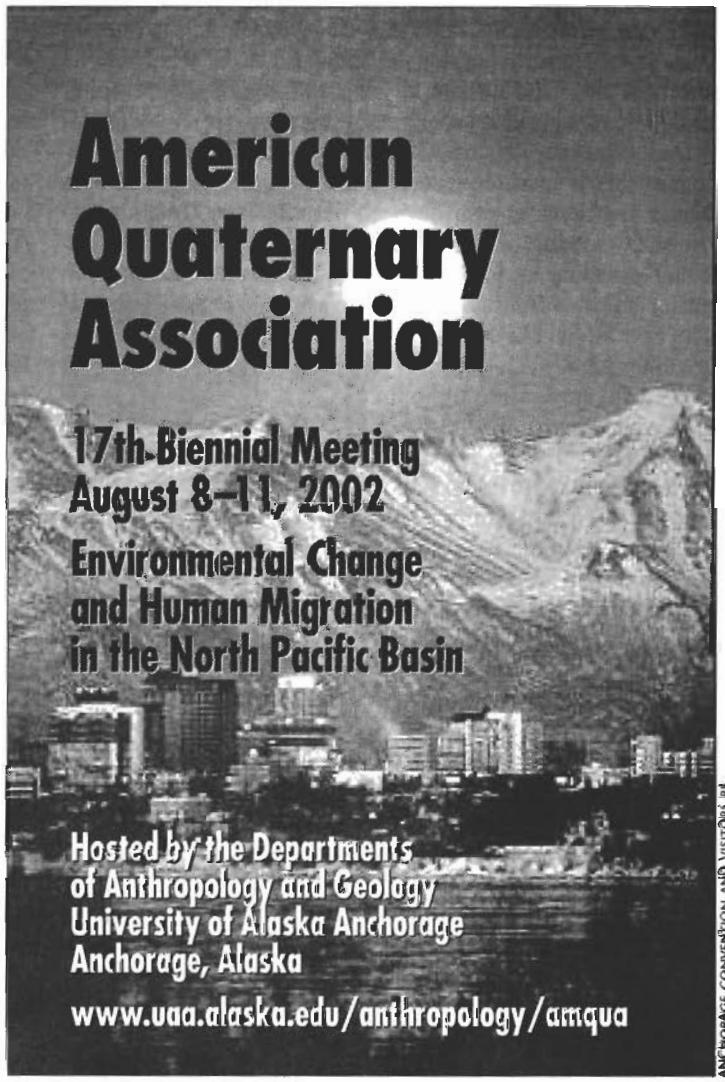

Address general AMQUA questions to:

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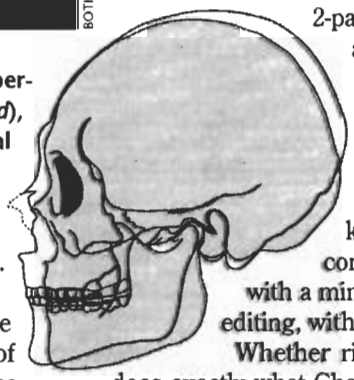
destroy the evidence—and anyone who cares enough to look for it. Were I to explore this claim, I would have been jumping from the frying pan into the fire. Yeah, yeah, I know, it sounds paranoid, doesn't it? But what if they really *are* out to get you?

The history of the Kennewick Man find includes some devastating political actions, many documented in detail by Chatters. Several times following the discovery, the ancient skeleton and the archaeological site faced imminent destruction. There was no choice but to involve the public and initiate legal proceedings to stop the destruction. All the scientists involved knew there

wasn't time to wait in the hope that someday the anthropological community, realizing the importance of these burials to humanity, would fight as a group for the ancient burials. We knew, as few others did, that burials all over the country were being sacrificed, repatriated to unaffiliated tribes *without proper identification* for the sake of political correctness. To a forensic anthropologist, this is just wrong. Disposing of unidentified human remains to claimants who have no demonstrable relationship other than existing on the same continent is indefensible. No one was standing up for correct identification and for demonstrating their scientific importance and their importance to human heritage.

BOTH: JAMES CHATTERS



Above, Kennewick Man skull. Right, shown superimposed on the skull of a Northwest Indian (*shaded*), both oriented in the standard Frankfurt horizontal with the ear opening used as the point of reference. The Kennewick Man skull is conspicuously different because of its high, rounded eyesockets, round chin, and well-supported nose.

Scientists serve the public in ways I value more all the time: painstakingly verifying facts, discovering new ways to understand them, and then translating what we learn to the general public so they can make informed decisions. Of course, that is only the ideal. Most of us in the Kennewick Gang believe the American people have a right to know what politicians are doing to our heritage. People don't know how many anthropologists thought nothing of destroying this part of human history for the sake of peace with disputing Native Americans, or how many bowed to political pressure and backed off. As one who did not back off, and paid the price, I know the human stakes involved in this issue. I know how facile politicians can be when promoting the current version of whatever is politically correct. That for a whim the only evidence found in the New World of our early migration around the planet could be destroyed without a thought is as morally repugnant to me as our studying bones is to some Native Americans. Like Chatters, I actually sympathize a great deal with the Indian people, but I also have values I hold sacred, and truth is one of them. Jim Chatters has fought the same battle and has suffered more than his book conveys. Whether it was worth the fight, only time will tell.

In the epilogue, Chatters summarizes his perspective:

> As strongly as I believe that it is morally wrong to excavate recent (as in 1,000 to 2,000 year old) American Indian graves or to keep them in museums without the consent and participation of their cultural next of kin, I believe it is immoral to turn the bones of the most ancient Americans over to modern tribes, who expressed an intent to bury them without learning what stories they have to tell about themselves and their time. The evidence is mounting that the Americas were peopled in several waves of ancient immigrations. The earliest of these peoples . . . do not culturally or physically resemble the modern-day peoples of our hemisphere.

Whether the reader agrees with this view or not, the clear separation of the historic and scientific facts from Chatters's personal views gives anyone interested an excellent opportunity to learn the issues and understand them.

A good read and a useful primer

I enjoyed reading *Ancient Encounters*, both from my personal perspective and from the point of view of someone who is just interested in the past. There are several excellent and compelling photographs of Kennewick Man and other ancient Americans seen for the first time here, and a few clear diagrams of topics discussed in the text. Written for a general audience, but clearly intended to stand up to professional scrutiny, the references are arranged in the back by chapter, by page number, and by key words that identify the sentence that the note and reference apply to. Although the absence of a bibliography may irritate technical readers, grouping notes and citations by topic is a tolerable compromise. The solid index leads the reader to information in the book. The prologue and epilogue serve their intended functions well by tying the book together. The simple 2-part, 10-chapter layout is well organized and flows smoothly throughout the book. It is a pleasure to read because Chatters explains each concept as it is introduced and answers questions in a comfortable order as they arise. I especially like the way he does not digress; he keeps to the point of each chapter and conveys a maximum amount of information with a minimum of words but, thanks to excellent editing, without a clipped or choppy style.

Whether right or wrong professionally, this book does exactly what Chatters intended. *Ancient Encounters* conveys to the public and to the professional community the facts surrounding the discovery and explains the reasons that compelled scientists to stand up for the right to examine the Kennewick Man fossil. It also tells much of the story of Kennewick Man himself, with a detailed forensic analysis and the prologue scenario that translates these myriad facts into a human life narrative. Although a full understanding of the complexity of this case requires reading *Skull Wars* and *Bones* and the eventual scientific publication of all the other recent discoveries, this is certainly the place to start.

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Suggested Readings

David Hurst Thomas 2000 *Skull Wars: Kennewick Man, Archaeology and the Battle for Native American Identity.* Basin Books, Nevraumont Publishing Company, New York, NY.

Elaine Dewar 2001 *Bones: Discovering the First Americans.* Carroll & Graf Publishers, New York.

When Science and Politics Collide

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skeleton. Their craniometric study shows that Kennewick Man is morphologically similar to Polynesians, Ainu (Japanese aborigines), and southern Asians, and quite different from Indians. Owsley and his co-plaintiffs, however, have not been permitted to measure the skeleton and study it using their techniques, or compare the craniometrics with Jantz's database. Since they have a vast bank of data to draw upon concerning relationships and origins, especially for Native Americans, the government study is inadequate. They hope that Judge Jelderks, by ruling in their favor, will establish the principle that the government cannot restrict examination of ancient remains to just a few selected scientists.

Looking at the test study of early-Holocene skeletons, it's important to keep in mind three facts that bear on these telling results. First, craniometric analysis can only reveal the genetic distance between the test subject and population groups. It has no diagnostic powers; if the distance is great, craniometric analysis cannot tell us the reason for it.

Second, skulls of early-Holocene skeletons are rare. Although a few appear in Jantz's database, some (like Buhl Woman and Hourglass Cave) were buried before scientists could examine them. Others suffer from poor preservation that reduces the amount and quality of information that can be gained from them. The specimens Owsley and Jantz chose for their study—Wizards Beach Man, Spirit Cave Mummy, Browns Valley, and Minnesota Woman—illustrate their point, that skulls of early-Holocene Americans are quite different from those of later prehistoric and historic Indians.

Third, future scientists will inevitably improve the analytic capability of present-day craniometrics—or perhaps perfect entirely different analytical processes capable of teasing even more information from skeletons. The sad truth is that future scientists will never be able to exercise their skills on early-Holocene skeletons that have been returned and buried.

That's why Kennewick Man is so important.

"We don't understand early Americans," Owsley freely admits. "We're just saying that the picture is so complicated that we can't be in a rush to get everything buried before we work it out. We can't destroy firsthand evidence."

–JMC

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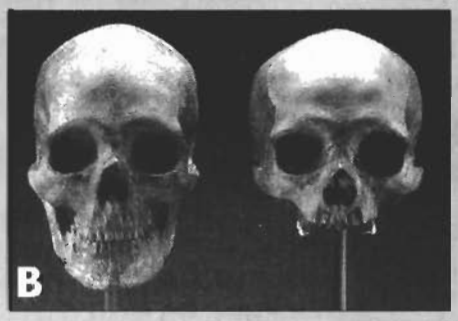
Juxtaposed skulls show differences and similarities that craniometric analysts can use to trace human origins and population movements.



A, three male skulls: (*l–r*) Mongolian, Native American, and an American of European ancestry. The two on the left, with features reflecting Asian ancestry, have wider and larger faces than the European.

B, a cast of the Spirit Cave skull (*left*) and the cranium (less mandible) of a historic-period Ainu male. Although separated by thousands of years and located on different continents, they share features observed in some ancient crania, especially a short face height.

C, frontal view, and **D,** right lateral view of casts of the Spirit Cave male (*left*) and the male from Upper Cave Choukoutien near Beijing, China, which dates to the upper Paleolithic period (ca. 10,000–28,000 CALYBP). Morphologically they are remarkably similar; the primary difference is that Upper Cave is more robust. You can trace this morphology to the historic Ainu of Japan, and into the New World with some of the first Americans.

ALL: CHIP CLARK, NMNH, SMITHSONIAN INST.

Sentinel Gap

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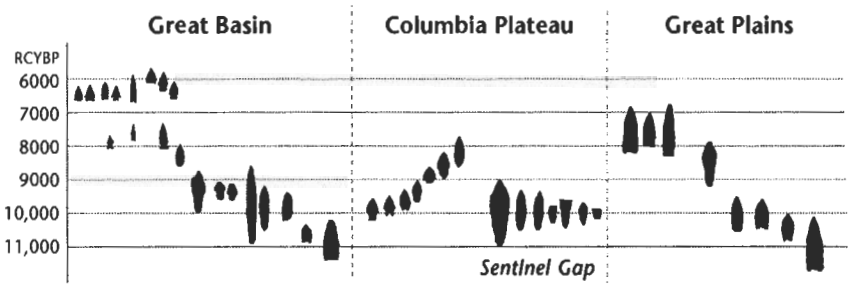
of the Columbia River, the maximum flood elevation was about 360 masl (1,180 ft above sea level); below that elevation, the terrain was scoured to basaltic bedrock. Sentinel Gap lies at an elevation of 187 masl (about 615 ft above sea level). Consequently the sediments that lie directly above bedrock were deposited by floods. "Whether they are all from the Spokane Flood or whether some are relicts from previous Pleistocene floods, we can't be sure," Galm admits. "What we do know is that, were it not for the floods, the sediments would be out of place because they're the wrong kind of sand for the environment, which is basaltic. The sands are quartz."

The Sentinel Gap site is like an amnesia victim who has lost all memory of events that occurred between Miocene lava flows and late-Pleistocene floods.

What of the people who visited Sentinel Gap and then moved on? Galm and Gough believe they are the last of a late-Paleoamerican culture, indicated by the style of bifaces and points they made and their lithic-reduction technique. They occupied the Columbia Plateau at the same time as the first people of the Windust Phase, whose adaptation to the changed environment was quite different from that of the Sentinel Gap people. "Windust is the beginning of the 'regionalized' cultures of the Columbia Plateau," says Galm, "the start of the Northwest 'Archaic'—people who settled here and began developing the cultural and physical skills needed to adapt to this specific environment."



Sentinel Gap knappers made large, thick bifaces without concern for economizing toolstone. Their technology differs from that of contemporary occupations in the Columbia Plateau, which include Lind Coulee and Windust Phase occupations (Windust Caves, Marmes rockshelter, and Granite Point). Considering the lithic technology, dates of occupation, and other evidence, Galm and Gough believe the Sentinel Gap people are members of a Paleoamerican culture. They may be the first evidence of competing late-Paleoamerican and Archaic adaptations in the Columbia Plateau.

In the end, the Windust people survived. As for the Sentinel Gap people, "they simply got out-competed by people with skills better adapted to the environment."

One word sums up the story of the Sentinel Gap people—Darwinism.

–JMC

The archaeological work at Sentinel Gap site was supported by the U.S. Army, Department of Defense. This article does not express the views of the Department of Defense or its personnel.

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Suggested Readings

Barnosky, C. W., P. M. Anderson, and P. J. Bartlein 1987 The Northwestern U.S. during Deglaciation: Vegetational History and Paleoclimatic Implications. In *North America and Adjacent Oceans during the Last Glaciation*, edited by W. F. Ruddiman and W. E. Wright, pp. 289–321. *The Geology of North America*, vol. K-3. Geological Society of America, Boulder, CO.

Galm, J., and S. Gough 2001 Site 45KT1362, a c. 10,000 yr b.p. Occupation in Central Washington. In *Current Research in the Pleistocene* 17:29–31. Center for the Study of the First Americans, Oregon State University, Corvallis, OR.

Gough, S. 1999 Archaeological Test Excavations at Sites 45KT1362 and 45KT726, Yakima Training Center, Kittitas County, Washington. In *Eastern Washington University Reports in Archaeology and History*, pp. 100–109. Archaeological and Historical Services, Cheney, WA.

Porter, S. C. 1976 Pleistocene Glaciation in the Southern Part of the North Cascade Range, Washington. In *Geological Society of America Bulletin* 87:61–65.

Weis, P., and W. L. Newman 1999 *The Channeled Scablands of Eastern Washington: The Geologic Story of the Spokane Flood.* ISBN 0-910055-11-4. Eastern Washington University Press, Cheney, WA.