Putting a Paleoamerican Campsite to Bed

Ever since the Sentinel Cap 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 site 12,000 years ago before moving on.

Having learned everything the site can tell us, a crew prepares the Sentinel Cap site for closing (backfill-log) 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 Koneti (wearing hat) and Ann Sharley.

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

Waters said that 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.

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 a newly founded specialization in experimental archaeology.

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 new name of the Mammoth Trumpet will carry forward on future 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.

"We will have a 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 BATONIUM, 4 April 2002

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New Books


There is a lot to say about Kennewick Man, enough to fill three very different books and hours of television documentary so far. David Thomas wrote Shale Wars: Kennewick Man, Archeology and the Battle for Native American Identity to put the Kennewick case into historical, cultural, 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, claim of possession, and scientific analyses performed on him, written by the only person who knows firsthand, Dr. James Chatters presents a tightly edited and clearly 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 Wizard Beach Man, I can say this is a welcome addition to the literature on one of the 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 historical issues directly relevant to the Kennewick remains in just the right balance of professional clarity and plain English for the general reader.

Before 1996, 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 Gill, preeminent physical anthropologist, told me, “I am not surprised by how old Spirit Cave Man is, I am surprised how young be 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 (557,455-673789), a girl range of ten years old with the same long skull shape as Spirit Cave man, also has a Cardelli’s cup, 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 149): “Beneath the outer twined mat made of ruffles and hemp cord were two more of the woven hemp blankets.” And later (page 369) that Spirit Cave Man was “wrapped in a blanket in a manner unknown in American after 9,000 years ago.” Just to set the record straight, these statements should read, “Beneath the outer twined mat were two mats made of split tule and hemp cordage, unlike 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
Wars that some cranial features change dramatically owing to environmental ef-
fcts. Chatters demonstrates how these
biometric studies support a model for the
first American humans very different
from that modeled in previous hypoth-
eses.

Several recent television productions
address these new scientific discoveries.
"The Real Eve" on the Discovery Channel
covers new evidence regarding the aston-
ishing shift in our understanding of the
human past, told in large part by data from
Kennewick Man, Spirit Cave, and related
sites. 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 re-
vealing 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
Sterne, Joseph Powell and Walter Nurses

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 an-
cient skulls do not match any modern
"groups" but cluster near Ainu and Medi-
evans Norse in some combination of traits,
they are actually demonstrating that early
continued on page 20
Floors—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 gradually 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 BCYBP, 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 6-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 sub-installation of Fort Lewis, Washington. This area, with large tracts of uppopulated 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 4EXT1382, its official designation, it was discovered in 1997 by
I. Bradley "Jake" Jackson, a civilian ar- 
chaeologist 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 al- 
tered the drainage of a small unnamed 
branch of Hanson Creek, a feeble water-
way 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 
1988 Gough and his team sank three
square pits through siloan sand. Down 
about 80 cm (about 30 in), they exposed a 
cultural level 8 cm (about 3 in) thick. It 
was a lucky shot, because large-scale 
excavations in 1990 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 85 sq. m 
(aboulit 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 massively rich in artifacts and fea-
tures. Two burned areas that may once 
have been dwellings yielded burned and 
partially burned artifacts, unaltered sedi-
ments, and animal bones. The many 
knives 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 re-
sources 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 be-
tween a deep-tunnel camp and a home. 
"In a camp," he says, "you find task-orien-
ted artifacts. In a home you find di-
verse 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;

...
Calcium carbonate-cemented flakes (like those in the inset photo) in this litchi debris pile were refitted to form the original nodule. Dumps of litchi 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 extruding flaws and faults. "They're taking the 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 debladed dumps contain great quantities of oversized flakes that would have been utilized by knappers practicing a more economical technique.

Galm and Gough are fully aware of their good fortune in finding a site so well preserved. Craftsmen of later cultures inhabiting the Columbia Plateau would have plastered the stores of useful litchi flakes left by the Sentinel Gap knappers, in effect turning the site into a talusstone quarry. Why didn't it happen here? "Because after the Sentinel Gap occupants 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 litchi 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 conspicuous land, which first created out of isolation the opportunity for life to exist, then sealed evidence of the brief episode for 12 millennia.

Land with a corrosive past

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

Dig down through 80 cm (about 2' 7") of eolian sand at Sentinel Gap and you come to the occupation zone. Dig down another 25-30 cm (about 10-12") and you find the first of three ancient palaeosols, 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 course sediments deposited by flood waters.

Finally, at a depth of 5-9 m (about 16-30") below surface you come to great slabs of basalt, the legacy of lava flows of the
Miocene epoch 13 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 cloth, became tilted. Today the northeast edge—the area north and east of Spokane—sits 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 chippin-style foreshaft treatment 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.

Stratigraphy at Sentinel Gap

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 - Paleoindians who occupied the site left a discrete in the archaeological record of varied base camp activities. Shortly after they left, sheet sands quickly buried the occupation surface. Its subsequent years the climate has deprived the site area of moisture needed to build soil rich in organic matter. Net sedimentation in the Pleistocene has been low, and soil development has been largely limited to poorly sorted colluvial carbonate.

Holocene-Pleistocene Transition - The Younger Dryas interval is characterized by a horizon that identifies soil rich in organic matter. In semi-arid regions, soils like these only form in riparian environments; relit 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 phytophlebic (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 14C yr BP, 14,000-15,000 CAL yr BP as early Lake Missoula-origin glacial outwash flows ravaged the Sentinel Gap site. Winds have reworked flood sands episodically until the present.
ELAINE ANDERSON
1936–2002

IN MEMORIAM

Lakes. The greatest of these was Lake Missouri. Deep valleys in the Rocky

Mountains collected meltwater, forming a multi-fingered lake covering 3,000 sq.

Nenous artificats, including fragments of a stone palette and bone implement
ts and ornaments, were found distributed about one of a pair of central burn
areas in this bluff excavated in summer 2000. Many artificats were encased in
calcium carbonate deposits, believed to be soluble salts carried by eolian sands that
ter time percolated down to the occupation layer.

referred for anyone interested in North American Pleistocene fauna and
still serves as the guide for Pleistocene mammal of North America. Our cop-
lies, like those of many of our colleagues, are therefore from continual use.
Elaine was busy revising this publication when she passed away.

Elaine was associated with the Denver Museum of Nature & Science (for-
merly Denver Museum of Natural His-
tory) since her childhood visits. She for-}

mally became involved as a professional
in 1984. Elected a Research Associate in
1994, she became inextricably involved with the Pocopon Care Project at an
typical phase of the project. Elaine and several others contin-
ued the project as a joint effort be-
tween the Western Interior Paleonto-
logical Society (WIPS) and DMNS. She
thoroughly enjoyed her time at the
cave in the summer and was also the leader of the Sunday pickup group at DMNS.

Elafe 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
1969 at the University of Colorado at Boulder. Her major’s thesis, which she
completed in 1968 under the supervision
of Dr. Peter Robinson at UCB, was
published in 1968 as “Fauna of the
Lamb Rock Rider Cave, Conecuh Co.,
Wyoming: The Carnivores,” in Univer-
sity of Colorado Studies series Earth
Science 63:3–29. Elaine then went to
Helsinki, the first Fulbright Scholar to
return to Finland. She studied with Björn
Kortén, at the time one of the foremost authorities in the world on Pleistocene mammals. Her Ph.D. was on “Quaternary Evolution of the Genus Marsupialis
(Aeotæ Zoologica Fenniae 130—1979).”

This study was a thorough biomeetric
and zoogeographic analysis of this Hol-
artic genus. Elaine continued to pub-
lish extensively on Quaternary carni-
yores, especially mustelids, throughout
her life.

After returning to the United States, she
worked as a scientific consultant at the
Pleistocene Hall at the Museum of
Natural History at the Smithsonian Insti-
tution. Although more than 35 years old, this exhibit is still one of the most
popular at the Natural History Mu-
seum. The hall formed the backdrop for
a well-known painting by Jay Mazucan
deing paleontologists, mammalogists and
naturalists as they passed through Denver.

More than a vertebrate paleontologist, Elaine was quite familiar with the modest
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 co-authored with Kortén in 1980. Not
only is this book authoritative, its organi-
zation 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 sections. It has become a standard

miles with a volume estimated at 500 cu-
ic 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.

The ice dam failed many times in the
period spanning 12,000–16,000 B.C.Y.B.
(about 14,000–10,000 CALYBP). Brian
Atwater of the U.S. Geological Survey
found evidence that the Columbia Plateau
experienced 80 great floods.

By far the greatest of these—and as far
as we know, the most powerful and de-
structive flood ever known on this
planet—was the Spokane Flood that oc-
curred sometime between 12,400 and
12,700 BCYP (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 65 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 12 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 tezpra 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 BCYP (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, paradox 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
The ABDONAL 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. District Judge John J. Darby. 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 Americans 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.

Owsley and research assistant Karl 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), Browett 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 Janze 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 Brazos Davidsians 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 may change through the years, but the basic techniques are 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. As 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—its cumulative process, because every ancient skeleton tells us something about the group it belonged 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.

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.

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

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

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George Frison and Bruce Bradley

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Olley and Jantz choose four well-dated crania from the early Holocene:

- Spirit Cave Mummy, found in 1940 in a small rock shelter 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 1993 in a load of gravel by an inadvertent archaeologist in Browns Valley, Mich.
- Minnesota Woman, found in 1931 by highway workers.

All these skeletons except Spirit Cave Mummy and Wizards Beach Man have since been reinterred and buried by local Native American tribes, but before the remains were transferred, measurements were made of their skulls. Cranio metric 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’s skulls describe the size and shape of the cranial vault and face.

Software compares cranial data of the subjects with values in the database. The Mahalanobis’ distance (formerly an Italian 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 mean 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 figures, Mahalanobis distances are plotted in two independent ways. 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 nose. Considering these cranial features, the skeletons from Minnesota are far removed from all modern populations, closest from African and Southeast Pacific populations. Spirit Cave is also distant from modern populations, though to a lesser degree. The three differ from modern populations in their wider vaults, narrower noses, flatter frontal bones, and more pronounced upper facial forwardness. The vertical axis (15 percent of total group variation in populations in both cases—in every cranial measurement included in this 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 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 Anasazi, the Japanese aborigines.

Of the early-Holocene skeletons, only Wizards Beach can be said to be similar to modern Native Americans in the cranio metric measurements considered in this analysis. Cranio metric 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 fall 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 shows similarities to Polynesians, Europeans, and the Anasazi. Yet scientists Olley 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 shaky people of this time period."
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 the 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 cranio metric 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.

Cranio metric analysis has been refined into a precise science. “When we measure a skull,” Osley 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 pro gnathism. Another series measures the length, breadth, and height of the cranial vault (brain case). Mapping a skull requires a battery of 60 measurements. “And oftentimes,” Osley 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. (Osley and Jantz’s database includes cranial measurements from 23 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, cranio metric 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 cranio metric analysis as a pro cess just as reliable in inferring population relationships as studying blood polymorphisms, DNA markers, or blood and serum proteins. A team headed by Osley was recently asked by the U.S. Bureau of Reclamation for information on tribal differences in the occasion involves nine Native American tribes, all of whom claim repatriation rights for remains of the Pecos mountain, a tribe that populated Utah about a thousand years ago. The claimants include Piaute, Ute, Hopi, Zulu, and Shoshone. They all share, says Osley, “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 cranio metric data (Osley and Jantz’s database has cranial measurements for more than 50 Fremont skulls). Jantz and his students (including Osley) have published extensively on Native American tribal differences in the last 30 years.

Applying the yardstick to early Americans

When cranio metric analysis is applied to a handful of early Holocene American skeletal remains (see sidebar), the results leap off the page in unmistakable graphic clarity: there is a 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 Kenneth 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
International Symposium

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

National Museum of Anthropology

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 (^14C on bone collagen) of four Paleoamerican specimens from the Basin of Mexico and their craniofacial 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 Mesoamerican 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 Dirección de Antropología Física, account number 0166200023, 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 National Museum of Anthropology Reforma y Gandhi S/N Chapultepec, Polanco C. P. 11560, México D. F. tel. (52) 5533 6204; fax (52) 5286 1933

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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, Haunt of Clovis Horizons"). 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 Natoway 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 (CER) 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 1991–1999 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; dated geoarchaeological, pedoarchaeological, and geomicrochronometric 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 CER. 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. McWeeny at Yale University.

In reconstructing the paleoecoscape, NBS team paleoarchaeologist/greatarcheologist Daniel P. Wagner of Geo-Sci Consultants, Inc. identified several reburied buried A horizons, including a faint one that separates the two deepest strata of human occupation. One buried A horizon, at the July 2001 Cactus Hill site evaluation: (l-r) NBS team members Dr. Dan Wagner and Dr. Thomas Whyte, Dr. William Farrand, Dr. Lucinda McWeeny, and Joe McAvoy 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 dates confirm the integrity of the deposit.

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 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 microscopic 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 CR, 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
Natoway River Survey Newsletter
Cactus Hill Site Project—April 2002
New Books: Ancient Encounters

continued from page 3

Asians 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 Americans. 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 80,000 years is almost as surprising as the fact that they all fall outside the range of modern variations.

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 cresting 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 5–6  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  Conference plenary sessions, including Paleoindian sites in interior Alaska

Questions?

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

David R. Yessen
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E-mail: afdry@uaa.alaska.edu
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American Quaternary Association
17th Biennial Meeting
August 8–11, 2002
Environmental Change and Human Migration in the North Pacific Basin

Hosted by the Departments of Anthropology and Geology
University of Alaska Anchorage
Anchorage, Alaska
www.uaa.alaska.edu/anthropology/amqua

Address general AMQUA questions to:

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[Text deleted to fit within character limit]
wasn't time to wait in the hope that someday the anthropological community, realizing the importance of these burials to human- 
ity, 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 identi- 
fication for the sake of political correctness. To a forensic anthro- 
pologist, this is just wrong. Disposing of unidentified human 
remains to claimants who have no demonstrable relationship 
other than existing on the same continent is indesirable. No 
one was standing up for correct identification and for demon- 
strating their scientific impor- 
tance and their importance to 
human heritages.

Scientists serve the public in 
ways I value more all the time: 
painstakingly verifying facts, dis- 
covering new ways to understand 
them, and then translating what 
we learn to the general public so 
they can make informed deci- 
sions. Of course, that is only the 
ideal. Most of us in the 
Kennewick Gang believe the 
American people have a right to 

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

know what politicians are doing to our heritage. People 
do n'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 politi- 
cal 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 fragile 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 (say in 1,000 to 2,000 year old) American Indian graves 
or to keep them in museums without the consent and participa- 
tion of their cultural nes 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 nev- 
eral waves of ancient immigrations. The earliest of these 
peoples... do not culturally or physically resemble the mod- 
ern-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 
intrigued in the past. There are several excellent and compel- 
ing photographs of Kennewick Man and other ancient Ameri- 
cans 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 refer- 
ences 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 
5-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 intro- 
duced and answers questions in a com- 
fortable order as they arise. 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 con- 
veys to the public and to the professional community the facts 
surrounding the discovery and explains the reasons that com- 
pelled 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 com- 
plexity of this case requires reading Shell Wars and Bones and 
the eventual scientific publication of all the other recent discover- 
ies, this is certainly the place to start.
When Science and Politics Collide

continued from page 13

buried before we work it out. We can't destroy freshened evidence." JMC

Third, future scientists will inevitably improve the analytic capability of present-day cranioometrics—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," Oswley freely admits. "We're just saying that the picture is so complicated that we can't be in a rush to get everything

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

A, three male skulls: (a) 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 Anu man. Although separated by thousands of years and located on different continents, they share features observed in some ancient cranial, especially a short face height.

C, front 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 CALYF). Morphologically they are remarkably similar; the principal difference is that Upper Cave is more robust. You can trace this morphology to the historic Anu of Japan, and into the New World with some of the first Americans.
of the Columbia River, the maximum flood elevation was about 360 nadai (1,180 ft) above sea level; below that elevation, the terrain was scoured to basaltic bedrock. Sentinel Gap lies at an elevation of 187 nadai (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 relics from previous Pleistocene floods, we can't be sure," Gaim 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 amnesiac victim who has lost all memory of events that occurred between Miocene lavas flows and late-Plenistocene floods.

What of the people who visited Sentinel Gap and then moved on? Gaim 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 Wendust Phase, whose adaptation to the changed environment was quite different from that of the Sentinel Gap people, "Wendust is the beginning of the 'regionalized' cultures of the Columbia Plateau," says Gaim, "the start of the Northwest 'Archae'-people who settled here and began developing the cultural and physical skills needed to adapt to this specific environment."

In the end, the Wendust 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


