THE INA QUARTERLY

BRINGING HISTORY TO LIGHT THROUGH THE SCIENCE OF SHIPWRECKS

STEAMBOATS OF SHELBURNE

2015 FIELD SEASON

AN INTERVIEW WITH
AFFILIATED SCHOLAR ART COHN

2015 INA BOARD MEETING

HIGHLIGHTS FROM
BURLINGTON, VERMONT

FALL 2015
VOLUME 42, NO. 3

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ON THE COVER: Launched in 1906 for passenger and freight service on inland waterways, the steamboat *Ticonderoga* now resides at the Shelburne Museum in Vermont (A. Campbell). **LEFT:** Jack Kelley was one of INA's earliest supporters.

SHELBURNE SHIPYARD STEAMBOAT GRAVEYARD

The identification of four 19th-century Lake Champlain steamboats in Shelburne, Vermont

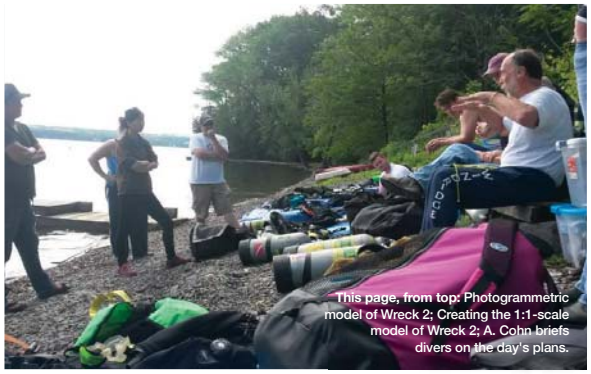
BY CAROLYN KENNEDY

Enormous engine bed timbers on Wreck 4 (*Whitehall*) challenged the photogrammetry process in the low visibility of Lake Champlain.

PHOTO: K. CRISMAN

In 2014, ten researchers representing and supported by both INA and the Nautical Archaeology Program (NAP) at Texas A&M University (TAMU) began archaeological work at an old shipyard in Lake Champlain. This year, a field school consisting of 12 undergraduate and graduate students from TAMU returned to Shelburne, VT, to continue the archaeological recording under the direction of NAP Professor and INA Vice President Kevin Crisman and myself. Alongside the students, Kevin and I worked closely with the Lake Champlain Maritime Museum (LCMM) Archaeological Director, Christopher Sabick (also a NAP alumnus), and Director Emeritus, Arthur Cohn (also an INA Research Associate profiled in this issue), who served as our divemaster. Ron Adams also returned to assist with divemaster duties in 2015 and we had plenty of help from friends and volunteers including property owners Mark Brooks and Charlie Tompkins.

Since the 1820s Shelburne Shipyard has been home to several steamboat companies including the Champlain Transportation Company (CTC). By 1833 the CTC bought all property from its competitors, which included the shipyard in Shelburne Bay. The



This page, from top: Photogrammetric model of Wreck 2; Creating the 1:1-scale model of Wreck 2; A. Cohn briefs divers on the day's plans.

PHOTOS : THIS PAGE, FROM TOP: D. BISHOP, A. PASSEN; OPPOSITE PAGE : K. YAMAFUNE

shipyard was home to the construction of new steamers, the repair of working boats, and a dumping ground for condemned vessels. Since wooden boats often lasted fewer than 15 years on the lake, their hulls were often stripped of valuable machinery and fittings before their owners left the wooden timbers to rot in the harbor. The remains of these steamboats retain no engine or boiler parts, but their wooden structural components are well-preserved in the cold, fresh water of Lake Champlain. Their deposition in this sheltered harbor offers archaeologists an easily accessible, small site with an abundance of ship timbers to examine.

In 2013, a satellite image of Shelburne Shipyard revealed four vessels sunk in shallow water in an area of approximately 47,360 ft^2 (1.08 acres). When we first examined the wrecks in person in June 2014, we identified the hulls as steamboats due to the large engine bed timbers found on all four. Engine bed timbers are heavy, longitudinal timbers on which the engine machinery was anchored. By incorporating these long, structurally sound timbers, shipwrights ensured the engine machinery would be securely fastened to the hull and also that the weight of the engine and boilers would be distributed along the length of the vessel instead of centered amidships, causing potential sagging.

Our first season on site revealed that these timbers, along with other major structural components, varied greatly in shape and design between the four hulls. Historical research paired with archaeological data led us to believe that the four wrecks were *A. Williams* (1870), *Winooski* (1832), *Burlington* (1837) and *Whitehall* (1838), labeled Wrecks 1-4, respectively. Wrecks 3 and 4 (*Burlington and Whitehall*) shared the most similarities. They were both very large (158 ft. and 214 ft.), had similar framing patterns and engine bed timber placement and construction. The framing pattern of Wreck 2 was the most different, with heavy, large, frames that were square in section and spaced much more closely than Wrecks 1, 3 and 4. Wreck 1 had light framing, similar to Wrecks 3 and 4, though the ship was much smaller overall. It also contained six pairs of longitudinal bed timbers versus the three pairs found on Wrecks 3 and 4.

The 2015 field school team (top L-R) R. Adams, C. Kennedy, K. Melia-Teevan, G. Tsai, D. Bishop, (middle L-R) M. Deckinga, R. Matheny, M. Barthule, S. Koenig, K .Crisman, D. Billman, J. Belisle, A. Cohn, (bottom L-R) K. Yamafune, C. Sabick, D. Israel-Meyer, L. Carpenter, T. Ehlers, C. Miller, A. Passen.

It was observed soon after the 2014 field season that the preliminary site plan for Wreck 2 closely resembled the site plan of *Phoenix* I (1815), studied as a doctoral dissertation by NAP alumnus George Schwarz in 2009-2010. The similarities between the two wrecks apparently built 17 years apart struck us as odd, considering Wrecks 2, 3 and 4, all built within one decade, were so different. For that reason, I selected Wreck 2 as the focus of our 2015 field school.

2015 DISCOVERIES

Work included measuring and drawing cross sections of Wreck 2. The cross sections revealed a fact that was overlooked in 2014: the beam of Wreck 2 was over 26 ft. This did not match *Winooski*'s documented 20.5-ft. beam. Our initial identification was therefore proven incorrect and Wreck 2 was, once again, a mystery. Even though we were certain Wreck 2's general construction was older in style than the other three wrecks, according to our historical sources no other steamboats built prior to *Burlington* seemed to fit. Though we continued the recording process throughout the month of June, my plan for the rest of the summer was to determine the identity of Wreck 2. I was lucky enough to have access to a collection of documents gathered by A. Peter Barranco, longtime friend and affiliate of the LCMM.

After nearly a month of perusing historical documents related to Lake Champlain, I stumbled across the steamboat enrollment papers. Much to my surprise, I discovered that one steamboat, whose final resting place was unknown, was actually 7 ft. shorter than recorded in Ogden Ross' *Lake Champlain Steamboats* 1809-1930, the primary source I had been using for shipwreck identification. The steamer was *Phoenix* II, built to replace *Phoenix I* after the latter sank in 1819 due to fire. According to the enrollment papers, *Phoenix* II was 143 ft. long rather than 150 ft. long, with a 27 ft.-beam. This placed *Phoenix* II within the range of plausible measurements for the 133 ft.-long wreck, since Wreck 2 was missing several feet forward of the apron, possibly accounting for the disparity. A similar inconsistency shows that the recorded length of *Phoenix* I was 146 ft. while the length of the actual vessel was 133 ft. Furthermore, *Phoenix* I's remains were also 133 ft. long; however the historical length of the steamer was 146 ft. Not only were the sizes of both wrecks comparable, the resemblance in the site plans suddenly made sense. Ross states that the Lake Champlain Steamboat Company (which built *Phoenix* I and *Phoenix* II) "apparently determined that the steamboat *Phoenix* [II] should resemble its self-perpetuating mythological predecessor in more than name only." We have since noted minor differences in the construction of the two vessels, but this could easily be explained by five years of advancement in design. Though we may never know for sure what steamer Wreck 2 represents, *Phoenix* II is currently our most educated guess.

The work on Wreck 2 was not restricted to recording cross sections. Since this field season began one week earlier than the previous year, we were fortunate to arrive

before the lake vegetation obscured many of the wreck timbers. Our first few days on site granted us the best visibility we had throughout the entire month. During the orientation dive on our first day we discovered features we had not observed in 2014. These included a section of frames from Wreck 3 (*Burlington*) that were detached and had fallen over between Wrecks 3 and 2. Another feature was nearly 90 ft. of side planking from Wreck 2 that had fallen over from the port side. Since Wreck 2 lists slightly to port, the rocks covering the hull had partially rolled over to the port side, making it more difficult to identify features beneath the rocks and sediment.

On Wreck 4 (*Whitehall*), a triangular feature off the starboard side near the stern was discovered late in the 2014 season. In 2015, one dive team examined this structure in more detail. Despite having a much clearer picture of these timbers, their purpose was unknown. At first we believed they could be part of a hogging truss, a feature commonly employed on longer steamboat hulls to prevent drooping of the bow and stern. The structure was deemed too large, however, to be part of a truss. Our second assumption was that it might be the wooden A-frame of Wreck 4's walking-beam engine; however, at only 16 ft. it was too short. Just as we resigned ourselves to another unsolved mystery, steamboat scholar Jean Belisle joined us on site for a few days. Belisle brought with him a collection of scanned Boulton & Watt machinery plans. Among the plans was a drawing of a paddlewheel-box support structure, which was nearly identical to our own drawings of the structure on Wreck 4. Based on a reconstruction made the previous year, the measurements fit almost perfectly with *Whitehall*'s paddlewheel box. Finally, one of the most exciting aspects of the 2015 field season was our incorporation of photogrammetric recording. Kotaro Yamafune, currently completing his Ph.D. in the Nautical Archaeology Program at TAMU, organized the photogrammetric recording of the four steamboat wrecks. Wreck 2, the target of this year's field work, was recorded with more than 10,000 photographs taken with a Nikon DSLR camera and fish-eye lens. The other three wrecks were also recorded photogrammetrically using video feed. While the 1:1-scale-constrained models of the three other wrecks are still in the processing phase, the results from Wreck 2 are complete. In order to create a 1:1-scale model, Kotaro had our team measure distances between control points. Over the course of four long dives, two teams of three divers measured over 100 distances between control points. These measurements had to be extremely precise in order to create an overall accurate 1:1 model. Our teams were excellent, as the model was correct within 1.2 in. accuracy after the first try! Even Kotaro was surprised to see this level of accuracy on such a large wreck.

The 1:1-scale, three-dimensional model of Wreck 2 will serve to supplement and cross-check the measurements our divers made by hand using traditional recording methods for hull timbers.

The 1:1-scale, three-dimensional model of Wreck 2 will serve to supplement and cross-check the measurements our divers made by hand using traditional recording methods for hull timbers. If measurements are missing from the field notes, the 1:1-scale-model can be used to obtain these measurements without having to return to the site.

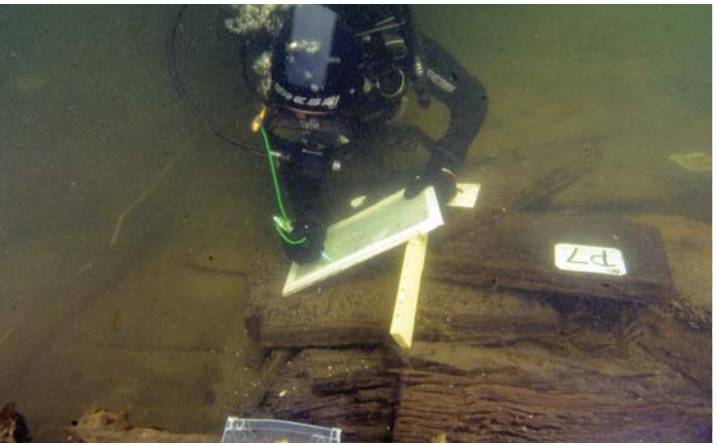
FUTURE PROJECTS

The troublesome rock piles that prevented recording of the port side frames in 2014 continued to block our progress. Though Dr. Crisman and I successfully recorded two cross sections, one at the midships frame and one just abaft the largest rock pile, these are not sufficient to reconstruct the full shape of the hull. Removing the rocks and ceiling planking in order to record the curves of the cross sections revealed that the buried timbers were in pristine condition. The color of the wood and the sharp corners of the timbers appeared as if the timbers had been cut yesterday. We have high hopes that removing more of the rock pile will uncover equally well-preserved wood.

Though we were able to dig out almost 2 ft. of silt around the sternpost, creating a large hole between the rudder and the sternpost, the bottoms of both features remain buried. After observing the excellent preservation of the frame timbers buried under the rocks and silt, it seems reasonable that the timbers making up the stern assembly are equally well-preserved.

Owing to the bow being not as deeply buried in silt, we were able to hand-fan away a fair amount of the silt that obstructed the starboard forward end of the wreck. The bow assembly proved more complicated than expected. Large blocks were discovered between the garboard planking and the keel on the starboard side, no doubt an effort to strengthen the outer hull. These blocks, or chocks, are not typical features of the bow assembly. Aside from the strange filler blocks, the stem timbers were difficult to interpret due to heavy erosion. The keel traveled forward and was rounded as if beginning the rake, however was cut abruptly flat on its forward end. What appeared to be the apron was the only surviving upright timber of the bow assembly, and was strangely scarfed to fit over the keel. It was clear that in between the apron and keel at least one timber was missing or badly damaged, most likely completing the stem. While we have a much clearer understanding of the bow features than we did in 2014, more study is needed. The 2015 field season yielded just enough data for us to conclude that Wreck 2, along with the other three wrecks in Shelburne Shipyard, will aid our understanding of this experimental phase in steamboat construction during the 1920s and 1930s. The incredibly heavy frame timbers of Wreck 2, paired with the massive chocks found at the bow and quite different from the light timbers found on Wrecks 1, 3, and 4 indicate that priorities in shipbuilding were shifting between the 20s and 30s, an extremely short period of time in the conservative world of ship construction. Dr. Crisman and I are pleased with our progress and are optimistic about returning to Shelburne, Vermont in 2016 to continue our work on Wreck 2 and the other steamboats.

PHOTOS: FROM LEFT, D. BISHOP, K. YAMAFUNE, K. YAMAFUNE



From left: G. Tsai records Wreck 2 timbers; The bow timbers of Wreck 2, which is believed to be the steamboat *Phoenix* II.; The hole between Wreck 2's sternpost and rudder, the bottom of which has yet to be uncovered by the dredge.