

California: The Ancient Ecology of Fire

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September/October 2017

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COVER: A painted pillar at Pañamarca in northwestern Peru depicts a priestess whose gesture suggests she is part of a Moche sacred ceremony or sacrifice.

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EDITOR'S LETTER

NO LONGER LOST

The ancient Peruvian site of Pañamarca, graced with extraordinarily imaginative polychrome murals by the Moche culture, was explored by archaeologists in 1950. In the years since, the site was assumed destroyed, its fragile masterpieces gone. "Painted Worlds" (page 26), by executive editor Jarrett A. Lobell, reports that archaeologists have recently found the site to be surprisingly well preserved and are just beginning to study its unique paintings in order to glean an understanding of the A.D. 600 Moche worldview.

"To Die Like an Egyptian" (page 44), by associate editor Marley Brown, is a story of retrieval,



Wall painting, Pañamarca, Peru

in this case of the burial shroud of a Roman-era Egyptian named Aaemka, who died around A.D. 10. The shroud, nearly portrait-like in its depiction of the deceased, was consigned to the archives of National Museums Scotland during World War II. Now, painstakingly restored, the shroud is offering a nuanced view of burial practices in a declining Egypt as power flowed to Rome.

Untangling a mystery is best done with plenty

of help. "The Heights We Go To" (page 38), by journalist Karen Coates, brings word of a multidisciplinary team that is attempting to learn how some people—but not all—are able to live successfully at extreme elevations. The research centers on genetic analysis of human remains discovered at the 14,000-foot-high site of Chusang, in Tibet, where evolution apparently took a strong hand in human survival some 7,000 years ago.

During the years after the end of Roman rule in the early fifth century, Britain lived through a time of warring kingdoms. The locations of several of these independent seats of power have been pinpointed, save one, called Rheged. "Lost Kingdom of the Britons" (page 32), by senior editor Daniel Weiss, covers the work of archaeologists in southwest Scotland on a hilltop site complete with heavy fortifications, fine metalworking shops, and evidence of control of the surrounding landscape and its resources—in a word, Rheged.

"Landscape of Secrets" (page 48), by journalist Samir S. Patel, concerns the retrieval of evidence of the Spanish Civil War in the rugged Asturias region of northern Spain. It was a defining conflict that pitted friend against friend, neighbor against neighbor. Archaeologists there are working to preserve details of the fighting, particularly of guerrilla resistance, even as survivors might prefer to forget.

And don't miss "Letter From California: The Ancient Ecology of Fire" (page 55), which explores what ancient peoples knew about both biodiversity and fire management—and what we might do well to rediscover.

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Editor in Chief

The Long Paw of the Law

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FROM THE PRESIDENT

OUR HUMAN STORY

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Last spring, I gave a series of lectures aboard a cruise ship on behalf of the Smithsonian Institution. I'd boarded in Dubai and we docked in Abu Dhabi, Salalah, Oman, and Aqaba, Jordan. From there we sailed to Egypt, up the Suez Canal, and on to Haifa where I disembarked. The trip allowed me to see parts of the Middle East that I had never before visited. In Dubai, I took an elevator to the top of the Burj Khalifa—the world's tallest building—and wandered around the Dubai Mall, marveling at the indoor ice skating rink, aquarium, and hundreds of upscale stores and restaurants. The lush coconut and banana groves of Salalah reminded me of parts of southern India. Arriving in Aqaba felt like coming home, just a stone's throw from Eilat and close to the Late Roman fort at Yotvata in Israel's Arava Valley, where I conducted excavations from 2003 to 2007. Many of us in the West tend to view the Middle East as one big, undifferentiated region. But to visit it is to be reminded that geographically, culturally, ethnically, and religiously it is incredibly diverse, and has been since ancient times.

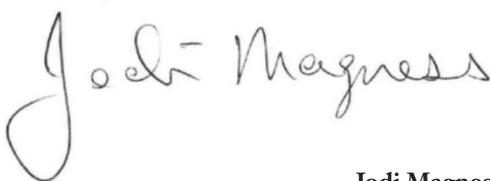


Prophet Jonah Shrine, Mosul, Iraq

Whereas Dubai and Abu Dhabi glitter with tall skyscrapers and huge malls, Salalah and Aqaba resemble more traditional Middle Eastern towns. Omani men dress in white *jalabiyas* like their counterparts in the United Arab Emirates, but wear distinctive caps that originated in Zanzibar. Some differences, such as variations among Arabic dialects, are more subtle.

As I enjoyed my travels in comfort and safety, I thought about the irreversible damage to so many of the archaeological sites and monuments in the region wrought by years of war and upheaval. In fact, one day during my trip, I watched a special broadcast documenting the devastation of Iraq's Mosul Museum, which had been left as a burned-out shell littered by pieces of smashed statues and other priceless artifacts.

Now, some months later, the conflict there, perhaps in its last days as of this writing, is taking a toll on both cultural heritage and on hundreds of thousands of civilians who call Mosul home. It has been observed by many that wherever archaeological sites and cultural heritage are under attack, no civilian is safe either. For our part at the Archaeological Institute of America, we claim as our mission the protection and preservation of the world's cultural heritage, which is bound inextricably with human identity and the human story. I hope you will consider supporting us. For more information, visit our website at archaeological.org. And, if you are already a supporting member, please contact your Local Society and ask how you can become involved.



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President, Archaeological Institute of America

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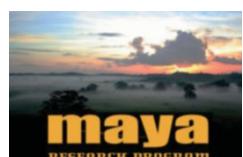
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LETTERS

FROM OUR READERS

A STEADY REMINDER

I was highly interested to read your article on the memento mori bead ("Artifact," July/August 2017) that Jarrett A. Lobell describes as a "pendant terminal, or end, of a set of late medieval rosary beads." Through my own research into artifacts thought to be Aztec crystal skulls, particularly the smaller ones measuring one to 1.5 inches, I have come to the conclusion that they too were pendant terminals from Catholic rosary beads, and not pre-Columbian Aztec ornaments. The small skulls were suspended from the bottom of a crucifix. The skull in Catholic iconography is usually shown at the foot of the cross and represents the skull of Adam, while also referencing the place of the crucifixion, Golgotha, the "place of skulls." The bead in your recent article is a more elaborate depiction, but no doubt served the same purpose. It is also the same size as the eight or 10 so-called Aztec skulls collected in the nineteenth century that



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I've looked at in museums in Mexico, the United States, and Europe.

Jane M. Walsh

Anthropologist Emerita
Smithsonian Institution
Washington, DC

AN OPEN QUESTION

I read with interest your article on bannerstones ("Set in Stone," July/August 2017) and wonder if they could possibly have served as stabilizing fins on the trailing end of a spear shaft? They could have been mounted on a reduced-diameter shaft at the trailing end close to the atlatl launch point. This would have provided some additional weight to counterbalance the spear point at the opposite end. This may explain why the objects were often kept as important items, as hunters or warriors would have been able to reuse them as the wooden shafts became damaged or worn out. I enjoy your magazine and look forward to each issue. Keep up the good work.

Winbon Berteau
Kenner, LA

STATE OF PRESERVATION

Kate Ravilious, in her article "The First Australians" (July/August 2017), twice comments that aridity is detrimental to organic preservation. Aridity has been hailed as the preserver of organic artifacts and remains all around the world—from the mummies of Egypt, Mexico, Peru, and Chile, to the Dead

Sea Scrolls of Qumran, and the papyri of Oxyrhynchus, Egypt, and, from my own experience as a North American archaeologist, to the sandals and baskets found in the southwestern United States and in rock shelters in Arkansas. Why should aridity in Australia be different?

J Cynthia Weber
New York, NY

Nigel Spooner responds: This raises an interesting point, as preservation in Australia does in fact differ from preservation elsewhere, for several reasons. The depth of time is the first. The examples you offer are all much younger than the deeper time range of Australian archaeological finds. Australian archaeology spans a vast amount of time, over which very slow processes make themselves felt and destroy wood, charcoal, and other organic materials. The oldest ochre materials at Warratyi are 10,000 years older than the oldest European cave paintings.

Secondly, although Australia is arid in general, every part of the continent actually gets rainfall each year, and anything in the open soil will eventually decompose because the total damp time will add up. Typically there will be many thousands of years for this damp time to accumulate. Also, the hot, tropical Australian soils are quite aggressive chemically toward organics, and so the organic component diminishes with time in these soils, whereas on other continents it does not.



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WHITE HORSE OF THE SUN

Carved into the chalk of a hillside in southern England, the Uffington White Horse is utterly unique. Stretching 360 feet from head to tail, it is the only prehistoric geoglyph—a large-scale design created using elements of the natural landscape—known in Europe. “There’s just nothing like it,” says University of Southampton archaeologist Joshua Pollard, who points to the Nazca lines in Peru as the closest parallel. Pollard says that because the site is so anomalous, researchers have resisted grappling with its distinct nature. As a consequence, few new interpretations of the site have been advanced since the early twentieth century. “Archaeologists are tripped up by things that are unique,” says Pollard, “and the White Horse has thrown us.” But now, after making a close study of the site and its relationship to the landscape around it, Pollard has developed a theory that connects the Uffington Horse with an ancient mythological tradition.

Stories about the White Horse have been recorded since medieval times. One popular legend had it being carved in celebration of an Anglo-Saxon victory over a Viking army in A.D. 875. But excavations in the 1990s yielded dates that showed it was created much earlier, during the Late Bronze Age or the Iron Age, sometime between 1380 and 550 B.C. Most archaeologists have thought that the site was probably a symbol that signaled a prehistoric group’s ownership of the land—their attempt at creating a landmark that was meant to impress outsiders. But Pollard did not find that idea wholly persuasive. “It doesn’t really work that way,” he says. “For one, the way it’s positioned makes it difficult to see the whole geoglyph from the surrounding landscape.” Pollard found that there are other hillside locations in the immediate vicinity that are much more visible, and where creating a totemic image meant to symbolize a group’s identity would have made more sense.

Pollard usually works on sites dating to the Neolithic, a period when people erect-

ed large monuments, such as Stonehenge, that were often aligned with astronomical events. That experience led him to wonder if the Uffington Horse could have been designed along similar lines, and he investigated how the geoglyph was positioned relative to celestial bodies. He found that when observed from a hill opposite, in midwinter, the sun rises behind the horse, and as the day progresses, seems to gain on the horse and finally pass it. From the same vantage point, at all times of the year, the horse appears to be galloping along the ridge in a westerly direction, toward the sunset.

Both the form and the setting of the site led Pollard to conclude that the White Horse was originally created as a depiction of a “solar horse,” a creature found in the mythology of many ancient Indo-European cultures. These people believed that the sun either rode a horse or was drawn by one in a chariot across the sky. Depictions of horses draw-



Uffington White Horse, England

FROM THE TRENCHES

ing this so-called solar chariot have been unearthed in Scandinavia, and Celtic coins often show horses associated with the sun. “The White Horse is depicted as a horse in motion, and the people who created it must have thought that it was responsible for the sun’s movement across the sky,” says Pollard. He posits that the geoglyph was not a static symbol, but an animated creature on the landscape, one that connected ancient Britons with the sun. “I’ve always wondered why it seems the White Horse was meant to be seen from the sky,” says Alistair Barclay of Wessex Archaeology, who was a member of the team that worked at the site in the 1990s. “I think



Sun chariot, Trundholm, Denmark

this explanation—that it is tied to the sun—makes sense.”

Over time, though its original purpose was lost, local people maintained a connection with the White Horse that ensured its continued existence. “If it

weren’t maintained, the White Horse would be overgrown and disappear in 20 years,” says Andrew Foley, a ranger with the National Trust, which oversees the site. Historical records indicate the local community has long held regular festivals devoted to maintaining the site. In 1854, some 30,000 people attended. Now, each summer, a few hundred local volunteers weed the White Horse and then crush fresh chalk on top of it so that it keeps the same brilliant white appearance it has had for 3,000 years. The site, as it must have throughout millennia, continues to be meaningful to the people around it.

—ERIC A. POWELL

OFF THE GRID

LOS ADAES, LOUISIANA

Any visitor today to the site of Los Adaes, in northwest Louisiana, will take in a landscape that was the easternmost point of Spanish expansion in the southwest. It was the location of a Spanish mission and presidio, constructed in 1721 and occupied until 1773, in a high, defensible position. A previous Los Adaes mission had been built in 1717, a short distance away, but was abandoned because of initially poor relations with the Caddo Indians. According to archaeologist George Avery of Stephen F. Austin State University in Texas, the Los Adaes mission, and others like it, was regarded as a less expensive alternative to military occupation. The Spaniards’ intention was to halt French incursions into the region and to prevent the French from using the Mississippi River as a means to trade with Mexico. They also were supposed to convert the Caddo to Catholicism. The Los Adaes mission, however, situated on the frontier and far from both Spain and Mexico, took on a unique character. According to archaeologist Pete Gregory of Northwestern State University, Los Adaes became a place of intense cultural exchange among the Spanish, the French, and the Caddo. “It’s what we call ‘creolization’ here in Louisiana,” he says. The archaeological record, with its robust mixture of ceramics from all three cultures, bears this out. Ultimately, these people weren’t supposed to get along, “but,” says Gregory, “they did.”

THE SITE

Los Adaes remained largely undisturbed from the time it was abandoned in 1773 until Gregory conducted archaeological investigations at the presidio in 1962. His initial aim was to confirm that the site was indeed Los Adaes. He uncovered a large quantity of French and Spanish ceramics, with the latter having been made in Pueblo, Mexico.



Los Adaes, Louisiana



Asian porcelain, which had arrived by way of Acapulco, was also discovered and reflected the robust trade route that reached from Mexico all the way to Los Adaes. More than 70 percent of all ceramics found across the site are Caddo in origin. The mission itself sits partially on private land and has not been excavated. In 2014, a geophysical survey of the mission site was conducted.

While only a small percentage of Los Adaes has been excavated, a 1767 map by cartographer Joseph de Urrutia, once thought to have been created for planning purposes, has been discovered by archeologists to be a reliable rendering of the settlement.

WHILE YOU'RE THERE

The visitor center is open on Wednesday through Saturday, noon to four, and is a favorite field trip for Texas schoolchildren, since Los Adaes was the colonial capital of Texas. Replicas of many of the excavated artifacts of colonial frontier life are on display, including French, Spanish, and Caddo ceramics, along with a detailed timeline of Los Adaes history. In addition, tour guides are available and walking trails with markers wind throughout the site.

—MALIN GRUNBERG-BANYASZ

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FROM THE TRENCHES



Clay dolls, Gyeongju, Korea

DOLL STORY

At the palace of Wolseong in Gyeongju, several hundred miles south of Seoul, archaeologists have found a group of sixth-century clay figures dating to the Silla dynasty (57 B.C.–A.D. 935). The dolls, which measure between one and eight

inches tall, include one wearing a turban and caftan believed to represent a Sogdian, a member of an ancient Iranian civilization. The Silla are known to have had active exchanges with Central Asia, Europe, and the Middle East, but few clay dolls resembling

people from the Middle East have previously been found. Other clay figures found at Wolseong include one riding a horse, a man with exaggerated male genitals, and several dancers in lively, dynamic postures.

—HYUNG-EUN KIM

FREEZE FRAME

A conservator for the New Zealand Antarctic Heritage Trust has uncovered, hidden among a stack of papers caked with mold and penguin excrement, a well-preserved 118-year-old watercolor depicting a deceased tree creeper. It was painted by the English artist and physician Dr. Edward Wilson, who perished alongside Captain Robert Falcon Scott and three others while returning from the South Pole in 1912. The stack of papers was collected, along with 1,500 other artifacts, from the team's base camp at Cape Adare, a group of huts first built by a Norwegian expedition in 1899, which the Trust

Watercolor of a deceased tree creeper



has begun to restore. A polymath, Wilson joined the Scott party as a doctor whose artistic talents aided his avocation as a naturalist. What remains a mystery is how his painting of a bird native to the northern hemisphere ended up in Antarctica. "My theory is that it was completely accidental," says Lizzie Meek, the Trust's program manager.



Dr. Edward Wilson

"It seems he was very prolific and prone to leaving his drawings all kinds of places. It's entirely possible that the painting had been stored in amongst other drawing paper and the whole stack was picked up and taken to Antarctica."

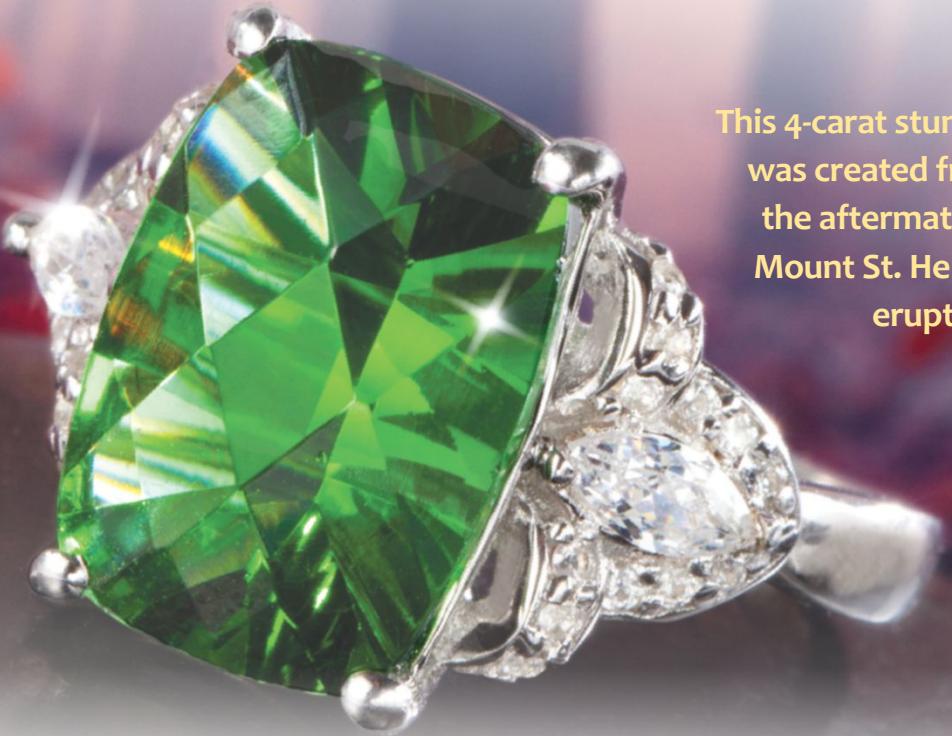
—MARLEY BROWN

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The Thirty Years' War raged from 1618 through 1648, and at its outset pitted Protestant states against Catholic ones within the Holy Roman Empire. In 1630, Sweden's king Gustavus Adolphus joined the side of the Protestants and led his troops to a number of victories before dying in

the November 1632 Battle of Lützen. Around 9,000 others also perished in the fight, which took place in present-day Germany. In 2011, archaeologists discovered a mass grave containing 47 of these soldiers in an area where an elite Swedish unit called the Blue Brigade was reportedly cut down in a surprise attack by a Catholic cavalry unit.

The researchers, led by Nicole Nicklisch of the State Office for Heritage Management and Archaeology Saxony-Anhalt, removed the remains in a 55-ton slab of soil and brought it to the lab for study. They have now found that, by seventeenth-century standards, an unusually high number of the soldiers had been shot. "More than half of the men were struck by gunfire," says Nicklisch, "which caused injuries that would have resulted in their deaths." The bullet fragments found in the grave

came from pistols, muskets, and carbines, the sorts of weapons used by cavalry at close range. While some of the soldiers in the grave were likely from the Catholic cavalry unit, most appear to have been their victims from the Swedish Blue Brigade.

—DANIEL WEISS

WHERE THERE'S COAL...

The record of human occupation in the Yucatán Peninsula has been helped greatly by the discovery and documentation of human fossils and bones found in cenotes, or sinkholes, and flooded caves. Among these sites is the Ancestors Chamber of the Cenote Aktun Ha cave system. Intriguingly, 14 concentrations of coal were identified in the Ancestors Chamber, distributed in an area of approximately 200 square feet. But without proof that the coal had been ignited there, scholars have long speculated as to whether it was brought

there by humans or if it had been deposited there by natural processes.

Now, however, through geological



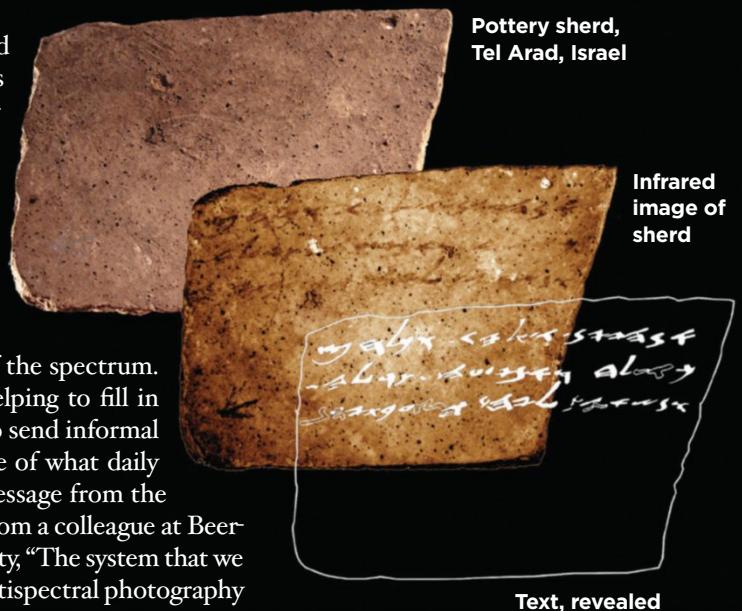
analysis of thermal alterations in the rock, researchers think they have evidence confirming the existence of bonfires in situ. This would date the occupation of the cave to around 10,500 years ago, at the end of the Ice Age when the cave was still dry. Archaeologists believe that the cave was used as a shelter providing protection from both the extreme weather conditions of the epoch and large predators, and that ceremonial activities might have taken place there as well.

—OCTAVIO DEL RIO

READING INVISIBLE MESSAGES

Researchers in Israel are using a technology called multispectral imaging to reveal biblical-era texts that are invisible to the naked eye. The team studied a collection of pottery sherds with ink inscriptions from the fortress at Tel Arad about 40 miles south of Jerusalem in the former kingdom of Judah. The sherds date to the period just before Judah was conquered by the Babylonian king Nebuchadnezzar in 586 B.C. Using a modified consumer digital SLR camera, they photographed both sides of each sherd at 10 different wavelengths of light covering the infrared and visual parts of the spectrum. The images captured traces of the deteriorated ink, helping to fill in letters and words. Writing on pottery sherds was used to send informal messages and conduct business, so it provides a glimpse of what daily life was like in ancient Judah. One sherd contained a message from the fortress's quartermaster requesting oil, silver, and wine from a colleague at Beer-sheba. Says Anat Mendel-Geberovich of Tel Aviv University, "The system that we developed offers a new, highly accessible method for multispectral photography that can be used by archaeologists in the field."

-ZACH ZORICH



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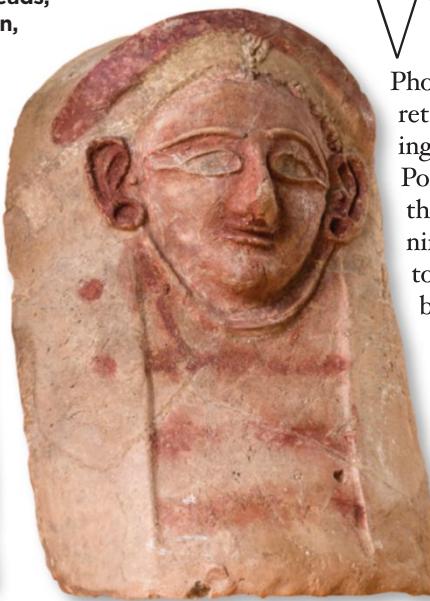
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FROM THE TRENCHES

DISPOSABLE GODS



Ceramic heads,
Porphyreon,
Lebanon



While excavating a refuse pit containing a mélange of burned animal bones, grape seeds, olive pits, and chickpeas, archaeologists working in the ancient Phoenician town of Porphyreon in present-day Lebanon also retrieved fragments of several ceramic female heads dating to around 2,400 years ago. The researchers, from the Polish Center of Mediterranean Archaeology, reassembled the fragments and found that the heads measured around nine inches tall and six inches wide. Small holes near the top of the most complete specimen indicate it may have been hung on a wall.

Mariusz Gwiazda, who led the team, also notes that the objects incorporate a combination of Greek, Phoenician, and Egyptian traits. "From the beginning, Phoenician art borrows different ideas from different cultures," says Gwiazda, "mixing them together and creating its own hybrid material language." He believes the pieces were meant to depict deities, though in the absence of written evidence it is difficult to say which ones.

—DANIEL WEISS

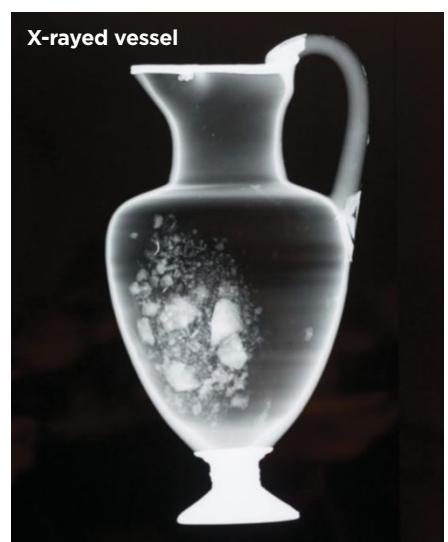
A PRINCELY UPDATE

In 2015, French officials announced the discovery of an exceptional Celtic burial located in Lavau, Champagne. The fifth-century B.C. tomb contained a wealthy individual—likely a prince—surrounded by a luxurious assemblage



Celtic prince, Lavau, France

of personal items and drinking vessels ("Top 10 Discoveries," January/February 2016). Now, two years later, laboratory analysis of those artifacts has begun to reveal just how truly extraordinary the burial is. Scientists from the Center for Research and Restoration of the Museums of France recently examined objects from the grave using a host of modern techniques, including X-ray tomography and radiography, 3-D imaging, and chemical analysis—a rare opportunity to employ the newest technologies on objects taken recently from the ground, as opposed to those that have been deteriorating in storerooms for decades, or those that have already undergone conservation procedures. Radiography showed that the prince's belt was embroidered with fine silver threads that formed a continuous frieze of Celtic motifs, the only one of its kind ever discovered. His knife sheath was decorated with bronze thread. Closer examination of the metal



X-rayed vessel

vessels revealed their remarkable quality and the skill of the ancient metallurgists, who had mastered the smelting and engraving process. High-resolution 3-D scanning was even able to identify signs of subtle wear on a gold torc caused by its contact with human skin or clothing.

—JASON URBANUS

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 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 untreated hearing loss could lead to depression, social isolation, anxiety, and symptoms consistent with Alzheimer's disease. He didn't know why hearing aids were so expensive 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 can cost 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 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

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stores. He evaluated numerous hearing devices and sound amplifiers, including those seen on television. Without fail, those were found to amplify bass/low frequencies (below 1000 Hz) and were not effective 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 cell phone he had just purchased. "I felt that if someone could devise a smart phone for about \$700 that could do all sorts of things, I could create a hearing aid at an affordable price."

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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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FROM THE TRENCHES

FAST FOOD

A n interdisciplinary study has determined that modern chickens only developed several of their most prized domestic traits within the last 1,000 years. A British team made up of archaeologists, geneticists, statisticians, and historians made the discovery by sequencing ancient DNA from chicken bone samples collected at archaeological sites across Europe, whose dates range from Roman times through the postmedieval period, and creating a model that pinpoints when specific chicken genes began to change. Though humans first domesticated jungle fowl in Asia around 6,000 years ago, it was only in the High Middle Ages that chickens began to consistently display both a lack of aggression and the capacity to lay eggs more regularly. According to Liisa Loog of the University of Oxford, a lead author of the study, one individual genetic variant may be responsible. "This particular mutation we're looking at has been shown in modern chickens to both make them friendlier and enable them to lay eggs earlier on in the breeding season," she says.

Humans, of course, favored these cooperative chickens and, unwittingly, exerted selective pressure that perpetuated their genes. To understand why chickens evolved so rapidly, Loog and her colleagues point to the spread of Christianity throughout Europe a thousand years ago, when dogmatic prohibitions on the consumption of four-legged animals and fasting rituals may have increased the demand for poultry. "Every time we see a transformation like this we just assume that it must have taken a very long time to happen," says Loog. Instead, it seems that a widespread and rapid shift in the dietary behavior of large populations accelerated the kind of evolutionary change in chickens that is often imagined to occur over millennia. Loog explains, "It kind of shows you don't really need to know much about genetics to make genetically modified organisms."

—MARLEY BROWN



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FROM THE TRENCHES



Copper mask
(front and back),
Cajon Valley,
Argentina

ANDEAN COPPER AGE

New radiocarbon dates show that a mask discovered in a valley in northwest Argentina is the oldest worked copper artifact ever found in the Andes. The 3,000-year-old mask, which depicts a stylized human face, was discovered in the grave of a man who lived at a time when Andean peoples were first beginning to practice agriculture. Scholars had generally believed metallurgy in the New World was first developed in Peru and then spread to the rest of South America. But the

mask challenges that assumption, says University of Buenos Aires archaeologist Leticia Inés Cortés, who led the team that studied the artifact. "Since complex societies later emerged in what is now Peru, there is a tendency to assume that all technological innovations did too," says Cortés. "The mask shows that there was not one place for innovation in metalworking, but many, including this region of the southern Andes."

—ERIC A. POWELL



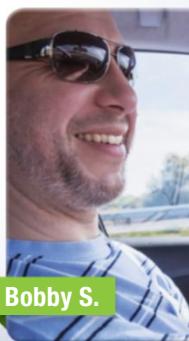
CAPITAL GAINS

Archaeologists working in downtown Mexico City have uncovered sections of a large circular temple dedicated to the Aztec god of wind, Ehecatl, and part of a ritual ball court, that date to just before the Spanish conquest in the late fifteenth century. The team also encountered a chilling collection of 32 male neck vertebrae that researchers believe was an offering associated with the ball game. Future excavations could reveal more ritual and governmental spaces believed to have been built during the 1486–1502 reign of Aztec emperor Ahuizotl, the predecessor of Moctezuma, and will prove integral in confirming surviving Spanish descriptions of the Aztec capital, Tenochtitlán.

—MARLEY BROWN

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FROM THE TRENCHES

NOT BY BREAD ALONE



Deep in the heart of Rome's largest catacombs, laser beams have unveiled stunning 1,600-year-old early Christian frescoes. Mixing pagan symbols with Christian images, the paintings adorn the ceilings and walls of two burial chambers in the Catacombs of Domitilla, a labyrinth of tunnels and tombs stretching over 10 miles beneath Rome near the ancient Appian Way. The crypts, carved out of volcanic tufa, were created for wealthy merchants involved in the imperial grain trade and the production of bread. They were painted around A.D. 360, a few decades after the emperor Constantine declared Christianity legal. "The chambers have long been known, but laser cleaning has removed centuries of grime, algae, and chalk, revealing elaborate scenes and new findings," says Fabrizio Bisconti, the superintendent in charge of catacombs for the Vatican's Pontifical Commission for Sacred Archaeology.

Led by Barbara Mazzei, restorers have been able to remove not just the black patina but also graffiti covering the frescoes. Old pagan symbols of the afterlife such as peacocks, scenes from the Old and New Testaments, and depictions of the grain trade have emerged for the first time. Such a mixture of symbols reveals the difficult shift suffered by wealthy Romans as they slowly abandoned their pagan beliefs to embrace the new Christian religion in the fourth century A.D. Says pontifical commission head Cardinal Gianfranco Ravasi, "These tombs represent the roots of Rome and of Christianity."

—ROSSELLA LORENZI

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WORLD ROUNDUP BY JASON URBANUS



LOUISIANA:

Two people walking along the banks of the Red River in northwest Louisiana.

Louisiana discovered a massive Caddo Indian canoe. The 34-foot-long, 2.5-foot-wide, dugout canoe is believed to be between 800 and 1,000 years old and was carved from a single tree trunk. It took a large team of workers using heavy machinery to finally remove the vessel, which may be the largest intact prehistoric watercraft ever found in the United States.



ICELAND:

Sometimes modern place names can

provide clues about past human activities, as is the case at Dynes along the Eyjafjörður fjord. The term Dynes comes from an old Icelandic word meaning burial mound, and, fittingly, archaeologists recently discovered several Viking Age tombs there, including as many as three rare ship burials. Although the graves were partially destroyed by ocean erosion, one ship contained a Viking chieftain who was entombed alongside his weapons and his dog.

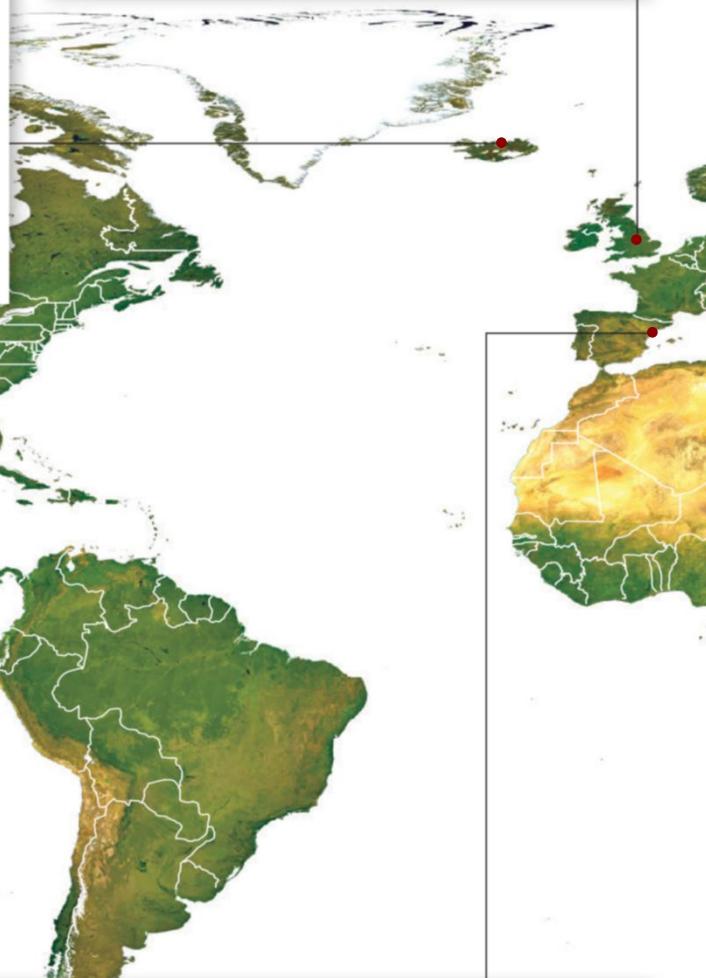


ENGLAND:

Geophysical survey within one of Avebury's stone circles detected previously unknown evidence of an older standing stone monument, but one whose megaliths were arranged instead in a square. Erected in the 4th millennium B.C., the 10,000-square-foot complex is the first of its kind identified, and may be 1,000 years older than Avebury's and even neighboring Stonehenge's stone circles. Researchers believe that the stones may have commemorated a wooden building that was perhaps associated with the original Neolithic settlement.



FLORIDA: Rare 1,000-year-old Calusa Indian artifacts, including pieces of wood, rope, and fishing net, were retrieved from a waterlogged midden located along the ancient shoreline in Pineland. The fishing net, likely fashioned from cabbage palm fiber, has some of its knots still attached. This allowed researchers to determine that its grid is around an inch wide. The deposit also contained clamshell weights and unburned seeds from a gourd-like squash, possibly all that remains of the attached gourds that once enabled the net to float.



SPAIN:

Cats have assumed various roles in human societies: house pets, rodent deterrents, even Internet memes. In Spain, some 1,000 years ago, it appears that they were also exploited for their fur. Analysis of nine cat skeletons from a medieval rubbish pit at the El Bordellet site shows that the skinning process left definitive cut marks on the bones. The cats ranged from 6 to 25 months in age, apparently the optimal age for producing a suitably sized hide but young enough so the fur was unlikely to have been damaged.

EGYPT: A reexamination of a 3,000-year-old prosthetic toe from Egypt is revealing that it is even more sophisticated than originally thought. The wooden prosthesis was discovered on a female mummy in 1997 in a tomb near ancient Thebes. The artificial toe's materials and design provided a surprising level of balance and movement, but the object's creator also strove to make it as aesthetically pleasing and lifelike as possible. Tests have shown that the device was readjusted over time to suit its owner.



ISRAEL: Apparently even 800 years ago, Crusader forces were aware of the concept of always leaving yourself a way out of a sticky situation. Conservation and restoration work in the old city of Tiberias exposed a secret escape tunnel that once connected the 12th-century Crusader citadel directly with the harbor on the Sea of Galilee. The surviving 21-foot section may have been used during times of turmoil, especially when the fortress was besieged by the Muslim general Saladin in 1187.

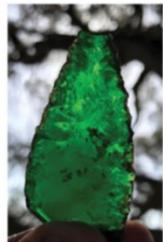


PAPUA NEW GUINEA: An organization dedicated to finding missing WWII soldiers and aircraft located two B-25 American bombers that had been lost in the Pacific for more than 70 years. While the existence of one of the planes had been previously known but never scientifically documented, the other was discovered with the help of historical archives, conversations with locals, and extensive surveying of four square miles of seafloor using sonar scanners, high-definition imagers, and underwater robots.

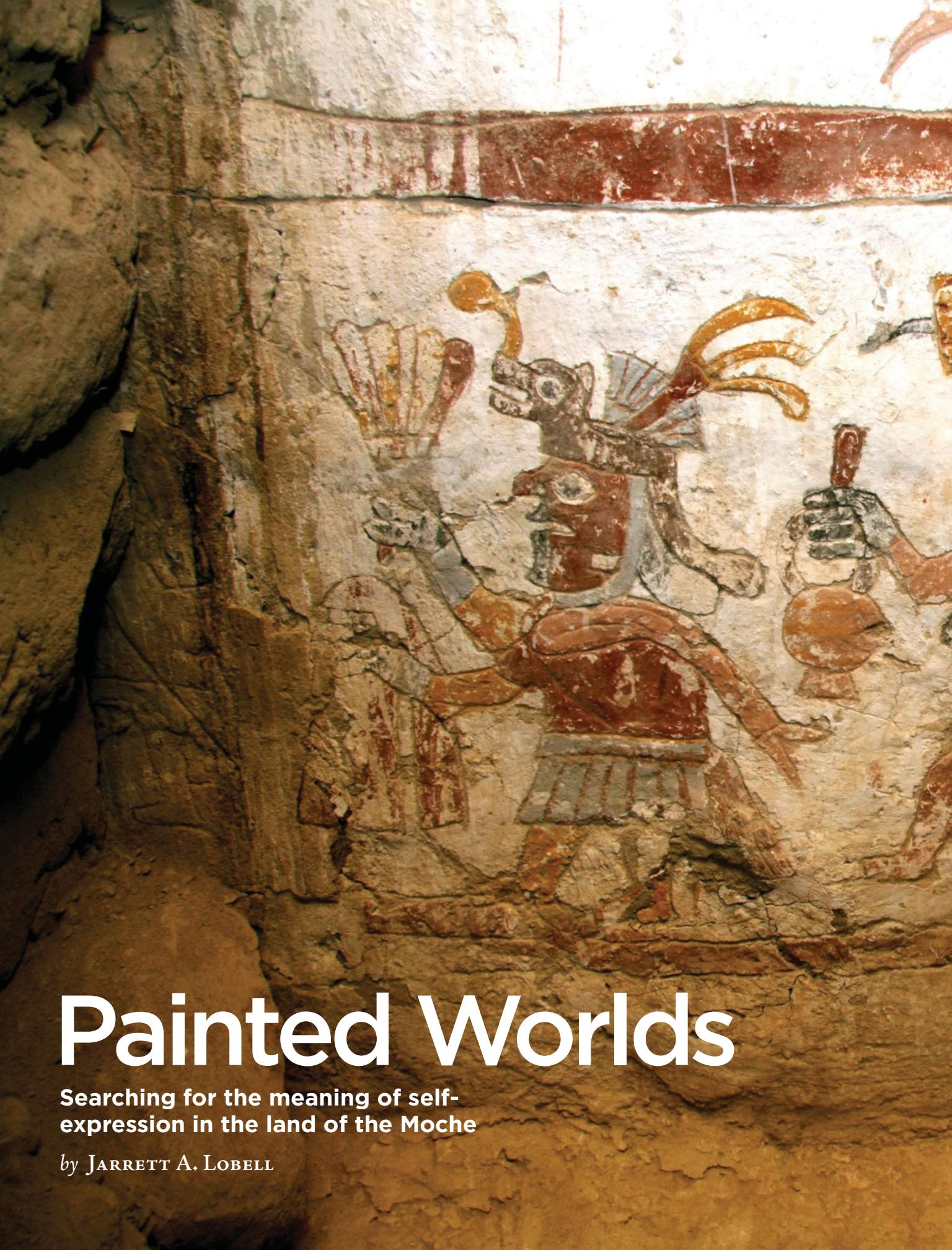


ROME: Modern scientists have long been baffled by the remarkable durability and water-resistant

nature of Roman concrete, even after it has been submerged for 2,000 years. Although the exact recipe is lost, the base ingredients of Roman concrete are volcanic ash, lime, and volcanic rock. A new study suggests that when seawater encounters the volcanic material, it causes a chemical reaction that produces a rare crystalline mineral that subsequently reinforces the structure. Therefore, while modern concrete deteriorates quickly in water, Roman concrete actually strengthens over time.



AUSTRALIA: A student on a university excursion to Rottnest Island off the coast of Perth found a rare green glass spearhead shaped by one of the island's former Aboriginal prisoners. Between 1838 and 1931, thousands of Aboriginal men and boys were incarcerated on the island, where many of them died from disease and malnutrition. Spearheads, fabricated from glass or ceramics, were used by the prison population for trade and perhaps to hunt quokkas, small wallaby-like marsupials.



Painted Worlds

Searching for the meaning of self-expression in the land of the Moche

by JARRETT A. LOBELL



Figures dressed in elaborate garments and headdresses process from right to left across the face of one of the pillars of the Temple of the Painted Pillars at the site of Pañamarca in northwest Peru. The figures hold typical Moche objects, including a plate with three purple goblets, a multicolored stirrup-spout bottle, and a feather fan.

THE COVER OF THE AUTUMN 1951 issue of *ARCHAEOLOGY* features a dramatic scene of close combat between two men, teeth bared, faces bright red with exertion, garments flying, pulling each other's hair so violently that each grips the ripped-out forelock of his foe. Created by the artist Pedro Azabache, this cover is a replica of a wall painting at the site of Pañamarca on the northwest coast of Peru, done very shortly after the work's rediscovery. Mural A depicts a contest between Ai-Apaec, the mythological hero worshipped by the Moche culture, which flourished in this region between about A.D. 200 and 900, and his twin or double. Although Pañamarca's impressive ruins on a granite outcropping in the lower Nepeña River Valley were well known in the first half of the twentieth century, and had been described by travelers in the late nineteenth century, only a few articles about the site had been published and very little had been said about its wall paintings. Thus, when American archaeologist Richard Schaedel arrived there in 1950, he believed that any paintings he might find would be fragmentary at best. Once there, however, he soon found that Pañamarca's adobe structures had been completely covered in polychrome murals. In a single week—originally planned for five days, the trip was extended when more murals and a group of burials were discovered—Schaedel and his five-person team not only recorded the combat scene, but also discovered new murals of what he identified as a large cat-demon and an anthropomorphic bird. On the walls of a large plaza, they



A 1950 photograph taken at Pañamarca shows Mural C shortly after it was exposed by American archaeologist Richard SchaeDEL. The painting depicts eight figures—likely warriors and priests—standing as much as five feet tall.

documented a 30-foot-long composition showing a procession of warriors and priests wearing a costume with knife-shaped backflaps known to have been part of Moche sacrificial rituals.

Though in less than pristine condition after more than 1,000 years, the abundance and unexpected state of preservation of Pañamarca's murals surprised and delighted SchaeDEL. But it also concerned him. In his article about the site for *ARCHAEOLOGY*, he writes, "We hope that this description [of the paintings] will serve as a timely note and warning to lovers of art and archaeology in Peru and elsewhere that this rich source of vivid mural decoration,

which today only awaits the patience of the archaeologist to reveal, may tomorrow be irrevocably destroyed. If these still unrevealed documents of the human spirit are not to be forever lost to us, we must constantly keep in mind two ideals: as archaeologists, to devote our attention first and foremost to the adequate documentation of fragile paintings; and to create among the public in general an awareness of their aesthetic as well as their documentary value, so that the present apathy towards their preservation may be replaced by a sense of obligation to their protection."

Over the more than 65 years since SchaeDEL's work at Pañamarca, it was widely assumed that his admonitions had been ignored or forgotten, and that the surviving murals had fallen into ruin. Very little fieldwork was conducted after SchaeDEL's excavations and work by Duccio Bonavia later in the 1950s, and only a few new paintings were discovered. When archaeologist and art historian Lisa Trever of the University of California, Berkeley, chose to work in Pañamarca in 2010 along with her Peruvian colleagues Jorge Gamboa, Ricardo Toribio, and Ricardo Morales, she wasn't very hopeful. "I was pessimistic when we began, figuring that most of the murals



A newly excavated figure (left) and a watercolor of the figure (right) at Pañamarca show one of a pair of supernatural combatants. The second figure is likely hidden behind the adobe bricks visible at the left of the image.

that had been discovered before had been destroyed, so we set out to map where the paintings had been and to contextualize what remained," she says. "But when we began to dig, we were shocked that so much had survived from the earlier excavations." What was even more surprising was that so much more remained in situ, intact, and unexcavated. "We were soon looking at things that no one had seen since A.D. 780, when parts of the site were deliberately buried," says Trever. "We went in with a sense that Pañamarca was a site of lost monuments and lost masterpieces of the ancient Peruvian past, and were amazed to find out that not everything was lost at all."

THE NAME "MOCHE" OR "MOCHICA" comes not from any ancient source, but was given to the culture in the 1930s because the region's ancient center was located near the modern town of Moche. Rather than being a single political entity or state, the Moche culture was a loose system of chiefdoms situated in multiple irrigated valleys, linked by shared practices and common beliefs. Their territory encompassed more than 400 miles along the coast of northern Peru. While not exactly a political capital, the cultural and artistic homeland of the Moche world was located in the Chicama and Moche Valleys, near the city of Trujillo. At some point, Pañamarca, which was about 100 miles to the south, grew in religious and cultural importance.

The Moche were skilled builders and artists. At some sites they demonstrated this by undertaking large construction projects.

potters created evocative ceramics depicting daily life, the natural world, religious sacrifices, and deformed and even skeletal figures, as well as an extraordinary panoply of hybrid monsters, mythological creatures, and gods in many forms. Gold and silver earspools, necklaces, and rings, some of which are inlaid with semiprecious stones, have been found at many Moche sites. Early Moche artists sculpted clay bas reliefs and covered them with mineral-based pigments at sacred locations such as Huacas de Moche, with its highly decorated Huaca de la Luna, and at Huaca Cao Viejo with its parade of naked captives and intricate geometric patterns. Later, they abandoned the relief style and replaced it with the flat narratives that cover the smooth adobe walls of their temples and public buildings. These paintings reveal much not only about the Moche in general, but also about how Moche rulers chose particular ways of expressing their local identity in a world where heterogeneity reigned.

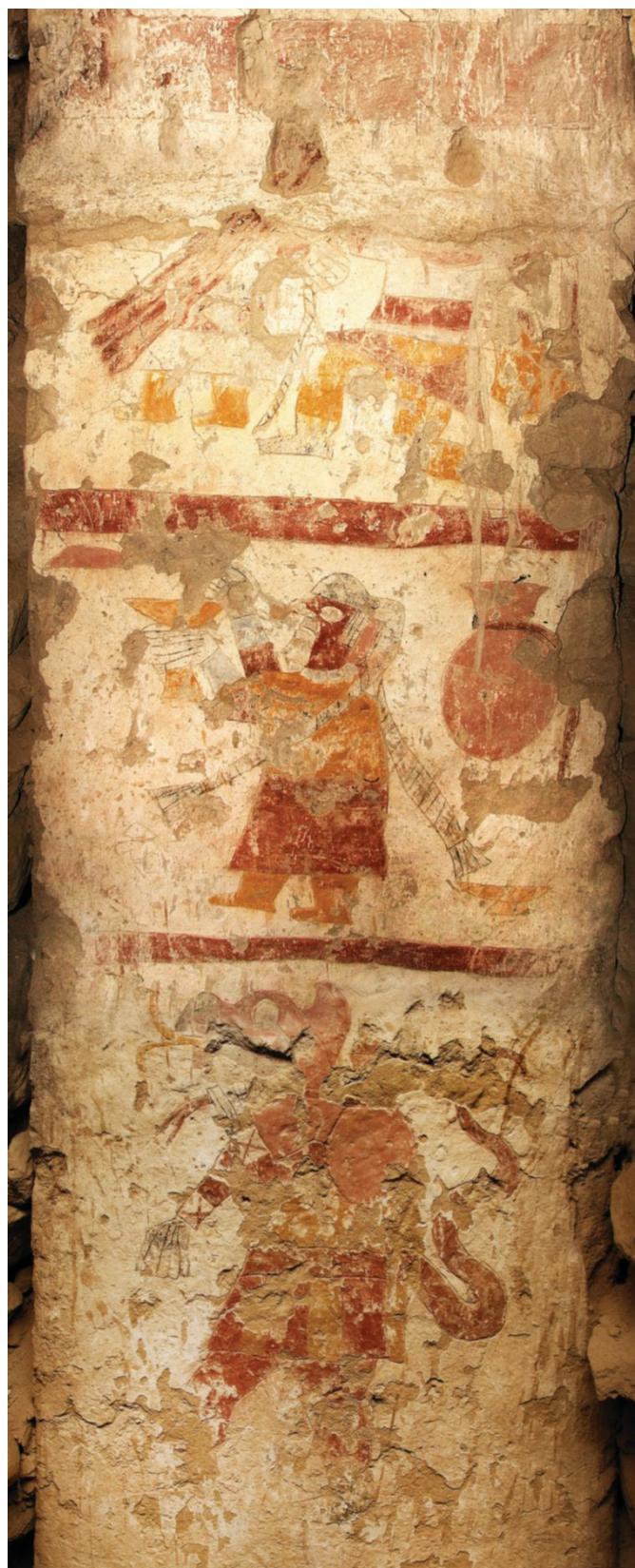
ACCORDING TO THE GERMAN LINGUIST Ernst Middendorf, who visited the ruins of Pañamarca in 1886, the Quechua name for the site, "Panamarquilla," means "little fortress on the right bank of the river." Trever, however, suggests a different, and more evocative, reading of the name: "little fortress of the paintings." Pañamarca's artists were deeply invested in painting, and the murals that cover their monumental temples, including the Temple of the Painted Pillars, reference a Moche ideology focused on either supernatural beings engaging in mythological acts or on human beings per-



The Mural of the Fish adorns one of the walls of a ceremonial platform at Pañamarca. The sea creatures depicted include (clockwise from left) a ray painted using blue-gray paint over red pigment, a long red, white and blue fish, and a small red fish with blue fins.

Other locations were peopled with accomplished metalsmiths or expert ceramicists, and still others boasted gifted mural painters. "There is an interesting view developing among scholars about a world of different accomplishments in different places that breaks down the monolithic view of Moche culture," says Trever. Moche

forming ritual acts, explains Trever. But adobe is ultimately not permanent—it is eroded and damaged by rain, wind, and time in a way that stone is not. "Because they are building fast, they are constantly remaking their built environment. This gives an immediate sense of their ongoing engagement with the



A pillar in the Temple of the Painted Pillars bears three vignettes (top to bottom): a female and a kneeling warrior, a priestess standing in front of a large, red jar, lifting a yellow goblet, and a zoomorphic figure composed of a human, feline, or fox with serpentine features.



The Moche hero Ai-Apaec is shown holding the typical Moche *tumi* knife in the Temple of the Painted Pillars doing fierce battle with the so-called *Strombus* monster.

engagement with the living world," says Trever. "And because Moche architecture, like Mesoamerican architecture, is renovated and not knocked down, what you end up with is like a set of architectural nesting dolls or onion skins."

Furthermore, at Pañamarca, Trever sees a localized expression of identity reflected in the murals that is very different from what can be seen at other Moche sites. She believes there was an anxiety about being in the hinterland, 100 miles from the Moche epicenter, that may have led to an increased sense of orthodoxy in the imagery. "What is striking here is that we don't see a hybrid form of Moche at all, but an even more conservative, even more explicit, Moche ideology expressed," she says. "It's almost like they have doubled down on the canon because they are in a more remote location intermingling with peoples of other cultures who aren't like them."

What is also unusual at Pañamarca is that there is a density of these canonical images not only in the most public, visible spaces of the temples, but also in restricted, private spaces. While at Huaca de la Luna the inside of many of the temple's rooms are simply white, at Pañamarca every surface that Trever and her team have excavated is covered in paintings. "It's almost as if they needed to remind even themselves at every step what it means to be part of a culture, especially when you are far from the heartland," explains Trever. Says Peruvian archaeologist Gabriel Prieto, "Whatever the reason was to paint all these murals here, it's clear to me that one of the intentions was to show users of and visitors to these monuments the complexity, quality, and order of the Moche's most important rituals, stories, and, perhaps, historic events. The paintings at Pañamarca are 100 percent Moche, but the style clearly shows some local taste, and this can tell us that the Moche were adaptable and flexible enough to forge relationships with local elites of other cultures."

THOUGH MUCH ABOUT MOCHE art and architecture is well understood, key questions about significant changes in painting styles over time—and how these might be related to shifts in Moche fortunes—are at the forefront of current work. Roughly four centuries after the culture

first appeared, some sort of disruption rippled throughout the entire Moche world. The cause, according to archaeologist Michele Koons of the Denver Museum of Nature & Science, is the million-dollar question. One possible explanation is an El Niño event, but Koons says that researchers have not yet found definitive evidence of this. She says, "I think that it was probably a mixture of different things—possibly climate change or drought, an earthquake, or some other natural disaster, as well as pressure from highland powers such as the Wari."

It is not only the cause of the episode, but also the precise date that Koons is interested in. "I realized during the course of my research [at the previously unexcavated Moche site of Licapa II in the Chicama Valley] that the traditional dating for the Moche wasn't really based on any data, but was built on assumptions about pottery styles that had no relationship to actual dates of any kind," she explains. "I felt the need to unpack this." By radiocarbon dating organic remains such as seeds and twigs found in excavated contexts alongside Moche ceramics at multiple sites, Koons was able for the first time to pinpoint the date of the catastrophic event or series of events at around A.D. 600.

With this newly refined chronology in mind, archaeologists are now able to recognize a fundamental shift in the way Moche leaders presented themselves to their communities and the outside world. "There is some sense at this time that people aren't really buying into the current way of doing things," says Koons, "and that their claim to leadership needs to be bolstered. This could have happened for any number of reasons." For example, climatic events may have caused people to lose faith in their leaders' ability to protect them. At Moche sites such as Huaca de la Luna, this change in perception is reflected in the murals, which become less repetitive and more narrative. Koons believes

that this type of art reveals an awareness of not just who they are, but who they have been. For example, the iconography of sacrifice, which was depicted in Moche art for centuries, can be seen in a nearly documentary manner. "There is a sense that they are saying, 'This is what we used to do,'" explains Koons. "It's as if they are becoming more self-reflective and more aware of themselves at some transitional moment."

The tremendous challenge faced by Trever and her team is that, while the history of other Moche sites prior to A.D. 600 is relatively well understood, the story of Pañamarca earlier than that date is somewhat dark—nothing has been excavated and little is known. What does seem clear is that Pañamarca's inhabitants ultimately recovered from whatever happened at the start of the seventh century, and that they experienced a kind of renaissance that would last for some 150 years. "The story of Pañamarca is not just about crisis, but also about recovery," says Trever. It was during this latter phase, on the site of an earlier temple, that Pañamarca's rulers supervised the construction and expansion of the large walled plaza and monumental adobe pyramids and platforms they covered with vibrant murals. And, as a result of radiocarbon dating of organic construction materials, it is now possible to say that these structures were built between A.D. 600 and 750, the first absolute dates for the Moche in this valley. Still, questions remain unanswered. "Pañamarca's paintings seem to me to be a large open book, and when I saw them I felt like the Moche were trying to tell me something about their civilization and their glorious past," says Prieto. What exactly they were saying is still something of a mystery. ■

Jarrett A. Lobell is executive editor at ARCHAEOLOGY. For more images, go to archaeology.org/mochemurals



A newly discovered painting shows a figure wearing a yellow dress, holding plates of food. She is trailed by a descending osprey.



Slingshot stones



Horse mount



Glass bead



Gaulish pottery sherds





LOST KINGDOM OF THE BRITONS

A doomed hillfort in far southwestern Scotland may have been a royal stronghold

by DANIEL WEISS

ROMAN RULE OF BRITAIN ended in the early fifth century A.D., and in the ensuing power vacuum, a variety of warring kingdoms grew up. Writing around A.D. 540, the monk Gildas decried the general breakdown in order during what has come to be known as the Dark Ages: “Britain has Kings, but they are tyrants; she has judges, but they are wicked. They often plunder and terrorize the innocent; they defend and protect the guilty and thieving...they wage wars civil and unjust...they despise the harmless and humble, but exalt...their military companies, bloody, proud, and murderous men.”

Given that Gildas provides one of the few written accounts from the time, archaeology has played a key role in providing insights into the nature of these kingdoms. In the Argyll region of western Scotland, archaeologists have uncovered Dunadd, the chief settlement of Dalriada, the earliest Scots kingdom. In eastern Scotland at Edinburgh Castle, they have unearthed what is thought to be Din Eidyn, the royal fortification of the Brittonic kingdom of Gododdin. And in northeastern England, they have explored the remains of Bamburgh, the headquarters of the Anglo-Saxon kingdom of Northumbria.

There is, however, one major Dark Ages kingdom of northern Britain that has remained elusive. The Brittonic kingdom of Rheged is known from poetic and historical sources, and is thought to have been based in northwestern England or southwestern Scotland. However, past attempts to locate it in places such as Carlisle, in northwestern England, where it was long thought to have been situated, have turned up nothing. Now, a pair of archaeologists—Chris Bowles of the Scottish Borders Council and Ronan Toolis of Guard Archaeology—believe they may have found Rheged’s stronghold at a complex site known as Trusty’s Hill in Galloway, a region in the far southwest of Scotland.



In the Galloway region of southwestern Scotland, Trusty's Hill is difficult to see from the Fleet Valley below. This intentionally inconspicuous spot would have made it the perfect location, in turbulent times, for a royal stronghold

THE FORT AT TRUSTY'S HILL has puzzled scholars for hundreds of years. At its entrance lies a natural outcrop of stone engraved with carvings featuring an abstract design typical of the Picts, a group of tribes native to the far north and east of Scotland known for their fearsome attacks on neighboring peoples and for having maintained their independence throughout Roman rule. This is strange, as Trusty's Hill lies hundreds of miles south of where such carvings are generally found. Another curious feature of the fort—perhaps connected to the carvings, perhaps not—is that at some point, it was burned down in a fierce fire.

In 1960, archaeologist Charles Thomas led an excavation at Trusty's Hill that was dogged by bad luck. With the project understaffed, Thomas enlisted Boy Scouts to do the digging, but they found little as rain fell without cease, turning the soil to a gloppy black mud from which it was almost impossible to extract artifacts. Nonetheless, the dig turned up enough evidence to establish that the site had been inhabited sometime after 200 B.C. Thomas speculated that it was a Dark Ages settlement, but couldn't nail down the dates of habitation or connect its people to the Pictish carvings.

Over the years, the mystery of Trusty's Hill has only grown deeper. Thomas had proposed that the carvings commemorated a fallen Pictish leader who had been responsible for the fort's fiery demise. Others suggested that the carvings might have been faked. In 2012, Bowles and Toolis re-excavated Thomas' trenches with a team of volunteers. "We wanted to verify that the Pictish carvings were legitimate and, at best, we were hoping for some radiocarbon dates," says Bowles. "We ended up finding quite a bit more."

SITTING ATOP A CRAGGY RISE overlooking the Fleet Valley and the Solway Firth, an inlet of the Irish Sea, the fort at Trusty's Hill would have been difficult to make out from the valley, a deliberate choice, Bowles says. The site appears to have been settled originally around 400 B.C., based on radiocarbon dating and the discovery of a single glass bead typical of the time.

After centuries of abandonment, the hilltop was resettled starting around the late fifth century A.D. and was fortified during the sixth or early seventh century. It was during this period that a small but vital enclave was established there, complete with battlements and a robust metalworking facility. Fortifications may well have been constructed in response to a heightened sense of threat and also, perhaps, to protect the fortress's wealth. Archaeologists have uncovered stone ramparts measuring 7.5 feet across, laced with three-foot-wide oak timbers, most likely harvested from a nearby managed woodland. Just inside the ramparts, researchers found a collection of rounded river stones believed to have been slingshot ammunition, further suggesting that the fort was on a wartime footing.

Inside these heavy fortifications stood two structures: a residence on an upper platform and a crafts area on a lower one. "There would have only been room for two buildings in the interior—fairly large buildings, but we're talking about a very small number of people living on the hill," says Bowles. The crafts area was extremely active. A range of implements for working leather, including a socketed iron tool and a variety of stones used to smooth and soften leather goods, have been excavated there. Crucibles, furnace lining, and clay molds for

making pins and brooches were also unearthed. “We found lots of evidence of ironworking,” says Toolis. The fort’s blacksmith had an anvil, and archaeologists discovered hammered flakes and evidence of iron smelting. The smith also had gold, silver, and copper at his disposal, as indicated by X-ray fluorescence on the crucibles. It is believed that the fort’s residents controlled local mining operations—a piece of lead known to have come from nearby hills was also discovered.

The fort’s metalworkers weren’t just highly productive, they were also highly skilled. A thistle-headed iron pin unearthed from the east side of the hilltop was pounded into shape rather than cast. Around its neck are two fine bronze bands. “The ability to pound something like that,” says Bowles, “and put this fine bronze banding around it suggests we’ve got a master metalsmith working here.” Another impressive artifact found at the site—a circular Anglo-Saxon-style copper-alloy horse mount that appears to have been gilded and silvered—may not have been made in the fort’s workshop, but is indicative of what was produced there or obtained through trade or theft. “The mainstay of the economy was gift exchange,” says Bowles, “so the ability to make this really nice, fine jewelry was what kept people in power.”

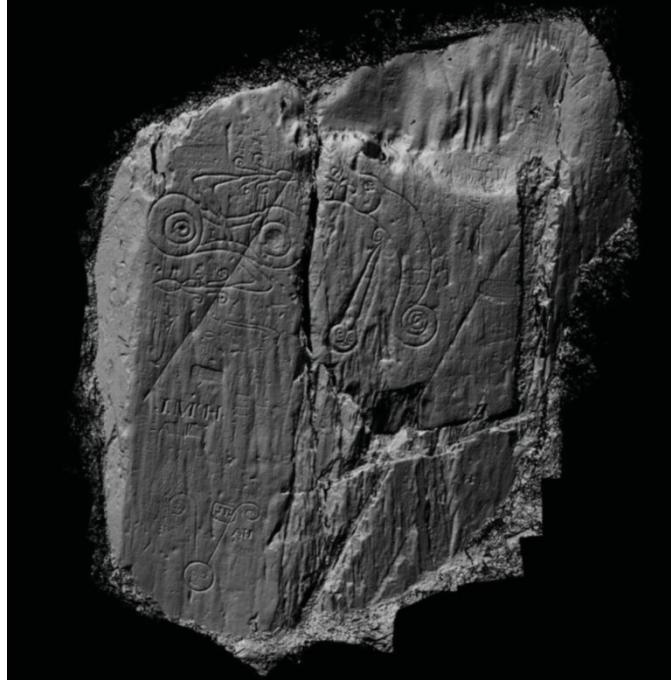
These items seem to have lured purveyors of luxury goods from the Continent to trade with the fort’s residents. During the period when the fort was active, Gaulish merchants carrying products such as oil and wine made landfall in the area. Previous excavations at two nearby sites—the Mote of Mark, a hillfort similar to the one at Trusty’s Hill, and Whithorn, an early monastery—have turned up pottery from the Loire region of France that was used to transport these goods. A sherd of this pottery was found at Trusty’s Hill as well, showing that its residents were also tapped into this trade network. “These Gaulish sailors were completely ignoring northern Wales and the northwest of England and really making a beeline to Galloway,” says Bowles. “It has among the highest concentrations of this imported pottery in all of Britain, which indicates that there was a strong kingdom in the area.”

The fort’s residents appear to have also held wealth in the form of cattle, as indicated by bones unearthed at the site. The researchers believe that herds may have been corralled in a lower-lying enclosure. At the time, cattle were seen as a form of currency, and cattle raiding was a popular pursuit among early medieval kings. As a result, says Bowles, keeping a herd close to the settlement was “like showing off your wealth and your ability to go off and do cattle raiding—like showing off your bank account.”

THE EARLY MEDIEVAL RESIDENTS of Trusty’s Hill were clearly wealthy and appear to have traded with continental Europe to the south, but the carvings at the entrance to the fort suggest they also had some sort of relationship with—or at least an affinity for—the Picts to the north. As part of their investigation, the researchers had the Pictish carvings at the fort’s entrance laser scanned and analyzed by two scholars at the University of Glasgow: Katherine Forsyth, an expert on the Picts, and her PhD student Cynthia Thickpenny.

The carvings can be divided into three sections. In the

upper left corner is a Pictish symbol known as a double disc and Z-rod. It consists of two sets of three concentric circles connected with a pair of inward-flexing horizontal bars, which are in turn intersected by a rod bent into a backward Z shape with floriations and a point at each end. In the upper right corner is what might possibly be a monster or dragon figure, with



Pictish carvings appear on a natural outcrop (top) at the entrance to the fort at Trusty’s Hill. A laser scan of the carvings (above) allowed scholars to carefully study them.



A rock-cut basin being unearthed at the entrance to the fort at Trusty's Hill may have been used for a ceremonial purpose, such as anointing kings with holy water or oil.

gaping jaws, a piercing eye, and a tightly coiled tail, impaled on a point or blade. In the lower left is a “doodle” of a face with long, projecting antennae.

Forsyth and Thickpenny dismiss this doodle as likely a modern addition to the stone, but believe that the other two sections appear to have been created by someone who was reasonably familiar with Pictish designs. Thickpenny notes that the double disc and Z-rod is among the most common Pictish symbols and is thought to have had a fixed meaning, possibly even representing a specific word or name. She says that, with some notable departures, such as details of the ends of the rod, the design found at Trusty's Hill fits with other known examples. “The artist has seen enough to know what the symbol is, but things are sort of off,” she says. Likewise, dragon designs show up in Pictish carvings, though they tend to appear in pairs and are never wounded in the way the one at Trusty's Hill appears to be.

Given these idiosyncrasies and the fact that the Picts are not known to have ventured as far south as Galloway, Thickpenny concludes that the designs were “probably carved by somebody local to signal some political interest or link with the north.” Although the Trusty's Hill carvings are located much farther south than any other known Pictish carvings fixed in place, portable objects, such as chains, bearing the designs have been found in the area, and this may be how the artist became familiar with them. Forsyth and Thickpenny also reject the idea that the carvings are a modern forgery. As Thickpenny notes, they were described as ancient by a local minister in 1794, a time when there was far too little general knowledge of Pictish designs for anyone to have produced such a convincing imitation of them.

For Bowles and Toolis, the Pictish carvings help set the

fort at Trusty's Hill apart, making it not just a wealthy site, but a royal one. Across from the carvings at the fort's entrance, their excavation revealed a rock-cut basin. Since the basin was outside the ramparts and not fed by a spring, they believe it served a ceremonial purpose, most likely for anointing kings with holy water or oil. A similar arrangement of Pictish carvings and a rock-cut basin was found at the entrance to Dunadd in the Argyll region of Scotland, north of Trusty's Hill but still far south of where such carvings are generally found. This site is known from historical sources to have been the royal stronghold of the kingdom of Dalriada. “That's a royal site, and the Pictish carvings and rock-cut basin help make it royal,” says Bowles. “By analogy, Trusty's Hill is likely to be a royal site as well.” Pictish carvings were also found at Edinburgh Castle, yet another royal site outside the realm of the Picts. “Unfortunately, there's no Rosetta Stone for Pictish symbols, so no one truly knows what they

mean,” says Bowles. “But their presence at Dunadd and Edinburgh Castle implies that the symbols were seen as a statement of authority at royal centers, whether Pictish or not.”

A potential challenge to this interpretation is the difficulty in dating the Pictish carvings at Trusty's Hill. Based on stylistic qualities, Forsyth and Thickpenny believe the carvings date to the late seventh century at the earliest and more likely the eighth or ninth century—after the fort at Trusty's Hill appears to have been destroyed and during a period when the hilltop was unoccupied. Bowles believes that the carvings were in place before the destruction of the fort, but notes that if they were executed after its abandonment, this would testify to the site's endurance in local memory. “We might speculate that the carving is tied to the continued use of the site in ceremonies of some kind after its last occupation,” he says. “I'd suggest that this is because it maintained a special status as a ruin, possibly as a remembered royal residence, and that this memory led successive generations back to the site.”

HAVING ESTABLISHED THAT the fort at Trusty's Hill was likely a royal stronghold, the researchers speculate that it could well have been the headquarters of the Brittonic kingdom of Rheged. According to the late-sixth-century poet Taliesin, whose work was recorded in a thirteenth-century manuscript, King Urien of Rheged was a fearsome warrior known as “a raucous cattle-raider” with “herds of cattle surround[ing] him,” as was his son Owain, who was called the “Bane of the East.” The two kings were later incorporated into Welsh and French tales of King Arthur as Knights of the Round Table. A section of the ninth-century *Historia Brittonum* that records a line of late sixth- to early seventh-century Anglian kings describes Urien and three other

Brittonic kings pressing an offensive against the Northumbrians on the island of Metcaud, known today as Lindisfarne, off northeastern England.

"Urien blockaded [the Northumbrians] for three days and three nights on the island of Metcaud," the history reads. "But during this campaign, Urien was assassinated on the instigation of Morcant [one of the other Brittonic kings] from jealousy because his military skill and generalship surpassed that of all the other kings." The *Historia Brittonum* also notes that a granddaughter of Urien was later married to King Oswiu of Northumbria (r. 642–670). In sum, the written sources appear to portray Urien as the leader of a powerful kingdom in northern Britain that rapidly grew from a base in southwest Scotland or northwest England.

"We are able to say Trusty's Hill was probably a royal center," says Bowles. "And the likeliest kingdom to have been centered there is the kingdom of Rheged, which has never really been pinned down on the map before." It is impossible to prove that Trusty's Hill was the stronghold of Rheged, but David Petts, an archaeologist at the University of Durham who is an expert

You've got this glowing rampart in the landscape with smoke pouring out of it for weeks, basically saying, 'You are never coming back up here again.'"

Urien Rheged's old foes, the Northumbrians, who are known to have pushed west across Britain and taken over Galloway around this time, are likely to have been the perpetrators of the destruction. "When Northumbria moved westwards, it was bloody, it was battles," says Petts. "This is a world of big guys butting heads and taking over land." The Mote of Mark, a fort located some 15 miles east of Trusty's Hill, was vitrified around the same time, and a number of other nearby forts are believed to have been vitrified as well, suggesting that the destruction was part of a campaign to systematically erase the area's former rulers from the countryside. "There are historical records of the Northumbrians conquering a neighboring king in northern England and firing castles by flame and sword," says Bowles, "but in terms of Galloway and Rheged, there is nothing that specifically says that happened. Archaeology is effectively putting the meat on the bones of history."

Despite the great lengths the attackers went to to destroy



Early in the 7th century, a fire at the fort at Trusty's Hill burned for so long and at such high temperatures that it melted, or vitrified, the fort's stone ramparts. Fires such as these had been set at enclaves throughout the region around the same time.

on the Northumbrians, notes that the evidence shows it was clearly an important settlement. "Even if it's not the capital of Rheged," he says, "it's certainly one of the most powerful sites in Rheged, or whatever you choose to call this particular area."

The manner in which the fort at Trusty's Hill was destroyed provides further evidence of its importance. Sometime early in the seventh century, the fort was vitrified—subjected to a fire that burned so hot and so long that its stone ramparts melted. According to Bowles, this could not have occurred by accident and was most likely the action of a conquering force. "This is arson on a big scale," he says. "To get the timbers in the ramparts to burn hot enough to melt the rock around them, the fire had to be tended for weeks or possibly months.

the fort at Trusty's Hill, people continued to visit the site well into the seventh and possibly even the eighth century, as indicated by radiocarbon dating of fill from the rock-cut basin. This suggests, Bowles notes, that Britons may have exercised continued resistance to Northumbrian rule in secretive ways. Indeed, this use may have continued much longer, as a hoard of sixteenth-century silver coins was found nearby when the Pictish carvings were first described in 1794. Most likely the basin and carvings served a votive or ceremonial purpose that drew visitors long after the kingdoms that fought over the site had been lost to memory. ■

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THE HEIGHTS



The mountains and plateaus of Tibet are amongst the world's highest, and yet humans have settled and survived there thanks to an ability to adapt to even the most challenging conditions.

WE GO TO

**The links among extreme environments,
genetics, and the human ability to adapt**

by KAREN COATES

HIGH-ALTITUDE LANDSCAPES are some of the most inhospitable places on Earth. They are cold, dry, and oxygen-poor. They were the last places humans settled—yet people did it and they survived. But how? For archaeologist Mark Aldenderfer of the University of California, Merced, a fundamental trait of humanity is our ability to adapt, especially to extreme environments. From the Himalayas to the Andes to the Ethiopian Plateau, people have evolved in ways that allow them to live at high altitude. “They’ve all converged on a solution,” he says. “They’ve all found a way to live at high elevation.”

Aldenderfer has assembled a team of experts in disciplines ranging from bioarchaeology to ethnography, paleoclimatology, geochronology, genetics, evolutionary medicine, and even mountaineering to augment archaeological research in order to understand what has clearly come about by way of evolution. He says, “You need the story of the people who lived at that time to tell you how these things actually worked. It’s about the whole process by which people adapt culturally, biologically, and genetically.”

ALDENDERFER BEGAN HIS research in the 1970s as a graduate student on the Ethiopian Plateau, one of the highest in the world, where he studied the remains of the Iron Age trading empire of Aksum. Political turmoil cut his research short, and it became impossible to go back. A short while later, he took a research position high in the Peruvian Andes, studying early hunter-gatherers. Aldenderfer realized he had stumbled into a niche of untapped archaeological research on early human adaptation to high-elevation environments.

Working at such heights can be excruciating. A throbbing head, aching lungs, sleeplessness, fatigue, wheezing, coughing, confusion, and rapid pulse are all associated with hypoxia, a condition where tissues can’t get enough oxygen. It occurs when people accustomed to living at lower altitudes climb above 8,000 feet, and it can be dangerous and lead to pulmonary edema, stroke, and even death. Women who aren’t adapted to high elevations can have a much harder time bearing children and risk having low-birth-weight babies. Nevertheless, people have successfully settled at these altitudes for millennia—perhaps 7,000 years or more. The question is, how does such an adaptation come about? Jacqueline Eng,



Many populations such as these traders in central Tibet, who live above 8,000 feet, are now known to have genetic characteristics that enable them to survive in environments where lowlanders would have trouble breathing.

Western Michigan University biological anthropologist and osteology expert on Aldenderfer's team, explains, "When we're challenged by the environment, if some individuals have genetic traits that enable them to survive and reproduce more successfully than others who lack that trait, then those with the beneficial traits live and pass those traits along until it becomes more common in populations owing to the advantage it confers."

It can be observed that, compared with people who live at sea level, Tibetans breathe more frequently and take in more oxygen, and they have expanded blood vessels that enhance the delivery of oxygen throughout the body. Andeans have higher levels of hemoglobin, the protein responsible for transporting oxygen in the bloodstream, so their blood cells carry more oxygen than those of lowlanders. Studies of highland Ethiopians, too, indicate genetic adaptations to low-oxygen environments. Something must confer these adaptations. Eng says there are several telltale alleles found in high-altitude populations where hypoxia is a major challenge. An allele is one of multiple versions of the same gene that determine various physiological traits—blood type in humans, for example, or the distinct color of a rose. Alleles can be thought of as recipes for the same gene—think of the difference between spaghetti with meatballs and spaghetti with ground beef. In evolutionary terms, random mutations create new recipes for alleles that may eventually come to exist throughout a population.

In the case of Himalayans, ancient and modern, two particular alleles have promoted adaptation to high elevation and the avoidance of hypoxia. One of those alleles is known as EGLN1, which, Aldenderfer says, is estimated to have appeared around 8,800 years ago. Another allele, EPAS1, has a fascinating origin story. It dates back to the Denisovans, an extinct hominin species that lived in the Altai Mountains of Siberia some 45,000 to 50,000 years ago. Scientists do not yet understand where or how, but it seems that, at some point, the Denisovans encountered early modern humans and, somewhere along the way, their EPAS1 gene ended up on the Tibetan Plateau.

RECOVERING THE ANCIENT DNA that allows for these conclusions is meticulous work, and is hampered by the fact that many of the world's highland environments, such as those in Ethiopia and Tibet, are politically unstable or otherwise off-limits. Nevertheless, Aldenderfer's team has been able to conduct what appears to be the first investigation of the ancient DNA of the people of the Himalayan arc. They have sequenced the genomes of eight individuals who lived during three distinct cultural periods between 1,250 and 3,150 years ago, in what is now Upper Mustang, Nepal, at altitudes between about 9,000 and 14,000 feet. The team's primary questions are: Where did these people come from? Did they have the adaptive alleles for high altitude? If so, which ones? And how do the genetic findings relate to any artifacts found nearby?

There have been many hypotheses about the identities and origins of early people living in these high valleys, with some

researchers suspecting that they came from elsewhere in Asia. But according to Christina Warinner of the Max Planck Institute for the Science of Human History in Jena, Germany, who is responsible for DNA extraction from the human remains from Upper Mustang, the genome sequencing has revealed that "genetically, these people are almost certainly coming from the Tibetan Plateau—they look very similar to present-day Tibetan populations."

Warinner works with Anna Di Rienzo of the University of Chicago's Department of Human Genetics, who directs the team's genomics research. By identifying the alleles that promote adaptation to high elevation and then comparing those of the closest modern population to those in the ancient samples, the team has found that while cultures, religions, and behaviors shifted dramatically through the centuries, their genetics did not. "Genetically they were very, very stable," says Warinner, "and that's uncommon." The researchers also found strong evidence that one of the adaptive alleles, EGLN1, is present throughout all time periods studied. The other—EPAS1, the gene that originated with Denisovans—appears only in the most recent period studied. Warinner is not yet certain why this is the case.

ALDENDERFER AND SEVERAL OF his colleagues created a stir in early 2017 when they announced that they had evidence of preagricultural hunter-gatherers living in a permanent settlement system on the central Tibetan Plateau at least 7,400 years ago—thousands of years earlier than researchers had previously thought. That research centers on a site called Chusang, about 215 miles from Lhasa, at an elevation of 14,000 feet. There, 19 human hand- and footprints are embedded in a unique formation of travertine limestone created in the remains of ancient hot springs. No artifacts were found nearby, just the markings of up to six individuals who were at that site millennia ago.

Without artifacts, the researchers had to rely on research methods such as geochronology and a variety of other dating techniques. Aldenderfer's team hypothesizes that Chusang was one stop in a permanent preagricultural occupation, and that the prints were made by early hunter-gatherers who settled on the plateau year-round. The finding is pivotal for several reasons. First, it clarifies Chusang's age, which had long been debated. Some previous research had pinned the site at 20,000 years old or more, which perplexed many researchers, as that would have meant humans were present there during the height of the Last Glacial Maximum. The new dates—7,400 to 13,000 years ago—"are more consistent with what we know about the broader region," says the University of Pittsburgh's Loukas Barton.

But Barton finds the team's interpretation of the new dates problematic because of the preagricultural part of the argument. Barton, like several others, hypothesizes that it was the introduction of agriculture to high-elevation regions that enabled early Tibetans to survive at such heights. Agriculture was established in this region roughly 3,600 years ago, and Barton's hypothesis for full-time occupation rests on the



A human handprint preserved in the soft limestone at the 14,000-foot-high site of Chusang in central Tibet was left there more than 7,000 years ago.

existence of agriculture on the plateau. His theory is that population growth and resource scarcity pushed early farmers higher up the mountains. They had sheep, barley, and wheat, which offered a food supply that could be stored year-round. And while they were up there, natural selection took hold, fostering the spread of the alleles that prevent hypoxia. He says this is an example of “gene/culture coevolution.” He says it shows “how culture broadly drove the biological evolution of the human capacity for low-oxygen environments. It means that these biological capacities evolved in a relatively short period of time, maybe 1,000 to 1,500 years.” That’s fast for human evolution—and he wonders what it could mean for the future, because, as he notes, humans are still evolving.

“Chusang could easily have been a seasonal encampment of some sort,” says Dave E. Rhode, research professor in archaeology at the Desert Research Institute, who has a decade of experience working on a different part of the Tibetan Plateau. He also disagrees with the preagricultural interpretation. “I have a very hard time seeing how it could be a permanent year-round camp [without agriculture].” The resources up there are so sparse, he thinks staying put would quickly exhaust the food supply. “Unless Chusang was some remarkably salubrious, sweet-spot Shangri-La, people would not have wanted to stay there permanently.”

Aldenderfer’s team, however, believes it would have taken too much time—28 to 70 days round-trip, depending on the route—for hunter-gatherers to travel between Chusang and a lower-level base camp. Plus, heavy snowfall would have made one possible route impassable much of the year. Michael Meyer, a geochronologist at the University of Innsbruck and a member of Aldenderfer’s team, says the data suggest the Chusang hot springs were most active and travertine formation was at its height during an age of peak monsoons, with flora and fauna flourishing across the plateau. The researchers think these wetter, more prolific conditions were a “pull”

for people to move higher into the mountains. Even today, he says, remote stretches of the Tibetan Plateau are flush with antelope, wild yaks, and bears. Hunting is a profitable—albeit illegal—business. “So for me,” Meyer says, “it is very easy to imagine that a slightly wetter climate would make a big difference in terms of food availability for ancient tribes and societies, facilitating human migration during much earlier times.”

Aldenderfer and his team don’t think Chusang was a permanent occupation in and of itself. Instead, the researchers believe that the site would have been one of many stops on a seasonal occupation of the higher elevation of the plateau. People moved around the plateau, but there was no seasonal migration to lower sites.

Furthermore, Aldenderfer says, both adaptive alleles found in modern-day Tibetans—EGLN1 and EPAS1—have been dated to ages that coincide with or precede the time when a few folks left their imprints in the Chusang mud. Genetically, they would have been preadapted to the altitude.

ONE MIGHT ASK WHY the whole debate is so critical. It is primarily because it touches on the broader question of adaptability. Looking at the time when humans first appeared on the plateau and how they managed to survive offers “a measure of the limits of human possibility,” says Jeff Brantingham of the University of California, Los Angeles. Earth is full of extreme environments where people today face dire choices about survival, he says. “Learning something about how such inhospitality was successfully conquered in the past tells us something about what happens on the edge today.”

Aldenderfer plans to expand his project across the Himalayan arc. He is also working with his colleagues and former students on genetic and isotope studies of early Andean hunter-gatherers to compare with the results from the Himalayas. In the Andes, research shows that people lived year-round at elevations exceeding 8,000 feet at least 7,000 years ago. “These early hunter-gatherers intensively processed tubers—a behavior that may have led to the domestication of the potato,” says archaeologist Randy Haas of the University of California, Davis, who worked with Aldenderfer. Aldenderfer believes that archaeology, in concert with other disciplines, is providing opportunities to look at differences and similarities across evolutionary time. “We’re exploring our common humanity here,” Aldenderfer says. “I think that’s something that we don’t do enough of—it’s important because it tells us something about us.” ■

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At Chusang's Tibetan Buddhist shrine, locals offer prayers at an elevation that most people on Earth would find challenging.





TO DIE LIKE AN EGYPTIAN

An ancient burial shroud offers insights into belief and identity at the beginning of Roman-era Egypt

by MARLEY BROWN

ABLE OF TEXTILES.” That is how a parcel containing an arresting and remarkably intact Egyptian burial shroud was described some 70 years ago, before being carefully put into storage in an Edinburgh museum. It was rediscovered this year as curators at National Museums Scotland were taking stock of their holdings. The shroud, according to Margaret Maitland, senior curator of ancient Mediterranean collections, had originally been excavated from a tomb in Thebes (modern-day Luxor). The body-length painted linen shroud names its owner, the previously unknown son of a high-ranking Roman-era Egyptian official, and holds clues to the beliefs of a family caught in a wave of cultural and political change. In addition, it reveals much about the tomb itself, which had been in use for 1,000 years.



Aaemka, a Roman-era Egyptian who died around A.D. 10, as depicted (opposite) on his burial shroud. A conservator (left) at National Museums Scotland in Edinburgh removes the shroud from the brown paper parcel in which it was stored for more than 70 years.



The careful, step-by-step process of unfolding the linen shroud (above) took some 24 hours as researchers steadily humidified it to avoid breaking its delicate, 2,000-year-old fibers. It was only when the burial shroud was fully opened (below), that museum staff realized its rarity and importance. While details in Aaemka's portrait hint at the beginnings of classical painting styles, other elements, including his depiction as the god Osiris, remain decidedly Egyptian.



Now on display after a painstaking conservation process, the shroud was that of Aaemka, son of Montsuef and his wife, Tanuat. Aaemka, who died around A.D. 10, was likely still a young adult. He had lost both of his parents in the same year, a fact confirmed by the researchers at National Museums Scotland who read the extant funeral papyri of Montsuef, who died in 9 B.C., and of Tanuat, who followed a month later.

Montsuef, the patriarch of the family, was a local official and cavalry officer. His own father had been a priest and the governor of the region of Thebes, once Egypt's capital and home to the Valley of the Kings. Montsuef and his wife lived through the end of the reign of Cleopatra (r. 51–30 B.C.), Egypt's last active pharaoh, and would have witnessed the conquest of Egypt by the Roman emperor Augustus. Their son, Aaemka, lived at the time of Christ.

NATIONAL MUSEUMS SCOTLAND has been in possession of the funeral papyri and the shroud, along with several other burial objects belonging to the family, since they were excavated in the late 1850s. Far from being just a single-family gravesite, the tomb in Thebes that housed Aaemka and his parents had been built 1,000 years before he was born. It was constructed in 1290 B.C., shortly after the reign of Tutankhamun (r. 1336–1327 B.C.), for the chief of police at the time and his wife. It was reused, disturbed, and looted countless times over a millennium until it was sealed in the first century A.D., the period when Aaemka was interred. The shroud and other tomb objects went on display in 1859 in what was then the National Museum of Antiquities of Scotland. Many of the artifacts were shelved in the 1890s, and some items may gradually have lost their connection to the site.

Maitland made it her mission in 2017 to track down any stray burial goods associated with the tomb and, in her search, she spotted an entry referring to textiles in the museum's records. Coming across a mere mention of Egyptian textiles is rare enough. When she actually went to the spot where the shroud was stored, she found, along with it, a note from the 1940s, written by a curator during World War II, that said it was from the Thebes tomb. "To realize then," she says, "that it had a connection to this whole Roman Egyptian family, to finally reveal the figure, and read his name—those were amazing moments."

BRINGING THE SHROUD TO LIGHT after so many years presented challenges for conservators. Nestled tightly in a brown paper parcel, it was folded and flattened. The process of unwrapping it required consistent humidification so that the linen's brittle fibers wouldn't break. The curators began to see colorful painted details, which suggested to them that the textile might indeed be a mummy shroud. But only after they were able to unfurl it completely, fold by fold, over some 24 hours, did they realize what a rare object they had. "At each step of this very long process, I found out something more about it," says Maitland. "At no stage were we let down."

In addition to the mixed feelings of delight and relief at having succeeded in bringing the shroud back into full view, the museum's curators recognized the extraordinary

opportunity the shroud provides to gain a more complete understanding of the Thebes tomb. Maitland explains, "To be able to have that whole assemblage, that archaeological context, to be able to give it more precise dating—that is really exciting." The shroud can now be compared not just to other examples from the same period, but it can also be evaluated alongside objects from other burials in the tomb, many of which are hundreds of years older. The Thebes tomb offers a window into the ways in which funerary practices in Egypt changed through time. It can also elucidate the various historical and cultural transformations that were in play, especially in periods such as Aaemka's, when Egypt was being buffeted by the political power, languages, and cultural imports of Greece and Rome.

Maitland believes that the family's burials show some subtle references to classical ideas. For instance, while Montsuef was interred wearing a gilded mummy mask, a traditional Egyptian burial object, he was also wearing a gold laurel wreath, a classical symbol of victory that Maitland thinks must have resonated with Egyptian sensibilities as a symbol of triumph over death. And, though Aaemka's shroud depicts him as the Egyptian god Osiris, it may also bear Greek and Roman painting techniques. "It is very traditional, in some senses, in its iconography," says Maitland. "But there are hints at attempting portraiture, in terms of shading and of the face, that I think herald the advent of Hellenic funerary portraits that are so famous from Roman-Egyptian times."

Much more evidence from the family burial, however, points not to an embrace of all things Roman and Greek, but to a deliberate resistance to change and an assertion of their Egyptian identity. Christina Riggs, a scholar of ancient Egyptian art, archaeology, and textiles at the University of East Anglia, who has researched material from the tomb in Thebes, believes that the shroud and other artifacts have much to say about the family and their place in an Egypt at a crossroads. "I don't think there is any classical influence in the painting of the shroud itself," she says, "but it is clear that Montsuef and his family are well aware of ideas from the Mediterranean world." She adds, "They are perhaps deliberately conservative in their choice of burial place and practices."

Maitland concurs, suggesting that the very location of the tomb shows that Aaemka and his parents were harkening back to ancient Egyptian times. "The family is choosing to be buried in what was by that time already a historic burial area," she says. "When the tomb was first built, Thebes was the capital of ancient Egypt. But by this time, that's in Alexandria. Everything is much more focused northward, on Greece and Rome." She believes this Egyptian family is trying to connect with their own very ancient funerary tradition.

Ultimately, what may be the most thought-provoking aspect of Aaemka's burial shroud is that, especially in the context of the tomb in which it was found, it helps to illustrate that by Roman times Egypt already had an ancient history of thousands of years. Says Maitland, "It's just so vast a time span." ■

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The intimidating karstic landscape of Asturias, in northern Spain, provided many places for guerrilla fighters to hide in the contentious years after Francisco Franco's victory in the Spanish Civil War in the late 1930s.

Landscape of Secrets

Archaeologists confront painful memories of the Spanish Civil War

by SAMIR S. PATEL

ASTURIAS IS SPAIN'S INNER KEEP. This region on the northern coast has a "moat," the Bay of Biscay, on one side, and the Cantabrian Mountains as its southern ramparts. The local culture, which dates back to the Paleolithic and took shape under Celtic influence in the Iron Age, has proven resistant to outside influences. The Romans subdued the Astures, as the province's people are called, but never truly conquered them. The Astures repulsed the Goths in the fourth century, and halted the Moorish invasion in the eighth. Asturias was the birthplace of the *Reconquista*, or the Christian reconquest of Islamic Spain. Even today, the province is an autonomous principality, and the heir to the Spanish throne is the "Prince of Asturias." Its mountains are the last habitat of Spain's brown bears. Asturias was not, however, spared from a threat that arrived from within. In the late 1930s, the Spanish Civil War divided cities, towns, and even families throughout the land. Today, concealed in this majestic, peaceful terrain is archaeological evidence of a unique aspect of the struggle as it played out here in the north—but resistance to unearthing these painful memories is profound.

ARCHAEOLOGIST ALFONSO FANJUL PERAZA hikes to a peak called Puerto Ventana as clouds flow through the valleys below. Above a wreath of purple wildflowers, the peak is crowned by a zigzag trench carved directly into the limestone, with a large dugout cave in the center. By Fanjul's reckoning, the dugout on Puerto Ventana is what he terms an "artificial battlefield cave." To gain insight into the nature and evolution of resistance in Asturias, he is working on a typology of the caves used both during the war and for decades afterward, as the repressive regime of Francisco Franco exercised its power and the remaining Republicans took to the mountains to escape its wrath. In archaeology, establishing a typology is a key step toward understanding a collection of sites or artifacts—a classification that distinguishes sites used in different ways and allows for direct comparisons. For Fanjul, it is an empirical, reasoned way to investigate a bloody, intimate conflict.

In Spain, the Civil War is a loaded subject for any kind of archaeology. To many, this history is inherently political and problematic, a threat to the delicate, collective amnesia that now cloaks Franco's brutal 36-year reign. "No one wants to know anything," Fanjul says. "It's like nothing happened." As

generations pass, however, some are beginning to recognize the value of this research. Fanjul, for his part, is documenting a landscape-wide battlefield and crafting a cultural history of the war and its aftermath in Asturias.

At the beginning of the war, Asturian workers, farmers, and miners successfully defended Puerto Ventana against Nationalist forces, though Asturias did eventually fall. In the aftermath, groups of guerrillas roamed the mountains, often using caves—natural and artificial—as headquarters and hideouts. Fanjul's interest rests on the largely untrained locals who evolved from determined soldiers to heroic guerrillas, only to become antsy fugitives and, finally, loathed bandits.

FOR ALL THE GLOBAL geopolitical factors that coalesced in the Spanish Civil War—sometimes considered the beginning of World War II—some of the first dominoes fell in Asturias. Following years of jockeying for dominance among political factions, in 1934 Asturian miners staged an armed revolt opposing the rise of right-wing elements in the government. The revolt was put down, viciously, by a relatively unknown general from Spanish Morocco—Francisco Franco Bahamonde. Tensions increased, and soon war became inevitable. The coup began in July 1936 as Franco's unified Nationalist movement, supported by Nazi Germany, fascist Italy, and Catholic militias, took on a loose and fractious Republican coalition of secularists, socialists, communists, and anarchists. After three years of pitched conflict, including summary executions and guerrilla warfare, the Nationalists prevailed in April 1939. Franco's autocratic rule lasted until his death in 1975, and only then was the country able to begin the transition to democracy.

The record of any conflict would seem to be a natural and significant subject for research, but apparently not this war in this place. Alfredo González-Ruibal, an archaeologist at Complutense University of Madrid, says, "There is not a strong tradition of historical archaeology in Spain." In his experience, which includes excavating camps, trenches, and mass graves from the war, people perceive this archaeology as a political act that favors the narrative of one side, usually the left, over that of the other. "There's this idea in Spanish society that with the Civil War—it is better not to touch it," he says. "It's something that is, let's say, polluting."

Archaeological research of Spanish Civil War sites only began around 1999 with the excavation of a Republican trench in Madrid and the exhumation of a mass grave, according to González-Ruibal. "This is not a coincidence," he says, explaining that this new interest represents a generational change—"the grandchildren of the war." Though the Spanish Civil War was extensively documented as it unfolded, it doesn't have a generally accepted master narrative—as World War II does, for example. Further, there has been little push, nationally or internationally, for restorative justice or truth commissions. "Archaeology is a window into a past we think we know, but

in many ways we don't," González-Ruibal says. "It can actually change the way the history of the war is told." But it will take time and cultural will, which is in short supply. The current, right-leaning Spanish government offers no support for historical archaeology. "It was difficult before," he says, "and now in some cases it is more or less impossible."

OVER CLOUDY ASTURIAN CIDER, ritually poured from above the bartender's head, Fanjul, whose doctoral work centered on an Iron Age hillfort, explains what happened when he proposed a side project of Civil War archaeology to his colleagues at the Autonomous University of Madrid: "They laughed." Even so, he pressed on, aspiring to a neutral approach, which has led him to turn down money to excavate mass grave sites. "When the archaeology is opening a grave, it's like opening a wound that has never healed." He adds, "The concept of trenches and mass graves as Spanish Civil War archaeology doesn't match the reality of the conflict." Fanjul's "Archaeology of Violence in Asturias" project began in 2012 as a way to understand a battlefield comprised of a beautiful, living landscape overlaid with conflict, violence, and resistance that spanned decades. He has excavated near Asturias' capital, Oviedo (see "House to House," page 53), but



Nationalist soldiers pass through hills during the Spanish Civil War. This professional, seasoned, Nazi-supported fighting force defeated the irregular Republican army, driving many of those fighters underground.

still has no official home for the finds, primarily personal items and military gear, for now meticulously catalogued and stored in his family's home in the village of Limanes.

AS NATIONALIST FORCES DESCENDED on Madrid, the army in Oviedo pledged allegiance to Franco and held the city against a Republican siege. When Nationalist reinforcements arrived via a coastal route, the fractious, largely untrained Republican army splintered. Some fighters went home, others escaped to the province of León and the plains of Castilla, and a few, including some of their leadership, fled

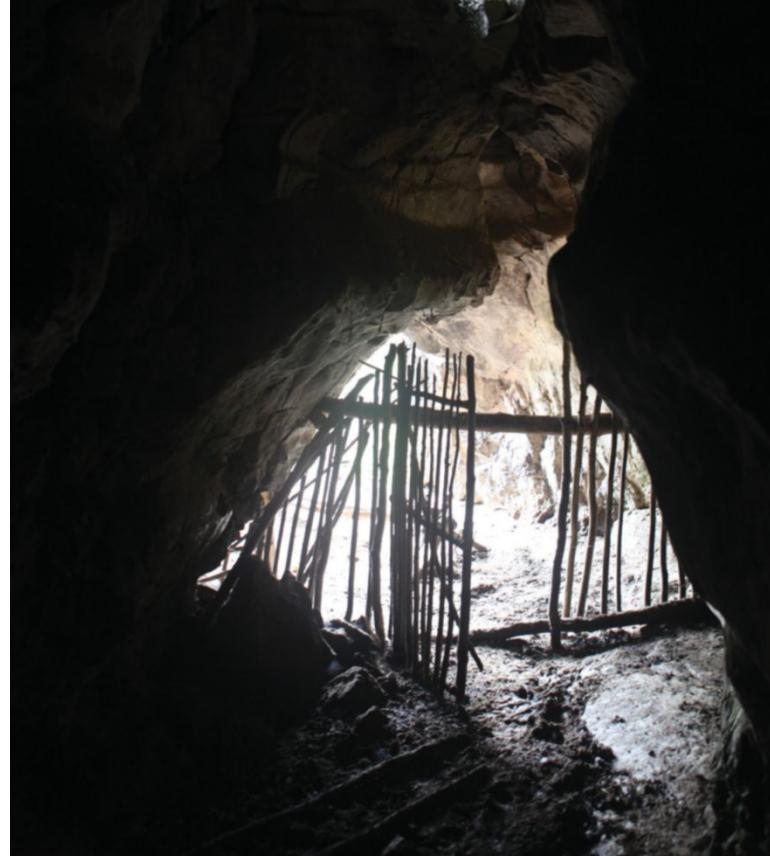
to France. Many hid out near the city or in the mountains with the intention of keeping up the fight.

The Asturian landscape is limestone karst riddled with caves and mines. Shepherds long used the caves, and still do. During the war some nearby Oviedo were used as bomb shelters. After the Siege of Oviedo, the caves then became a critical resource for the Republican resistance as they organized, fought, and hid. Some caves were occupied multiple times and the surface materials left behind are jumbled. Shepherds keep the caves clean, and the fugitives who used them had reason to hide their garbage. “It’s not so easy to do an archaeology of caves,” says Fanjul. Nonetheless he has found intact evidence in every cave he’s investigated.

Fanjul uses published accounts, police records, the writings of fugitives, and, critically, the knowledge of locals, to find Civil War caves. So far, he has documented 40 and been told of hundreds more. He has been able to track how the guerrilla war and local status of these fugitives evolved. In order to get to one such hiding spot, Fanjul walks a medieval footpath through a mountain forest in an area called Bueida. Around 100 feet above the path is what has been named the Cave of the Bones. It has a small shepherd’s fence topped with a goat skull at its entrance. It’s tidy and seems shallow at first, but hides deep



The Republican army was composed of a loose coalition of socialists, communists, and anarchists. Militias such as this one brought laborers, farmers, and miners into combat.



This cave, called the Cave of the Bones, as it was used by Republican rebels in Asturias shortly after the fall of the capital of Oviedo. It provided shelter—as it does today for shepherds—for fighters fleeing south into the plains.

reaches. The evidence of Republican use—in addition to the local accounts that led him there—was a hidden war-era stash of tuna and sardine tins in a smaller cave a dozen feet away through the brush. Because of its proximity to the footpath, use of this cave would have been about mobility, convenience, and observation of police patrols, rather than long-term shelter. Guerrilla bands were continually on the move to avoid detection. The cave was almost certainly in use shortly after the war, and was a “temporary refuge” in Fanjul’s typology. At this juncture, the fighters were lionized as heroes of the left. “The fugitives become part of the local folklore,” says Fanjul.

In these years, there may have been as many as 5,000 Republican fugitives hiding out in the area. Some were actively fighting, while others were just waiting for tempers to cool so they could hope for prison instead of execution. The term “guerrilla,” roughly translating to “little war,” comes from the Spanish resistance to the Napoleonic invasion in the early nineteenth century. It is a style of warfare built around small, mobile bands of fighters who use local support and knowledge to wear down larger, more organized forces. “In the nineteenth century, the Spanish became experts in guerrilla tactics,” says Fanjul. “And also counter-guerrilla.” The engagements that concern him, however, happened more than 100 years later.

Fanjul approaches another cave site, located on a mountain-side above a wide valley in an area called Entrago, southwest of Oviedo. A roadway sits beneath it. Looking up, one can see an odd sight in front of the cave—a woman in athletic gear dangling from a rope. She’s one of a pair of German climbers navigating



The Black Cave (top) and the Cave of the Fairies (above) were both used as hideouts for Republican fighters after the war—the former for attacking Nationalists in surrounding valleys and the latter simply for avoiding capture later.

the rock face above. This one, called Black Cave, is deep, dark, and cool, with high, vaulted ceilings. Two entrances face the valley, one that is hard to see from below, and another that has a half-height wall built across its mouth, framed with wooden posts. “This is interesting, because a shepherd doesn’t need a wall,” says Fanjul. This is a “headquarters” type cave, defensible, but too prominent for long-term occupation. From here, according to local accounts, a group of six men—familiar with the landscape and sightlines—controlled the valley and coordinated with groups in other valleys to defend the area. There’s little remaining evidence of their presence, but documents confirm that five died fighting here, and one escaped—likely taking a path much like the one the climbers are attempting.

At another headquarters cave, in what today are the more economically depressed mining valleys southeast of the capital, a similar story played out. It is called, fittingly, the Cave of the Fairies—or *xanas*, a particular breed of mythical Asturian mischief-makers, protectors of hidden places and dark secrets. This cave is harder and more dangerous to reach than the Black

Cave—more marginal, less centrally located, less strategically useful. To Fanjul, its characteristics are reflective of how things changed for the fugitives as time passed. It is said that 10 men hid in the cave, raiding local flocks of sheep, rather than attacking Nationalists. Local history says that they met the same fate as the men in the Black Cave—given up by people in a local village. “Their mistake was trust,” Fanjul says. “Always.”

YEAR BY YEAR, the numbers of guerrilla fighters in the mountains dwindled. Many were killed and many of those—like the men in the Black Cave and Cave of the Fairies—were denounced to police. There are several reasons that denunciations became the greatest risk to the guerrillas. Over time, as their losses mounted, the fugitives were no longer a viable fighting force. Nationalist social programs began to improve the long-damaged local economy, so people were no longer willing to suffer for ideology. They also simply wanted the hostilities to be over. The authorities offered tempting rewards. They also interrogated and threatened people. “The big mistake [the fugitives] committed was always contact with family,” Fanjul says. Guerrillas were dependent on family for supplies, which created the opportunity for both resentment and betrayal. Denunciations were often used, pointedly, to settle personal scores over illicit romances, debts, petty jealousies.

Once many of the most dedicated guerrilla fighters were killed, organization and coordination gave way to the individual drive to survive. The remaining fugitives became increasingly isolated—and desperate. “In a couple of years, they become bandits,” Fanjul says. “The region that had supported them on the front lines was against them in the mountains.” They stole, engaged in small-scale conflicts with shepherds, and generally went from folk heroes to shambling villains.

On the steep slope of a stream bank between two landholdings, not far from his home, beneath overhanging vegetation, Fanjul has located two small, coffin-like, debris-filled rooms carved into the riverbank. A neighbor tipped him off to this unnamed spot—the “artificial cave” type, by Fanjul’s classification. According to the neighbor, a single fugitive lived there in constant discomfort and fear for years after the war. His wife hid food for him in her laundry when she walked down to the stream



This small cave, carved out of a riverbank by an unknown man, was used as a solo hideout, probably long after the guerrilla war had waned. It is said that his wife secretly provided food when she went to the river to do laundry.

for washing. This is where this Republican fugitive story peters out—the fate of this particular man has been forgotten. But the fervor that drove the revolution, the battles, the betrayals, sieges, escapes, raids, and denunciations—that has not.

Fanjul still grapples with the academic questions, political problems, and personal impact of choosing to study the Spanish Civil War. “It is a difficult archaeology,” he says. “You have feelings. You have fear.” A full-time academic position has been elusive, and his excavations—he has additional ones planned for more traditional battlefield sites in the mountains—have been supported and staffed by institutions and students from the United States, England, and Ireland, but not Spain. In candid moments he’s frustrated that this can’t be treated as a quest for knowledge, free from politics and personal animus.

“There are a lot of taboos,” Fanjul says. “Perhaps we need one generation more to pass.”

To an outsider, the lingering effects of the conflict are hard to understand on anything but an intellectual—and ultimately inadequate—level. Historical amnesia comes with risks, but Spain today does have a functional democracy, a great deal of pride, a global reputation built on soccer, food, a rich culture, and support for the arts, rather than oppression and violence—all predicated on a determined choice to move forward. In this setting, questions about the past are gradually becoming a bit easier to ask, but the path of memory, Fanjul has found, remains a hard one to walk. ■

Samir S. Patel is deputy editor at Atlas Obscura.

House to House

THE FATE OF ASTURIAS in the early stages of the Spanish Civil War hinged on the capital of Oviedo. Encircled by high ground, Oviedo is not an easily defended city. What it lacked in strategic value—it had none—it made up for with symbolic value, as a place occupied by landowners and aristocrats in the center of a communist stronghold.

As Franco’s coup began, the Republican Army in Oviedo, led by Colonel Antonio Aranda Mata, pledged loyalty to the existing government. But once thousands of miners decamped to fight the Nationalists in Madrid, Aranda flipped and seized the city on behalf of the Nationalists. He executed many of the Republican fighters who remained and prepared for a siege.

These days, when Spanish Civil War archaeologist Alfonso Peraza Fanjul takes curious visitors to a hill north of the city called Naranco, he is able to point out the battle lines of the siege in the city below. “This,” he says, “is the start of the Second World War.” Aranda, known for his strategic acumen, fortified Naranco beforehand so his troops could lay down machine-gun fire almost anywhere in the city.

The Republicans had seized a smaller hill called La Miliciana, and during the fight a no-man’s-land between the peaks was covered with trenches—one of which Fanjul excavated in 2012.



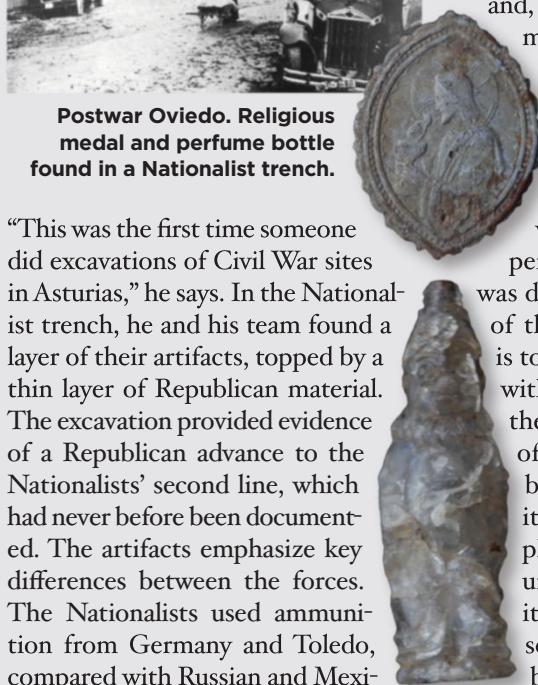
Postwar Oviedo. Religious medal and perfume bottle found in a Nationalist trench.

“This was the first time someone did excavations of Civil War sites in Asturias,” he says. In the Nationalist trench, he and his team found a layer of their artifacts, topped by a thin layer of Republican material. The excavation provided evidence of a Republican advance to the Nationalists’ second line, which had never before been documented. The artifacts emphasize key differences between the forces. The Nationalists used ammunition from Germany and Toledo, compared with Russian and Mexican material used by Republicans. The Nationalists were far from home, so they carried items of sentimental value, such as a perfume bottle and religious medal that were found. The Republicans, on the other hand, expected to return to their nearby vil-

lages, so their belongings—shoes and ammunition—are far more utilitarian.

From the peak of Naranco, Fanjul is able to point out neighborhoods where the fighting was street to street, block to block, house to house. “It was a battle without prisoners,” he says, and, in fact, in Oviedo’s charming medieval core, the scars of the battle are apparent on many of the buildings.

Those that lack bullet holes have been restored or built since the war. This core was Aranda’s stronghold. Eighty percent of the city outside of it was destroyed. A southern front line of the battle called the Campallin is today an idyllic park crisscrossed with irregular paths. Before the war the Campallin was a rough warren of a neighborhood, known for its brothels and bars, but in 1936, it became the most dangerous place in Europe. The narrow, unpredictable streets meant that it was too dangerous to fight in, so the Nationalists shelled it and burned it to the ground. The paths today follow the original street layout. Fanjul flips through a binder of photographs: charred buildings, sandbags, trenches where there are now sidewalk cafes. “In 100 years,” he says, “you will see archaeologists here, digging.” —SSP



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Firefighters watch a 2015 wildfire in northern California. Destructive blazes such as these were less common in the region in the ancient past.



LETTER FROM CALIFORNIA

THE ANCIENT ECOLOGY OF FIRE

Lessons emerge from the ways in which North American hunter-gatherers managed the landscape around them

by ANTONE PIERUCCI

The Quiroste Valley on California's central coast lies sheltered from the wind that blows in from the Pacific not two miles distant. Coniferous pine and redwood trees stand along the valley's rim and sweep down into the lowland where they compete with thickets of poison oak, buckeye, and coyote brush. This overgrown valley of some 200 acres was once the home of the Quiroste, a people who would not recognize their traditional lands today. When a Spanish expedition first visited the Quiroste's

village in 1769, the valley was full of meadows, hazel groves, and stretches of burned earth. The expedition chaplain, Juan Crespi, noted in his diary that the Quiroste hunter-gatherers were careful managers of the landscape. He wrote that they regularly burned the meadowlands "for a better yield of the grass seeds that they eat."

On public lands today, vegetation often goes unmanaged and, as a result, becomes the tinder that fuels wildfires. Nearly 7,000 blazes ravaged California in 2016 alone. But for the

Quiroste, fire was a powerful tool. They used it to manage a number of food resources, not just grass seeds. And by regularly setting controlled fires, the Quiroste also kept themselves safe from catastrophic wildfires, which feed on dense undergrowth. Recently, a group of archaeologists, ecologists, and members of a local Native American tribe set out to understand the history of this practice in the Quiroste Valley, now part of Año Nuevo State Park. "We had a lot of questions we wanted answers to," says University of

LETTER FROM CALIFORNIA



Northern California's Quiroste Valley today is largely overgrown, but early Spanish accounts describe a much more diverse landscape that was carefully tended to by the Quiroste people.

California, Berkeley, archaeologist Kent Lightfoot, one of the project's directors. "First and foremost we wanted to know if we could even identify the general pattern of human-made fires in the archaeological record. Then, if so, we wanted to know when they started, how widespread the practice was, and what its impact on the local ecosystem was." Identifying fires from the ancient past is difficult enough, but differentiating natural ones caused by lightning strikes from those deliberately set posed a serious problem for the researchers. Underlying the challenge was the fact that some scholars have argued that prescribed burns might not have been as widespread in the ancient past as they had become when the Spanish first arrived in California.

As a first step, the team studied how ecosystems on the central California coast have reacted to fires caused by lightning in the recent past. Ecosystems similar to the Quiroste Valley

take about 100 years to fully recover from a fire. The first plants to regrow are grasses and herbaceous plants. But grasslands are disturbance-dependent communities, meaning they can only persist with regular grazing, tillage, or burning that removes encroaching woody plants. Given no further disturbance, grasses don't last long, and within about 20 to 30 years most of the grassland is choked out by coyote brush and poison oak scrublands. Within a century, the vegetation reaches a mature stage, with most areas covered by scrublands and mixed conifer forests, and once again the landscape becomes fuel for wildfires.

This fire ecology research suggests that anthropogenic, or human-made, fires would create a landscape dominated by open, prairie-like vegetation, while those fires occurring naturally would result in a landscape of shrubs and conifer forests, such as the one in the present-day Quiroste Valley. Using

these expectations about natural fire cycles and the succession of plant species, the team hypothesized that they could differentiate between the general pattern of anthropogenic fires and that of natural ones in the archaeological record. "If people frequently burned the landscape in the past," says Lightfoot, "we would expect to find archaeobotanical and faunal remains that reflect widespread grasslands and fire-adapted trees."

Between 2007 and 2009, the team, which includes members of the Amah Mutsun Tribal Band, who trace their ancestry to the Quiroste, systematically surveyed the site of the large village first described by Crespi in 1769. Low-impact magnetometry helped them pinpoint potential fire pits and other human-made features in the ground, which they uncovered in a series of small excavation units. Under the direction of University of California, Berkeley, archaeologist Rob

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Cuthrell, soil samples from these excavations were sent to Berkeley for flotation analysis. This procedure separates small artifacts, faunal specimens, and botanical remains from the soil itself. The samples are placed in a bucket, which is then filled with water and agitated. The heavy soil sinks to the bottom and the rest floats to the top to be recovered and analyzed.

Cuthrell remembers his surprise as the ancient material was processed. "We found a lot of charred hazelnuts," he recalls, "which was odd because hazelnut shrubs aren't found much in the valley anymore." The team also

recovered grasses, tarweeds, and clover in even higher densities than hazelnuts. Perhaps most significant was the near-complete lack of charcoal from fir and pine trees, the species of trees that ought to be growing in abundance in the valley in the absence of regular fires. Instead, the researchers found that redwood—a fire-adapted tree that would have persisted well in an environment where frequent, low-intensity fires were set—was the primary fuel people at the site were using.

The animal bones from the site were also suggestive. The team uncovered a higher ratio of vole bones than bones of

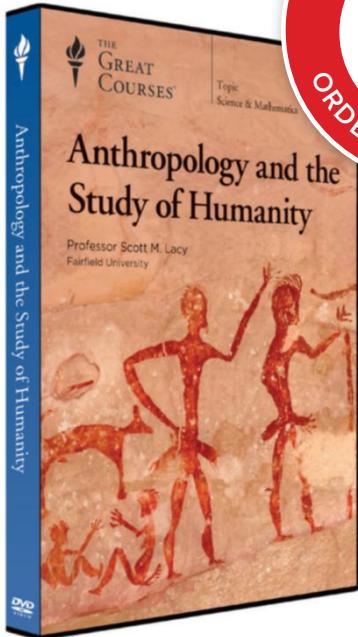
wood rats. As the name implies, wood rats are usually found in closed habitats such as woods, while voles prefer open grassland. More evidence came from phytoliths, microscopic silica structures produced by certain types of plants that remain in the soil long after the plants themselves have decayed. In and around the Quiroste Valley, the soil contains high ratios of grass phytoliths. "That indicates extensive grass cover in the valley for several hundred to thousands of years," says Cuthrell. With everything processed and analyzed, the research team felt confident that they had identified a long history of human-made fires in the valley.

Radiocarbon dating suggested that this practice dates back to at least A.D. 1000, when the site in the Quiroste Valley was first inhabited. Exactly when prescribed burning first came into use in the area outside the valley is difficult to say, but new excavations at older sites are already showing that the practice could have begun several hundred years earlier. Other studies along the western coast of North America have revealed a similar pattern of human-made fires. A project conducted by the U.S. National Park Service and Simon Fraser University in British Columbia revealed that tribes along the coast of Washington State used fire to maintain productive prairie land starting at least 2,000 years ago. Now the evidence from the Quiroste Valley and other sites farther north, near San Francisco, shows that this practice of landscape management was far more extensive than previously believed. "It certainly suggests," says Lightfoot, "that it was a fairly widespread practice going back to ancient times."

The implications of hunter-gatherers using this sort of landscape management are far-reaching. "I think a key point is that they were forward-thinking in their interactions



Members of the research team retrieve a pollen and carbon sample to help determine whether prehistoric people set controlled fires in the ancient past.



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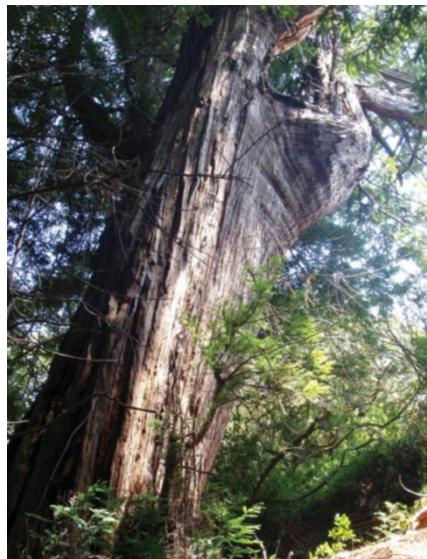
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LETTER FROM CALIFORNIA

(continued from page 58)

with the environment," says Lightfoot. Studies of other peoples who also used fire for resource management suggest that the social organizations employed in these practices varied widely. On one end of the spectrum are the aboriginal people of western Australia, who set low-intensity fires to hunt burrowing animals. Requiring relatively little coordination among members of a tribe, in cases like these, fires were set primarily as a means of achieving an immediate goal: flushing out the burrowing rodents. On the other end of the spectrum, setting large-scale fires would have been a community-level practice that would have taken a great deal of coordination.

"I think the Quiroste fall somewhere in the middle," says Lightfoot. "Creating a coastal grassland habitat



Redwood trees such as this one, which are well adapted to frequent fires, dominated wood samples from the valley.

over many decades or centuries, as has been documented, would have

required a regular pattern of burning on the order of every few years. This indicates that there was some level of consistency in their management practices within the broader society." But Lightfoot and other members of the team believe the practice was a local one. "I don't think coordination of land management happened on a regional scale," says Cuthrell, "but rather on the scale of the tribe or even groups smaller than the tribe. Tribes had small populations and small territories, so this coordination probably happened on scales that most people would think of as local."

The end result, though, was wide reaching. "The whole area would have been a garden to them," says California State Parks archaeologist Mark Hylkema, who is also participating in the ongoing project. By creating patchworks of recently burned

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LETTER FROM CALIFORNIA

land and stands of herbs and berry-producing plants, the Quiroste would have improved the availability of nuts, greens, and fruits as well as grass seeds. As an added benefit, this mosaic of grassland and groves of trees and bushes would have attracted wild game.

The woods threatened to encroach on the valley as soon as the Spanish prohibited the practice of prescribed burning in the late eighteenth century. However, extensive cattle grazing under Mexican and then American control kept the grasslands in a sort of artificial stasis for the next

few centuries. Ironically, the landscape then underwent its most dramatic transformation, when the valley entered the California State Parks system. The famous watchword of “Take nothing but photos, and leave nothing but footprints” that governs much of American conservation philosophy has resulted in landscapes dominated by mature vegetation that is prone to catastrophic wildfires. “It sounds nice, but in reality it just doesn’t work,” admits Hylkema.

Valentin Lopez, tribal chairman of the Amah Mutsun Tribal Band, takes that criticism one step further, explain-

ing that many modern conservation practices are “completely contrary to Native American stewardship.” The archaeological evidence has borne out this point, revealing a millennium-long tradition of direct human impact on the landscape, one that created a symbiotic relationship between humans and nature. People received nourishment from the plants their land management practices had encouraged to grow, and the environment, without the accumulation of piles of dried and dead plant material, didn’t feed the type of devastating wildfires that would leave the land completely unusable.

For the people who tended the land for generations, this relationship went beyond mere gathering for the sake of sustenance. “Native American stewardship was all about having a relationship with Mother Earth and the plants,” says Lopez. “It was all a part of the tribe’s spirituality.” Today, the Amah Mutsun Tribal Band is able to sustain that kind of relationship with the Quiroste Valley. Starting in 2014, the newly created Amah Mutsun Land Trust began to implement the sort of land management practices in the valley that the archaeological research had revealed. Although prescribed burning in the Quiroste Valley is not yet feasible due to the severe overgrowth, members of the tribe have begun manually clearing strips of land and have reintroduced native plant species. These cleared areas, with the occasional berry-producing bush growing up from native grass, serve several ends. They increase the biodiversity of public lands, provide a supply of native ceremonial plants for the Amah Mutsun to harvest, and create much-needed fire breaks in the otherwise fuel-choked land. Acre by acre, the tribe is continuing a millennia-long practice in an effort to bring the landscape of the Quiroste Valley, once again, back into balance. ■



Members of the Amah Mutsun Tribal Band (top) remove undergrowth from the Quiroste Valley. Tribal member Abran Lopez (above) chops down nonnative hemlock.

Antone Pierucci is a freelance writer in Stockton, California.

DISPATCHES

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THE RICHARD C. MACDONALD ILIAD ENDOWMENT FOR ARCHAEOLOGICAL RESEARCH



Göksel Sazci

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Director of archaeological research at the site of Maydos-Kilistepe

This annual \$20,000 grant supports scholars working on the site of ancient Troy or geographic areas and time periods that give context to an understanding of ancient Troy.

Maydos, a large settlement on the northern shore of the Hellespont, bears archaeological resemblances to Troy. Sazci is interested in the transition from the Early to Middle Bronze Age there and will continue excavations, prepare a detailed topographic map, and initiate an archaeobotanical research program examining environmental factors which may have contributed to Troy's decline.

ELIZABETH BARTMAN MUSEUM INTERNSHIP AWARDS



Katherine Burge

Ph.D. candidate, Art and Archaeology of the Mediterranean World,
University of Pennsylvania

Burge will intern at the University of Pennsylvania Museum of Archaeology and Anthropology, assisting curators developing a new permanent exhibition, the Middle East Gallery, set to open in spring 2018. The Penn Museum's Near Eastern collection is one of the most extensive in the United States, and the project will integrate artifacts, archival data, and current research to show how aspects of modern life developed first in the ancient Near East.



Elifgül Doğan

M.A. candidate, Cultural Heritage Management and Museum Studies,
Koç University, Istanbul, Turkey

Doğan will intern at the University College London Petrie Museum of Egyptian Archaeology. She will conduct collections management research on human remains, assist with the development of an exhibit on research methods, and prepare ethical guidelines and procedures for a related display. Doğan's internship experience will inform her M.A. thesis, which she hopes will contribute to establishing legislation in Turkey to deal with archaeological human remains and associated research practices.



Rachel Vyukal

Ph.D. candidate, Anthropology, University of Tennessee, Knoxville

Vyukal will intern at the Agora Records Office of the American School of Classical Studies at Athens, Greece, where all artifacts and records from the ongoing decades-long Agora excavation are kept. The Agora was occupied from at least the Bronze Age onward, and was the economic, social, and political center of Athens in the classical period. Vyukal will gain experience in collections management, archiving, and best practices in long-term curation.

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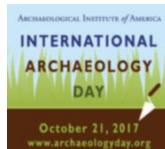
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The AIA thanks Kathleen and David Boochever for their generosity in establishing this grant.

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Sometime between 1926 and 1929, a soldier at Camp Lincoln lost the bronze disc from the collar of his service coat that identified him as part of the Eighth Illinois National Guard. At the time the disc fell to the ground, it's likely that the soldier was practicing his marksmanship, says Illinois State Military Museum curator Bill Lear. The area of the camp where the disc was unearthed during construction of a new bridge is known to have been the location of the rifle range and training ground, and expended rifle shells were found nearby. Yet, while the story of this individual soldier's life is lost—as are the stories of hundreds of millions of soldiers throughout history—the story of his regiment is not. The Eighth Illinois was also, for a time, the 370th Infantry, a unit of African-American officers and enlisted men who fought on the battlefields of the Western Front in World War I.

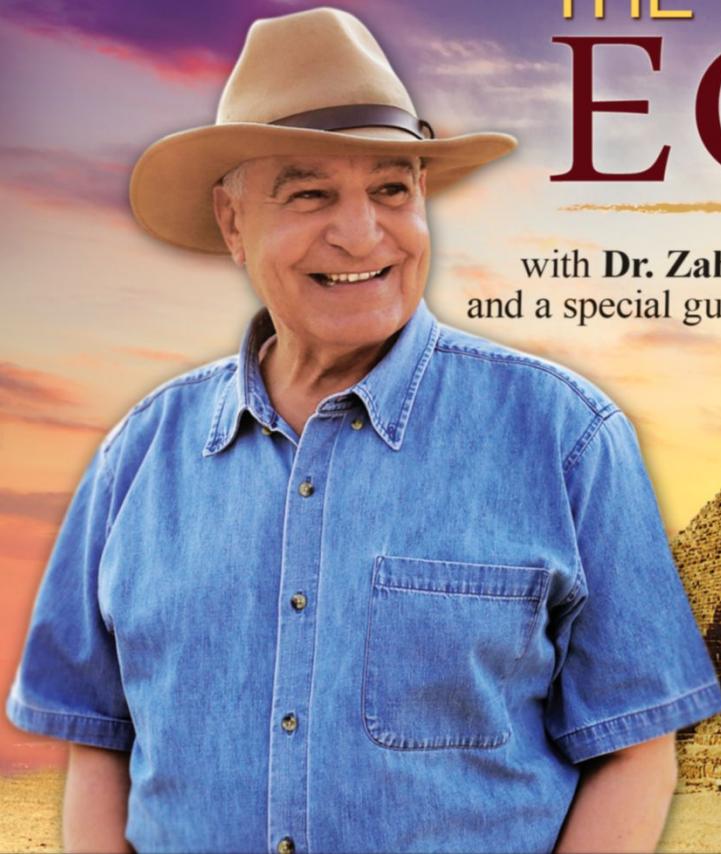
About 10,000 African-American National Guardsmen served in World War I. The 370th arrived in France in April 1918, and was reassigned to the French army and equipped with French weapons, uniforms, and rations. The soldiers of the 370th fought for 10 months, earning 71 individual Croix de Guerre medals, 21 Distinguished Service Crosses, one Distinguished Service Medal, and numerous other military honors. As members of a segregated unit not allowed to fight alongside their white compatriots, "these men endured hardships that other soldiers wouldn't have," says Lear. "They stuck it out and served their country for many reasons. I would like to think that a sense of duty, honor, loyalty, and love of country had something to do with it."

WHAT IS IT
Type II collar disc
CULTURE
United States
DATE
1926-1937
MATERIAL
Gilded copper
FOUND
Camp Lincoln, Illinois
DIMENSIONS
1 inch in diameter



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