

Searching for the Bonhomme Richard

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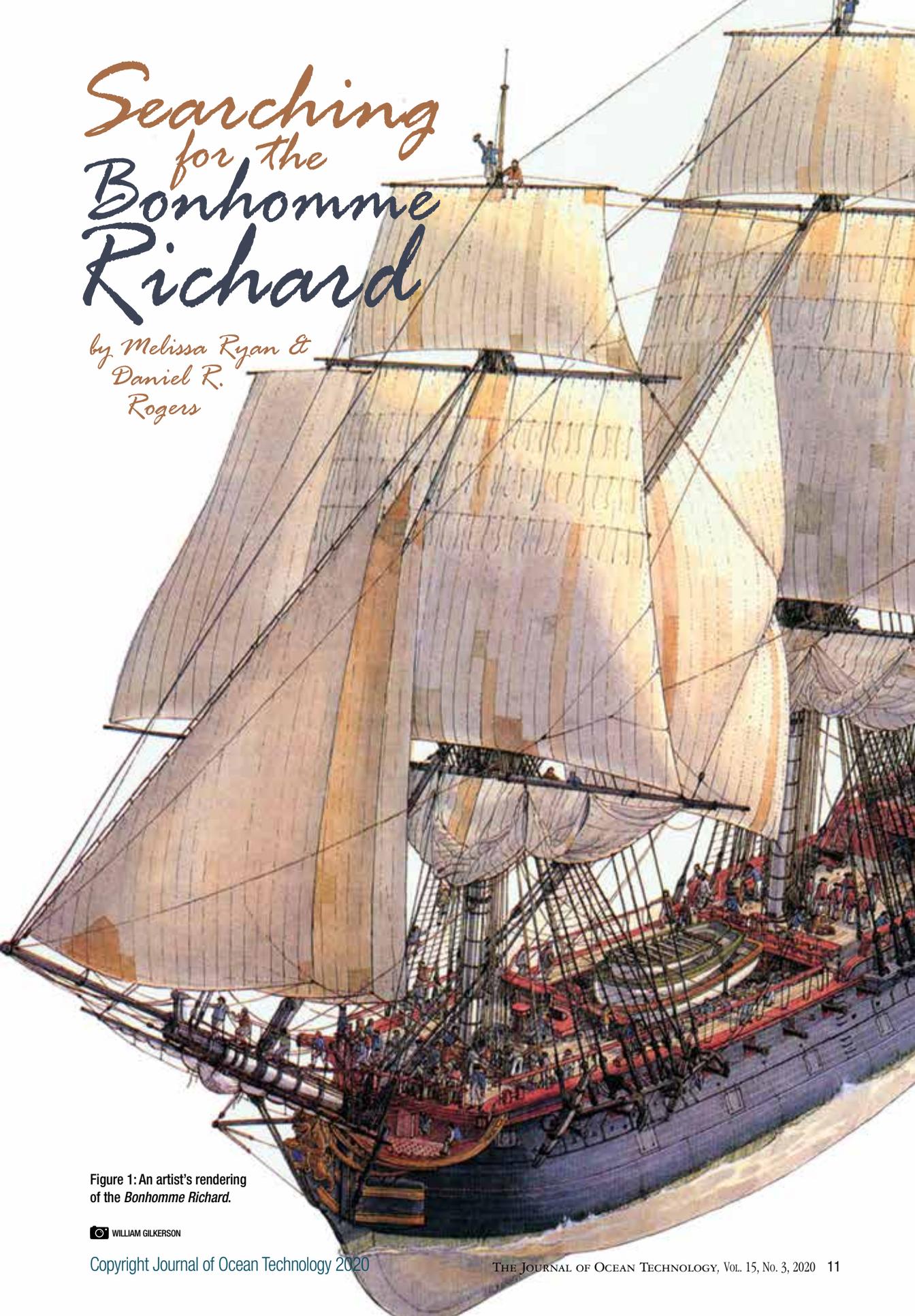


Figure 1: An artist's rendering of the *Bonhomme Richard*.

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Introduction

The *Bonhomme Richard* (*BHR*) was a sailing warship that is an iconic symbol of America's fighting spirit and colourful maritime history (Figure 1). Commanded by American naval hero John Paul Jones during the Revolutionary War, the ship was lost off the east coast of England after a ferocious battle with the British ship *Serapis* in 1779. It was during this naval engagement that Jones's famous words – "I have not yet begun to fight!" – became part of American history. Although he was victorious, the *BHR* drifted for 36 hours after the battle ended, as the crew unsuccessfully tried to save its badly damaged ship. Jones took command of *Serapis*, and watched from its deck as the North Sea claimed ownership of his beloved vessel.

Although the *BHR* was lost, Jones' victory over *Serapis* was a significant turning point for America in its fight for independence from British rule. It elevated the status of the Continental Navy, and convinced France to contribute more resources to the American war effort. Finding the remains of the *BHR* would rekindle public enthusiasm for America's naval heritage, allow for further studies on the construction of Revolutionary War vessels, and present the only means for interpreting the lives of the *BHR* crew members, of which little is known. The quest has been extremely challenging, since the ship's log is missing a 20-hour period – from the time the battle ended to the ship's sinking – and there is no record of the direction or speed at which the ship drifted.

The Ship

The *BHR* was a French East Indiaman originally named *Duc de Duras* and later renamed *Bonhomme Richard* ("Wise Man Richard") to honour Jones's friend Benjamin Franklin, who at the time was writing *Poor Richard's Almanack*. France and America were strong allies and Franklin was instrumental in convincing the French to loan the U.S. more resources to fight the war. One of these resources was the *BHR* itself, which was

outfitted as a warship for Jones at the significant and sole expense of the French Crown.

There are estimated to be tens of thousands of shipwrecks at the bottom of the North Sea. The difficulty is not in finding one of the many wrecks scattered throughout this region, but in locating and conclusively proving the identity of one particular wreck. The *BHR* has a long list of distinguishing features from which it could be identified. Any one of these features on its own may not be conclusive proof, but a wreck having many of these characteristics would be indicative. It is likely that a positive identification of the *BHR* would at first present as circumstantial evidence.

One feature used to identify a shipwreck are its anchors. The shape and style of the anchors can point to their place of origin and the time period in which they were made. The *BHR* had two bower anchors weighing one ton each and it is known that the bower and sheet anchors were 4.5 m along the shank.

Weapon debris scattered among a wreck site also contains useful identifiers, if present. Cannons alone can offer many clues as to the origin and time period of a shipwreck. For example, the sizes of these guns and their inscriptions are distinctive. Cannon trunnions may have markings from the foundry that include the name of the foundry master. In the case of the *BHR*, markings on the cannon breechings are expected to be in French pounds. Even the number of cannons can be specific to a particular ship based on historical documents; the *BHR* was equipped with 34 guns – six 18-pounders and 28 12-pounders. The style of firearms within a wreck site can also be telling. For example, musket barrels were mounted differently on French and English weapons. Blunderbusses, or short firearms with a large calibre barrel and flared muzzles, had evolving designs and can be used to narrow down the time period of a wreck.

Pig iron, shot, and old cannons found in the middle of a wreck may have been used as iron

ballast. The *BHR* carried approximately 200 tons of iron ballast, primarily pig iron, and this should prove distinctive for its identification. Other ships of its time were usually fitted with stone ballast, rather than iron, because of the expense of the latter.

The size of frames and other hull components is also helpful in identifying wrecks. The *BHR* was a very large ship by the standards of its time, measuring 47 metres in length by 12 metres wide. Its frames were 56 cm long and 28 cm thick. Its planking was made of 8 to 10 cm oak tanks along the bottom and sides of the ship, up to and including the lower gun deck. From the upper gun deck upward, the planking was 8 cm fir, and the keel was oak. A wreck with wooden debris matching these characteristics might be the *BHR*. Further, it was common for French ships at that time to use square wooden nails as fasteners. It is also known that the *BHR* had “knees” made of iron instead of wood; knees are curved pieces used to support deck beams.

Other artifacts we might expect to find in the remains of the *BHR* include ceramics that suggest a French origin, large copper kettles used for cooking, and the presence of artifacts denoting a military function. The distinguishing features summarized here are by no means exhaustive. A long list of characteristics that might serve as identifiers for the *BHR* wreck are known. However, the difficulty is acquiring and deploying the right tools and resources needed to find them.

The Search

Finding a particular shipwreck on the bottom of the sea is like searching a large sandy beach for your lost car keys. Both are almost impossible to find without proper tools and strategies. Over the last 15 years, a variety of marine technologies have been applied to the search for the *BHR*, including the U.S. Navy’s nuclear Submarine *NRI* (Figure 2), French and U.S. hydrographic and dive support ships (Figure 3), aerial and marine magnetometry, sonars, underwater vehicles, and human divers.



Figure 2: U.S. Navy Submarine *NR1*, which was used in 2008 to search for the *Bonhomme Richard*.

The capabilities of these technologies are all very different, but are unified by a targeted exploration strategy to search for the *BHR*: first explore large areas of the seafloor in relatively low detail to find specific targets of interest, and then utilize more focused and detailed exploration methods to prove the identities of those targets.

The first step in this exploration strategy is to image tens or hundreds of square nautical miles of seafloor to find potential wreck sites, just as you might comb back and forth on the beach in a visual search for your lost car keys. A practical way to capture an “image” of the seafloor is with sonar, specifically side scan sonar (Figures 4a and 4b). This type of device is generally towed behind a ship or mounted on its hull and can also be installed on autonomous underwater vehicles (Figure 5). It operates by emitting a wide fan of acoustic pulses down toward the seafloor while moving horizontally through the water. The result is an image that interprets “soft” acoustic reflections as dim pixels and “hard” reflections as bright pixels on a stitched image. The acoustic pulses are emitted at a set frequency and the device moves through the water at a constant speed. The final image is a two-dimensional plot of the seafloor with the direction of motion on



Figure 3: The *USNS Grasp*, a diver support vessel, alongside before a *Bonhomme Richard* expedition out of Sunderland, England, in 2016.



GRASP

S



Figure 4: (A) A Klein side scan sonar used by the French Navy to search for the *Bonhomme Richard* in 2016. (B) An unidentified object imaged by side scan sonar in the North Sea.



Figure 5: A REMUS 100 autonomous underwater vehicle on the deck of the *USNS Grasp* in 2016.

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one axis and the extent of the sonar fan on the other. Objects in these images that cast “shadows” are likely protruding from the bottom, since the acoustic pulses cannot “see” past tall objects. The longer a shadow is, the higher the object extends from the seafloor.

Interpreting side scan sonar images is as much an art as it is a science. The challenge of this task is to differentiate between actual manmade debris and shipwreck-shaped rock piles based on blurry sonar images. Analyzing hundreds or thousands of images on a single expedition is like a Rorschach inkblot test that might indicate how motivated you are to find a shipwreck. Fortunately, there are certain characteristics that distinguish a wreck from a geological feature. For example, long and linear sonar returns that are distinct from

seabed patterns are unlikely to be natural features and often indicate the presence of manmade objects. Researchers on *BHR* expeditions are tasked with determining the likelihood that imaged objects are actually shipwrecks, and highlighting “target” sites for further exploration.

A limitation of side scan sonar imaging, however, is that it only shows objects that rest on top of the seabed. In the search for the *BHR*, this is complicated by the fact that the ship has most likely been covered by sediment with each ebb and flow of the tide for the last 241 years. In this case, visually searching the surface of the sandy beach for your lost car keys is probably not enough. You need to have some idea of what is buried below the surface. Magnetometers are useful for this purpose



Figure 6: A towed magnetometer used to detect magnetic anomalies while searching for the *Bonhomme Richard* in 2016.

because they can detect magnetic signatures from metal objects buried in the seabed. This technology can be useful in detecting the presence of iron cannons, knees, or ballast on a wreck such as the *BHR*. Towed magnetometer devices are similar in form and operation to towed side scan sonar units (Figure 6). They are often used in tandem and can help to distinguish between true shipwreck targets with magnetic signatures and shipwreck-shaped geological features.

This is similar to how a hand-held metal detector might help to distinguish between suspiciously key-shaped rocks in the sand and an actual car key with a detectable magnetic signature. Researchers are able to narrow down their list of “target” sites initially detected by side scan sonar with magnetometer readings. Magnetometers have been utilized on many of the same expeditions as side scan sonars in the search for the *BHR*.



Once the locations of possible shipwreck targets have been identified, like your comprehensive log of car key-like anomalies on the beach, the next step is to shift exploration strategies and focus on smaller areas of seafloor to ground truth and identify the targets. In the search for the *BHR*, this has been done using remotely operated vehicles (ROVs) as well as U.S. and French Navy divers. The advantage of using ROVs for this work is that they can be deployed for long

periods of time, given that subsea currents and surface conditions remain manageable. They are typically equipped with specialized underwater lighting and high-definition cameras able to zoom in on potentially identifying shipwreck artifacts. Working-class ROVs have been used on several *BHR* expeditions over the past 15 years.

The U.S. and French Navies have also deployed divers to investigate potential *BHR*



A



B

Figure 7: (A) A deadeye block with lanyards intact discovered on *Target 131*. The buried portion of the deadeye was well preserved. (B) Deadeyes are part of the standing rigging on old sailing ships.



Figure 8: *Target 131* revealed large sections of partially buried wooden planking.

wreck sites, who have dexterity and finesse beyond that of ROVs. However, the sites that have been investigated during the *BHR* search are at depths and pressures that push the safety limits of human divers. For this reason, the ships that divers have operated from were equipped with hyperbaric chambers that allowed them to properly decompress after deep dives. French Navy divers were only able to explore the target sites on the seafloor for around seven minutes at a time in teams of two, making it challenging to efficiently use the time and resources dedicated to these missions. Weather conditions and sea states need to be fairly calm for dive operations, which adds another layer of complexity when working in the dynamic North Sea.

It should be noted that *BHR* missions have often served multiple purposes. Training, research and development, technology transfer, and strengthening international relations are often main priorities when the U.S. Navy deploys resources in searching for the *BHR*. This also means that the search has largely been dependent on the availability of Navy ships, personnel, and resources which does not always lead to optimal expedition planning. As of now, we have not yet confirmed the final resting place of the *BHR*. However, there is one promising site that might just be our lost car key in the sand.

Target 131

Melissa Ryan, an author of this essay, has led 14 expeditions to search for the wreckage of the *BHR*. After searching 1,813 square kilometres of the North Sea, and investigating dozens of shipwrecks, only one stands out as a possible candidate. Known as *Target 131*, it was first discovered with side scan sonar in 2012 during a French Navy survey. Further investigation in subsequent years revealed a mostly buried wooden wreck and an anchor with dimensions that closely match the smallest anchor on the *BHR*. The site contains objects indicative of an 18th century French vessel, such as a wooden deadeye block with its lanyards intact (Figures 7a and 7b), remains of a spar and spar hoop, iron concretions, and extensive areas of partially buried wooden planking (Figure 8). According to historical records, the dimensions of the spar and the deadeye block correlate to those believed to have been outfitted on the *BHR*.

To date, no modern objects have been found on the site and preliminary investigations have shown that partially buried objects are well-preserved. All discoveries so far are encouraging although there is not yet definitive proof of the wreck's identity. To confidently identify the wreck, artifacts must be retrieved.

Ownership of the Wreck

Ownership of the *BHR* wreckage is

complicated. It was a French vessel on loan to America, commanded by an American Continental Navy officer, and flying an American flag at the time that it sank in British waters. Further, France's loan of the ship was never repaid. Given the many possible interpretations of vessel ownership, it is easy to see why each of these countries would want to claim the wreck. Maritime salvage law is ambiguous, some of it antiquated, and thus it is largely open for interpretation. An extensive French-U.S. expedition to prove the identity of *Target 131* was planned for 2019, but last minute concerns about ownership and management of the still-unidentified wreck resulted in the mission being postponed indefinitely.

The Path Forward

A multinational agreement between the U.S., France, and possibly the U.K. would seem to ease the apprehensiveness of parties interested in the study and management of the *BHR* when its location is eventually proven. Precedent for successful Franco-American shipwreck management was set in 1989 with the case of the *CSS Alabama*, a Confederate ship lost off the coast of Cherbourg, France, in the 1860s. The remains of the *BHR* could be managed in a similar manner, with both countries working together to honour our alliance and shared piece of maritime history.

Conclusion

This search is a quest that belongs to everyone – the interested citizen, the history buff, members of our military, and the young student whose interest in marine technology is piqued by reading about *BHR* missions. Although the project began in 2006 with a small team of people looking for a shipwreck, it has evolved into a significant international project, with over 700 U.S. and French Navy personnel participating across 14 expeditions. The search pushes the limits of technology and personnel in the extreme North Sea environment and each has held their own in impressive ways.

As we continue our research, outreach, and networking efforts to find support for the next expedition, we hope that the story of the *Bonhomme Richard* will continue to inspire interest and appreciation in the rich maritime heritage of the U.S. For more information, please visit www.bonhomme-richard.org. ~



Melissa Ryan is Vice President of the Global Foundation for Ocean Exploration. She is a scientist, ocean explorer, and educator with more than 25 years of experience in the oceanographic and education fields. Ms. Ryan has led 14 expeditions to search for the

Bonhomme Richard, flagship of John Paul Jones. She has an extensive background in education, having instructed in-person and online courses for undergraduates and teachers on science topics. She worked for seven years as an Education Specialist for NOAA's Office of Ocean Exploration and Research, where she managed a national professional development program on ocean science and exploration for educators. Prior to her work in education, she worked for ten years analyzing and promoting environmental policy for the Connecticut Council on Environmental Quality.



Dan Rogers recently joined the Consortium for Ocean Leadership as a Program Specialist for Ocean Exploration and Research. He has a diverse background in ocean engineering, media production, and education. Mr. Rogers holds a B.S. in physics from the University

of Massachusetts Amherst and a M.S. in mechanical engineering from the University of Hawai'i at Mānoa. Additionally, he is currently working toward a Master of Business Administration and Environmental Policy from the University of Massachusetts Dartmouth. He supported over 25 expeditions aboard NOAA Ship *Okeanos Explorer* as an ROV pilot and engineer with the Global Foundation for Ocean Exploration. Before going to sea, he worked for five years as a science educator and directed the development of a planetarium film about Polynesian star navigation and the Hawaiian voyaging canoe *Hōkūle'a*, which is now shown daily at the Bishop Museum in Honolulu. He is passionate about supporting the responsible management of our most valuable ocean ecosystems.