

# THE INA QUARTERLY

A PUBLICATION OF THE INSTITUTE OF NAUTICAL ARCHAEOLOGY

## 2013 YUKON RIVER STEAMBOAT SURVEY

DOCUMENTING THE WRECKS  
OF THE KLONDIKE GOLD RUSH



**THE ROCKLEY BAY  
RESEARCH PROJECT**  
IN SEARCH OF A 17TH-  
CENTURY NAVAL BATTLE

**SIXTY YEARS  
OF SERVICE**  
CELEBRATING INA'S  
RESEARCH VESSEL

FALL 2013  
VOLUME 40, NO.3

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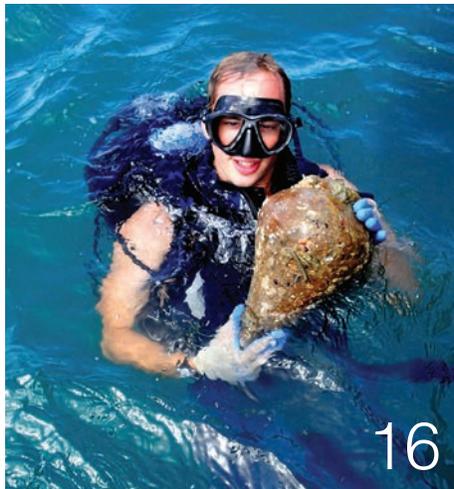
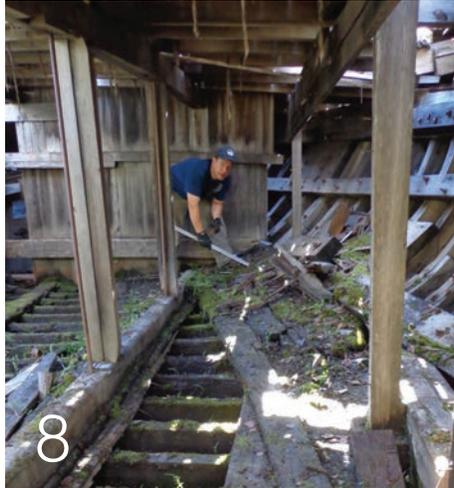
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# CONTENTS



## DEPARTMENTS

- 4 LETTER FROM THE PRESIDENT
- 6 NEWS & EVENTS
- 28 REVIEW
- 30 RETROSPECTIVE

## FIELD REPORTS

- 8 **THE 2013 YUKON RIVER STEAMBOAT SURVEY**  
Documenting unique hull designs in the hulks and wrecks of the Klondike Gold Rush  
BY JOHN POLLACK AND SEAN ADAMS
- 16 **SEARCHING FOR THE 17TH CENTURY IN ROCKLEY BAY, TOBAGO**  
Seeking out remains from the Franco-Dutch War  
BY KROUM N. BATCHVAROV AND DOUGLAS INGLIS

## ARTICLES

- 24 **SIXTY YEARS OF SERVICE**  
Celebrating INA's Research Vessel, *Virazon*  
JOHN D. LITTLEFIELD

**ON THE COVER:** The team assesses the situation from atop the collapsed superstructure of *Seattle No. 3* -- one of the seven vessels in the West Dawson shipyard.

The Institute of Nautical Archaeology is a non-profit organization whose mission is to advance the search for the history of civilization by fostering excellence in underwater archaeology

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## A LETTER FROM THE PRESIDENT

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Recently someone told me that INA is an organization that celebrates its pioneers and past deeds. My response was “Why shouldn’t we, inasmuch as INA has blazed the trail of excavation and conservation and publication of shipwrecks from so many different places and periods?”

In the classical archaeology seminar I am teaching this semester we talk about those key figures that shaped the discipline 250 years ago. To examine the founding of underwater archaeology as a scholarly discipline we can look back only 50 years to the pioneering efforts of Peter Throckmorton, George Bass, and Claude Duthuit, among others. In other words, INA archaeologists have been there from the beginning.

One of the articles in this issue of the *INA Quarterly* celebrates another key member of virtually every Turkish shipwreck excavation or survey for the past 35 years – INA’s research vessel *Virazon*, formerly known as U.S. Army T-502. What fun we had perusing the image archive with INA Archivist Meg Anderson to locate some of the black-and-white photos of *Virazon*’s early years.

This issue is also about the future. INA archaeologists are forging new partnerships in new places like Tobago, Japan, and Sri Lanka. INA research associates and affiliated scholars are uti-

lizing new technologies to record and preserve the fascinating relics of our maritime past, as in the Yukon Steamboat Survey, which is the subject of one of two field reports in this issue.

INA may celebrate our pioneers but we are always looking toward the future, and there is no better indication of this than the fact that in 2013 INA will award the first annual Claude Duthuit Archaeology Grant – \$25,000 toward a single underwater archaeological project of high caliber and impact.

It is sobering to reflect on the challenges and risks of those early underwater projects; the optimism and selflessness of their early pioneers.

Today’s nautical archaeologists face different challenges, with increasing administrative hurdles from universities and governments, but some things have not changed – we still care deeply about the past; we still feel an urgency and a responsibility to preserve, protect and share that past.

If you are reading this it is because you care as much as we do, and I urge you to help INA in its mission to bridge the gaps in our shared seafaring history.



Deborah Carlson  
[president@nauticalarch.org](mailto:president@nauticalarch.org)



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# CLAUDE DUTHUIT

## (1931-2011)

Underwater Archaeologist,  
Explorer, and INA Director

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INA is honored to announce the establishment of the **Claude Duthuit Archaeology Grant**. This \$25,000 grant will be awarded each year to the underwater archaeological project that best captures the **innovative, bold, and dedicated** spirit of Claude Duthuit – a pioneer of nautical archaeology.



### Pioneer

Diver, innovator, and designer of essential excavation and safety equipment

### Scholar

Author, documentary filmmaker, philanthropist, and passionate protector of artistic copyright



### Ambassador

Loyal supporter of INA since its inception, Army veteran and recipient of France's highest decoration, the Legion of Honor

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# NEWS & EVENTS

Bodrum gets a freeze dryer, INA fieldwork in Asia, forthcoming publications, and NAP alumni news

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## BODRUM CONSERVATION CONTINUES TO GROW

The conservation facilities of INA's Research Center in Bodrum, Turkey continue to grow with the imminent arrival of a 1.2-ton freeze-dryer from the Museum of Cultural History in Oslo, Norway. The freeze-dryer, which is 20 years old and in excellent condition, will be a terrific asset for INA's ongoing conservation of wood, rope, and other organic material often found on shipwrecks. The Museum of Cultural History made the unit available to INA free of charge, provided that we meet the cost of shipping it from Oslo to Bodrum, which was realized with help from INA Directors and the National Geographic Society. For more on the use of freeze-dryers to treat waterlogged wood, see the article in *INAQ* 39.1&2:22-23 by past INA president Dr. Donny Hamilton, head of Texas A&M University's Conservation Research Laboratory.

## UPCOMING INA FIELDWORK IN ASIA

Frequent readers of the *INA Quarterly* are undoubtedly aware that the bulk of archaeological fieldwork takes place in the summer between teaching semesters, but two important ongoing INA fieldwork projects in Asia will resume this winter. In Vietnam, a collaborative team of researchers representing INA, Monash University, Murdoch University, and the Institute of Archaeology in Hanoi will return for a fifth season to the Bach Dang River to survey, excavate, and collect core samples from the naval battlefields of the 13th-century Mongol invasion. Early next year, a team of INA staff and Texas A&M University graduate students will return to Sri Lanka, where one year ago, together with colleagues from the Sri Lankan Department of Archaeology, we initiated excavation of the 1st-century BC shipwreck at Godavaya (*INAQ* 40.1). With the help of a grant

from the National Endowment for the Humanities, INA will ship two important pieces of equipment to Sri Lanka for use on the excavation: a two-person recompression chamber and Nitrox unit that produces oxygen-rich compressed air, which reduces nitrogen absorption and extends bottom times at depths of less than 120'.

## INA AND AIA

INA is honored to be a sister organization of the Archaeological Institute of America (AIA) which sponsors hundreds of public lectures every year including those endowed in the name of INA researchers George Bass (2013-14 lecturer Susan Katzev) and Dick Steffy (2013-14 lecturer Dr. William Murray). INA President Dr. Deborah Carlson is also an active member of the AIA's National Lecture Program and will be delivering a talk on the Tektaş Burnu shipwreck in Valparaiso, Indiana on January 28, 2014.

## FOLLOW INA ONLINE

Find the latest news, excavation blogs, photos and more at [www.nauticalarch.org](http://www.nauticalarch.org). Like our Facebook page, too!





Numerous INA-affiliated fieldwork projects will be featured in scholarly presentations at the AIA's Annual Meeting in Chicago, January 2-5, 2014. Visit [www.archaeological.org](http://www.archaeological.org) for more information on these and other AIA events.

### FOR THE SHELF

Bibliophiles will be interested in new titles including *The Modern Explorers* (Thames and Hudson, 2013) which features a chapter authored by INA Founder Dr. George Bass, and *The Archaeology of Watercraft Abandonment* (Springer, 2013) which includes a chapter by INA research associates John Pollack and Robyn Woodward on their diligent efforts to record the fascinating ships of the Yukon Gold Rush. Bass himself has been busy preparing his first e-Book entitled *Archaeology Beneath the Sea: My Fifty Years of Diving on Ancient Shipwrecks*, scheduled for release by Boyut Publishing later this year. INA Vice President Dr. Kevin Crisman is making final corrections to what promises to be a spectacular volume on the War of 1812, *Coffins of the Brave*, expected from Texas A&M University Press in early 2014. INA members receive a 30% discount on all titles from Texas A&M University Press, including J. Richard Steffy's *Wooden Ship Building and the Interpretation of Shipwrecks*, now available in paperback.

### ALUMNI NEWS

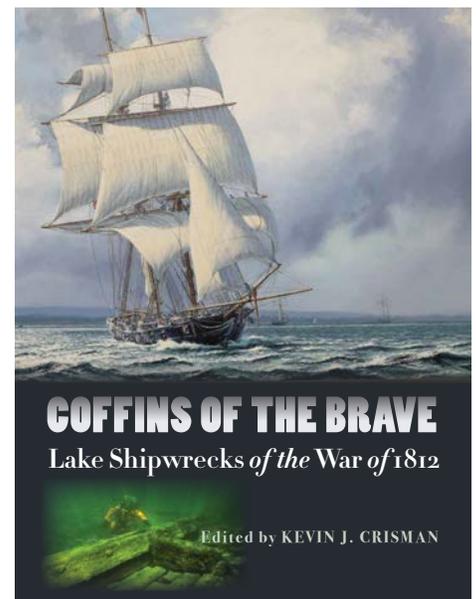
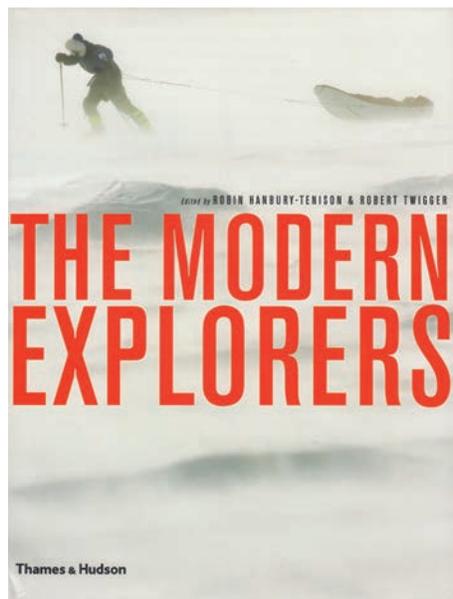
INA Research Associate Dr. Rebecca Ingram (M.A. 2005) successfully defended her doctoral dissertation entitled "An Analysis and Reconstruction of Shipwreck YK 11 (7th century AD) from the Theodosian Harbor at Yenikapı in Istanbul, Turkey," in May 2013.

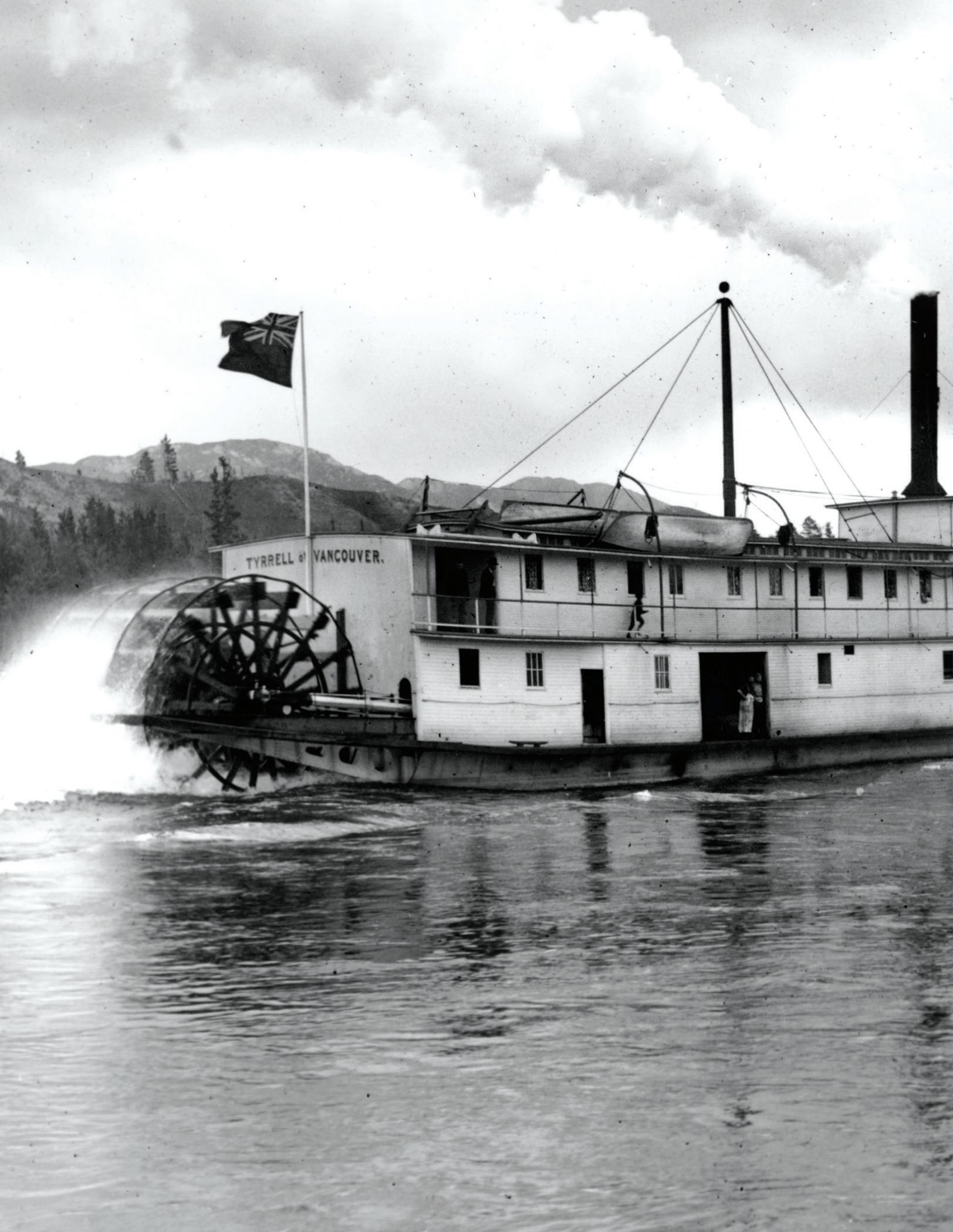
INA Research Associate Dr. Michael Jones (M.A. 2007) successfully defended his doctoral dissertation entitled "The Recovery, Reconstruction, and Analysis of Yenikapı 14 (YK 14), a Middle Byzantine Merchant Ship from the Theodosian Har-

bor Excavations at Yenikapı, Istanbul," in August 2013.

Dr. Erika Washburn, who earned her M.A. from the Nautical Archaeology Program in 1998, was recently appointed Manager of the Lake Superior National Estuarine Research Reserve in Wisconsin. Washburn earned her Ph.D. at the University of New Hampshire in 2009; her dissertation focused on land use decision-making and participatory action research in coastal watersheds, for which she received the Walter B. Jones Award for Excellence from the National Oceanic and Atmospheric Administration (NOAA).

Dr. Justin Leidwanger, who earned his M.A. from the Nautical Archaeology Program in 2005, began a tenure-track post in the Department of Classics at Stanford University earlier this year and received one of two inaugural Cotsen Excavation grants to first-time project directors from the Archaeological Institute of America. Leidwanger is directing the INA-affiliated Marzamemi Maritime Heritage Project, which is a collaborative excavation, survey, and heritage management initiative that focuses on the maritime landscape and seaborne communication off the coast of southeast Sicily.





TYRRELL of VANCOUVER.

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# THE 2013 YUKON RIVER STEAMBOAT SURVEY

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Members of this INA project return for their eighth season locating and recording the maritime relics of the Klondike Gold Rush

BY JOHN POLLACK AND SEAN ADAMS

In 2013, members of the Yukon River Steamboat Survey traveled north for our eighth season documenting the hulks and wrecks of the Klondike Gold Rush. The numerous sites provide opportunities to study the full range of stern-wheel steamboat designs of more than a century ago. To date we have learned there were many different styles of sternwheelers in the Yukon drainage. Practical shipbuilding was still the rule, designs evolved via builder's experience and 'trial and error,' and both personal and business risk were common aspects of Yukon steamboating.

This year we concentrated on two unique hull designs used on the river during the Klondike Gold Rush now near Dawson City.

## THE STEAMBOAT TYRRELL

The 43.9 meter-long steamboat *Tyrrell* was

one of three composite-hull steamboats prefabricated for the Canadian Pacific Railway (CPR) in Toronto and then shipped by rail to Vancouver for assembly. *Tyrrell* was built at the Polson Iron Works while *Minto* and *Moyie* were built at the Bertram Iron Works. All three ships were



Opposite: Historic photo of the steamboat *Tyrrell*, circa 1900.

destined for the new all-Canadian Stikine River route to the gold fields.

*Tyrrell* was launched in Vancouver on June 6, 1898 but the Stikine route had collapsed that spring, and the vessel was sold to the British America Corporation. It was moved into the Yukon River drainage via St. Michael and subsequently worked on the Whitehorse-to-Dawson City route. Ownership eventually passed to the British Yukon Navigation Company, and the ship was laid up in the 1920s.

The *Minto* and *Moyie* remained unassembled in Vancouver. The CPR rerouted them to southeastern British Columbia to serve on the water routes connecting the

transcontinental railway lines. Both ships were lengthened by 6.0 m with steel parts fabricated in Toronto. The vessels' active careers ended in the 1950s. *Minto* was scuttled in the Arrow Lakes whereas *Moyie* was preserved at Kaslo, BC as a National Heritage Site.

*Tyrrell* now lies opposite Dawson City at the old shipyard along with six other large stern-wheel steamboats. The hull is divided by two longitudinal bulkheads, and five transverse bulkheads to create 15 compartments. The bulkheads, sides, frames and deck beams are steel, but the lower hull planking is wood. The superstructure, one engine cylinder, boiler, paddle wheel and rudder system are missing. Lying on the main deck is a second disconnected horizontal high pressure engine cylinder and a monkey rudder assembly.

Our assessment of *Tyrrell* was aided by

years of work inside *Moyie* at Kaslo, BC. The objective was to confirm differences in design, and we expected those differences to be small. Our hypothesis was simple: all three Stikine vessels had been ordered at the same time by the largest transportation company in Canada, and the decision to lengthen the hull of the *Moyie* was made after the ships had been prefabricated in Toronto. Hence the only major difference would be an additional row of compartments, and *Tyrrell* should be identical to *Moyie*, except 6.0 m shorter. Six years later the CPR relied upon blueprints when ordering its three 61.6 m super stern-wheel steamboats. *Tyrrell's* and *Moyie's* designs should be similar and it was possible the 1897 order marked the onset of a scientific shipbuilding approach for river steamboats in Canada.

After a single day in *Tyrrell* it was clear we were wrong; the design differences

From left: Project team for 2013 - Left to Right Sean Adams, Gisli Balzer, John Pollack and (seated) Tim Dowd; Sean Adams views the rudders, starboard tiller, and bustle stern of steamboat *Victoria*.





The objective was to confirm differences in design, and we expected those differences to be small... After a single day in *Tyrrell* it was clear we were wrong.

were huge. A major difference occurs where the lowest frames in the bottom of the hull (floors) meet the two longitudinal bulkheads. In *Moyie* the longitudinal bulkheads rest atop the floors, and each floor consists of a continuous piece of U-channel running from the port to starboard chines. The gaps between the bottom of the longitudinal bulkheads and the floors are not watertight, and water can flow athwartships but not forward or aft past the watertight transverse bulkheads.

In *Tyrrell* the longitudinal bulkheads do not rest on the floors. Instead, these bulkheads extend down to the bottom plank-

ing. The floors consist of three distinct segments that are attached with gussets and brackets to the sides of the longitudinal bulkheads. Hence no gaps exist below the longitudinal bulkheads in *Tyrrell*, and all 15 compartments in this vessel are water-tight whereas only two-thirds of *Moyie's* 18 compartments are watertight.

There are the markedly different approaches to floor and frame design in the two vessels. The floors, side frames and brackets in *Moyie* were simplistic such that each frame station consisted of only five riveted structural elements, whereas *Tyrrell* required nine pieces not including numerous additional gussets and brackets used to attach the floors to the longitudinal bulkheads.

The hogging system provided a further surprise. A stern-wheel steamboat sup-

The team assesses the situation from atop the collapsed superstructure of *Seattle No. 3* -- one of the seven vessels in the West Dawson shipyard.

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Project Member and  
quad-copter pilot



ports many hundreds of tons of freight atop a long, wide and shallow hull. The hogging system forms a series of cantilevered arches using rods (hogging chains), vertical beams (hog posts), and turnbuckles to tension the system. The hogging system adds longitudinal stiffness to a hull that would fail without this support. *Tyrrell* used only one central hog post and four hogging chains. However, lengthening *Moyie* clearly worried the builders; and a total of 18 hog posts and eight hogging chains were used to stiffen the hull. *Moyie's* length to beam ratio had increased from 4.7 to 5.4 and this large ratio places *Moyie* in the top 10% for riverboats in western Canada. The builders appear to have taken dramatic steps to correct a perceived weakness by adding an extensive hogging system.

In one area *Moyie's* hogging system is truly unique. Ten short hog posts and four hogging chains are contained completely within the hull and positioned immediately adjacent to and outboard of the two longitudinal bulkheads. These

short hog posts do not rise above the main deck. Typical hog posts are massive beams that can rise many meters above the topmost decks, and *Moyie* does contain some large hog posts. However, the internal hog posts are less than 1.6 m in height, and completely hidden within the hull, likely to avoid creating space issues on the main deck.

## What happened in 1897 when the Canadian Pacific Railroad ordered steamboats from two different shipbuilding companies?

In summary, *Tyrrell* and *Moyie* are not sister ships, which begs the question: "What happened in 1897 when CPR ordered steamboats from two different shipbuilding companies?" The design differences are so large, it is not possible the CPR utilized hull blueprints as it did in 1904 when the three western super-sternwheelers were designed. Instead, it appears a set of general specifications

were issued, and the master builders in the two different yards determined how they would build each ship. When *Moyie* was lengthened, another western master builder did the same thing and installed a unique hogging system to prevent hull failure.

A search is now underway for CPR records that document the decisions made

during the ordering, prefabrication, and modification stages. It may yet be possible to pinpoint the circumstances and timing of the progressive shift from practical to scientific shipbuilding in the inland waters of western Canada.

## THE BUSTLE STERN OF VICTORIAN

In 2011 Robyn Woodward and John Pol-



lack discovered a bustle stern on *Victorian* at West Dawson. Bustle sterns incorporate recesses in the raked stern (or apron) to protect the multiple rudders of river boats from logs. In some cases they may also improve flow to and therefore control of the rudders. Bustles appeared on the American rivers in the mid-1870s but no examples were known in western Canada until *Victorian*. The obvious questions are: how was this complex structure constructed and how did this design come to Canada?

*Victorian* was one of three wooden-hulled stern-wheel steamboats built for the Canadian Development Company in Victoria in 1898 for use on the Stikine River. Two of these vessels met with accidents – *Columbian* was destroyed by an explosion and fire when over two tons of blasting powder detonated in 1906 near Eagle Rock, in the most famous of all steamboating accidents on the river. The badly shattered lower hull of that vessel was found in 2010 by an INA team. The second vessel, *Canadian*, caught fire and lay derelict near Whitehorse until it was buried under landfill in the 1990s.

Archival research yielded the name of the man who built these three vessels - John H. Todd. The Todds are a family of captains and shipbuilders well known on the western United States rivers. Josephus Todd was an Ohio River steamboat captain who moved west to the Mississippi and Missouri Rivers after the American Civil War. He was employed on the Missouri River by the Northwest Transportation Company in 1872-73, later joined the Coulson Line, and had partial ownership in some ships including the great steamboat *Montana*, built in 1879 and wrecked in 1884.

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Clockwise from top left: the complex framing system of *Tyrrell*; Modern-day Main Street in Dawson City; Running on the river near Steamboat Slough; The bow of steamboat *Tyrrell*.

Coincidentally the 2002 excavation of *Montana* revealed a stern incorporating a bustle and skegs - hence, the Todds were familiar with this class of design.

Todd moved to Canada in 1882 to serve the chief navigational officer for the Western Coal and Navigation Company. This company intended to mine the rich coal seams in southern Alberta, and supply the CPR's expanding transcontinental rail lines. Todd constructed *Baroness*, in 1883, patterned after a twin-stacked Mississippi packet. By 1883-4 Josephus' brothers and sons were in Canada and building a fleet of three steamers and 25 barges. Additional archival research is needed to confirm whether Josephus Todd or his son John was the shipwright behind the construction of *Victorian*.

Today *Victorian* lies in the old shipyard between *Mary F. Graff* and *Tyrrell*. Superstructure and machinery have been removed, and most of the 44.7 meter-long hull is open to the sky except for the 12 m nearest the bow. Engines, boiler(s), and paddle wheel are missing. The port cylinder beam and port rudder show signs of repair, possibly to deal with damage incurred during a grounding while being towed from the Stikine River to Alaska. The most dramatic feature is a complete tiller and rudder system at the stern, where three overhead tillers are *in situ* in wells between the transom and false transom.

This season we conducted a total station survey to capture the construction of the bustle stern, chines, tiller and rudders of *Victorian*. Minor excavation exposed two of the three partially-buried rudders. The work was timely as the stern was riddled with rot and ants, and it will not survive another decade. All three rudders are identical and of balanced design, and the bustle is "built in" using complex sawn floors with trapezoidal cross-sections.

Each floor is a single, unique timber incorporating the varying curves of all three rudder pockets. Bottom hull planking is affixed directly to the floors to yield the flowing curves of the bustle stern. The degree of craftsmanship is extraordinary and warrants separate publication of the detailed assessment made in August 2013.

### NEXT PHASES

Recently we obtained a historic photograph showing the aftermath of a 1902 fire that destroyed two small stern-wheel

steamboats, *Glenora* and *Mona*, while in winter quarters at Steamboat Slough, upstream of Dawson City. The slough is a protected channel where vessels can overwinter and avoid ice damage during spring breakup. A combined INA/ Government of Yukon team used a 6.4 m Carolina skiff and a pole-mounted Starfish 452F CHIRP side scan sonar to search the area. Two promising targets were located in shallow water but zero visibility precluded any diving. These targets will be inspected in 2014.



Modern-day view of Steamboat Slough near Dawson City.

Finally, a technological leap of faith occurred with an aerial mapping trial over *Tyrrell* using a DJI Phantom quadcopter equipped with an autopilot, GPS stabilization, and a video camera. These next-generation units are sophisticated yet affordable. Our trial used surveyed reference points on the deck, and resulted in a four-minute flight along the deck at a height of 15-18 m. Processing will use DIDGER software to georeference the images, features will be digitized, and finally the digitized polygons

will be imported into TRAVERSE-PC to produce various maps. We have used the software before but never in conjunction with a Phantom. The technique should provide a low-cost, detailed mapping tool for foreshore and shallow water wrecks, as well as some stunning YouTube video clips.

### SUMMARY AND CONCLUSIONS

The 2013 survey team documented two rare hull designs and the potential for the future is undiminished. Both *Tyrrell* and

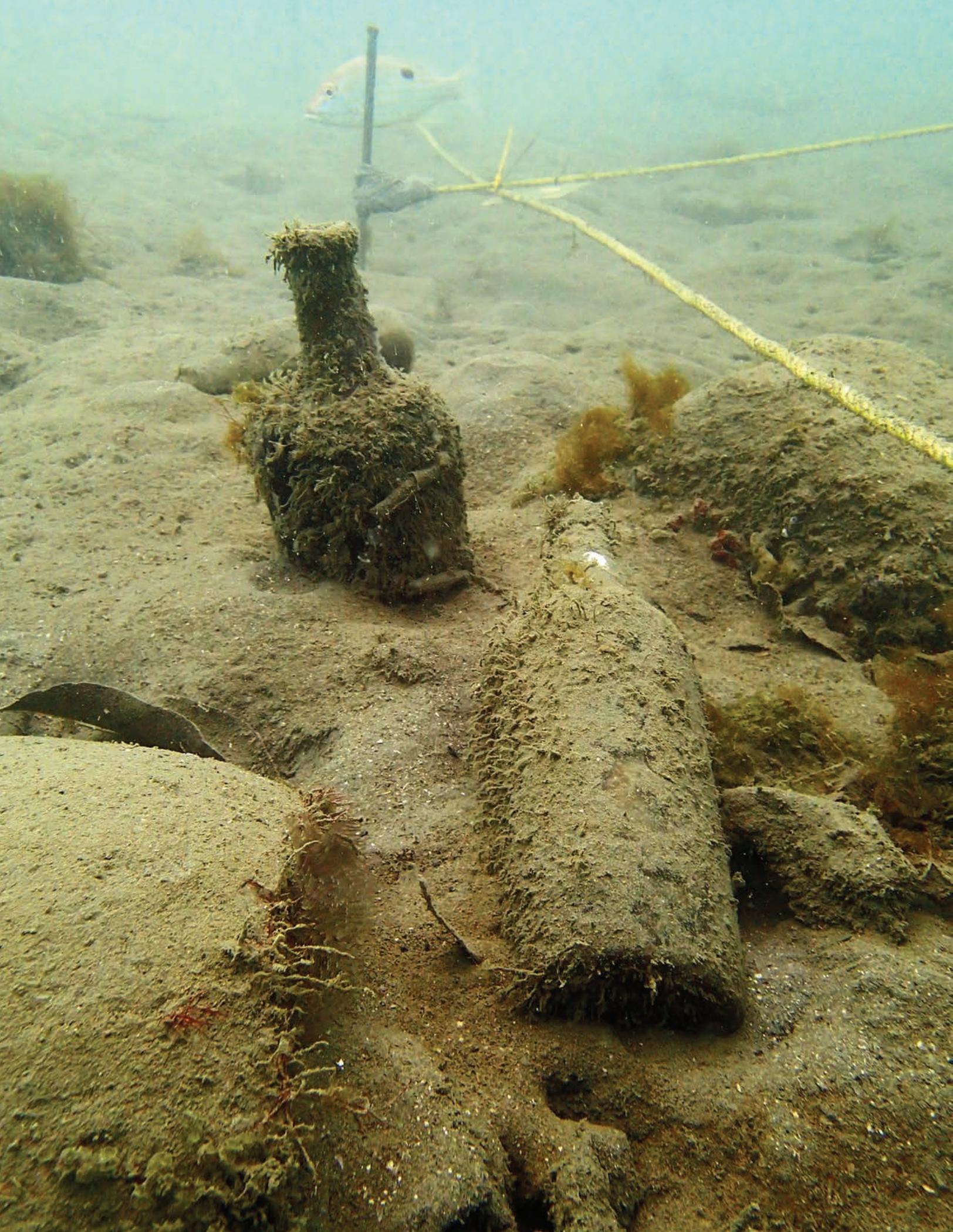
*Victorian* will provide insights related to the late 19th-century evolution of the North American stern-wheel steamboat, and the timing of the transition from practical to scientific shipbuilding. Detailed findings on *Tyrrell* will be presented at the annual meeting of the Society for Historical Archaeology, at Quebec City in January 2014.

*The support of INA, the Government of Yukon, and the Tr'ondëk Hwëch'in First Nations are gratefully acknowledged.*

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# SEARCHING FOR THE 17TH CENTURY IN ROCKLEY BAY, TOBAGO

INA researchers scour Scarborough Harbor to locate the remains of a devastating naval battle that changed the course of the Franco-Dutch War

BY KROUM N. BATCHVAROV AND DOUGLAS INGLIS

The 1672-1678 Franco-Dutch war was fought mostly in European waters, but both sides sent squadrons into the Caribbean to devastate each other's colonies. In February of 1677, a large French squadron under the command of M. le Comte d'Estrées arrived at Tobago to attack the Dutch West Indies Company settlement located at present day Scarborough Harbour, Tobago.

Despite the clear French superiority in man and firepower, the campaign lasted about two weeks without any decisive result. On March 3, 1677, d'Estrées launched a final combined land and sea assault on the fort that Jacob Binckes, the Dutch commander, was then building. Believing, correctly, that the key to holding the island was retaining control of the fort, Binckes was forced to pull his crews from the ships to bolster the land defense. This left the squadron dangerously undermanned and practically defenseless. In the fierce battle that ensued, however, the French were forced

to retreat after they lost four of their largest men-of-war, including the 72-gun flagship, *La Glorieux*. Another three French ships were dismantled and heavily damaged. The Dutch victory, nonetheless, was dearly bought and eight of their 10 men-of-war were lost. Tragically, three transports on which Binckes had evacuated women, children and unknown number of slaves, were accidentally burned in the battle.

In December of 1677, d'Estrées returned with 11 even larger ships of the line to repeat the attack on Tobago. This time, d'Estrées had learned his lesson and did not attempt a sea attack. 3500 French soldiers came ashore, supported by mortars. The third bomb fired by the mortars, through incredibly good fortune, fell into the gunpowder magazine and killed the Dutch commander Binckes, 16 officers and 250 of his men. Only one officer survived the explosion and he had no choice but to surrender. This battle ended the Dutch domination in the Caribbean.

Although France retained the island until 1763, it never colonized Tobago. Sedimentation in the bay, caused by

erosion from deforestation in the 17th century, covered the remains of at least 15 wrecks and protected them until the 1990s, when a new jetty was built for cruise ships calling at Tobago.

It is believed that the wreck of *La Glorieux* was destroyed during that recent construction. At least three other wrecks were damaged by the pylons of the jetties, and others have been buried under landfill that now forms the port facilities. The government is currently considering a new proposal for dredging to expand the port. If undertaken, this dredging would likely destroy what remains of the battle.

Opposite: Exposed cultural material, including several glass bottles, was located at trench TRB-2 at the beginning of the season.



## THE ROCKLEY BAY RESEARCH PROJECT

In 2007, Kroum Batchvarov began a campaign to obtain a permit for the archaeological investigation of the 1677 naval battle. In 2012, the Tobago House of Assembly approved the permit and a preliminary investigation of the bay was undertaken by a small INA-University of Connecticut (UCONN) team consisting of Dr. Fred Hocker, Emma, Thomas and Simon Hocker, the late Wes Hall who located the wrecks in the 1990s, Jason Paterniti, Robert Auerbach Sr., Robert Auerbach Jr. and Dr. Kroum Batchvarov. Four potential targets, TRB-1, TRB-2, TRB-3 and TRB-4, were identified for further investigation. In May 2013, a team of collaborators from INA, Texas A&M University, and UCONN Avery Point returned to begin systematic exploration of the targets.

The 17th century marked a crucial turning point in the development of navies and the character of Caribbean colonization. The rapid progress of ship construction technology provided European nation states with a previously unavailable strategic ability to project power overseas. To understand this historical process properly one has to understand the technological changes that enabled it. The main source of data for its study is the contemporary material culture, i.e., shipwrecks.

Until now no Dutch men-of-war from the 17th century have been archaeologically excavated, with the exception of the Dutch-built Swedish Royal Ship *Vasa* of 1628. No drafts of Dutch naval vessels exist as they seem not to have been used in this period. The Rockley Bay Research Project (RBRP) aims to fill these gaps in our knowledge. Since the vessels were in active commission at the time of their sinking, archaeological excavation will yield important knowledge of 17th-century colonial expansion, naval warfare and life on board. Analysis will help interpret the course of the battle

and expand our understanding of the events 335 years ago when hundreds of men and women lost their lives on the 15 ships destroyed during the battle.

## THE 2013 SEASON

We began the season with an expanded survey of the areas of interest identified in 2012. Although we had GPS coordinates for TRB-1, TRB-2, TRB-3, and TRB-4, the bottom landscape of Scarborough Harbor had changed dramatically between the 2012 and 2013 expeditions. Divers had to use radial search patterns to relocate the cannon and anchors at TRB-2, the cannon at TRB-3, and the ballast pile at TRB-4. A swivel gun associated with TRB-2 was never relocated. Our team also conducted a sweep of the harbor; teams of divers swam transects across the seafloor to identify diagnostic material associated with the 17th century.

## TRB-2

We began the season at TRB-2, as it is more endangered by modern harbor traffic. The area is covered with exposed cultural material, which needed to be recorded. Small finds were mapped using a survey grid made of rebar and polypropylene rope. TRB-2 is a complex, multi-component site lying between the ferry jetties. It includes a 17th-century cannon and two 17th- or early 18th-century anchors. The seafloor is scattered with 19th-century bricks, bones, bottles, pipes, ceramic, and ballast stones.

The grid facilitated mapping and allowed our team to monitor the movement of artifacts displaced by currents and marine traffic. Jet wash from the



**The 17th century marked a crucial turning point in the development of navies and the character of Caribbean colonization.**

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**This page:** An encrusted onion glass bottle found during the reconnaissance of trench TRB. **Opposite:** The Rockley Bay research team, 2013. **From Left to Right:** Joe Bingaman, Mathew Milne, Wabba, Jason Paterniti, Tom Lacey, Will, Kroum Batchvarov, Cassandra Devney, Mike Gilbert, Nigel Nayling, Veronica Morriss, Doug Inglis.



ferries creates turbulence at 10 m below the surface, making the ferry corridor an extremely dynamic environment. Lightweight artifacts, (such as pottery sherds, pipes, and broken glassware), can shift position by as much as 3 m on a daily basis. These fragile artifacts were collected, drawn, photographed, measured, and reburied in order to protect them. No artifacts were raised permanently because of the lack of conservation facilities.

In conjunction with the survey grid, we used the Direct Survey Method (DSM) to create a three-dimensional site plan of TRB-2. Fixed control points, which consisted of 2 m sections of pipe anchored in concrete-filled tires, were placed throughout the site. Archaeologists trilaterated the position of each artifact by measuring its distance to at least four of these control points.

Survey transects across the bottom of the harbor revealed that the types of

artifacts discovered in TRB-2 are ubiquitous south of the jetties and that artifact scatters continue for several hundred meters. Despite the prevalence of 18th- and 19th-century material, our team decided to investigate TRB-2 because both the cannon and the anchors could date to the 17th century. The TRB-2 cannon was in secondary context next to an in situ array of thick yellow bricks. We elected to conduct test excavations along the north face of the cannon to see if we could identify any diagnostic 17th-century material beneath the 19th-century deposits. Excavation revealed deposits of shingle ballast, butchered bones from both cows and medium-sized mammals, a layer of crushed red earthenware tile or pottery, blue and white transferware, exfoliating glass, concreted bolts and nails, iron barrel hoops or box straps, and the degraded fragments of a wooden container.

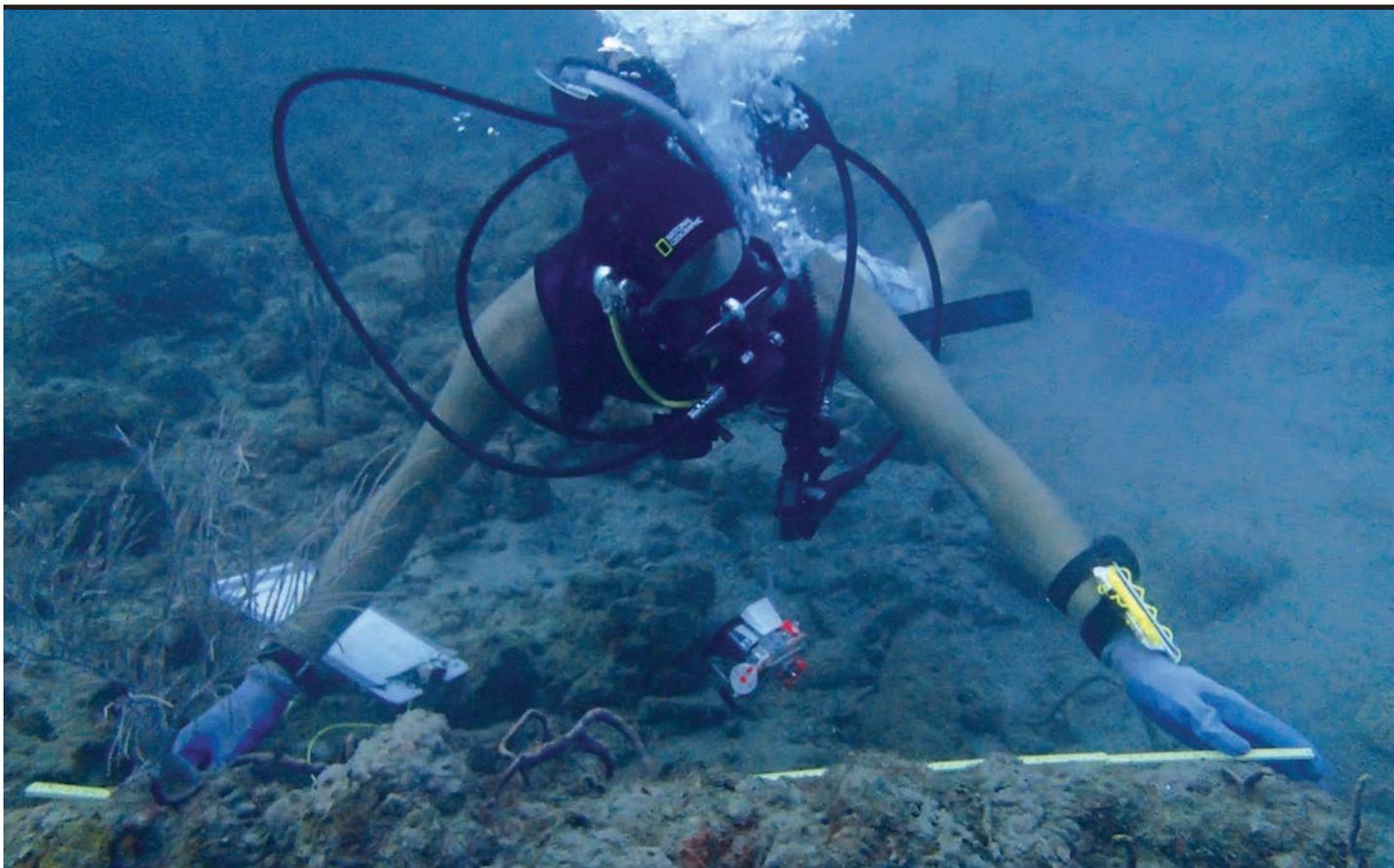
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Since the vessels were in active commission at the time of their sinking, archaeological excavation will yield important knowledge of 17th-century colonial expansion, naval warfare and life on board.

#### TRB-1

Site TRB-1 is a large ballast pile located in the 1990s by Wes Hall, just west of the Coast Guard jetty. In 2000 the Trinidad-based company Heritage Management Consultants (HMC) engaged a dive team from the Mary Rose Trust (MRT) to investigate the site. The team opened two trenches and dated the wreck to the 17th century, thus making the site of prime interest to us. RBRP chose to revisit the wreck because it was known to contain coherent hull structure and material suitable for dendrochronological dating and analysis. In 2012, Batchvarov, Hocker, and Hall used probes to delineate the ballast pile, which measures 10.5 m wide and 28.5 m long, beneath 1.5 m of sediment.

During excavation, we encountered a number of the tags originally placed by the MRT team, 19th-century bricks (probably from backfilling) as well as a

great deal of modern trash. The extent of the MRT trench was clearly discernible: ballast covered the unexcavated timbers while exposed frames still retained their tags. We concluded that we were within their Trench B. This was fortunate, as there is no published illustration of the structure encountered in Trench B.

Professor Nigel Nayling from the University of Wales Trinity Saint David joined us in Tobago to collect samples from all exposed timbers for dendrochronological analysis. All samples were subsequently reburied in a pit beside the keel, in plastic bags with artifact tags. The timber was not in prime condition and most of the samples proved to be from fast-grown oak, containing too few

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This page: Doug Inglis records the measurements of an early cannon. Opposite: The barrel of the 17th-century cannon from TRB-2, partially buried in sediment.

rings for dating. Despite a large number of samples, only a few had enough rings to be viable. Preliminary attempts to date the vessel were inconclusive, though additional analysis is being conducted in the United Kingdom. The timbers did not match established English or Continental European chronologies, so other possibilities are being explored, including a North American origin for the vessel, or at least its timbers.

The square we excavated appears to include the stern of the vessel. We were able to identify the deadwood and the keel. The ship was framed with square half-frames, fayed to the deadwood and fastened with iron spikes. In the area we excavated, we were able to identify traces of seven framing timbers, of which two were barely intact. The rest of the frames were heavily eroded with no original surface surviving on the upper face. The sides of the timbers are in a better state of preservation and it was possible to record the sided dimensions with accuracy; the moulded dimensions, however, are only estimates due to the heavy erosion of the upper surfaces. It is interesting that at least two of the timbers were longitudinally fastened to each other with a 1.25-inch iron bolt. At our current state of knowledge, this is not believed to have been Dutch shipbuilding practice in the 17th century. In fact, based on construction, dendrochronological analysis, and overall impression of the site, a 17th-century date is unlikely. Nevertheless, the extensive timber preservation, size and possible source of the timbers make TRB-1 an interesting subject for further excavation in the future.

### TRB-3

The TRB-3 site consists of an isolated cannon, possibly dating to the 17th century. Surface finds in the vicinity included 19th-century bricks, 18th- and 19th-century bottles, concreted bolts and machinery, as well as fragmentary pipes and ceramics. One thin, crudely made,



yellow brick was found on the surface in close proximity to the cannon. It is visually consistent with 16th- and 17th-century Dutch bricks. A sample was obtained for petrographic analysis to determine its origin. Deposits of shingle ballast were found dispersed across the site.

We excavated a narrow trench around the gun so that it could be recorded. Once the cascabel was uncovered, we could see the button was distorted and 5 cm of material from the right side was missing, potentially indicating battle damage. Deposits around the gun were primarily of shingle mixed with compact silt. Excavation revealed a couple of pipe fragments, brick, glass, a few sherds of stoneware, and blue and white transferware.

### CONCLUSIONS

Original plans for the season included investigations only of TRB-1 and TRB-2. Careful management of both time and resources, coupled with an exceptional team, enabled us to include preliminary exploration of TRB-3 and reconnaissance of TRB-4. Based on the season's findings, we are far better placed to identify the position of the Dutch line. We have demonstrated that the line was not where researchers have assumed it was. We determined that many wrecks believed to have been part of the 1677 battle in fact post-date it by a significant margin, and are most probably connected to the island's past as a British colony.

Interviews with people involved in the construction of the jetties identified potential locations of at least four additional wrecks. Material recovered from these sites during dredging and construction is consistent in description with 17th-century material. For the 2014 season, we propose to locate these wrecks and test them to determine if they indeed were part of the Dutch line.

Currently the construction of a new conservation lab is underway and the walls are being erected at the time of writing. We have established good working relations and have the confidence and support of the Tobago House of Assembly. The future looks bright and promising for INA's Rockley Bay Research Project in Tobago.

### ACKNOWLEDGMENTS

*The authors would like to thank the Tobago House of Assembly for their trust; US Ambassador Beatrice Welters for her support, Her Excellency the Ambassador of the Kingdom of the Netherlands Lucita Moeniralam and Peter Mathieu for their friendship and contribution to the project. We owe a debt of gratitude to Dr. Levis Guy of Tobago for all that she has done to make this project a reality.*

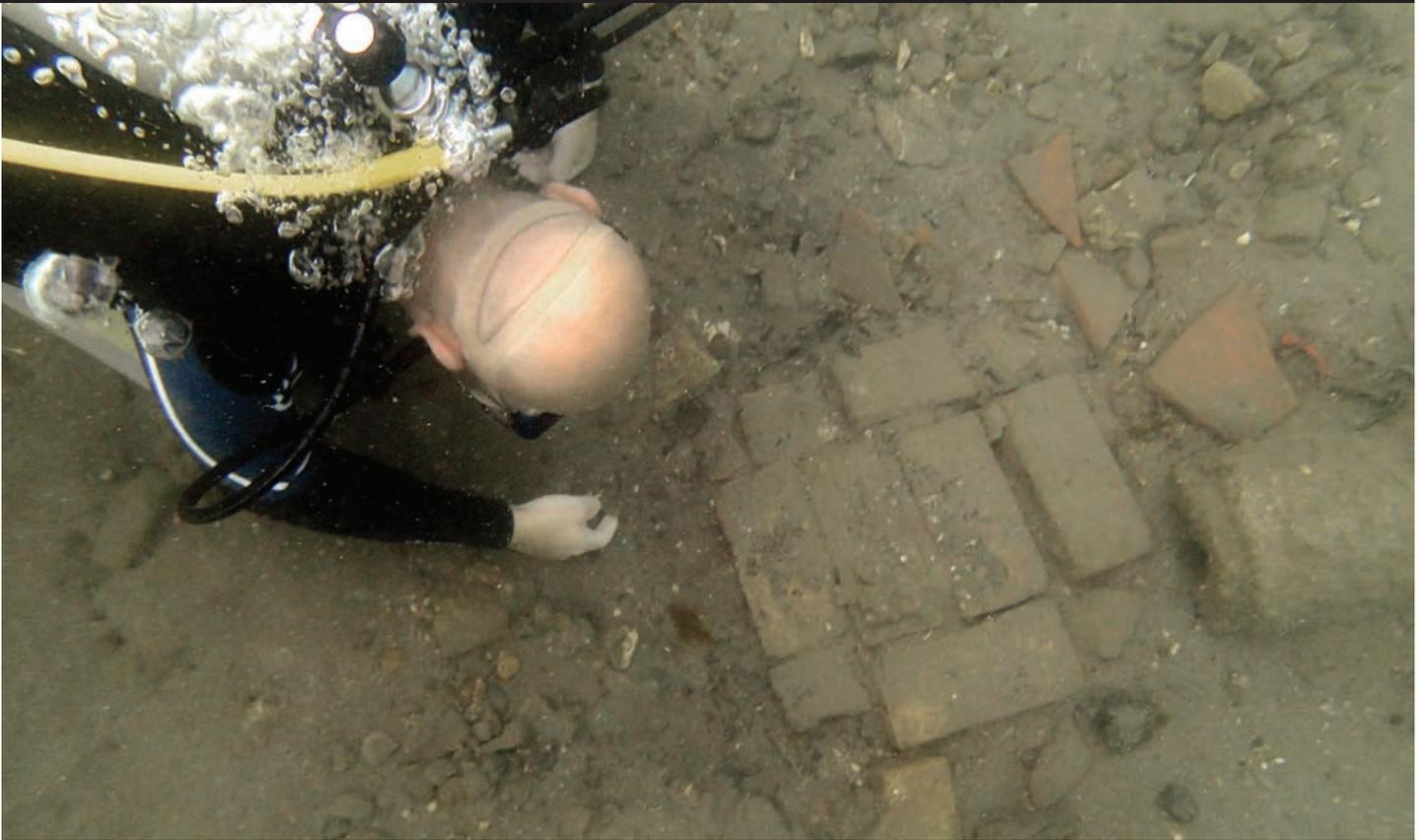
*We are indebted to team-member Jason Paterniti who was instrumental in getting the project off the ground. Batchvarov would like to express his deep gratitude to John de Lapa for all his support, help, encouragement and friendship! Batchvarov would also like to thank INA President Deborah Carlson and Director of the Centre for Maritime Archaeology and Conservation, Kevin Crisman for their unwavering support and friendship over the years. A huge Thank You is owed to the Auerbach family for their incredible generosity and hospitality over the years this project has been in gestation. The authors thank Robert Steinhoff of Bermuda for his generous support and participation in the diving operations.*

*The authors acknowledge with gratitude the trust and support of the Institute of Nautical Archaeology and the University of Connecticut Avery Point.*



**We determined that many wrecks believed to have been part of the 1677 battle in fact post-date it by a significant margin.**

**This page:** Mike Gilbart and Doug Inglis work together to bring the dredge to the sea floor to excavate the site. **Opposite:** Kroum Batchvarov, project director, studies exposed cultural material in trench TRB-2; Kroum Batchvarov investigates exposed wood and pottery fragments on the sea floor.





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# SIXTY YEARS OF SERVICE

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We celebrate INA's research vessel *Virazon*, designed for the Army and adapted for underwater archaeology

BY JOHN D. LITTLEFIELD

For the past 50 years, archaeologists, students, and volunteers working on shipwreck projects in Turkey have had the pleasure of diving from and living aboard the research vessel *Virazon*, first for the University of Pennsylvania Museum and for INA since 1964. Despite her Spanish name (that of a westerly sea breeze in South America, Spain, and Portugal), *Virazon* is a proud product of the United States, built in New Orleans, Louisiana in 1953 as U.S. Army transport vessel T-502.

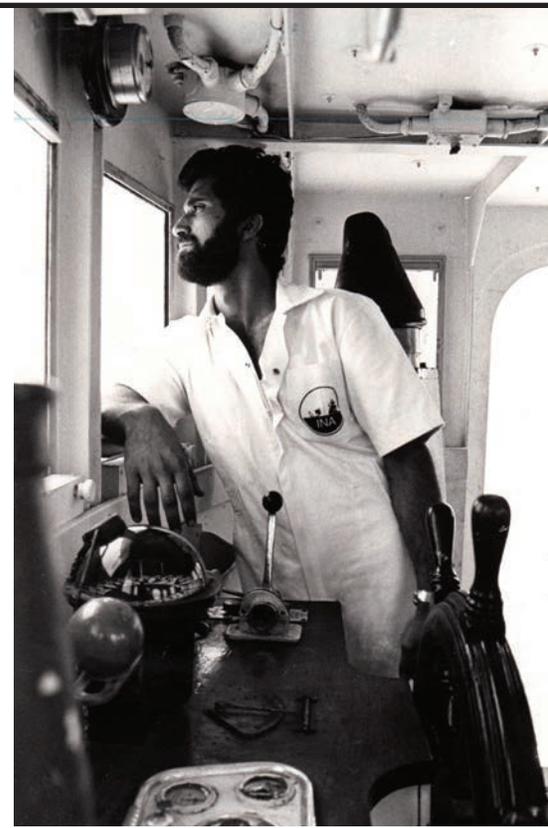
T-boats constructed between 1940 and 1951 were of wood. The 110 steel T-boats produced between 1951 and 1953 in Kansas, California, and Louisiana, were designed to serve as personnel transports, tug boats, and coastal lighters in the Korean War. The 20 meter (65 ft)-long steel-hulled *Virazon* was constructed as T-502 in New Orleans in 1953 by Higgins Industries, the same company that had manufactured Higgins boats or LCVPs

which proved so pivotal in the Allied victories of World War II. *Virazon*, like most of the more than 80 T-boats built in New Orleans, never saw any action as the Korean War drew to an end at the time she was under construction.

In 1962 *Virazon* was on loan to Texas A&M University-Galveston, and in 1964 the U.S. Navy agreed to loan her instead to George Bass, a graduate student at the University of Pennsylvania, in order to test equipment in the newly emerging



Opposite: *Virazon* en route to the excavation at Serçe Limani (1977-1979) This page: *Virazon* is loaded aboard *Ruth Lykes* in New Orleans in 1964.



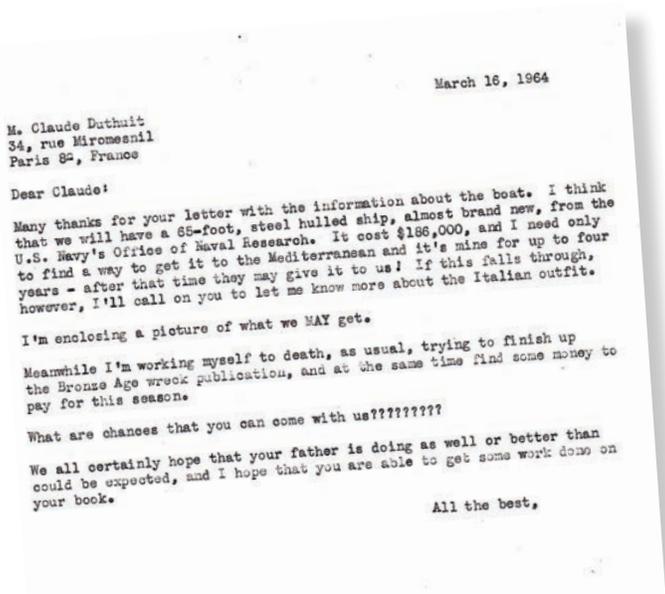
field of underwater archaeology. Bass sent to Galveston a three-man volunteer crew that included a Philadelphia banker and yachtsman Lloyd Wells (captain), amateur mechanic Gerald Stern (engineer), and a college student/deckhand who happened to be the son of a representative of the Lykes Brothers Steamship Line. But *Virazon* was not designed for sailing on the open sea and had no substantial keel, so a voyage across the Atlantic Ocean to Turkey was not an option. Instead, the

trio sailed *Virazon* to New Orleans, where she was loaded onto the *Ruth Lykes* and carried as deck cargo to Athens, completely free of charge. According to Gerald, who crossed the Atlantic with her at no cost, rough seas brought *Virazon* dangerously close to being lost before ever reaching the Mediterranean.

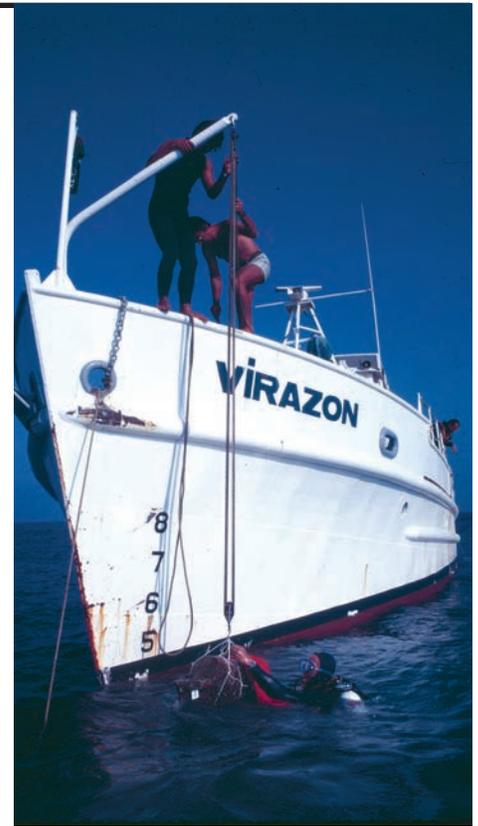
Her first job, at the Yassiada Byzantine shipwreck excavation in 1964, was to tend the submersible *Asherah*. In 1967, *Virazon* participated in the excavation of the 4th-century Yassiada shipwreck and a survey to locate the wreck that had yielded the bronze statue of an African youth. In 1969, thinking that he was finished with underwater archaeology, Bass arranged for her transfer to the U.S. Air Force base in Izmir, Turkey, where she served as a recreational vessel for servicemen stationed

there. When Bass returned to Turkey after the founding of INA in 1973, he enquired about *Virazon*, only to learn that her name had been changed to *Miss Vicky* and that she was not for sale. In 1979, however, a decade after her last archaeological project, *Virazon* was again available and INA employee Tufan Turanlı convinced Bass that recent modifications made her worth a \$6,000 offer, which was after all, a mere fraction of the \$186,000 it cost to build her in 1953.

On 16 May 1979, *Virazon* was acquired by INA. Her heavy steel mast and boom, which caused her to roll badly, had already been removed. Now the large forward cargo hold was remodeled and outfitted with eight bunks and a double-lock recompression chamber that is still in use



From top left: *Virazon* at Kizilburun in 2009; Captain Tufan Turanlı; Captain Feyyaz Subay; Captain Zafer Gül; hoisting artifacts from the bow at Uluburun; INA Founder George Bass wrote to his friend Claude Duthuit about *Virazon* in 1964.



today. The engine was overhauled, one of two heads was replaced with a darkroom, and a drafting table was installed atop the chamber. Professors, students, and even INA Director Bill Sturgis sandblasted and repainted the vessel. Later a deeper keel was welded to the hull in order to reduce even more her tendency to roll, and all necessary compressors and diving equipment were installed, transforming her

shipwreck surveys as well as the excavations at Uluburun (1984-1994), Tektaş Burnu (1999-2001), Pabuç Burnu (2002-2003), Kızılburun (2005-2011), and the 50-year anniversary return to Cape Gelidonya in 2010.

2013 marks *Virazon's* 60th year of service, and her fourth decade as INA's research vessel in the Mediterranean, under the able guidance of captains

## 2013 marks *Virazon's* 60th year of service, and her fourth decade as INA's research vessel in the Mediterranean.

into a formidable research vessel capable of conducting annual surveys of the Turkish coast and shipwreck excavations in deeper water.

*Virazon* returned to archaeological service for the last season of INA's excavation of the 11th-century Glass Wreck at Serçe Limanı (1977-1979) and has been a central fixture of INA fieldwork in Turkey ever since, as the lead vessel of numerous

Tufan Turanlı (1979-2001), Feyyaz Subay (2002-2009), and Zafer Gül (2010-2013). From all of us who have experienced the distinctive sound (and feel) of her rumbling Buda engines, decompressed under the protective shadow of her bobbing hull, and been lulled to sleep by the crackling of her oxidizing steel plates: Happy Birthday, *Virazon*, and thank you for the memories.

FROM TOP LEFT: © INA PHOTO BY JOHN LITTLEFIELD; © INA; © INA PHOTO BY DEBBIE CARLSON; © INA PHOTO BY DEBBIE CARLSON; © INA PHOTO BY DON FREY

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# REVIEW

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## THE GUROB SHIP-CART MODEL AND ITS MEDITERRANEAN CONTEXT

By Shelley Wachsmann

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Texas A&M University Press  
ISBN 978-1-60344-429-3  
REVIEWED BY CHRISTOPH  
BACHHUBER

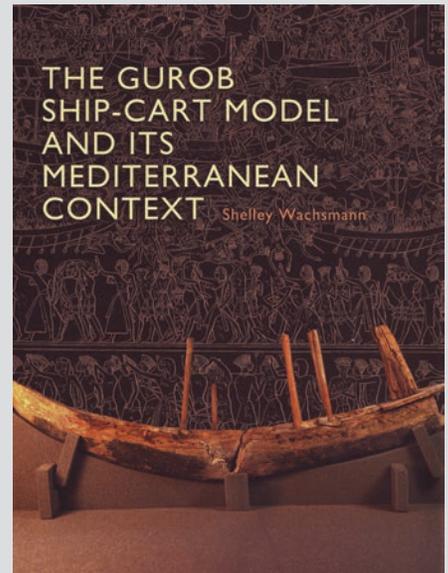
In this book Wachsmann offers a sequel to his *Seagoing Ships and Seamanship in the Bronze Age Levant* (hereafter *Seagoing Ships*), which remains, to this day, the most authoritative work on Bronze Age seafaring. The new book focuses on a ship-cart model excavated from Gurob, Egypt, that Wachsmann discovered after publishing his earlier monograph (in the preface he calls the model ‘the one that got away’). *Gurob Ship-Cart* expands from an analysis of the model into a comprehensive thesis on the end of the Bronze Age in the Mediterranean. Parts of the thesis were already formulated in his discussions of the ‘Sea Peoples’ in *Seagoing Ships*, but the transition between the Late Bronze Age and Iron Age is treated more comprehensively in the new book. *Gurob Ship-Cart* is accompanied by an innovative, open source, and interactive digital supplement that highlights reconstructions of the object.

Chapter 1 begins with a very readable biography of the Gurob ship-cart model, from its 1920 discovery in a Nineteenth Dynasty tomb at Gurob in the Fayum, to its subsequent languishing in the Petrie Museum in London. The object has been the focus of scant and inexperienced research. Wachsmann then brings the model to life with a technical exposition of all of its parts, showing his mastery of descriptive detail related to ancient seafaring technology. He reveals the Gurob ship-cart model

to be a galley fashioned onto a wheeled carriage.

In Chapter 2 the ultimate significance of the Gurob ship-cart model is declared in the first sentence of the first paragraph: ‘Despite its Egyptian provenience, as we shall see, the ultimate prototype of the Gurob ship model is clearly a Helladic-style galley of the Late Bronze/Early Iron Ages.’ Chapter 2 is divided into three main sections. In the first, Wachsmann enters familiar territory with an analysis of the Sea Peoples’ galleys in reliefs from the late second millennium temple of Ramesses III called Medinet Habu, and of other roughly contemporary iconography and models from around the Mediterranean and Europe that also show bird-headed stems. This is an architectural/design feature that is shared with the Gurob ship-cart model. There is not much that is new in this section (i.e. developed from *Seagoing Ships*), although Wachsmann offers a more confident interpretation of the ‘bird-boats’ from central Europe and their relationship to the Sea Peoples’ galleys depicted at Medinet Habu. He concludes that an ‘Urnenfelder crew’ (from central Europe) was among the Sea Peoples’ fleet. This was a somewhat surprising turn in the analysis, but later chapters reveal why the interpretation was made.

The second part of Chapter 2 focuses on iconographic evidence that was also not included in *Seagoing Ships*, but had been previously published by the maritime iconography expert Lucien Basch. Rock art from the Dakhla Oasis in the Western (or Libyan) Desert of Egypt shows a ship graf-



fito with nine naked stick-figure men on board. Several of these figures raise before them models of ships with bird-headed stems and sterns. The content and meaning of this evocative, self-referential scene is overshadowed in the analysis by one detail of the graffito that appears anomalous to Wachsmann: a large timber that extends diagonally up from near the stern, past the mast. He considers but then dismisses the (lowered) mast-function of the timber, and concludes that it represents a giant phallus. This interpretation is based mostly on comparanda in scenes on a later Attic (Greek) cup, which show naked men heaving a large diagonal phallus that is supported by a crutch. It is not clear whether this Attic ritual was performed on a ship, but Wachsmann believes that this is likely.

The final section of Chapter 2 re-enters

familiar territory with a comparative discussion of ship iconography in the eastern Mediterranean. There is a particular focus on the representation of a galley fashioned with a bird-headed stem on a cremation burial jar from an Early Iron Age cemetery at Hama, in Syria. According to Wachsmann, the Gurob ship-cart model finds its closest parallel on the Hama cremation urn. The cremation context of the Hama burial (in a vast cemetery of about 1100 cremation burials) inspired another survey, this time noting who cremated their dead and who did not, at the transition from the Bronze to Iron Age. The Urnenfelder people of central Europe did cremate their dead, and they also represented their boats with bird-headed stems. These practices, coupled with the identification of European-inspired weapons and jewelry deposited with the Hama cremation burial, suggests to Wachsmann that the individual whose burnt remains were placed in this jar was European in origin, like the Urnenfelder crew represented in the Sea Peoples fleet at Medinet Habu. The chapter ends with additional iconographic comparanda for the construction features of galleys in the eastern Mediterranean (and their ultimate Aegean origin). Some of this is redundant with *Seagoing Ships and Seamanship*, and seemingly *ad hoc*. The overall coherence of this chapter would have been assisted by some sort of summary of its major points at its end.

Chapter 3 compiles a large body of data for the use of ship-carts and ship models similar to the Gurob example. Wachsmann places particular emphasis on a silver ship model fashioned onto a carriage with wheels from the 17th-Dynasty tomb of Ahhotep in Egypt. Superficially the model resembles any ancient Nilotic craft (with papyriform stem and stern posts), although the profile of the model suggests to

Wachsmann an Aegean (Minoan) origin, with now obvious implications. He then enters new territory in a detailed, extensive, and often enjoyable study of overland ship processions in ancient Egypt, Classical Greece, and also modern Egypt where he argues convincingly for continuity with ancient traditions. Like Chapter 2, there is no summary of the major points of this lengthy and data-rich exposition, although clearly the emphasis on the Aegean and Egypt intended to establish a meaningful relationship between the two regions, as regards the Gurob ship-cart model and overland ship procession rituals.

Chapter 4 marshals all the evidence presented in the first three chapters to argue that the individual buried in the Gurob grave with the ship-cart model was foreign, and can be identified as a member of the Sea Peoples. In addition to the ship-cart model with all of its presumably foreign associations, textual evidence is suggestive of forcefully resettled Libyans (Tjemhu) in Lower Egypt and perhaps the Fayum during the reign of Ramesses III. The larger site of Gurob has also produced no shortage of Aegean and Levantine-inspired material culture from this period. The emphasis on cremation at Hama in Syria becomes comprehensible because mortuary practices in the Gurob graves included fire rituals: reconstructed from the so-called 'burnt groups.' Although there is no evidence that bodies were burned (the burnt groups were groups of burnt objects), Wachsmann nevertheless suggests that this fire ritual is related to central European Urnfield cremation rites, which he observes also in the cremation cemetery at Hama. Gurob, then, was a multi-cultural place where elements of Sea Peoples of European origin arrived, and quickly assimilated to Egyptian norms while maintaining core aspects of their European identity (commu-

nicated in mortuary practice through both the ship-cart model and in the fire rites).

Students of maritime and nautical archaeology will enjoy Wachsmann's insights into ancient seafaring (although some are redundant with *Seagoing Ships*). They will also enjoy the flashes of humor, and perhaps even the eccentric diversions into problems like circumcision or cremation in the ancient world. However, students of Mediterranean prehistory and early history may feel alienated both by the technical aspects of the book and Wachsmann's refusal to engage seriously with a vast literature related to problems of identity in the ancient Mediterranean region. His repeated invocation of 'Occam's razor' (the simplest solution is the best solution) may work for aspects of ancient ship design, it does not work for issues related to ethnicity and identity. Wachsmann is expert at finding appropriate comparanda for ship construction/design to explain otherwise ambiguous features represented in the iconography or models of ancient ships. He uses the same methodology for social practice, to create an historical narrative that is based entirely on cultural essentialism (Semitic/Egyptian/Aegean people do this, but they don't do that). This runs against decades of research in Mediterranean archaeology and history.

Although the interpretive framework in *Gurob Ship-Cart* may surprise and concern any archaeologist who takes seriously issues of identity and ethnicity in the ancient world, this volume does offer valuable insights on ship design and maritime-related ritual in ancient Egypt and the Mediterranean region more broadly. The accompanying open source digital supplement is also a novel illustration tool that should be widely emulated in archaeological monographs.

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INA REMEMBERS:  
**DICK ROSENBERG (1926-2013)**

We bid farewell to one of INA's dearest friends and supporters,  
as seen through the eyes of his wife, Mary

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**“Ann and I remember Dick as a man of great imagination, creativity and talent, with a multitude of interests from art and architecture to horticulture and conservation. He was delightful to be with and perhaps the kindest person we have ever known.”**

– GEORGE BASS

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This page: Dick and Mary Rosenberg onboard INA's research vessel *Virazon* at the Pabuç Burnu site in 2003; Opposite page: Dick Rosenberg shares a jar of fresh olives in Datça with Ann Bass, wife of Dr. George Bass.

**A**fter sailing to Turkey from Portland, Oregon in 1980, Dick and Mary Rosenberg fell in love with the country that would shortly become a significant place in both of their lives. They learned of INA's work in Turkey when they met George Bass at a fundraising dinner held in Los Angeles by mutual friends John and Ellie Stern, and the Rosenbergs eventually became supporters of INA, and dear friends of the INA family.

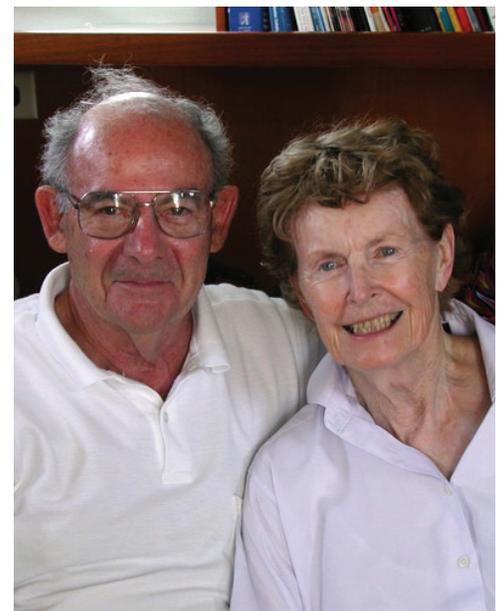
In 1995 the Rosenbergs established an 86-acre farm in Datça, south of Bodrum, which employed over 100 local Turks pressing olive oil from their centuries-old trees. Within a few years, their retail specialty store, The Olive Farm, was providing baskets, pottery, textiles, olive-wood utensils, dried apricots, and other Turkish specialties to customers outside of Turkey, who could enjoy three varieties of olive oil, cold-pressed within 24 hours of harvest and shipped in insulated containers to protect it from light and heat.

Back home in Portland, the Rosenbergs formed the Northwest Friends of INA to raise awareness and funds by inviting INA team members to share details of underwater archaeological excavations with a local audience, initially hosted in their own home. These annual seminars grew quickly in popularity, eventually requiring a larger venue. Mary says graciously of those days "We had a whole lot of support, since all the diving team members became potential speakers" – the impressive list includes George Bass, Deborah Carlson, Bill Charlton, Fred van Doorninck, Faith Hentschel, and Cemal Pulak. Over the years, the Rosen-

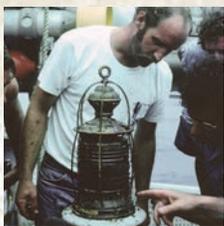
bergs and their Northwest Friends have contributed approximately \$250,000 in direct support to INA, helping to build the research center in Bodrum, Turkey and to obtain the 4,000-volume Dorothy and Homer Thompson collection for the center's library.

In reflecting upon the Rosenbergs' commitment to INA and Turkey, Mary emphasizes their belief in the importance of education and conservation, saying "Dick's love of history, my love of the ocean, and George's great enthusiasm and ability to bring people together" were essential elements of this adventure. Dick Rosenberg will be deeply missed by everyone in INA, as will his palpable enthusiasm for nautical archaeology.

*Thanks to Chatten Hayes for her assistance with this tribute*



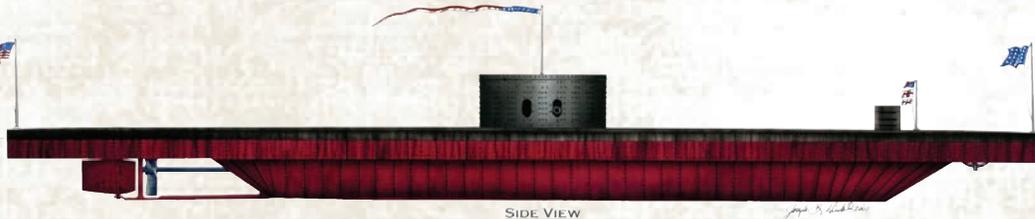
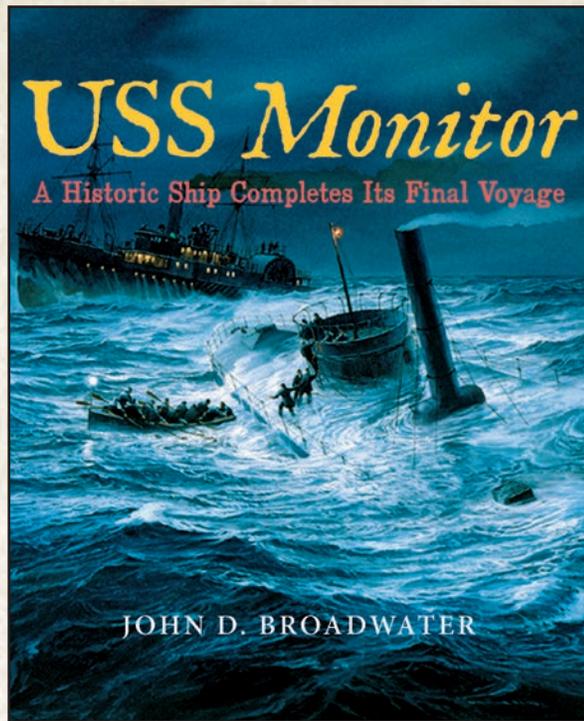




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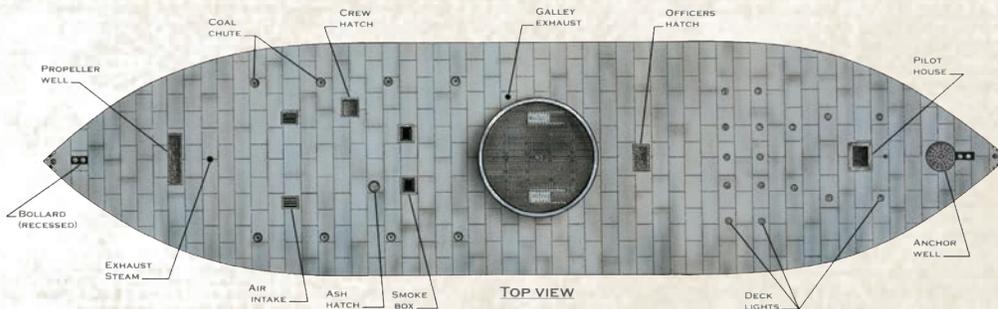
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