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**Cover:** A side-scan sonar image of HMS Erebus, the flagship of the ill-fated 1845 Sir John Franklin expedition in search of a Northwest Passage. Missing for almost 170 years in the Canadian Arctic, the wreck was first detected by a side-scan sonar towed from the Parks Canada research vessel Investigator on September 2, 2014 after six field seasons of survey.

**Credit:** Parks Canada

View more images of our feature articles online at www.archaeologicalconservancy.org
The Fight For Florida

One of the most interesting and intriguing spheres of North American archaeology concerns the machinations of the great powers of Europe—Britain, France, and Spain—for dominance of the newly discovered continent. All three were establishing fortifications and settlements on coastal America, and their success or failure determined the course of American history. In this issue of American Archaeology (see “When France Tried To Colonize Florida,” page 32) we take a look at the 16th-century struggle between France and Spain for control of Florida.

In 1562, the French built Charlesfort on Parris Island, South Carolina, the first European settlement north of Mexico. Two years later, the French moved to Fort Caroline near the mouth of the St. John’s River, by Jacksonville, Florida. The Spanish countered by establishing St. Augustine in 1565, and attacking and defeating the French.

Today, archaeologists are hard at work trying to locate, preserve, and understand the remains of this conflict. Charlesfort and the successor Spanish colony of St. Elena are preserved on the Parris Island Marine Base, and archaeologists are gleaning much new information about these early European settlements. St. Augustine is a thriving resort city with one of the nation’s most active urban archaeology programs, where its earliest history is being coaxed from 450 years of development.

Fort Caroline is still lost, but archaeologists are searching for its remains and its story. The ships that went down in the first European naval engagement in the United States are also lost. Archaeologists on the land and in the water are now using the latest technology to find the missing Fort Caroline and the missing sunken ships. It can be a long and tedious process, but archaeologists are a determined lot, and dramatic results may be just around the corner.
Letters

The Importance Of Old Vero Man

Congratulations on the great Spring 2015 issue. I found every article both useful and fascinating. Of particular interest to me was Tamara Stewart’s news article “Archaeologists Confirm Controversial Findings” regarding the Old Vero Man Site. This important work has gotten little publicity outside of the Vero Beach area.

Stewart didn’t mention the so-called Old Vero Mammoth Plaque—an approximately 18-inch long mammoth bone fragment containing engraved figures—including a depiction of as fine a mammoth as any found on examples from the Solutrean cultures of Europe. Found by an amateur fossil hunter several years ago, the antiquity of the artwork has been authenticated by researchers at the University of Florida and the Smithsonian Institution.

Thanks to the work of James Adovasio of Mercyhurst Archaeological Institute and his colleagues, however, it is apparent that at least one as yet unnamed culture inhabited the Eastern U.S. at least a thousand years before the arrival of Clovis technology to the region. And with no Clovis artifacts reported from the Old Vero Man Site, it is very possible that the mammoth bone fragment had been engraved by those earlier people, long before Clovis big game hunters were butchering megafauna here in North America. With no sites on the West Coast of the U.S. dating any earlier than 13,000 years old, I think the results of the new excavations of Vero Beach puts the final nail in the coffin of the Pacific Coastal migration hypothesis as a plausible explanation of the initial settlement of the Americas.

Bruce J. Kennedy
Naples, Florida

Editor’s Corner

In May of 1845 Sir John Franklin set sail from England. Franklin was in command of two ships, HMS Erebus and HMS Terror, and 129 men. His task was to find a navigable route through the unmapped portion of the Northwest Passage—the route through the Canadian Arctic by which a vessel could travel from the Atlantic Ocean to the Pacific.

This was no easy job, but, having led two overland Arctic expeditions, Franklin appeared to be the man for it. He had two large and sturdy vessels at his disposal that were well-stocked for the long journey. But as well prepared as he seemed to be, Franklin and his men met with tragedy. Both ships became icebound and eventually sank.

Since 1848, there have been numerous unsuccessful attempts to find the shipwrecks. But then, in 2014, a Canadian team located the remains of Erebus. Our feature article “Investigating A Maritime Mystery” (see page 12) tells the story of how the wreck was discovered and the challenges of excavating it. (The Terror is still lost.)

Divers from Parks Canada, the government agency responsible for locating and protecting the Erebus and Terror wrecks, teamed with their counterparts from the Royal Canadian Navy to dive under six feet of ice to reach the wreck. Their investigation of the wreck could provide clues as to what happened to the Franklin expedition.

Sending Letters to American Archaeology

American Archaeology welcomes your letters.
Write to us at 1717 Girard Blvd. NE, Albuquerque, NM 87106, or send us e-mail at tacmag@nm.net.

We reserve the right to edit and publish letters in the magazine’s Letters department as space permits. Please include your name, address, and telephone number with all correspondence, including e-mail messages.
Why Save Archaeological Sites?
The ancient people of North America left virtually no written records of their cultures. Clues that might someday solve the mysteries of prehistoric America are still missing, and when a ruin is destroyed by looters, or leveled for a shopping center, precious information is lost. By permanently preserving endangered ruins, we make sure they will be here for future generations to study and enjoy.

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American Archaeology is the only popular magazine devoted to presenting the rich diversity of archaeology in the Americas. The purpose of the magazine is to help readers appreciate and understand the archaeological wonders available to them, and to raise their awareness of the destruction of our cultural heritage. By sharing new discoveries, research, and activities in an enjoyable and informative way, we hope we can make learning about ancient America as exciting as it is essential.

How to Say Hello: By mail: The Archaeological Conservancy, 1717 Girard Boulevard NE, Albuquerque, NM 87106; by phone: (505) 266-1540; by e-mail: mbawaya@americanarchaeology.com; or visit our Web site: www.americanarchaeology.org

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NEW EXHIBITS

National Museum of the American Indian
New York, N.Y.—The spectacular, permanent exhibit “Infinity of Nations: Art and History in the Collections of the National Museum of the American Indian” showcases some 700 works of art from throughout pre-Columbian North, Central, and South America, demonstrating the breadth of the museum’s renowned collection and highlighting the historic importance of many of these iconic objects. Chosen to illustrate the geographic and chronological scope of the museum’s collection, the exhibit opens with a display of headdresses. Signifying the sovereignty of Native nations, these works include a magnificent macaw-and-heron-feather ceremonial headdress. (212) 514-3700, www.nmai.si.edu/explore/exhibitions/newyork (Long-term exhibit)

Museum of Western Colorado
Grand Junction, Colo.—The colorful new exhibit “Diné Bits’aa Bahawe: The Story of Navajo Baskets” explores Navajo basketry and traces early Diné history and how the first baskets were made, explaining the intricate symbolism of the basket designs and their meanings. Other Diné art forms will also be featured, including Navajo looms and rugs, exquisite silver jewelry, and historic woven artifacts. (970) 242-0971, www.museumofwesternco.com/exhibits (Through October 17)

Museum of Indian Arts & Culture
Santa Fe, N.M. — During 2007 and 2008, flying at alarmingly low altitudes and slow speeds, Adriel Heisey leaned out the door of his light plane and, holding his camera with both hands, re-photographed some of the Southwest’s most significant archaeological sites that Charles Lindbergh and his new bride Anne photographed in 1929. For the first time, large format prints of Heisey’s stunning aerial images will be paired directly with the Lindberghs’ images in the new exhibit “Oblique Views: Archaeology, Photography, and Time.” Heisey was commissioned to recreate current aerial photographs corresponding to their perspective and time of year and day, graphically displaying changes that have taken place at these important places over the last 80 years. The exhibit pairs large-scale then-and-now photographs, revealing the layers of civilization that have shaped the American Southwest from a vantage point few of us will ever experience in person. (505) 476-1269, www.indianartsandculture.org (Opening October 25, 2015)

CONFERENCES, LECTURES & FESTIVALS

Iroquois Indian Festival
September 5-6, Howes Cave, N.Y. This annual festival includes Sky Dancers from the Six Nations Reserve in Ontario, who perform traditional Iroquois social dances, and an all Iroquois Indian Art Market showcasing both traditional and contemporary arts. The children’s area features arts and crafts activities such as beadwork and cornhusk doll making. There will also be traditional Iroquois storytelling and foods, and demonstrations of early technologies such as flintknapping. (518) 296-8949, www.iroquoismuseum.org
Three Trails Conference 2015: All Trails Lead to Santa Fe
September 17-20, Convention Center, Santa Fe, N.M.
Co-sponsored by El Camino Real de Tierra Adentro Trail Association, the Old Spanish Trail Association, and the Santa Fe Trail Association, this groundbreaking conference features paper presentations and field trips to local trail-related sites, providing an opportunity to share information and learn about new ways of evaluating the trails and their impact on our national and international identity. Environmental and sociological aspects of the trails will be explored, as well as their history and connections. www.3trailsconferencesantafe.org

Annual Harvest Festival & Pow Wow

Jornada Mogollon Archaeology Conference
October 9-10, Museum of Archaeology, University of Texas at El Paso. Archaeologists working in the Jornada Branch of the Mogollon culture area of the American Southwest will present their recent research. The Jornada Mogollon region extends from southern New Mexico and southwest Texas to northern Mexico. Contact George Maloof, at (915) 755-4332, MaloofGO@elpasotexas.gov, www.elpasotexas.gov/arch_museum

Arizona Archaeological Council Fall Conference And Symposium
November 5-7, Sedona Poco Diablo Resort, Sedona, Ariz. Sponsored by the Arizona Archaeological Council and Verde Valley Archaeology Center, the Fall Conference includes an opening reception on Thursday, and paper and poster presentations on Friday related to the theme “Getting to the Point: Projectile Point Analysis and Typology in the American Southwest.” Projectile points are used as key cultural and chronological indicators, yet there is little current consensus regarding proper point analysis, how to assign points to existing typological styles, or what is required to identify new types or styles. (928) 203-5923, www.verdevalleyarchaeology.org/symposium

Midwest Archaeological Conference
November 5-7, Hyatt Regency Milwaukee Hotel, Wis. A welcome reception will be held Thursday, with a behind-the-scenes tour of the Milwaukee Public Museum. Posters, symposia, and general sessions will take place Friday and Saturday, with a Saturday night banquet and lecture. Contact Robert Jeske at Jeske@uwm.edu, or go to www.midwestarchaeology.org

New Mexico Archaeological Fall Conference
November 14, Hibben Center, University of New Mexico, Albuquerque. The fall conference will explore the theme “Fire and Archaeology in the Southwest,” seeking to gain a better understanding of past and contemporary fires as part of climate change adaptation planning and scenario planning with ethnographic considerations of human-uses of fire in the ancient and modern Southwest. Tom Swetnam of the Laboratory of Tree-Ring Research at the University of Arizona will give a public lecture on Friday evening, November 13. Contact Amalia Kenward at akenward@unm.edu, or go to www.nmacweb.org

Southeastern Archaeological Conference
November 18-21, Doubletree by Hilton Downtown Nashville, Tenn. This year’s conference features paper and poster presentations, guided tours to local sites, and a Friday night dance in the hotel ballroom. www.southeasternarchaeology.org
Jamestown Bodies Identified

Researchers believe they were four of the colony’s founders.

Jamestown archaeologists and scientists from the Smithsonian’s National Museum of Natural History recently announced the identities of four founders of the first permanent English colony in the New World whose unmarked graves were discovered beneath the chancel of the 1608 church where Pocahontas and John Rolfe were married.

According to William Kelso, director of archaeology at Jamestown Rediscovery Foundation, the graves and the artifacts discovered with them underscore the importance of religion to the colonists at Jamestown. “Even though they were living on the far edge of the British Empire and were under tremendous stress, they were still adhering to the practices of the church and had formal burials for people who rated.”

The discoveries also raise questions about the role of Catholicism in the colony at a time when Catholics in England were persecuted for practicing their religion.

The men were identified as the Rev. Robert Hunt, the first Anglican minister of Jamestown; Capt. Gabriel Archer, secretary of the colony; Sir Ferdinando Wainman, a high ranking officer who was master of the ordnance and in charge of the horse troops; and Captain William West, who was killed in a fight with Indians in 1610 and brought back to Jamestown for burial.

Hunt and Archer were among the first settlers who arrived at Jamestown in 1607. Wainman and West arrived at Jamestown in 1610. They all died between 1608 and 1610.

A silver reliquary, a sacred object normally associated with Catholicism, discovered on top of Archer’s hexagon-shaped coffin may suggest that he was a secret Catholic, Kelso says. The small box, engraved with the mysterious letter “M,” contains seven bone shards and a tiny broken lead ampulla that may have contained holy water, oil, or blood.

Kelso was surprised that Archer was buried with his head to the east, in the same position as Hunt. That orientation is usually reserved for ministers. He wonders if Archer was a Catholic priest, and if he was trying to spread Catholicism to Jamestown and the New World. He notes that Archer was the son of prosperous, but recusant Catholics who were outlawed for refusing to swear allegiance to the Protestant Church of England. Archaeologists have discovered rosary beads and crucifixes elsewhere at the site, which suggest the presence of other Catholics.

Although the graves were discovered in 2010 when the church was excavated, they were not investigated until 2013. Since then, the remains have been analyzed by the noted forensic anthropologist Douglas Owsley and his team at the Smithsonian.

—Paula Neely

Researchers excavate the unmarked graves in 2013.
Earlier this year a team of archaeologists discovered human footprints in the sediments on Calvert Island in British Columbia, Canada. Radiocarbon analysis on a piece of charcoal found in one of the footprints dates it to approximately 13,200 years ago, indicating that they’re the oldest human footprints found in North America. A 14,500-year-old footprint was discovered at Monte Verde, in Chile.

“The date on the footprints is very early for the west coast of Canada,” says Duncan McLaren, an archaeologist with the Hakai Institute and the University of Victoria, who led the excavation. McLaren and his colleagues have been investigating late Pleistocene and early Holocene archaeological sites along the coast of Calvert Island. They were digging there last year when, as their season was about to end, the team found the first footprint at the bottom of a test pit below the tideline on the shore.

They took a quick photo and filled in the pit, then returned in April 2015 for a more thorough examination. “We were all very excited when we returned in 2015 and found an additional 12 discernible footprints,” McLaren says. They came in three sizes. “The larger two sets have clear toe imprints. The smallest set may have been wearing some kind of shoe, as there are no clear toe marks.”

The footprints were all near a hearth, and the archaeologists surmise that, while a group of Paleo-Indians gathered around a fire, their feet sank into the soft clay soil by the sea. Sometime later dark brown sand filled in these impressions, forming the footprints that McLaren and his colleagues discovered.

The researchers hope to confirm the single radiocarbon date. “If we can duplicate these results, it will provide evidence that early peoples in the Americas were using watercraft and likely gaining their subsistence from marine sources,” he says. “This finding may also provide evidence for a coastal migration route into the Americas at the end of the last ice age.”

McLaren has been studying sea level changes since the end of the last Ice Age along Canada’s Pacific Coast, finding a relatively stable coastal environment at Calvert Island that was suitable for human occupation. That stability contributed to long-term human habitation. —Charles Poling
Kennewick Man DNA Indicates Native American Ancestry

Study shows the ancient remains are most closely related to the Coleville tribe.

Researchers in Denmark who analyzed ancient DNA from Kennewick Man recently reported that he shares ancestry with Native Americans from North America. The research, led by geneticist Eske Willerslev, was conducted at the Centre for GeoGenetics at the University of Copenhagen, a world leader in ancient DNA analysis.

The researchers obtained a metacarpal bone specimen from the 8,500-year-old remains to sequence his genome, and then compared it to genome data worldwide. According to the study, they found that “Kennewick Man is closer to modern Native Americans than to any other population worldwide.”

After Kennewick Man was discovered in 1996, local tribes tried to claim the remains for reburial under the Native American Graves Protection and Repatriation Act (NAGPRA), but scientists filed a lawsuit to stop them. In 2004, a federal appeals court ruled that the skeleton was so old that it was impossible to link it to any existing tribe and awarded the right to study it to a team of scientists.

Members of the Colville, one of the five confederated tribes that tried to claim Kennewick Man, provided saliva for Willerslev’s study. Researchers used DNA from two Colville members, as well as from Native Americans from other countries in the Americas. “Identifying which modern Native American groups are most closely related to Kennewick Man is not possible at this time as our comparative DNA database of modern peoples is limited, particularly for Native-American groups in the United States,” Willerslev and his colleagues wrote. “However, among the groups for which we have sufficient genomic data, we find that the Colville… show close affinities to that individual or at least to the population to which he belonged.”

“We’ve always known that he is Native American,” says Jackie Cook, repatriation specialist for the Colville Confederated Tribes. James Chatters, the first archaeologist who examined the ancient skeleton, says the number of individuals sampled is not sufficient and the results have not been replicated. “It’s fuzzy. I think they have over-reached science and are meddling with politics.”

Cook says their claim for the remains is ongoing. They are “in consultation” with the Corps of Engineers and will pursue it through the NAGPRA process. Michael Coffey, a spokesperson for the Corps of Engineers, confirms that they are having conversations with the tribes about the way forward. Tribes claiming Kennewick Man would need to demonstrate Native American affiliation, which the study would help support, she says. They would also need to demonstrate cultural affiliation through a preponderance of evidence based on geographic, kinship, biological, archaeological, linguistic, folklore, oral traditions, and other historical evidence.

— Paula Neely
DNA Studies Tell Of Early Migration

Both studies report a connection between early Americans and Australasians.

The area around the confluence of the Silverthrone and Klinaklini Glaciers in southwestern British Columbia provides a glimpse into how the terrain traveled by Native Americans in Pleistocene times may have appeared.

Two unrelated DNA studies of Native American genomes released in July revealed evidence of Australasian heritage, but account for it in different ways. A study published in Nature by author David Reich of Harvard Medical School and his colleagues theorizes that the Australasian signal comes from a mysterious Population Y that had long-since mixed with the First Americans by the time they reached Amazonia. Researchers detected it there among present and ancient populations.

The other study, led by Eske Willerslev and published in Science, looked more broadly on the peopling of North America. It found evidence of a single migration for all Native Americans through the Beringia region no earlier than 23,000 years ago. The study also detected a weak Australasian genetic signal.

“We found that in Amazonian groups there’s a special genetic link with people you might call Australasians,” says researcher Pontus Skoglund of Harvard Medical School, who participated in the Nature study. “That suggests that the founding populations of Native Americans were more diverse than we thought before.” The findings surprised Skoglund, who hadn’t gone looking for the Australasian link. “I was sitting there looking at the data on my screen and suddenly I see this affinity to South Americans with this population. It was a wild sensation.”

The link to the Australasians occurred “tens of thousands of years ago,” Skoglund says. “There must have been multiple pulses of people. It can be distinct migrations of populations or a more fuzzy picture, where they diffuse into the Americas.” But they all came over the Bering Land Bridge.

The Science study suggests the Australasian component appeared after the initial migration wave, perhaps from a much later gene flow out of Asia. Co-author David Meltzer of Southern Methodist University says it might have been a long, drawn-out process, “a steady dribbling of population from Asia. At what point is it two separate migrations or one population sending off multiple daughter populations?”

“Both models make sense,” says Meltzer. “The good news is, this is not an irresolvable problem. We just need to study ancient genomes that are pre-Clovis in age. If the signal is there, then David is right. If it’s not there, then we’re right” that it came later.

The new methods of genetic research are creating “a sea change in the way archaeologists look at population history and who’s related to whom,” Meltzer says. “We can actually tell now. It used to be we were just looking at rocks through time.”

—Charles Poling
Research Suggests
Anasazi Used Tobacco

Wild tobacco identified inside 1,200-year-old fiber bundles from Arizona cave.

Recent DNA analysis of 10 fiber bundles recovered in the late 1950s suggests that the Anasazi sucked tobacco that was in the bundles. The bundles, known as quids, consist of wild tobacco wrapped in yucca fibers. The researchers theorize that the potent tobacco-filled quids were a recreational stimulant.

Hundreds of quids were found during an excavation at Antelope Cave in northwestern Arizona, and more than 300 of them have been sitting in storage at UCLA’s Fowler Museum ever since. Keith Johnson, a professor emeritus at California State University, began to analyze the quids as part of a broader study of materials recovered from Antelope Cave, and he found most of them contained tiny plant fragments. Johnson then asked archaeobotanist Karen Adams, a research associate at Crow Canyon Archaeological Center, to analyze some of them.

“We speculated that the quids might contain tobacco when we initially catalogued them, as many of them had inclusions of tiny plant fragments,” says Johnson. Twenty-seven of 30 quids examined contained various pieces of a wild tobacco plant that still grows in the area today. Adams identified the tobacco by comparing it to wild plant specimens catalogued in the University of Arizona Herbarium, then Terence Murphy of University of California, Davis undertook DNA analysis of the quid fibers to confirm they were from yucca plants. Their research was published in the Journal of Field Archaeology. Fewer than 10 percent of the quids originally recovered from the cave have been analyzed.

“Hardly anyone has looked at the interior contents of quids and identified them,” says Adams. “Others have mentioned things inside quids, but didn’t go any further in trying to figure out what they were. Our research is significant because it is among the first to use DNA to identify ancient well-preserved plant parts in the U.S. Southwest. Terry brought that skill to the table.”

Quids have been found in archaeological sites across the American Southwest, often with visible teeth marks. While evidence indicates that human occupation of Antelope Cave dates back to Archaic times, the greatest use appears to have been by the later Virgin branch of the Anasazi culture between A.D. 1 and 1000. Two of Antelope Cave’s radiocarbon dates come from quids, giving dates of A.D. 680-890 and 710-960. Other cultural material recovered from the cave such as arrows, basketry, and feathered ornaments have provided important information about the ancient Anasazi, although notions about the use of the hundreds of quids recovered from the cave and across the Southwest have remained speculative until now. —Tamara Stewart
Investigating A Maritime Mystery

In 1845 HMS Erebus and HMS Terror set sail from England to find a navigable route through the Northwest Passage. Both ships disappeared in the Canadian Arctic, and their whereabouts had been unknown for decades. The recent discovery and investigation of the Erebus wreck could reveal information about this ill-fated voyage.

By Tom Koppel

“That’s it. That’s it,” shouted underwater archaeologist Ryan Harris as the clear outline of a sunken ship suddenly came across his screen in September 2014. His crewmates in the wheelhouse of the Canadian survey boat Investigator, which was towing a side-scan sonar, began to hug and high-five each other. Given its location near King William Island in the Canadian Arctic, the wreck had to be either HMS Erebus or HMS Terror, two iconic 19th-century British ships. This was the sixth summer the team had been surveying the ocean floor in search of the two shipwrecks. It was a euphoric moment, “like winning the Stanley Cup” in hockey, recalls Harris, who has led those searches.

He and his colleagues from Parks Canada, the government agency responsible for finding and protecting the shipwrecks because they’re a national historic site, soon deployed a small, remotely-operated vehicle to give them video images. Multi-beam sonar from an accompanying Canadian Hydrographic Service boat produced even clearer 3-D representations. They showed that the dimensions and design details of the shipwreck matched those of Erebus.

Harris and Jonathan Moore, another underwater archaeologist with Parks Canada, dove the shipwreck for a closer inspection. It was “exhilarating and fascinating,” says Moore, “just the sheer wonder.” Although stormy conditions had stirred up sediment, “we could see tolerably well.” What they found was a surprisingly-intact hull resting upright at a
A diver examines the port side of the Erebus wreck.
depth of less than 40 feet. A later dive brought up the ship’s bell. Rough weather and the approach of winter meant that further study of the site would have to wait.

The **Erebus** wreck is the sad remains of a disastrous mid-19th-century voyage of exploration led by Sir John Franklin, who had previously led two overland Arctic expeditions. He was given command of two large and well-equipped Royal Navy vessels. Both had been “bomb ships” designed to assault shore installations by lobbing huge mortar shells. *Terror* took part in the attack on Fort McHenry, Baltimore, during the War of 1812, which was immortalized by the Star-Spangled Banner’s lyrics “Bombs bursting in air.” Built to withstand the recoil, they were deemed ideal for the hazards of Arctic ice.

Franklin’s objective was to find a navigable route traversing the last unmapped portion of the Northwest Passage, a sinuous and usually ice-choked channel through today’s Canadian Arctic. Great Britain saw it as a potential trade route to the Pacific.

The ships, carrying 129 officers and men, sailed in May of 1845. After spending that winter at Beechey Island, they became icebound northwest of King William Island in 1846, and spent the second winter there. In the summer of 1847 the ice never cleared and the ships had to overwinter yet again. According to a note found years later in a cairn on the island, Franklin died that June; other members of his crew had died earlier. Scurvy, and perhaps lead poisoning or botulism from their canned food, were possible causes. The note did not say where, or whether, Franklin was buried.

In 1848, the first of many search expeditions was dispatched from Great Britain and the U.S. But too late. The aforementioned note stated that, under the command of Francis Crozier, *Terror’s* captain, 105 surviving men abandoned the still-trapped ships in April of 1848. They headed
Erebus’ bell was found at the site. The date 1845 is embossed near the top of the bell.
southward along the island’s shore, dragging boats with them in hopes of reaching the Back River and a distant Hudson’s Bay Company outpost. It was a pathetic death march. The local Inuit told would-be rescuers of witnessing men falling and dying, and others resorting to cannibalism. A series of searches over the next decades found corpses, bones, and abandoned possessions.

The Inuit said that one of the ships had been crushed by ice and sank. The other may have drifted, or been piloted, more than 90 miles southward, eventually sinking in remote Queen Maud Gulf, where Erebus, Franklin’s flagship, has now been located. The Inuit told of boarding the ship and finding a corpse. Other Inuit stories mention seeing smoke, footprints, and other indications of men living on the ship before it sank. The final days of the Franklin Expedition are a mystery waiting to be solved by today’s archaeologists.

The discovery of Erebus has created great public interest. Prime Minister Stephen Harper called it “truly a historic moment,” adding that Franklin’s expeditions “laid the foundations of Canada’s Arctic sovereignty.” Canada claims the Northwest Passage as an internal waterway. The U.S. and some European countries consider it an international strait.

In April 2015, about 20 Parks Canada and Royal Canadian Navy divers, plus support personnel, began a detailed investigation of the Erebus by diving under the ice. The Navy joined this project because, unlike Parks Canada, it had the expertise and equipment for under-ice diving. Having a large team of divers was also beneficial. The team did what’s known as surface support diving, using umbilicals rather than tanks to supply compressed air as well as communications links. The technique was routine for the Navy, but the Parks Canada researchers needed months of training, diving under thick winter ice in southern Canada. Then came joint exercises, with one Parks Canada diver paired with a Navy counterpart. The Navy divers were given a crash course in archaeological techniques. “This is a whole new concept,” says Lieutenant Greg Oickle. “Typically, our dive teams don’t mingle with non-Navy divers. I’d never gone down with civilians on a Navy dive.”

The next challenge was setting up a heated tent camp on six feet of ice, and cutting holes in the ice above the sunken ship. Most equipment, including an air compressor, snowmobiles, food, and fuel, was flown to the site by the Royal Canadian Air Force in nimble Twin Otters fitted with skis. The heavier items were transported by a Hercules cargo plane on skis courtesy of the New York Air National Guard. The Canadian Rangers, a lightly armed, primarily Inuit militia under Canadian Army command, provided general Arctic expertise as well as protection against polar bears. Strong cross winds sometimes made it impossible for the supply flights to land at the remote site, which delayed the project. As a result, the team completed only five days of diving, but they lasted from dawn well into the night.

But these conditions were also a blessing, as the near-freezing water temperatures beneath the ice have preserved the ship remarkably well, says Marc-André Bernier, who heads Parks Canada’s underwater archaeology team. And in the calm water under the ice, “the clarity was absolutely phenomenal.” The ice also provided a stable and convenient working platform. “In the morning, you roll out of your sleeping bag, walk over to the dive tent and start diving,” says Oickle. “No getting boats ready, loading the gear, and transiting to the dive site.” However, because the water temperature was so cold, the divers could only stay down for about an hour without risking hypothermia.

Though the divers recovered a number of objects lying
on the deck—notably a six-pound brass cannon, some tunic buttons, ceramic plates, and a glass deck prism—they were primarily concerned with documenting the wreck. They carefully cut away the kelp that lined one side of the hull to expose and photograph the ship’s planking. They never penetrated the hull, although a gaping hole in the fore deck provided limited access below the upper deck. “You can lower yourself between the decks without actually going inside,” says Bernier. “By doing that, you can actually see the galley stove down there,” as well as some intact leather boots and wooden crates.

This hole also allowed a 3-D laser scanner to be lowered into the forward cabin, where it panned around, scanning the interior. It was “like something out of Star Wars,” says
Harris. The data from this scanner will provide a complete and precise picture of the interior of the hull, which will help the archaeologists determine how to proceed with their investigation of the wreck.

Once the ice

has melted, the researchers plan to do another five weeks of open water diving from a boat. Parks Canada may send a small ROV into the hull “to probe a little bit internally,” Harris says. But there will be no rush to retrieve artifacts. In part, this is due to safety concerns, because some deck beams are broken and may need to be reinforced. The intention is to proceed slowly and responsibly. “We’re going to go about it surgically,” taking as much time as necessary. “We don’t want to lose any information.”

The first task will be to excavate outside the stern of the ship, where moving ice has torn open Franklin’s cabin, possibly spilling much of its contents onto the sea floor. A grid will be established and sediments on the sea floor will be sucked up into mesh bags by a water dredge. Once on deck, these sediments will be screened for artifacts.

The search for Terror is also scheduled to continue in Victoria Strait, near the area where the ships were abandoned in 1848. An autonomous underwater vehicle that, unlike a remotely operated vehicle, is controlled by an inertial guidance system, will survey the seafloor. This vehicle can operate at a depth of some 300 feet.

Ultimately, Harris will focus on identifying traces of activities related to the final months of Erebus. His hope is to answer a whole series of questions: What actually happened to her crew? Why did they abandon ship? Did any men remain on board, or return to the ship after the initial abandonment? How much food did they have? Did any Inuit accounts, according to some Inuit accounts, there was a large quantity of canned food on board.

The site’s location, far from the area where 105 men were said to have left the two trapped ships, suggests that Erebus might have sailed southward from that point before it sank. It had an auxiliary steam engine and a supply of coal, and a small crew could have piloted it.

Finding human remains is possible; the Inuit reported seeing a body in one of the cabins. “Most Inuit stories are consistent and prove to be right,” says Bernier. “So what happened to these men?” Some Inuit told of “four sets of footprints heading off toward the east,” Harris says. “Maybe those
were the last footfalls of the Franklin Expedition. We don’t know.” Given the extreme cold and largely intact vessel, any such remains might yield DNA, especially from the molars, which could then be compared to the DNA of living people to identify individuals. “We’ve had lots of volunteering from descendants of the Franklin men over in the UK,” says Harris. It’s also conceivable that Franklin’s body will be found.

Personal objects might be traced to specific individuals. “Sailors had this fantastic habit of scrawling their initials on possessions, even ones that were inherited from fallen comrades,” says Harris. Eventually, he expects to re-analyze objects from the Franklin Expedition that were found on the shore by 19th-century search parties that are now kept in British and American museums, including the Smithsonian.

Documents such as a ship’s log or diaries would be very informative. As unlikely as it seems, it’s possible the cold water could preserve such documents, says Bernier, who once assisted the U.S. Navy during its investigation of a 70-year-old plane crash in the frigid St. Lawrence River. The plane’s radio log was still legible.

A parallel course of enquiry will focus on the Inuit. Harris thinks “patterns of re-distribution of materials within the hull” could be a consequence of the Inuit boarding the ship. He hopes to identify “what they valued most and what they disregarded or left behind.” Ceramic plates are scattered on the floor, for example. Is that from the ship going down, or the Inuit “casting them asunder because they were of no interest?” He doesn’t expect to find many knives, forks, or other metal objects. “Those were prized.”

The archaeology of the Erebus site does not end with the wreck itself. It is part of an entire, and very large, archaeological landscape, says Bernier, extending from Beechey Island south to the Back River. Deciphering and interpreting all the clues will require reconstructing the entire sequence of events on sea and shore. It could also include a reanalysis of Inuit accounts of these events, and it will certainly involve reexamining past assumptions, such as the notion that all the survivors left both ships in a single group.

Harris expects the project to last many years. “As each field season cascades into the next, we’ll be spending progressively more and more time on site to accomplish increasingly elaborate tasks.” And speaking of assumptions, he knows better than to make any. “The thing about archaeology,” he says, “is that it often surprises you.”

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The founding of the Charles Towne colony brought together three different peoples: Europeans, enslaved Africans, and Native Americans. The archaeologists are studying the artifacts to determine if the three groups maintained their distinct identities.

A European gold-plated brass cover for a wheel lock pistol depicting Adam and Eve.
Archaeologists are learning how South Carolina’s first permanent colony took shape.

By Gail Crouch
On a sultry spring day in the South Carolina Lowcountry, students from Salve Regina University in Newport, Rhode Island, and their instructors work in an excavation unit at Charles Towne, where the English founded the first permanent colony in South Carolina in 1670 on marshy Albemarle Point. Some 25 miles up the Ashley River, another group established a fortified settlement with a trading post known as the St. Giles Kussoe Plantation.

The Carolina colony, which was populated by the English, Native Americans, and enslaved Africans, was not a royal enterprise run by the king. It was instead a venture by a group of individuals to turn a profit. And a profit was far from certain. While the Lowcountry's (South Carolina's coastal region) 18th- and 19th-century economies were based on lucrative rice, cotton, and indigo plantations, the 17th century was a period of trial and error during which the colonists searched for products that guaranteed their success.

Jon Marcoux, an archaeologist at Salve Regina University, is codirecting an investigation of the Charles Towne colony’s beginnings along with Andrew Agha, an archaeologist with the Charles Towne Landing State Historic Site. They’re focusing on two areas: the Miller site, which is located where the colony was founded, and the Lord Ashley site, where St. Giles Kussoe was established. The two sites “are two different aspects of the colonial experiment,” says Jon Marcoux.

Eight Lord Proprietors in England were granted the Province of Carolina (originally encompassing what would become the states of North Carolina, South Carolina, Georgia, Alabama, Tennessee, Mississippi, and parts of Florida and Louisiana) in 1663 as reward for their help returning Charles II to his throne. Lord Anthony Ashley Cooper, the First Earl of Shaftesbury and head of the Lords Proprietors, headed the colony. The Shaftesbury Papers, a collection of Lord Ashley’s letters and other documents that chronicle the management of the colony and the activities at St. Giles Kussoe, Lord Ashley’s 12,000-acre plantation, serve as an important resource for archaeologists.

The Lords Proprietors granted parcels of land to the colonists, who were ordered to grow maize and Old World crops, raise livestock, and log the forest as well as experiment with potential cash crops such as ginger and sugar cane. A number of the initial 150 settlers arriving in 1670 were planters from Barbados, where sugar cane plantations utilizing slave labor had become profitable. The colony permitted slavery, and small numbers were brought in with their owners from Barbados. Later, rice plantations that took hold in the 18th century would require enormous labor, and in the next 100 years, Charleston would become the center of the slave trade in the South. Initially trade with Native Americans and the Spanish was prohibited, and then allowed in the late 1670s.

St. Giles Kussoe, on the other hand, appears to be “a manifestation of Lord Ashley’s personal ambitions to create a successful plantation,” says Marcoux. Lord Ashley chose the location, and he informed the governor of Carolina his manager (Lord Ashley never set foot on St. Giles) that his plantation was to operate exclusively under Ashley’s authority. In addition to growing crops and raising cattle, and unlike the Charles Towne settlement, St. Giles’ settlers traded European goods with Native Americans in exchange for animal skins and, very possibly, Indian slaves. In fact, Lord Ashley’s correspondences “suggest that cattle and trade in skins and Indian slaves were the main focus,” Marcoux says. St. Giles was one of only two places in Carolina where trading with Native Americans was sanctioned by England. Agha and Marcoux, as well as many historians, believe the plantation provided the financial and slave-labor model that led to the development of the 18th-century plantation economy.

The Miller site, where the researchers are working, is named for amateur archaeologist Johnny Miller, who first researched the Charles Towne area in 1968. Miller discovered a 17th-century trash pit containing domestic refuse, brick and mortar fragments, and a small piece of armor. A year later, Stan South, then with the South Carolina Institute of Archaeology and Anthropology at the University of South Carolina, located the remnants of Charles Towne’s main palisade nearby. In 1972, Charles Towne became a state park—the Charles Towne Landing State Historic Site—featuring replicas of the palisade wall and cannons, and reconstructed European glass beads were popular with Native Americans.
earthworks. (Miller is one of Charles Towne Landing’s several archaeological sites.) But for the next several decades the only archaeological research that took place was occasional salvage work mandated by a construction project.

Then the situation changed. The state wanted to make use of the natural and cultural resources in its parks “in new and better ways,” according to Agha, and one of those ways was archaeology. Consequently, “there’s been a serious research agenda at Charles Towne Landing” since 1999, he says, at which time the park hired an archaeologist. South returned there in 2000 in hopes of finding the remains of a house from the 1670s, as he wanted to know more about daily life during the colony’s first 10 years. (Around 1680 the colony moved from the Charles Towne Landing site on Albermarle Point to Oyster Point, the location of modern Charleston.)

South discovered, and excavated, the foundation of a 1670s settler’s home within the palisade he uncovered in the late 1960s. He also found plenty of pottery, some of which came from Barbados, as well as items like glass and nails. In 2006, roughly 1,000 feet from the house, park archaeologist Elsie Eubanks discovered the remnants of sugar cane plants inside the palisade walls. There was also evidence of other crops—possibly cotton, indigo, and rice—which at the time were considered to be experimental. This is the oldest British Colonial garden in South Carolina.

After the colony moved to Oyster Point, a French Huguenot named James LeSade purchased a large tract of land that included Charles Towne Landing some time between 1694 and 1697. When Miller excavated the site in the late 1960s he also discovered the remains of a structure that he thought was LeSade’s house, and a cache of wine bottle and smoking pipe fragments led him to surmise that the house was later converted to a tavern. South, during his subsequent research, accepted Miller’s interpretation. However, another investigation in 2009 directed by David Jones, head archaeologist for South Carolina Parks, Recreation and Tourism, and Cicek Bibby, then Charles Towne Landing’s staff archaeologist, concluded that Miller was right about the house, but wrong about the tavern. Miller “misinterpreted the artifacts then,” says Agha, who succeeded Bibby as the park’s archaeologist in 2012.

Agha has been working at the Miller site since then, and he and his colleagues have made several notable discoveries. Back in 2009, Jones and Bibby uncovered a 15-square-foot tabby floor that could have been part of LeSade’s house. Tabby, a mixture of lime, water, sand, oyster shells, and ash, was used as a building material by the British in South Carolina mainly during the 18th century. Few British colonial-period tabby floors exist, and this could be one of the earliest examples. Agha dug beneath the tabby floor, uncovering 1670s style artifacts in intact stratigraphy. This was the first discovery of artifacts from the colony’s initial decade at the Miller site in more than 40 years. The artifacts included pottery and three counting tokens, two of which bear the likeness of King Charles II.
Andrew Agha and Jon Marcoux are codirecting the investigation.

Miller mapped the site when he worked there, but his map was hard to read, so it was with some difficulty that Agha relocated the trash pit where Miller found the piece of armor. Having done that, Agha then discovered, some 10 feet from the trash pit, the previously unknown remains of a palisade wall roughly four feet below the surface. He suspects this wall was part of a small fort that once stood there.

Historical accounts state that the British brought 12 suits of armor with them, and the archaeologists have found items such as brass rivets that would have held the steel plating of suits of armor together. Historical accounts also speak of a military structure in the area. “There is an account from around 1672 of a Spanish spy named Camunas who traveled from the north to Charles Towne,” Agha says. Camunas “said he encountered a blockhouse with a captain and 50 of his men, before he encountered ‘the wall of heavy logs’” that Agha assumes was Charles Towne’s main palisade.

This season Agha and his colleagues found evidence of a foundation wall made of brick, which is highly unusual for the 1670s. Though the colony began at Charles Towne Landing, the colonists for some time planned their move to Oyster Point, which they thought to be a more auspicious location because its deeper harbor could accommodate larger ships, which made for more robust trade. Consequently, they built impermanent structures rather than durable ones made of brick. Or so the archaeologists thought. “It’s problematic, and very exciting,” Agha says of the brick wall. “It makes us question what was going on.” The wall could have been related to the military blockhouse. “The theory now is that there’s some kind of military installation at the Miller site that goes away” when the colony moves and LeSade acquires the land, says Agha.

“This project also gives us the opportunity to explore how, in a very short time, Europeans, Indians, and Africans created the colonial landscape that defines American history for the next 350 years,” Marcoux says. “We want to see how the complex social and power relationships among these three groups played out within their daily lives.” The Europeans and the enslaved Africans were both far from their homelands, and the latter were reduced from humans to possessions. The Native Americans had to deal with their new neighbors. How did these people cope with the challenges of colonial life? To what extent did their identities change?

The researchers have found fancy European wares, not to mention Chinese porcelain, at both the Lord Ashley and Miller sites. “The cost of these items, which also included fancy wine glasses, and the risk of breakage importing them to Carolina, says something about their importance to the European residents at these sites,” Marcoux says. “From this, I get the sense that there was definitely an attempt to transport English social statuses across the Atlantic.”

But the majority of the pottery was a low-fired variety known as Colonoware that was produced by the Native Americans and Africans. “The high occurrence of low-fired earthenwares at the sites means that Indians and enslaved Africans have a way to materialize their identities,” he says. “This is vital to (Native Americans) at a time when depopulation due to violence and disease are forcing many distinct groups to form multi-ethnic refugee communities. For enslaved Africans, who have had many of their cultural practices taken from them, potting traditions represent a tangible tie to their heritage that can be practiced relatively openly.”

The abundance of Colonoware suggests that the English eventually adopted these ceramics.

The archaeologists are also looking for evidence of the melding of cultures in the foodways of the three cultural groups. The British and enslaved Africans were used to eating domesticated animals and plants, whereas the Native Americans were much more reliant on hunting and gathering. The faunal remains at both Miller and Lord Ashley are primarily from cattle, though there are chicken bones as well. Pork was also common at Lord Ashley. Even though cattle were a valuable commodity that could have been traded, and there was no lack of wild deer to be hunted, the “English eat beef, they don’t eat deer,” says Marcoux. “Perhaps the British were proud,” and their pride was expressed by maintenance of their diet and other signatures of English life in this foreign land.
The predominance of domestic animal remains suggests that Native Americans included them in their diets. But the archaeologists have also found wild animal bones, which could indicate the Europeans also broadened their diets. Paleoethnobotanical analyses of plant remains from the Lord Ashley site indicated both wild and domesticated plants and nuts were consumed. Though that’s not surprising, finding evidence of watermelon was. Melons originated in Africa, so it’s assumed they were cultivated by the enslaved Africans. Agha thinks this watermelon seed shows the continuation of African culture that was either allowed by, or hidden from, the European managers at St. Giles Kussoe.

Meanwhile the British and Native Americans exchanged goods at St. Giles, which served as a kind of economic engine that benefitted the Charles Towne colony and, to a lesser extent, England. The Native Americans, for their part, obtained European goods, but this trade came at a great cost. “My research and that of others has outlined the profound effects of the Carolina Indian trade on the cultural landscape of the late 17th-century Southeast,” Marcoux says. Those effects included “population movements, disease, endemic violence and fundamental economic transformation.”

The archaeologists have found hundreds of sherds at St. Giles that, to Marcoux, speak of the Native American diaspora resulting from colonization. The style of the sherds is unlike any Native American pottery found in the Southeast. “It had crushed shell mixed into the clay, and it was impressed with a paddle that had been wrapped in cord,” Marcoux says.

Searching for similar ceramics, he found pottery at two sites along the Savannah River near Augusta, Georgia. This would appear to corroborate the historical accounts of Lord Ashley’s Indian agent, Dr. Henry Woodward, “who used the St. Giles plantation as a base of operations for his trade with the Savannah Indians during the 1680s,” Marcoux says. The Savannah was a branch of the Shawnee who migrated to the Southeast from the Midwest in the 1680s.

The exotic sherds appear to be a manifestation of “Native American movement that was made necessary because of the colonial landscape.” There were numerous instances in which the Indians left their homelands and moved to the territories of other tribes, competing with them for necessities such as food as well as animal skins that were in demand in Europe. This competition frequently led to conflict, and more migration. “Basically the whole Eastern Seaboard was in flux,” Marcoux says, “and all of that is tied to this global economy across the Atlantic.”

Such was colonial life during this time. St. Giles Kussoe ceased operation in 1685. The relocated Charles Towne colony endured, eventually becoming the city we know today as Charleston. The archaeologists have learned much about the city’s beginnings, but much remains to be learned. “At first I thought that we have five years of research ahead,” says Agha. “But in light of the new discoveries at Charles Towne Landing, now I think there are several lifetimes of research left. This is easily the premier 17th-century site in the Southeast.”

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WHEN MIKE SEARCY is in the field, he likes to get a bird’s-eye picture of his study area. “That means I’m teetering on top of a ladder or climbing up on some truck, trying to get a good angle,” says the Brigham Young University archaeologist. Sometimes it’s meant taking an expensive, and nausea-inducing ride in a small plane. Things can get difficult, he says.

These days, however, Searcy has an easier option: He can, so to speak, call in a drone strike. In minutes, the flying, instrument-laden robot can skim across large archaeological sites, collecting high-resolution images that once would have been beyond the reach of most meagerly-funded archaeologists. This digital data can then be used to create detailed three-dimensional maps. “It still blows me away. I’m incredibly impressed with what a drone can help you do quickly and pretty cheaply,” says Searcy, who has used drones to document sites in the Southwestern United States and Northern Mexico.
Drones can be immensely helpful to archaeologists, but regulatory uncertainty complicates their use at U.S. sites.

By David Malakoff
He’s not the only researcher benefiting from this technology. In recent years, archaeologists around the world have taken advantage of plummeting drone prices and advances in imaging technology to take to the skies without ever leaving the ground. For less than $1,000 archaeologists can now buy remotely-piloted drones that can carry an array of instruments from digital cameras to sensors capable of “seeing” underground. Drones are helping researchers to discover new sites and document hard-to-reach features in rugged terrain. The aircraft can also monitor vast areas threatened by looters, development, and natural weathering, and the images they obtain can be used to create virtual copies of ancient ruins and artworks that could aid restoration efforts. “Drones are helping us get instruments where we need them, when we need them,” says Falko Kuester, a computer scientist at the University of California, San Diego, who is pioneering ways to visualize and share drone data. “We’re collecting and analyzing terabytes of data that can be shared widely.”

The drone’s rise, however, has created some severe legal turbulence for archaeologists working in the United States. Government officials are struggling to decide how to regulate the aircraft, which have raised concerns about safety, privacy, and security. New rules are expected in 2016, but for the moment many researchers are barred from flying drones within the U.S., unless they go through an expensive and time-consuming permitting process. They face big fines...
if they break the rules. “Our main problem is the legal uncertainty. This situation hinders research and development,” says archaeologist Gerardo Gutiérrez of the University of Colorado. Still, some researchers have found ways to keep flying—often by exploiting a regulatory exemption for hobbyists, or by taking their drones abroad, where the regulations aren’t as strict.

FOR DECADES ARCHAEOLOGISTS have strung cameras to kites and balloons and attached instruments to aircraft and satellites in order to get aerial views of sites. But kites and balloons are subject to the whims of weather, while aircraft and satellites are very expensive. Hence the appeal of drones, which were once flown only by the military or by gadget enthusiasts, but are now available to almost anyone. Hundreds of models are available, ranging from tiny helicopters that cost less than $20 and sit in the palm of your hand, to larger, more expensive “octocopters” sporting eight rotors, to fixed-wing robots the size of business jets that cost hundreds of thousands of dollars. Most are radio-controlled by relatively untrained pilots on the ground, but many can be pre-programmed to automatically fly long routes. At the same time, there’s been a revolution in the payloads that drones can carry, as batteries, computers, cameras, and other sensors keep getting smaller, lighter, and more capable.

A few years ago, the practical implications of such advances became clear to archaeological consultants Evelyn Billo and Robert Mark. The couple owns Rupestrian Cyber-Services, a Flagstaff, Arizona-based company that helps government and private landowners document and manage rock art sites across the Southwestern U.S. In 2008, the company got involved in a multi-year effort to survey ancient art in the U.S. Bureau of Land Management’s Sears Point Archaeological District. The district, along the Gila River in southwestern Arizona, features rock art as well as large geoglyphs, which are figures made of earthen mounds and arranged rocks, and intaglios that are carved directly into the desert surface. They quickly realized that an aerial survey would help document such features, and perhaps locate new ones. “But we were having real trouble getting it done right,” Mark recalls. They tried taking pictures from a small plane, and even from helium and hot air balloons. “But those weren’t ideal solutions,” says Billo. The plane flew too high and too fast to take detailed images, and “the problem with balloons is that the wind takes you where it wants to go,” Mark says.

The project ended in 2012, but the couple wasn’t ready to give up. They decided to return to their seven-acre study area—this time with a camera-carrying drone that Billo had given to Mark, a former pilot, as a Valentine’s Day gift. This time, so as not to violate the government’s drone regulations, the pair worked as volunteer hobbyists rather than paid
consultants. The results “were so much more satisfying,” says Mark. Their four-rotor quadricopter—which under federal rules had to fly below about 400 feet—was able to quickly skim over complex rock alignments that were hard to interpret from the ground, and even document new geoglyphs and trails overlooked by surveyors on foot. It was also able to hover harmlessly above huge boulders with horizontal rock art panels—which might have been damaged by researchers standing on them to take pictures. And the copter easily scaled vertical cliffs to photograph carvings in hard-to-reach spots. The couple has since used drones to document more than a dozen Southwestern intaglios, in some cases noting threats to them.

Such projects “really show the potential of drones for documentation and monitoring,” says Mark. Ultimately, the couple believes drone surveys should become a standard part of evaluating how proposed development projects, such as gas wells or wind farms, might affect archaeological sites. “If you don’t fly, you’re going to miss some of these features,” Billo says. (The nation of Peru has started using drones to do just these kinds of comprehensive surveys of its archaeological sites.)

THE COUPLE’S WORK also highlights some of the problems that drones pose. “Drones do sometimes just fall out of the sky” due to technical problems, says Mark. And then there’s pilot error. Searcy, for one, managed to flip a drone on one of his first landings, damaging it. Still, researchers mostly see the upside. For example, drones are helping expand the use of a three-dimensional mapping technique known as photogrammetry. It uses software to create detailed relief maps from two-dimensional images. In one study, a team led by Gutiérrez showed that drones could map a seven-acre site 27 times faster than traditional surveying technologies, and training students to use the aircraft took just about one-third of the time needed to master surveying equipment. It is the “easiest and most economical way” to survey sites, Gutiérrez says, potentially costing just pennies per day. (Although FAA regulations could drive that cost up to $4,000 per day, he estimates, by requiring the purchase of liability insurance and the use of a licensed pilot.)

Droner photogrammetry does have one limitation: regular cameras can’t see through thick vegetation. That’s no problem for another 3-D-mapping technology, known as LIDAR, that archaeologists have begun to use. The challenge, however, has been developing lighter, more affordable LIDAR systems that can be carried on drones. But recently companies have released systems costing around $10,000—putting them within reach of researchers. Mark predicts that “drone LIDAR is coming, and it’s going to be great.”

Searcy is intrigued with another idea: equipping his drone with a thermal imaging sensor that can detect buried objects by the stored heat they radiate. “We may be able to identify sites without using a shovel to move any dirt,” he...
Last year, researchers used the approach to map buried structural foundations at a roughly 1,000-year-old Anasazi site in northwestern New Mexico known as Blue J. Despite tricky winds and technical setbacks, the drone made five mapping sweeps in just about an hour, identifying some previously unnoticed features, Jesse Casana of the University of Arkansas and three colleagues reported last year in the Journal of Archaeological Science. Heat-sensing drones could be “a powerful method for investigations of large sites where conventional geophysics might require many months of fieldwork,” they wrote.

Kuester foresees combining all the drone data—thermal, LIDAR, and visual—into a single virtual reconstruction that archaeologists could explore, at their leisure, back at the lab. “Using all of the electromagnetic spectrum to observe is immensely powerful,” he says. “Imagine being able to use your personal x-ray vision, so to speak, to magnify a crack in a wall, step into it, and discover things you might not have noticed in the field.” Or zooming out to understand how distant sites relate to each other, or the surrounding area. “Today we are already in the position to turn data acquired by drones into physical artifacts through 3-D printing,” says Kuester, potentially aiding efforts to recreate sites damaged by looters or disasters.

At many North American archaeological sites, however, that dream may have to wait for the government to decide how and when researchers will be allowed to fly drones in U.S. airspace. Many U.S. universities have asked the Federal Aviation Administration (FAA) to create flexible, less onerous rules for researchers using drones to pursue knowledge, but they aren’t expecting an answer soon. Meanwhile, some researchers, including Mark, are plodding through the applications for an official FAA drone permit. “I sent in a three-page request explaining what I wanted to do, and they basically asked me to resubmit it in legalese,” he says. “So it’s going to require an expensive aviation consultant, and be 30 pages instead of three. And there’s still no guarantee I’m going to get it.”

DAVID MALAKOFF is a Deputy News Editor at Science in Washington, D.C. His article “Grappling With A Great Mystery” appeared in the Summer 2015 issue of American Archaeology.
On August 12, 2014, two divers rolled into the water from the research vessel Roper, anchored just off the coast of Florida’s Cape Canaveral. They were pretty sure they’d find something beneath the sand that day. Earlier that summer, the ship had towed a side-scan sonar and a magnetometer over the seabed, and all of a sudden the computers had come alive and registered a major magnetic signature, indicating that some large object containing iron or steel was beneath them.

“It was a pretty decent hit, and had a sizable magnetic anomaly,” says Chuck Meide, director of the Lighthouse Archaeological Maritime Program, the research arm of the St. Augustine Lighthouse & Museum, who was leading the crew on board the boat that day. “When we saw our first anomaly in the survey area, everybody was huddled around the computers and we were all excited.”

Some days later, divers swam down about 25 feet to the seabed. Using a 10-foot hydraulic probe, they repeatedly bore into the sand using a narrow, high-pressure stream of water. After a little over two-dozen probes, they got a “hard return”—meaning the probe detected something immovable not far beneath the surface.

Had they at last found La Trinité, the French ship that...
Meide has called “the holy grail of maritime archaeology?” When it departed Dieppe, on France’s Upper Normandy coast just weeks before it sank in 1565, La Trinité’s manifest showed that it was laden with nearly 1,000 cannon balls, 300 iron pikes, 100 armored corsets, along with anvils, iron bowls, hooks, and many other iron objects—all of which could explain the strong magnetic signature. Historical accounts also record that the ship didn’t have time to unload on Florida’s coast, as a hostile Spanish fleet had arrived in its wake, forcing it and three other French ships
to hastily raise their anchors and flee.

The next day the divers returned with a vacuum-like dredge and started suctioning sand around it. They gradually uncovered a metal box with a lift ring attached, and an opening at a corner revealed that it was hollow. After a bit more dredging, the divers peered down and at last got a good visual read on their target.

Welcome to the glamorous world of archaeology: the treasure was an old fuel tank, apparently from a shrimp trawler that sank sometime between World War II and the 1980s. And so the long search for archaeological evidence of what historian John McGrath has described as “the most ambitious and significant overseas effort that the French had ever attempted at that time” had reached yet another dead end. The diving crew packed up and moved on, hoping that another day would bring better results.

Nearly every school child knows that St. Augustine, Florida, is the site of the oldest continuously occupied European settlement in mainland North America. It was founded in 1565, and this year marks its 450th anniversary. What’s not commonly known—at least outside of Florida—is how French intrigue provoked that first settlement.

By 1564, the French had established Fort Caroline, a tenuous colony with a rudimentary garrison, at the mouth of the St. Johns River near present-day Jacksonville, about 30 miles north of St. Augustine. La Trinité had just arrived at Fort Caroline on a resupply mission, thereby drawing the Spanish fleet and resulting in a showdown.

Fort Caroline was in fact France’s second attempt to establish a settlement on the North American mainland. In 1562 they built the short-lived Charlesfort on present-day Parris Island in South Carolina, which they abandoned after a year. For chronological context, note that Fort Caroline preceded France’s settlement of Montreal and Quebec by nearly a half-century, and was two decades prior to the British “Lost Colony” of Roanoke.

Fort Caroline’s leader was Capt. René Goulaine de Laudonnière, who arrived in June 1564 with about 200 soldiers and settlers, mostly Huguenots eager to leave Catholic France. The French promptly erected a wood-palisaded fort. After that, things didn’t go very well. Laudonnière proved an inept administrator, rankling his own men and triggering two mutinies. More dangerously, he opted not to plant crops or learn how to fish local waters, which would have made the colony relatively self-reliant. Instead, he relied on trade with nearby Timucua Indians for game and produce. But due to a lack of rain, the tribe left their village to hunt and gather elsewhere, leaving the French to fend for themselves.

What Laudonnière called a “hideous famine” then ensued. After a year’s occupation, and with no sign of French ships bearing provisions or new settlers, Laudonnière made plans to abandon the fort and sail back to France. Parts of the fortifications were dismantled, the lumber used to build new ships.

The French had complicated reasons for establishing Fort Caroline: it served as a base for trade, as a colony where

John de Bry examines historical documents pertaining to France’s ambitions in Florida at the Bibliothèque National de France in Paris.
Hugenots could practice their religion without harassment, and as a base from which to seek gold and other treasure further inland. The powerful Spanish empire, however, did not look kindly on other European powers establishing bases on lands it believed it had been granted by the Vatican decree of 1493, which divided the New World between the Spanish and the Portuguese, and was later codified by the Treaty of Tordesillas.

More so, Spain took great objection to any foreign base being established along the Florida Strait, the channel between Florida and the Bahamas that, due to currents and winds, was the main route between Havana and Spain. Through these waters each spring passed a vast Spanish armada of silver- and gold-laden ships, bearing treasure from Peru and Mexico. A French settlement within striking distance of the strait could be used as a base for harrying raids. This raised more than eyebrows; it raised a fleet.

The military commander in charge of establishing both Charlesfort in 1562 and Fort Caroline two years later was Jean Ribault, a noted French seaman and soldier. Unaware of the disarray at Fort Caroline since Laudonnière was left in charge, he departed Dieppe in June 1565 aboard La Trinité, accompanied by six other ships brimming with settlers, soldiers, and provisions. His departure did not go unnoticed by Spanish spies; Spain dispatched Pedro Menéndez de Avilés, a proven soldier with an equally well-armed armada, to eradicate the impudent French.

The Fort Caroline National Memorial was established on the banks of the St. Johns River near Jacksonville in 1953 to commemorate the French settlement. A replica of the fort offers visitors an interpretation of its 16th-century defenses. What the replica doesn’t offer, however, is a clue as to the exact location of the original fort. Historical documents suggest the fort had existed somewhere along the banks of the river not far from the ocean. Yet its precise location has never been found.

It’s not been for lack of trying. Historian Francis Parkman sought it as early as 1850. Archaeologist John Googins, of the University of Florida, searched for it intermittently for two decades starting in the 1950s. In the 1960s, amateur archaeologist William Jones sifted for clues in the dredge spoils when the St. Johns was made deeper and more navigable. Although these activities span more than a century, they had the same result: none turned up anything even remotely indicating the location of the fort.

Nor has Robert Thunen, an archaeologist with the University of North Florida, who has been searching for it with his students on and off since the mid-1990s. “We did a shovel test survey of Fort Caroline National Memorial area just to say that it was not there,” he says. And in 2012 and 2013 he and his colleague Keith Ashley led another large-scale shovel test survey in the nearby Theodore Roosevelt Preserve and other areas on the south bank of the St. Johns River. “We found great prehistoric and plantation-period...
But no Spanish, and certainly no French, material.”

What to look for? “The fort did have a moat, so we probably would see some darker stains representing it,” he says. And remains of stockade posts could offer clues. It’s also known that the French had a blacksmith shop and a boatyard to build small boats for exploring upriver, remnants of which could still exist.

The search is somewhat complicated by the fact that Fort Caroline was later taken over by the Spanish, renamed San Mateo, and occupied for five more years. “So people have been looking for this French fort, and they may have walked over the top of it and not even realized it was there,” Thunen says. “I ask my students, so what are we looking for archaeologically? Five years worth of garbage, or 15 months worth of garbage? It’s a no-brainer. We should be looking for a Spanish site superimposed on top of a French site.” Such was the case at Charlesfort in South Carolina, which also became a Spanish redoubt, and where archaeologists eventually found French artifacts beneath a layer of Spanish debris.

Environmental factors are another complication. The St. Johns River follows a different course than when the region was first settled, but the extent of that difference is unclear. “Unfortunately for us, the St. Johns is one of the most heavily modified rivers because of the sandbars at the mouth,” Thunen says. “Since the American period there’s been dredging and altering of the river, and that’s changed the flow dynamics, which also contributes to erosion. It’s not Pompei, something frozen in time.”

So the land on which the fort was built could have eroded into the sea, taking any clues with it. “One other thing we’re now looking at is how the environment has changed between 1564 and today,” Thunen says. In an attempt to understand the extent of that change, he has imported data from historic maps and other documents, mid-1500’s archaeological sites, and modern environmental information into a geographic information systems computer program. This gives him an approximation of the ancient landscape that he can compare to the modern one. As a result, he’s identified, and plans to survey, some areas that he had previously not considered. “This new research will bring us closer to discovering if there is any remaining evidence of the fort.”

But even if the river had erased some of the original fortification, he says that the sheer size of the triangular fort—1,000 feet on each of three sides—may mean that a portion avoided the river’s erasure and awaits discovery. “Maybe we might just catch the edge of the fort,” he says. “Maybe it’s not all gone.”

Thunen will continue the search as time and funding permit. He admits that turning up something this year would offer a nice coda to the 450th anniversary of the founding of St. Augustine. But the clock is ticking. “I haven’t been fanatical about this,” he says. “When opportunities come up for the field schools, or we find funding, we’ll test another area. But there’s no doubt if, or when, we find it, this will be of great importance to Jacksonville.”

This rapier-like hat pin was found at the Armstrong site.

The Armstrong site also yielded these French silver coins.
What was most remarkable about the attempted French settlement was not that it happened, or its scale, wrote historian John McGrath in his book *The French in Early Florida: In the Eye of the Hurricane*. “What is most astonishing is the way in which it failed.” When Jean Ribault’s fleet arrived with hundreds of soldiers and settlers at Fort Caroline, Laudonnière and the entire colony were literally hours away from sailing back to France. While Ribault and Laudonnière parleyed, the fleet’s smaller ships crossed the sandbar then headed to the fort to unload. The four larger ships remained anchored offshore, awaiting smaller ships to ferry goods across the bar. 

And then out of the blue the sails of Menéndez and his Spanish fleet arose on the horizon. Ribault reboarded and cast off and Menéndez was unable to pursue him because much of the Spaniard’s fleet’s rigging had been damaged by an earlier storm. The Spanish fleet instead sailed 30 miles south, offloaded supplies from the two larger ships, which were then sent to Havana for repairs. Mendez ordered his men to start building their own fort. It was St. Augustine’s Day, and he named this new settlement accordingly.

Ribault and his ships soon circled back south, believing it expeditious to attack Menéndez before he could construct his own fort. Ribault’s ships arrived at the sandbars off St. Augustine, and plans for attack were underway. A battle was imminent and the situation heavily favored Ribault.

But fate had other ideas. “The Catholic wind” (so called because the Spanish interpreted it as divine intervention against the Protestants) arose, and an intense and unexpected storm rapidly swept in. Caught out of position, the three French ships accompanying Ribault were driven south and then pushed onto a beach where they broke apart, marooning their men on a sandbar. Not long afterward *La Trinité* went down offshore, its cargo intact.

Menéndez seized this divine opportunity, ordering his troops to march overland 30 miles north through torrential rains and winds. The Spanish took the remaining occupants of Fort Caroline by surprise and slaughtered them. The Spanish subsequently captured the shipwrecked Frenchmen to the south, and ferried them off the sandbar back to the mainland. In groups of 10, the prisoners were marched over a bluff, and on the far side their throats were slit. Hundreds were massacred, including Ribault, although several dozen managed to escape into the brush. So devastating was the
defeat that the French gave up hopes of settling Florida or other parts of the Gulf region for more than a century.

Which still begs the question: where is *La Trinité* today? Cape Canaveral is littered with shipwrecks, and finding one after half a millennia is no easy matter. The massive amount of iron *La Trinité* was thought to be carrying when it sank should make it easier to find with a magnetometer than a wooden vessel with less iron aboard. Last summer, with the anniversary of St. Augustine’s founding approaching, the Lighthouse Archaeological Maritime Program renewed its effort to find the ship. Its researchers spent about three weeks on the water, trolling with magnetometers along five miles of coastline, analyzing anomalies, and then returning with divers, probes, and dredges to investigate anything that merited further study.

The anomalies that turned out to be the shrimper’s fuel tank generated considerable excitement because they were located near what’s called the Armstrong site. This is a cluster of several areas on the lagoon side of the barrier island where metal-detecting relic hunters in the 1970s turned up French coins, an enamel hatpin, and some tools that are thought to be artifacts left by the escaped survivors of *La Trinité*. The site was later acquired by the National Park Service, which excavated it in 1990 and 1995, confirming the earlier interpretation. Among the more intriguing finds are Normandy stoneware, and spikes from the ship that the French refashioned into tools, presumably for trade with local Native Americans.

John de Bry, the director of the Center of Historical Archaeology, said that French historians are keenly interested in *La Trinité* because of the rarity of the lost armaments presumed aboard. “Very little is known of the arms of the period,” he says, noting many had been lost or melted down and recast. “That makes this one of the most historically and archaeologically important shipwrecks.”

As with the St. Johns River, the search is complicated by environmental uncertainties—no one really knows how the sands and the barrier islands have shifted over the past 450 years. What was once a wreck in 25 feet of water could now feasibly be entombed beneath an island, or be farther offshore.

Meide and de Bry say new technology could help find *La Trinité*. Aerial magnetometer surveys, which scan large areas quickly, have been used elsewhere recently. This technology can also simultaneously survey offshore, the surf zone, and the beach. One of the firms doing the aerial surveys, Canada-based Geotech, has discovered historic shipwrecks in Australia. In some cases the wrecks were discovered in a matter of minutes. De Bry and Meide have approached Geotech about using this technology to search for *La Trinité*.

Meantime, as the anniversary year ticks down, Meide’s students are reviewing last summer’s data, looking for any magnetic anomalies that might deserve closer scrutiny. “Ever since I was a little kid, I knew stories of Ribault,” says Meide, who grew up in Jacksonville. “When I was in fourth grade, I remember drawing little Spanish guys fighting little French guys. My dad told us those Spanish conquistadors might have marched through our back yard on their way to sack Fort Caroline. This really is one of my dream projects.”

Rock Art Ranch in northeast Arizona has more than 3,000 petroglyphs. Researchers are studying the ranch and the surrounding area to understand who made the rock art and what these images meant to them.

This image depicting a woman giving birth is one of the amazing petroglyphs at Rock Art Ranch.
Escaping from the blistering desert heat, we are drawn down the worn stone steps into Chevelon Canyon, toward the cool oasis of flowing water and lush vegetation, where we stare up in awe at the sandstone cliffs densely covered with ancient imagery. Known as Chevelon Steps, the location boasts one of the largest concentrations of rock art in the middle Little Colorado River Valley of northeastern Arizona. The surrounding landscape is rich with evidence of the Paleo-Indian, Archaic, and Pueblo peoples who occupied the land for millennia. But until recently, the 5,000-acre, privately-owned Rock Art Ranch and the adjacent public land had seen no professional research aside from recording the images.

This past summer, a University of Arizona field school completed another season of work at, and around, the ranch, which is located about 25 miles southeast of Winslow. Field school students have been surveying the ranch since 2011, and excavating a prehistoric pueblo known as Multi-Kiva, which is roughly 10 miles southeast of the ranch, since 2013. The focus of this project, which is codirected by E. Charles Adams, a University of Arizona archaeologist and a curator at the Arizona State Museum, and Richard Lange, a research specialist at the museum, is learning how people used this region over the past 13,000 years, and why they migrated to and from it. The researchers also want to know who made the rock art and the significance of these works to their creators.

Adams approached Brantley Baird, the owner of the ranch, about conducting research there in 2010, and Baird, whose great-grandmother was Cherokee and who has a great respect for native cultures, quickly agreed. It’s a working...
cattle ranch and Baird, with his daughter Sandy, opened it to the public for guided tours about 17 years ago. The travel website TripAdvisor lists visiting the ranch as its number one activity in and around Winslow, and tourists flock to see Baird’s museum, in which he keeps hundreds of fascinating artifacts that he’s collected over the years. Old farming, blacksmithing, and ranching equipment surrounds the ranch house, including the last remaining bunkhouse of the Hashknife Cattle Company, one of the largest 19th-century ranching operations in Arizona and the previous owners of Rock Art Ranch.

“The ranch includes an amazing landscape with very high archaeological site density,” says Adams. “We want to survey the entire ranch to understand how past people moved across and used the land, but it’s slow-going.” The Arizona Archaeological Society completed recording the canyon’s more than 3,000 petroglyphs in 2001, and two years later the site was listed on the National Register of Historic Places as Baird’s Chevelon Steps. The steps refer to the worn stone boulders that lead down into the deeply incised canyon. Baird has added a metal railing along the steps, and a covered structure that juts out over the edge, encouraging visitors to enjoy the view while picnicking in the shade. Over the years, floodwaters have periodically blasted through the canyon, eroding petroglyphs on the lower canyon walls, but for the most part the site is incredibly pristine.

The rock art in lower Chevelon Canyon dates from at least 6000 B.C. through about A.D. 1250, just before the area’s inhabitants appear to have moved south to establish the large pueblos of Homol’ovi I and II, Chevelon, and Cottonwood Creek Ruins. The images were pecked into the desert varnish covering the area’s Coconino sandstone. The varnish then grows back at a relatively constant rate, a process known as repatination. The petroglyphs are all dated by relative methods such as style, subject matter, and the extent of repatination. Many are located high up the steep canyon walls in areas that are mostly inaccessible today, and most are highly repatinated.

Anthropomorphic figures are by far the most common images found in the canyon. Some are as tall as four feet, and have detailed facial features and decorated clothing. Many hold implements such as S-shaped throwing sticks. They are often shown clustered together or in rows holding hands or joined at the feet. There are also numerous animals, including deer, big horn sheep, pronged horn antelope, beaver, and water birds, as well as insects and fish. Researchers have identified three distinct rock art styles at Chevelon Steps: the Palavayu Anthropomorphic style (4500 B.C.-A.D. 250), the Chinle Representational style (A.D. 250-800), and the Ancestral Pueblo style (A.D. 800-1250). Chevelon Steps is the type-site for the Palavayu style. In a place like the Steps, there is a strong ritual overlay where many groups may have
gathered on occasion to share in these rituals," Adams says. "This could account for the number and variety of glyphs and the lengthy use of the Steps during eras when groups were still quite mobile."

Because of its visibility, rock art served as an expression of social identity and a means of marking territory. Rock art "conveys to groups moving through the landscape that others have been here before and claim this space," says Adams. "Identity is conveyed by details of the petroglyphs in this case." For the Hopi, for example, most identifiable glyphs represent known clans. "This is social identity. These groups, by being known by others in the area, then can also indicate by their marks that they have rights to that area."

"We are very interested in documenting Hopi visitation to this area," he says, adding that the Hopi council of elders comes out to the ranch every couple of years to visit the Steps. While the archaeological evidence suggests no new rock art was created after the mid-13th century, many of the petroglyphs appear to have been modified after that time, indicating that they continued to serve ceremonial purposes.

"We want to put the petroglyphs into context," says Adams. "That is, to understand where the individuals who carved the glyphs lived, when they were there, and what activities they were involved with."

The researchers have surveyed about half of the 5,000-acre ranch, discovering 120 sites, most of which are artifact scatters that, in some cases, cover more than five acres. Roughly 60 of these date to the pre-ceramic period, prior to A.D. 500. The sites are concentrated along the shallow canyons that

Archaeological evidence suggests that people were moving about this area as long as 13,000 years ago. It appears that the people who occupied Multi-Kiva in the 13th century later joined people from the Hopi region to form the Homol'ovi pueblos in the late 13th and the 14th century.
dissect the ranch, where the occupants could have dug wells to get water. Adams and his colleagues assume that, because of the stable geology, various trees similar to those standing there now would have stood in the canyons in ancient times, providing firewood and building materials.

The students show me an area they call “the quarry,” because ancient people fashioned numerous projectile points and other lithic tools from its high-quality stone. They’ve found two Clovis points in and around the quarry, “indicating 13,000 years of use here,” says Adams. The various “diagnostic finds are helping us date and better understand the context in which the petroglyphs were made.” He notes the “incredible amount of ground stone out here. Even before they were full-time farmers, the inhabitants ground a lot of seeds from the local grasses and other plants—more than I’ve seen anywhere else in the Southwest.” Fifteen varieties of grasses with edible seeds now grow across the varied terrain of the ranch, many of which were likely consumed by ancient people. The consumption of these seeds, and the apparent hunting of deer and antelope that migrated in the fall, suggests that people made frequent, short-term forays here for food and for ceremonial purposes. When corn was introduced to the area around 1000 B.C., the sizes and density of the sites increased, presumably because its production could support larger groups for longer stays. The researchers have also documented six pueblos on the ranch, three of which they’ve excavated. The excavated pueblos date to between about A.D. 1225 and 1255, and cluster around land that appears to have been farmed.

At the end of the 2011 field season, Arizona site steward Darlene Brinkerhoff brought the researchers to Multi-Kiva, a nearby prehistoric pueblo she had been monitoring on state land. Perched on a ridge south of Rock Art Ranch, the site was being vandalized, so the researchers decided to conduct a mapping and documentation project to complement the survey being done of the ranch property, and to provide information for better managing and monitoring the site.

Multi-Kiva Pueblo is a complex settlement with multiple occupations and structures of two different architectural styles—pithouse and pueblo. The site consists of a nearly square, compact, 25-to-30-room pueblo that dates to roughly A.D. 1200. There are several open plaza areas, and two large, circular depressions southwest of the main room-block, one about 33 feet and the other 65 feet in diameter. Numerous ash concentrations, rock alignments, and artifact scatters extend across the ridge top north and south of the pueblo, the vestiges of an earlier occupation dating between about A.D. 500 and 950.

At first it appeared that the extent of vandalism at the site was relatively small, involving only three large holes in the main pueblo, but then the researchers discovered that portions of the main room-block had been heavily damaged. The archaeologists used the looters’ pits to scrutinize the sizes of structures, the nature of the remaining deposits, and the condition of the floors. Due to the height of the rubble...
Rooms are also quite large, averaging 13-by-13 feet, considered very unusual for the Colorado Plateau region, but much more typical for villages found along and below the Mogollon Rim to the south. This, along with other evidence such as the styles of ceramics and projectile points, suggests people initially migrated into the area from the Mogollon region to the south or east, and obtained decorated pottery from other Anasazi people living in the Hopi Buttes area, and to the east along the Little Colorado River.

While investigating Multi-Kiva, the researchers also surveyed 640 acres surrounding the pueblo to better understand its cultural and spatial contexts. They wanted to know if there were other villages nearby, and if so, how large they were, when they were occupied, and what were their residents were doing. They discovered a number of sites that are mostly contemporaneous with Multi-Kiva, although some are considerably older. Most of these sites consist of surface artifact scatters, some of which could be the remnants of buried pithouse villages.

Multi-Kiva appears to have been the central pueblo of an extensive community of small farmsteads that marked the area’s last intensive occupation before the mid-13th century. Despite its name, it has no traditional kivas, however it does have an interesting and varied array of ceremonial structures that were used for purposes similar to kivas,” according to Adams. “Such variety is typical of western Mogollon groups.”

Multi-Kiva’s ceramics, as well as those from pueblos at
Rock Art Ranch, strongly resemble corrugated pottery from Homol’ovi. “This leads us to speculate that groups who occupied Multi-Kiva Pueblo and others in the surrounding region joined groups migrating from what today are the Hopi mesas to form multi-ethnic pueblo communities in the late 13th and 14th centuries that Hopi refer to as Homol’ovi,” Adams says. Since the Clovis period, ancient peoples have used this area for various purposes. “For millennia, Chevelon Canyon was more than a resource for subsistence needs,” he adds. “It was a place of reverence and ritual power that Hopi continue to utilize to this day.”

TAMARA STEWART is the assistant editor of American Archaeology and the Conservancy’s Southwest region projects coordinator.
Conservancy Establishes Its 19th New York Preserve

The Esmond Preserve includes prehistoric sites and associated wetlands.

The 50-acre Esmond preserve contains two sites, known as Esmond 2 and 3, that date from the Late Archaic to the Early to Middle Woodland periods (3000 B.C. – A.D. 1000). The sites were originally discovered in 2005 during a shovel-test survey done in advance of a residential development project. In addition to the archaeological sites, the property, which is located in the Town of Malta in eastern New York, contains associated wetlands, and the development was under review by several government agencies who recommended preserving as much of the sites and associated wetlands as possible. The property was then donated to the Conservancy by the owners Thomas P. Deveno and Thomas J. Farone.

Archaeological testing has identified the Esmond 2 site as a habitation area containing features and artifacts from the Late Archaic to the Middle Woodland periods, complete with Woodland period ceramic pottery fragments. The Esmond 3 site’s abundance of lithic material, including a significant amount of debitage and discarded broken projectile point preforms, indicates that it was a lithic workshop.

“The location of the Esmond property is atypical for a large Native American settlement in the upper Hudson region because it is not on a lake or sizeable stream,” says Edward Curtin, president of Curtin Archaeological Consulting, Inc. a cultural resource management firm that was hired by the developer. “Other local sites in the upland away from Saratoga Lake tend to be very small, very temporary campsites. But something really strikes me about the particular location of the Esmond sites; they are positioned near the headwaters of streams that form the upper part of the route to the Mohawk River.”

Curtin surmises that people traversed the river to a quarry that yielded Onondaga chert, which “arguably was the most important kind of stone used in New York State during the Early Woodland period.” The predominant lithic material found at both Esmond sites is in fact Onondaga chert, which doesn’t occur naturally in Saratoga County, where the property is located. The stone was “the special material that allowed local communities to participate in a regional system of alliances,” he says.

The establishment of the Esmond Preserve demonstrates how the Conservancy serves a unique role in the conservation of America’s most significant archaeological resources. The Stockbridge-Munsee and Saint Regis Mohawk Tribal Historic Preservation Offices, the Army Corps of Engineers, the New York State Office of Parks, Recreation and Historic Preservation as well as consulting archaeologists Adam Luscier of Hartgen Archeological Associates, Inc., and Edward Curtin all played an important role in this acquisition. —Andy Stout
American Archaeology

A Moundville Outlier Saved

The acquisition of the Asphalt Company Mound could reveal information about the development of the Mississippian capital Moundville.

The Black Warrior River Valley in west central Alabama is literally covered with prehistoric mound sites. The largest and best known of these is the Moundville site, which is near the city of Tuscaloosa, Alabama. It is now an archaeological park administered by the University of Alabama Museums. The site consists of over 20 pyramidal mounds arranged around a large plaza. At one time a palisade surrounded it. The site was occupied from about A.D. 1000 to 1450, and for much of this time, it was the dominant social and political center of the region.

It took many years for Moundville to rise to prominence, and many years for it to decline. Archaeologists have tried to clarify the chronology of the construction and use of the mounds at Moundville, and while there is much that remains poorly understood, most researchers agree that it was once a small regional mound site with only one or two small mounds.

There were other small, single-mound sites in the area during what is referred to as the Moundville I phase, approximately A.D. 1050-1250. One of these nearby early mound sites is the Conservancy’s most recent Southeast preserve. Because it was once on the property of an asphalt company, it is sometimes referred to as the Asphalt Company Mound. It is approximately 100-feet across at its base, about 11-feet tall, and located half a mile north of Moundville. Excavations conducted in 1975 by the University of Alabama determined that it is likely contemporaneous with the two earliest mounds at the Moundville site. The excavations also yielded a diverse collection of exotic materials, such as fragments of galena, Mill Creek chert, and sandstone.

For some reason, Moundville grew into a major regional center. The smaller surrounding sites, such as the Asphalt Company Mound, are often referred to as outlier sites, and they hold important information about what led to the transformation of Moundville, as well as the socio-political relationship between Moundville and the surrounding area sites.

The Bank of Moundville, which acquired the Asphalt Company Mound site, has agreed to sell the 19-acre tract to the Conservancy in a bargain sale to charity. The Asphalt Company Mound is the first of the Moundville outliers to be preserved for future researchers.

—Jessica Crawford
Pithouses And Projectile Points

The Siemer Preserve contains evidence of ancient life.

Last winter the Siemer family contacted the Conservancy about buying their property in northeast California near the town of Bieber. The Siemers own 300 acres that are located on the south-central edge of Big Valley and border the Modoc National Forest. The property, which affords picturesque views of Big Valley and the surrounding area as well as a glimpse of the top of Mount Shasta, consists of flatlands covered by grass and sage and rolling hills dotted with junipers. Several intermittent drainages run down the hillside to the valley and a spring is located at the southern border.

There is no official record of cultural resources having been found on the property, but the Siemers have discovered artifacts such as projectile points that suggest a prehistoric habitation. While conducting a cursory survey, the Conservancy found cultural resources in eight different areas. Five
of these areas are situated along the drainages and contain surface artifacts and prehistoric pithouse depressions. The depressions are circular or oval, several feet in diameter, and as deep as two feet. Two of these areas contain at least 10 depressions. A lithic scatter with several stone tools and two trash dumps dating to the first half of the 20th century were also found on the property.

The Achomawi, who are also known as the Pit River Indians, have resided in this area for centuries. According to ethnographic accounts, the Achomawi lived in the pithouses, which were more substantial than their summer residences, in winter. The exteriors of the aboveground portions of the pithouses consisted of slabs of tree bark and branches that were supported by interior posts.

The Siemer property has significant research potential. It can yield more precise information as to when the pithouses were occupied and what the residents were doing. Any new data will enhance the knowledge of the local prehistory.

The Conservancy has acquired the 300-acre parcel and will preserve it in perpetuity. It is named the Siemer Archaeological Preserve in honor of the family.

—Deanna Commons

This chert biface tool was found at the site.

The Protect Our Irreplaceable National Treasures (POINT) program was designed to save significant sites that are in immediate danger of destruction.

Deanna Commons
Barton Preserve Research Ongoing

EAST—Bob Wall of Towson University, working with students and volunteers from the Archaeological Society of Maryland, conducted limited excavations at the Barton Preserve this year. Wall is investigating two different components of this multi-component prehistoric through contact-period site, located in northwest Maryland near the Potomac River.

This year’s research built on previous seasons that explore the deeply buried Paleo-Indian component of the site. This component was originally defined by its bifacial and unifacial tools, associated debitage, and a hearth feature that was radiocarbon dated to approximately 12,300 years ago. Further investigations have expanded beyond the hearth area in an effort to identify additional activity areas and diagnostic artifacts from this early period of the site.

The other focus of this season’s research was the Early-to-Middle Woodland component of the site, which is located on a low terrace where a 2009 magnetometer survey revealed a large anomaly. The researchers have sampled areas within and adjacent to the anomaly to ground truth the survey results.

Research At Spikebuck Town

EAST—At the southern edge of the Appalachian Mountains, near the town of Hayesville, North Carolina, sits the Conservancy’s Spikebuck Town preserve. The preserve, which was acquired in 2011, is part of the Cherokee community historically known as Quanassee that was occupied into the 18th century.

In May of 2014, Jane M. Eastman, an archaeologist at Western Carolina University, directed a field school that conducted a remote sensing survey and also excavated the site. The remote sensing was done to better understand the spatial organization of Quanassee, and it included relocating excavation units that were dug by researchers working at the site in the 1970s.

Measures were taken to ensure that burials were avoided to the best of the researchers’ abilities, and the archaeologists and field school students worked closely with the Eastern Band of Cherokee Indians to develop a plan of action in case any human bones were encountered. When human bone...
These pottery, bone, and brick fragments were recovered during the excavations.

Remote Sensing at Pueblo San Marcos

SOUTHWEST—This summer, students involved with the Summer of Applied Geophysical Experience (SAGE) applied remote sensing technologies to look beneath the surface at Pueblo San Marcos in the Galisteo Basin south of Santa Fe, New Mexico. SAGE is a program sponsored by Los Alamos National Laboratories to give hands-on field experience to college-level students in geophysics. About 40 students from colleges and universities throughout the world receive a combination of classroom instruction and field training by four professors during the program each summer.

San Marcos is one of the largest pre-Columbian settlements in the American Southwest. It contains the remains of a Spanish Mission church, and was occupied from the mid-13th century until the Pueblo Revolt of 1680. It’s likely that some of its residents played an important role in the revolt.

For the past 10 years or so, SAGE has used the Conservancy’s Pueblo San Marcos archaeological preserve to give students experience in four different non-invasive technologies that reveal information about subsurface features. The students presented the results of their individual research topics in Santa Fe this June.

fragments were found in three test units, the excavation was stopped and the bone fragments were reburied.

Work continued in three other excavation units. One of these was located in a floodplain, and testing uncovered multiple plow zones and flood deposits, one of which may date to the Cherokee occupation of the site. In the other two units, which contained less complicated stratigraphy, the researchers identified a large feature that is most likely a house as well as other intact pit features.

The artifacts from the summer’s fieldwork have been cataloged and a report of the fieldwork is forthcoming.

SAGE students use remote-sensing technology at Pueblo San Marcos.
Medieval Mississippians: The Cahokia World
Edited by Timothy R. Pauketat and Susan M. Alt
(SAR Press, 2015; 169 pgs., illus. $60 cloth, $25 paper; www.sarpress.org)

This collection of 17 essays by 28 archaeologists and Native Americans explores the world of the Mississippians, Native Americans united by a common culture that dominated the Southeastern United States and beyond from about A.D. 1000 until the coming of the first Europeans in the 1540s. Thousands of their descendants continue to live in the region. In particular this volume looks at the early centuries of the Mississippian era (A.D. 1000-1300) and its principal city of Cahokia near present-day St. Louis.

Each of the 17 essays focuses on some aspect or place of Mississippian life, from its origins in the Cole Creek culture of Mississippi and Louisiana to its spread north, south, east, and west, and to the fall of Cahokia. The central place of the Mississippians was Cahokia, a large city of some 40,000 people in A.D. 1100 with dozens of earthen platform mounds supporting the temples and homes of the ruling class. Other mounds contain many burials. Monk’s Mound, the largest pyramid north of the Valley of Mexico, is 100 feet tall and its base covers some 13 acres. Cahokia has an elevated causeway, a grand and secondary plazas, and an astronomical center known as Woodhenge. The central part of the city was enclosed by a large wooden palisade.

Cahokia was a center of a large trade network that linked the smaller centers of the Mississippian world. Corn agriculture fed the large populations. Cahokia was also a spiritual center with activities that included human sacrifice, and it influenced a vast area. Art from Cahokia is found throughout the region. The game of chunkey was played with disk-shaped stones by everyone in the region, and it had enormous influence on the culture that it helped bind together. The various authors pull all of these threads together to give us a sharper view of the complex Mississippian system.

Written for the general public and amply illustrated with black and white and color photographs, drawings, and maps, Medieval Mississippians is an important addition to the growing body of Mississippian literature. It is the eighth volume of an excellent series on North American archaeology by SAR Press.

Beliefs and Rituals in Archaic Eastern North America: An Interpretive Guide
By Cheryl Claassen
(University of Alabama Press, 2015; 408 pgs., illus., $60 cloth; www.uapress.ua.edu)

Appalachian State University archaeologist Cheryl Claassen has produced this outstanding guide to the places, rituals, and beliefs of the Archaic period in the Eastern United States and Canada. The Archaic period in North America is the second period of human occupation, spanning from about 8000 to 2000 B.C. It is characterized by the subsistence lifestyle of hunting and gathering of seeds, nuts, shellfish, fish, and other animals. It ends with the development of agriculture. Regional variations are abundant.

Part one of this book is a guide to Archaic spiritual beliefs and practices, especially burial practices. They were the first Americans to construct mounds of shell or earth for the ritual practice of human burials, many of which contain ceremonial grave goods. Part two describes 91 Archaic sites in the Eastern United States and Canada, including a brief description of what artifacts and characteristics they contain. Part three is an annotated compilation of Archaic rites and beliefs including items that were sacred to them.

Claassen pulls together an enormous amount of archaeological information to give the reader a basic understanding of this important part of the Archaic world.
Ancient Teotihuacan: Early Urbanism in Central Mexico
By George L. Cowgill
(Cambridge University Press, 2015; 312 pgs., illus., $35 paper; www.cambridge.org)

Beginning in about 150 B.C., a great city developed in the fertile Teotihuacan (Nahuatl spelling) Valley some 25 miles northeast of what is now downtown Mexico City. Before long it was the largest city in ancient America with 100,000 to 200,000 residents occupying more than 11.5 square miles. It contained elaborate palaces, well-designed neighborhoods, and dozens of pyramids, including the massive pyramids of the Sun and the Moon. The city flourished for several centuries, but by about A.D. 550 it was in decline, and a century later it was in ruins.

The author, Arizona State University archaeologist George Cowgill, has spent a lifetime studying Teotihuacan, and this is the first comprehensive English language book on the great city. Drawing on his own research as well as that of many other scholars, Cowgill deftly creates a vivid picture of 800 years of Teotihuacan history. Scholars have had difficulty coming to grips with Teotihuacan, not only because of its size and complexity, but also because its inhabitants left no written records. While the city is firmly within Mesoamerican cultural traditions, it lacks the writing system of the Maya, who were 800 miles to the south, and very literate. The presence of a distinct ruling class is far from obvious, and that ubiquitous Mesoamerican institution, the ballcourt, is nowhere to be found. Undaunted, Cowgill tackles all the archaeological problems, giving the reader a clear picture of a huge, vibrant society.

The story begins in about 400 B.C. at the southern end of the Valley of Mexico, 30 miles south of Teotihuacan, at the enigmatic site of Cuicuilco, now largely buried under lava flows. It was the first urban area in central Mexico. Cowgill suggests that volcanic activity in the southern Valley of Mexico as well as to the east around modern Puebla may have caused a migration to the Teotihuacan Valley, where a new city was beginning to rise. By A.D. 1, it already had a population of 20,000.

Teotihuacan has scores of impressive pyramids laid out on the north-south Avenue of the Dead. Temples and palaces are equally impressive, and they are carefully described by the author. Even more impressive are the 2,300 compounds of the ordinary people of Teotihuacan, and it is here that Cowgill is at his best. Some consisted of specialized artisans. Others were peopled by migrants from elsewhere in Mexico, like Oaxaca. They were laid out on a grid that evokes city planning, and very few have been scientifically excavated.

Ancient Teotihuacan is an impressive synthesis of decades of work at the great city. It is heavily illustrated with some 100 photos, nine maps, and three tables, and it is overwhelmingly informative for both the scholar and the layperson. While the central core of Teotihuacan is preserved by the Mexican government, much of the outlying neighborhoods are not. Urban development and modern agriculture are now taking a heavy toll on the great city and threaten to forever destroy much of its archaeological legacy. —Mark Michel

The Lost World of the Old Ones: Discoveries in the Ancient Southwest
By David Roberts
(W.W. Norton & Co., 2015; 353 pgs., illus., $28 cloth, www.wwnorton.com)

David Roberts writes about mountaineering, adventure, exploration, Western history, and anthropology. In this engaging travelogue, he and two of his mountaineering compatriots set out to explore some of the remote ruins and rock art sites of the American Southwest. He finds that it takes all of his skill and not a little verve to reach some of the remote granaries of the Ancestral Puebloans tucked high into sheer cliff faces. Those ancient people were formidable rock climbers and mountaineers who may or may not have used ropes. Some of their dramatic rock art sites are just as difficult to reach.

If you are ready for a break from serious archaeology, this is a fun tale of exploration and discovery in one of America’s most inaccessible and interesting regions. On a more serious vein, Roberts challenges archaeologists to seek answers through unconventional inquiry that could lead to breakthroughs in the understanding of the ancient peoples of the Southwest.
Maya of Yucatán and Calakmul

When: January 14 – 24, 2016
Where: Mexico
How Much: $2,995 per person ($325 single supplement)

From A.D. 300 to 900 the remarkable Classic Maya culture flourished in the Yucatán Peninsula of Mexico. We’ll visit some of their most splendid sites, including Dzibilchaltún, Balankanche Cave, Mayapán and Chichén Itzá. We’ll also drive deep into the forest to visit Calakmul, which has been undergoing significant excavations in recent years. Calakmul is believed to be the largest of all the Maya cities. More than 100 stelae and 6,500 structures have been discovered so far. During the Late Classic it dominated the entire southern Yucatán. Accompanying us will be John Henderson, one of the nation’s leading Maya scholars.
Guatemala Highlands and Copán

When: March 10 – 20, 2016
Where: Guatemala and Honduras
How Much: $2,995 per person ($325 single supplement)

Rain forests, snow-capped volcanoes, and magnificent lakes make up the landscape of the ancient Maya in the highlands of Guatemala. On our tour you’ll experience a complete spectrum of history ranging from ancient ruins to modern Maya cities. Our travels will take us from beautiful Lake Atitlán to the Honduran rainforest, where we will visit Copán, considered the crown jewel of the southern Maya cities. John Henderson from Cornell University will accompany us on the tour.

This stele depicts 18 Rabbit, one of Copán’s greatest rulers.
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The Archaeological Conservancy’s POINT-5 Program—an effort to Protect Our Irreplaceable National Treasures—is a $2 million emergency acquisition project designed to ensure that virtually no nationally significant archaeological site is destroyed by development, looting, or the effects of the environment. Conservancy cofounder Jay T. Last made a $1 million challenge grant, to be matched dollar for dollar, to launch POINT-5. Due to the Conservancy’s dedicated members and donations from foundations, the $1 million match for POINT-5 was recently attained.

Unlike traditional land acquisition programs, the POINT-5 Program gives the Conservancy an indispensable tool with which to work: an immediate cash offer. As part of this phase of the POINT project, the Conservancy placed its emphasis on the historic sites of the Northeast, colonial forts in the Southeast, Late Prehistoric cultures of the upper Ohio River Valley, Great Basin archaeology of the West and Southwest, and nationally significant Paleo-Indian sites. The Conservancy would like to thank everyone who generously donated to this significant program for their support.
American Archaeology Magazine
On The Web

You can now read complete back issues of American Archaeology on the Web. The available issues range from Spring 1997, American Archaeology’s debut issue, to Fall 2013. There will be a two-year lag between the most recent print and Web issues.

American Archaeology also has a subject index on the Web that is searchable by key word as well as a list of all the books that have been reviewed in the magazine.

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Some Conservancy members think the only way to help save archaeological sites is through membership dues. While dues are a constant lifeline, there are many ways you can support the Conservancy’s work, both today and well into the future. And by supporting the Conservancy, you not only safeguard our past for your children and grandchildren, you also may save some money.

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