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# ARCHAEOLOGY

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A publication of the Archaeological Institute of America

May/June 2017

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<https://vk.com/readinglecture>

COVER: Hadrian's Wall near Haydon Bridge, Hexham, Northumberland

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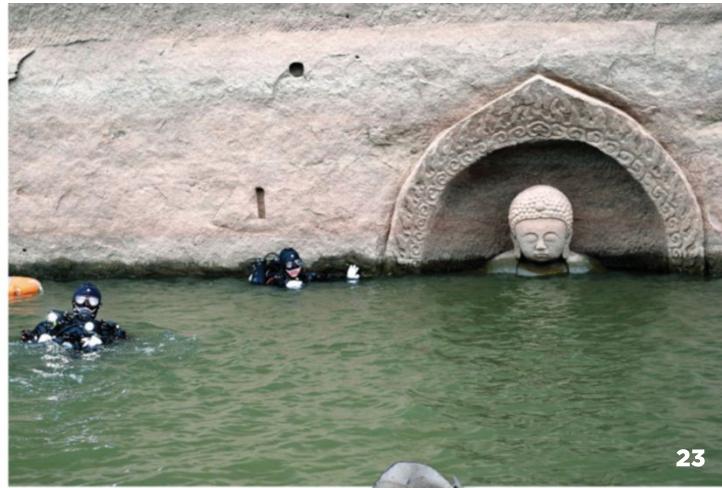
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## EDITOR'S LETTER

# SPEAKING VOLUMES

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It spanned 73 miles, running the entire width of Great Britain, and was constructed in roughly six years under the leadership of the Roman emperor Hadrian. From the early second century A.D., and for the next 300 years, Hadrian's Wall did more than define a border. In our special section "The Wall at the End of the Empire" (page 26), executive editor Jarrett A. Lobell details how the wall was built, the defensive system of which it was a part, and why it is still regarded today as one of the most enduring and fluent statements of Roman power.



Gladiator  
glass,  
Vindolanda

Fluency of a different sort is at the heart of "When the Ancient Greeks Began to Write" (page 44), by online editor Eric A. Powell. Newly discovered inscriptions are allowing researchers to close in on when and how the Greek alphabet was created—a profound development because it included symbols for vowel sounds and, therefore, for the first time, allowed for notation of the sound of speech.

In November 2013, during the construction of a café in Durham, England, archaeologists were called in when workers discovered a mass burial. Confirming the remains as Scotsmen lost in the aftermath of the 1650 Battle of Dunbar against Cromwell's English troops, researchers posted details of their discovery online. "After the Battle" (page 50), by senior editor Daniel Weiss, traces the surprising connections that were then revealed to exist between the deceased Scotsmen and a robust descendant community in the United States, many generations on, who finally came into possession of their ancestral narratives.

"The Blackener's Cave" (page 36), by deputy editor Samir S. Patel, tells of a forbidding, dark-as-night cave called Surtshellir, in Iceland's Hallmundarhraun lava field. The cave contains what archaeologists believe could be among the oldest standing Viking structures in the world—dating to the early tenth century A.D. Deposits indicate that the bones of as many as 200 animals were hacked into tiny pieces there, and that an impressive wall was constructed to bar intruders. Discussion continues on whether the cave was a ritual site or a hideout for outlaws, but Surtshellir's reputation, long established in Icelandic myth and storytelling as the home of a fearsome giant, remains secure.

Executive editor Jarrett A. Lobell brings us another way in which something might be a bit more than it seems in "One + One = Forty-Nine" (page 42). And don't miss "Letter from Greenland: The Ghosts of Kangeq" (page 55), in which researchers work to save coastal heritage sites from the impacts of climate change.

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Kevin Mullen

## Director of Integrated Sales

Gerry Moss

## Account Manager

Karina Casines

## Account Manager

Jeff Posner

PRI Communications Inc.  
Jeff@pricommunicationsinc.com  
516-594-2820 x11

## Circulation Consultant

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## Pro Circ Retail Solutions

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For production questions  
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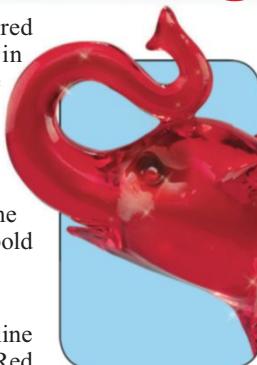
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## FROM THE PRESIDENT

# NEXT STEPS AT THE AIA



Athenian  
silver coin

**A**s we move ahead at the Archaeological Institute of America (AIA), it is important to acknowledge its distinguished past. The AIA was founded in 1879 and, in 1885, launched the prestigious *American Journal of Archaeology (AJA)*, which continues publication to this day as a top-rated scientific, peer-reviewed journal. In 1906, the AIA was recognized and chartered by the United States Congress. In 1919, the AIA was admitted to the American Council of Learned Societies, whose mission is “the advancement of humanistic studies in all fields of learning in the humanities and the social sciences and the maintenance and strengthening of relations among [them].” As a learned society, the AIA represents and serves professional archaeologists—in particular, a core constituency of classical and Mediterranean archaeologists—within the broader context of the humanities and social sciences. Professional members benefit from the *AJA*; from the AIA’s annual meeting, held at the beginning of January, at which hundreds of papers are presented; from AIA fellowships and grants; and from other services.

The AIA, however, is distinguished from other learned societies in that it also has a significant number of avocational, nonprofessional members. These members, along with professionals, benefit from ARCHAEOLOGY magazine, established in 1948, as well as the hundreds of public lectures and other events offered each year by 110 AIA Local Societies throughout North America and abroad. The AIA’s unique combination of professional archaeologists and avocational members is its great strength.

The AIA is also involved in a broad range of advocacy issues, including the preservation of our shared cultural heritage, both nationally and internationally. Over the next three years, I hope to build on our long tradition of supporting archaeological fieldwork and research by increasing our endowment and strengthening our collaboration with closely allied learned societies such as the American Schools of Oriental Research and the Society for Classical Studies. Local Societies used to enjoy three lectures per year (supported by the national office), but that number has been reduced to two due to budgetary constraints. One of my priorities is raising money to restore the third lecture, as the Local Societies remain our most effective means of public outreach—which is crucial for the future of archaeology.

I hope you will join me in achieving these and other goals by joining the AIA as a Supporting Member. If you are already a Supporting Member, you have my thanks. Perhaps you might consider giving the gift of membership to someone else.

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A handwritten signature in black ink that reads "Jodi Magness".

Jodi Magness  
President, Archaeological Institute of America

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## LETTERS

# FROM OUR READERS

### CAREER PATH

I look forward to every issue of *ARCHAEOLOGY*. When I was deciding on a major during my freshman year in college in 1963, archaeology was on my short list of favorites. I eventually decided on geology as the major in which I could most likely make a career. But I never lost my interest in archaeology, and today, as a retired geologist, I have the time to read articles and books on the subject. In addition to the main articles, I really enjoy the short ones in the "From the Trenches" section. The magazine opens up the world of archaeology to me, for which I am truly grateful.

Steven Lower  
Cushing, OK

### WHEN ANGER OVERWELMS

In the March/April 2017 issue, in the article "The First American Revolution," archaeologist Matthew Liebmann described the curious episode of the Jemez people destroying their own village after ousting their Spanish occupiers. He noted that people were puzzled by this apparent self-destructive behavior. I am

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primarily interested in Holocaust studies, and the phenomenon described by Liebmann is well known in that discipline.

Over the years, I have seen much primary source data and collected several oral histories that reveal a sort of "temporary liberation insanity" that sets in when people are delivered from long-standing oppressive circumstances. In the case of Holocaust survivors in the immediate aftermath of liberation, it was as though a dam broke, releasing years of pent-up rage and violence.

I have spoken with more than one Allied soldier who witnessed, with great confusion, recently liberated concentration camp inmates and slave laborers demolishing their own shelters, setting fire to otherwise useful stores of supplies, and even, in some cases, lashing out irrationally and attacking fellow survivors. It seems the Jemez people mentioned by Liebmann were working through a similar process following their own liberation.

I would like to thank the staff of *ARCHAEOLOGY* for providing such a fine publication. I eagerly await each issue of your magazine and devour it cover to cover for the wonderful glimpse it offers of fresh and exciting discoveries being made around the world.

Chris McGee  
Star City, AR

### A POSSIBLE SCENARIO

I've been thinking about the fate of the

Waldgirmes settlement discussed in "The Road Not Taken" (March/April 2017), and I would like to offer the following conjecture: Immediately upon having learned of the defeat of Varus' three legions, the leadership of the Waldgirmes *vicus* realized that this settlement on the "wrong side" of the Rhine was now in deep trouble. There were no longer any Roman soldiers anywhere nearby to protect the *vicus* from the now-rebellious Germanic tribesmen all around it. Therefore, the leaders decided the settlement should be abandoned in order to save the lives and livelihood of the Roman settlers living there.

The people were urged to pack up their possessions, and they probably left all at once, in a group large enough to afford themselves a modicum of protection on their journey to the "friendly side" of the river. The *vicus* was left intact, including the monumental statuary that was too heavy to move quickly. Quite soon, the local Germans realized that the *vicus* had been abandoned. They then entered it, and, in a show of defiance against the Roman invaders, the statuary was pulled down and broken up, and the huge gilded horse was dropped into the settlement's well as a religious sacrifice. Then the entire settlement was set afire, symbolically ending Rome's claim on German territory once and for all.

Steve Henigson  
Eastsound, WA



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## SCROLL SEARCH

In 1946 or 1947, a Bedouin goatherd found a number of ancient texts in a cave overlooking the Dead Sea and the ruins of the town of Qumran in the West Bank. Searches over the next decade yielded around 900 mostly fragmentary ancient Jewish texts in 11 different caves. These texts, known as the Dead Sea Scrolls, are among the greatest archaeological discoveries of the twentieth century. Written primarily on parchment and papyrus, they date from between the third century B.C. and the first century A.D. and include almost all of the Hebrew Bible, texts related to it known as Apocrypha, and the writings of a Hebrew sect thought to have been based at Qumran, most likely the Essenes. The texts offer valuable insights into debates about Jewish law and ritual—as well as messianic speculation—in the period after the composition of the Hebrew Bible and before the rise of Christianity and Rabbinic Judaism.

Recently, small fragments of texts purported to be from the area have appeared on the antiquities market. Many are thought to be fakes, but they have led to concern that there are undiscovered Dead Sea Scrolls, and that looters are getting to them in advance of archaeologists. In response, the Israel Antiquities Authority has launched Operation Scroll, which aims to survey several hundred caves in the area and excavate ones that may contain texts. In February 2017, archaeologists announced they had discovered a cave in the cliffs west of Qumran near the northwestern shore of the Dead Sea that they believe once held additional Dead Sea Scrolls.

In a tunnel around 50 feet from the cave's entrance, archaeologists led by Oren

Gutfeld of the Hebrew University in Jerusalem and Randall Price of Liberty University in Virginia unearthed a range of objects, including several broken storage jars of the sort that sometimes contained scrolls, multiple pieces of cloth used to wrap scrolls, straps of leather to tie them, tendons that connect them, and even pieces of blank parchment. “But, unfortunately, the scrolls were not there,” says Gutfeld.

Then, hidden between two rocks, they found a pair of pickaxes dating to the 1950s. This, for Gutfeld, was critical. “In my opinion, for sure there were scrolls in this cave that were looted by Bedouins 60 years ago,” he says. “And how can I be so certain? We have everything that is attached to the scrolls. And they left us their pickaxes.”

Robert Cargill of the University of Iowa and other experts

Blank parchment fragments



## FROM THE TRENCHES

aren't so certain. Cargill points out that many caves in the area have signs of looting. In his opinion, it is the discovery of blank parchment that makes the newly excavated cave significant. Along with previous discoveries at Qumran of ink-wells and styluses, remains of animals and materials to remove hair from their hides, and tests showing that ink used to write

at least some of the Dead Sea Scrolls was made using water from the Dead Sea, the blank parchment supports the argument that some of the scrolls were produced locally. "The big story is that



Cave excavation, West Bank

they found another piece of evidence that the residents of Qumran, whoever they were, could manufacture scrolls," says Cargill, "not that they found a Dead Sea Scrolls cave."

For Lawrence Schiffman of New York University, the blank parchment is also the excavation's most important find, though for a different reason. He sees it as an explanation for how forgers have managed to produce fake Dead Sea Scroll fragments that appear to be genuine based on radiocarbon dating. "It tells us that it is possible to recover blank animal skin material from antiquity that

could be used to make fakes," he says. "Since this cave had some writing material, it may be that other caves had blank writing material as well."

—DANIEL WEISS

## OFF THE GRID

COLUMBIA HILLS HISTORICAL STATE PARK, WASHINGTON

*In the 1950s, the U.S. government funded the Dalles Dam Project to build hydroelectric capacity for the Northwest and beyond. The project was completed in 1957, but the rising waters behind the dam forever changed a stretch of the river valley separating Washington and Oregon. The area had long been a gathering place for people from the Warm Springs, Yakama, Umatilla, and Nez Perce tribes. Their modern descendants opposed the dam construction and feared that ancient rock art there would be submerged. Although they were not able to stop the project, the tribes were able to save approximately 40 artworks by having them jackhammered out of the cliffs. In the early 2000s, the artworks were taken out of storage and placed in a permanent outdoor display called Tamani Pesh-Wa, or "Written on the Rock," in Washington's Columbia Hills Historical State Park, formerly known as Horsethief Lake. There are also some petroglyphs higher on the cliff face in situ. Archaeologist Ken Feder of Central Connecticut State University says, "It's fortunate that the locals had the presence of mind to figure out a way to preserve some of the rock art before it was lost forever to the floodwaters."*

"She who watches"



### THE SITE

The petroglyphs of the Tamani Pesh-Wa display are now easily visible from a walking trail, and depict deer, mountain sheep, hunters, thunderbirds, owls, fish, and a creature with long flowing tentacles. One

especially notable work remains high up in the cliff face, and can only be visited with an escort from the park. It is called Tsagaglalal, or "She who watches" in the Wasco-Wishram language. The legend of Tsagaglalal tells of a female chief who was concerned over what would happen to her people when she was gone. Coyote came

to her and told her that soon the world would change and that women would no longer be chiefs. Coyote then tricked her and turned her into a rock, saying, "Now you shall stay here forever, watching over your people and the river."

Petroglyph



### WHILE YOU'RE THERE

Close to Columbia Hills Historical State Park are the Maryhill Museum of Art and the Columbia Gorge Discovery Center, both of which house artifacts from the local tribes. In the park, the lake provides recreation, and the cliffs are known for excellent rock climbing. Visitors in the spring can expect to see beautiful fields of lupine and balsamroot.

—MALIN GRUNBERG BANYASZ

# Chicago Doctor Invents Affordable Hearing Aid Outperforms Many Higher Priced Hearing Aids

Reported by J. Page

**CHICAGO:** A local board-certified Ear, Nose, and Throat (ENT) physician, Dr. S. Cherukuri, has just shaken up the hearing aid industry with the invention of a medical-grade, affordable hearing aid. This revolutionary hearing aid is designed to help millions of people with hearing loss who cannot afford—or do not wish to pay—the much higher cost of traditional hearing aids.

**"Perhaps the best quality-to-price ratio in the hearing aid industry"** —Dr. Babu,  
Board-Certified ENT Physician

Dr. Cherukuri knew that untreated hearing loss could lead to depression, social isolation, anxiety, and symptoms consistent with Alzheimer's disease. **He could not understand why the cost of hearing aids was so high when the prices on so many consumer electronics like TVs, DVD players, cell phones, and digital cameras had fallen.**

Since Medicare and most private insurance plans do not cover the costs of hearing aids, which traditionally run between \$2,000-\$6,000 for a pair, many of the doctor's patients could not afford the expense. Dr. Cherukuri's goal was to find a reasonable solution that would help with the most common types of hearing loss at an affordable price, similar to the "one-size-fits-most" reading glasses available at drug stores.

He evaluated numerous hearing devices and sound amplifiers, including those seen on television. Without fail, almost all of these were found to amplify bass/low frequencies (below 1000 Hz) and were not useful in amplifying the frequencies related to the human voice.

## Inspiration from a Surprising Source

The doctor's inspiration to defeat the powers-that-be that kept inexpensive hearing aids out of the hands of the public actually came from a new cell phone he had just purchased. "I felt that if someone could devise a

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smart Phone for about \$700 that could do all sorts of things, I could create a hearing aid at an affordable price."

## Affordable Hearing Aid with Superb Performance

The high cost of hearing aids is a result of layers of middlemen and expensive unnecessary features. Dr. Cherukuri concluded that it would be possible to develop a medical-grade hearing aid without sacrificing the quality of components. The result is the **MDHearingAid PRO®** for less than \$300. It has been declared to be the best low-cost hearing aid that amplifies the range of sounds associated with the human voice without overly amplifying background noise.

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—Dr. May, ENT Physician

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—Al P.

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## FROM THE TRENCHES



Glass essence bottle



Mushroom catsup jar



Marmalade jar shard



Decorated pot

## A CORNUCOPIA OF CONDIMENTS

More than 13,000 jars and ceramic pots that once held jams and other condiments from the Victorian era were unearthed during construction of a new railway station on Tottenham Court Road in London's West End. The containers—four tons in all—were found in a cistern at the site of a Crosse & Blackwell factory and warehouse that

operated from 1830 until 1921.

The cistern probably held water used to provide steam power and was rendered unnecessary due to renovations carried out in the 1870s, according to Nigel Jeffries, an archaeologist with Museum of London Archaeology. "I think it was a very swift accumulation," he says. "The cistern was probably filled over the course of a couple of weeks."

Most of the containers appear to have been discarded intact, and the labels of many remain legible. The range of condiments represented—from marmalades and jams to mushroom catsup, piccalilli, and chutneys—illustrate how once-conventional British tastes at the time were broadening to include flavors from India.

—DANIEL WEISS

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(\*Each when you buy a pair)

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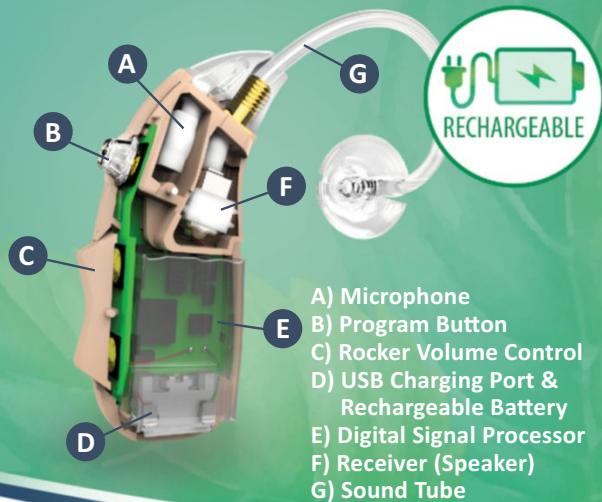
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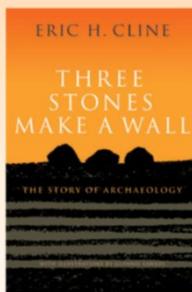
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—Sarah Parcak, University of Alabama at Birmingham, winner of the 2016 TED Prize



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## FROM THE TRENCHES



Failaka Island, Kuwait



Two sides of a jasper seal

## BRONZE AGE BLING

**O**n a windblown island in the Persian Gulf, archaeologists have found a 3,500-year-old jewelry workshop that may hold secrets to the collapse and rebirth of a major trade network. By 2100 B.C., Failaka—now part of Kuwait—was home to the Dilmun culture, a seafaring society whose trade economy fueled the cities of Bronze Age Mesopotamia, or present-day Iraq ("Archaeology Island," March/April 2013).

Suddenly, around 1730 B.C., the Dilmun trade network collapsed. Cities and temples were abandoned, leading to a period scholars know little about. Now, a team led by researchers from Denmark's Moesgaard Museum has uncovered fragments of semiprecious stones not native to the island and likely imported from India and Pakistan. "The presence of carnelian and jasper on Failaka indicates that shipping through the Gulf had picked up [a few hundred years later]," says Flemming Højlund, senior scientist and curator at the museum. "It indicates that Dilmun had emerged again as a political entity."

—MARLEY BROWN

# SQUEEZING HISTORY FROM A TURNIP

Founded in 1594, the garrison town of Tara was one of the first Russian settlements in Siberia. Archaeologists led by Tomsk State University's Maria Chernaya are now discovering what life was like there for the earliest Russian pioneers. In addition to wooden fortifications, the team has unearthed the remains of burned log houses that held toys, chess pieces, leather shoes, and knitted stockings that show that life on the Siberian frontier wasn't as austere as some might imagine. Chernaya says the most unexpected discovery was a clay pot containing a charred turnip. "It was likely part of the winter stocks, so the house probably burned in the winter or spring." She thinks the fire must have started just as someone was preparing to cook the root vegetable for a meal.

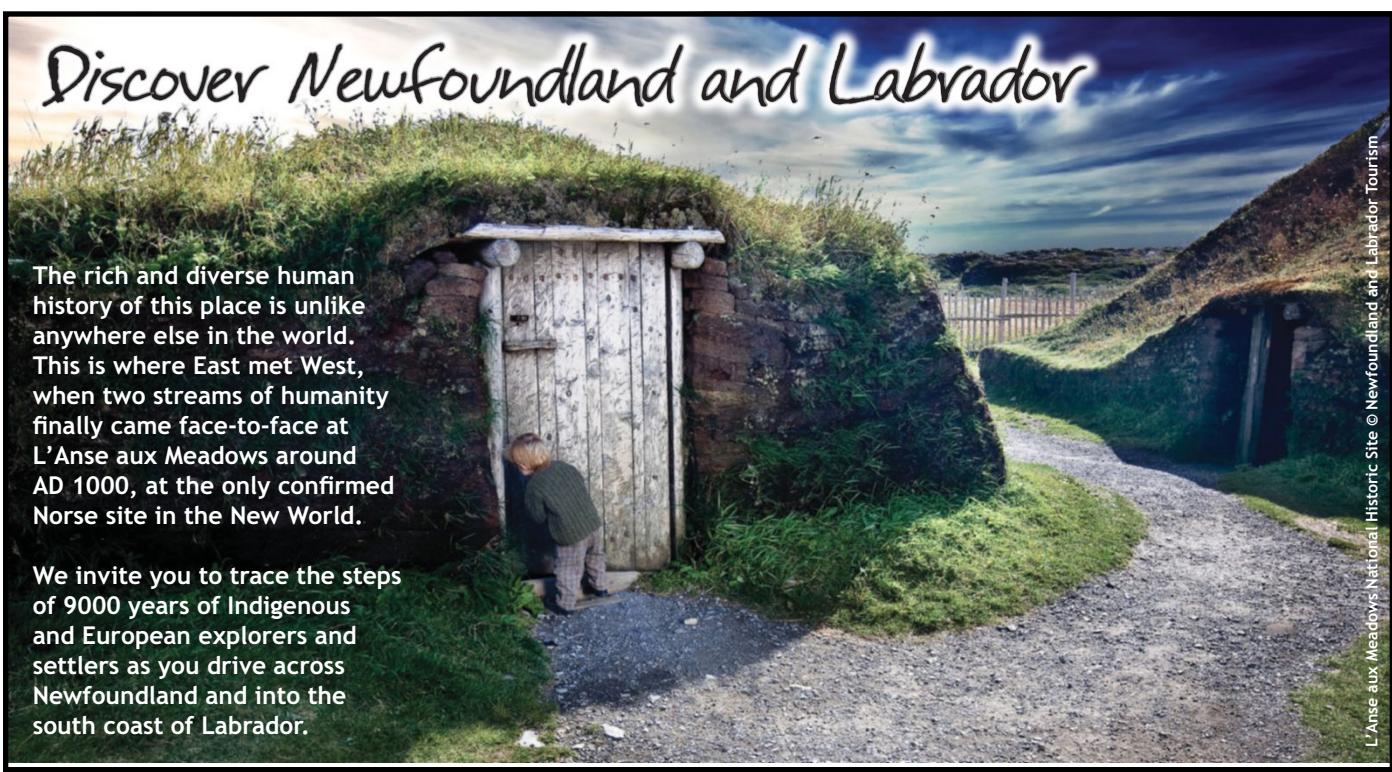
—ERIC A. POWELL



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## FROM THE TRENCHES

# AURIGNACIAN SCHOOL OF ART



Engraved limestone block

New excavations at Abri Blanchard in southwestern France have uncovered a limestone block engraved with a series of dots and the image of an aurochs, a wild ancestor of modern cattle. Pieces of bone found with the artifact were radiocarbon dated to 33,000 years ago, the period when the Aurignacian people, Europe's first anatomically modern humans, made the first representational artwork. In addition to the aurochs tablet, the research team reanalyzed 38 engraved limestone blocks that had been found at Abri Blanchard between 1910 and 1912. One of those tablets was decorated with a feline figure that was drawn using the same distinctive technique that an artist used for a painting of a feline at Chauvet Cave, about 200 miles away. While some techniques are shared between such early artistic sites, there are interesting differences, too. Randall White of New York University says, "Each region had its own particular medium of expression: engraving in southwestern France, miniature sculpture in Germany, and deep cave painting in southeastern France."

—ZACH ZORICH

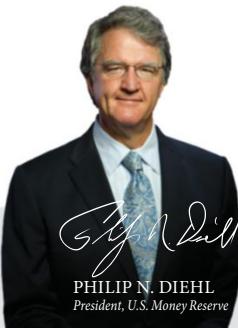
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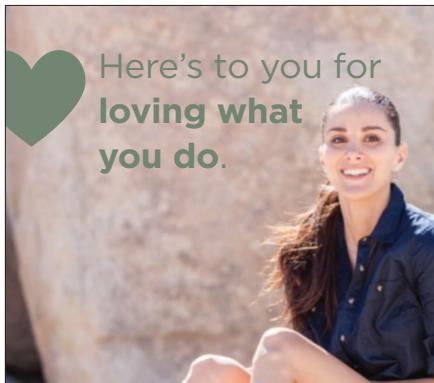
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## FROM THE TRENCHES

# COMMON GROUND

**A**rcheologists from the Cambridge Archaeological Unit have uncovered an Augustinian friary that occupied what is now Cambridge University property from the 1280s to 1538. In addition to buildings and artifacts, they have discovered nearly 40 burials. These will be analyzed as part of an ongoing project that compares human remains from throughout the city, including around 400 skeletons found at Cambridge's Hospital of St. John in 2010. It will be interesting, site director Craig Cessford says, "to know if the friars had different diets or origins, were healthier, or lived longer than the rest of the Cambridge population."

—MARLEY BROWN

**Friary excavation, Cambridge, England**



**Floor tile**

**Burial excavation**

# STANDING STILL IN BERINGIA?

The Bluefish Caves, which sit along a Canadian riverbank just over the Alaska border, in northwestern Yukon Territory, were first excavated 40 years ago. The digs lasted a decade and yielded a small collection of stone tools, thousands of bone fragments, and the controversial assertion that humans inhabited the site as early as 24,800 years ago, far earlier than most other evidence suggested.

While debate over the caves has faded, University of Montreal PhD candidate Lauriane Bourgeon took a second look at 36,000 bone fragments from the excavations. After two years of analysis, she isolated 15 samples that seem to bear marks of human modification: cuts from stone tools that are deeper and thinner than if the bones had been trampled on. In cross-section, the cuts appear to be V-shaped, as opposed to the characteristic U-shape made by carnivores' teeth. Bone samples were dated to between 12,000 and 24,000 years old, with the oldest being the jawbone of a horse that scientists believe was extinct in the region by 14,000 years ago—around the same time that humans are widely accepted to have entered North America.

The controversial new finding not only pushes the occupation of North America back by 10,000 years, it also lends credence to the Beringian standstill hypothesis, which posits that humans, while migrating from Siberia to the Americas, paused in Beringia—the ancient, now largely submerged land that included Kamchatka and Alaska—during the Last Glacial Maximum. They waited there, the theory states, until conditions improved about 17,000 years ago.

Lee Lyman, a bone-analysis expert at the University of Missouri, calls Bourgeon's assessment that humans made the bone markings "pretty convincing." But Ben Potter at the University of Alaska

Fairbanks remains unconvinced that humans were in the region so long ago, even though he called the new work "as good as cut-mark analysis could get." Without cultural features, such as organic residue or hearths, that can be dated and tied directly to the tools and bones, he

says, the date appears to be an outlier.

"We're lacking archaeological evidence in Beringia," Bourgeon says in response to her critics. "We need to find more evidence. It would help people to be less skeptical of this study."

—NIKHIL SWAMINATHAN

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## FROM THE TRENCHES



## THE VIKINGS' WIDE REACH

**R**ecent analysis of the only intact Viking boat burial ever discovered on the British mainland has revealed new information about the identity, culture, and origins of the interred individual. The tenth-century grave, which belonged to a high-status warrior, was first discovered in 2011 in western Scotland. Isotope analysis of two teeth indicates that the occupant of the grave was likely born in Scandinavia. The grave assemblage included several weapons, typical of Viking warrior burials, and other items related more to daily life such as food preparation and farming. The artifacts came from a wide range of sources, including Ireland, Scotland, and Scandinavia, underscoring the broad geographical connections of the well-traveled warrior. Says University of Leicester archaeologist Oliver Harris, "This burial helps us learn about how Viking people were interacting and eventually settling in this part of Scotland at the time."

—JASON URBANUS

## CLOSE QUARTERS

In February 2017, the Thomas Jefferson Foundation, which owns and operates Jefferson's home, Monticello, uncovered and began reconstructing what they believe were the personal quarters of Sally Hemings, an enslaved woman and longtime companion to the founding father. The work is part of the Mountaintop Project, a multiyear effort to peel back early twentieth-century modernization at Monticello and reveal the experience of enslaved people who lived and worked there.



Excavation, Monticello, Virginia

Excavating in the mansion's south pavilion, archaeologists have found rooms that housed enslaved domestic servants, including Hemings, who was the half-sister of Jefferson's wife Martha, and, almost certainly, mother to several of his children. Ambitious even for a man of Jefferson's stature, Monticello's original kitchen included French-style stew stoves, which allowed cooks, including Hemings' brother James, who was trained in Paris during Jefferson's time as minister to France, to prepare continental haute cuisine.

"How this is all going to be interpreted is a work in progress," says Fraser Neiman, director of archaeology at Monticello. "We are trying to get folks to think about Sally and James Hemings as people with full lives, rather than just ciphers to Thomas Jefferson."

—MARLEY BROWN

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## FROM THE TRENCHES

# THE THIRD REICH'S ARCTIC OUTPOST

In 1943, the German navy constructed a secret base on the island of Alexandra Land in the Arctic Ocean. Codenamed "Treasure Hunter," the station was staffed by meteorologists who provided weather forecasts to German cruisers and submarines in the Arctic. After the war, Soviet officials ordered the base destroyed. "We had only a very vague understanding of where the station was and how much had been preserved," says Russian Arctic National

Park archaeologist Evgeni Ermolov, who led a team that recently rediscovered the site. They found evidence of residences, warehouses, and a network of defensive structures, along with artifacts such as cartridges, batteries, and even pieces of raincoats. "We were surprised to find some artifacts still bearing German military insignia," says Ermolov.

After the station's destruction, rumors circulated that it had also been a submarine base and was outfitted with fortified

bunkers. The team found no evidence to support that theory, but they did discover the remains of a temporary airfield. It was built in July 1944 for a long-range reconnaissance aircraft that set down on the island to evacuate the station. The base's entire crew had contracted trichinosis after eating undercooked polar bear meat, and had to be flown to Norway for treatment, leaving the station abandoned for the remainder of the war.

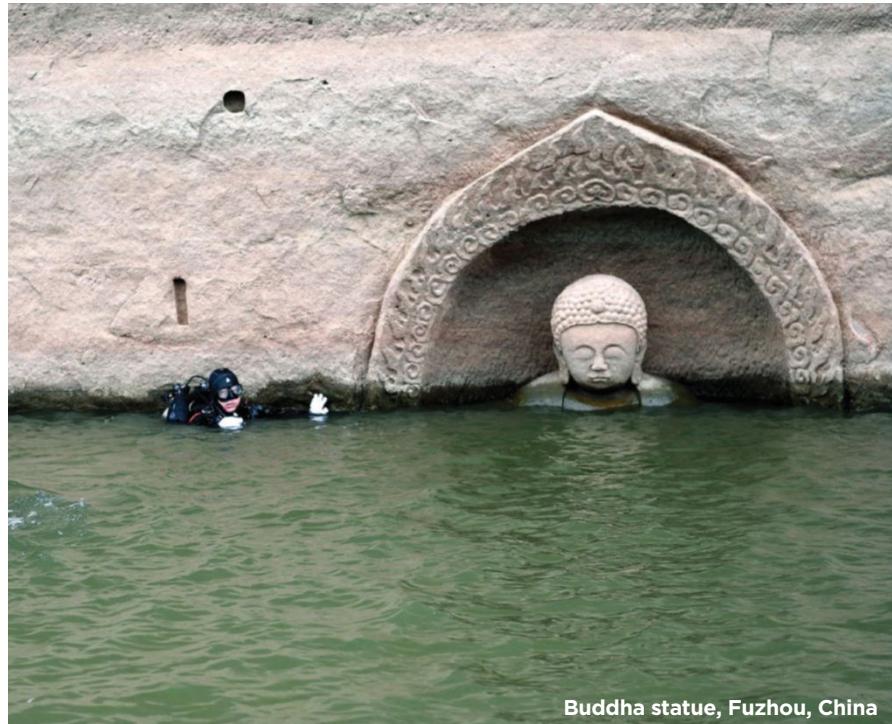
—ERIC A. POWELL



# THE BUDDHA OF THE LAKE

When a hydropower construction project lowered the water level of the Hongmen Reservoir in the southeastern Chinese city of Fuzhou, an unexpected visitor appeared—the head and shoulders of a 12-foot-tall Buddha statue carved into what had been a riverside cliff before the area was flooded by a dam in the 1950s. Underwater archaeologists found evidence of a temple below. According to locals, tricky currents made river navigation perilous, so the temple may have been where people prayed for safe passage. Researchers are documenting the Ming Dynasty (1368–1644) finds before they are submerged once again by spring rains.

—SAMIR S. PATEL



Buddha statue, Fuzhou, China

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## WORLD ROUNDUP BY JASON URBANUS

**MEXICO:** Maya communities living in the interior of the Yucatán Peninsula were evidently aware of the great marine predators swimming at the outskirts of their jungle world. A new study has examined the strong influence sharks



had on Maya art, iconography, and daily life. Shark teeth have been found at many inland Maya sites, including fossilized examples from extinct megodonts. The teeth, which were acquired through trade, were used in ritual ceremonies, as votive offerings, or as personal adornments.



**CHILE:** The Atacama Desert, which stretches 600 miles along South America's west coast, is one of the driest locations on Earth. It had previously been thought that the desert's uninhabitable conditions created a barrier to the movements of the earliest human settlers. However, recent research has detected evidence of freshwater plants and animals buried deep beneath the arid surface. This suggests that between 9,000 and 25,000 years ago, the Atacama may have contained wetlands that could have sustained and even aided early human colonization.



**ENGLAND:** A Roman skeleton that was first discovered near Stanwick, Northamptonshire in 1991, only recently disclosed its gruesome details. Analysis of the 25- to 35-year-old man, who died in the 3rd or 4th century A.D., reveals that his tongue had been cut out, causing an oral infection and abnormal bone growth around the skull. A flat rock was inserted into the mouth during burial, perhaps as a symbolic replacement in death for what he had lost in life.



**GHANA:** Hundreds of terracotta figurines unearthed in Koma Land were likely used during ritual ceremonies between the 6th and 14th centuries. Many of the animal and human statuettes contain recesses near their heads that once held small amounts of liquid. DNA and biological analysis of these cavities identified remnants of exotic plants such as banana and pine, which had been mixed into ceremonial libations. Little is known about the people who produced these artifacts, as they abandoned the area in precolonial times.



**NORWAY:** Archaeologists excavating a medieval farm in Ørland came upon a child's toy boat buried at the bottom of an ancient well. The wooden plaything, which was carved to resemble a Viking ship, had a hole into which a small mast would have been inserted. The object was thrown into the well when it was abandoned and filled around 1,000 years ago. Another well nearby contained four discarded leather shoes.



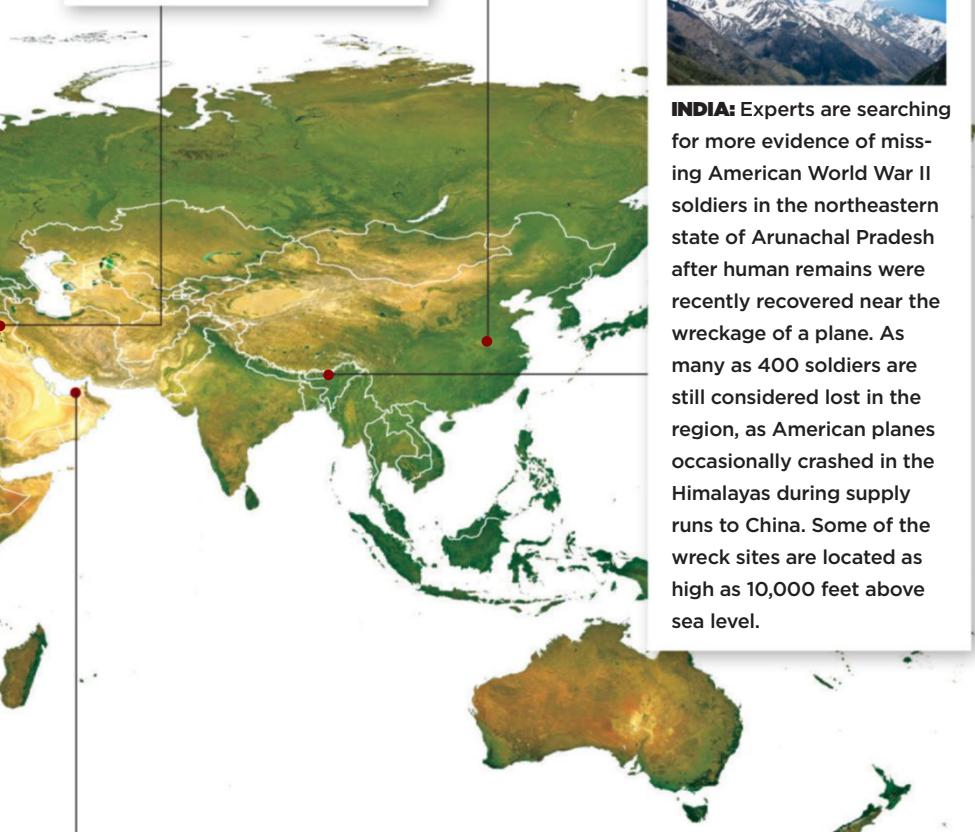
**SUDAN:** Excavations at the Christian monastery of al-Ghazali in northern Sudan point to a highly organized monastic community. The 7th- or 8th-century complex comprises two churches, dormitories, refectories, and food production areas. It's two bathroom facilities, which have 33 toilets, are the only ones ever found in the area of ancient Nubia. Given its size, experts believe the monastery was founded by King Mercurios, who was known as a "New Constantine" for his pivotal role in the development of Nubian Christianity.





**IRAQ:** A tomb in northern Iraq, first exposed

by construction workers in 2013, concealed the remains of at least six individuals. Along with dozens of ceramic vessels, a bracelet decorated with snake heads was found among the burials and helps date the tomb to the end of the Achaemenid Empire, about 2,400 years ago. Sometime later, between 400 and 1,300 years ago, the tomb was reused—five more people were buried on top of the ancient skeletons.



**UNITED ARAB EMIRATES:** The discovery of a rare stone house on Marawah Island off the coast of Abu Dhabi has provided a remarkable glimpse at what life was like in the Persian Gulf around 7,500 years ago. The three-room building is the best example of Neolithic architecture ever uncovered in the region. Hundreds of artifacts, as well as animal remains, suggest that the inhabitants herded sheep and goats, but also relied heavily on marine resources for trade and sustenance.



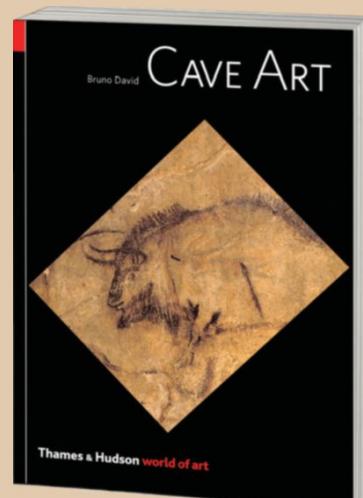
**CHINA:** The Neolithic site of Jiahu, where the oldest playable musical instru-

ment was previously found, has now produced evidence of the oldest silk fibers in human history. Soil samples taken from beneath skeletons in two tombs that date back 8,500 years reveal traces of silk proteins, indicating that the deceased may have been dressed in silk garments when they were buried. This new evidence pushes back the first known silk production technology by nearly 3,500 years.



**INDIA:** Experts are searching for more evidence of missing American World War II soldiers in the northeastern state of Arunachal Pradesh after human remains were recently recovered near the wreckage of a plane. As many as 400 soldiers are still considered lost in the region, as American planes occasionally crashed in the Himalayas during supply runs to China. Some of the wreck sites are located as high as 10,000 feet above sea level.

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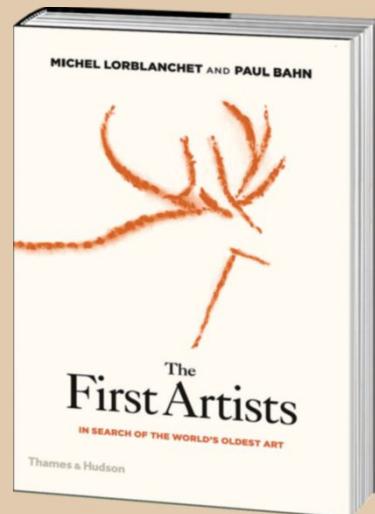


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# THE WALL AT THE END OF THE EMPIRE

The long and varied history of life  
along Hadrian's Wall

by JARRETT A. LOBELL



Running for more than 70 miles across the island of Great Britain, Hadrian's Wall formed the northern border of the Roman Empire for nearly 300 years beginning in the early second century A.D.

**W**HEN THE EMPEROR Hadrian visited the province of Britannia in A.D. 122, he was in full command of the entire Roman Empire, which stretched some 2,500 miles east from northern Great Britain to modern-day Iraq, and 1,500 miles south to the Sahara Desert. He had become emperor five years earlier, after a controversial postmortem adoption by his predecessor and guardian Trajan, and he ruled until his death in 138, at the age of 62, likely of a heart attack. In just over 20 years, he became, according to an anonymous ancient source, the “most versatile” of the Roman emperors. He was a battle-tested soldier who fought with Trajan in Dacia, a skilled politician who masterminded the consolidation of the empire’s territory, a faithful patron and lover of the arts, and a tireless traveler who visited nearly half the empire during his reign.

Hadrian is perhaps best known, however, as one of Rome’s most prodigious builders. In this he followed in the emperor Augustus’ footsteps as a ruler who grasped architecture’s inherent ability to express ideology and power. For most of Hadrian’s reign, the empire was at relative peace—the *Pax Romana*, or “Roman Peace,” was at its height. Thus he didn’t achieve the notable military victories of some of his predecessors. Instead, he turned to art and architecture as a way of legitimizing his rule, demonstrating Roman dominion, solidifying his legacy, and leaving his enduring stamp on the landscape of the empire.

In Rome itself, the emperor sponsored numerous building projects, both to enrich the lives of its citizens and tie himself to the city’s past. At the site of the Pantheon, the spectacular domed temple in the heart of Rome that Hadrian is credited with completing, he linked his own rule to one of Rome’s most revered men, the first-century B.C. consul Marcus Agrippa—a great builder in his own right. Hadrian chose to retain the





**Matthew Paris' 13th-century map showing Hadrian's Wall and the later Antonine Wall to its north**

facade of Agrippa's much earlier temple on the front of the Pantheon, while at the same time providing a new venue for the worship of all the gods. Hadrian also designed what is thought to have been the largest temple in ancient Rome, an enormous edifice honoring the goddess Venus Felix, a "bringer of good fortune," and *Roma Aeterna*, or "Eternal Rome," a double dedication whose symbolism, like the immense temple itself, was impossible to miss.

Outside Rome, Hadrian displayed his personal love of all things Greek, and he combined it with the clear message that Rome was now in charge. In Athens, for example, he restored the Greek Olympieion, or Temple of Olympian Zeus, and erected a new gold-and-ivory statue to the god, but also placed four statues of himself in front of the main shrine and a large Roman-style arch at the entrance to the *temenos*, or sanctuary.

In the provinces, as in Rome, architecture served symbolic as well as utilitarian purposes. Hadrian sponsored the renovation of ancient cities such as Smyrna, now Izmir in

modern Turkey, founded entirely new ones such as Antinoopolis in Egypt, and commissioned the construction of public architecture—theaters, temples, arches, municipal buildings, and countless statues and inscriptions—everywhere he went. These sites often exhibit a mix of local and imported styles and tastes, and brought what Duke University historian Mary Boatwright calls a "Roman visual vocabulary" to much of the empire, uniting the vast territory in a way that proclamations and policy often could not. But there was one place where the emperor thought something entirely different was required.

**B**Y THE TIME Hadrian visited Britannia, his plan to end Trajan's policy of extending the empire's territory at all costs had already played out in Mesopotamia, where he had ceded newly conquered lands east of the Euphrates River and restored the border to its previous location. In this, too, he followed Augustus, who had espoused the principle that borders should be defendable, and, whenever possible, formed by natural boundaries, such as the Euphrates, the Rhine and Danube Rivers, and the Atlantic Ocean. But Great Britain has no broad rivers running through its center to delineate the border between the province of Britannia and the lands north, which were occupied by indigenous Celtic tribes with whom the Romans often came into conflict and who, early in Hadrian's reign, were in rebellion.

Hadrian decided that the only solution was to build a wall. There were already man-made fortifications along parts of the empire's other frontiers, mostly constructed of timber, earth, and turf. But on no other frontier did an emperor construct a wall made almost entirely of stone—the formidable edifice now known

as Hadrian's Wall, much of which survives to this day.

**H**ADRIAN'S WALL SPANNED 73 miles, or 80 Roman miles, the entire width of the island, from Wallsend on the River Tyne in the east to Bowness-on-Solway in the west. At first the eastern part of the wall was built of stone, the western half of turf and timber, but the plan for the wall changed soon after it was begun. Its overall width was reduced to about eight feet, or even less in some places depending on the terrain, and the 30-mile turf-and-timber section from Bowness east to the River Irthing began to be replaced by stone, though this modification would not be completed for decades.

The majority of the construction was accomplished in six years, mainly by 15,000 troops from the three Roman legions stationed in Britain at the time—the II Augusta, VI Victrix, and XX Valeria Victrix—along with some members of the Roman fleet, using the ample supply of local stone as well as

the natural features of the landscape, and largely without the use of mortar. The medieval monk, historian, science writer, and theologian, the Venerable Bede, describes the wall as standing 12 feet high, although some archaeologists believe it might have once stood a few feet higher. At each Roman mile along the span, there was a fortified milecastle, and between each milecastle were two observation towers. There were also forts, likely 16 in total, spaced about seven miles apart. To augment its effectiveness and create a military zone, a 19-foot-deep by 10-foot-wide ditch with mounds flanking it, called the Vallum, was constructed south of the wall. A 10-foot-deep, 28-foot wide, V-shaped ditch was dug on the north side of the wall as an additional defensive measure. When fully manned, not by the legions that built it, but by regiments of auxiliary infantry and cavalry drawn from the provinces, at its height under Hadrian, nearly 10,000 soldiers were stationed on the wall.

Much current archaeological and historical research on Hadrian's Wall centers on the question of its purpose. At first, this might seem obvious—if there are troublesome tribes to the north, and you want to keep them out, you build a strong defensive wall. In fact, the late-Roman author of Hadrian's biography in the *Historia Augusta* states that Hadrian "was the first to build a wall 80 miles from sea to sea to separate the barbarians from the Romans." But this undoubtedly biased view is not the only possible answer, and, as with his other construction projects across the empire, Hadrian likely had multiple objectives in mind.

The wall was also built to keep people in, within the confines of a Roman province. It allowed the Romans to direct civilian traffic in and out of the empire, a powerful weapon in exerting economic control over those wishing to obtain access to Roman markets. Construction and maintenance of the wall provided years of work for thousands of soldiers who, particularly until near the end of the second century, had very little to do owing to the relative quiet that prevailed across the



Mid-2nd-century enameled pan naming four of the wall's forts

empire. Idle, bored soldiers—who are already being paid—are never a good thing. Furthermore, the Roman legions had all the expertise required to build the wall as they traveled with their own surveyors, engineers, masons, and carpenters.

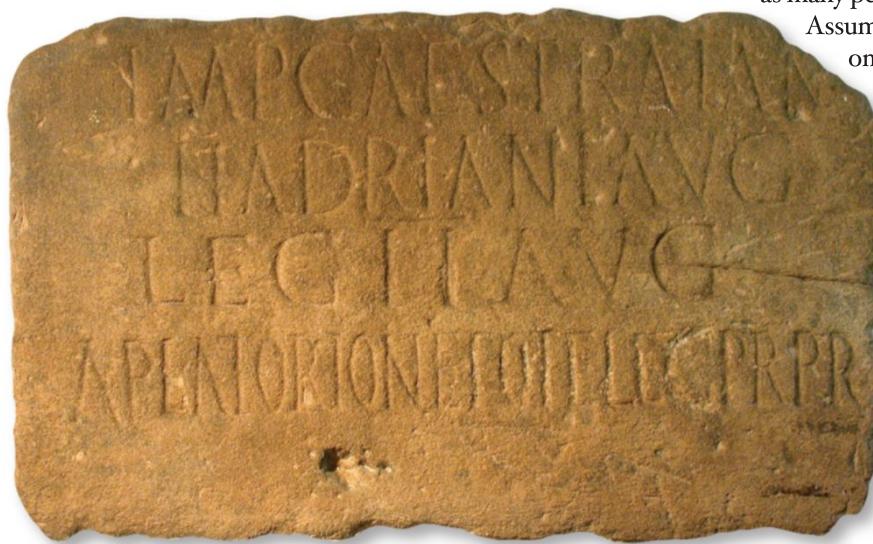
Beyond its practical purposes, the psychological impact of the wall must have been tremendous. For nearly three centuries, until the end of Roman rule in Britain in 410, Hadrian's Wall was the clearest statement possible of the might, resourcefulness, and determination of an individual emperor and of his empire.

**T**HE ROMAN CONQUEST of Britain began in earnest in the mid-first century A.D. Although the Romans had first come to the island a century earlier, rebellions had pulled Julius Caesar back to the continent. Britain remained free until A.D. 43, when the emperor Claudius led an invasion force of as many as 40,000 legionary and auxiliary troops. The complete subjugation of the island would take decades, but from that point on, the Roman army left its permanent mark.

At the time of the construction of Hadrian's Wall, there were likely about 35,000 Roman soldiers in Britain, and twice as many people associated with military installations there.

Assuming a total population on the island of around one to two million people, as much as 10 percent of its inhabitants were supported by the empire.

This, explains archaeologist Andrew Birley, had a tremendous impact on the environment, trade, economics, law and order, governance, and, indeed, every aspect of life. Although its effect on some segments of society, such as the native population of Great Britain, is not well understood, a great deal has been learned, particularly over the last 100 years, from excavations of sites on and associated with the wall. Hadrian's Wall is a microcosm of the Roman world—its military strategy, building techniques, material culture, and the lives not only of its soldiers, but also of the thousands of men, women, and children who lived on the empire's northern frontier.



Inscription identifying Hadrian as the wall's builder

Vercovicium



## DEFENSIVE STRATEGY AND THE CONSTRUCTION OF THE WALL



**A**lthough not its only purpose, Hadrian's Wall was a major component of the empire's frontier military strategy. "Undoubtedly the wall must have been used to define and regulate points where people from north of the wall could come to trade and have contact with the empire," says Nick Hodgson, principal archaeologist of the Tyne & Wear Archives & Museums. "But I see its primary purpose as a physical barrier to slow up the crossing of raiders and people intent on getting into the empire for destructive or plundering purposes." To this end, the entire length of the wall was built with an alternating series of forts, most for both cavalry and infantry, each housing as many as 600 men, manned milecastles for

between 12 and 20 men, and lookout towers. "It's important to be clear that the wall isn't the sort of defensive line where the whole of the Roman army would have stood together to repel some kind of siege like a medieval fortress," says Hodgson, "but rather that it would allow the instant observation and slowing down of an attack or movement towards the province, and give time to bring extra troops from the nearest milecastle or fort, or even from other locations. It's not a place where you make a final stand."

But the forts and milecastles, and even the wall itself, were only part of what Hodgson describes as a multilevel system of defense that also included outpost forts as far as 70 miles north of the wall, as well as a network of forts south of the wall housing major military installations. During excavations of the fort and wall at Wallsend, whose Roman name may have been Segedunum, Hodgson's team uncovered a particularly interesting feature of this system—rows of holes in the ground between the wall and the defensive ditch. At first the team believed that the pits, which likely held branches or small tree trunks entangled with sharpened branches to form a nearly impenetrable obstacle, were a local feature designed to give extra protection to the town outside the fort. But a few years later, more of these pits were found farther west along the wall, and it is now thought that they are a general feature of Hadrian's Wall, at least along the first 12 miles of the eastern section where the terrain is quite flat. Says Hodgson, "This new part of the wall's anatomy has been a fascinating discovery because this extra, very sharp-looking set of obstacles immediately in front of the wall has reignited the discussion of the purpose of the wall and demanded a reconsideration of the long-held interpretation that it had no defensive or tactical role."



Newly discovered section of wall, Segedunum

## WHERE WERE THE STABLES?

**A**lthough infantry was the lifeblood of the Roman army, cavalry provided a crucial element of the Roman military system across the empire. During excavations of the barracks at Segedunum on Hadrian's Wall, the mystery of where the horses were kept was solved. "We had never been able to identify stables in Roman forts because we were always thinking of separate stables and soldiers' barracks," says Segedunum archaeologist Nick Hodgson. "But since we were able to recognize the long, deep pits for the horses' waste under the barracks' floors, it's universally recognized that the horses and men were accommodated together—three horses and three troopers to a room." This allowed the men to keep a close eye on their very valuable roommates.



Barrack blocks, Cilurnum

Antonine Wall, North Lanarkshire, Scotland



## THE OTHER WALL

For 23 years, between A.D. 142 and 165, Hadrian's Wall actually wasn't the Roman Empire's northern frontier. After Hadrian's death, his successor, Antoninus Pius, reinvaded Scotland. Like Hadrian, Antoninus Pius did not have military triumphs to call upon to gain prestige, but unlike his predecessor, he turned to territorial expansion. He then built his own wall 100 miles north of Hadrian's, between the Firth of Forth and the Firth of Clyde. The 37-mile-long "Antonine Wall," was made mostly of turf on a stone foundation, was 10 feet tall, 16 feet wide, and had 17 forts and additional fortlets. As many as 7,000 soldiers were stationed along the Antonine Wall, but this far northern frontier proved difficult to defend and troops may have been needed to face more pressing needs on the continent. Soon after Antoninus Pius died, the new emperor, Marcus Aurelius, moved the frontier back to Hadrian's Wall, where it remained until the end of Roman rule in Britain nearly 250 years later.

# FEEDING THE ARMY

In the Roman period, the fort at South Shields, which overlooks the entrance to the River Tyne, guarded port access to Hadrian's Wall. Several forts were built at the site, first under the emperor Hadrian, and then under Marcus Aurelius, but in the first decades of the third century A.D., the fort's southern wall was removed and the fort's main function as the guardian of the harbor changed. With the addition of 13 granaries to the original two that were standard—with a further six constructed later—South Shields, whose Latin name may be Arbeia, became the main supply base for the whole of Hadrian's Wall.

Scholars believe that this repurposing of the fort was tied to the emperor Septimius Severus' invasion of Scotland and his plan for Rome to attempt, once again, to occupy the entirety of northern Britain. As part of this effort, Severus ordered that Hadrian's Wall be rebuilt where needed, which likely was the reason that the wall was originally identified as the "Severan Wall." Septimius Severus' campaign would, in the end, prove



unsuccessful and be abandoned by his son Caracalla.

Though originally intended to supply the tens of thousands of troops Septimius Severus brought with him for the invasion, for a century after the effort failed, Arbeia nevertheless remained a main supply base for soldiers on the wall. "This has really important implications for understanding how the Roman army provisioned itself and about its relationships with local people," says archaeologist Nick Hodgson.

"The default modern assumption has been that Hadrian's Wall's army got its foodstuffs from the local population, whether by taxation, requisition, or purchase. But Arbeia casts doubt on this because it suggests a continuing reliance on imported materials, perhaps from southern Britain, or even from the continent. It's a more complicated method of supplying the army than the rather more cozy model of getting it all from local farmers."

Lead seal (above) of Septimius Severus and sons

Granaries, Arbeia



# LIFE ON THE FRONTIER

## ARTIFACTS FROM VINDOLANDA



Writing tablet



Baby bootie



Slipper



The first Roman settlement at the site of Vindolanda was built between A.D. 74 and 85 just a mile south of where Hadrian's Wall would be constructed decades later. Vindolanda would remain vital to the frontier system over the next three centuries, during which a total of nine forts would be constructed, and hundreds of thousands of soldiers, men, women, and children passed through the fort and extramural town, or *vicus*, associated with it. Since 1929, when the first modern excavations of Vindolanda began, the site has provided archaeologists with the best evidence of how these varied inhabitants of the frontier lived.

What makes Vindolanda exceptional among frontier sites is the access it

provides to information about daily life, thanks to an extraordinary level of preservation and decades of careful excavation, explains archaeologist Andrew Birley. "The biggest thing we can do here is to connect where people lived with their discard sites," he says. This allows archaeologists to track individuals around the site, see how they used certain spaces, and map out all the artifacts associated with them. Birley says, "We have a context for everything, which is key. All the artifacts are surrounded by a supporting cast of materials. For example, if you are looking at the commander's house, you don't just have the house, but also the whole family's shoes." In fact, more than 6,500 discarded shoes have been found at Vindolanda—

though there are only two complete pairs. "Roman leather is like plastic. They use it until they can't fix it anymore, and then do everything they can to get rid of it. But in these anaerobic conditions, it survives for millennia," says Birley. "The shoes allow us to do some very cool things, such as deconstruct the myth that the Roman army was an entirely male world. Just like the modern army, the fighting soldier is actually in the minority. When we find a child's shoe, for example, it's another nail in the coffin of the male preserve."

But the most distinctive artifacts to have been discovered at Vindolanda are the more than 2,000 writing tablets—written in ink on wood or, much less commonly, scratched with a stylus into sheets of wax



Sock



Marching boot

on wooden backings—that tell the story of the site, and indeed of the Roman army in Britain, in a remarkable way. The tablets contain records of business transactions, one of which mentions the “awful” state of the Roman roads, personal letters home asking for socks, shoes, and underwear, and an invitation to the commander’s wife to attend a birthday party, which is thought to be the earliest example of a woman’s hand in Britain. “It’s no longer enough to say you have a Roman fort with a Roman army because then all you are doing is painting everyone with the same big brush and smearing everyone with the same paint,” says Birley. “We want to see the characters, the individuals, and the communities, because this is what makes up the full, richer picture.”

## THE RITUAL LANDSCAPE

The troops stationed along Hadrian’s Wall came from across the empire—from modern Spain, France, the Netherlands, Germany, Croatia, Hungary, Romania, Bulgaria—and also included local recruits. According to the *Notitia Dignitatum*, a list of available civil service jobs in the empire dating to around A.D. 400, which refers

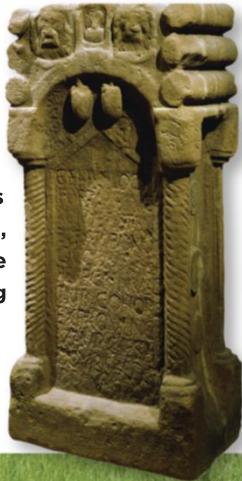
to a unit of Tigris River boatmen stationed at Arbeia, some even came from much farther afield. As a result of this diversity, there is, says Newcastle University archaeologist Ian Haynes, considerable evidence of a range of religious practices, much like there was in Rome. “Religion is everywhere along Hadrian’s Wall—in the scratched figure on the wall of a local house, on soldiers’ belt plates, in small and smoky temples, in omens read into the flights of birds, and in the marshes and bogs a short distance away,” says Haynes. “It’s also in votive statues and altars, and at the heart of the fort where even the military standards have a godlike quality and their own spirits.”

At various sites, artifacts have been found representing the full panoply of deities—Roman, Eastern, Romano-Celtic. The fort of Maryport, Roman Alauna, which was part of an extension of the empire’s defenses south along the Cumbrian coast, has been a particularly rich source. There, Haynes discovered two cult buildings, one of which is the northwesternmost classical temple in the Roman world—the northeasternmost being in Armenia. His team also reinvestigated one of Maryport’s best-known religious features—the more than 20 sandstone altars dedicated to the supreme Roman deity Jupiter Optimus Maximus that were first excavated in 1870. These altars were bestowed annually—perhaps on the anniversary of an emperor’s succession or his birthday—by the fort’s commander, and this was common practice at forts both along the wall and across the empire. Haynes’ team’s work shows that the altars had not been ritually deposited, as had been believed for more than a century, but rather were reused supports for at least one later timber-framed building from what he calls the “twilight of Roman imperial power.”

Intaglio of Romano-Celtic deity (top),  
altar (right) to Jupiter Optimus Maximus



Temple of Mithras, Brocolitia





# THE BLACKENER'S CAVE

**Viking Age outlaws, taboo, and ritual  
in Iceland's lava fields**

by SAMIR S. PATEL

**T**HE HALLMUNDARHRAUN lava field—basalt dark, with great swells and a froth of white moss—looks like a stormy sea whipped into a frenzy and frozen in place. It begins under the Langjökull glacier in mountains to the east and winds some 30 miles to Hraunfoss—literally, “Lava Falls”—where a crystalline river of meltwater pours directly from its wide, stony face. It’s very Icelandic: fire and ice, water and stone. When the lava flowed at the end of the ninth century, shortly after the Vikings arrived on the island, it was probably the first volcanic activity of its kind that northern Europeans had ever witnessed. Those early residents of western Iceland may have heard eruptions, seen a fiery glow on the horizon, and tracked its spread across the landscape, a spread that ultimately consumed around 90 square miles.

The image shows the interior of a lava tube. The walls are made of dark, layered rock, likely basalt, which has been weathered and covered in patches of bright green moss. The floor is uneven and covered with a mix of dark rock fragments and lighter-colored stones. In the background, a narrow opening leads to a brighter area where more of the lava tube's structure is visible.

**Surfshellir**, a lava tube in western Iceland, is one of many with signs of human use, but presents a puzzle for archaeologists. Was it a hideout for bandits or the feared home of a mythical fire giant?

Hallmundarhraun, just a few hours' drive from Reykjavík, is riven with lava tubes which form when fresh molten rock flows through an existing field of cooled lava. Over time, the ceilings of some of these tunnels partially collapse to form caves. There are some 500 across Iceland, and around 200 hold evidence of human occupation. One of these caves is Surtshellir, part of a lava tube complex that is Iceland's longest, at more than two miles. It is named for Surtr, the elemental fire giant of Norse mythology, the "scorcher" or "blackener," ruler of Muspelheim, who will kill all gods and life at the end of time. Inside is one of the more enigmatic archaeological sites on the island.

Until one is almost directly on top of Surtshellir's entrance, an amphitheater-shaped depression, the arrested turbulence and uniform darkness of Hallmundarhraun conceals it. But the cave is no minor feature. It is giant-scaled, a leviathan's burrow up to 40 feet in diameter, littered with massive, angular blocks of basalt calved from the ceiling. Around 100 yards into the cave, that ceiling opens to the sky, the result of a collapse centuries ago. Just before reaching this skylight, one encounters, partially buried under boulders from the ceiling, a titanic man-made wall, 15 feet tall and spanning the cave, made up of blocks, each weighing up to four tons. Just past the skylight, two small galleries branch off, one to the left and one to the right. These side caves, Vígishellir ("Fortress Cave") on the left and Beinahellir ("Bones Cave") on the right, are the remnants



Surtshellir's dark entrance is visible in this photo of the Hallmundarhraun lava field, which covers 90 square miles and formed shortly after the first Norse settlers arrived at the end of the ninth century.

of an older, smaller lava tube bisected by Surtshellir. After one scrambles up a rockfall into Vígishellir, the darkness descends like a shroud. Light is swallowed and incidental sound amplified. Breath hangs in the still, cold, humid air.

A few yards into Vígishellir is a second man-made structure: an anomalous arrangement of stones, piled a few feet high to form an oval enclosure, 22 by 11 feet. Archaeologists believe it could be the oldest standing Viking structure in the world. Next to it is a pile of animal bones, methodically hacked into tiny pieces. Archaeological sites generally have telltale patterns that show scientists how they were used: domestic activity, craft production, ritual. Surtshellir eludes such clarities. The things it contains—and, more importantly, doesn't contain—fit some patterns and resist others, and show just how difficult it can be to divine behavior, intent, and even emotion from bits of stone and bone.

**T**HE THIRTEENTH-CENTURY *Landnámabók* (or *Book of Settlements*) describes in detail the earliest habitation of Iceland, beginning around 870. It is the first source to mention Surtshellir by name. It states that a chieftain's son, Thorvald "Hollow Throat" Thordarson, traveled there across the uninhabitable interior to recite a *drápa*, or a laudatory poem, to the giant who lived there. It also tells of a group of 18 "cavemen" outlaws who lived in the area centuries before, and a related story appears in the fourteenth-century *Harðar saga ok Hólverja*, though neither places them specifically in the cave. In the *Sturlunga saga*, Órækja Snorrason, illegitimate son of Snorri Sturluson, then Iceland's most powerful chieftain, was

captured in 1236 and taken to Surtshellir, where he was blinded, castrated, bound "on the top of the fortress," and left for dead (though he survived the ordeal). A later folk story tells of 18 heretical student priests who took refuge in the cave and turned to livestock theft, kidnapping, enslavement, rape, and murder. The dire reputation of Surtshellir increased through the centuries, and was cemented in the *Hellismanna saga*, a nineteenth-century work of fiction that brought many of the outlaw stories together.

The site deep in Surtshellir—the enclosure in the side cave Vígishellir—was first described as early as the 1750s by Icelandic naturalists Eggert Olafsson and Bjarni Pálsson, and was cited again several times after that. Notably, none of these descriptions mention

the other built feature, the wall across the main tunnel, which was concealed by some combination of darkness, rockfall, and, once the ceiling collapsed fully, snow drifts.

In 2000, archaeologist Kevin P. Smith, now chief curator of

the Haffenreffer Museum of Anthropology at Brown University, was excavating at a nearby site. He and archaeologist and architectural historian Guðmundur Ólafsson of the National Museum of Iceland encountered tourists in the small town of Reykholt, once the chiefly center of Snorri himself, who told of the bones they had taken as souvenirs from Surtshellir. “It’s a very long tradition,” says Ólafsson. In the museum collection, there is a large piece of bone collected there by a couple on their honeymoon in 1915—conveniently engraved with the details.

A few days later, Smith and Ólafsson visited the enclosure and bone pile in Vígishellir. “I was shocked to learn that there had never been an archaeological survey,” says Smith. The next year they returned with a team to map Vígishellir and excavate part of the bone pile. It was also the first summer that snow drifts melted back enough to expose the wall in the main part of the tunnel, which proved to be the largest known Viking Age stone structure in Iceland.

The other lava caves in Iceland with evidence of human occupation usually show signs of brief, transient use. Surtshellir is different. “It’s a complicated cave,” says Smith. “It’s got a lot of

interesting stories in it.” There is the enclosure in Vígishellir, rough but sturdy. It resembles in shape a Viking-era hall, with an opening, or doorway, on each of its longer sides and three shallow niches built into the walls. In 2001, the bone pile next to it was just a few inches deep and several feet around. It appears that the bones had been thoroughly smashed, perhaps to extract every bit of marrow, a pattern not often seen in Iceland. But, surprisingly, they were not burned or scorched by a cooking fire. Staining on the wall and fragments embedded in cracks show that the pile—before tourists and travelers got to it—had been a couple of feet deep and 12 feet around, perhaps representing the remains of up to 200 animals. The archaeologists excavated

a portion of the pile and catalogued 7,500 fragments, mostly from sheep and goats, but also cattle, pigs, and horses. Radiocarbon dates and the age of the lava flow put the bones at around 890–930, soon after the arrival of the first migrants from Scandinavia.

The other structure in Surtshellir, the large wall, adds to the mystery. It is easily overlooked when initially exploring the cave, but once distinguished from the later rockfall, it is unmistakable. Its sheer face runs 40



**Deep within the cave, archaeologists survey an oval-shaped stone enclosure (above) that could be among the oldest standing Viking structures in the world. In the left corner (and in a detail, top) are the remains of a large pile of bone fragments, methodically hacked into tiny pieces.**

**Four lead weights found in the center of the enclosure are believed to conform to a weight standard used in Viking legal proceedings.**



feet across, a formidable barrier to movement through the cave in either direction. Because there is no passage through it, anyone wishing to access the deeper interior of the cave and the enclosure there would have to scale it. Building the wall was surely a communal undertaking—by hand, in complete darkness. “This is almost certainly the ‘fortress’ wall on which Órækja, Snorri’s son, was blinded, castrated, and left to die,” says Smith.

Smith and Ólafsson’s initial interpretation hewed to the cave’s local reputation. “It takes quite a lot of work to put up those stones,” says Ólafsson. “If you have a group of youngsters with testosterone and needing something to do, I think this would be a perfect place to have a youth gang.” Under this theory, the cave would indeed have been the residence of a band of young outlaws who raided local farms for livestock and deposited the bones in a pile. The wall would have been built for defense, the enclosure a sort of “home” to make the space more livable, Ólafsson suspects. As time passed after their initial explorations, however, Smith began to have doubts about the hypothesis.

**S**URTSHELLIR IS A PLACE without equivalents, and would have been very, very difficult to live in. The enclosure in Vígishellir is around 800 feet from the entrance. Before the ceiling collapsed, it was far beyond the reach of natural light. Anyone living there would need fire for heat, light, and cooking. They would need a latrine area in the cave to spare them dangerous passage through the darkness and over the massive wall. The cave is damp but has no stream, so the outlaw residents also would need means to collect, transport, and store water. Finally, though the written sources are not strictly reliable, many refer to 18 outlaws. That’s a lot of people to be making use of the small, room-sized, short-walled “house.” “It’s not big enough for 18 people to do anything in,” says Smith.

In 2012, Smith, Ólafsson, and others returned, with funding from the National Science Foundation and Iceland’s heritage agency, to test a new 3-D modeling system developed at Brown. The cave environment made modeling difficult, but Smith saw an opportunity to look for more evidence of long-term occupation. During the project, the team chanced upon a Viking Age bead, then another, and pieces of jasper firestarters, all in a delicate, sandy layer running through the enclosure. The next year Smith brought a team back for an emergency excavation and survey.

The archaeologists found few of the additional signs of occupation Smith was looking for. Little to no soot on the walls and ceiling. No hearth or food preparation tools. No phosphate-rich areas to indicate a latrine. No water collection or storage system. Though absence of evidence is not evidence of absence, the apparent lack of any of these features bolstered Smith’s suspicions. The survey did find the remains of six additional, smaller bone piles—now more or less picked clean—near the enclosure, in the main tunnel, and in the second side gallery, Beinahellir. The bone fragments were contemporaneous with the main bone pile, deposited over a span of 80 to 100 years. That is a long time for an outlaw occupation that left scant evidence, especially during a time when such careers were more often measured in months or seasons rather than decades.

The sandy layer held a collection of glass beads near the opening in the enclosure that faces the deeper recesses of the cave—“one of the largest assemblages of beads at any site in Iceland other than burials,” says Smith. They came in an unusually restricted set of colors: green, blue, and yellow. Around them were small flecks of orpiment, a valuable arsenic-based yellow pigment not otherwise found in Iceland at the time. The beads and orpiment may have been part of an object of some value. There were also burned bone fragments, clearly separated from the large, unburned bone pile. “There was a strangely divided treatment of bone,” Smith says. Within the structure were more jasper firestarters—the Viking equivalent of matches, in this case burned by intense heat—from all over western Iceland, in a variety of colors, but notably not the black jasper from the closest known source. It appears that the enclosure had been host to fires after all, but only episodically.

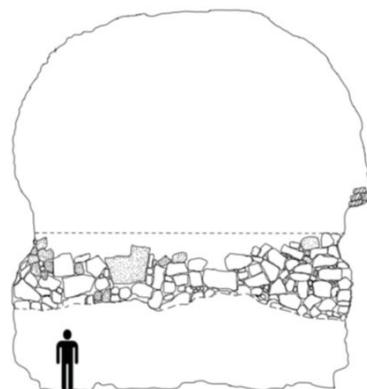
And, in the center of the enclosure, the archaeologists found a lead cross, and then three other lead pieces. They had been pecked and gouged, suggesting they were used as official weights. Smith believes they comprise a complete set, as they add up to 26 grams, a weight standard that Vikings used not for commerce but for legal proceedings, such as the manumission of a slave or compensation for injury or murder. He thinks that they were not dropped by outlaws, but rather placed there (and not burned) deliberately—to end a tradition of ritual offerings around the time Christianity came to Iceland. “It has closing deposit written all over it,” he says.



The strange artifacts and patterns of color and origin, to Smith, echo this more mystical explanation. In the *Landnámabók*, it is not outlaws that Surtshellir is explicitly tied to, but the poem of praise to the giant. Traditionally, such poems were powerful incantations, still remembered, in this case, hundreds of years after the island-wide conversion to Christianity.

Smith's theory is that the cave was the site of rituals dedicated either to keeping Surtr in or to supporting Freyr, a Norse god of fertility and agriculture who opposes Surtr. The enclosure, in addition to resembling a Viking hall, could also be interpreted as a ritual stone boat, related to the mythology of giants. The domestic animals may have been sacrificed as a call to Freyr and placed in a series of piles as a barrier across the cave—like the wall itself. The colors of the beads are also associated with Freyr, and the absence of black beads or jasper is interesting, as the color is tied to Surtr. The labor involved and the value of the remains suggest to Smith that the rituals were organized at the chieftain level. “The punch line is that it worked,” he says. “The volcano never erupted again.”

The National Museum’s Ólafsson doesn’t appear convinced just yet. While he acknowledges that the site is unusual and complex, he thinks that occupation by some fringe group remains



A wall spanning Surtshellir (illustration, left) went undiscovered until 2001, when snow melted back far enough to expose it. Mostly concealed by rockfall (above), the wall would have been a major obstacle to passage through the cave.

the most likely explanation, supported by cultural traditions. “In my opinion, that story gives the best explanation of all the finds, but it seems that it’s much more complicated than we thought in the beginning,” he says. “I don’t think we have the answer yet.”

A ritual history and a legacy of outlaws need not be mutually exclusive. Both engender a frisson of fear, the taboo, the unknown, transgression, destruction. It’s not hard to imagine that a place thought to be the gateway to Muspelheim, the door through which the blackener would come to claim time itself, would become home to stories of debased priests, torture, and gangs who terrorized the countryside. During the 600 years between the medieval and modern periods, Surtshellir was more or less unvisited and perhaps even off-limits. Whether associated with giants or outlaws, it was threatening. The place where these narratives overlap—mythical, apocryphal, historical, archaeological—at least conveys a bad feeling. It’s darkness, and in Surtshellir, it is consuming. ■

Samir S. Patel is deputy editor at ARCHAEOLOGY.

## A crocodile mummy's many surprises

by JARRETT A. LOBELL

ONE + ONE =  
FORTY-NINE



**N**EARLY 200 YEARS AGO, a 10-foot-long mummy of a crocodile arrived from Egypt at the Dutch National Museum of Antiquities in Leiden—or at least the curators thought it was a crocodile.

For the Egyptians, animals were spiritual beings that possessed souls, and animal cults were an essential part of their religion. Animal mummies, which include hawks, ibises, falcons, shrews, dogs, and cats, as well as numerous crocodiles, have been found dating from almost all periods of ancient Egyptian history. Most were likely made as votive offerings—some scholars estimate that tens of millions of animals were mummified for this purpose. Some are believed to be mummified family pets. There are complete mummies of adult, juvenile, and baby animals, and even some eggs. And, in some instances, seemingly complete mummies actually contain a part standing in for a whole, such as one dating to the first century B.C. in which a bone fragment—possibly bovine—is wrapped to form the shape of a bull. One “ibis” mummy was found to contain several snakes twisted into the bird’s silhouette. And there are even empty mummies that may have been sold as the real thing to unsuspecting pilgrims (“Messengers to the Gods,” March/April 2014).

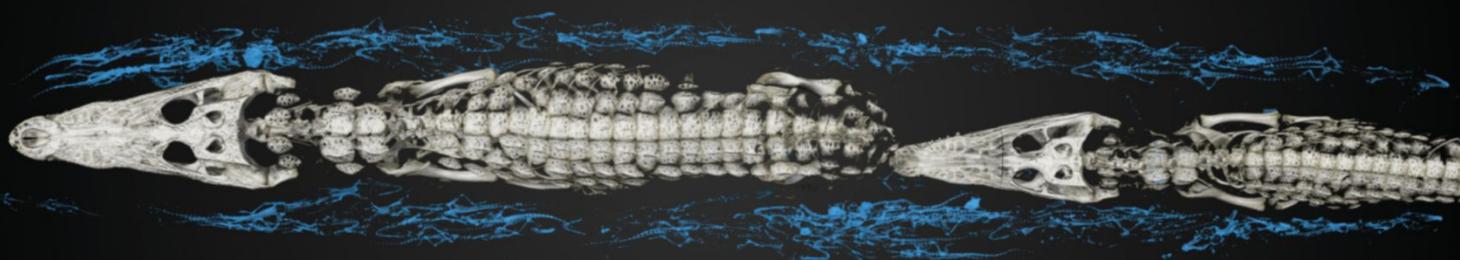
The crocodile mummy in question came to the Netherlands from a private collection in 1828 without any information about its provenance. In 1996, and then again in 2001, the curators in Leiden wanted to learn more about their enigmatic reptile. CT scans and X-rays revealed that the single crocodile was, in fact, two juveniles tied together with palm leaves, cords, and strips of linen to create the appearance of a single reptile. While the crocodile that forms the rear is complete, the one at the front is missing both hind legs and most of its tail. In fact, only about seven feet of the mummy’s total length is real

crocodile—the tail and front are linen filling and wrapping.

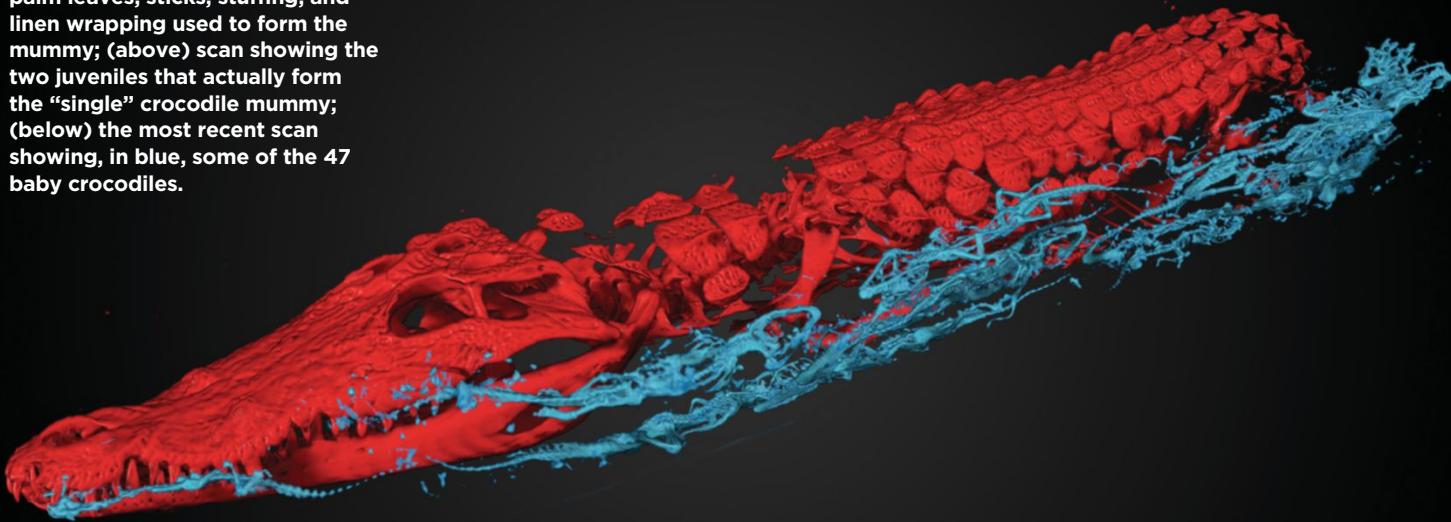
Advances in CT imaging over the past decade recently brought the Leiden mummy back to the scanner and exposed the truth in 3-D: In addition to the stuffing and the two juveniles, there are also 47 baby crocs in individual bags hidden inside its linen wrappings. The Leiden mummy is not the only example of older crocodiles mummified with babies—one now in the British Museum dates to between 650 and 550 B.C. and is from Kom Ombo. This was the site of a temple dedicated to the crocodile god Sobek and the falcon god Horus—and the findspot of more than 300 mummified crocodiles. The reptile in the British Museum is 12 feet long and has more than 25 hatchlings attached to its back. But the presence of the babies alongside the juveniles in the Leiden mummy is exceptional, says Lara Weiss, the museum’s keeper of Egyptian antiquities.

Crocodiles were objects of both worship and fear, and, explains Weiss, a mummified crocodile may have been offered to Sobek, or to one of the other crocodile gods, for protection. “The power of the dangerous crocodile could be used against other dangers,” she says. Weiss believes there are two possible explanations for why the priests who assembled the Leiden mummy did so in such an extraordinary way. “Either they needed a larger crocodile and took whatever parts they could get their hands on,” she says, “or, perhaps more convincingly, the combination of two generations—juveniles and babies—to create one adult mummy, and thus a third generation, was a deliberate choice to represent the religious concept of rejuvenation, which is one of the most important ideas in Egyptian religion. Putting three generations into one mummy might have symbolized a type of eternal life.” ■

Jarrett A. Lobell is executive editor at ARCHAEOLOGY.



Using state-of-the art 3-D scanning technology, scientists confirmed some previously known information and also discovered some exciting new details about an ancient Egyptian crocodile mummy. (Top) Scan showing the palm leaves, sticks, stuffing, and linen wrapping used to form the mummy; (above) scan showing the two juveniles that actually form the “single” crocodile mummy; (below) the most recent scan showing, in blue, some of the 47 baby crocodiles.





In this detail from a Greek cup dating to the 5th century B.C., a student uses a stylus to write on a tablet.

# When the Ancient Greeks Began to Write

**Newly discovered inscriptions help explain how literacy spread**

by ERIC A. POWELL

**A**CCORDING TO GREEK mythology, after Zeus assumed the form of a bull and abducted the princess Europa from Phoenicia, her brother Cadmus embarked on a quest to bring her home. As the story goes, though he never rescued Europa, during his long travels the Phoenician prince managed to slay his share of monsters. But what truly places him in the pantheon of Greek mythological heroes is that he is said to have introduced the Phoenician alphabet to Greece. That myth, it turns out, reflects historical reality.

It has long been known that, sometime before 750 B.C., the ancient Greeks adapted the forms of the Phoenician alphabet for their own use, with the crucial innovation of using signs to represent vowels. That system eventually consisted of 24 characters, each standing for a consonant or a vowel, and it not only played a central role in the cultural development of ancient Greece, but is the basis for most alphabets in use today. “It’s one of humanity’s greatest inventions,” says University of Wisconsin classicist Barry Powell, who heralds the use of sym-

bols for vowels as central to that achievement. “Vowels allow a system that permits one to capture the sound of speech. That is the genius of the Greek alphabet.”

Now excavations in northern Greece are providing a new look at the earliest days of this new way of writing. At the ancient city of Methone, a team led by Matthaios Bessios of the Greek Archaeological Service has discovered a trove of very early Greek alphabetic inscriptions written on ceramics. Dating to between 730 and 690 B.C., the inscriptions were created just as the alphabet was beginning to come into widespread use, and show just how quickly it went mainstream. University of California, Los Angeles, archaeologist John Papadopoulos, who also excavates at Methone, says the newly discovered inscriptions are crucial to understanding “how we go from a Greek world without writing in the ninth century B.C., to one where it was used for transcribing the oral poetry of Homer, and even jokes, just a hundred years later.” The finds at Methone are helping scholars better understand the reality that underlies the myth of Cadmus, and have also helped fuel bold theories about the origins of the Greek alphabet.



**Excavations at the ancient city of Methone (top) show it was a thriving international port as early as the 8th century B.C. In a deep basement at the site (above), archaeologists have found ceramics bearing early alphabetic inscriptions.**

**T**HE METHONE INSCRIPTIONS fit into a long tradition of research into the origins of Greek literacy, which can be traced back to the palace states of the Bronze Age Mycenaeans, who used a script called Linear B. This writing system represents an early form of spoken Greek, and was developed around 1450 B.C. from the still undeciphered Linear A script. Like Mesopotamian cuneiform, Linear B is a system for writing syllables, not letters.

These Mycenaean states were built on rigid political and economic systems, and records kept on Linear B tablets were the lifeblood of their bureaucracies. Virtually all surviv-

ing tablets are administrative in nature, tallying commodities such as crops and trade goods. The men who kept these records were a select group of literate administrators who served at the pleasure of the king. At Knossos, in Crete, 66 of these unnamed officials have been identified on the basis of handwriting on tablets. That they were bureaucrats rather than simply scribes seems likely because individuals specialized in certain activities, such as one at Knossos who both recorded wool production targets and kept a census of textile workers. The ability to write and read Linear B was limited to this small guild of highly specialized professionals—no one else was literate. Frescoes depicting bards suggest that the Mycenaeans enjoyed oral poetry, but no one who mastered Linear

B ever left a written record of this literary tradition. When a combination of violent conflict and natural disasters caused the Mycenaean states to collapse around 1100 B.C., Linear B vanished along with the political system that it sustained.

After the Bronze Age collapse, the Greek world entered a period of economic contraction. During this so-called Dark Age, trading links were still maintained with Near Eastern civilizations such as the Phoenicians, and life was probably not so dire for the average Greek. But the political might of the Mycenaean world was a dim memory. That started to change around 900 B.C., the beginning of the Geometric period (ca. 900–700 B.C.), named for the decorative motifs that appear on pottery from the time. During this era, Greek city-states began to flourish and became part of increasingly active trade networks across the Mediterranean. Eventually, some cities were even able to establish colonies as far away as the Bay of Naples. The adventurous spirit of this period is captured in Homer's *Odyssey*, which follows its eponymous hero on an epic journey that takes him across the Mediterranean to many locales that became Greek colonies.

Although archaeological evidence for the alphabet is scant during the Geometric period, many scholars think it likely that it was invented around 800 B.C. and must have played an important role in this prosperous age. "It was a cultural big bang," says Aristotle University of Thessaloniki epigrapher Yannis Tzifopoulos. "Philosophy, poetry, prose, theater—the new alphabet allowed all these things to spread." Some of the earliest complete alphabetic inscriptions are poems found on pots that date to around 735 B.C. One, discovered on a ceramic cup in a grave at the colony of Pithekoussai in the Bay of Naples, preserves a text written partly in hexameter, the same poetic meter used in Homer's *Iliad*. It reads:

*I am the cup of Nestor, a joy to drink from. Whoever drinks this cup, straightaway that man the desire of beautiful-crowned Aphrodite will seize.*

This is a bawdy reference to the aged hero Nestor, who the *Iliad* tells us possessed a cup that endowed him with sexual potency. One of the earliest examples of Greek alphabetic writing, it is a direct, if frivolous, reference to the *Iliad*, an inside joke that would have amused anyone who was familiar with Homer's work. "It's an extraordinary inscription," says University of Michigan classicist Richard Janko. "I think it tells us that the alphabet must have also been used to record longer poetry at this time."

DURING THIS PERIOD of expansion, colonists from the city of Eretria on the island of Euboea in central Greece founded not only Pithekoussai, but also Methone, then the northernmost Greek outpost in the Aegean. According to the historian Plutarch (ca. A.D. 46–120), the city was founded in 733 B.C. It was located at a strategic position on two hills at the mouth of the Haliacmon, Greece's longest river, and both served as a port for maritime traffic and afforded traders access to inland resources, especially minerals and timber. Later, Methone would become famous for supplying the wood Athens used to construct its fleet of triremes, the warships that allowed that city to dominate the Aegean.

Before the recent excavations, Methone was thought to

have been on the periphery of the Greek world early in its history. But Bessios and his team have found evidence that Methone was an important international port city from almost the moment of its founding. Some of the earliest Phoenician amphoras found in the Aegean, as well as pottery from throughout the Greek world, show it was connected to a vast trade network. The team has also found evidence for working gold, silver, lead, bronze, ivory, and iron. "It's a wide range of industries for the Greek world at the time," says Papadopoulos. "It was an unusually prosperous city and it would have attracted anyone who wanted to make money." Among the city's wealthy and cosmopolitan population were some of the earliest fluent writers of the Greek alphabet.

While excavating a 36-foot-deep rectangular basement, known as a *hypogeion*, Bessios' team found 25 fragments of drinking cups that bore alphabetic inscriptions. They date to the late eighth century B.C., roughly the same time as Nestor's Cup and another ceramic vessel known as the Dipylon *oinochoe*, which was discovered in Athens and bears a poetic inscription that refers to a dancing competition.

Faced with an extraordinary collection of early inscriptions, Bessios asked Tzifopoulos to study and translate the texts. "When he first showed me the inscriptions, I thought he must have his dates off," says Tzifopoulos. "To have this many early inscriptions together, in a place we didn't know the alphabet was used during this period—I couldn't believe it at first. I told him to recheck his dates."



An early poetic inscription can be seen scratched onto this cup, unearthed at a Greek colony in the Bay of Naples. It contains a playful reference to Nestor, one of the great heroes of the *Iliad*.

Tzifopoulos soon found that all the inscriptions were names of the vessels' owners. One longer inscription was written half in prose, half in iambic verse, the earliest such example of that poetic meter yet found in Greece. One version of the text reads: "I am the cup of Hakesandros...whoever steals me...will lose his eyesight." Another inscription on a drinking vessel from the island of Lesbos reads: "I am [the cup] of Philion."

The fact that early alphabetic inscriptions are found primarily on vessels used to drink wine is no accident. The cups would have been used at the drinking parties known as symposiums, where friends and acquaintances played games and were entertained by music, dance, and the recitation of epic poetry by Homer and other poets. It's likely that symposiums were one of the chief venues through which the early Greek alphabet spread, likely in the form of jokes. "Homer is serious theater. It is like going to see *Hamlet* on Broadway instead of *Cats*," says Tzifopoulos. But evidently symposiums were not all about high art. "They would have used short humorous poetry or songs to undermine or compete with Homer's heroic poetry," says Tzifopoulos. As knowledge of the alphabet spread, symposium-goers were then able to write jokes on cups. Tzifopoulos points to the cup of Hakesandros as an example. "Hakesandros means 'one who heals,' or a doctor. So Hakesandros is saying, 'Here is my healing cup, but if you steal it, you'll lose your eyesight.' It's very playful and humorous."

The Methone inscriptions range from perfectly executed to amateurish, some possibly even written by illiterate people in imitation of actual inscriptions. "Some of these inscriptions are beautiful to look at, some are not," says Tzifopoulos. He points out that in the competitive environment of the symposium, there would have been some prestige in being able to inscribe one's name on a cup, so even illiterate people may have tried their hand at using the new alphabet.

Since most of the earliest examples of the Greek alphabet were written in the context of literary games, it is apparent that it was not a script used just by a small guild of specially

trained bureaucrats, as in Bronze Age Greece. Linear B tablets don't record who inscribed them, while many of the earliest alphabetic inscriptions are literally the names of the men who wrote them. "It's a democratic medium," says Tzifopoulos. "It's easy to use and simple to learn, and I think it spread much more quickly than we thought."



Recently discovered alphabetic symbols from small drinking cups and amphoras at Methone's mother city of Eretria also make the case that the alphabet was in the mainstream, and not just the province of the wealthy and powerful. Discovered by a team of Swiss archaeologists in the city's sanctuary of Apollo, they include examples of letters inscribed on pottery before firing, suggesting they were written by the

people who made the ceramic vessels. "These aren't scribes who were serving a ruling elite," says Papadopoulos. "They are potters. That says a lot about how widespread literacy probably was in this period."

**J**UST WHERE AND WHEN the alphabet was first invented is still a much-debated topic. It must have happened someplace where Greek and Phoenician traders lived and worked together, but that was true of many places across the Mediterranean, including the Nile Delta, Syria, Crete, and any number of sites in the Aegean, including Eretria and Methone. Papadopoulos thinks that a strong case can be made that the alphabet was invented in the northern Aegean at one place and at one time. He points out that the alphabet used by the



**Fragments of a cup found at Methone bear an inscription that states the vessel belongs to one Hakesandros, and humorously warns away potential thieves.**

Phrygians, a people who lived in western Anatolia, has vowels that work the same way Greek vowels do. In his view, the invention of these vowel symbols could only have happened once. “I think we need to be looking at a place where Greeks, Phoenicians, and Phrygians met and did business together,” says Papadopoulos. “Methone was probably just such a place.”

Theories about the alphabet’s origin abound. Some scholars suggest that Phrygian inscriptions that predate surviving Greek examples show that the Phrygians actually invented the alphabet. But most believe a preponderance of evidence suggests that the alphabet first took shape on the island of Euboea. Janko emphasizes that both Pithekoussai, where Nestor’s Cup was found, and Methone, home of the newly discovered Hakesandros inscription, were founded by Euboean



**The name “Phlion” was written on a cup (top, left) unearthed at Methone. Such cups played a central role in games enjoyed at symposiums, or drinking parties, like the one depicted in this 5th-century B.C. fresco found near the Greek colony of Poseidonia in southern Italy.**

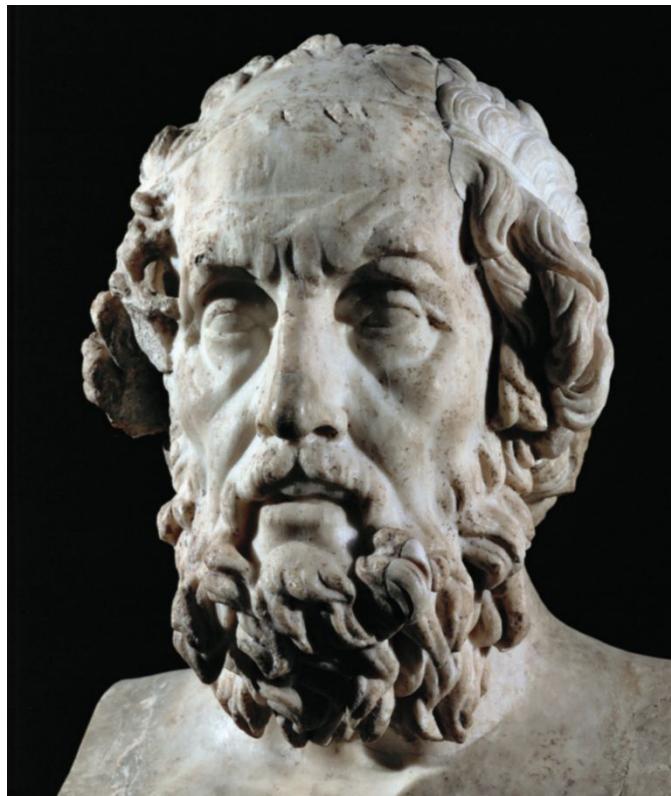
settlers from Eretria. “Euboea is the missing link between Pithekoussai and Methone,” says Janko. “Nestor’s Cup and the Hakesandros inscription use the same word play, and are essentially the same joke, and they are found more than 1,000 miles apart by sea. What the cities have in common is that they were both founded by Eretria.”

Powell supports both Papadopoulos’ view that the alphabet was invented at one place at one time and the consensus that it was on Euboea. He also thinks the earliest surviving Greek inscriptions support the idea that the alphabet was first and foremost a literary invention. Further, Powell believes that the Greek alphabet was originally created for the sole purpose of recording the poems of Homer, the semilegendary figure who many scholars now believe actually existed.

According to Powell’s theory, one person, probably a Greek-speaking Phoenician, was commissioned by wealthy Euboeans with access to papyrus to take dictation from the most famous

poet in Greece, and preserve what even at the time must have been the most celebrated poems of the age. The Phoenician alphabet, with its lack of vowels, was not up to the task of preserving Greek hexameter, so this scribe—Powell calls him the “Adapter”—needed to invent vowels from existing Phoenician letters. “It was a stroke of genius,” says Powell. “In order to capture the Homeric verse, the Adapter was forced to make, in my view, one of the great innovations of all time. Homer’s poetry is the foundation of Western culture, but what the Adapter did was no less significant.”

According to Powell’s thesis, it would have been a stupendous endeavor. The Adapter and Homer would, of necessity, have spent months together transcribing the *Iliad* and the *Odyssey*. Indeed, if this happened, it would have been a singular



**The epic poet Homer is depicted in this 2nd-century B.C. bust. His oral poetry was probably transcribed during the earliest days of the Greek alphabet.**

occurrence: Homer would never before have performed either poem all the way through. Instead, he would have recited sections at feasts and festivals. “It’s much too long to be a record of an actual performance,” says Powell. “Before they were written down, no one would have had the experience of listening to the entire poems.” He points out that, if his theory is correct, there was a point in time when only the Adapter could have read the text. But such was the success of the new alphabet that within just a few decades, a man named Hakesandros enjoying a symposium at Methone had mastered it well enough to inscribe a joke on his own cup. ■

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Eric A. Powell is online editor at ARCHAEOLOGY.

# AFTER THE BATTLE

**The defeat of a Scottish army at the 1650 Battle of Dunbar was just the beginning of an epic ordeal for the survivors**

by DANIEL WEISS

**O**N SEPTEMBER 3, 1650, between Doon Hill and the London Road in Dunbar, Scotland, the English Parliamentary army led by Oliver Cromwell battled the Scottish Covenanting army. By this time, the series of conflicts known as the English Civil Wars had raged, off and on, for eight years. At the outset, Cromwell and the Scots had been on the same side, opposed to the royalists who backed King Charles I. The king had been beheaded the previous year, and now the Scots were supporting the royal claim of his son, Charles II.

The Scots are thought to have had as much as a two-to-one advantage in men, and held a superior position on the hill. However, many of the Scots were novices who had been recruited over the summer to replace more experienced soldiers purged from the army for their dissenting political views. When the Scots set out to attack at first light, Cromwell's forces pounced and made quick work of them. The Battle of Dunbar was over in an hour, with the Scots suffering the overwhelming majority of casualties.

"I imagine it was quite chaotic. Cromwell's men were trained professionals, and the Scots weren't in good condition when they went into that battle," says Chris Gerrard, an archaeologist at the University of Durham. "They had been at war for many years, and the clans were tired of giving up their best to the army. It was just men against boys."

In the aftermath, several thousand sick and wounded Scottish soldiers were allowed to go home, but some 4,000 others deemed a potential threat were taken prisoner and marched south into England toward Durham, 100 or so miles away. These captives, many still teenagers and away from home for the first time in their lives, were in for a series of horrific travails. Already malnourished, they would suffer extreme privation and languish in unsanitary confines. Those who survived would be dispersed throughout the British Isles and as far afield as North America, where some would go on to lead improbably prosperous lives, with countless descendants living in the United States today. Although generally aware of their Scottish ancestry, many of these descendants knew



little of what their seventeenth-century forebears had gone through—until an archaeological excavation produced new evidence of the harrowing events of more than 350 years ago.

**A**S THEY MADE THEIR WAY south toward Durham, the Scottish prisoners were in the charge of Sir Arthur Hesilrige, Cromwell's governor at Newcastle. He explained what became of them in a letter to the English Council of State for Irish and Scottish Affairs dated October 31, 1650. The

This 1886 painting depicts Oliver Cromwell (bareheaded, center) leading the English Parliamentary army in its overwhelming victory over the Scottish Covenanting army in the 1650 Battle of Dunbar.



captives hadn't been given a morsel to eat, and 30 miles into the march a number collapsed, claiming they could not go on. Parliamentary troops shot several dozen protesters, and the rest, resigned, continued on their way. Penned into a walled garden for the night farther along, the famished captives dug up raw cabbages and wolfed them down, muddy roots and all, so that they "poysoned their Bodies," Hesilrige wrote. Based on his account, it seems that around one in four of the captives died on the march to Durham from starvation, exhaustion, execution,

or an intestinal condition that he termed "the Flux."

There is evidence that the Scots thought men would fight in a more "kingly" fashion if they were hungry, Gerrard says, so they probably hadn't eaten much even before the battle. "They then were marching for six or seven days, and that is quite a time to go without food if you are walking a hundred miles."

In Durham, the 3,000 captives who made it were locked in the town's cathedral, which was unoccupied as Cromwell had dismissed its religious leadership. The town's nearby castle, also



Scottish soldiers taken prisoner after the Battle of Dunbar were marched south to Durham and locked in the town's cathedral, shown here in a 19th-century engraving.

empty, was used to house the many captives who grew sick. In his letter, Hesilrige reported that, during their stay in Durham, around 1,600 more of the captives had died and been buried—with the flux as the primary culprit. He also blamed the “unruly, sluttish, and nasty” prisoners for creating conditions that led to their demise and, in some cases, outright killing each other. In reality, historians believe that, despite Hesilrige’s claim to have gone to great lengths to supply the captives with food, they probably succumbed to a range of maladies brought on by starvation, reduced strength and immunity, and cramped, filthy quarters with little fresh water.

The survivors were sent to a variety of destinations. Some were used as labor to drain the fens in East Anglia, others fought for the Parliamentary army in Ireland, and still others were enlisted in the battle against the French in Barbados. Around 150, possibly selected for their hardiness, were transported to London, and then shipped across the Atlantic on the *Unity*, most likely arriving in Charlestown, Massachusetts, in late December 1650. There, the 100 or so who had survived the journey were sold into indentured servitude for £20 or £30 each. Around 60 of these went to work in various capacities for the Saugus Iron Works in Lynn, Massachusetts, around 20 were sent to a sawmill on the Great Works River in southern Maine, and the rest were bound to other masters in the area.

Arriving just a few decades after the establishment of the Massachusetts Bay Colony, which had a total population of around 15,000 at the time, the new arrivals from long-settled Scotland found themselves in dramatically unfamiliar surroundings. Further, as Presbyterians, or even Catholics, who spoke with a heavy brogue, they also constituted a distinct cultural minority in Puritan New England. “I think they would have stood out like a sore thumb,” says Emerson Baker, an archaeologist at Salem State University who studies colonial New England.

On a rainy afternoon in November 2013, during construction of a café at the university’s Palace Green Library, a piece of skull and a piece of pelvis were unearthed within a foot or so of one another. “One of the builders who was working on the project said, ‘Oh, that’ll be one of them Scots soldiers, then,’ ” says Richard Annis, a University of Durham archaeologist who supervised the excavation of the site and analysis of the recovered remains. “We spent a long time trying to prove whether or not he was correct.”

Further excavation made clear that the remains were part of a mass grave. “A large number of burials were tightly packed on top of each other with absolutely no artifacts at all—not a pin with them,” says Annis. “It looked like they had been dropped naked into a pit in some disarray. Some were face up. One was face down. A couple were on their sides tumbled in.” A few feet away, sep-



The McIntire Garrison House in southern Maine was built in the early 18th century to protect members of the Scottish community there from Native American raids.

The McIntire Garrison House in southern Maine was built in the early 18th century to protect members of the Scottish community there from Native American raids. Ultimately, these men were able to obtain their freedom—either by sav-

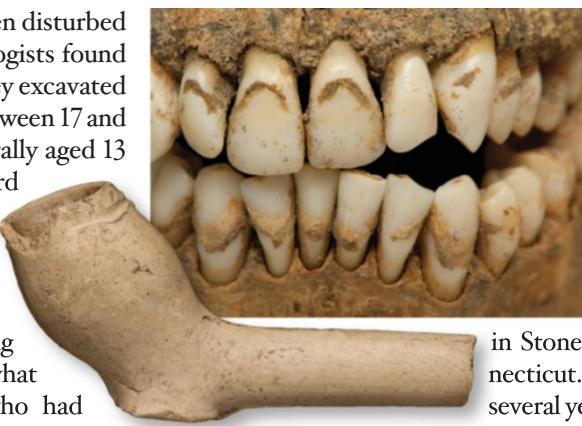
arated by an area that had been disturbed in recent times, the archaeologists found another mass grave. In all, they excavated the remains of somewhere between 17 and 28 people, all male and generally aged 13 to 25, with the majority toward the younger end. "There was very little evidence of healed injury," says Annis, "so they weren't a bunch of battle-hardened soldiers or anything like that." All of this fit with what was known of the Scots who had fought in the Battle of Dunbar.

A helpful clue to dating the remains was provided by several sets of teeth with telltale elliptical gaps in the upper and lower incisors, evidence of habitual tobacco smoking with clay pipes. "This was remarkable given their young age," says Annis. "And it showed that they had died after the introduction of relatively cheap Virginia tobacco in the early seventeenth century." Radiocarbon dating further narrowed the window to between 1640 and 1655. Isotopic analysis of teeth from 13 of the people showed that most were likely to have come from various parts of Scotland, but three had grown up in areas of northern Europe outside the British Isles. These could have been descendants of Scots who had gone to war abroad, or mercenaries from mainland Europe or Scandinavia who had come to fight in Scotland.

After several years of analysis, the researchers concluded that the remains were indeed those of the Scots soldiers. "It's been known for hundreds of years that large numbers of men had gone through a horrendous campaign of warfare, defeat, the march to the south in very poor conditions, then imprisonment, and that a sizable number of them had died. Yet there was no clear evidence as to where those people had ended up," says Annis. "The discovery at Palace Green was tremendously important in answering that question."

**W**HEN THE RESEARCHERS announced on the university website that the mass graves held remains of Battle of Dunbar soldiers, they were surprised to find a massive influx of online traffic from the United States. "Thousands of people on the eastern seaboard of America were looking at our site," says Gerrard, who led the University of Durham team that excavated and analyzed the remains. "We were inundated with inquiries from the survivors' descendants. It was quite remarkable."

Last October, a number of the researchers, including Gerrard and Annis, traveled to New England, where they presented their findings to several dozen of these descendants at a public library down the street from the site of the Saugus Iron Works, which is now a National Historic Site. "The room was completely packed," says Annis, "and most of them were clutching their family tree that shows their eighth or ninth great-grandfather being one of these people who had gone through this experience in Dunbar, in Durham, and then the transportation overseas. It was absolutely fascinating to see



Gaps in the incisors of a number of the individuals excavated at the University of Durham, caused by smoking tobacco in clay pipes, helped identify them as 17th-century Scottish captives.

the degree of interest in this group, and it was profoundly gratifying, really."

One of the descendants who attended the presentation was Heidi Thibodeau, 58, a corporate library assistant who grew up in Stoneham, Massachusetts, and now lives in Connecticut. Before starting to work on her family tree several years ago, she knew nothing of her connection to the Battle of Dunbar. She has since found that she is descended from a number of the survivors who formed the community in southern Maine. One of these was James Warren, who lived into the early years of the eighteenth century and had five children, one of whom was abducted, along with her daughter, and taken to Canada in a 1689 Native American raid. At the presentation, which she says felt like a family reunion, Thibodeau met fellow descendants for the first time.

"I'm really grateful to the people from Durham that came over and shared what they've found out about the lives of the men who died and were buried over there," she says. "It kind of brought to life my own ancestors. I'm in awe of them, of their ability to survive and thrive when I think of what they went through. They were shipped here to a strange country, far from their family and loved ones, and they made successful lives for themselves. I'm just amazed at their strength and their courage."

**I**N DURHAM, ONCE the researchers determined that the remains they had excavated were those of Battle of Dunbar soldiers, they were faced with the question of where they should be reburied. Some in Scotland have argued that the remains should be buried there, to return the soldiers to their homeland. However, Gerrard points out, the prevailing practice in the United Kingdom is to bury excavated remains in the modern cemetery closest to the point of discovery.

In this case, he suggests, there are several added arguments for this custom. First, the team has excavated only parts of individual soldiers' bodies, with the remaining bones thought to lie under the library building, and some believe that different parts of individuals should not be separated by a great distance. Second, the overwhelming majority of the captives remain buried near the café site, so the excavated remains should be kept as close to them as possible. As a result of these arguments, the team has decided that the remains will be reburied later this year at the Elvet Hill Road Cemetery in Durham, less than a mile from where they were exhumed.

"A point of view that has been made forcefully is that this is a group of people who fought together, went through this terrible march together, and then died together," says Gerrard. "These were their friends, their colleagues, and in all likelihood their relatives, so they should be kept together." ■

Daniel Weiss is a senior editor at ARCHAEOLOGY.

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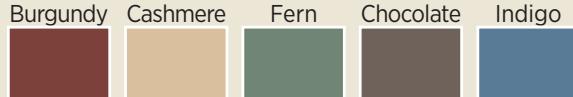
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The settlement of Kangeq, in southwest Greenland, was abandoned in the 1970s.

Middens there show that the site had been occupied for thousands of years, and the deposits are now under threat from climate change.

## LETTER FROM GREENLAND

# THE GHOSTS OF KANGEQ

**The race to save Greenland's Arctic coastal heritage from a shifting climate**

by HANS HARMSEN

By late August, most of the brash ice is gone from Greenland's Nuuk Fjord, but occasionally the distant boom of an ice chunk calving off an iceberg echoes through the fog. A small boat owned by the Greenland National Museum, the *Inua*, cruises carefully toward the faint outline of an inlet. There are no trees on the shore, only bare rock, sea wrack, and patches of wild grass. The boat's stern is angled toward a rocky point, and Henning Matthiesen, a soil chemist from the National Museum of Den-

mark, jumps over the bow and holds the nose of the *Inua* while colleagues scramble to pass boxes and backpacks over his head and onto shore. Matthiesen and five other scientists wait there while the boat returns to Nuuk, Greenland's small capital city, to pick up their colleagues.

The researchers have arrived at a small, lifeless settlement called Kangeq. Several weather-worn houses can be seen through the dense fog, along with a boarded-up church, all connected by winding footpaths and

dilapidated bridges. The ghost town was a lively community before it was abandoned in the 1970s. Giant whale ribs, broken glass, wood, and rusting metal poke out of a sludge pool near the water's edge. Upon closer inspection, the earth around the pool is a thick layer of compressed turf containing thousands of disarticulated fish, bird, and sea mammal bones. It's not a natural deposit, but one of the middens of Kangeq: a layered index of human occupation in western Greenland that covers at least two millennia.

## LETTER FROM GREENLAND



**Scientists from the Greenland National Museum and Archives and the REMAINS project (top) investigate the midden at Kangeq, comprised of compressed turf (above) that offers excellent preservation of wood and bones.**

"The atmosphere at Kangeq is unsettling," says Jørgen Hollesen, leader of the project, known as REMAINS of Greenland (Research and Management of Archaeological Sites in a Changing Environment and Society). "People were living here for thousands of years, and then suddenly the whole town was deserted. There's so much evidence of human activity—

you can still see the playground where the kids used to play."

Over the past several decades, archaeological surveys have identified hundreds of midden sites scattered throughout the interconnected fjords and archipelagos of western Greenland. The middens formed as generations of people threw their garbage out their front doors, and the unique

combination of climatic and environmental conditions in this part of the Arctic preserved wood, bones, feathers, baleen, antler, leather, fur, animal dung, and even human hair. Under scrutiny, these materials can provide very specific information about how past peoples survived in the circumpolar north. But it's clear that these deposits, like much of Greenland's ice cover, are at risk from climate change. Fluctuating weather patterns are melting the permafrost and accelerating natural decomposition—turning the organic material into mush and what the Greenlandic archaeologists jokingly refer to as "butter bone." The team at Kangeq is trying to track these changes and determine which sites are most at risk.

Greenland's middens have already been a boon to the reconstruction of the country's deep human past. For example, in 2010, researchers from the Natural History Museum of Denmark and the Beijing Genomics Institute sequenced the DNA from a tuft of human hair collected from a midden at Qeqertasussuk, a site north of the Nuuk Fjord. Results showed that Greenland's earliest residents, the Saqqaq, known for their small-tool tradition, migrated from eastern Siberia, across the frozen ice shelves of Baffin Bay, about 5,000 years ago. Another distinct prehistoric people, called the Dorset, arrived around 900 B.C., but disappear from the archaeological record around A.D. 1300. Toward the end of their tenure in Greenland, the Dorset are believed to have shared the massive island with Norse colonists, though there is little evidence to suggest that there was much—if any—direct contact between the two peoples.

The Greenlandic Norse colonies lasted a few hundred years, and recently their disappearance has come to be seen as emblematic of a society that collapsed as a result of their failure to

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## LETTER FROM GREENLAND



Researchers from the REMAINS team examine bone fragments collected around Nuuk Fjord. They are looking for insights into how past populations have dealt with shifts in climate.

adapt to Greenland's climate. However, newer archaeological evidence suggests that the Norse were actually very adept at making the most of the opportunities afforded by a highly unpredictable and intransigent environment. For example, the Norse were previously thought to have been shortsighted in the maintenance of their fields, resulting in soil erosion. New evidence suggests, on the contrary, that they were doing what they were supposed to do—reusing animal fodder to enrich their pastures and encouraging the growth of certain plant species to stabilize their fields. The disappearance of these early European settlers may have had more complicated and distant causes.

"Although environment and climate were certainly important factors, there was a combination of influences that led to the Norse withdrawal from Greenland," says Christian Koch Madsen, archaeologist and curator at the Greenland National Museum. "This included demographic pressures, changing social relationships, a lessened demand in European markets for Greenlandic exports such as walrus ivory and skins, and microshifts in sea-

sonal weather and the annual returns of harvests. The story is much more nuanced and needs to be contextualized by the growing body of archaeological evidence available."

There is some anecdotal evidence that the Norse may have had some interaction with another group of indigenous peoples, the Thule, who arrived around A.D. 1200 and eventually gave rise to modern Inuit Greenlanders. Within a few centuries, the Thule settled almost all of Greenland's fjord systems by adjusting their hunting and food gathering to the seasonal availability of resources both on land and in the sea. In the summer months, groups moved into the fjords to hunt large game such as caribou and musk ox, and in the winter they migrated to the coast to hunt seal and whale. Today, this ancient seasonal rhythm continues to shape the cultural landscape and seascape. Its signs are visible at Kangeq, where the walls of Thule winter huts can still be seen along the shore near the more recent settlement. These huts would have provided ample shelter from harsh gales and sea storms, while providing access to the

open waters of the Davis Strait.

Scandinavians returned to Greenland in the eighteenth century, and the island fell under the rule of the Danish Kingdom. In 1721, missionary Hans Egede established the first permanent European settlement in Greenland, slightly north of Kangeq. Egede's decision to settle on this remote part of the west coast was motivated by the belief, held by many Scandinavians of the time, that a lost colony of Norsemen was still living in Greenland, waiting to be brought back into the Christian fold. Although Egede never found a lost colony, he did attract several converts among the Inuit peoples at Kangeq and the surrounding fjord. Within 10 years, Egede's mission was relocated farther inland, to the shores of modern Nuuk (then called Godthaab, or "Good Hope"), where the weather was more favorable. During his time in Greenland, Egede traveled up and down the west coast and noted what he believed were remnants of Norse houses and farms.

Kangeq continued to be an important nexus of regional trade and an official trading station for agents of the Royal Greenland Trade Department for centuries. It was only in 1973 that the last families left the island for the mainland, a result of the Danish government's efforts to coordinate social and health services. Kangeq was just one of a number of outposts that had dwindled in importance as the economy shifted toward large-scale commercial fishing.

If there is a common story to the middens found throughout the Nuuk Fjord, it is how humans negotiated environmental uncertainty in the Arctic. However, many of these stories now appear to have an expiration date. In addition to increased rates of decomposition, coastal erosion is eating away at the archaeological record at some sites. For example, at the nearby Norse site of Itivi, the

REMAINS team was unable to locate a large midden feature previously documented by Danish archaeologist Jørgen Melgaard in the 1950s. It appears that large portions of the site had been obliterated by the tide and a nearby channel current. Matthiesen, the soil chemist with the REMAINS project, is deeply concerned about the

imperative for us to pinpoint which remains are most at risk."

Currently, Greenland's capacity for managing archaeological sites and monuments is limited. The enormous task is overseen by a small group of individuals from the Greenland National Museum. Bo Albrechtsen, deputy director of the museum, is

land's coastline alone stretches over 44,000 kilometers [27,000 miles], longer than the entire coastline of Australia." One of the eventual outcomes of the REMAINS project will be a map that identifies the most vulnerable sites, created by feeding the data collected in the coming years into the museum's online database.



**PhD student Anne Marie Eriksen places modern bone fragments in the wall of a test pit to assess how fast remains in the Kangeq midden are decomposing.**

rate of change occurring at archaeological sites he has visited. "Evidence from the past has only been preserved due to the unique environmental conditions found in Greenland," he says. "However, with the ongoing climatic and coastal changes we observe, some of the remains may start degrading or completely disappearing, and it is

encouraged by the possibilities offered by the REMAINS project, but shares the concern about the future of Greenland's cultural resources. "We have a very difficult situation here in Greenland. We only have a handful of qualified individuals responsible for monitoring, documenting, and protecting a huge area," he says. "Green-

**B**ack at Kangeq, the team's time is limited. The weather can turn bad with little warning, so the researchers work quickly and methodically. Hollesen, with the assistance of archaeologists from the Greenland National Museum, checks some moni-

*(continued on page 62)*

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Materials for the May/June issue are due on May 11, 2017

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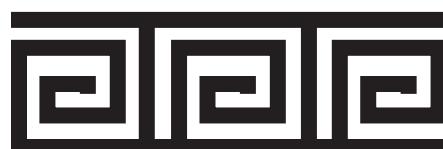
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## LETTER FROM GREENLAND

(continued from page 59)

toring equipment installed at the site in 2012. Andreas Westergaard-Nielsen, from the Department of Geosciences and Natural Resource Management at the University of Copenhagen, works with PhD student Rasmus Fenger-Nielsen to set up a quadcopter drone and perform a high-resolution aerial survey of the site. Pinpointing the current configuration of the high tide line from above will help determine a baseline for measuring further coastal erosion at Kangeq. If time and weather permit, the team will also install time-lapse cameras to observe the snowpack accumulation over the coming winter.

Later in the day, PhD student Anne Marie Eriksen, from the Centre for GeoGenetics at the University of Copenhagen, sits next to an open pit, attaching labels to small pieces of pig bone with pink string. In addition to monitoring subsurface phenomena such as soil temperature and moisture, the team is also collecting data on the speed and intensity of natural decomposition of organic materials in the middens. Eriksen embeds chunks of bone, one by one, at different depths in the wall of the pit before it is back-filled with soil. She is optimistic that when the team returns to the site in a few years they will have a baseline for measuring the rate of decomposition in the midden. “The conditions we observe below the surface at different sites in the study area are profound,” she says. “Understanding the duration of freezes and thaws and the rate at which these organic materials decompose at different sites will give us a better idea of where we should direct future efforts in order to save the archaeological remains.”

Besides annual fluctuations in the rates of freezing and thawing belowground, other climate-driven phenomena are significantly affecting the archaeological record. Greenland is actually becoming *greener*. Nanna



**Students and scientists from the National Museum of Denmark sort material found at another midden site, Iffiartafik (top). This hand-carved bone point (above) was among the finds there.**

Bjerregaard Pedersen, a researcher from the National Museum of Denmark, walks along the rocky shoreline, scanning the landscape for patches of *Salix glauca*, a flowering dwarf willow species native to North America that has proliferated in Greenland over the last century. Robust species such as *S. glauca* are taking advantage of the nutrient-rich soil found in middens, and their deep root systems appear to be hastening the breakdown of organic material. Samples collected during this field season will be shipped to Denmark for dendroanalysis and hopefully provide some insight into the northward migration of the species.

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## LETTER FROM GREENLAND



The author (left) digs a test pit at a midden at the site of Qoornoq. Scientists are rushing to document such sites around Greenland in the hope of identifying those at greatest risk.

**A**lbrechtsen believes that new strategies must be developed to take advantage of local knowledge to manage the future of Greenland's heritage. "Modern Greenlanders are frequently very familiar with changes to their hunting and fishing grounds from year to year, and we want to figure out a way to capitalize on this local knowledge," he says. One possibility he suggests is the development of a simple mobile app to document and record important information on threats to coastal archaeological sites. He is encouraged by the success of crowdsourcing the collection of coastal heritage data in other

North Atlantic countries. Combined with the information collected by the REMAINS team, these data can offer a real-time picture of perennial changes in the coming years and decades.

Greenlanders have always had an intimate relationship with the land and sea, and have always had to come to terms with the reality that these places are defined by uncertainty. The success and failure of past peoples—from the Saqqaq and the Dorset to the Norse and the Thule—have always been shaped by the information they had available at the time, and knowledge passed down over generations. At the moment, Green-

land, like other Arctic communities, is experiencing milder weather and less severe winters. Not everyone perceives these changes as negative. Johan Jeremiassen, a 29-year-old local fisherman and hunter, comments on the changes in the fjord in recent years with the help of a translator from the museum. He smiles and says that the fishing is better lately and more cod seem to have returned to this part of the country, which always means more steady work. But farther inland, the fjord was unusually dry during the summer, there were hardly any mosquitoes, and the caribou moved farther in because the vegetation was not getting enough rain. For Jeremiassen it is hard to say whether these types of little changes are precursors to a bigger change, or just the normal fluctuations between good and bad years that have always defined life in Greenland.

But the little changes are being felt in Kangeq in other ways. The children and grandchildren of the people who once lived there are beginning to return, and are slowly rebuilding and repairing some of the older structures for recreational use during the summer. As the population of Nuuk grows, places such as Kangeq will likely become popular for tourists and daytrippers looking to explore Greenland's historic and archaeological legacy. "The Arctic is a bellwether for the massive climate change impacts already being felt and predicted to increase around the world. What we see in Greenland may just be the beginning," says Hollesen. "It is time to realize that these fantastic records of our past should not be taken for granted. This generation and the next live in a crucial juncture with a once-ever opportunity to recover, save, and analyze them." ■

Hans Harmsen is an archaeologist and curator at the Greenland National Museum and Archives in Nuuk.

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FROM THE AIA

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## AIA COTSEN EXCAVATION GRANTS GUATEMALA AND ITALY

### WINNER: FIRST-TIME PROJECT DIRECTOR



Jessica Munson (right)  
with project co-director  
Lorena Paiz

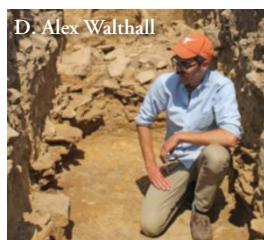
Jessica L. Munson

Assistant Professor of Latin American Archaeology,  
Lycoming College, Williamsport, Pennsylvania  
Director, Altar de Sacrificios Archaeological Project  
(ALSAP), Guatemala

Located at the mouth of the Pasión River, Altar de  
Sacrificios was an important ancient Maya site and

trading center, continuously occupied for nearly two millennia beginning about 900 B.C. Previous excavations focused on Altar's ceremonial core and monumental architecture. Munson will be conducting excavations in two residential house groups to investigate settlement patterns, domestic life, and the social experience of groups living at the site's core. Her focus will be on the emergence of social inequality during the Preclassic period (ca. 1000 B.C.–A.D. 200) and how that altered the quality of life among Maya households. In addition, Munson's data will be incorporated into the site's existing database, expanding the picture of life in this community.

### WINNER: ONGOING PROJECT



D. Alex Walthall

D. Alexander Walthall  
Assistant Professor of Greek and Roman  
Archaeology, University of Texas at Austin  
Director, American Excavations at Morgantina:  
Contrada Agnese Project (AEM: CAP), Sicily

Over 60 years, the American Excavations at  
Morgantina have uncovered substantial portions

of the ancient settlement, including many monumental public and commercial buildings in the city's classical and Hellenistic agora. Walthall's investigations, focused on a previously unexcavated city block, will examine the lives of nonelite people who lived and worked on the outskirts of the city and will record the socioeconomic changes that followed in the wake of the Roman siege that captured Morgantina in 211 B.C. While previously thought to have experienced social and economic decay after the attack, Morgantina, Walthall believes, was actually far from extinguished and remained an important political and economic center until the late first century B.C.

The Cotzen Excavation Grants are made possible through the generous support of Lloyd E. Cotzen, former AIA Governing Board member and chairman of the Cotzen Foundation for the ART of TEACHING and the Cotzen Foundation for Academic Research. To read more about the Cotzen Excavation Grants and other AIA grants and fellowships, please visit [archaeological.org/grants](http://archaeological.org/grants).

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The 119th Joint Annual Meeting of the Archaeological Institute of America (AIA) and the Society for Classical Studies (SCS) will take place in Boston, Massachusetts, January 4–7, 2018. The meeting's program showcases the fieldwork and research of archaeologists from around the globe and includes sessions that explore topics as diverse as art, shipwrecks, social systems, fashion, architecture, cooking, and many others.

Special events include the fourth annual Conference for Heritage Educators and the opening night lecture by John Papadopoulos (Department of Classics, UCLA), followed by the opening night reception. Meeting registration and hotel reservation information will be available in late summer. Watch "Dispatches from the AIA" for announcements. If you are considering submitting a paper, please visit [archaeological.org/meeting/cfp](http://archaeological.org/meeting/cfp).

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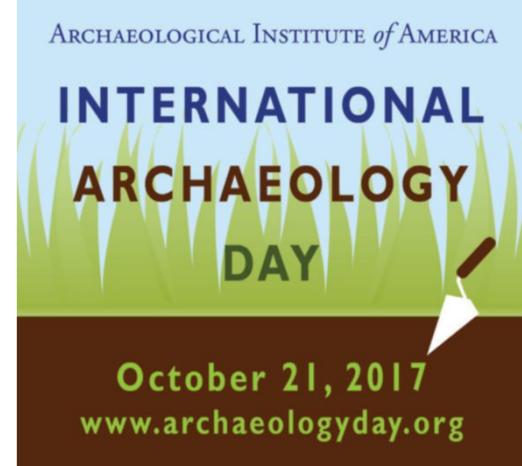
This fund supports the use of technology in archaeological research by providing grants to archaeological projects that make innovative use of technological tools and methods.

The AIA thanks Richard C. MacDonald, Julie Herzig Desnick and Robert Desnick, and Ellen and Charles Steinmetz for their generosity in establishing these grants. Read more about these and other grant opportunities at [archaeological.org/grants](http://archaeological.org/grants).

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International Archaeology Day (IAD), our annual celebration of archaeology, archaeologists, and their discoveries, allows organizations around the world to join in raising awareness of the discipline by creating programming and events for their members and the general public. Begun in 2011 as a national event, by 2013 it had become International Archaeology Day. In 2016, more than 100,000 people participated in 700 events around the world organized by 530 Collaborating Organizations in two dozen countries. We encourage you to join the celebration this year on Saturday, October 21, as a Collaborating Organization by holding an IAD event. Popular events have included archaeology fairs, lab open houses, classroom visits, special tours of museums or sites, symposiums, conferences, or meetings, student presentations, and lectures. All Collaborating Organizations and their events will be listed on the IAD website so you can find one near you.

If you want to join the fun online, in past years we have created games such as ArchaeoMadness, in which players vote for their favorite archaeological sites in head-to-head matchups; an online scavenger hunt; and the creation of a Google Earth layer showing popular archaeological sites throughout the United States and Canada. Similar activities will be organized for 2017, and if you have suggestions for other great ways to celebrate digitally, please contact AIA Director of Programs Ben Thomas at [bthomas@aia.bu.edu](mailto:bthomas@aia.bu.edu). For more information, visit [archaeologyday.org](http://archaeologyday.org).



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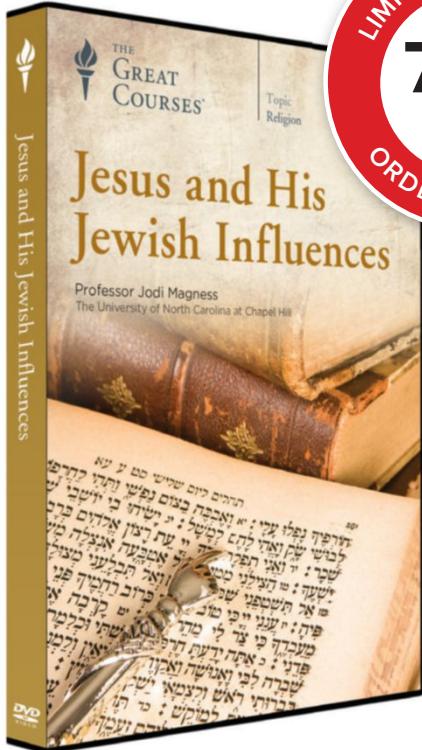
Ancient Maya rulers were seen as divine beings responsible for all aspects of life, including the weather. And for the Maya, the wind was more than just an element—it was a force that symbolized the breath of life and was fundamentally linked to the power of the king. This pectoral was likely made for and worn by the Maya king Janaab' Ohl K'inich, who is named twice in an inscription on its back (pictured below). University of California, San Diego, archaeologist Geoffrey Braswell explains that the text, which begins, "He put on the necklace for the incense-scattering ceremony," describes a common ritual.

The Mayan glyph for wind and breath is *ik*, and is shaped like a T. This pectoral, which is itself T-shaped, was found in a T-shaped building, and on the front is a large, deeply incised T. "These are references to the wind, breath, and life, and specifically the wind that brings the monsoon rains," says Braswell. The pectoral was found with a ceramic object that may have been a drum, decorated with images of the Maya god of wind and music, and a lithophone. They were likely intended as divine offerings made during one of these regular incense-scattering ceremonies.

One explanation for why this collection of artifacts was discovered in a tomb that doesn't contain any human remains is that it was placed there to appease the god of wind at a time when climate change was adversely affecting agriculture, explains Braswell. "The pectoral remained an immensely valuable object, and there is evidence it was used for at least 60 years after it was inscribed," he says. "It was perhaps the great heirloom of the community and the royal family."

WHAT IS IT	Pectoral
CULTURE	Maya
DATE	A.D. 672
MATERIAL	Jade
FOUND	Nim Li Punit, Belize
DIMENSIONS	7.4 inches wide, 4.1 inches high, 0.3 inches thick





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