



# MAMMOTH TRUMPET

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Center for the Study of the First Americans  
Department of Anthropology  
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## The greatest show in Texas

The crews digging here at the Debra L. Friedkin site and at the nearby Gault site are finding lithic artifacts, including projectile points—not fluted points, *stemmed points that predate Clovis by more than 2,000 years*. It's our lead story on **page 1**.

Photo by CSFA

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## The stemmed-point trail to Clovis

### The Gault and Friedkin sites



**E**XCAVATIONS at Cooper's Ferry in Idaho by Oregon State University archaeologist Loren Davis reveal artifacts that date to 15,000–16,000 years ago. Davis finds similarities between his earliest artifacts and those from the oldest layers at the Debra L. Friedkin and Gault sites in Texas, especially the early presence of stemmed projectile points.

The Gault site and the nearby Debra L. Friedkin site are situated along Buttermilk Creek. At these sites, layers rich in artifacts span the continuum from Late Prehistoric to Clovis. It's the discovery of lithic artifacts beneath the Clovis layer dating to at least

16,000 years old, however, that has caught the attention of Michael Collins, Director of the Gault School for Archaeological Research, Texas Archeological Research Laboratory (TARL), in Austin, and Mike Waters, Director of CSFA. Collins has been investigating the Gault site since 1998; Waters has been studying the Debra L. Friedkin site since 2006.

Besides those from the Gault and Friedkin sites, pre-Clovis assemblages have been found at the Monte Verde site in southernmost Chile at 14,500 yr B.P., the Page-Ladson site in Florida at 14,600 yr B.P., and the Paisley Caves in Oregon

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*Decades of research at Paleolithic sites in Russia and Ukraine (he mastered the Russian language) prepared him for his current challenge: To determine when humans first occupied Beringia.*

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at around 14,000 yr B.P. What makes the Gault and Friedkin assemblages special is the large number of artifacts, which shed new light on pre-Clovis artifact assemblages and show that stemmed points have deep time depth in North America and may in fact be the earliest point style introduced by

the First Americans to North America.

### A tough nut to crack

Excavating the Gault and Friedkin sites presented a formidable problem when it came to dating artifacts. Because organic material necessary for radiocarbon dating wasn't preserved, researchers had to rely on optically stimulated luminescence (OSL), which determines the time elapsed since a quartz grain was exposed to sunlight. As in the Gault site, OSL was chosen to determine the age of the artifacts at the Friedkin site by dating the floodplain sediments that bury them. According to the geologic principle of



Williams.

inclusions, any items, such as artifacts, in an undisturbed sedimentary deposit like the floodplain clays at the Friedkin site, are at least as old as the sediments that contain them. In 1½ m of clay, Waters's team obtained 78 dates in four vertical columns in chronological order as they moved down through the deposits. At Gault, 20 OSL ages were obtained from Area 15.

### Deep time depth at the Gault site

In the oaken hills of central Texas between Austin and Waco, a spring rises along a fence line, watercress waving downstream. Water emerges clear and clean, running between willows and cottonwood roots. Even in dry years, Abbott Spring flows strong, two to three

liters a second from deep below the head of Buttermilk Creek. A short walk along the creek reveals pieces of gray chert everywhere. You can't walk without stepping on them. A local outcropping of this rock, called Edwards Plateau chert, served as a source for high-quality toolstone. The Gault archaeological site is located on these grounds in a valley at the intersection of the Edwards Plateau and Blackland Prairie. The locale, with

ample water for humans and game and a plentiful supply of high-quality toolstone, understandably would have had great appeal to early human arrivals.

The site is interesting because it manifests a pre-Clovis archaeological tradition in a buried context beneath Clovis archaeological material. Collins guesses that the Gault site may have already yielded as much as 60% of all excavated Clovis artifacts known today.

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—Michael R. Waters, Director

However, what came before Clovis at the Gault site may be even more compelling as it relates to the peopling of the Americas.

Thomas Williams, Assistant Executive Director of the Gault School of Archaeological Research and a Research Associate at TARL, details the early projectile-point technology in North America at the Gault site in the July 2018 issue of *Science Advances*. Williams and his colleagues have compiled an OSL chronology for the entire archaeological sequence at the site. Excavations below deposits containing Clovis artifacts revealed well-stratified sediments containing artifacts distinct from Clovis, which they call the “Upper Paleolithic” (UP) but which was referred to as the OTC (older-than-Clovis) assemblage by Mike Collins. Williams and his colleagues prefer not to use the nomenclature *Clovis* when discussing the early evidence. Williams insists that “it should be assessed for its own merits and compared with its contemporaries.” Then the origins of Clovis can be explored through studying the earlier period.

The OSL dates from the UP layers all fall between 16,700 and 21,700 yr B.P. As we would expect, all samples from four overlying Clovis layers date between 11,900 and 13,200 yr B.P. Evidence from the Gault site excavation pushes the earliest human occupation of North America back by at least 2,500 years. Moreover, it identifies a previously unknown, early lithic technology. Area 15 at the Gault site, a 56-m<sup>2</sup>

block that was excavated in 1-m units, revealed a projectile-point technology previously unknown in North America. Using OSL, 5 stemmed and 2 concave-base projectile points were dated to 16,000 yr B.P., along with bifaces, blades, blade cores, scrapers, graters, and other tools, and about 150,000 pieces of debitage.

Accumulations of cultural material decrease between the UP, Clovis, and Paleoindian occupations, which suggests either repeated reductions in site activity or possibly interruptions in occupations between the cultural layers.

The UP assemblage exhibits the same generalized biface and blade-and-core lithic tradition as the overlying Clovis

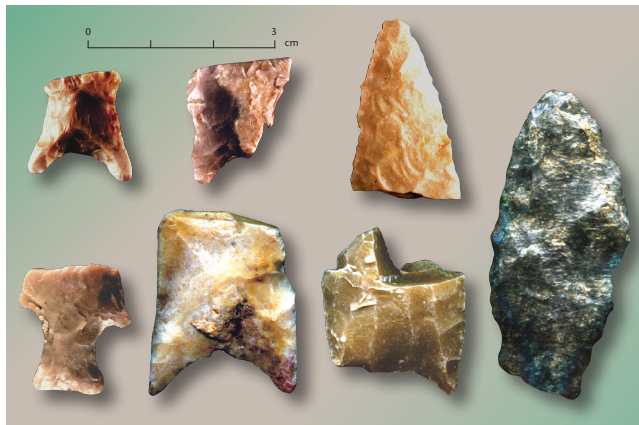
materials, but its artifacts differ in two significant respects. To thin a biface, the UP biface assemblage predominantly employs comedial (midline) flaking, which proportionally thins a biface.

Clovis, on the other hand, uses aggressive full-face and overshot flaking to produce thinned bifaces (MT 26-1, -2, -3, “What it means to be Clovis”). Another difference is in the flake striking platforms produced during manufacture. Those of the UP assemblage are larger and more crudely prepared than Clovis flake platforms.

The similarities and differences suggest the absence of a single linear trajectory toward Clovis technology within the UP assemblage. Instead, parts of the technological repertoire, like the blade-and-core tradition, appear to have carried over to the Clovis levels at the Gault site, whereas the projectile-point and biface traditions underwent significant changes.

### Corroborating evidence at the Friedkin site

Researchers reported an assemblage of stemmed projectile points associated with other artifacts below a Folsom and Clovis artifact-bearing layer at the Debra L. Friedkin site. This site, located just 250 m downstream from Area 15 of the Gault site, was dated to 13,500–15,500 yr B.P. (MT 27-2, -3, “Buttermilk Creek”). The Buttermilk Creek Complex artifact assemblage, as Waters calls it, is much larger and more varied than that



◀ Projectile points from the Gault site.

Pre-Clovis projectile points from the  
▼ Friedkin site.



of other North American sites having a pre-Clovis component.

The Buttermilk Creek Complex, artifacts retrieved from a 20-cm-thick layer, consists of more than 15,000 stone artifacts, separated into macro-debitage, micro-debitage, and tools, accompanied by 18 OSL dates ranging from 14,000–17,500 yr B.P. Lanceolate stemmed projectile points are scattered throughout this layer (OSL dated to around 15,500–13,500 yr B.P.), and triangular lanceolate points appear around 14,000 yr B.P.

Excavations confirm nearly continuous habitation of the site, beginning with the Buttermilk Creek Complex occupation until the Late Prehistoric. Specifically, artifacts recovered can

be grouped into distinct zones that correspond to the prehistoric cultural periods of central Texas. In chronological order:

- near the surface, a zone of late-Prehistoric and late-Archaic artifacts;
- below it, a zone of only middle- and early-Archaic artifacts;
- next, a deeper zone with late-Paleoindian point types;
- bottommost, a zone containing only Folsom and Clovis artifacts.

This shows that successive occupations on the Buttermilk Creek floodplain were buried by sediment during repeated overbank events over

**A** Waters at the Friedkin site holding a stemmed lanceolate projectile point about 15,000 years old, 2016.

**B** This photo of the point in situ is described by a colleague of Waters as “the million-dollar shot.”

**C** The stemmed lanceolate projectile point.

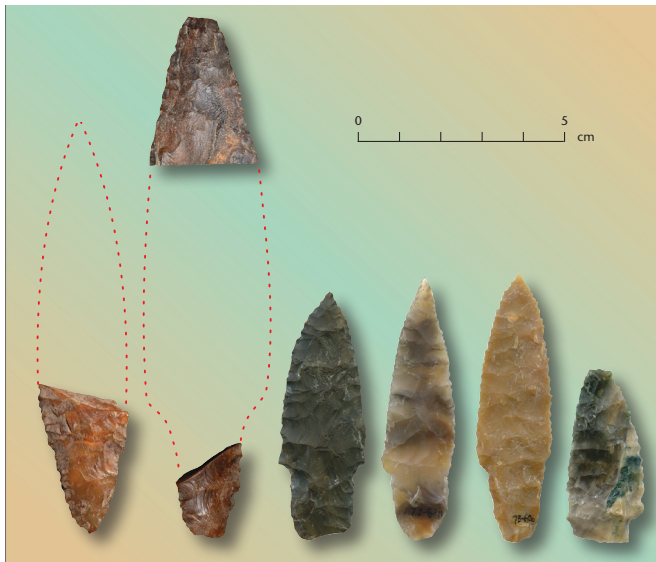


the last 13,000 years. Since burial, these zones have remained intact with little disturbance.

Artifacts making up the Buttermilk Creek Complex include blades, bladelets, scrapers, bifacial discoidal cores, snap-fracture tools, retouched flakes, expedient tools, ground hematite, 11 complete and fragmentary lanceolate stemmed projectile points, and a triangular lanceolate projectile point with a basally thinned concave base, along with about 100,000 pieces of debitage. The debitage found in all horizons is characteristic of late-stage lithic reduction, which indicates that each occupation used the site for the same purpose. The tool:debitage ratio of the assemblages, however, suggests that during the Buttermilk Creek Complex occupation the site served more diverse tasks than in the Folsom and Clovis occupations.

The Friedkin tool repertoire is augmented by similar tools found in UP layers at the Gault site 250 m upstream. Like the people at Paisley Caves and Monte Verde, those who settled at Friedkin likely foraged for food and preyed on animals large and small. The oldest tools

**Earliest stemmed points from the Cooper's Ferry site.**



recovered at Friedkin bear strong similarities to Clovis technology. This suggests that the Clovis lithic technology may have originated with the earliest artifacts found at the Debra L. Friedkin site.

### Criticisms

Although no sterile layer separates the Clovis and UP layers at Gault, the flake count in that interval is low and the Clovis layer itself has few artifacts compared with the much earlier UP-assemblage layers. It's difficult to explain away this assemblage as a product of artifact migration downward from Clovis or later layers.

This observation is relevant because several years ago it was suggested that artifacts found in the lowest levels at the Friedkin site had drifted downward from the higher Clovis layers. Waters defends the integrity of the early assemblage. Many lines of evidence show that the artifacts didn't become displaced into the pre-Clovis levels—78 OSL ages occur in 4 columns with all dates in correct stratigraphic order, and the ages associated with diagnostic projectile points match the known age of the point. According to Waters, “Over 100 diagnostic projectile points dating from the Late Prehistoric period to Clovis occur in correct stratigraphic order with no mixing; geologic and pedogenic evidence shows minimal movement of materials in the floodplain clays; micromorphic study of the sediments shows that artifacts occur in peds and not between peds; there is no size sorting of artifacts from the top to the bottom of the site; there are increases and decreases in artifact concentrations with depth; we have artifacts from the same level that fit back together; and magnetic studies show minimal disturbance of the sediments.” And these are just a few lines of evidence that refute downward movement of artifacts at the site. Waters further notes that “most archaeologists accept that

*continued on page 19*

# CERAMICS

**Born in Pleistocene Asia, the industry  
hitched a ride to the Americas**

## Part 2

**F**UMIE IIZUKA offers three hypotheses concerning the connection between Pleistocene pottery producers of greater East and Northeast Asia and the First Americans. First, Pleistocene pottery producers from East and Northeast Asia weren't the people who migrated to the Americas. Instead, the migration out of mainland Asia to Beringia must have occurred before 15,000 yr B.P., originating from a preceramic or non-ceramic-producing area. Therefore, establishing the timing of the development of pottery technology in East and Northeast Asia provides an ending date for the beginning of the American dispersal out of Asia.

The second possibility is that the first settlers who began to arrive in the Americas after 15,000 yr B.P. may have been pottery-producing people who dispersed out of paleo-Honshu and probably -Kyushu 16,500–15,000 years ago. But pottery production was abandoned owing to subsistence and behavioral changes in the course of adapting to more northern environments and new food sources; alternatively, pottery making continued as people (the incipient Jōmon people) dispersed northward, but we just aren't finding their ceramic products in the archaeological record.

The third possibility is that pottery makers from Hokkaido and Honshu migrated toward Beringia during the the Bølling-Allerød (B/A) period (14,700–12,700 yr B.P.), based on the Paleo-Sakhalin-Hokkaido-Kuril Peninsula model. A simultaneous cold snap and rise in sea level during

the B/A could have launched such a migration, as pottery makers and other human groups found themselves progressively deprived of formerly accessible resources and habitats.

### The Cooper's Ferry connection

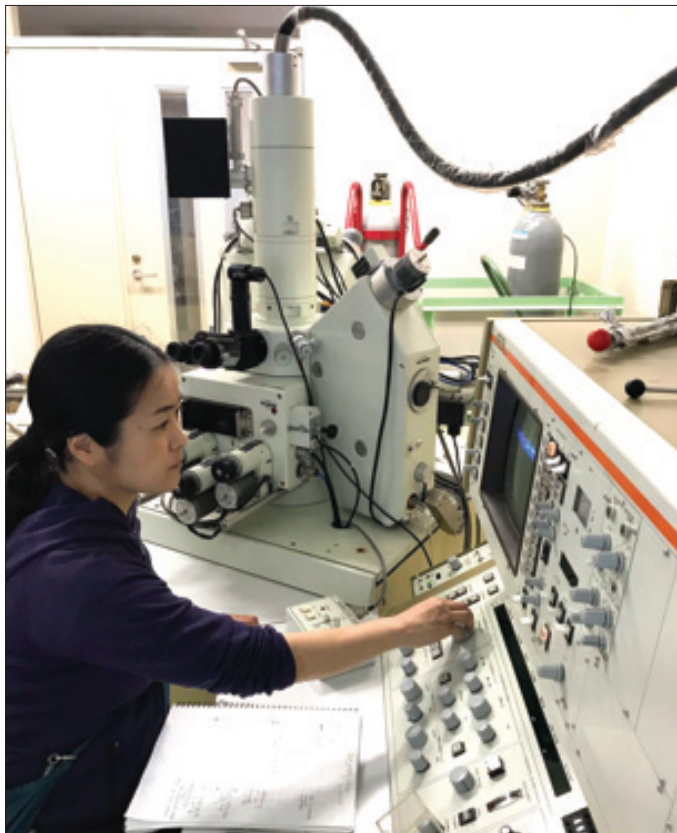
Iizuka admits that recent work at Cooper's Ferry by Oregon State University archaeologist Loren Davis has caused her to reconsider aspects of her research. His excavations at Cooper's Ferry in Idaho reveal that the deepest layer of artifact-filled sediment at the site ranges in age at around 16,000 yr B.P..

This discovery supports a coastal migration route into the New World by the First Americans. Archaeologist Todd Braje of San Diego State also suggests that the First Americans island-hopped and hugged the shore, following a coastal "kelp highway" of sheltered bays rich with food. He proposes that people coming down the Pacific Coast encountered the mouth of the Columbia River, which offered a convenient off-ramp from coastal migration as well as a viable interior route to areas south of the ice sheet.

Additionally, the stemmed projectile points found at Cooper's Ferry could be among the oldest found in the Americas and stand as evidence that this lithic technology developed before Clovis. Stemmed projectile points aren't a recent technology. Toolmakers in Africa, Asia, and the Levant discovered 50,000 years ago that stems made points easier to haft.

But there are different ways to shape a chunk of flint into a stemmed point. The morphology of Cooper's Ferry stemmed points is strikingly similar to that of stemmed points from Northeast Asia, especially from sites on the Japanese island of Hokkaido dating to 16,000–13,000 yr B.P. Iizuka notes during this same period pottery was being produced. As evidence she points to a site on Hokkaido associated with pottery that dates to the B/A.

Other stone tools found at Cooper's Ferry resemble those made



**Fumie Iizuka at the controls of an electron-microprobe at Hokkaido University of Education. She studies the geochemistry of minerals and volcanic glass present in pottery of the Incipient Jōmon.**

and used on Hokkaido at the same time. Davis and colleagues claim that the similarity is no coincidence. They interpret this temporal and technological affinity between the stemmed projectile points of Cooper's Ferry and those of Northern Japan

as a cultural connection with Upper Paleolithic Northeast Asia, which aligns with current evidence for shared genetic heritage between late-Pleistocene peoples of eastern Asia and North America. Although archaeologists have to reckon with the possibility that two distant cultures developed the same lithic technology simultaneously by chance, researchers dismiss this as a remote possibility.

The Cooper's Ferry discovery has served to bolster Iizuka's confidence in the Paleo-Sakhalin-Hokkaido-Kuril Peninsula (PSHK) standstill model, which figured prominently in her third hypothesis about the peopling of

**Sakurajima Volcano viewed from Senganen Park, Kagoshima City. Tephrochronology, dating effluents expelled in volcanic eruptions, is a valuable resource for dating late-Pleistocene ceramics in southern Kyushu, Japan.**



FUMIE IIZUKA


the Americas and pottery producers. If people migrated from PSHK in the terminal OD or B/A, that migration "overlaps with pottery-producing peoples and their occupations in Hokkaido (B/A) or Honshu (OD and B/A). It leaves a possibility that ceramic producers from northern Japan migrated toward Beringia and the Americas."

### Explaining the absence of pottery in the New World

If we can find evidence of a connection in lithic technology between the Old and New Worlds, then why can't we find a similar connection in pottery production? If the forebears of First Americans migrating from Northeast and East Asia were mobile hunter-gatherers who didn't use pottery, the absence of pottery may be explained simply because they migrated prior to the advent of pottery technology. On the other hand, if pottery technology in Asia predated the spread of humans into Beringia, Iizuka can name a number of reasons for the absence of pottery in the New World: changes in subsistence practices after abandoning a broad diet that included megafauna and related species; fragile pottery, a result of inferior low-fired baking and freeze-thaw cycles in the subarctic environment. She allows that only a small quantity of pottery was produced and used and therefore doesn't appear in the archaeological record.

Iizuka sums up her thoughts: "The folks that didn't have pottery at that time, who coexisted with the pottery users, migrated. They weren't using pottery. But if pottery users also migrated, they must have abandoned the technology, or the technology was low quantity, low fire, and therefore difficult to detect." After all, as she points out, one out of 20 sites may contain tiny fragments of pottery, and archaeologists would easily miss them during a dig.

To evaluate the timing of the adoption of pottery in light of Neolithization processes, as well as the possibilities of the presence or absence of pottery producers migrating to the Americas, researchers must weigh the degrees of mobility and sedentism at early pottery sites in Asia, and subsistence and associated technology and features. "We have to look

at the behavioral elements to understand all the links," Iizuka counsels. 

—Katy Dycus

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## Call for Data

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The author of the **Texas Clovis Fluted Point Survey** and colleagues at TARL and the Prehistory and Research Project (PRP) ask for help in updating information for the 4th edition of the **Survey**.

### Brief Outline

In 1985 David Meltzer initiated a survey of Clovis fluted points in Texas. That survey continues to the present, and as of 2007, when the 3rd edition of the **Texas Clovis Fluted Point Survey** was published, over 544 Clovis fluted points were recorded. Clovis fluted points occur throughout the state, with concentrations on the High Plains, Coast, and along an

arc through central Texas following the Balcones Escarpment along which high-quality chert and freshwater sources were readily available. The majority of Texas Clovis fluted points were made of Edwards chert from central Texas, with a minority fashioned of Alibates agatized dolomite and Tecovas jasper from the High Plains.

The **Texas Clovis Fluted Point Survey** has now come under the control and curation at TARL. We anticipate that the number of Clovis fluted points from Texas will be increased as well as the roll of counties where points were reported. This call for data will provide details of how and where to report any Clovis fluted-point discoveries.

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Tel: (512) 232-4898 (leave a message)  
<https://liberalarts.utexas.edu/tarl/texas-clovis-fluted-point-survey.php>

**Texas  
Clovis Fluted  
Point Survey**

**G**LACIERS AND MOUNTAINS on the periphery of the Mammoth Steppe, which once enveloped all of Russia, insulated the landscape, creating a cooler, drier climate than today. Toward the end of the last Ice Age, rising temperatures helped seal the fate of the mammoths by shrinking and drowning their grassland habitats, leaving herds stranded across isolated islands. Today they are being resurrected as their permafrost graveyard thaws and erodes.

Encased in ice for centuries, the tusks of long-dead mam-

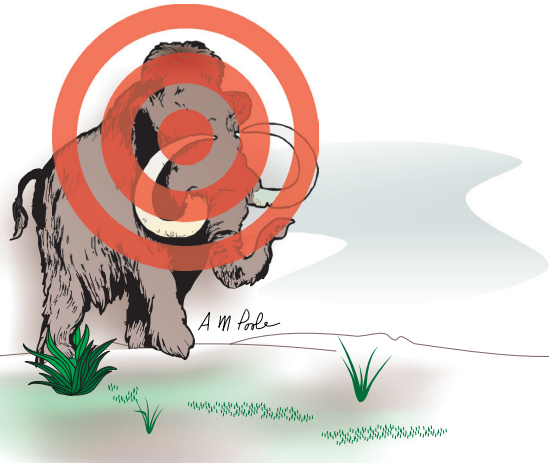
moth Ran Barkai of Tel Aviv University, who was also coauthor of Agam's studies of the interaction between humans and proboscideans. "Once I started diving into the world of early human-proboscidean interaction," he recalls, "there was no way back."

These two fields of study, exploiting lithic materials in prehistory and early human-proboscidean interaction, speak volumes about how early humans perceived the world around them. By studying modern hunter-gatherer societies that hunt elephants, Agam can make informed assumptions about pre-

historic hunters. He envisions that "early humans considered the different non-human agents around them—be it an animal, a mountain, or a rock source—as an other-than-human person, and these were not just sources to be exploited by them. Rather, they were living things with whom you interact, which you should always respect and thank, and which you must always preserve. This perspective always guides me when trying to understand the behavior of prehistoric societies."

## *Beyond Survival*

# Hunting Mammoths in the Paleolithic



moths reveal what remains of Siberia's lost giants. After an international ban on the trade of elephant ivory in 1991, mammoth tusks became a prized substitute. The rush on mammoth ivory is luring tuskers, known as "mammoth pirates," into the Russian wilderness and creating millionaires in some of the poorest villages of Siberia (MT 33-4, "Of mammoths and men"). *The Guardian* reports that prospectors in Russia are digging up remains of mammoths for a trade worth an estimated \$50 million a year. A single tusk can net more than \$60,000.

And pirated tusks are a loss to science. Thick as tree trunks and containing similar rings, the tusks themselves carry valuable information about climate, diet, and the environment.

Yet thousands of years before tuskers exploited mammoth ivory for financial gain, ancient humans hunted proboscideans for their meat, bones, and ivory. Their survival depended on it.

### Exploiting lithics and interacting with proboscideans

Aviad Agam, a Ph.D. candidate in prehistoric archaeology at Tel Aviv University, studies lithic materials used by prehistoric societies in the Lower Paleolithic. He became involved in the study of proboscideans through one of his supervisors, Profes-

### Hunting for more than subsistence

In more recent hunter-gatherer societies, much effort and thought is put into exploiting elephants, and these creatures play a unique social and cultural role in the lives of hunters. "Following the major nutritional role," Agam tells us, "elephants are integrated into the mythology of the people hunting them; taboos are defined and distribution routines formed. It's impossible to define which value is more important—the nutritional one or the cosmological one. Those two values go

hand in hand, as they are a part of the same social-cultural-economic system." These people, he assures us, wouldn't hunt an elephant without performing the required rituals before, during, and after the hunt, and without following the strict de-



Agam delivering a presentation at the VII International Conference of Mammoths and Their Relatives Conference in Taichung, Taiwan, September 2017.

mands and taboos associated with the hunt. They wouldn't say, 'Okay, I think we can skip this ceremony. We'll get the elephant anyway.' "For a hunter-gatherer to slay an elephant without practicing the associated rituals and ceremonies is to invite misfortune.

Agam cautions against extrapolating too boldly from the

present to the past. Today's hunter-gatherers aren't a window into the past. Each group, he insists, "represents only their own geographic setting, and their own desires, needs and beliefs. Still, I do think that these groups share some worldviews, and I like to think that these groups can really teach us something about past societies. I imagine that, similar to recent hunter-gatherers, prehistoric hunter-gatherers respected the agents around them. They knew that their existence was strongly dependent on the preservation of the resources used by them. I believe that they were thankful for the water they drank, for the animals they ate, for the rocks they knapped."

### Ethnographic models show concern for preservation

Ethnographic studies yield compelling evidence of the social and cultural prominence these animals hold among the few hunter-gatherer groups who still hunt elephants today. These studies examine aspects of behavior that don't leave an archaeological signature and are therefore difficult to identify when studying prehistoric societies. Although the techniques employed by prehistoric hunters can never be fully known, Agam believes they probably resembled those of the elephant-hunting tribes of the recent past.

Jerome Lewis's study of the Mbendjele BaYaka of northern Congo-Brazzaville, for instance, shows that complex social mechanisms govern elephant hunting, partly out of

**Pitulko "packing the treasures"  
found at the northern Yana-  
Indighirka lowland, 2013.**



concern for preservation, and also to curb human greed and conceit by denying hunters status and prestige for successful hunts repeated too often. Agam cites the case of the Mbendjele BaYaka of northern Congo-Brazzaville: "When elephant hunters hunt too often, instead of gaining prestige, they are mocked. Moreover, women refuse to cook the meat gained by such hunters." The mocked hunter may be exiled or shamed into leaving the group, which is too great a sacrifice. Agam finds it plausible that prehistoric hunters behaved in similar fashion to preserve their irreplaceable food source. It appears we can't gauge human behavior in exploiting proboscideans solely on the basis of cost and profit.

### Prioritizing nutritional concerns

Vladimir Pitulko, Senior Research Associate in the Institute for the History of Material Culture at the Russian Academy of Sciences, believes that the primary reason early hunters targeted

mammoths was to obtain tusks and bones for toolstock, and probably fat for fuel.

Mammoth bones were also desirable as a source of nutrition. The promise of shattering long bones for their marrow as well as for toolstock was undoubtedly additional incentive for transporting limb bones from kill sites to residential sites. Moreover, edible parts of the head probably didn't go to waste. "In our own study from 2016," Agam says, "we demonstrated that the nutritional value of proboscideans' heads extends beyond the brain, as edible meat and fat are also available in fat cushions behind the eyes, at the base of the trunk, inside the jaw, and within the skull. Early humans would have taken advantage of every part of the creature."

### Hunting to satisfy all nutritional needs

After analyzing frozen mammoths found in the permafrost of Siberia, the team of Guil-Guerrero shows that Pleistocene proboscideans could significantly contribute to human nutrition. Noting the significant content of essential fatty acids like omega 3 in Pleistocene mammoths, they argue that fat-rich organs, which yield much more energy than lean meat, were essential for survival. Thus "brain, bone marrow, subcutaneous fat, viscera and meat would have been the targeted mammoth organs for Stone Age hunters," and "given the high energy needs of Stone Age hunters, protein-rich food, such as meat, should have been ingested to a lower extent than other, fatty tissues." Paleolithic humans seem to have understood the nutritional elements their bodies needed and selected various parts of the mammoth's body to satisfy those needs.

At the Yana site in Arctic Siberia, mammoth-tongue bones were found in the cultural layer far away from the main accumulation of mammoth bones, which

indicates that fresh mammoth meat was consumed. Pitulko notes that since mammoth meat is of poor quality compared with the meat of other animals found at the Yana site such as horse, bison, and reindeer, mammoth meat would have ranked low as a reason for hunting mammoths compared with the need for tusks, bone, and fat.

The team of Guil-Guerrero calculates that 4500 kcal, the estimated daily energy need of a Paleolithic hunter, could be satisfied by consuming 566 g of meat, complemented by 592 g of fatty tissues, such as subcutaneous fat. Approximately 5% of the mass of a mammoth consisted of subcutaneous fat and other fats distributed throughout the body. Thus a medium-sized mammoth weighing 3 tons would be a storehouse of 1 million kcal as fat, providing energy for a hunting group of 12 to 24 individuals for approximately 9 to 18 days. Supplemental meat would have extended the duration even further. When bone marrow is added to the calories and fatty acids obtained from

mammoth fat and meat, the dietary potential of proboscideans is even more impressive.

Fat samples from two well-preserved mammoths found in the Siberian permafrost yielded  $\alpha$ -linolenic acid percentages very close to values found in extant elephants. (Linoleic acid, a polyunsaturated omega-6 fatty acid, is an essential fatty acid for humans, who must obtain it through their diet.) This confirms the mammoth as a source of essential fatty acids for Paleolithic hunters.

### The role of humans in mammoth extinction

It's a single leap from the fact that proboscideans met the bulk of early humans' nutritional and material needs to the conclusion that humans therefore played a major role in their extinction. This debate is ongoing. Agam, however, doubts that the overkill hypothesis reflects the true situation. "First, in most cases it is very difficult to assess how long it took material within a given prehistoric site to accumulate. A week? A year?

Moreover, recent hunter-gatherer cultures abide by a system of rules which are aimed at preserving the animals they depend on. One strategy is to completely halt hunting as long as meat and fat are available for consumption. Taboos also exist concerning the hunt itself. Among the Nuer, for example, an elephant must not be hunted by stealth. "You have to directly confront it," Agam explains, "and by that the hunt becomes more difficult to be successfully executed. Therefore, and if we accept the assumption that recent hunter-gatherers can indeed teach us about the way prehistoric hunter-gatherers may have acted, it seems that prehistoric groups would have made the effort to preserve the animal which was so essential to their survival, and which was most likely a major part of their cosmology, mythology, and ontology."

Pitulko's work at the Yana site in Arctic Siberia convinces him that occupants hunted mammoths infrequently, and that this sporadic pattern of hunting can't be the principal cause of

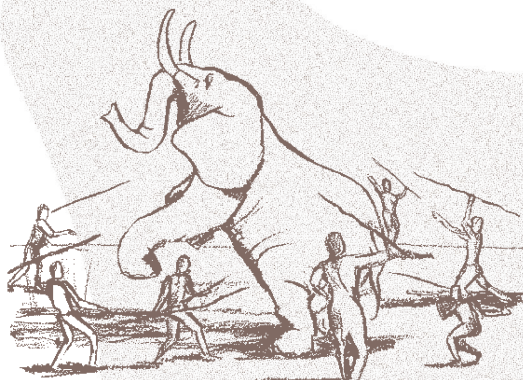
extinction. "Humans couldn't have played a role in extinctions," he argues, "before maybe some 12,000 to 11,000 years ago and until they disappeared 3,000 years after that." He explains that this was when mammoths were gathered in refugia, rendering isolated populations easy to destroy.

Bone piles give a distorted view of mammoth predation, Pitulko further argues. At Yana the skeletal remains of 200–300 mammoths appear to incriminate hunters for wholesale slaughter, but radiocarbon dating verifies, as Agam suspects, that the remains aren't the product of a mass killing, but in fact accumulated over a space of several hundred years, which may have been a mortality rate sustainable by the mammoth population.

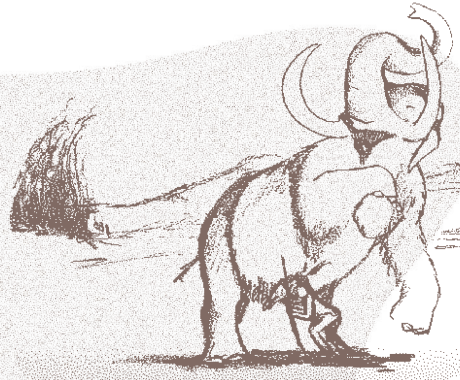
University of Wyoming archaeologists Nicole Waguespeck and Todd Surovell conclude that the descendants of Old World hunters seem to have had a greater impact on proboscideans in the Americas (MT 25-4, "The Paleoindian menu: Subsistence and diet"). They consider 14 Clovis proboscidean kill sites

identified in North America remarkable, "a very large number." Compared with Old World hunters, Clovis peoples seem to have killed mammoths with much greater frequency than hunters of any other time and place and thereby lend credence to the Overkill Hypothesis. They attribute the deadly efficiency of

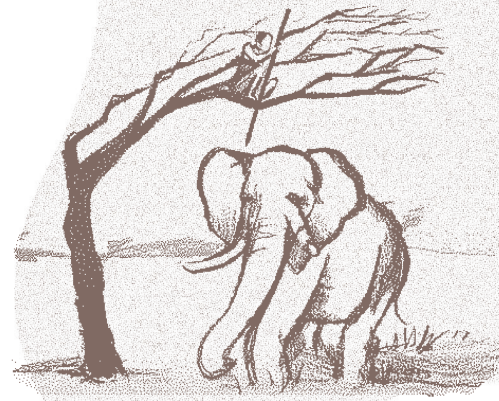
## These observed strategies for hunting elephants suggest methods Paleolithic hunters may have used to kill mammoths.



*Hunting using spears.*



*A single hunter stabbing the prey in the belly.*



*A single hunter stabbing the prey from a tree that spans a known game trail.*



*Hunting using pitfalls and dogs.*

Five hundred years? More than this? Therefore it's almost impossible to draw conclusions concerning the scope of hunting." He points to ethnographic studies that show that elephants are procured once every few months, "a frequency which doesn't correspond well with an overkill scenario."

Paleoamerican hunters to specialized large-game predation strategies.

### Hunting to obtain resources

Pitulko believes that Yana hunters targeted mammoths first and foremost for ivory, secondarily for their nutritional value. The widespread manufacture of ivory hunting tools, such as full-sized thrusting spears and composite tools, was probably a consequence of human expansion about 50,000 years ago into the open landscapes of northern Eurasia, where wood was scarce. In the absence of this important resource, mammoth ivory was substituted. In like manner, Greenland Eskimos use narwhal tusks to make spears or spear shafts when they have a shortage of wood.

The dimensions and shape of ivory shafts, long points, and thrusting spears and their preforms found at the Yana site explain why Yana hunters preferred mammoths of a certain size. They hunted animals whose tusks were of preferred size and shape for manufacturing hunting weapons. The most desirable size appears to have been a slightly curved tusk 100–120 cm long, the size and shape typical of adolescent and young-adult female mammoths. Pitulko argues that this kind of selective hunting over several thousands of years wouldn't have been fatal to a sustainable Eurasian mammoth population. He does concede, however, that hunting, coupled with climate-driven environmental changes of the LGM, may have been the “last straw” leading to their extinction.

### Favored hunting practices

Pitulko believes Old and New World hunters probably employed approximately the same tactics. They would attack the least-formidable animal, especially if it had relatively straight tusks, meaning a female mammoth. The hunt-

**Specimens from Yana Mass Accumulation of Mammoth: A–D, thin longitudinal removals; E–F, longitudinally split mammoth tusks; G, residual ivory core; H–I, cores for manufacturing long ivory shafts.**

ing method was a spear fall, multiple simultaneous piercings, then continued thrusts. The purpose was “to hit the creature several times to make at least one or two bad bleeding wounds, preferably restricting movement, too.” Once the animal was on the ground, hunters finished the kill by attacking the base of the trunk, as hunters do in Africa today. There weren't many other options. It was important, Pitulko emphasizes, that the hunters try to limit the animal's mobility, to make it hard for the animal to escape. “There were no mass kills or pitfalls,” Pitulko adds. “Hunters would look for some narrow spaces like

ravines or narrow passes and certainly would watch for them near river crossings.”

Paleolithic hunters likely attacked the animal from the rear-right side, aiming to damage vital organs. In contrast, an enlarged heart-shaped symbol on a mammoth depiction at El Pindal Cave in northern Spain isn't a fancy decoration; it marks the target area for a serious wound, but on the left side of the animal. (El Pindal Cave is home to one of over 500 Paleolithic cave paintings of mammoths, testifying to the prominence of proboscideans in the life and symbolism of early humans.)

### Choosing proboscidean prey by age

Evidence from archaeological sites in Europe and Asia indicates that hunters consistently targeted young proboscideans. Agam cites as examples the Lower Paleolithic site of Terra Amata (France), the Acheulian site of Holon (Israel), the post-Acheulian cave site of Bolomor (Spain), the Middle Paleolithic Spy Cave (Belgium), the Upper Paleolithic 27,000-year-old site of Krems-Hundssteig (Austria), and Pleistocene cave sites

in China. The relative ease of killing younger specimens and transporting their body and leg parts may have dictated hunting strategy. As a bonus, young proboscideans undoubtedly tasted better and yielded plentiful nutrients from their fat deposits.

Pitulko believes New World hunters pursued a similar strategy. Calves were easy for Clovis hunters to take, and, like any young animals compared with adults of the same species, they were tastier. Concerning tusks for use as toolstock, hunters certainly preferred tasks as straight as possible. Otherwise, he reasons, they would



FROM PITULKO ET AL. 2015

have to straighten them, which takes time and effort, “so if the tusk was straight enough in the beginning, they would get a finished weapon sooner.” Based on evidence at the Yana site, Pitulko finds that mammoths hunted were mainly females because their tusks were relatively thin, long, and straight, which made them ideal preforms in manufacturing rods. Juveniles were also hunted at Yana, but mainly as food.

### Hunting strategies vis-à-vis kill sites and camp sites

Agam notes that instances of mass kills of females and males,

juveniles and adults, can be found in the New World, possibly accomplished by hunters driving mammoths into a natural trap or the result of a natural catastrophe (for example, mass drowning in a waterhole). Opportunistic hunters may also have killed dying mammoths overcome by drought, which implies “a pattern of behavior associated more with active scavenging than with hunting.” Although it’s difficult to infer a strategy used by Clovis hunters, Agam believes they were active hunters of mammoths rather than opportunistic scavengers and that they were flexible in their subsistence strategies.

We know that ancient hunters were intimately familiar with the behavior of their prey. Agam explains that “elephants tend to behave in a repeated manner, doing the same things over and over, using the same trails, at the same times. Proboscidean hunters would definitely use that kind of knowledge to their benefit.”

Hunting methods are devilishly hard to evaluate because they leave no archaeological trace. In view of the many cave sites containing proboscidean remains, Agam concludes that “prehistoric groups didn’t fully exploit carcasses at the kill site, but instead carried at least parts of the carcass to the living site. Consequently, evidence related to the hunt itself is more likely left behind at the kill site.”

Kill sites are hard to find, being ephemeral by nature and leaving little, if any, evidence. Agam allows that “bones are often carried away, and good tools are taken away to be reused. Some of these events don’t require any tools whatsoever, such as drives toward natural traps.” Enormously satisfying though it is to find a proboscidean kill site, Agam is the first to admit it isn’t easy. He suggests that “understanding the circumstances leading to a situation identified in a living site might help us to reconstruct the procurement method. Future work will take us exploring the issue of transportation of selected proboscidean body parts to living sites, specifically to cave sites, as an indicator of delayed consumption and practices of meat sharing.”

### The hunters’ armory

Pitulko considers the spear the most important tool in the ancient hunter’s toolkit: “You can’t hunt without a spear, which consists of the shaft and foreshaft, point, and tip. This means you are using wood, ivory or bone, and lithics. To produce all that you need a number of tools, plus the knowledge of how to process these materials and where to get them.

“You must also have some spare parts to reload, to replace a broken tip or fix the foreshaft, for example. And, of course, you’d better have something to enhance your throwing capability,” namely, a spear-throwing board. Clovis hunters had it, and it complemented their tactics wonderfully by making it possible to attack from a greater distance.

Pitulko calls our attention to a distinctive technology that appears at the Yana site, foreshaft construction of the spear or dart. This weaponry is also a hallmark of the Clovis culture. Its appearance at the Yana site confirms its widespread use in western Beringia long before Clovis. Pitulko doesn’t mean to imply that Clovis and Yana are closely related, or that Yana foreshafts are ancestors of those used by Clovis. He merely asserts that toolmakers in both cultures apparently reasoned along the same lines.

It isn’t clear what kind of weapon damaged mammoth bones found at the Yana site. Fragments of a lithic point and a small

ivory flake embedded in the same lesion on a mammoth scapula suggest to Pitulko some sort of composite lithic-and-ivory tool. He believes it



Artifacts produced from mammoth ivory: **A–C**, spear points from the Yana site complex; **D**, spear point or dart from Bolshoy Anuy site.

was probably a short weapon consisting of a heavy ivory main shaft equipped with a long foreshaft made of ivory or rhinoceros horn.

Hunters also used simple or combined ivory thrusting spears. Some ivory points from the Yana site are more than 60 cm long, further augmented by ivory cores. They demonstrate that Yana toolmakers were capable of crafting full-size thrusting spears similar to those found among grave goods in a burial at the Sungir site in Russia, which dates to about 24,000 yr B.P. Agam reminds us that “we are still far from understanding the nature of the Paleolithic symbolic systems. But the role of mammoths in Upper Paleolithic cosmology and symbolism cannot be ignored.”

Agam agrees with Pitulko that the spear was an essential hunting tool, “definitely the most common component in elephant hunting described in the ethnographic and ethnohistoric documentations.” He is convinced, however, that other tools used by ancient hunters were no less important. He cites a case in the ethnographic record in which elephant hunters used axes, another in which they used arrows. He believes that “each tool used by both prehistoric and recent hunter-gatherers had its own importance and a special place in the lives of the people producing it.” This explains why toolmakers sometimes put considerable effort into acquiring specific materials suitable for making tools. Consider, he says, Konso women in Ethiopia, who travel up to 25 kilometers to obtain lithic materials best suited for making scrapers to process animal hides. He thinks that “each tool had its place in the functional, social and ontological world of the society manufacturing it.”

### Mammoth consumption and cultural development

Throughout the Paleolithic, humans consumed mammoths, and also used skeletal elements as building materials and to

*continued on page 20*

**J**OHN HOFFECKER of the Institute of Arctic and Alpine Research at the University of Colorado, Boulder, is one of the lucky few: His life's work aligned with his childhood dreams. Born in London in 1952, Hoffeecker moved with his family to New York, where he grew up in Brooklyn and developed an early interest in ancient civilizations, particularly Egypt. Although he entered Yale as a history major in 1971, a freshman class in Egyptology reminded him of his childhood interest in

archaeology of Eastern Europe and Beringia seemed for many years to be two separate research topics, the two themes eventually merged into one—the global dispersal of anatomically modern humans.

### Off to Russia

Hoffeecker's original dissertation project was derailed by the international fallout from the Soviet invasion of Afghanistan in 1979, and he didn't land in Russia until early 1986. During the late 1980s and 1990s he collaborated with several Russian colleagues on the study of Paleolithic sites in the northern Caucasus, including Mezmaiskaya Cave. In 2001 he began a new program of collaborative research at the famous Kostenki sites on the central East European Plain. The research team included his former crew chief from Lubbock

## Seer of the Global Dispersal of Anatomically Modern Humans



Hoffeecker in L'viv,  
Ukraine, November 2018.

archaeology, and the following year he switched his major to archaeology (which was an option at Yale at the time).

He spent the summer of his junior year working at the Lubbock Lake site in Texas and returned to Yale in the fall of 1974 to finish his undergraduate studies. "That fall I took a course in Social Archaeology with the late KC Chang," Hoffeecker tells us, "and, in one of those fateful moments that affect the remainder of your life, a young faculty member suggested I look at Richard Klein's book on the Kostenki Upper Paleolithic sites in Russia, because they contain complex dwelling features that provide a basis for investigating social archaeology in the Upper Paleolithic. So I wrote a paper for Prof. Chang on the large dwelling feature at Kostenki 1."

In 1986 Hoffeecker completed his Ph.D. at the University of Chicago. Richard Klein was his committee chair and advisor, and his dissertation was on the Upper Paleolithic of the East European Plain. Before he began work on his Ph.D. at Chicago, however, he

Hoffeecker excavating  
with Nancy Bigelow at  
Cape Espenberg,  
Alaska, August 2009.



spent three years at the University of Alaska in Fairbanks, where he worked with his faculty advisor, the late Roger Powers, at the Dry Creek site and developed a lifelong interest in the archaeology of Beringia. Although the Upper Paleolithic

Lake, Vance Holliday of the University of Arizona.

"I was the Principal Investigator on an NSF grant for Kostenki that was awarded in December 2001 and covered the 2002–2003 field seasons, supporting research at both Kostenki 12 and 14," Hoffeecker explains. "The previous field season, 2001, was supported by a grant from the Leakey Foundation. We got another Leakey grant in 2004, plus supplemental support from NSF. For the 2007–2008 field seasons we won another NSF grant, plus support from Leakey and National Geographic Society."

The focus of these investigations was on the early Upper Paleolithic occupation layers, initially at the sites of Kostenki 12 and 14, and, beginning in 2004, also at the original Kostenki site (Kostenki 1), "which had been the subject of my senior year paper for Prof. Chang a quarter of a century earlier." A series of new dates on the oldest layers at Kostenki obtained after 2000 revealed that they were the earliest modern human occupations in Eastern Europe (about 45,000 years old), and a 2007 paper in *Science*, coauthored with Vance Holliday, garnered international media attention and helped secure new funding for continued research at Kostenki.

"John and I first met as students working at the Lubbock Lake site, Texas, long ago," says friend and colleague Vance Holliday, geoarchaeologist at University of Arizona. "We didn't work together again until 2001 when John invited me to work as a geoarchaeologist on a project he was

planning with Russian colleagues at the Kostenki-Borshevo Paleolithic localities in western Russia.

“We have put in many seasons now, including work elsewhere in Russia and in Ukraine. It has been a remarkable experience, cementing both a professional and a personal relationship. Besides archaeology, we share interests in history, politics, movies, and TV (as Baby Boomers!). Our conversations are endlessly fascinating (and funny). In the field we might be discussing the finer points of upper Paleolithic site-formation processes along terraces of the Don River and 5 minutes later chuckling about a favorite scene or character in an old movie (John does great imitations).

“The breadth and depth of John’s interests and knowledge are breathtaking. He works with and has encyclopedic knowledge of the archaeology of subsistence and technology, cold-climate adaptations by humans, the peopling of Ice Age eastern Europe, Beringia, and North America. To further his research abilities he learned to read, write, and speak Russian, at the ripe old age of a graduate student no less.

“John’s remarkable abilities show in his publication output. In my office I count three books by John, dealing with the origin and dispersal of modern humans, the ice age of eastern Europe, and the evolution of human thought, plus another book likely well known to *Mammoth Trumpet* readers, a synthesis of the archaeology and paleoecology of Beringia coauthored with Scott Elias. Then there is a monograph on Cold War archaeology, plus high-profile journal articles. I never fail to be in awe of John’s accomplishments.”

### A dispersal of high-tech foragers

The modern humans who showed up at Kostenki 45,000 years ago were part of a global dispersal that began more than 50,000 years ago in Africa (and reached Beringia before 30,000 years ago). Several earlier *Homo sapiens* dispersals out of Africa, beginning more than 200,000 years ago, were comparatively limited in geographic extent and never reached either Europe or Siberia, which effectively blocked modern humans from the only land route to the Americas (Beringia).

By 2017 Hoffeecker had concluded that the success of the later global dispersal lay in a significantly increased capacity

for designing complex technology, including winter clothing and mechanical devices, such as small-mammal traps and mechanical projectiles. These complex technologies were es-

sential to the settlement of places like Siberia and Beringia, where food resources are less plentiful (and therefore require increased foraging efficiency) and winter temperatures are extreme. Evidence of these technologies shows up in the early occupations at Kostenki and also in the earliest sites in Beringia (near the mouth of the Yana River), investigated by Hoffeecker’s colleague Vladimir Pitulko.

Hoffeecker (right) with geoarchaeologist Vance Haynes at the Murray Springs Clovis site in Arizona, 2009.



In the fall of 2017 Hoffeecker articulated this theme in his book *Modern Humans: Their African Origins and Global Dispersal* and in a paper in the journal *Evolutionary Anthropology* coauthored with his son Ian, who is a post-doctoral researcher in biophysics at the Linnaeus Institute in Stockholm.

“John Hoffeecker’s depth and breadth of knowledge, which spans multiple continents and reaches beyond 50,000 years ago, is unique among archaeologists investigating the peopling of

the Americas,” says Associate CSFA Director Ted Goebel. “I followed in John’s footsteps as a graduate student at the University of Alaska Fairbanks in the late 1980s, and in 1993 he included me as a junior author on a major research paper in the journal *Science*, and I’ve never forgotten that early opportunity. For 30 years he has been a major role model of mine, not only because of his contributions to Russian and Beringian archaeology, but also because of his prolific publishing career, which through his multiple books has made the world of Paleolithic archaeology more accessible to the public.”

Hoffeecker making notes on mammal bones at Kostenki, August 2015.



### Tackling Beringia during the LGM

Hoffeecker spent five years writing *Modern Humans*, which at last enabled him to bring together the two research themes he had pursued since the 1970s—the East European Plain and Beringia—as pieces of the larger story of the global dispersal of *Homo sapiens*. It also reflected a theme developed long ago by his Ph.D. advisor Richard Klein, who in a second 1973 book on

Eastern Europe had described the Upper Paleolithic cultures of modern humans as a “quantum advance” over those of their Neanderthal predecessors. Another theme in *Modern Humans*, also long articulated by Richard Klein, was the integration of human paleogenomics with archaeology.

In 2016 Hoffecker and his colleague and coauthor Scott Elias received a grant from NSF for a workshop at their institute on Beringia that brought together geneticists, paleoecologists, and archaeologists to discuss and debate the “Beringian Standstill Hypothesis.” This

**Geoarchaeologist Vance Holliday (left) and Hoffecker in Volgograd/Stalingrad planning a visit to a Paleolithic site in the city and to localities related to the titanic battle that raged in the city in WW II, 2013.**



hypothesis, based on the analysis of mitochondrial DNA and published by Erika Tamm and others in 2007, suggested that ancestral Native Americans had occupied Beringia thousands of years before their dispersal in the Americas. Participants at the workshop included Hoffecker’s former professor at the University of Alaska in the 1970s, Richard Scott of University of Nevada, Reno, and Ted Goebel.

“There is a potentially important distinction between when the First Americans arrived in the northwestern corner of the New World (eastern Beringia, today’s Alaska and the Yukon); and when they arrived in mid-latitude North America and farther south,” Hoffecker explains. “It looks as though we now have good agreement between paleogenomics

and archaeology with respect to the dispersal, in mid-latitude North America and Central and South America, of the ancestors of today’s Native American population, which takes place about 15,000 calendar (or calibrated radiocarbon) years ago. I suspect that the critical variable in the timing of the dispersal was the retreat of the Cordilleran ice sheet along the NW Pacific

coast, which allowed people in eastern Beringia to move southward along this coastal zone.”

The alternative explanation, according to Hoffecker, is that Beringian environments were the critical variable in the timing of the arrival of Native Americans, that harsh climates or scarce resources in part or all of Beringia were the barrier to the New World. According to this view, people occupied Beringia when climates warmed after 16,000 years ago, which also coincided at least roughly with the

retreat of ice along the NW Pacific coast. In Hoffecker’s view, the question of whether ancestral Native Americans were living in eastern Beringia (Alaska/Yukon) during the LGM is unresolved. “There are reliably dated archaeological sites dating to about 14,500 years ago in central Alaska, but there also is possible evidence for people in arctic Alaska and Yukon, as well as in arctic western Beringia (on the other side of the Bering Strait), during the LGM. In this case, the paleogenomics are ambiguous: on one hand, they are widely interpreted to indicate a divergence of the ancestral Native American population from its Asian parent population before 20,000 years ago, but on the other hand, they don’t tell us if this ancestral Native American population was living in Beringia, including Alaska/Yukon, or

**A**MONG THE EARLIEST modern humans in Europe were hunters who settled beside the Danube 30,000 years ago. They chose the site well: It lay at the edge of the enormous ice sheet, which created a tundra-like environment that attracted mammoth and reindeer. With ample food year-round, they had the leisure to learn new skills. Excavations at the site in the modern Czech Republic, ongoing since 1924, reveal some of the earliest examples of textile and ceramic manufacture. They were gifted artisans, capable of creating stunning jewelry and figurines (notably the famous Venus of Dolní Věstonice shown here on the cover, an exotic, highly stylized female fetish). They practiced ritual burial, in one instance three young persons interred in a common grave.

Scientists will find the scholarly text of *Dolní Věstonice–Pavlov: Explaining Paleolithic Settlements in Central Europe* a valuable



reference. Casual readers will enjoy the beautifully executed scenes of Paleolithic life inspired by archaeological finds over the past century. Those who enjoy Jean Auel’s *Clan of the Cave Bear* will find intriguing the fact that the author credits the technical accuracy of Paleolithic life expressed in her novel to research at Dolní Věstonice. See the outside rear cover of this issue for ordering information.

**Jiří A. Svoboda** served as principal investigator of the Dolní Věstonice site from 1985 until he retired in 2019. He is coeditor of *Early Modern Human Evolution in Central Europe: The People of Dolní Věstonice and Pavlov*. Translator **Suzanne Dibble** has served the English-language needs of publishers, universities, and other institutions throughout the Czech Republic.

not.” He’s hopeful that ongoing research in the next few years in Alaska/Yukon and western arctic Beringia will resolve the question of whether people were in Beringia 20,000 years ago. At present, however, he doesn’t think “we can firmly say when people arrived in the New World, at least in the northwestern corner of North America.”

The NSF workshop on Beringia helped established a long-term collaboration among a group of researchers from several fields that continues today. The “Beringia Working Group” includes geneticist Dennis H. O’Rourke of University of Kansas, archaeologist Vladimir Pitulko of Russian Academy of Sciences, and dental anthropologist Richard Scott, who has recently published new research that reveals a pattern in teeth similar to that reported by Tamm and others based on mtDNA analysis in 2007, suggesting an early divergence from their Asian parent population and extended period of isolation for the First Peoples of the Western Hemisphere. Recently the group has focused its attention heavily on the arctic zone of Beringia, where all existing evidence for early settlement is found.

“I have known John since his arrival at UAF in the late 1970s,” says colleague Richard Scott of the University of Nevada, Reno. “In my graduate seminar, he demonstrated an incisive mind, exceptional writing skills, and a keen sense of humor. Coming from Yale to the last frontier was a shock to the system, but he handled it with aplomb in the field (e.g., Dry Creek) and classroom. He does great impersonations, especially the one for conservative intellectual William F. Buckley. He would lean back, stroke his chin, and impersonate Buckley perfectly. He does others, but their names will remain anonymous to protect the faint of heart. Buy him a beer and you’ll see what I mean.”

### Past, Present, and Future

After receiving his Ph.D. in 1986, Hoffecker worked for more than 10 years at one of the national labs (Argonne). During this period he continued to pursue field and laboratory research in Eastern Europe and Beringia. He also worked on the history of Cold War military technologies, including the early warning systems, for the U.S. Department of Defense,


which stimulated an interest in the history of technology and innovation. Eventually, technological innovation became another major theme in his research.

In the late 1990s he joined the Institute of Arctic and Alpine Research at the University of Colorado in Boulder, and in 2003 he became a fellow of the institute. In 2005 he was awarded an honorary degree by the Russian Academy of Sciences. Both his 2017 *Modern Humans* book and a 2007 book on Beringia co-authored with Scott Elias received awards from the American Library Association as “outstanding academic titles.” He was guest on *Science Friday* in early 2014, following publication of a short paper on “Beringian Standstill” in *Science* with Scott Elias and Dennis O’Rourke.

Hoffecker currently is researching and writing about Eastern Europe, Beringia, and technological complexity in human evolution. Recent research in Eastern Europe has been focused on the earliest traces of modern humans in northern Eurasia, which are represented archaeologically by the Initial Upper Paleolithic. With colleagues in Ukraine, he recently obtained a series of dates on the only known Initial Upper Paleolithic site on the East European Plain, which is found in western Ukraine. In Beringia he is currently developing collaborative research proposals for new field and lab research on both sides of the Bering Strait. Hoffecker and Elias are currently writing a new book on Beringia for Texas A&M University Press. Along with Olga Potapova (*The Mammoth Site*), they recently published a paper in



**Hoffecker at Shlyakh, southern Russia, August 2013.**

*PaleoAmerica* on arctic Beringia. He also continues to work with his son Ian on papers regarding the measurement of technological complexity in the archaeological record and the role of technological innovation in human evolution. 

—Martha Deeringer

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### Suggested Readings

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——— 2002 *Desolate Landscapes: Ice-Age Settlement in Eastern Europe*. Rutgers University Press, New Brunswick.

Hoffecker, J. F., and S. A. Elias 2007 *Human Ecology Of Beringia*. Columbia University Press, New York.

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Powers, W. R., R. D. Guthrie, and J. F. Hoffecker 2017 *Dry Creek: Archaeology and Paleoecology of a Late Pleistocene Alaskan Hunting Camp*. Texas A&M University Press, College Station.

**E**VERY LIFE is unique, but some lives merit the term more than others. The life of George Carr Frison was one of those.

With George's passing September 7, 2020, two months shy of his 96th birthday, the field of Paleoindian archaeology lost not just one of its giants, but also, figuratively and literally, one of the tallest among them; and many of us lost a kind, quiet, generous, unassuming friend and colleague. George's many professional accomplishments are enumerated in his autobiography, *Rancher-Archaeologist* (2014, Univ of Utah Press), which I highly recommend. Here, I want to focus on George as a person.

But let me give a quick summary: He started college at the age of 37, after a life in ranching (sheep for much of that time, but always some cattle to "maintain respectability"). He completed his B.A. at the University of Wyoming (UW) in two years (1964), and then went to the University of Michigan, the top school at the time, where, in an unbelievable three years (it normally takes seven), he finished his Ph.D. in 1967. More unbelievable, he returned to the UW that year to become the first head of the newly created Department of Anthropology, and, soon thereafter, Wyoming's first state archaeologist, positions he held for some 20 years. He authored his first book, *Prehistoric Hunters of the High Plains*, in 1978, at the age of 54—and he would go on to publish another dozen books or so, along with over 100 professional papers. He trained dozens of students and traveled widely: Europe, Africa, South America, Russia, China. He was elected to the National Academy of Sciences in 1997 and is still the only faculty member at the University of Wyoming in any field ever to achieve that honor. He was president of the Plains Anthropological Society and later of the Society for American Archaeology (SAA), the primary professional organization of archaeologists in the western hemisphere. He received the SAA Lifetime Achievement Award, as well as the American Quaternary Association Distinguished Career Award, the Asa Hill Award of the Nebraska Historical Society, the UW George Duke Humphrey Distinguished Faculty Award, the Distinguished Service Award of the Plains Anthropological Society, the UW Distinguished Former Faculty Award, the Wyoming Archaeological Society Golden Trowel Award, and was inducted into the Wyoming Outdoor Council Hall of Fame.

And yet, to many who knew him, he was simply "Doc."

George was born November 11, 1924, in Worland, Wyoming. He described his earliest days in a short paragraph in his autobiography: Three months before his birth, his father, George S. Frison, died in a hunting accident. His mother remarried when George was three years old, and his paternal grandparents "convinced her to let me live with them on the ranch." And that was it; his autobiography never mentions his parents again. I don't mean to imply George was unfeeling, not at all. But some people might have spent much of their life angry at being abandoned. Not George. I think there were many events in his life—like the kamikaze attack in World War II that injured him (in his autobiography he simply says he

received a minor back injury while in the Navy)—that to him were just things that happened; no need to dwell on them.

The day he arrived at his grandparents' house he was put on a horse. He would spend long hours in the saddle for many years after that. He found his first arrowhead at the age of five—spying it from horseback. He shot his first deer at 9, and his first elk at 13. Looking for arrowheads and hunting: these would be much of what his life was about.

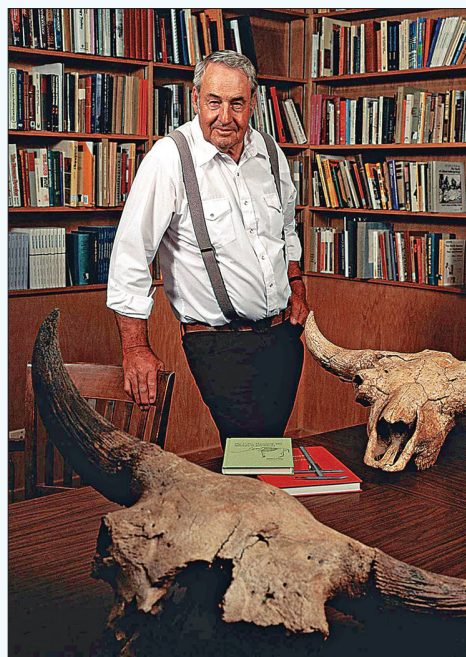
George was highly intelligent, and he became a keen observer of nature, especially of animal behavior. Growing up on the western side of the Bighorn Mountains, part of traditional Apsáalooke (Crow) territory, he was exposed from an early age to Native American culture. Chasing

## *Remembering* **GEORGE CARR FRISON** **1924–2020**

down cattle, he encountered hunting parties as a boy, as well as "war lodges," travois poles, discarded or lost equipment, crevice and tree-platform burials. For a while he rode a horse his grandfather acquired in trade with a Crow party. George once showed me his ranch guest book; the last signature was that of Joe Medicine Crow (1913–2016), an Apsáalooke war chief, historian, and author (and a man with his own fascinating life story).

George's first school was the classic one-room schoolhouse with an outhouse and a small stove for heat (it gets cold in Wyoming, and not just in the winter). He was an avid reader. He told me that when he was quite young his grandmother caught him reading a book—some dime-store novel of boyhood adventure—that included a scene of a boy being bitten by a rattlesnake. "That's not the sort of thing you should read," his grandmother said, taking the book away from him. But it didn't stop George from reading. When he was in his early 90s, I found him in his office reading a textbook on mineralogy. "I need to know about this," he explained.

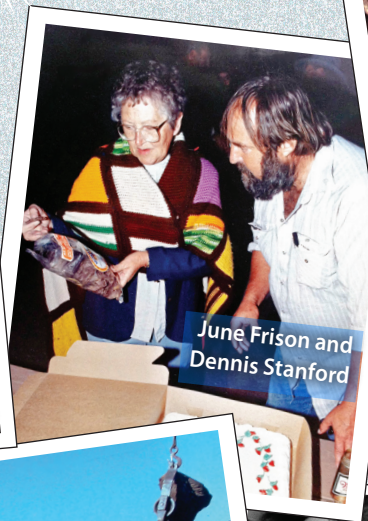
After finding that first arrowhead George always kept his eye on the ground (often to the annoyance of his grandfather). With no professional training he excavated sites (he dug Daugherty Cave in 1957, the year I was born!). Today we'd say he looted them—but George kept notes and later published those—Daugherty Cave and Spring Creek Cave among them. Many others he visited as a boy or young man, logging them away in his memory and returning to them as a professional. As a teenager George joined



# An extraordinary life and career!



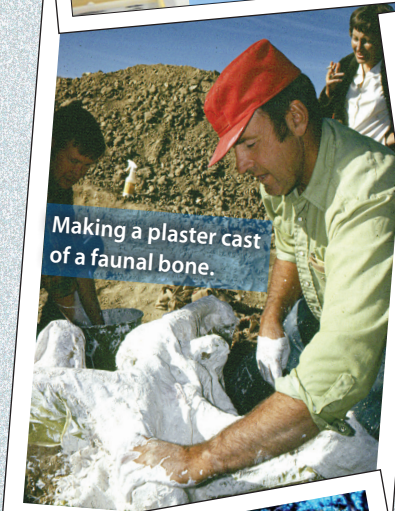
Discussing the ocher source at the Powars II site with Smithsonian scientists.



June Frison and Dennis Stanford



A lifelong hunter, George put the meat of this bighorn ram into his freezer, gave away the head and cape, and donated the skeleton to the UW Anthropology Dept.



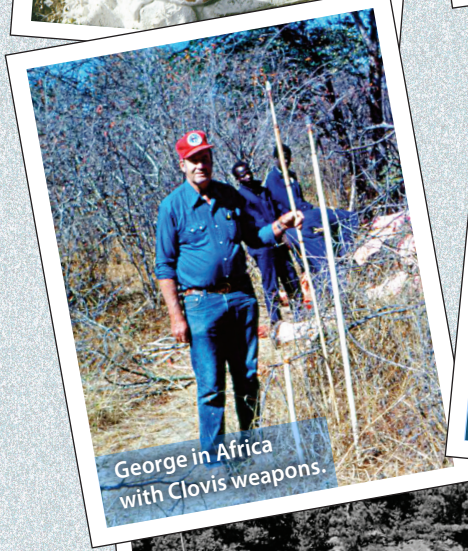
Making a plaster cast of a faunal bone.



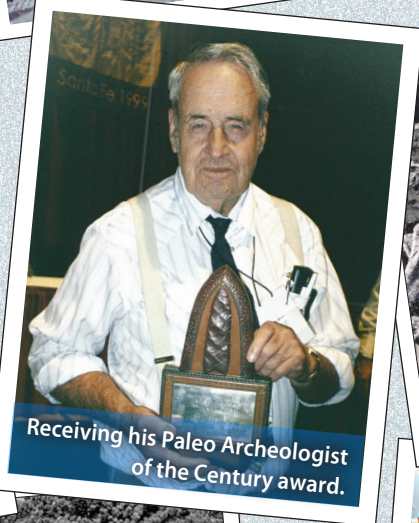
Spearing an elephant carcass with Clovis point.



Curating the skull of a bison.



George in Africa with Clovis weapons.



Receiving his Paleo Archeologist of the Century award.



Excavating the mammoth bone bed at the Colby site.



Presenting a check to the Frederick family on purchasing the Hell Gap site.



Holding the first projectile point he found at age 4 (circa 1928).

ranch hands to drive cattle from Ten Sleep to Worland, where the animals were loaded onto a train for market. The crew watered the cattle at the only waterhole between the two towns—a spring where George would later excavate the Colby mammoth kill.

The probability of leaving ranch life in Ten Sleep was low. But George wanted an education, and he left the ranch for the University of Wyoming after graduating from high school in 1942. After a semester, though, duty called, and he joined the Navy to help in the war effort. (My father and he apparently served in some of the same places in the Pacific.) Like many vets, he didn't speak much about the war. When I asked him about it, he simply said, "Too much water." (This wasn't because of a fear of drowning. Unlike many Wyoming kids, George could swim; he learned to do so in Ten Sleep creek. I've put my toe in that frigid, rocky creek and wondered: How the heck did he learn to swim in this?)

George returned to the ranch after the war and, when his grandfather passed away, took over its operation with his two uncles. He also reconnected with a high school acquaintance, Carolyn June Glanville. They married in 1946 and had a legendarily happy 65-year marriage until June's death in 2011. June often served as cook on George's field projects, and accompanied him everywhere he went, always with books to read in the shade while George dug. She supported George, but she was never subservient. In 1998, after George was elected to the National Academy of Sciences, the Wyoming legislature declared a "George Frison Day" (how many archaeologists can claim that honor?). He and June stood before a joint session, and George acknowledged people who had helped him along the way. He finished by thanking June, claiming that he could never have done anything without her. June leaned out to the legislators and in a stage whisper said, "That's true, you know." The legislators roared. George beamed.

Sometime after June had passed, I went into George's office and he handed me a yellowed letter, addressed to June Glanville. "Look at that," he said. It took me a moment before the post mark registered on me: November 21, 1941, U.S.S. *Arizona*. "My God, two weeks before Pearl Harbor!" I looked at the name with the return address. "Did he die there?" George nodded. "Was he a suitor?" George nodded. "And you got June?" Again he nodded, with moist eyes.

It wasn't unusual to walk into George's office and have him launch into some tirade—on just about anything: Once it was: "I don't know why people think camp cooks are jolly, friendly fellows. I never met one who wasn't a bigger SOB than the last one." That was a prelude to a story of a camp cook, the fellow's lost pipe, a large pot of coffee, and a kicking horse. Another time it was about the college dean—who had retired decades earlier (maybe George forgave slights, I don't know, but he didn't forget them). More often than not, though, it was about Clovis points or chert or bison bones—and for the last few years it was about Powars II, the ocher mine whose use dates back to Clovis. George's office was awash in chert samples from the site, artifacts, notes, maps, early 20th-century photographs—and everything was stained red.

He was enthusiastic and hands-on involved, right to the end. He published on Powars II in 2017 in *American Antiquity*, and a week before he passed, a paper on which he was coauthor (about the La Prele mammoth kill site), appeared in print in the same journal.


The list of sites he worked at and reported on is a who's who of Paleo-indian archaeology: Agate Basin, Hanson, Hell Gap, Horner, Casper, Carter/Kerr-McGee, Sheaman, Mill Iron, the Fenn cache, the Colby mammoth kill. He literally wrote the book on Wyoming archaeology, *Prehistoric Hunters of the High Plains* (1978; now in a third edition with Marcel Kornfeld and Mary Lou Larson, *Prehistoric Hunter-Gatherers of the High Plains and Rocky Mountains*, 2010), and published on all facets of Wyoming prehistory, including excavations at Medicine Lodge Creek, Leigh Cave, Rice Cave, Paint Rock V, Beehive, Piney Creek, Wedding of the Waters . . . the list goes on. George approached archaeology like it was ranch work: just git 'er done (but take notes). He had no problem with moving large volumes of dirt ("If you want to make an omelette, you got to break some eggs"), and he loved working with a backhoe.

In 2000, when George was 75, he returned to the Agate Basin site. The crew exposed a profile at the Brewster locality, as George had done at many other sites, and while he was examining it, the wall of sediment collapsed, burying him completely. Students jumped in, digging wildly. They managed to drag him out and get him to an ambulance. George survived with a few cracked ribs.

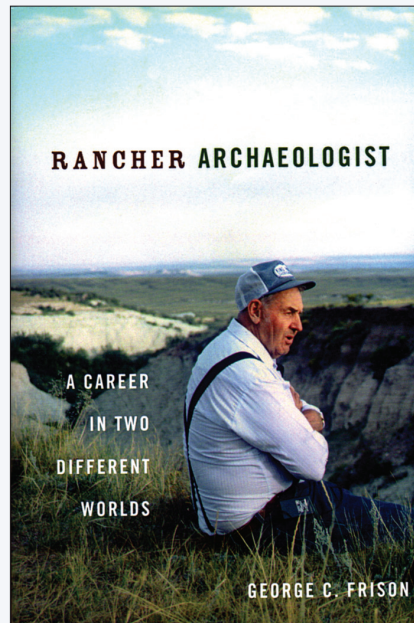
He had a classic Wyoming sense of humor about these things, things that just happen. At the time of his Agate Basin work, I was excavating the Pine Spring site in southwest Wyoming. I had dropped a 50-gallon drum of water on my foot and hobbled into the department as soon as I arrived in town. George was the first person I saw, and in those ancient, pre-cell phone days, I knew nothing about the previous week's near-death experience. "What happened to you?"

he asked, noticing my limp. I explained, and he said, "Is that all?" and walked away.

In 1982 I excavated a cave site with George on the North Fork of the Shoshone River, outside Cody. It was perched far above the river, at the top of a steep talus slope. None of us in the crew expected to find anything (we were right). George and I excavated a large, deep test unit just outside the entrance. By deep I mean George was excavating at the bottom, throwing the dirt up to the level I stood on, where I shoveled it out, above my head. We dug and dug. But then George stopped, and with a finger to his lips indicated I should be quiet. He slowly pointed to the top of the excavation. There, perched on the edge, was a small bird, cocking its head, letting out an occasional chirp. George smiled, and we stood there for the few minutes that the bird found us interesting, appreciating a small, brief moment of the natural world's beauty.

George cared deeply about where he came from, about June, and about archaeology. So it's fitting that his cremated remains were spread in the beautiful Ten Sleep Canyon, where June's ashes were spread, and also near his and June's tombstones in the Ten Sleep cemetery, and finally at the base of the highway sign on Route 16 that marks the nearby Colby mammoth kill site. Next time you drive between Worland and Ten Sleep, stop at the sign and say hello. 

—Robert L. Kelly  
University of Wyoming



## The Gault and Friedkin Sites

*continued from page 4*

the artifacts below Clovis at the Friedkin site are in place and are a pre-Clovis assemblage.”

An important aspect of the Gault and Friedkin sites is that they were investigated by two different teams working independently; the sites were dug by different archaeologists and dated by different experts in OSL dating, and different geologists recorded the stratigraphy. That said, these two teams independently found artifacts below the Clovis horizon, and the earliest artifacts from these sites are amazingly similar and date to the same time period.

### Connections with other sites in the Americas

The earliest stemmed points elsewhere in North America are found in the Intermountain West at Paisley Caves in Oregon and at Cooper’s Ferry in Idaho. Taken collectively, the evidence from Friedkin, Gault, and other sites suggests that the earliest known people to enter North America were using stemmed points. These sites, says Waters, “clearly show that stemmed points predate the lanceolate concave-base points typical of Clovis.” They show that stemmed points ranged from western to central North America. The Friedkin and Gault sites also provide a rich assemblage of tools used by the First Americans. He points out that “at Gault and Friedkin, we physically have Folsom overlying Clovis and then artifacts below Clovis. First, there are very few sites with Folsom overlying Clovis. Second, there are only two sites—Gault and Friedkin—that have artifacts below Clovis.”

Likewise, South America has a long history of stemmed points used by the earliest inhabitants of the continent and their descendants. At Monte Verde, Chile, people used stemmed projectile points by 14,500 years ago. Later stemmed Fishtail points became widespread across South America around 13,000 years ago.

Evidence from these sites suggests that the earliest known people to enter the Americas bearing stemmed points likely arrived by traversing the Pacific coast by watercraft, then hopscotching down the coast. The coastal route would have been accessible to watercraft by 16,000 years ago as the Cordilleran Ice Sheet retreated and exposed refugia along the coast. The interior corridor between the Cordilleran and Laurentide ice sheets, the famed Ice-Free Corridor, didn’t open until 14,000 years ago, and bison and other animals were passing through the corridor by 13,000 years ago. As people occupied the coast, some began to migrate inland, and some journeyed all the way to Texas, to the Gault and Friedkin sites,

by at least 15,500 years ago. Some groups, carrying stemmed points, continued south.

### Born, a new point form to be called Clovis

A triangular lanceolate point appears at the Friedkin site by 14,000 years ago. This could have developed in situ from the earlier lanceolate stemmed point and may be the precursor to the lanceolate fluted Clovis point. Similarities between the bifaces and tool assemblages of the Buttermilk Creek Complex and Clovis suggest that Clovis may have emerged in situ from the Buttermilk Creek Complex, according to Waters. One possibility is that toolmakers divided: The technology of the lanceolate fluted concave-base point spread over the eastern two-thirds of North America and into northern Mexico; people using stemmed points remained in the western third of the continent, where that technology developed into the Western Stemmed Tradition by 14,000 years ago.

Loren Davis considers the Cooper’s Ferry, Gault, and Friedkin sites significant “because they contain evidence that stemmed-projectile-point technologies overlap with and predate fluted-point technology in the Americas. The Gault and Friedkin records are important because they contain such a large number of lithic artifacts in deposits stratigraphically below a buried Clovis component.”

Future studies of these earliest lithic assemblages will yield information about lithic technology used by people before the appearance of the Clovis Paleoindian Tradition.

**Davis studying excavation unit F134 at Cooper’s Ferry.**



For the last 3 years, Waters and colleagues have been studying a site called Hall’s Cave, which lies about 150 km southwest of Friedkin. Waters expects the site will yield a paleoenvironmental record that correlates to the Friedkin site.


Davis believes these Texas sites, along with Cooper’s Ferry, may ultimately be found to share similar core- and flake-production technologies. Although stemmed projectile points found at all these sites differ in their morphology, for Davis the morphometric differences of end products like projectile points aren’t as significant as the similarity of larger patterns of lithic reduction.

### Taking stock of what we know

Archaeological and genetic evidence, independently derived using distinctly different methods, converge to tell a complementary story of the First Americans. The evidence

shows that before 15,500 years ago geographically dispersed populations used biface, blade, and osseous technologies in North America. “Given the age of Gault, Friedkin, and Cooper’s Ferry,” Williams tells us, “that age is the very *minimum* for the presence of humans in the New World. All these sites present ages in excess of 16 ka [16,000 yr B.P.], which means humans were already in the Americas.”

Genetic studies point to eastern Asia as the homeland of the forebears of the First Americans. It makes sense, therefore, to look there for origins of these technologies. Hokkaido, with its diverse Upper Paleolithic assemblages, presents a strong case. The genetic and archaeological evidence shows that the peopling of the Americas was a complex process we’re only beginning to comprehend. Archaeologists intend to find and excavate sites of forebears of the First Americans in Beringia and across the Americas, but datable late-Pleistocene sites are difficult to find because of problems involving site preservation and identifying potential site candidates. Moreover, obstacles confronting researchers are mind-boggling. Erosional processes have displaced enormous volumes of late-Pleistocene sediments from many locations and with them any potentially early sites. Add to that sea-level rise, which has submerged the early archaeological record on the continental shelves. Yet the known late-Pleistocene sites show that there are places where this record is preserved and accessible. Nevertheless, archaeologists are sure to surmount

these obstacles. When they eventually excavate and date more of these sites, they’ll provide the material and genetic evidence needed to better define the movement of the First Americans across the New World. 

—Katy Dycus

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## Suggested Readings

Rodrigues, K., et al. 2016 OSL ages of the Clovis, Late Paleoindian, and Archaic components at Area 15 of the Gault site, Central Texas, U.S.A. *Journal of Archaeological Science: Reports* 7: 94–103.

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## Hunting Mammoths in the Paleolithic

*continued from page 11*

fabricate tools and decorative objects. Thus cultural development is intertwined with mammoth consumption.

Agam again draws a parallel between hunters of today and Paleolithic hunters: “When Mbuti pygmies of the Ituri forest hunt an elephant, they move their entire camp to the kill site, celebrating for weeks with singing and dancing and no hunting.” Likewise, the successful hunting of a proboscidean was probably a celebratory event. “While the effort, risk and time invested in such complex activity were considerable, we suggest that the nutritional, economic, and social benefits of such hunting were greater still.” 

—Katy Dycus

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Zutovski, K., and R. Barkai 2016 The use of elephant bones for making Acheulian handaxes: A fresh look at old bones. *Quaternary International* 406:227–38.

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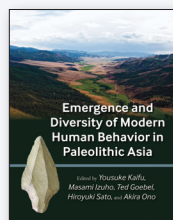
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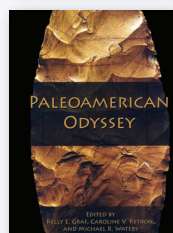
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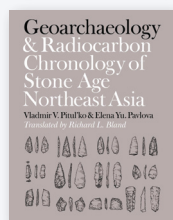
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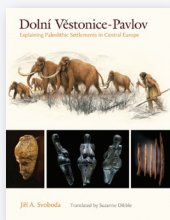
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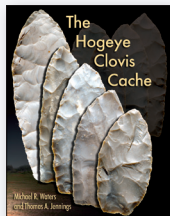
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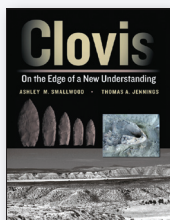
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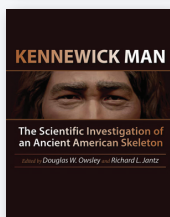
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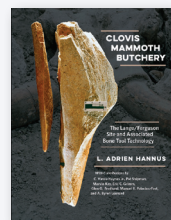
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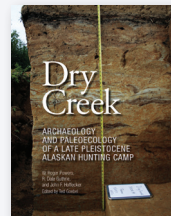
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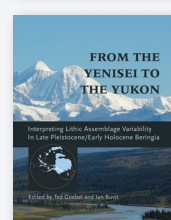
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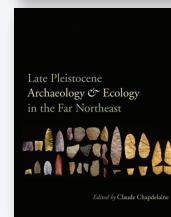
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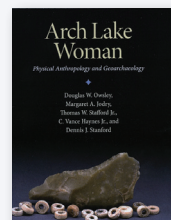
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