



MAMMOTH TRUMPET

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Center for the Study of the First Americans
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Paleo Patagonia

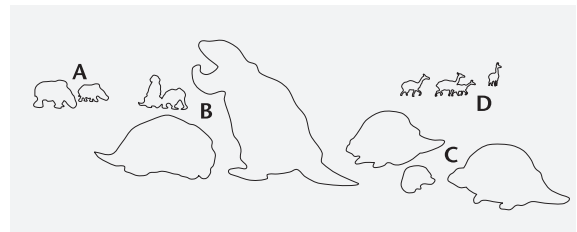
When mammoth and *Bison antiquus* dominated the plains of North America, the creatures shown here in Charles R. Knight's magnificent painting, "Pampean Life," were roaming the pampas of South America. The world learned of their existence, and of the Paleoamerican hunters that preyed on them, because of the extraordinary efforts of American

archaeologist Junius Bird. Today his collections reside in the American Museum of Natural History in New York. That's where Knight's painting hangs (on the fourth floor), and where research associate Tom Amorosi works to catalog the Bird archives and to plan an expedition to continue Bird's research. Dr. Amorosi is our guide in the conclusion of our series on the life and accomplishments of Junius Bird that starts on **page 15**.



AMERICAN MUSEUM OF NATURAL HISTORY

The fauna species in Knight's masterpiece: **A**, *Toxodon*, a massive ungulate; **B**, *Megatherium*, the largest ground sloth; **C**, *Glyptodon*, the giant armadillo; **D**, *Camelus*, an extinct camel.



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

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Following the Obsidian Trail



Obsidian projectile points from Kamchatka.

R. J. SPEAKMAN

THE CLASSIC MODEL that dominated First Americans studies for half a century—that the first immigrants trudged across the Bering Land Bridge connecting northeast Asia and Alaska, and went on to people the Americas—has been battered in recent years by the discovery of Monte Verde and other pre-Clovis occupations in the New World. Nevertheless, recent discoveries in Alaska by archaeologists, notably Chuck Holmes (MT 20-1, “Early Americans in Eastern Beringia: Pre-Clovis Traces at Swan Point, Alaska”), are convincing evidence for some scientists that at least one wave of migrants passed through on foot. To keep this theory alive, though, demands answers to such ques-

tions as, Where did they come from? How many were they? When were they here? Fortunately, the travelers themselves are giving us many of the answers. They were toolmakers, and one of the more abundant toolstones available to them in Beringia (eastern Siberia and Alaska) was obsidian, volcanic glass, a substance that tells a scientist with the knowledge and the right equipment the precise location of the quarry where it was obtained.

The wonders of obsidian

Jeff Speakman of the Smithsonian Institution, who has traced obsidian artifacts to their source in North America and Asia, emphasizes the importance of obsidian in

INSIDE

4 Decoding the paleoclimatic record for the Southeast

Sediments collected in sinkholes at the Page-Ladson site reveal a history of climatic extremes that's vastly different from what the Southwest experienced—and evidence of pre-Clovis occupation besides. Florida State archaeologist Jim Dunbar lets us in on his cheat sheet for finding evidence of early humans.

9 In this case, a pretty face with lots behind it

Gaudily colored stone chips led point collectors to find a Paleoamerican base camp in an unlikely place. Today the Hester site in Mississippi enjoys NHL status.

15 Picking up where Bird left off

Anthropologist Tom Amorosi is recruiting a team of scientists to confirm Junius Bird's discoveries of early fauna and humans at the tip of South America, and perhaps to find what he missed.

resolving the Beringia question. Obsidian is prime toolstone due to its workability and the extremely sharp edges produced when it's knapped. What makes obsidian so valuable to archaeologists is its unique chemical signature that precisely and unambiguously identifies its source. Speakman explains that “each source

[of obsidian] has a unique fingerprint, and if you know what that fingerprint is . . . you can analyze the artifacts and tell exactly where the artifacts came from." Much can be discerned by identifying the source of a fragment of obsidian. "By knowing that information," Speakman says, "you are able to track migrations of people, social interactions, trade paths, and long-distance movement." Without obsidian sourcing, such facts are practically invisible in the archaeological record. Concerning the particular long-distance migration that archaeologists are eager to confirm, of peoples crossing the Bering Land Bridge during the Pleistocene, obsidian could be the key to answering this question. If Russian obsidian dating to the



Jeff Speakman analyzing gold artifacts by PXRF at the Museo Antropológico Reina Torres de Araúz, Panama City, Panama, July 2007.

Pleistocene is found in Alaska, this discovery will go a long way to proving the theory correct.

The sourcing process itself has evolved over the years, and seems to have peaked at a fortunate time. Of a number of processes used to source obsidian, three stand out as the most reliable methods: instrumental neutron activation analysis (INAA), laser ablation inductively coupled plasma-mass spectrometry (LA-ICP-MS), and X-ray fluorescence spectrometry (XRF).

The grandfather of the group, which has great precision and high accuracy, is INAA; on the down side, it requires a

nuclear reactor and destroys the obsidian sample being tested.

ICP-MS is as sensitive as INAA, yet less invasive to the artifact being tested. The drawbacks with ICP-MS are that it is still somewhat destructive to artifacts and quantifying data can be an arduous task. ICP-MS also requires an initial investment of several hundred thousand dollars and a dedicated laboratory and staff. Nonetheless, such instrumentation is quite common at most major research

institutions and is rapidly replacing INAA as a preferred method for trace-element analysis of rocks and minerals.

XRF, though not as sensitive as INAA or ICP-MS, has the great advantage of being completely nondestructive and has been used extensively to analyze obsidian since the 1960s. But it gets better; XRF has evolved into PXRF, P for portable, which gives scientists the ability to source obsidian in situ. This is especially handy for sourcing museum pieces, par-



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Mammoth Trumpet, Statement of Our Policy

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

—Michael R. Waters, Director

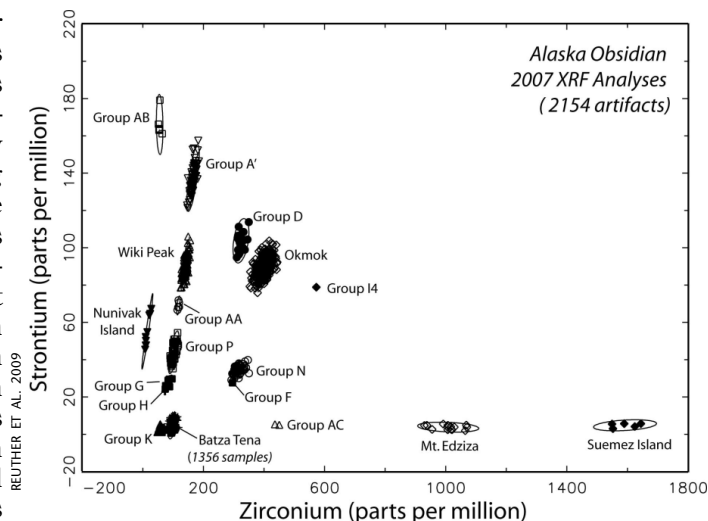
ticularly those in other countries. Not only is this device handy, its results are highly accurate. It “is ordinarily what I use for sourcing obsidian, even at the Smithsonian,” says Speakman, who considers the instrument essential in the search for Northeast Asian obsidian in eastern Beringia. It yields source data while in the field at Alaskan and Russian sites. What’s more, it harmlessly analyzes obsidian articles in Russian museums, thereby eliminating the hassle of transporting a truckload of machines across borders.

May the source be with you . . .

There are 32 known sources of obsidian in eastern Beringia, which includes Alaska and the parts of neighboring Yukon and the Northwest Territories not covered by glaciers. These sources are known to the extent that archaeologists are aware of their existence; however, only nine of them can be located on a map and only seven are known to have been utilized by prehistoric peoples. Though the locations of the other sources have yet to be pinpointed, their existence is inferred from their “fingerprints,” which were lifted from obsidian artifacts scattered around Alaska and Canada. It’s just like “CSI”; we haven’t apprehended the culprit, but we know who done it.

It isn’t easy to locate a source of obsidian, particularly in Alaska’s frigid vastness. Sometimes a location can be estimated by consulting geologic maps and triangulating in on a source using the distribution of artifacts made of the unique obsidian quarried from it, but this involves a lot of guess work. Most often, Speakman says, “Geologists are the ones who find the sources first and the archaeologists find out later.”

Archaeologists took notice of the rediscovered Batza Tena obsidian source in 1970. This source, whose name translated from the Koyukon language means *Obsidian Hill*, is located in central Alaska. Today we think of this as remote, but



The obsidian fingerprint: All obsidian from the same source has identical proportions of certain trace elements, which makes it possible to match obsidian artifacts with their source. This bivariate plot of zirconium and strontium elemental concentrations (analyzed by PXRF) shows 2,154 obsidian artifacts and geologic source samples analyzed by Speakman and Natalia Slobodina, fall 2007.

prehistorically, according to Speakman, it was probably easily accessible, which would account for its being the most common obsidian used by prehistoric people throughout Alaska.

Like many obsidian sources, Batza Tena spawned a number of sites, some associated with quarrying activities. Artifacts made

Public Symposium April 25, 2009, 9:00 A.M. to 3:30 P.M.

Old Questions, New Science: Reinterpreting Native American Origins

What is the latest archaeological & genetic evidence for the peopling of the Americas?
Sessions and speakers include:

Historical view of American Indian origins in relation to 19th c. anthropology and archaeology by Dr. Terry A. Barnhart of Eastern Illinois University

Contemporary archaeological methods and recent discoveries by Dr. Bradley T. Lepper, Curator of Archaeology at the Ohio Historical Society

Molecular genetic studies and recent findings about Native American populations by Dr. Cecil M. Lewis, Dept. of Anthropology, University of Oklahoma

Current controversies and unanswered questions in American archaeology by Dr. Kenneth L. Feder, Anthropology Dept. at Central Connecticut State University

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of Batza Tena obsidian were widely dispersed in the late Pleistocene and early Holocene, reaching distances of 500 km. The runner up is Wiki Peak obsidian, at 460 km. Wiki Peak obsidian, although extensively used, wasn’t easy to get. Instead it is found in what Speakman describes as “fairly isolated pockets,” a consequence of the challenging terrain in this part of Alaska (compared with Batza Tena, which is conveniently located on a tributary of the



Natalia Slobodina, University of Washington, analyzing obsidian artifacts from Alaska using PXRF at the Smithsonian’s Museum Conservation Institute, December 2007.

Koyukon River). Jeff Rasic, with the National Park Service and the University of Alaska, another key player in this project,

continued on page 13

THE PAGE-LADSON SITE is special. Lying at the confluence of the Wacissa and Aucilla rivers in the Florida Panhandle, it's a pioneering venture where over the last 20 years scientists have developed, fine-tuned, and put into practice new methods in underwater archaeology and laboratory analysis. After solving the problems of dealing with the obvious obstacles in excavating an underwater site, the team was astonished to discover extraordinary specimen preservation and a stratigraphic record spanning about 8,000 years that made it possible to assemble the first paleoclimatic model for the southeastern U.S. Now that environmental information is available, it puts another perspective on Southeastern paleoarchaeology—the relationship between man and beast, and their adaptations to the many climatic shifts of the Pleistocene age.

Discoveries made at Page-Ladson tell the story of times of want and times of plenty, times of extinction and new beginnings. A finding pivotal to future paleo-environmental studies is the stark contrast detected between the climatic histories of the Southeast and the Southwest. In time, the chronology of the Southeast will be worked into the big picture, both globally and in the Americas, and will greatly enlarge our understanding of the peopling of the Americas.

INTIMATE methodology

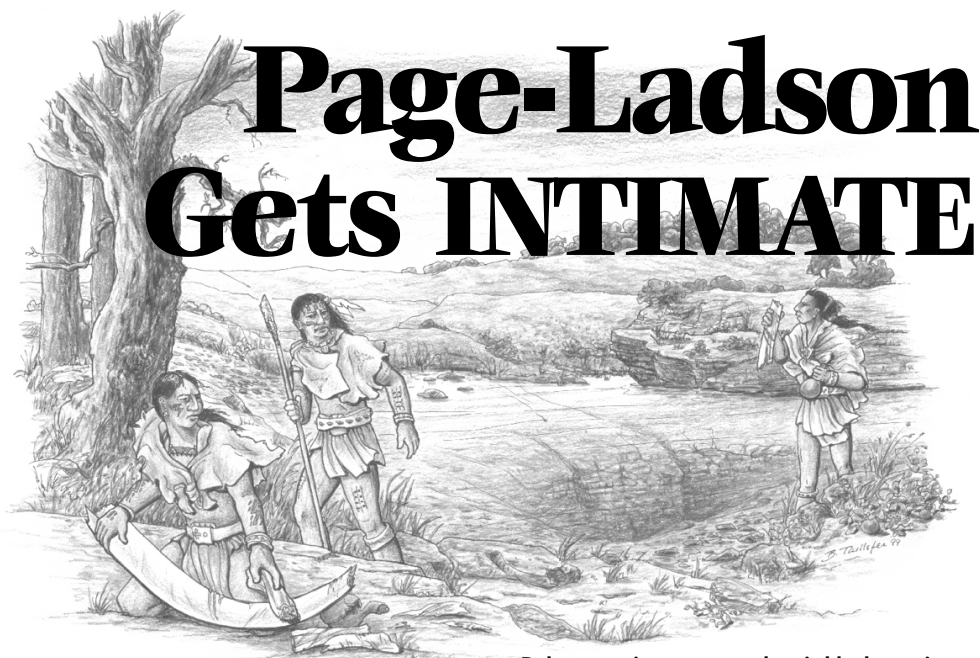
INTIMATE (INtegration of Ice-core, MARine and TERrestrial records) is a program of the International Union for Quaternary Research (INQUA) Paleoclimate Commission that uses a combination of disciplines and such related data as ice cores, marine sediment cores, and on-land excavations to develop age linkages and thereby construct the sequence of regional climate events. Jim Dunbar, Senior Archaeologist with the State of Florida's Bureau of Archaeological Research, Public Lands Archaeology program, chose the INTIMATE method of analysis at Page-Ladson—culling information from many sources—to help scientists better understand the effects of abrupt climate changes on the ocean and on land environments. A firm believer in the methodology of consilience (the happy state that's achieved when two or more independent approaches lead to the same conclusion), Dunbar believes that advancing a hypothesis only after finding confirming evidence from multiple sources fosters the creation of sound theories. Otherwise, he believes, "anything without confirmation is just speculation."

The site, a laboratory made to order

There was no shortage of data at Page-Ladson, since site

preservation in the Aucilla-Wacissa area is quite good. Not only pollen, grapes, seeds, and berries were recovered, but mastodon digesta and dung as well. Fairly rapid inundation of the area probably accounts for the excellent site preservation. This inundation occurred repeatedly; sediment layering suggests the water table rose and fell many times during the six millennia represented at Page-Ladson.

The Aucilla River, home to the site, is narrow, deep, and highly karstified. The river's subterranean origin takes it as much as 120 ft below ground. Karstification occurs when car-

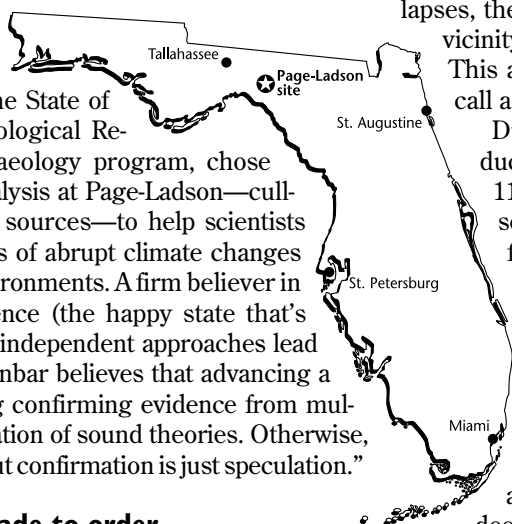


Paleoamericans around a sinkhole oasis.

BARBARA TAILLEFER

bonate-rich rock—Florida's limestone, for example—comes into contact with acidic groundwater charged from vegetation on the surface. Relentless dissolution produces voids in the rock. Springs, disappearing springs, sinkholes, natural bridges, and collapsing bridges are all results of the karstification of the Aucilla River. When a natural bridge collapses, the underground river becomes a surface river in the vicinity of the collapse before dodging back underground. This aberration is called a river siphon (what geologists call a swallet).

Dunbar explains the unusual circumstances that produced the Page-Ladson site. "Around the 12,000 to 11,000 year mark there was a natural land bridge on the south end of the sinkhole," he says. "If the water was flowing it would go back underground at that point, but sometime during the Archaic that land bridge collapsed. So now rather than being the end of a surface channel of the Aucilla River, this thing keeps flowing and goes much farther south before the river goes back down underground again." He compares the limestone bottom of the Aucilla River to a moonscape; some sections only 10 or 12 ft deep are pitted with abrupt, deep sinkholes that may be 30 ft deep. It's the sediments that collect in these depressions on the river bottom at the Page-Ladson site that Dunbar finds

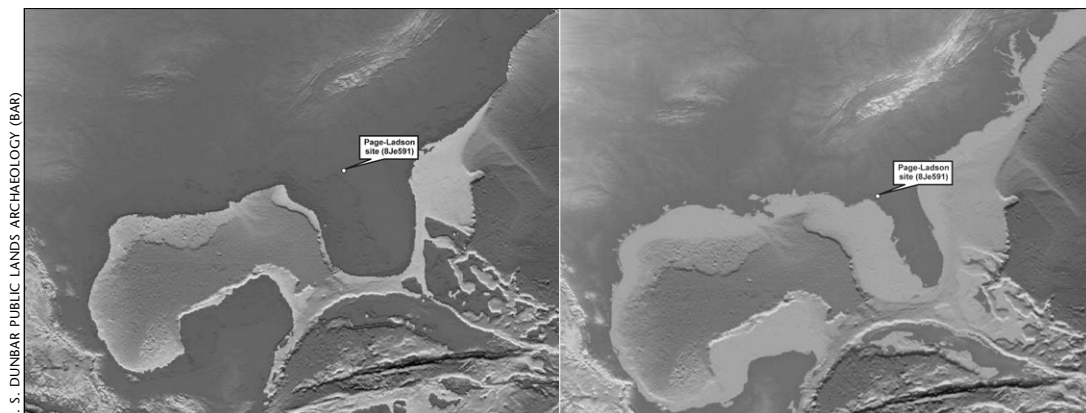


eye-opening. “The sediment at the Page-Ladson sinkhole spans that period of time we are really interested in,” he notes, “which is from the late glacial maximum and through into the early Holocene. There’s pretty much an entire stratigraphic record from about 18,000 RCYBP right up to about 9500 or a little

had environmental events, especially colder ones, which would kick in over the course of a decade or two. You’d have a warm event such as the Allerød, with glaciers receding and the like, and then during the beginning of the Younger Dryas you had this tremendous ice-rafting out into the North Atlantic.” He

calls these abrupt climatic changes “knife-switching.” Early Americans, hammered by successive cold events followed by gradual

Contrast between the shoreline at the last glacial maximum and today.
Dunbar’s droll comment:
“Location, location, location. Real estate just isn’t like it used to be.”



younger.” That stratigraphic record has made it possible for the team to create the first climatic model for the southeastern U.S.

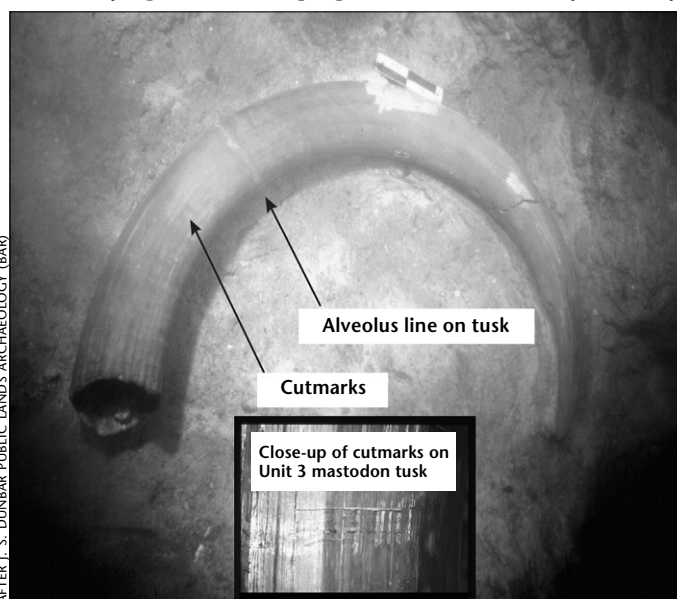
The effects of climate on Paleoamericans

Changing climate directly affects the availability of the resources essential to the life of a hunter-gatherer: potable water, protein, bone for toolstock, and quarries for toolstone. Drought attracted megafauna to a reliable source of water like the Page-Ladson sinkhole, making bone and protein resources readily available to Paleoamericans encamped nearby. Moreover, the dropping water table exposed low-lying chert outcrops, providing toolmakers with abundant supplies of stone. Fish, on the other hand, less plentiful in a period of drought, were less likely to be exploited. During wet conditions the reverse became true. The population of megafauna, now able to forage over a larger area because of plentiful water and browse resources, dispersed. Toolmakers, denied lowland outcroppings now submerged, found their sources of toolstone greatly reduced. Fish, now plentiful, became a mainstay of the diet.

Dunbar’s interest is the techno-environmental behavior of Paleoamericans. “You have a repertoire of tools and the technology that goes with it,” he explains. “Given enough time, people develop their toolkits to maximize the exploitation of the environment they live in.” This, he says, may be the reason there is no evidence of any sound horticultural or agricultural economy prior to the Holocene. “The last of the Pleistocene

warming at intervals of 100–500 years, were denied the opportunity to develop agricultural skills.

A solid grasp of the environment associated with a site is an important aspect of Paleoamerican archaeology, as important even as a good understanding of time. “Environments were shifting around wildly during the Pleistocene. This site [Page-Ladson] seems to be the first one that has provided the hook to let us understand the timing of climatic events,” Dunbar explains. For geoarchaeologists today, understanding the conditions people had to live in is as important as identifying the animals they were trying to exploit.



Evidence of a Georgia-to-Florida migration

One of the animals Paleoamericans relied on was the mastodon. The 7-ft-long tusk of a mature male American mastodon, *Mammuth americanum*, was found at Page-Ladson, along with stone artifacts and debitage from toolmaking. These materials associated with mastodons yielded seven dates with an average of $12,425 \pm 32$ RCYBP (about 14,400 CALYBP). Visual inspection of the tusk detects probably butchering marks, not

Excavated butcher-marked mastodon tusk at the Page-Ladson site. The tusk had been buried under more than 2 m of sediment.

unlikely given ivory’s place in the Paleoamerican toolkit. Further analysis of the remains reveals strontium uptake in the bone (MT 23-2, “Chemical Studies Reveal the Lost World of Pleistocene America”) that is consistent with the granite environment of the foothills of Georgia, near present-day Atlanta. The environment where the tusk was found, however, is limestone, not granitic, which suggests that mastodons may have migrated farther than previously thought. Oddly enough, one of the

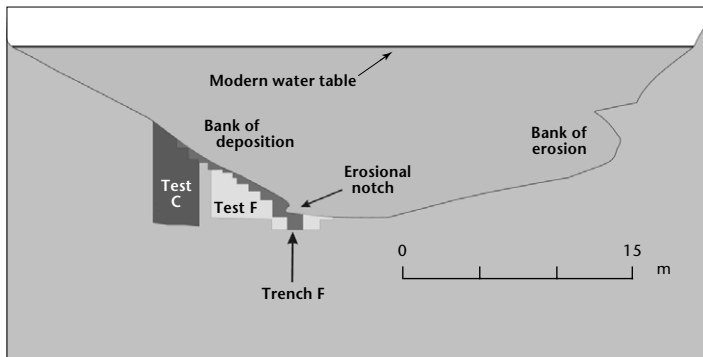
Page-Ladson site channel cross section, facing north.

first points ever found at the site back in the 1960s, the Page-Ladson point, appears to be made of Flint River chert, which sources out of Georgia. (Unfortunately the artifact was found out of context, one of a handful of points recovered by river divers who first discovered the site.) Unlike Paleoamerican sites in the Southwest, Southeastern sites of Clovis age and younger rarely yield exotic stone. Dunbar thinks it's possible, although still speculative, that the Page-Ladson point is a likely pre-Clovis candidate. If so, this is strong evidence that Southeastern Paleoamericans, like their mastodon prey, roamed over greater distances than previously thought.

Extinction of Pleistocene megafauna

Also intriguing is a controver-

Examples of Paleoamerican point types. A, Page-Ladson; B, Clovis; C, Lake Jackson (possibly reworked tips of broken Clovis points); D, Simpson; E, waisted Clovis; F, waisted Suwannee; G, Greenbriar-like Suwannee.



AFTER J. S. DUNBAR PUBLIC LANDS ARCHAEOLOGY (BAR)

Clovis, then Pleistocene megafauna in the Southeast didn't become extinct at 11,000 RCYBP. Their survival beyond the Younger Dryas onset boundary would certainly be news. Today, however, that's only an interesting supposition awaiting the radiometric dating of Suwannee-point sites.

Rounding out the prehistory of the Sunshine State

It's becoming increasingly clear how markedly the Southwest and Southeast prehistories differ from each other and how many surprises they hold. At the beginning of the Allerød, for instance, the desert Southwest was a gentle, moist environment while the Southeast was very dry. According to Dunbar, that set of circumstances

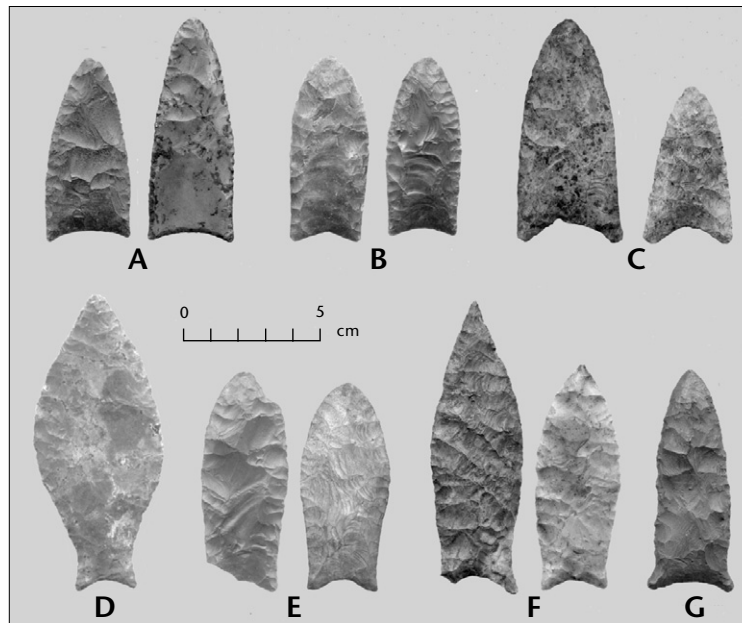
switched "in seesaw-like fashion" with the onset of the Clovis drought about 11,700 years ago. Research conducted in the Aucilla River area points to a rise in the water tables around 12,200 years ago; by the time of mid-Allerød, the Aucilla was flowing freely.

In the larger picture, the Eastern U.S. has produced a variety of lanceolate Paleoamerican points (Clovis, Simpson, Suwannee, Gainey, Redstone, Cumberland, Dalton) that must be researched further and their chronology established.

sial possibility involving the extinction of the Pleistocene megafauna. Although Suwannee points have not been dated in any context, Southeastern archaeologists say they are likely Clovis offspring, much like Folsom. Both the Ryan/Harley site on the Wacissa River (a tributary of the Aucilla) and the Norden site on the Santa Fe River 70 miles east of Page-Ladson have pro-

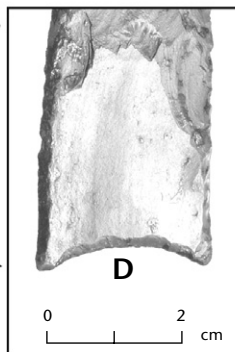
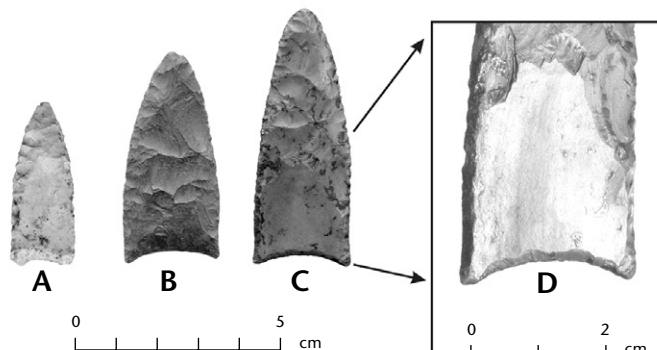
Who could have guessed there was such a diversity of points in the Southeast? A diversity so extreme, in fact, that Dunbar suspects there's something going on in Eastern prehistory that hasn't been seen in the West. "There are a lot of possibilities about what that could be," he says puckishly, "and I'll just leave it at that."

The Page-Ladson site has enormously benefited Southeastern geoarchaeology by giving us a fully datable stratigraphic profile. It'll take some time, of course, to work the chronology of the Southeast into the overall picture. "I think this kind of research needs to continue," says Dunbar. "And it takes a multi-disciplinary team to get in there and do these kinds of sites justice." Coring samples have been taken in the



AFTER J. S. DUNBAR PUBLIC LANDS ARCHAEOLOGY (BAR)

Examples of the Page-Ladson point type manufactured on thin flakes. A, from the Wakulla Lodge site (WA329); B-C, from the Page-Ladson site (JE591).



AFTER J. S. DUNBAR PUBLIC LANDS ARCHAEOLOGY (BAR)

duced extinct Pleistocene megafauna remains associated with Suwannee points. If Suwannee points are in fact younger than

Aucilla River, and geoarchaeology at other sinkholes in the Aucilla is becoming intensive. Dunbar is a scientist who is

obviously glad that investigations at Page-Ladson don't appear to be waning. Because this is the first geoclimatic model for the Southeast, the conclusions drawn from its data will have to be tested and possibly adjusted.

More pages to be turned—and a surprise pending

This is an exciting time for studying archaeology in the Southeast. For example, Dunbar is confident that late-Paleo-american sites will inform us about the evolution of the Bolen

The Answer Man

Jim Dunbar's encyclopedic knowledge of proboscideans is eclipsed only by his generosity in sharing it with others. We had proof of this in summer 2005 when *Mammoth Trumpet* editor Jim Chandler received this e-mail:

Hello,

My husband found what we believe to be a fossil of a mastodon. If you could look over these photos and let us know what you think we have found, we would appreciate it. It was found on the beach in southeast Texas. Thank you for your time,

Mildred McFarland

Attached to her message were four photos. Here are two, obviously taken with great reverence for accuracy and clarity.



The *Trumpet's* technical authority, CSFA Director Mike Waters, was out of town. Chandler turned for help to Jim Dunbar, a fine friend of CSFA and a scientist who over the years has contributed to *Trumpet* articles and prestigious CSFA technical publications.

Within 24 hours Mildred received this message from Dunbar.

Hi Mildred:

Jim Chandler, editor of the *Mammoth Trumpet*, forwarded your photographs to me to provide some comment.

Yes, the tooth is mastodon. The only other Proboscideans (elephant form) with similar-looking teeth are members of the family Gomphotheriidae (gomphotheres). The one in the photographs has the characteristics of the mastodon, which is of the family Mammutidae. Appears to be the typical *Mammut americanum* (American mastodon) tooth. Mastodons lived until the end of the late Ice Age and in the Texas and the American Southwest are believed to have become extinct by about 13,000 years ago (hope not to confuse but 11,000 radiocarbon years before present = 13,000 calendar years before present). Mastodons differed from mammoths in that they were browsers, meaning

they preferred scrubs and the tender leaves of trees, grape vines and the like. They also liked edible gourds, and their preserved droppings and/or digesta sometimes contains seed of these plants. They liked water and in my imagination at least, they were somewhat akin to pigs in their love for the waterhole. Mastodons do not appear to have been herd animals, which is also unlike mammoths. Studies have shown that mastodons tended to migrate over large territories, whereas mammoths did not and remained in relatively small territories. Mammoths packed together in matriarchal herds similar to the African elephants of today. Waco, Texas, has a site that has yielded a matriarchal herd of mammoths that were drowned in a flood. One last thing about mastodons. The body hair of mastodons is almost identical to its relatives' hair, the manatee and dugong. Mammoth hair, on the other hand, is similar to that of modern elephants and is unlike that of their marine cousins, the manatee and dugong or the mastodons. Guess you could say mastodons are representative of a more primitive line of Proboscidean.

One other, though, before closing. It is interesting that a mastodon tooth was found on the beach. Did this happen after a storm? There is a drowned lake that now lies offshore of the southeastern Texas coast that is noted for having late-Pleistocene-age land mammal fossils. Several decades ago some students at Texas A&M reported that site. Yet another famous Texas beach site is McFadden Beach (had to check your last name, it's close). The McFadden Beach site is a noted Clovis site and at least two investigations have been published about it. However, no one has located in place deposits (the stuff archaeologists dream about) as of yet. It's the undisturbed, in-place sites where archaeologists get to do Miami CSI-like investigations into the past. Such sites are not crime scenes—they are layer cakes of time which hold the puzzles of the past.

Hope this helps. The best.

—Jim D.

Observant readers will recognize Mildred's photo as the sample we showed to illustrate geologist Kathryn Hoppe's work in inferring migratory habits of megafauna by analyzing the chemistry of their teeth (**MT 23-2**).

Piquancy is added to this episode by the fact that Mildred isn't a *Trumpet* subscriber. CSFA was one of many hits she got in her Internet search for information on mastodons. We happen to be the only contact that replied to her inquiry.

Mildred and Jim Dunbar subsequently enjoyed a brief correspondence: a package of information on Paleoindians and Pleistocene megafauna from him, a message of gratitude from her for his thoughtful assistance. We're glad she is grateful for his gracious reply to her inquiry. We sure are.

—JMC

toolkit. He counsels that “if you want to study an interesting point in time in the Southeast, then find a very well stratified late-Paleoindian site because that is where you’re going to find evidence of Paleoindians transitioning towards Archaic subsistence because the Pleistocene megafauna at first thins out and then is gone prior to the onset of the early Archaic. Paleo-environmental studies light the way.

“The more we know,” he says confidently, “the more we are going to be able to predict where sites may occur.”

Dunbar, October 2003, before the mastodon skeleton recovered from Wakulla Springs in 1930 and now on display in the Florida Museum of History in Tallahassee.




ROY LETT, BUREAU OF ARCHAEOLOGICAL RESEARCH (BAR)

For Dunbar, a key to understanding Paleoamerican strategies for survival is the tendency for hunter-gatherers and fauna to congregate near scarce water sources during dry Pleistocene climate periods.

A case in point is Kirk serrated-point sites from the early Archaic. They aren’t easy to find because the sites are widely distributed over a wide territory. In fact, they seem to be all over the place, but because the environment was wet at the time and freshwater resources were plentiful, there wasn’t a need for animals to congregate near an oasis. On the other hand, if you want to find Bolen points, Dunbar advises looking near sources of deep water because dry conditions prevailed at the peak of the Bolen culture. This is the concept behind what he refers to as

“the big cheat sheet into the future of Paleoamerican archaeology.” It’s a hypothesis so simple it’s brilliant.

Dunbar hints at an upcoming announcement that will let us gauge the effectiveness of his hypothesis, but he refuses to divulge any further information on the subject. With a “sorry about that” and a chuckle, he closed our interview.

Page-Ladson has given the archaeological community a lot of gristle to chew on: new methods, a detailed stratigraphic record and paleoclimatic model for the Southeast, and new perspectives on the pressures dramatic climate swings of the Pleistocene imposed on early Americans and the flora and fauna they depended on. Until we hear the announcement Jim Dunbar hints is in the works, we’ll just have to keep our ears perked and try to be patient. 

—Dale Graham

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Suggested Readings

Our recommendations If you’d like to learn more about the Page-Ladson site, we recommend *First Floridians and Last Mastodons: The Page-Ladson Site in the Aucilla River*, edited by David Webb (below). In this volume there are 21 chapters written by Jim Dunbar and other scholars that detail the site’s geology and dating, climate history, plant and animal remains, and Paleoindian and Archaic archaeological records. We also recommend Barbara Purdy’s new book *Florida’s People during the Last Ice Age* (below), a comprehensive and interesting synthesis of the early human prehistory of Florida.

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HESTER

The Paleoamerican site that
wasn't supposed to be there

UNLESS NOTED, ALL PHOTOS: MISSISSIPPI DEPARTMENT OF ARCHIVES AND HISTORY; JACKSON, MISSISSIPPI

more noted for its prehistoric Woodland and Mississippian earthworks.

Three seasons of investigations by Brookes and McGahey confirmed stratified cultural deposits up to 4 ft deep, making Hester one of the largest intact Southeastern base camp sites containing discrete cultural components of the Paleoamerican and Archaic periods. Archaeology at Hester, which lies on the boundary of the Tennessee and Mississippi River basins, clarified prehistoric projectile-point chronology, revealed innovations in lithic technology, and enlarged our understanding of early explorers and settlers of the Eutaw Hills.

Overview of the Hester site, located in the background near the tree line, as it looked in 1974. The borrow pit in the foreground hadn't degraded the site.

by Mark R. Barnes

COLORED BITS OF STONE caught the eye of two amateur projectile-point collectors in early 1973 as they combed the ground abutting a creek in northeastern Mississippi. This region in the Eutaw Hills had never produced a find of major archaeological significance and was now home to an unglamorous gravel operation. Thanks to their alertness and the guidance of professionals, collectors Glenn Beachum and Alan Harrison were about to make an important contribution to early Southeastern prehistory, for the Hester site they discovered is today recognized as a nationally significant middle- to late-Paleoamerican (10,000–11,000 CALYBP) and early-Archaic (9000–10,000 CALYBP) base camp.

From responsible avocationalists into the hands of capable professionals

Recent plowing had removed dense forest litter that normally blanketed the ground, and Beachum and Harrison recognized that the stone flakes—colored bright yellow, orange, pink, and red—that stood out in stark contrast against sandy tan soil were lithic debitage. After a few weeks of digging, they recovered nearly twice as many Paleoamerican and early-Archaic diagnostic lithic artifacts as had previously been found at any site in Mississippi. Fortunately for American archaeology, they suspected their material came from stratified contexts that might contain even more early human artifacts. Rather than relegating their finds to a coffee can, they took them to Sam Brookes and Sam McGahey, staff archaeologists with the Mississippi Department of Archives and History in Jackson. By a happy coincidence, the scientists had a professional interest in Paleoamerican and Archaic cultures in a state

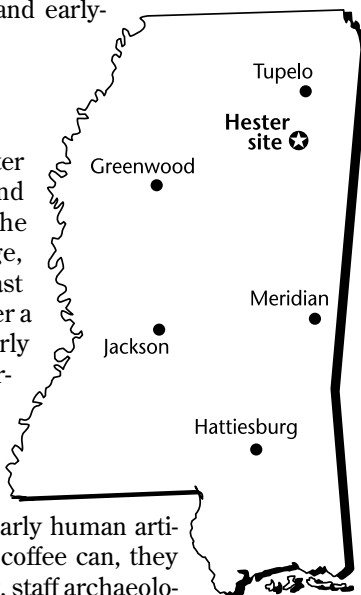
Peeling back layers tells the history of Hester

The Hester site lies on an alluvial floodplain next to a small creek, which empties into the Tombigbee River. The Eutaw Hills soil consists of micaceous glauconite sand layers, which in the area of the Hester site overlie Tuscaloosa chert deposits. These chert deposits, exposed by erosion in the nearby creek, were doubtless a principal reason for repeated occupations. Hunter-gatherers scouting for an ideal location for a base camp sought to satisfy three requisites: a reliable source of water, an ample supply of food, and stone for making tools. At Hester they found all three. Although the Tuscaloosa chert was inferior in knapping quality to, say, fine Edwards chert, we'll see how resourceful toolmakers found a way to work around the deficiency in local toolstone.

Brookes and McGahey visited the site in December of 1973 and immediately excavated five 5-by-5-ft test pits to define the depth and extent of the site and hopefully to determine which cultures had occupied Hester and their sequence. Their excavations revealed four distinct soil zones at the Hester site:

- 1) a surface layer of black sandy humus 1.2 ft deep;
- 2) a layer of red-brown sand, extending to 3.4 ft below the surface;
- 3) a layer of yellow sand 3.4–4.4 ft below the surface;
- 4) a layer of white sand that overlies the tan Tuscaloosa chert deposits. This lowest sand layer is a culturally sterile, naturally occurring level.

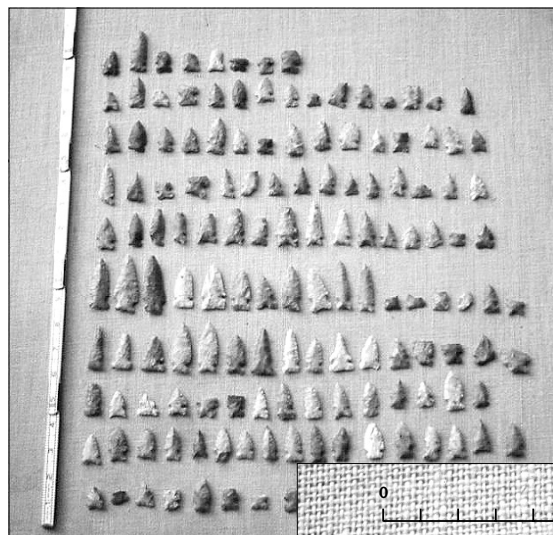
The surface layer, as expected, was a plowzone. Strata containing cultural materials of the middle-Archaic, late-Archaic, Woodland, and Mississippian periods, identified by



ceramics and projectile points, had been deflated by cultivation and their contents hopelessly intermixed.

In the reddish brown sand layer investigators found evidence of early- and middle-Archaic occupations (10,000–7000 CALYBP). The early-Archaic artifacts, made almost exclusively of native Tuscaloosa chert, included Lost Lake, Greenbrier, Pine Tree, Decatur, Eva, Morrow Mountain, Beachum, and Big Sandy projectile points, along with stone cores, large flakes, prismatic blades, nutting stones, unifacial

A few of the Archaic and Paleoamerican projectile points recovered at the Hester site in early 1973 by Beachum and Harrison. This evidence led McGahey and Brookes to undertake investigations in 1973, 1974, and 1978.

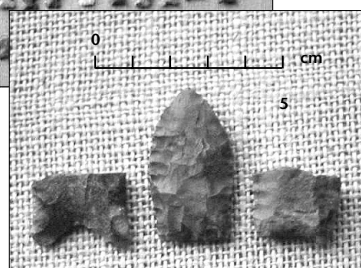


(Inset) A complete fluted point and bases of two points recovered at the Hester site by Beachum and Harrison in early 1973. The point on the far left was made from dark gray Fort Payne chert native to north Alabama, probably deposited by some of the earliest occupants of the site. The other two points are made from local tan Tuscaloosa chert.

Paleoamerican period. Brookes likewise concludes that the presence of Fort Payne chert material associated with a pre-11,000 CALYBP Paleoamerican occupation at the Hester site is evidence of initial inhabitants of the Eutaw Hills emanating from the east to explore and eventually colonize the area of present-day northeast Mississippi.

McGahey, on the other hand, is more cautious about accepting as fact occupation at Hester as early as Clovis or Cumberland merely because of the presence of these fluted points. In the first place, he notes that they aren't in good context; moreover, he suspects that "they may all have been transported there by later prehistoric inhabitants." Perhaps, in his view, a member

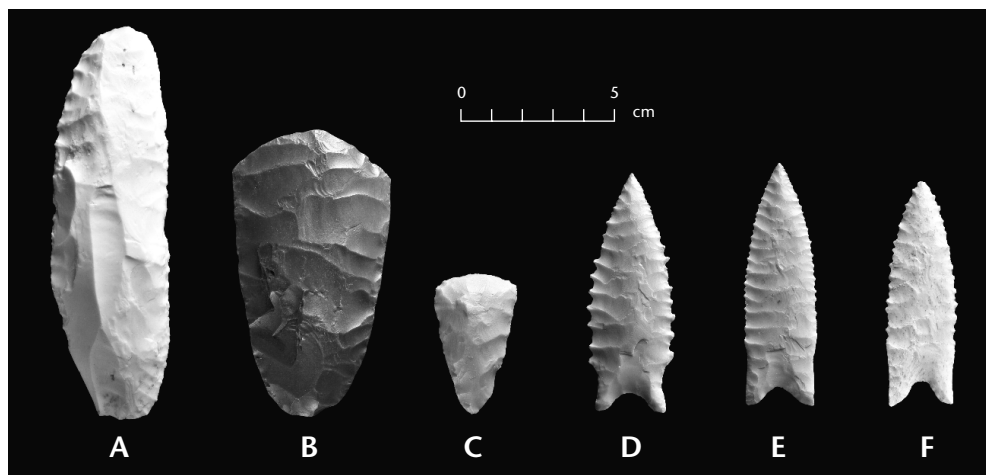
of the Dalton culture or some other Early American appreciated the fine workmanship in a discovered Clovis point. McGahey's skepticism underscores the need for further research at Hester.



endscrapers, and bifaces. To Brookes and McGahey the range of flaked-stone and finished tools indicated that "tools were completely finished at the site," indicative of a base camp occupation.

The upper portion of the yellow sand layer contained middle- and late-Paleoamerican (Quad and Dalton) artifacts (11,000–10,000 CALYBP) made of local tan-colored Tuscaloosa chert. Two fluted Paleoamerican points were found in 1978 toward the lower part of this layer, one Clovis and one Cumberland. They were made not of local tan chert, but of blue-gray Fort Payne chert from the Tennessee River Valley of northern Alabama more than 100 miles to the east. Al Goodyear,

Lithic artifacts of the Dalton culture from the Sloan site in Arkansas, which was occupied at the same period as the Hester site. A, unifacial knife; B, adze; C, endscraper; D–F, projectile points.



principal investigator of the Topper site in South Carolina (MT 21-4, "Clovis at Topper"), finds it significant that both fluted points came from "the lower portion of the yellow sand zone" (middle and late Paleoamerican, Quad and Dalton occupations). For Dr. Goodyear, this is strong evidence for the presence of one or more occupations of fluted-point makers of the

Fixing the boundaries of Hester

Brookes and McGahey's five test pits demonstrated that intact Paleoamerican and early-Archaic deposits extended to an astonishing depth of 4 ft. Brookes notes, however, that the horizontal sequencing of strata "was not readily apparent because only small widely scattered [test] pits were excavated," rather like a half-opened Christmas Advent calendar. In 1974 the scientists dug two more test pits and a trench 150 by 5 ft to

verify the cultural strata sequence and determine the horizontal extent of the site.

This 1974 trenching operation discovered, in addition to more of the same types of Paleoamerican and early-Archaic tools as found in the initial test pits, blade cores, *pièces esquillées* (lithics produced using a bipolar flaking technique),

adzes, drills, knives, choppers, hammerstones, a mano, anvils, abraders and grooved stones, fire-cracked rock, and banner-stones not found in earlier investigations.

In 1978, Brookes expanded excavations on either side of the 1974 trench, netting a total excavation of 1,350 ft². Goodyear notes that this work conclusively confirmed “a good stratigraphic separation of the Early Archaic notched points associated with the dark red-brown sand zone from the Dalton (late-Paleoamerican) material in the yellow sand zone.” What’s more, these excavations also identified a previously undetected Quad (middle-Paleoamerican) horizon below the Dalton occupation in the lower portion of the yellow sand zone, pushing back the initial occupation of the site by another 1,000 years.



Follow-up investigations by Brookes and McGahey concentrated on areas of the site to the northwest of the area explored by the discoverers. This excavation area was given State site survey number 22Mo569 and the name Hester-Standifer, a combination of the landowner’s name and a nearby geographical feature. Eventually the Hester site was expanded to the southeast of 22Mo569 to include the area first investigated by the collectors. This part of the Hester site was given the number 22Mo1011 and named the Beachum-Harrison site in recognition of the original discoverers. The Hester site, which embraces both sites and bears both State site survey numbers (22Mo569 and 22Mo1011), was listed in the National Register of Historic Places in June 1975. The Hester Site was designated a National Historic Landmark by the Secretary of the Interior in January 2001, under a joint Mississippi Department of Archives and History and Southeast Regional office of the National Park Service effort.

Solving the mystery of the Technicolor stone flakes

Remember those brightly colored flakes of stone that originally caught Beachum and Harrison’s attention? McGahey’s exhaustive analysis of lithic material from the Paleoamerican and early-Archaic strata (the red-brown and yellow layers) determined that Hester toolmakers developed innovative heat-treating techniques to improve their ability to work the local inferior Tuscaloosa chert into useful tools. Heat treating changed the color of the tan chert to vivid reds, pinks, and yellows.

McGahey tells us that the earliest examples of heat treating, which apparently date to Clovis times, “often left little obvious indication on bifaces, the most common remaining indication being a reddened distal end, auricle [shoulder], or both. This phenomenon appears to be the result of heat treating at lower temperatures or at an earlier stage of reduction than was the

case with the later technique.” The later, improved technique, apparently begun at the Hester site in the lanceolate (early Dalton) period and further refined during the later (side-notched Dalton) period, was used almost exclusively in the succeeding early-Archaic period. Applied to the tan Tuscaloosa chert found at Hester, heat treating produces a complete color change and imparts to the chert “a bright, lustrous appearance after flaking.”

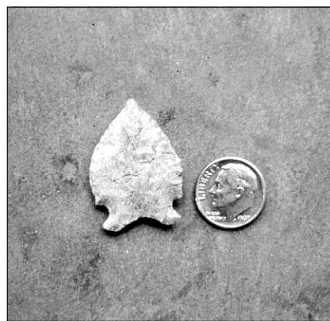
Over the millennia, knappers at Hester applied their enhanced technique of heat treating Tuscaloosa chert so extensively that the practice may be responsible for the reddish brown hue of the early-Archaic soil layer.

Tendrils of inquiry extend beyond Hester’s borders

Of especial value to archaeologists are artifacts of the Dalton period found at the Hester

Byron Inmon, then a graduate student of the University of Arkansas, excavating at the Hester site in 1974 under the auspices of the Mississippi Department of Archives and History.

site. Dating Dalton projectile points in the southeastern U.S. has always been problematic. Although research from some sites places Dalton points exclusively in the late-Paleoamerican period, evidence from other sites suggests manufacture of Dalton points continued into the early Archaic. The Dalton component at the Hester site, according to Brookes, is “the only known occurrence of such an isolated Dalton deposit in Mississippi and one of the few known in the Southeast.” A dozen Dalton projectile points were uncovered in excavations at the Hester site—perfect specimens, since they aren’t mixed with later cultural materials—along with Dalton-period tools including burins, knives, blades, flakes, end- and sidescrapers, graters, pitted stones, cores, *pièces esquillées*, and hammerstones.



“All categories of artifacts from the Dalton zone,” says Brookes, “would seem quite in place in a hunting-butcher station.” The 1974 trenching

An early-Archaic projectile point recovered by Beachum and Harrison from the Hester site in early 1973.

operation uncovered evidence of at least two separate Dalton occupations at the Hester site. Dalton tools recovered from the trenching operation of 1974 didn’t show signs of heat treating, were predominately lanceolate in form, and had little side notching. They differ markedly from Dalton points recovered by collectors Beachum and Harrison, which bore evidence of side notching and heat treating, indicative of a later Dalton occupation in which toolmakers used heat treating. Thus

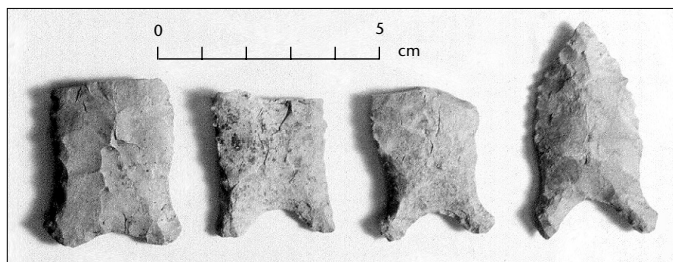
Hester has given us two discrete Dalton hunting and gathering occupations, one Paleoamerican and one early Archaic, separated in time, space, and by lithic technology. This nugget of information will pay off handsomely in dating Dalton artifacts at other early Southeastern sites.

Informing us about adzes . . . and much more

Early-Archaic occupations at Hester are a continuation and elaboration of the initial Dalton-period base camp occupation. Discoveries of adzes and nutting stones are evidence that activities expanded in the early Archaic to include woodworking and processing wild plant foods. McGahey notes that although no faunal remains were recovered from these occupation levels, remains of hickory nuts, walnuts, hackberries, acorns, and wild plums were recovered from both late-Paleoamerican and early-Archaic occupation levels.

The Brand site in Arkansas, a Dalton-phase site, has produced adzes similar to those found in the early-Archaic level of

Quad points, made from local tan Tuscaloosa chert, excavated from the Hester site in 1974. They were found below the stratum containing Dalton points, which confirms the chronological ordering of Southeastern Paleoamerican artifacts.



the Hester Site. It's possible that adzes weren't found in the Dalton component at Hester because of sampling error. Brookes considers it also possible that the adze was introduced as a new tool type from Arkansas during the succeeding early-Archaic period. If he's right, then the introduction of adzes into the Hester site during the early Archaic may signify a vector of transmission of new tool forms from the west into the Eutaw Hills of Mississippi.

The intact cultural stratigraphy of the Hester site has been of enormous help in identifying projectile points and assigning them to cultural periods at other Southeast sites. Unlike many Alabama sites where Big Sandy and Dalton artifacts have been found together, at Hester there is, Brookes notes, "a clear separation between the two types, Dalton points lying beneath Big Sandy points. At the Hester site, therefore, it can be definitely stated that the Big Sandy occupation occurred after the Dalton occupation."

Other early-Archaic projectile points besides Big Sandy points, including Greenbrier, Jude, Plevna, Ecusta, Decatur,

Autauga, Josselyn (Provisional type), Pine Tree, Lost Lake, and Beachum, were found at Hester above the Quad and Dalton yellow sandy layer. These points are similar to types found at the Stanfield-Worley Rockshelter and Russell Cave, both in nearby northern Alabama, where Dalton and early-Archaic points shared the same stratum. Because of the mixed nature of these cave sites, John W. Griffin in 1974 postulated that Dalton and Big Sandy point makers coexisted; moreover, he doubts that Big Sandy points will ever be found in a pure context.

Brookes counters Griffin abruptly: "Hester has answered Griffin's question: Big Sandy points are found in a zone above the Dalton assemblage."

Brookes also notes differences between Dalton and Big Sandy points made evident at Hester: color (Daltons are light yellow, whereas heat-treated artifacts of later cultures are overwhelmingly reddish) and lithic technology (he is confident that analysis of flakes from Hester will find evidence of a different heat-treating technique). "Not only point form and soil zone,"

Brookes concludes, "but also technological aspects demand a separation."

McGahey offers helpful advice, based on his analysis of points recovered from Hester, on re-

solving a sticky problem that confronts researchers: differentiating early-Archaic Dalton and Greenbrier projectile points. Both are similar types quite close in time and usually not distinguishable, particularly when both types are made from tan Tuscaloosa chert. He notes that Greenbrier points from Hester have a straight or slightly concave base, unlike a Dalton point, whose base is usually definitely concave. Greenbrier points in north Mississippi are more likely than not to show evidence of heat treating, which changes the usually tan stone to a shade of red. Finally, McGahey observes that a Greenbrier point is likely to have been recycled as a wedging tool, the hard duty resulting in multiple impact flake scars emanating from the distal and proximal ends.

Hester and our changing view of early cultures

We used to think Paleoamericans were big-game hunters that lived only on the Great Plains and hunted exclusively megafauna. Decades of continuing research have altered our perception of these groups. Now we see they were in fact

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cultural innovators that explored and colonized many different ecological zones and exploited many kinds of game and plant foods. This is the changing “big picture” of the Paleoamerican and early-Archaic periods. The Hester Site, and others like it, gift us with the minutiae of cultural information—how and from where areas were colonized and new tool types intro-

duced; what activities were performed at a site and how these evolved through time; how these people physically modified the environment at this locale.

Preserving national landmarks like the Hester site is critical to future generations of researchers who will ask questions about cultural data we may not even have conceptualized. 

This article and previous articles on the Borax Lake site (MT 22-2) and Hardaway site (MT 22-4) grew out of a National Park Service effort to develop National Historic Landmark studies for consideration by the Secretary of the Interior while I was employed as a Senior Archeologist with the National Register Programs Division of the Southeast Regional Office in Atlanta, Georgia. Albert Goodyear suggested the series of articles for the *Mammoth Trumpet* as a memorial to my colleagues and friends Robson Bonnicksen, who was instrumental in developing the Borax Lake land-

mark study, and Thomas Eubanks, Louisiana State Archeologist, whom I had worked with to preserve several sites in his state. Proceeds from these articles will be donated to the Archaeological Conservancy to help purchase and preserve archaeological sites in their memory. Special thanks to Sam Brookes and Sam McGahey for their helpful comments in drafting this article.

—Mark R. Barnes, Ph.D.

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Following the Obsidian Trail

continued from page 3

recently visited Wiki Peak. He found artifacts throughout this area.

Apart from Alaska, there is an obsidian source in the Aleutian Islands on a volcano called Okmok. There are dozens of sources in British Columbia, the Yukon Territory, and southeast Alaska; obsidian from three of them—Hoodoo Mountain, Suemez Island, and Mount Edziza—was used extensively by pre-historic people. Obsidian from Mount Edziza, for example, has been found in the Alaska interior, about 1,200 km from its origin.

Post-Cold War cooperation

After the fall of the Soviet Union at the end of 1991, researchers from America and the former Soviet Union joined forces in an attempt to confirm the Bering Strait theory. It was thought that when scientists from these two continents got together it would be a simple matter of comparing their respective fluted points. However, no Clovis-like material has been discovered in Siberia. This doesn't rule out the possibility that early people migrated over the Land Bridge; it simply means scientists are going to have to get creative to prove it.

Today obsidian sourcing is practiced by scientists in Siberia in the states of Kamchatka and Chukotka. Kamchatka is a well-documented area, as far as obsidian is concerned. In all, 30 sources lie within its borders, but only 16 were used prehistori-

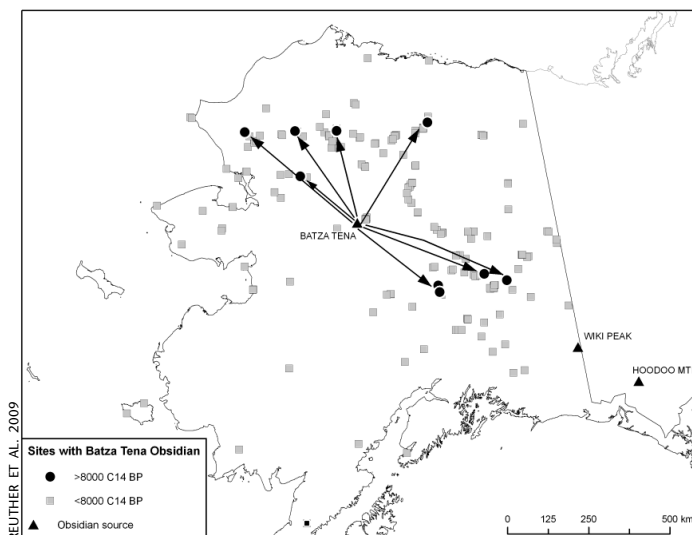
cally. Interestingly, there is a group of sites here known as the Ushki Lake sites, which contain components thought to be older than 13,000 CALYBP (MT 18-1, “Hunting Pre-Clovis in Siberia: Year 2000 Excavations at Ushki, Kamchatka”).

This obsidian project, spanning continents, is a huge international effort. Collaborating with American researchers including Speakman and Michael Glascock, of the University of Missouri, are Russian scientists Yaroslav Kuzmin, Vladimir Popov, Andrei Grebennikov, Margarita Dikova, and Andrei Ptashinsky. Together they have studied Ushki Lake and discovered six sources of Kamchatka obsidian that were utilized in the Pleistocene. This information confirms the significant mobility of these early people. It also suggests they may have kept moving, right across the Land Bridge, to become the first Americans.

The state of Chukotka in north-east Russia is a little less forthcoming with information. Analysis of

obsidian artifacts from the surrounding area documents three sources, but only one has been located, Krasnoye (Red) Lake. Some 150 artifacts have been analyzed from this state, and 90 percent of them come from the Krasnoye Lake source.

Distribution of Alaskan archaeological sites known to have obsidian obtained from the Batza Tena source.



obsidian artifacts from the surrounding area documents three sources, but only one has been located, Krasnoye (Red) Lake. Some 150 artifacts have been analyzed from this state, and 90 percent of them come from the Krasnoye Lake source.

The big question

You have to be able to identify East Beringian obsidian so you can distinguish it from Siberian obsidian. But if the location of a source is unknown, how can you know whether obsidian came from Alaska or, say, Siberia? And there are 23 obsidian sources whose locations remain unknown.

Since the database for Northeast Asian obsidian is very thorough, it's unlikely that unknown obsidian material found in Beringia comes from sources in Northeast Asia. "We've analyzed about a thousand artifacts and geologic source samples from Kamchatka," says Speakman. "We have a very good idea of what the obsidian looks like chemically. So I think that there's little likelihood that some of the unknown Alaska groups are from Kamchatka." However, he allows the slim probability that unknown sources may lie in Chukotka and areas west of there because these locations are less well understood.

With all this information, has any Siberian obsidian been found in Beringia? The answer is yes. Unfortunately, none of it is datable to the Pleistocene. John Cook of the Bureau of Land Management in Alaska documented the first immigrant obsidian from Russia in a 1995 article in *Arctic Anthropology*; since then, a handful of other pieces have surfaced. All of these, however, date to the late Holocene. Nonetheless, Speakman and his Alaskan collaborators, Jeff Rasic and Joshua Reuther (Northern Land Use

Geologist Andrei Grebennikov (left) and Speakman examine obsidian at Nachiki, Kamchatka, summer 2004.



Research, Inc., Fairbanks), remain optimistic that Siberian obsidian will be found in Alaskan archaeological sites that date to the late Pleistocene or early Holocene.

There are a number of sites dating to the Pleistocene in Beringia. The oldest is the Swan Point site, whose cultural zone has been dated to about 12,000 RCYBP. Swan Point lies almost directly between Batza Tena and Wiki Peak, and all its obsidian artifacts are assumed to be made of material from Alaskan sources. The puzzle is further complicated, of course, by the

number of sites that predate Swan Point in both the continental U.S. and South America.

But what can it mean?

So why hasn't Russian obsidian from the Pleistocene been found in Alaska? The first obvious answer is simply that the Bering Land Bridge wasn't the original access to the New World as we thought. This is a difficult bit of information to swallow for those of us who have been taught it since elementary school. It begs the question, Where else? Dennis Stanford and Bruce Bradley argue that Clovis was introduced by immigrants from the Solutrean culture in Europe (MT 17-1, "Immigrants from the *Other Side*?"). According to this hypothesis,

boat people made their way to the New World 15,000 to 20,000 years ago by skirting the North Atlantic ice sheet. Other researchers, including Loren Davis and Roberta Hall (MT 22-1, "Late-Pleistocene Occupations on the Oregon Coast"), and Alan Bryan and Ruth Gruhn (MT 17-2, "The Baja Connection"), envision boat people skirting the Pacific coast and settling as far south as Baja California. These theories are still overpowered by the classic model of migration

over the Bering Land Bridge, and they haven't been seized upon by the archaeological community at large. But evidence continues to mount in support of both of these scenarios.

There's another alternative to tossing the dominant Bering Land Bridge theory out the window: Perhaps the Clovis culture never existed in Northeast Asia. "Clovis could be a New World manifestation," Speakman suggests, "but the actual people themselves are migrants that could have come across the

continued on page 20

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- Glascok, M. D., V. K. Popov, Y. V. Kuzmin, R. J. Speakman, A. V. Ptashinsky, and A. V. Grebennikov 2006 Sources of Obsidian on Kamchatka Peninsula (Russian Far East) and Their Use in Prehistory: Initial Results. In *Archaeology in Northeast Asia: On the Path to Bering Strait*, edited by D. E. Dumond and R. L. Bland, pp. 73-88. University of Oregon Anthropological Papers No. 65. University of Oregon, Eugene.
- Goebel, T., R. J. Speakman, and J. D. Reuther 2008 Results of Geochemical Analysis of Obsidian Artifacts from the Walker * Road Site, Alaska. *Current Research in the Pleistocene* 25:88-90.
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*A Center for the Study of the First Americans publication.

In the footsteps of Junius Bird

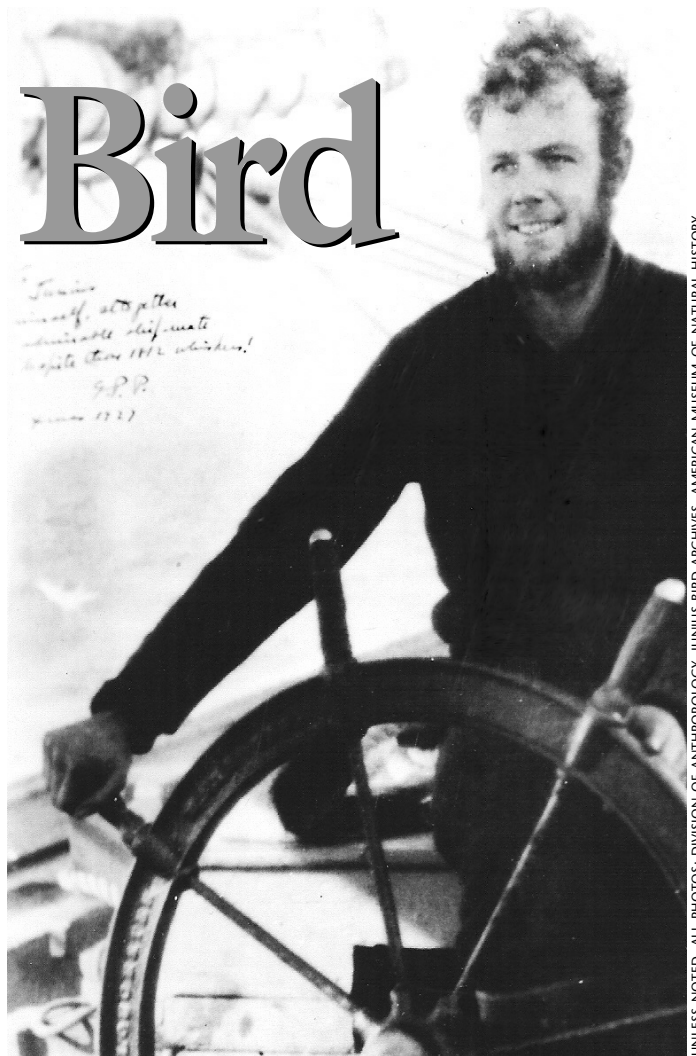
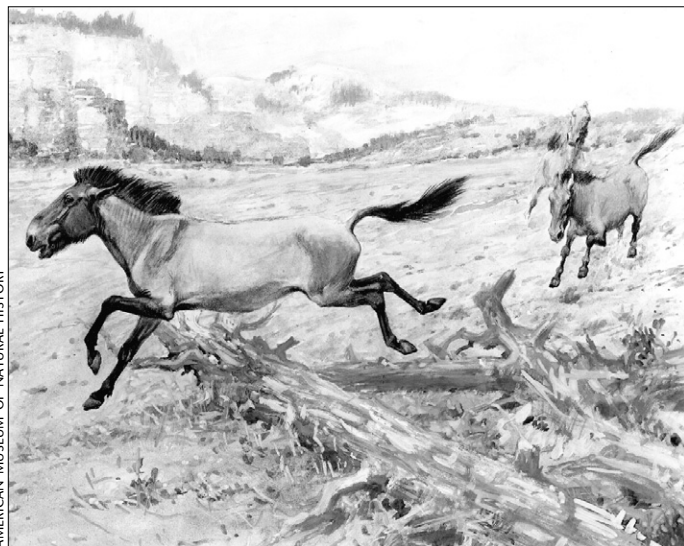
Part III: Reexamining the Record

MAGICIANS pull rabbits from hats. Archaeologist Tom Amorosi prefers to have an ace up his sleeve.

Dr. Amorosi, Research Associate in the Division of Anthropology at the American Museum of Natural History in New York, sometimes slips a special red ace of spades into a card deck to replace a black one when lecturing students. He fans the deck on a table, asks if they notice anything unusual, and then waits until someone spots the bogus red ace. It invariably takes graduate students longer to find the card than it does his undergraduates; his more experienced peers take the longest of all to find the card.

The trick, he says, demonstrates that strongly held assumptions might not always be correct, and that the longer we hold those assumptions the more vulnerable we become to overlooking certain details or discrepancies.

This lesson is uniquely important to the study of old museum collections—there's always something new to learn each time they are examined, particularly with a fresh perspective



The archetypal young bearded scientist! Junius learned his seamanship aboard Captain Bob Bartlett's sloop on the southern Labrador coast in 1927.

and an open mind. Amorosi is organizing an international effort that will review with fresh eyes and state-of-the-art methods pre-Columbian collections of archaeologist Junius B. Bird that have been housed in the U.S. and Chile for more than half a century. Some parts of those collections have been repeatedly reviewed. Others have never been touched.

Bird's ground-breaking work of nearly 70 years ago clearly

Equus scotti depicted by Knight, the artist who executed the painting on our cover. The discovery of extinct horse remains at Fell's Cave and Pali Aike was considered firm evidence of the association of humans with Pleistocene-age fauna. Bird thought horse remains found in these rockshelters belonged to *E. scotti*. Although Bird's horse remains are still under study by Amorosi, their actual taxonomic affiliation is probably assignable to an older equine genus, *Onohippidium*.

This map by D. F. L. Bradley, which plots the Birds' 1936–37 journey in the Southern Cone, also shows the sites of Fell's Cave and Pali Aike.

demonstrated that humans coexisted with now-extinct mammals at the southern tip of South America some 11,000 radiocarbon years ago, approximately coincident with the Clovis culture in North America. His work raised questions that continue to stir heated debate about the timing of human entry into the New World. His stratigraphic work also provided baseline original research and human occupation sequences that have guided archaeological thought about that region ever since.

Whether there is a red ace hidden in that body of research remains to be seen. But Amorosi and the team he assembles intend to watch for it.

Amorosi recognizes the value of museum collections like Bird's. "Sometimes we can get blinded by expectations of what should be there," he admits. "Sometimes we can get some valuable new information out of these collections, or use them as a springboard for future analysis or the testing of new research questions. And, yes, sometimes we run into blind alleys. But I think it is worth the effort."

There's no shortage of material for researchers to study in the collection at the American Museum, which could fill two 8-by-10-ft rooms. It spans the time from the Pleistocene to the 19th century. The faunal material for Pali Aike Cave alone, Amorosi notes, comprises 10,000 remains.

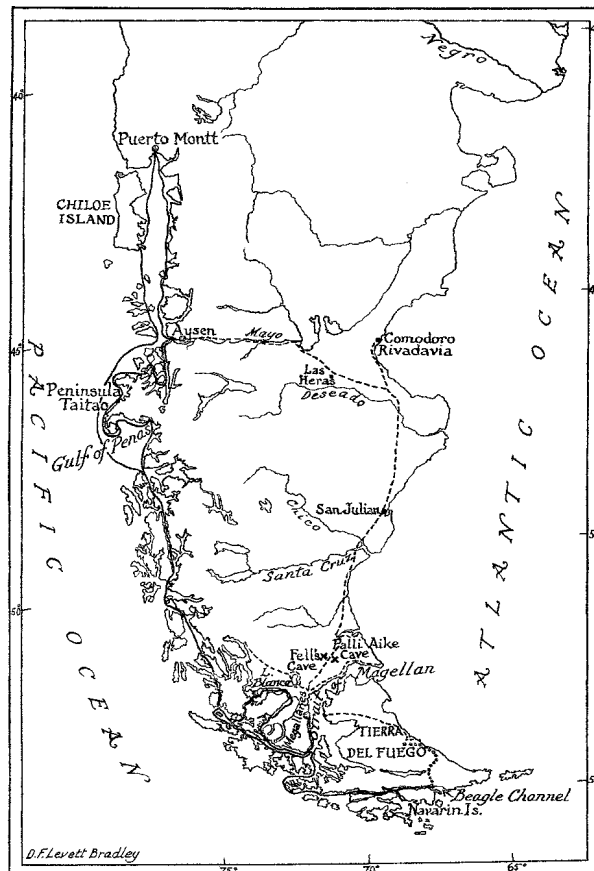
For most of us research on this scale would be daunting, probably harrowing. Amorosi comes well prepared for the task after examining more than half a million bones for his dissertation project in Iceland.

Assembling the team

The project today is in its infancy. As Amorosi describes the current state in re-

A major problem in the 1969–70 field season at Fell's Cave was removing large and potentially dangerous boulders from the cave's stratigraphy. Ever resourceful,

Bird and his son figured out how to leverage these boulders out of the way of his excavation team.



cruiting team members, "We are still finding out who wants to play in the sand box."

On board so far are **Michael Waters**, director of CSFA, and **Thomas Stafford** of Stafford Research Laboratories in Boulder, Colorado, who together will refine dates on some of Bird's materials; **Jaco Weinstock** of the Ancient DNA and Evolution Group, Centre for Ancient Genetics, Neils Bohr Institute and Biological Institute, University of Copenhagen, Denmark, will help with DNA work; **Andrew Dugmore** of the Institute of Geography, School of Geosciences, University of Edinburgh, Scotland, will date volcanic ash from some of the sites in his tephrochronology laboratory; **Mario A. Rivera**, a former colleague of Bird's from Chile and now a visiting professor at Beloit College in Wisconsin, will assist with data analysis. Paleontologist **Francisco Juan Prevosti** of the Departamento Científico de Paleontología de Vertebrados at the Museo de La Plata, La Plata, Argentina, will be

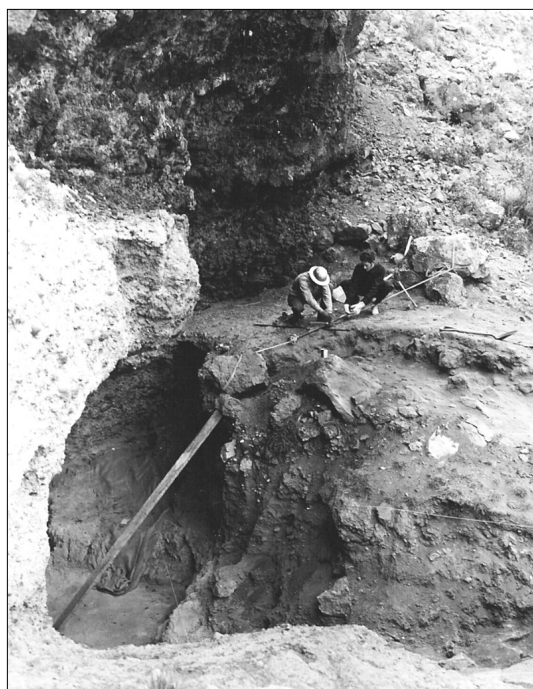
there. So will **Luis A. Borrero** and **G. Lorena L'Heureux** of the Departamento de Investigaciones Prehistoricas y Arqueologicas (CONICET), Buenos Aires. **Sumru Aricanli**, Senior Scientific Assistant at the Division of Anthropology, AMNH, helps organize the researchers and the collections.

Project details, such as research questions to be asked and

tasks to be assigned, have yet to be determined. Money to finance what Amorosi sees as a possible 5-year project—assuming his full-time devotion to it—remains elusive. Nevertheless, grant writing is underway, and Amorosi is optimistic that information gathered so far will leverage money to expand and continue the project.

Inventorying the record

Meanwhile, Amorosi and his team plow onward. "We have only inventoried the [American Museum] collections at this point," Amorosi says, and that inventory is far from complete. But he sees a storehouse of information locked up in bones from the collections. He notes, for example, that Wein-



stock and another set of colleagues in Argentina are already investigating ancient camelid DNA to see how far back in time they can trace different camel species in Bird's collection.

Also bound up in the data is the issue of whether the domestic dog existed in Pleistocene South America. Juliet Clutton-Brock examined the carnivore remains from Fell's Cave, identified domestic dog, *Canis familiaris*, at the lowest level, and concluded that people living in southern South America brought the domestic dog with them. "It has been assumed," Amorosi explains, "that domestic dog existed in early South American sites. Yet we see no evidence of *Canis familiaris*, only the doglike fox species *Dusicyon*. We have analyzed every bone fragment and were very surprised by it." He and Argentine paleontologist Prevosti published a joint paper, "A Preliminary Review of the Canid Remains from Junius Bird's Excavations at Fell's and Pali Aike Caves, Magallanes, Chile," in the 2008 edition of *Current Research in the Pleistocene*; their findings assert that tooth morphology from reanalysis of samples earlier studied by Clutton-Brock is more akin to fox than to domestic dog.

Surprises have a way of popping up in collections. Amorosi recalls when he and a colleague were examining material supposedly containing fox and seal remains. Lo, on close examination a mandible turned out to be from a mountain lion. What was a mountain lion doing this far south? How old was it? Success in examining collections depends on patience and an open mind. "The whole set of this material needs to be examined closely," he says, "just to see what we have got."

The inventory process has already produced one major new discovery, a site plan for Pali Aike Cave that had previously escaped detection (*Current Research in the Pleistocene* 2006,

vol. 23). The discovery came by accident, the result of a flash of insight. While going through stacks of Bird's paperwork in 2005, Aricanli gave Amorosi four sheets of notebook-sized paper containing elements of a drawing. They looked familiar to him, but he couldn't place it. So he pinned the papers to his office wall. One day he suddenly saw them as a whole.

"I still wasn't sure what it was," he recalls.

◀ The cave mouth of the Pali Aike site, lying within an old volcanic cone, as it appeared in 1936 before Bird began his excavations. Log on to Google Earth to view the Pali Aike lava field where this site is located.

▼ The view from inside the cave mouth of the Pali Aike rockshelter in 1936. Taphonomy is complicated by the steep slope—rainwater can disturb sediments and objects in the cave.



Numbers appeared on parts of the drawing. Then he remembered seeing numbers marked on sloth bones from Pali Aike Cave material he had earlier inventoried. When he examined the sloth material, Amorosi discovered that the numbers on the bones matched the numbers on the drawing. Viewed as one unit, they became a map or site plan. Since the map pieces hadn't been labeled, Amorosi remembers "it was like a jigsaw puzzle trying to put it together."

Prior to finding the map, researchers had little to go on for Pali Aike Cave except limited notes Bird had taken in 1936 in the somewhat casual manner common among archaeologists of his time. The few photographs found with the notes were of little use. Bird's record keeping was consistent with practices of the times. Sometimes his notes contain even more detail than expected.

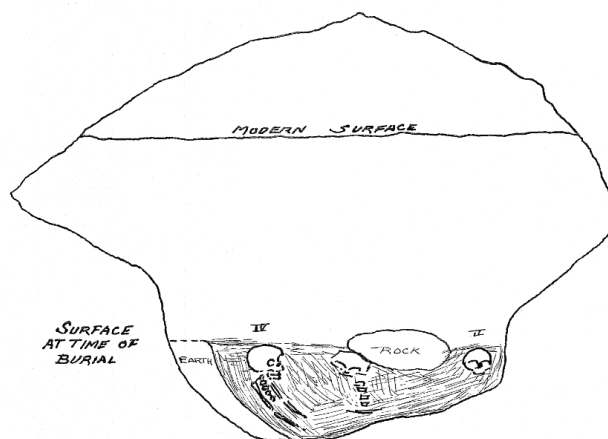
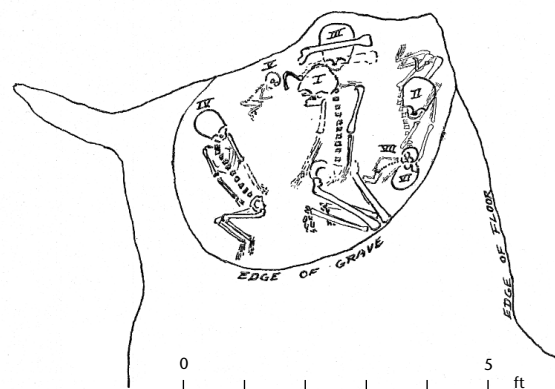
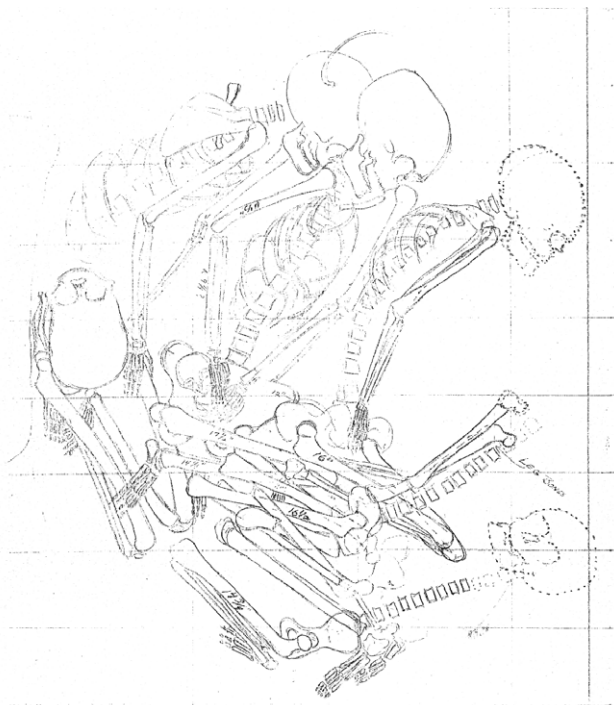
Bird thought the sloth remains from Pali Aike Cave came



from human predation, but subsequent analysis showed a low incidence of carnivore gnawing on the bones and no evidence of butchering. Bird also thought he was dealing with a semi-articulated sloth skeleton. According to Amorosi, however, closer examination reveals "only a jumble of

This shaker mechanism, used to screen material in Bird's 1969–70 season at Fell's Cave, was modeled after a coal-mining screen.

(Below) Plan of the Cañadon Leona group burial (Burial No. 2) from Bird's 1935 field notes. This group burial, and the other burial (Burial No. 1), date to the middle Holocene. The crania of some of these individuals are grossly damaged from blunt-force trauma, perhaps indicating intra-band feuding resulting from a scarcity of resources in the Magallanes area at this time. Amorosi and L'Heureux, who are studying these individuals, are considering the possibility of using middle-Holocene population dynamics as a model to explain the patchy nature of Paleoamerican distributions in this same area.



(Above) This illustration from the transcription of Bird's 1930s field notes illuminates his thoughts about the stratigraphic position of the group burial recovered from the Cerro Sota rockshelter. This burial, like those at Cañadon Leona, dates to the middle Holocene. Amorosi and L'Heureux have discovered the use of partial cremation in burials. Craniometric data analysis concludes that the individuals in this group burial were related to each other.

skeletonized adult and juvenile fragments that washed into the area before deposition." Consequently the resulting analysis clouds earlier assumptions and frustrates attempts to determine how the caves were actually used.

Bird's excavation project records will be a valuable research tool. Although some have undoubtedly been lost over time, Amorosi plans to make an exhaustive search for any still extant. Recovering missing notes could be a gold mine, Amorosi admits, "or it could be a wild goose chase."

Amorosi is itching to re-sift excavated material at Bird's sites. "I'd love to get into his back-dirt piles with a smaller mesh screen," he says. "His use of half-inch-mesh screen means that you lose all the rodent materials, and I am sure a good bit of the climate and environmental data is presently missing." He also wants to ascertain that Bird reached bedrock at Fell's Cave, that nothing was left unexamined.

Tools Bird lacked: modern dating methods

Amorosi emphasizes that before any conclusions about hu-

man use of the caves can be reached, "we must first lock these caves into a proper chronology." Only three dates are reported from the lowest levels of Fell's Cave: 11,000 ± 170 RCYBP (I-3988) from Layer 21; 10,720 ± 300 RCYBP (W-915) from Layer 19; and 10,080 ± 160 RCYBP (I-5146) from Layer 18. These dates, obtained on charcoal from hearths, were associated with Fishtail projectile points. The oldest dates from the Fell's Cave are coeval with dates for Clovis sites in North America, suggesting that people were living in the southern cone and making fish-tail points at the same time Clovis people occupied North America. The oldest date from Pali Aike Cave is only 8639 ± 450 RCYBP (C-485). To test the validity of these early dates and establish a more accurate and precise chronology for these two caves, AMS technology will be used to date hearth charcoal and bone from both Fell's and Pali Aike Caves.

The first order of business is to nail down the chronology for all caves in the area, then compare the dates with those for other caves in the Southern Cone. Amorosi admits that "this is

definitely going to be a collaborative effort with the Chileans and Argentines as well.”

Decoding the lifestyle of South American Paleoamericans

Once the chronology is resolved, it will be possible to investigate how the caves were actually used. For example, he wants to explore whether humans used the caves year-round or whether occupation was sporadic, possibly seasonal. Bird recovered 15 fish-tail projectile points and fragments from the lowest level of Fell’s Cave, but only the stem fragment of a fish-tail point at Pali Aike Cave, which led him to conclude that Fell’s Cave was frequently used by humans. At the same time, Bird recorded few sloth bones from Fell’s cave and a considerable number from Pali Aike Cave. Based on the mixed age of sloth remains from Pali Aike Cave, it appeared to Bird that its lower level reflected a period when the cave was a denning area for ground sloth, but not at Fell’s Cave.

Amorosi suspects that the situation at the Patagonian caves is similar to the accommodation Neanderthal people reached with cave bears: Neanderthals occupied caves when no cave bears were using them, and wisely absented themselves when bears were present. A similar relationship makes sense with the *Mylodon* ground sloth, particularly when humans faced an animal weighing about a ton—bigger than a full-grown bull. “With an animal that size,” says Amorosi, “you don’t want to get near it or its young.” Based on the artifact assemblage he is seeing from the collection, Amorosi is getting the message that “people are coming in, but not when the ground sloths are coming in.”

The terrain surround-

ing the three caves—Fell’s, Pali Aike, and Cerro Sota—is similar, Amorosi says, and people might have been moving between the caves on seasonal rounds. He’s optimistic, hop-



In the 1936–37 excavations at Fell’s Cave, Bird took great care in executing in situ recovery of extinct species *Mylodon* sp. (ground sloth) and *Onohippidium* (horse) in the late-Pleistocene level.

◀ Detail of *Onohippidium* pelvis (hip) and canine tooth.

▼ Detail of articulated *Onohippidium* vertebrae and the basal portion (rear bottom) of a skull. At the lower right are several bones of *Mylodon* sp.



ing that “somewhere down the line we can talk about seasonality and when people were using these caves.”

How did they make their living?

A major goal of this project is to determine whether Paleoamericans of lower South America interacted with their environment differently from their co-evals in North America.

Amorosi concedes that the South American model could end up looking vastly different from what archaeologists have found in North America. Consequently he approaches this task with no preconceived notions. “The assumption in the north is that Paleoamericans were big-game hunters,” he explains, and it

might appear reasonable to assume they employed the same subsistence strategy in South America. “But at places like Monte Verde we are not seeing that,” he tells us. “We are seeing different variations.” Beware of the red ace of spades! For this project, the



A lone guanaco near Fell’s Cave. Today the distribution of South American camelids is becoming restricted as their habitat is converted into cattle ranges. This photo shows the great vantage point the Fell’s Cave rockshelter gave hunters for spotting game.

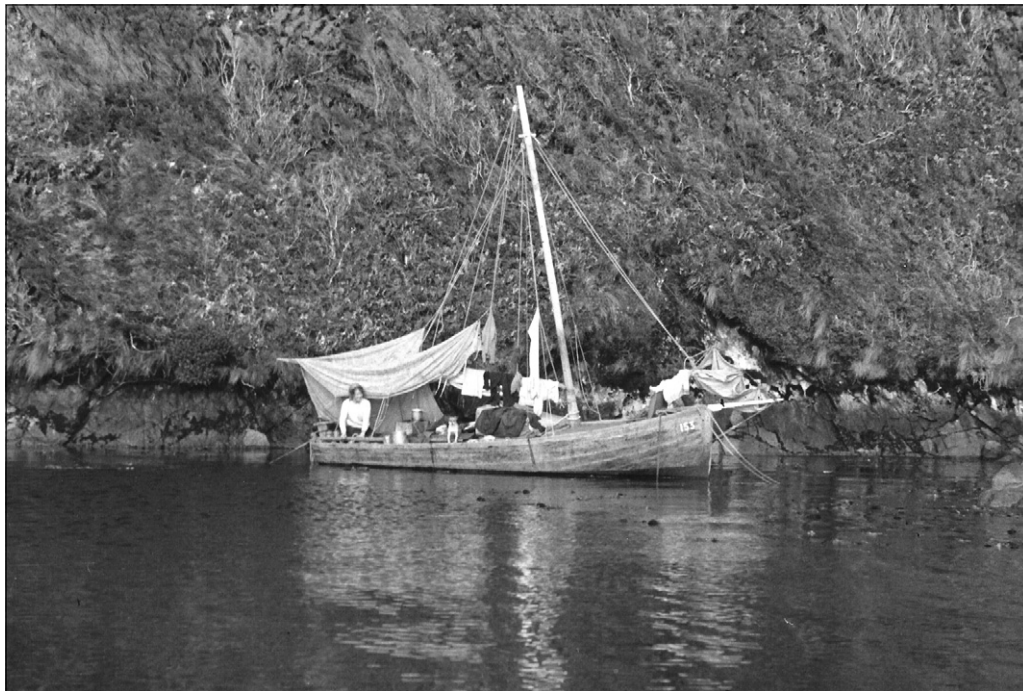
Peggy Bird and their dog aboard the *Hesperus*, the open boat in which the Birds sailed down the inner channel of Chile's rugged coastline. Amorosi notes that this framed photo sits on a table in the Bird Laboratory for South American Archaeology and is much admired by visiting researchers.

minimum complement of tools in any scientist's kit is caution and an open mind.


A project with a broad agenda

Today Amorosi has far more questions than answers. What about the broad nature of paleoclimate data? Was it possible to get there via a midpacific route of entry? Were these people maritime-adapted, or were they entirely terrestrial? What was their diet? "What we have here is a wonderful jigsaw puzzle with lots and lots of pieces missing," Amorosi says. "And it's just fascinating sometimes when we can't get these pieces to link up."

His colleagues are eager to probe Bird's collections. Rivera hopes that, by revealing new knowledge, they will contribute a wealth of information to South American archaeology and enrich the database for its earliest inhabitants. "There is so much we don't know," he frankly confesses. "It is very important that



we revisit these collections. We can gain many things from them. There are remains in Patagonia that haven't been analyzed at all . . . and there is also a great deal of the collection back in Chile at the Museum of Natural History in Santiago that has not been touched either."

Rivera reminds us that a considerable amount of Bird's work hasn't been published. Findings from this revisitation project will assuredly complement what has been published and possibly "add immeasurably to what we already know." 

—George Wisner


Following the Obsidian Trail

continued from page 14

Bering Strait, or by boat along the North Atlantic ice sheet." His line of thinking opens an entirely new can of worms labeled *pre-Clovis*, and he shares it with good company. For example, Steve Holen of the Denver Museum of Nature & Science attributes broken mammoth leg bones at sites in Nebraska and Kansas to human intervention—bones dated to 7,000 radiocarbon years before Clovis (MT 23-1, "Early Mammoth Bone Flaking on the Great Plains"). Perhaps, Holen proposes, the first colonizers made the trek across the Land Bridge, just as the classic theory dictates, but thousands of years before the Clovis culture flourished in North America.

Though none have been found yet, there may be sites that predate Clovis in western Beringia. Any such site would be of enormous interest to North American archaeologists, but finding it is proving difficult. The Ushki Lake sites in Kamchatka,

thought to be older than Clovis by a few hundred years, proved to be younger when it was re-dated by Mike Waters and Ted Goebel of CSFA.

The question of the Bering Land Bridge migration still hasn't been resolved. After all, only a handful of immigrated Russian obsidian artifacts dating to the Holocene have been found. There's still a lot of looking to do, and lots of obsidian to source. A piece of Pleistocene-aged obsidian from Russia found in Alaska may be sitting in Speakman's lab as you read this, waiting to be sourced. 

—Katie Hill

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