Diving into History

The Latest Underwater Discoveries

In recent years, for-profit underwater salvors have captured the public imagination, garnering breathless headlines announcing their recovery of "treasure" ships. But there's much more to the world of nautical exploration than the giddy promise of gold coins. Every field season, underwater archaeologists make extraordinary discoveries that expand our vision of humanity's past. These precious insights are the fruit of careful research, thousands of dives, and hundreds of hours in the lab.

On the following pages, we highlight just a few of these ongoing underwater archaeology projects, from the recovery of a sixth-century B.C. Phoenician shipwreck, where excavators found a cargo that included elephant tusks and amber, to work on a 19th-century vessel in Oklahoma's Red River that has given archaeologists their first look at early steamship design. In addition to updates from the field, you'll find a few suggestions about how you can safely explore underwater sites yourself.

In deciding which projects to feature, we canvassed several underwater archaeologists, and relied, in particular, on James Delgado, president of the Institute of Nautical Archaeology and a valued member of our editorial advisory board. Of course, we can only skim the surface of this vibrant field. For accounts of other extraordinary nautical discoveries, including a list of the most important underwater finds of the past 50 years, visit www.archaeology.org.

—The Editors

Roman Stone Carrier

KIZILBURUN, TURKEY

The glorious marble monuments of Greece and Rome are architectural masterpieces to be sure, but they are also great feats of engineering and logistics. After spending the last four years excavating the wreck of a first-century B.C. stone carrier in southeastern Turkey, nautical archaeologist Deborah Carlson of Texas A&M University has a unique perspective on how those great buildings took shape. "The ship was carrying a column," says Carlson. "It had eight giant marble column drums, each about five feet across, and a capital." Stacked one on top of another, the drums would have formed a 30-foot-high Doric column.

The ship foundered off Kızılburun ("Crimson Cape"), only 40 miles from the Temple of Apollo at Claros, famous for an oracle similar to the one at Delphi. Based on detailed measurements and stylistic analysis, Carlson is now virtually certain the column was intended for Claros. "It's an eye-opener in terms of the logistics," she says. "The eight drums in the cargo, which together weigh about 50 tons, weren't enough for a single column at Claros, each of which was made of 11 or 12 drums. Using a ship like this one would have required 20 voyages to supply enough marble for the 14 known columns at Claros." Geological studies have pinpointed a quarry on Marmara Island in the Sea of Marmara in northern Turkey, as the likely source of the marble.

Carlson's team moved the drums with lift balloons (left) in order to excavate a wooden pallet that protected the hull of the stone carrier. They also found marble headstones and basins that were probably bound for Claros. Perhaps the most poignant find was a terracotta statuette portraying a pillar with a bearded face, likely on board as the ship's protective deity. —Eric A. Powell

HMS *Ontario*

LAKE ONTARIO, NEW YORK

In June 2008, after a 35-year search, electrical engineers Jim Kennard and Dan Scoville discovered the HMS *Ontario*, the oldest shipwreck in the Great Lakes and the only known fully intact British warship in those waters. The vessel sank in Lake Ontario during a sudden gale on October 31, 1780, with more than 120 passengers aboard, including 30 American prisoners of war. Kennard and Scoville used side-scanning sonar to locate the wreck, which rested in an area of the lake where depths exceed 500 feet. They later explored the vessel with a remotely operated vehicle (ROV).

"The first thing we came upon was not *Ontario* but a longboat that probably was trailed along behind the ship," says Kennard. "The next thing we saw was the ship's rudder and then seven windows in the stern. At that point, we knew from British Admiralty drawings of the ship that we had found *Ontario* for sure."

Images from the ROV show the vessel's two masts are standing and its cannons are still on board. *Ontario* was once the area's most sought-after wreck, so its location is being kept secret to protect it from looters. *Ontario* is considered a British and American war grave and is the property of the British Admiralty.

"It's phenomenal that a ship of that age is still so intact and complete," says Carrie E. Sowden, the archaeological director for the Great Lakes Historical Society. "Really incredible finds like this bring the Great Lakes into the forefront and remind people that there is a lot of history here."

—Nicole Albertson

Min of the Desert

THE RED SEA, EGYPT

Nearly 3,500 years ago, the female pharaoh Hatshepsut ordered five trading ships built for a voyage over the Red Sea to the legendary Land of Punt. Now, Florida State University maritime archaeologist Cheryl Ward has plied the same waters on a similar vessel, a 66-foot-long, 30-ton reconstruction of an 18th Dynasty trading ship. Called *Min of the Desert*—in honor of the powerful Egyptian fertility god commemorated in stelae and shrines at the Middle Kingdom lagoon site of Mersa Gawasis—the ship was partly based on a detailed relief depicting Hatshepsut's fleet in her funerary temple.

Ward also relied on archaeological data recovered from Mersa Gawasis, where since 2003 archaeologists have unearthed wooden ship parts, anchors, and ropes still tied in original knots, evidence that ships were dismantled at the site. She used measurements from the artifacts, including a complete hull plank, in her design.

Last December, Ward and a crew of two dozen students, engineers, and sailors embarked on an 18-day voyage on the Red Sea aboard the reconstructed ship. The trip indicated that the Egyptians were much more proficient shipwrights than previously thought. "When the wind picked up and filled our sail, we just took off," she says, about twice as fast as she'd expected. "My hope was that we would be able to have a nice, solid voyage in which we could test the capability of the ship. I had no idea it would be so exhilarating, so easy to operate, and such a direct reflection of what we see in the ancient reliefs." —Eti Bonn-Muller

Heroine

SWINK, OKLAHOMA

Not many underwater archaeologists have to cross a cow pasture to get to their site. But Kevin Crisman of Texas A&M University is well acquainted with that nautically odd commute after four years exploring the *Heroine* in Oklahoma's Red River. The early steamship was bound for an army fort with supplies when it sank in 1838, after being hit by a "snag," or submerged log.

"The earliest steamship plans are from the 1850s," says Crisman. "So this is our first real look at one of these early ships, which revolutionized commerce in the American Midwest by making upstream travel feasible." Working in strong currents and with visibility never more than a foot, Crisman and his crew mapped and excavated the site largely by feel. "The wreck had its paddle wheels and much of its machinery intact," he says. "It was just a trove of information on early steam propulsion." The team eventually hired a helicopter to remove *Heroine*'s machinery (right), which is now undergoing conservation.

Two barrels of well-preserved pork were also brought to the surface. "Our nation was built on pickled pork," says Crisman, but until now, no intact barrels have ever been recovered. Their contents give scholars direct evidence of meatpacking practices of the period. "It was the first time we'd seen anything like this," says University of Georgia zooarchaeologist Elizabeth Reitz, "and I don't think we'll see anything like it again." —Eric A. Powell

Corinthian Shipwrecks

ADRIATIC SEA, ALBANIA

Thanks to decades of political isolation under the reign of paranoid Communist dictator Enver Hoxha, Albania's coastline has long been off-limits to divers of all kinds. "Virtually nothing is known about the cultural resources in the waters off Albania," says Jeff Royal (left), archaeological director of the nonprofit RPM Nautical Foundation. Together with Adrian Anastasi of the Albanian Institute of Archaeology, Royal is now directing a survey of the area, one of the last unexplored coastlines of the Mediterranean world.

Though only two years into the project, the team has already made numerous finds. "There are all kinds of sites down there," says Royal, "from ancient Greek and Roman cargo ships to a modern ferry that sank just a few years ago with cars aboard."

So far, the most significant sites are artifact scatters from ships that sank while transporting cargo from the Greek city of Corinth to its colonies on the Adriatic coast. "We're finding a high concentration of Corinthian goods," says Royal, "including those from an amphorae carrier and a vessel that was shipping roof tiles to the colonies. Once we've analyzed these wrecks we'll know much more about how trade worked between Corinth and its colonies from the sixth to second century B.C."

The team is continuing to use sonar to survey the coast from Greece to Albania's northern neighbor of Montenegro. "We've got at least another decade of work, minimum," says Royal. —Eric A. Powell

Submerged DNA

CHIOS, GREECE

Unexpected insights often result when scientists from different disciplines get together for drinks. That's what happened to archaeologist Brendan Foley of Woods Hole Oceanographic Institution and environmental geneticist Maria Hansson (left) of Lund University in Sweden. "As science nerds do, we were discussing our research over a glass of wine," says Foley. Using an autonomous underwater vehicle, a robot that operates without a tether to a ship, he had recently surveyed a late classical wreck near the Greek island of Chios, and was lamenting his inability to identify the ship's cargo. "They do DNA analyses on the pots, right?" asked Hansson.

Working with the Greek Ministry of Culture, Foley acquired samples from two amphorae recovered off the wreck. Hansson then conducted standard DNA tests in her lab in Sweden to see if genetic material had survived more than 2,400 years on the bottom of the ocean. "Until now, everyone thought that the marine environment would be a lousy place for the preservation of DNA," says Foley.

Hansson found genetic traces of olive and oregano in one amphora and tree resin in the other—direct evidence of the original contents. The herb would have both flavored and preserved the olive product. "We can see what these ancient people were doing to boost their economies," says Foley. "Now you've got something that tastes good and will last longer."

Foley and Hansson (who are engaged) are now refining the technique and assessing its limitations. Foley envisions testing amphorae from wrecks in collections throughout the Mediterranean to create a clearer picture of the ancient economy than has ever been seen before. —Samir S. Patel

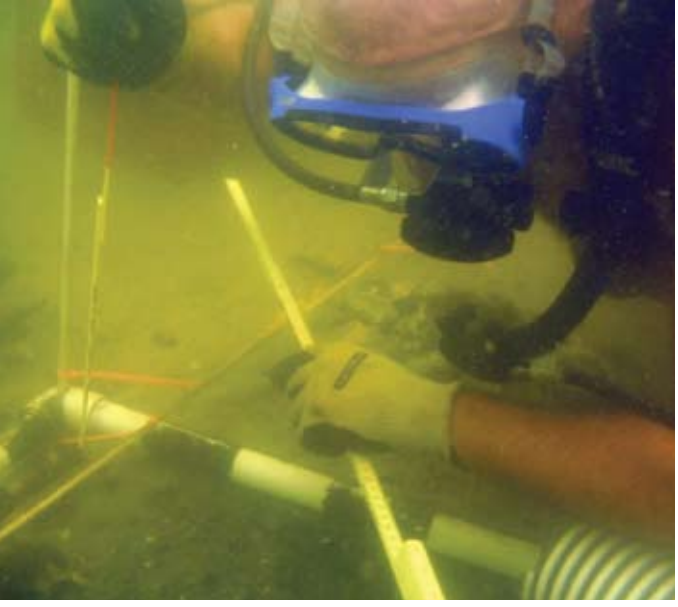
The Khan's Lost Fleet

BACH DANG RIVER, VIETNAM

In A.D. 1287, China's great Mongol emperor Khubilai Khan received word that his navy had been crushed in Vietnam. Nearly 400 of the emperor's prized ships, part of a massive invasion force, had become trapped in the Bach Dang River, where Vietnamese soldiers set them afire with flaming arrows and burning bamboo rafts. In later years, the leader of the Vietnamese forces, Tran Hung Dao, boasted of his effortless victory. "When the enemy advances roaring like fire and wind," he observed, "it is easy to overcome them."

But how, exactly, did Tran Hung Dao and his forces defeat the great armada? With the Vietnam Institute of Archaeology, nautical archaeologists Randall Sasaki at Texas A&M University and Jun Kimura of Flinders University in Adelaide, Australia, are now searching for new clues to explain the momentous victory. According to texts from the period, Vietnamese forces cut down hundreds of trees, sharpened their ends, and placed them in a "stakeyard" across the Bach Dang River. Then, small Vietnamese ships lured Khubilai Khan's fleet into the area just before the tides turned. As the water ebbed, long lines of stakes emerged several feet out of the water, barricading the river and preventing escape.

Sasaki and Kimura are mapping all surviving remnants of the stakeyard. Their studies show that the Vietnamese forces made clever use of islands and other natural obstacles to create part of the barrier. And today, at least some of the stakeyard lies in local rice paddies. "The preservation is really good under the mud in the rice fields," notes Sasaki. "If we could find a ship, it would be wonderful." —Heather Pringle



Tristán de Luna's Ships

PENSACOLA BAY, FLORIDA

In August of 1559, Spanish nobleman Don Tristán de Luna y Arellano anchored a fleet of 11 ships in Florida's Pensacola Bay. He intended to found the first European colony in the present-day southeastern United States. But in just a month, a storm grounded six of his vessels, destroying much of the doomed colony's supplies. Luna abandoned the effort shortly thereafter, leaving behind scant remains of the early Spanish presence.

Archaeologists identified one of Luna's ships, the so-called Emanuel Point wreck, in the 1990s. Now a team led by University of West Florida archaeologists John Bratten and Greg Cook has located a second, smaller Luna ship, dubbed "Emanuel Point II," just a quarter of a mile from the first wreck in Pensacola Bay. "During the last week of our 2006 field season, we found the ship's ballast stones," says Bratten. The crew then exposed intact hull timbers and recovered artifacts that were stored in the bow and stern, such as jars that once contained olive oil, wine, or water. "We also found rat bones and the remains of cockroaches," says Bratten.

The ships are the oldest known in Florida waters and provide nautical scholars with a new look at 16th-century shipbuilding practices in the New World. They also help give historians a complete picture of who accompanied Luna to Florida. "We recovered three pieces of Aztec pottery and a group of obsidian cutting blades," says Bratten. The artifacts would have belonged to Aztec warriors who accompanied the expedition. —Eric A. Powell

Phoenician Wreck

CARTAGENA, SPAIN

Dubbed the "princes of the sea" in the Book of Ezekiel, the Phoenicians sailed from their ports in modern-day Lebanon all the way to the Iberian Peninsula in search of precious commodities. Trading a costly violet-blue dye, Tyrian purple, and exquisite glasswares, these master navigators and merchants filled their holds with silver and other valuables from about 1200 to 300 B.C. But archaeologists have uncovered little evidence of these ships apart from depictions on reliefs (below right), or much direct proof of the vast extent of their trade networks.

Now, a discovery off the coastal city of Cartagena in southeast Spain by archaeologists Mark Polzer and Juan Pinedo of Texas A&M University promises to fill many gaps in our knowledge. At a depth of 60 feet, the two have found artifacts from a sixth-century B.C. Phoenician shipwreck, including goods as diverse as amber from the Baltic Sea coast and elephant tusks (above) from the Atlantic coast of Morocco. "They went beyond the Straits of Gibraltar and connected to trade in the Atlantic," says Polzer. "This is the first site to produce direct evidence of this."

On a more human level, the artifacts also promise to tell us much about the diets and lives of Phoenician sailors. During initial excavations, the team recovered remains of acorns, hazelnuts, and olives that crew members would have eaten, as well as a small stone cube that likely served as a gaming piece. "It looks like a little die," says Polzer. "I always like these types of finds because they connect you to an individual." —Heather Pringle

Liman Tepe Harbor

BAY OF IZMIR, TURKEY

The world's oldest wooden anchor is just one discovery made since excavators at Turkey's Liman Tepe, or "harbor mound," turned their attention from land to sea. On the Turkish Aegean coast's Bay of Izmir, Liman Tepe was an important settlement from the Early Bronze Age (third millennium B.C.) to the classical period, when it was the site of the Greek city Klazomenai.

Excavations at the site began in 1979, but in 2000 Ankara University archaeologist Hayat Erkanal and his team began working on a harbor complex buried just off Liman Tepe's coastline. With the help of Israeli archaeologists led by Michael Artzy of Haifa University, the team investigated a 300-foot stone breakwater that formed one of the world's earliest artificial harbors. They also located traces of a pier jutting out from the breakwater, and dug a series of stratified harbor floors, including one dating to the sixth century B.C. where they found the anchor.

"We know the site goes deeper," says Vasif Sahoglu, director of the Ankara University Research Center for Maritime Archaeology. "No one has ever dug a Bronze Age harbor in the Mediterranean before. If we find one at Liman Tepe, it could tell us about how maritime trade was organized in that period. If you consider that only two Bronze Age shipwrecks have ever been investigated, this would be very exciting."

—Malin Banyasz

Tips for Underwater Site-Seeing

Diving on an archaeological site is one of the great thrills of a lifetime. Here are a few commonsense guidelines to make sure that both you and the site remain safe.

Choosing the right site is important—never dive on one that hasn't been opened officially to recreational divers or one that is above your skill level because of depth, visibility, or currents. Research the site and the period to which it dates, so you know what to expect, and always work with a well-established dive operator with guides that know the site well. If necessary, take advanced or specialized diving courses beforehand, which is especially important for wreck diving.

When you actually reach a site—either a wreck or an artifact scatter—dive carefully. Treat archaeological sites like coral reefs, where it is critical not to touch or remove anything or go digging around. Make sure your buoyancy and fin control are good. Also, dive tight, which means making sure your equipment, including your pressure gauge and backup regulator, don't drag beneath you, where they can cause damage or snag.

Most important, stay calm, have fun, and be sure to report anything unusual to your guide. You might actually make a discovery, and you'll definitely have great stories to tell on the surface.

—Samir S. Patel

Where to suit up:

Perhaps the best place to experience underwater archaeology is in one of the 13 National Marine Sanctuaries (NMS) around the country (sanctuaries.noaa.gov). **Thunder Bay NMS** in Lake Huron, Michigan (left), where shipwreck preservation is unusually good, offers a particularly rewarding experience. The **1733 Spanish Galleon Trail** might be the best dive in the sanctuaries, featuring 13 ships that were grounded on reefs 80 miles south of the Florida Keys. Several sanctuaries on the West Coast are worth visiting as well. The *Winfield Scott*, a Gold Rush–era steamer, is in the waters of **Channel Islands NMS**. Over the years, the treacherous coastline at **Monterey Bay NMS** has caused at least 140 wrecks, some of which are diveable.