

THE **INA QUARTERLY**

BRINGING HISTORY TO LIGHT THROUGH THE SCIENCE OF SHIPWRECKS

2014 INA BOARD MEETING

FIVE SPECTACULAR DAYS IN TURKEY

IOPPA MARITIMA LAND SURVEY

THE SEARCH FOR
ANCIENT SHIPS ON LAND

THE ROCKLEY BAY RESEARCH PROJECT

IN SEARCH OF A 17TH-
CENTURY MAN-OF-WAR



FALL 2014 | Volume 41, No. 3
Institute of Nautical Archaeology

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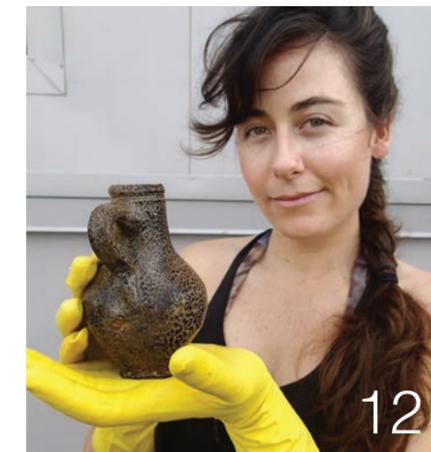
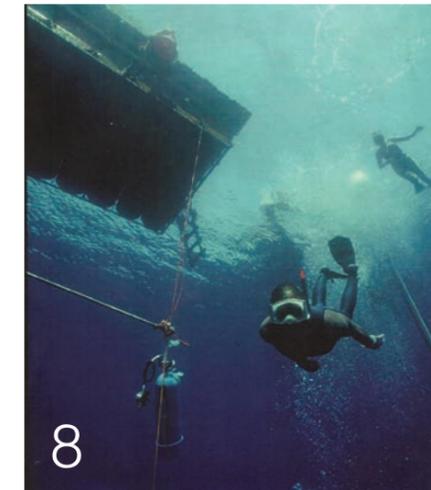
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The Institute of Nautical Archaeology is a non-profit organization whose mission is to advance the search for the history of civilization by fostering excellence in underwater archaeology

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Editor
Deborah N. Carlson, Ph.D.

Assistant Editor
Stephanie Koenig

Designer
Jacqueline Munz

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Institute of Nautical Archaeology
P.O. Drawer HG
College Station, Texas
77841-5137 USA
email info@nauticalarch.org
phone (979) 845-6694
fax (979) 847-9260
www.nauticalarch.org

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If you are interested in submitting an article for publication please contact the Editor at inaq@nauticalarch.org

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A LETTER FROM THE NEW CHAIRMAN OF THE BOARD

It was a privilege to attend INA's Board Meeting in Istanbul and Bodrum, Turkey, this year. It has been my privilege to serve on the Board of INA for more than 25 years as a Texas A&M University representative. In the past, I was asked to consider being chairman but I always felt it was unwise and a conflict of interest for a university employee to serve as Chairman of the Board. However, since I retired on August 31, 2014, John De Lapa and Debbie Carlson both said the time was right to consider becoming the new chairman because I was no longer employed by Texas A&M University.

As your new chairman, I would like to thank John De Lapa for serving two terms as our chairman. John did an excellent job. Also, my heartfelt thanks goes out to Debbie Carlson as President of INA who continues to lead in a marvelous way.

The October trip to Turkey was my fifth, and every time I visit INA's Bodrum Research Center and the Bodrum Museum of Underwater Archaeology, I am thankful for all the men and women who have so generously supported INA over the years. It has also been my privilege to correspond and visit personally with our founder, Dr. George Bass, and his wife, Ann. In fact, George and I break bread together at least once a month. George, we are all grateful to you for the original decision you made to bring INA to Texas A&M University. One of my goals as chairman is to build an even stronger bridge between the two institutions. It is also

Bob Walker photographed atop the ancient city of Labranda in southwestern Turkey



very important that the A&M family have a greater understanding of INA and the prestige that it has brought over the years to the university.

To all of my fellow board members, I thank you for your input and your support and I look forward to working together to build an even stronger organization in the years ahead. We can continue to support our seven wonderful nautical archaeology faculty members and the wonderful graduate students who are seeking degrees in nautical archaeology.

Please know that I welcome your input and suggestions as we move forward in the New Year. Thanks again for all the support and guidance so many of you have offered through the years.

Robert L. Walker
Chairman of the Board

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The conversation on INA's **Facebook page**

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INSTITUTE OF
NAUTICAL
ARCHAEOLOGY

NEWS & EVENTS

New leadership and student fellows for INA, conference lineups, and a museum display

INA BOARD ELECTS NEW OFFICERS

For one week in October, the Board of Directors and their guests traveled to Turkey for INA's annual meeting. During two very productive days of meetings, the Board elected Dr. Robert Walker to replace outgoing Chairman Mr. John De Lapa and Mr. Jason Sturgis to replace outgoing Vice Chairman Dr. Robyn Woodward. Robert "Bob" Walker, who retired from Texas A&M University (TAMU) earlier this year after more than three decades of success in development and fundraising, has long been a loyal supporter of INA. Working alongside INA Founder Dr. George Bass 20 years ago, Walker was instrumental in building the endowments and scholarships that support the faculty and students of TAMU's Nautical Archaeology Program. Jason Sturgis is the son of Judy and [the

late] Bill Sturgis (*INA Quarterly* 41.2: 22-23), as well as an accomplished documentary filmmaker; Jason's groundbreaking underwater videography of humpback whales will be part of an IMAX film set to debut in 2015. Outgoing officers De Lapa and Woodward had both served for four years, the maximum allowed by INA's bylaws, and INA thanks them profusely for their leadership and support. Read more about the 2014 Board Meeting on page 26.

NAUTICAL ARCHAEOLOGY PROGRAM ANNOUNCES NEW DEGREE

Beginning in Fall 2015, graduate students entering the Nautical Archaeology Program at Texas A&M University will have the option of earning a Master of Science (M.S.) in Maritime Archaeology and Conservation, in addition to the

M.A. and Ph.D. in Anthropology. The new degree is aimed at providing terminal Master's students with more of the technical skills necessary to secure a growing number of jobs in maritime museums, state and federal archaeological agencies, cultural resource management, and the offshore oil industry. The new curriculum will, however, retain the traditional focus on the research strengths of NAP faculty, which include artifact conservation, archaeological fieldwork, ship construction technology, and seafaring in the Old and New Worlds. Applications for the new M.S. program must be received by February 1, 2015. Visit <http://anthropology.tamu.edu/html/graduate-admission.html> for more information.

INA AT AIA AND SHA

INA research was well represented at two important national conferences occur-



An exhibit of Don Frey's underwater photography displayed at the Minnesota Marine Art Museum

ring simultaneously in early January. Alongside the over one dozen Nautical Archaeology Program graduate students presenting papers at the annual meeting of the Society for Historical Archaeology (SHA) in Seattle, WA (January 6-11), INA research associates Piotr Bojakowski, Katie Custer-Bojakowski, Ben Ford, John Pollack, and George Schwarz presented the results of their ongoing research and fieldwork around the world. Old World archaeologists convened in New Orleans, LA (January 8-11) for the annual meeting of the Archaeological Institute of America (AIA). There INA research associates Rebecca Ingram and Michael Jones co-hosted a colloquium dedicated to Byzantine Maritime Trade and Technology, INA President Deborah Carlson co-hosted, with French scholar Jean-Charles Moretti, a colloquium entitled "Recent Archaeological Work in the Sanctuary at Claros, Turkey," and INA Affiliated Scholars Elizabeth Greene and Justin Leidwanger co-hosted a workshop devoted to Underwater Cultural Heritage.

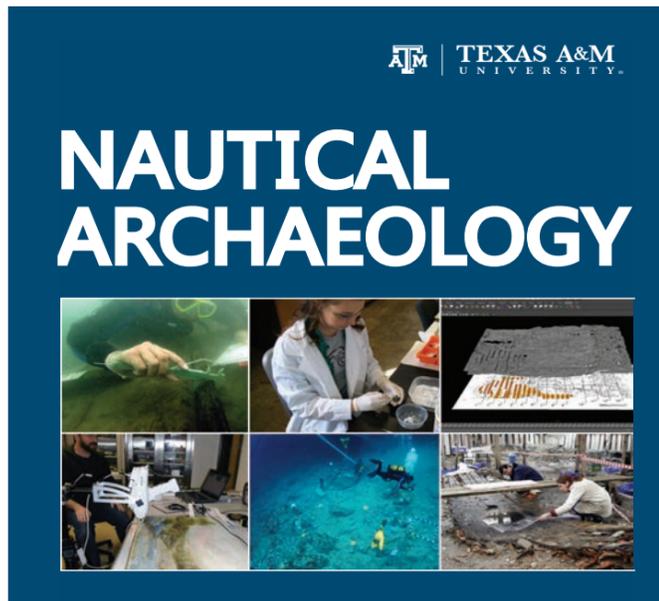
INA STUDENT FELLOWS FOR 2014-15 ACADEMIC YEAR

INA is pleased to announce that Ms. Mara Deckinga and Ms. Carolyn Kennedy of the Nautical Archaeology

Program (NAP) at Texas A&M University are joint recipients of the Marian M. Cook Fellowship for 2014-15. Deckinga is an M.A. student interested in Great Lakes archaeology; she works as a research assistant at the Conservation Research Laboratory and is an officer of the local student chapter of the Society for Underwater Technology. Kennedy is a Ph.D. student with research interests in the nautical archaeology of north-eastern North America; her dissertation will focus on the construction of three early 19th-century steamboats from Lake Champlain. Mr. Kevin Melia-Teevan is the Mr. & Mrs. Ray Siegfried II Fellow for 2014-15. Melia-Teevan is a Ph.D. student researching changes in framing during the transition from shell-based to frame-based ship construction in the first millennium, and spent the fall semester in residence at INA's Bodrum Research Center. In addition, the following students received financial assistance in the form of tuition relief from the Cook and Siegfried fellowships: Mr. José Casabán, Mr. Nathan Gallagher, Ms. Staci Willis, and Mr. Kotaro Yamafume.

PHOTOGRAPHER DON FREY FEATURED IN UPCOMING EXHIBIT

Photographer and videographer Don Frey, whose iconic underwater images of INA excavations have appeared in dozens of prestigious publications including *National Geographic* and *Time*, will be featured in a new exhibit at the Minnesota Marine Art Museum in Winona, MN. *A Life Aquatic: Don Frey Retrospective* will showcase a selection of Frey's work captured during four decades of documenting ancient shipwrecks in the Mediterranean. Frey has been a member of the INA family since its beginning in the 1970s, and has directed many of the annual underwater surveys that led to the discovery and ultimate excavation of the shipwrecks at Uluburun, Bozburun, Kızılburun, and Tektaş Burnu. During his tenure as INA's second president from 1982 until 1988, INA began construction of the Bodrum Research Center in southwestern Turkey, where Frey has lived for three decades. The exhibit, which opens in mid-January, will run through the end of April 2015. For more information about the exhibit, visit www.mmam.org.



Don Frey with a fresh catch of sponges in Turkey



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PROFILE:
KEN TRETHEWEY
 A conversation with INA's newest Associate Director
 about his passions and vision for the future

Dr. Ken Trethewey grew up in Houston and received his B.A. from the University of Texas at Austin, majoring in both History and Classics. As an undergraduate, he focused mainly on the history of the American Civil War, ancient Roman and Greek History, and Colonial Africa. He went on to earn an M.A. and a Ph.D. in Classics from Princeton University and afterwards attended the Nautical Archaeology Program at Texas A&M University. At Princeton he wrote a dissertation about Scipio Africanus the Elder and began participating in archaeological fieldwork on land in Cyprus and Sicily and under water in Greece. At Texas A&M he participated in INA shipwreck excavations at Godavaya, Sri Lanka, and Bozburun, Kızılburun, and Tektaş Burnu, Turkey. Ken particularly enjoys technical diving: black water, deep water, redundant systems, and mixed gases. He has logged hundreds of dives in Lake Travis and at 60-90 meters in the Caribbean. In his days as a student, Ken indulged his inclination to travel far more than has been possible recently, visiting all over western and eastern Europe, to the Soviet Union before its collapse, and across northern and western Africa. Now a sales executive, Ken maintains his ties to INA as an Associate Director.

What led you to study in the Nautical Archaeology Program?

I had long been an avid diver when I began excavating on land while working on my Ph.D. at Princeton University, and I immediately thought that marrying

my two interests would be an interesting exercise. I managed to get onto the Greek team working on a 5th-century B.C. Greek shipwreck at Alonnisos in 1993, and I was hooked. A year or two later, George Bass came to Princeton to give a

lecture, and I spoke with him afterwards about the possibility of coming to Texas A&M University after I finished my Ph.D., and he encouraged me to apply to the Nautical Archaeology Program. So, in 1997, I did.



OPPOSITE PAGE, LEFT PHOTO: © 2003 COURTNEY PLATT.COM



Describe a vivid memory from an INA fieldwork project.

I have two really vivid memories from INA projects. The first was at Bozburun, during my first season of working with INA. I was on the sea bed, at the lower end of the site, working in my square. Periodically I would glance over at my dive buddy Kristin Romey as she worked in her area, just to make sure she seemed OK. On one of those buddy checks, I saw her carrying a complete amphora over to the depot. As I looked up the slope at the ship-shaped mound of amphoras spreading away from me, the clear blue water all around, and the barefoot diver tiptoeing gingerly across the mound, with bright pink accents on her black wetsuit, carrying a large, complete ancient pot cradled in her arms, the scene just struck me as intensely beautiful, and I stopped what I was doing and kept watching, mesmerized.

This page, from left: Exploring the beautiful reefs at 90 meters in the Cayman Islands; Ken and Zafer Gül, captain of INA's research vessel Virazon, prepare the recompression chamber for diving in Sri Lanka. **Opposite page, from left:** Ken gently removes sand to expose artifacts from the Kızılburun shipwreck; Ken smiles for the camera at a decompression stop after a long dive at Kızılburun.

I was thinking, "This is such an amazing place to work!" Then she glanced down at me, saw I was watching, and immediately made a gesture toward the mouth of the amphora with her head and smiling eyes. I looked more closely, and noticed the little face of an octopus peering out of the jar. He had made it his home, apparently, and was not about to leave just because a human was carrying it around on the seabed. I will never forget that scene.

The second was also under water, of course. It was two years later, at Tektaş Burnu. I was excavating an area that was particularly rich in artifacts, and had found ceramic lamps, plates and bowls, still stacked as they had been on the galley shelf. I was fanning the fine silt away from the artifacts carefully and sucking it out of the water with an airlift. As you are doing this, the level of the silt around and between the artifacts decreases, while the artifacts remain in place, so that it sometimes sort of looks like the artifacts are actually rising up out of the silt. This is the experience I had when I discovered the alabastron, an alabaster perfume bottle. One minute there was a bare area of silt, and the next there was what appeared to be the side of a glass vessel, like a champagne flute, just beginning to peek out of the sediment. I assumed, since it seemed

to be glass, that it would be broken, and that what I was seeing was just a sherd. But as the silt level dropped, more and more of a complete vessel, tall and slender, maybe glass but maybe something else, lying on its side, appeared, seeming to rise out of the sand. It was complete, and it was unblemished, while the ceramic artifacts had often been marked or covered by marine growth. I was struck there on the seabed, as I saw this complete object appear, looking as if it could have been made the week before, but knowing that it was 2500 years old, that no human eyes had seen it in all those centuries until that moment. It just gave me a striking awareness of the great scope of the time that had elapsed since those people had sailed there and wrecked so long before.

I am sure that nitrogen narcosis enhanced both of the experiences I have just described. That's one of the things I love about diving: you can feel while diving that something magical is happening, and it often is.

Describe some challenges you have experienced as Diving Safety Officer.

Well, I have acted as Diving Safety Officer in two places: in Turkey and in Sri Lanka. In Turkey, conditions were amazingly good. Visibility was excellent, currents



negligible, and we could jump into the water from our camp on shore and swim straight down to the wreck site. The main challenge was getting divers out of the water in the afternoon, when swells sometimes pounded against the ladder we had installed on that rocky coast. We managed by installing a fin basket at the bottom of the ladder below the area of the swells. Divers could remove their fins and place them and other items they might be carrying into the basket while still in deeper, calmer water, and then have both hands and feet available to scamper quickly up the ladder through the swells, while the basket was pulled up on a rope and pulley. Pretty easy stuff! We didn't know how good we had it there.

Sri Lanka was a different story. The wreck site was far from shore, in rough, rolling seas, which made for long days of rocking in the tropical sun. To make matters worse, the current was so strong that it was difficult to moor the boat securely, and divers needed a shot line down to the site to keep from being swept away. Decompression in that current was difficult, too. Finally, visibility could be so bad there that it was sometimes impossible to work at all, and the shot line was necessary just to find the wreck. Additionally, the current changed sometimes during the day, so

that a mooring that was adequate in the morning was unsustainable in the afternoon. These conditions made for much more difficult diving operations than I had managed in Turkey. Without a completely secure dive platform, we could not count on surface supplied oxygen for decompression, so we ultimately had to settle for one dive per diver per day, with short enough bottom times for air decompression.

What do you enjoy about being an INA Associate Director?

I love everything about it! I enjoyed my decades of student life, indulging my passions for study and travel. But I realized, too, that at some point I needed to actually make some money to provide for myself and my family. Being an Associate Director of INA lets me continue to indulge those passions while I slave away at my day job. It also lets me stay in touch with the wonderful people at INA, those with whom I have worked in the field for years and those I have gotten to know only since joining the board. And it keeps me informed of all the projects INA is working on around the world, projects in which I might like to participate. Finally, I enjoy having the opportunity to give, and give back, to INA. My wife, Monica, and I have much to be thankful for, and

we actively support various organizations with causes that are close to our hearts. INA is at the top of our list. We derive great satisfaction from supporting the great work that INA does for the world.

If you could tell the world one thing about nautical archaeology in general and/or INA in particular what would it be?

I have often seen the lights go on in lay people's eyes when I explain the appeal of nautical archaeology as follows: in most archaeological contexts on land, people inhabited a particular spot for long periods of time, so that layer upon layer of the remains of their lives is piled on top of each other. And often there are construction or drainage trenches or wells or other instances of a later civilization digging down and intruding into an earlier one, and all of this must be painstakingly sorted out by the archaeologist.

This page, from left: Ken excavates the ophthalmos, or ship's eye, from Tektaş Burnu; Ken develops a close loving relationship with the fish while diving in Bonaire. **Opposite page, from left:** Ken has been an active diver for decades - checking the decompression stop in Alonnisos, 1993; Advocating for INA at a press conference in Sri Lanka regarding the Godavaya shipwreck.

Also, what those people left there for us to find is usually broken, or else they would have bothered to pick it back up to keep using it. But each shipwreck has gone to the bottom at one particular moment in time, and usually has not landed on an older wreck, so one does not have the trouble of sorting out the various layers from various times. Everything associated with that wreck is therefore contemporary with everything else, and we thus obtain a snapshot through the ship itself and all of its cargo of the material world at the moment of the ship's sinking. Plus, in most cases, most of what was on the ship went down with the ship, including unbroken and valuable items that no one meant to abandon, so rather than pot sherds, you find complete vessels, and that's nice, too. People usually understand me when I describe the value of nautical archaeology in this way, so that would be my message to the world. As for INA, we are where the discipline was born, and we continue to do the best nautical archaeology.

If you could find and excavate any type of shipwreck in the world, what would it be and why?

I fear my dream shipwreck is not very sexy. Having immersed myself most thoroughly in the Middle Republican period of Roman history, I would like to find and study some Roman wrecks from the era of Scipio and Cato. I'm sure there are many of those out there. If I am allowed to dream, wouldn't it be great to find a supply ship wrecked while carrying equipment to Scipio's legions in Spain or Africa?

Have INA's goals changed over the years? How could INA improve?

I'm not really aware of the more subtle changes in INA's goals over the years, since I have only been close to its inner workings since 2011. More broadly, I think the primary goal has always remained to increase the world's knowledge of the past and particularly the nautical past through the scientifically rigorous excavation, study and publication of significant shipwrecks. And of course it helps if those

wrecks have some popular appeal as well, as the Tektaş Burnu wreck did, to attract media attention and funding.

I think increasing our popular appeal is one way INA can continue to improve. We do not wish to and will never dilute the quality of our scholarship and our scientific rigor, but we can maintain those while also drawing a wider audience to the fascinating information we produce. I think we can accomplish this through participation in more conferences, in more fields, ancillary to the traditional archaeological groups in which we are known, and by broadening the appeal of our website to draw in more curious lay people.

It may also be time to explore affiliations with other academic institutions rather than just with Texas A&M. We could benefit immensely from an infusion of additional scholarly expertise, university resources and new sources of funding we might find elsewhere.



FOLLOW INA ONLINE: Read more about INA's team of Officers, Administrators, Directors, Associate Directors, Affiliated Scholars, and Research Associates: http://nauticalarch.org/our_team/





THE ROCKLEY BAY RESEARCH PROJECT

Several promising targets surface in the search for remains of the 1677 Battle of Tobago

BY KROUM N. BATCHVAROV, JASON PATERNITI AND DOUGLAS INGLIS

PHOTO: K. BATCHVAROV

The large stoneware Westerwald jug *in situ*, depicting the three Biblical generals David, Joshua, and Alexander.

For the 2014 season, the Rockley Bay Research Project was awarded the singular honor of receiving INA's inaugural Claude Duthuit Archaeology Grant. The Grant made possible an extremely successful expedition in the waters off Tobago, where we discovered the final resting place of at least one of the Dutch men-of-war that participated in the bloody battle of March 3, 1677. For more information about the Battle of Tobago and the maritime history of Scarborough Harbor, see *INA Quarterly* 40(3): 16-21.

The first component of the 2014 season consisted of a remote-sensing survey of an area previously unexplored by our team. Mr. J. B. Pelletier, Senior Nautical Archaeologist of URS Corporation, deployed a marine magnetometer and side-scan sonar, provided to the project by the Institute of Nautical Archaeology. The survey area was determined through analysis of historical documents attesting to the original positions of the ships at the start of the battle and, based on weather conditions predominant in March, we estimated the drift of the ships after the breaking or burning of the anchor cables. The estimates had to take into account the modern changes to the coastline, as the north coast of the bay has been extended southward by approximately 150-200 meters, and a stone breakwater and two jetties have been erected in the harbor.

The area was partially surveyed by the late Wes Hall in the 1990s, but he always believed that a more detailed survey was necessary. The results of the 2014 season proved him right: of the several targets identified by Mr. Pelletier, 13 were investigated by our divers. Three of these (TRB-5, TRB-6, and TRB-7) warranted further investigation to determine their possible association with the battle.

TRB-7

Among the most promising targets is TRB-7. This magnetic anomaly does

not match any of Hall's previously recorded targets. Our team identified the site as a non-operational sewer pipe running across the top of a well-defined ballast pile. Local informants spoke of a shipwreck, found when the sewer line was built in the 1990s. Historical documents suggest that the Dutch fluyt *Sphaerae Mundi* and possibly the ship *Gouden Monnick* may have sunk in the general area of the target. Commodore Jacob Binckes had ordered the Dutch colony's women, children and slaves to be evacuated to these ships for safety during the battle. Tragically both vessels burned with the loss of most people aboard. Surface investigation identified modern construction debris as well as 19th-century bricks, both of which appear to be intrusive. In the future, we intend to return to the site to date and identify it, as TRB-7 may prove to be one of the transport ships.

TRB-5

Unquestionably the most interesting target is TRB-5. The site consists of a large ballast pile; seven or eight cannon are lying on the surface of the smooth layer of mineral encrustation that has formed atop a pile of bricks and ballast stones. The heavily concreted cannon and the





bricks are consistent with a 17th-century date, thus, the site became our primary focus. To confirm the date and nature of the site, we excavated a 6.5-m-long and 50-70-cm-deep test trench adjacent to cannon #4 and #5.

Better visibility on the site in comparison with previous seasons allowed Assistant Project Director Douglas Inglis to experiment with a 3D-photogrammetric method of documenting the site by creating *Structure from Motion* (SfM) models. SfM is a range imaging technique which estimates three-dimensional structures from two-dimensional photographic or video sequences. In theory, by acquiring photographic sequences on a daily basis, the program creates 3-D models of daily progress throughout the season. Although the technique undoubtedly has advantages, the processing is time-consuming and requires powerful computers. To calibrate SfM and compare the accuracy to traditional methods, the team also used the tried-and-tested Direct Survey Measurement method developed by Nick Rule for the excavation of the 16th-century Tudor man-of-war, *Mary Rose*.

CANNON

Divers identified and recorded seven – possibly eight – cast iron cannon lying in a 40-meter-long linear alignment. The guns were heavily concreted, some almost completely embedded in the sea bottom, which made it impossible to record them in detail. The muzzles of all cannon were covered with encrustation and could not be measured this season; however, we were able to obtain overall dimensions. Although precise measurements were not possible, weapons of at least three different calibers are present on the site. Of the seven heavily concreted cannon, two seem to be at least 18-pounders, the medium-sized guns may be 8-

This page, from top: UCONN student and US Navy veteran Mark Wiegel with his first pipe; Project Director Kroum Batchvarov documenting Cannon #4.

6-pounders, and the smallest gun is probably a 3-pounder. All cannon have flat breeches and the trunnions are below the centerline of the gun. Both of these characteristics are indicative of a 17th-century date. The range of calibers is typical of a medium-sized, 17th-century, two-decked man-of-war.

BRICKS

The test trench in TRB-5 yielded large numbers of bricks, in some cases still held to one another by mortar. This argues that we are working in the area of the ship's galley. Research suggests that the brick dimensions (ca. 18 x 9 x 4 cm) are a reasonable match for the 1642 statute registered in the city of Leiden, Netherlands: 18.3 x 9.2 x 3.9 cm.

The flat breeches and trunnions below the centerline of the gun...are indicative of a 17th-century date.

Information on the construction and location of galleys on Dutch warships comes from two main archaeological sources: the Dutch-built, Swedish royal ship *Vasa* of 1628 and the so-called Hohenzollern model of a Dutch warship, dated to the 1660s-70s. In both cases, the galleys were placed on platforms, covered with brick floors and walls. In the case of *Vasa*, the galley is in the very bottom of the hold, immediately forward of the mainmast. The Hohenzollern model was destroyed by allied bombing during World War II, but was documented by Heinrich Winter before the war. A monograph with an extensive photographic appendix and plans of the model was published by Mr. Winter in 1967. From the interior profile drawing, it is visible that the galley is aft of the foremast and forward of the main hatch, at the end of the forecastle. The platform is "hanging" in the hold, with a chimney carrying the smoke to the upper deck. According to one of the

foremost specialists on 17th-century Dutch shipbuilding, Mr. Ab Hoving, the chimney was probably made of copper sheets, and a sheet of copper was found in the test trench.

At least two fragments of larger timbers were uncovered near the brick pile, separated by about a meter and parallel to each other. They might be remnants of frames, but it is more probable that they were left in situ and reburied to preserve them for further study. Numerous, smaller, unidentifiable wood fragments were observed in the test trench. Professor Nigel Nayling of the University of Wales Trinity Saint David studied the timber fragments in an attempt to date and source them, but the samples did not

have a sufficient number of tree rings to provide a date.

CERAMICS

Seventy-two clay pipe bowls were recorded in the trench. Veronica Morriss cleaned the encrustation from most and was rewarded with the discovery of several marks on the heels and heraldic decorations. The clay of the pipes is brick-red, with two exceptions. One is white, with a decorative face carved on the inside, facing the smoker, and the other is a dark, almost black, pipe with no decoration at all. The pipes' shapes and dimensions are consistent with those manufactured between 1650 and 1680.

The test trench also yielded pottery fragments and three well-preserved items. These include a fragment of a large, salt-glazed Rhenish stoneware jar of the type known as Bellarmine or Bartman jug, and a small, complete Bellarmine jug without the typical face mask decoration. Parallels for this type are frequently

found on 17th-century shipwrecks and are easily dated.

The most impressive piece of pottery recorded at the site is a large stoneware Westerwald jug decorated with three elaborate escutcheons depicting the Biblical generals David, Joshua, and Alexander. Above Alexander are the numerals 1585. So far we have been unable to find an exact parallel for the jug, though the shape and escutcheons do have parallels

AUTHORS



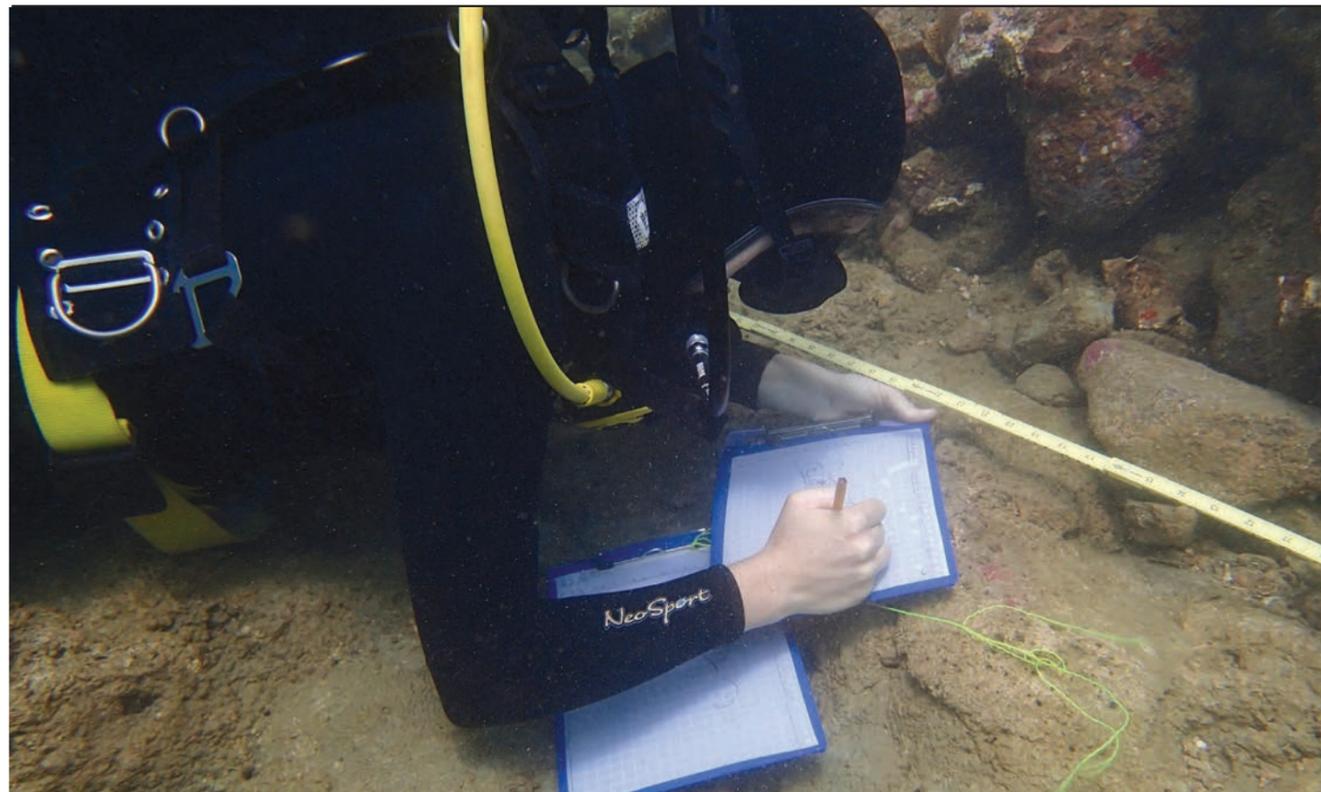
KROUM N. BATCHVAROV
INA Affiliated Scholar and
Assistant Professor, University
of Connecticut Avery Point



JASON PATERNITI
President and Chairman, Global
Exploration & Oceanographic
Society (GEOS)



DOUGLAS INGLIS
Ph.D. Student, Nautical
Archaeology Program



Preliminary analysis of the pottery is also consistent with a later 17th-century date and Dutch cultural association.

among the Siegburg stoneware products of the 17th century. This type of container evidently was used for beer.

METAL OBJECTS

The site is covered with iron concretions that appear to be ship's hardware and fasteners. Without raising them and subjecting them to an x-ray, it is not possible to positively identify the concretions.

Within the trench, archaeologists uncovered four forks and five spoons in various states of preservation. The humble forks are the most important of our finds on TRB-5, as they may be the earliest examples found in a datable archaeological context. Mr. Arent Voss, an archaeologist with the Cultural Heritage Agency of the Netherlands, is unaware of any other examples found on 17th-century shipwrecks; forks were still a new-fangled development

in food consumption at that time.

Other metal fragments of note include what appear to be the guard from the trigger guard and serpentine spring from the firelock of a firearm. Eleven pieces of small lead shot of at least three different calibers were uncovered; none of them was used, as no deformation of the castings was observed. A small round disc with traces of relief was likely a token or medal, but it was not possible to identify it without conservation.

TRB-6

Approximately 20 m east of the center of the cannon concentration at TRB-5 lies TRB-6, a magnetic anomaly that proved to be the shank of an anchor, leaning against the rocks and hard to observe. The ring and upper 1.5 m of the anchor protrude from the sand; the rest remains

buried. Although, the target was initially assigned a separate site designation number, its close proximity to TRB-5 may indicate that the anchor belonged to that ship.

DISCUSSION

Based on the associated artifacts, TRB-5 can be dated with some confidence to the third quarter of the 17th century. The cast iron guns, some of which are of substantial caliber, argue in favor of identifying the site as the wreck of a 17th-century man-of-war. The concentration of cannon of different calibers implies the wreck of a two-decked man-of-war and is typical of Dutch naval vessels of this period. This is not consistent with what one would expect to find on the wreck of a merchantman (lighter guns) or a later frigate (more homogeneous armament).

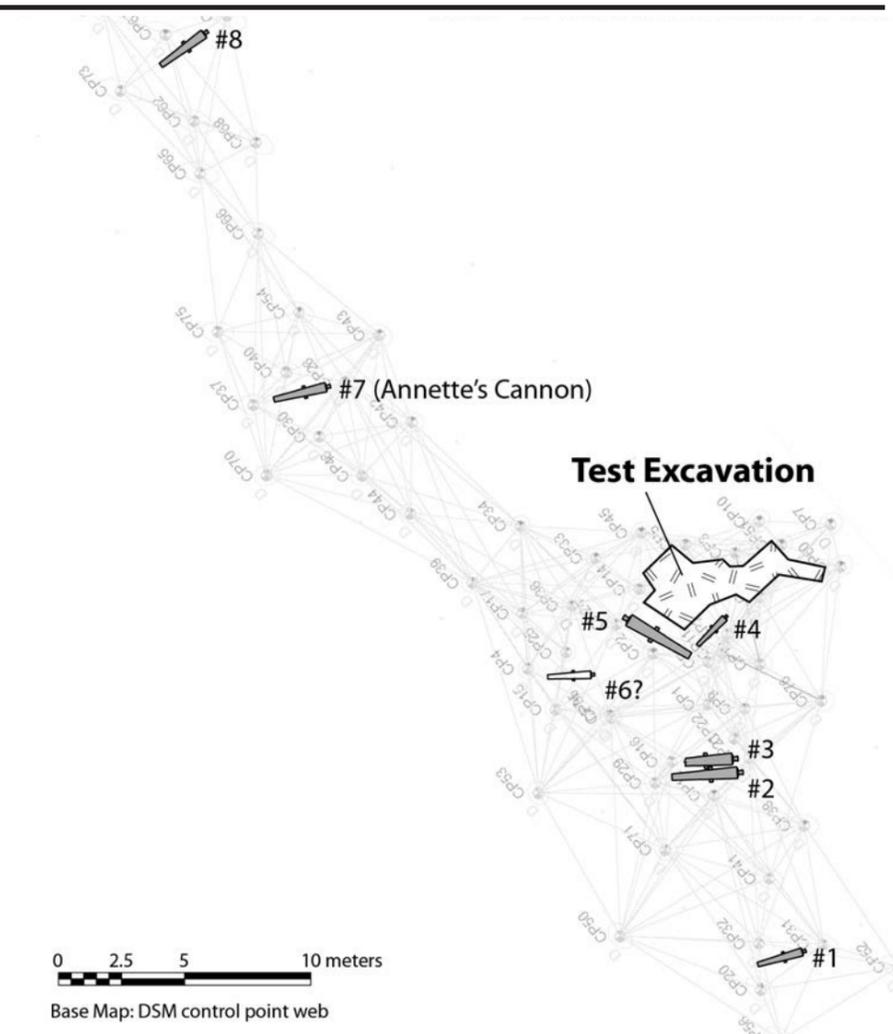
The pottery is also consistent with a later 17th-century date and Dutch cultural association. TRB-5 is the first site investigated in Rockley Bay that has not yielded any post-1600s material. Thus, based on the material culture found at the site, it appears that TRB-5 is indeed one of the Dutch warships that sank in the Battle of Tobago in 1677.

Of the seven Dutch men-of-war present at the battle, five sank in the bay during the battle with the French. Of these five ships, only *Huis te Kruiningen*, launched in 1653, is known to have carried 18-pound cannon. Two of the guns observed at TRB-5 appear large enough to be of this caliber. The original position of *Huis te Kruiningen* in the Dutch battle line is known from contemporary accounts of the battle. Based on interviews conducted in 2014 with local mariners and port officers, the wind and tide patterns typical during March are such that *Huis te Kruiningen* would most likely have drifted to the vicinity of TRB-5, once her anchor cables parted.

Huis te Kruiningen was built in 1653 for the Republic of Genoa but was acquired by the Admiralty of Amsterdam around April of that year. After the Battle of Ter Heide in August 1653, the Dutch Admiral Michiel de Ruyter transferred his flag onto her for the rest of the campaign. In the great battles of 1666, during the campaign of the Second Anglo-Dutch war, the ship was armed with 18-pounders on the lower deck, 8-pounders on the upper deck and 3-pounders on the quarterdeck and forecastle.

During the Battle of Tobago, *Huis te Kruiningen* was attacked by the French flagship, *La Glorieux*. Admiral Jean Comte d'Estree mistook her for Commodore Jacob Binckes' flagship, as she was the largest Dutch vessel present. A

Opposite page: Veronica Morriss drawing a profile of the ballast pile. **This page, from top:** Site plan by Douglas Inglis; J. B. Pelletier, Jason Paterniti and Annette Madsen discussing the search pattern.



LEFT PHOTO: D. INGLIS; RIGHT PHOTO: K. BATCHVAROV

number of contemporary accounts of the battle survive, but they differ in some details. Evidently *Huis te Kruiningen* was boarded by the French and Captain Roemer Vlacq cut the cables in order to run her aground and prevent capture. The ship caught fire, which spread onto *Glorieux*. Both vessels were lost, but the tactical advantage lay with the Dutch; for the cost of an elderly and smaller ship near the end of her useful life, they had destroyed the new and immensely more powerful French flagship.

CONCLUSION

Based on the material observed at TRB-5, we believe we have discovered a 17th-century Dutch wreck. The large size of the cannon implies that these are the remains of a warship, and therefore it likely formed part of Jacob Binckes' squadron. At this stage of research, it is not possible to determine which of the

men-of-war from the Dutch squadron TRB-5 is. We may never know with certainty the identity of the wreck, but the evidence available at present suggests that *Huis te Kruiningen* is a candidate. She was positioned in the middle of the Dutch line and, based on dominant wind and current patterns, likely drifted to the area of TRB-5 after her anchor cables parted. The large cannon, the date, and the position all corroborate this identification, though it is too early to make a definitive statement to this effect.

ACKNOWLEDGMENTS

The team would like to thank the INA Archaeological Committee for the great honor of awarding us the inaugural Claude Duthuit Archaeology Grant. Our

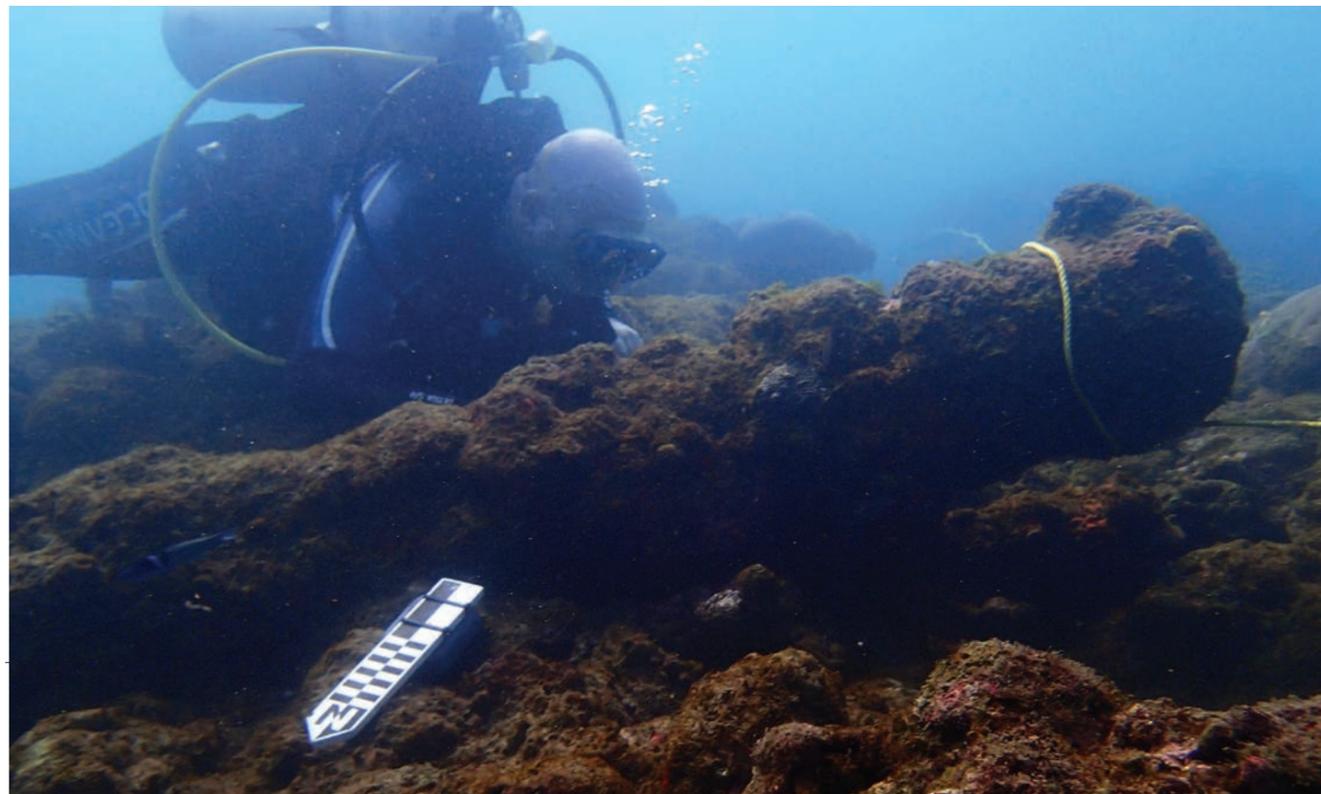
gratitude goes to Mr. John De Lapa, Mr. Edward Boshell, and Mr. Jason Paterniti for their generous support of the project. We would like to thank the United States Embassy in Trinidad and Tobago for its ongoing support of the project. A huge thank you goes to Her Excellency the Ambassador of the Kingdom of the Netherlands to Trinidad and Tobago, Mrs. Lucita Moeniralam. We express our gratitude to the Tobago House of Assembly, the Chief Secretary Mr. Orville London, the Division of Tourism, and the Secretary of Tourism, Ms. Tracy Davidson-Celestine. This project would not have been possible without the support of Dr. Levis Guy-Obiakor. Finally, this is written in memoriam of our very good and deeply missed friend Mr. Robert Auerbach.



FOLLOW INA ONLINE: Check out the Rockley Bay Research Project blog for updates and additional photos and information, or view other INA project blogs: <http://nauticalarch.org/blogs>



Opposite page: Batchvarov studying cannon #4. This page, clockwise from top: The central escutcheon of the Westerwald jug, which reads Alexander 1589; Pottery vessels from the test trench; Morriss with the small Rhenish stoneware jug after cleaning; 17th-century forks, possibly the oldest found in underwater archaeological context; Smoking pipes from TRB-5.



THIS PAGE PHOTO: D. WINTER; OPPOSITE PAGE PHOTOS: D. INGLIS, V. MORRISS



THE 2014 IOPPA MARITIMA PROJECT: **THE LAND SURVEY**

An INA team searches for shipwrecks in Israel without setting foot in water

BY SHELLEY WACHSMANN

Jaffa (Hebrew: Yafo; Arabic: Yafa) was one of the most important harbors in antiquity along Israel's long and straight Mediterranean coast. Today the site is nestled inside Tel Aviv. Team members from the Jaffa Cultural Heritage Project, under the directorship of Drs. Aaron Burke, from the University of California, Los Angeles, and Martin Peilstöcker, from Johannes Gutenberg University, are currently excavating the ancient site. During the Late Bronze Age (1550-1200 B.C.) Jaffa served as an Egyptian fortress, manned by Egyptian troops controlling the Canaanite hinterland. The present excavation focuses on a monumental gateway dating to the time of Ramses II (aka "Ramses the Great"), the pharaoh traditionally associated with the Exodus.

Jaffa is first mentioned in Egyptian sources as one of the cities conquered by Thutmose III in the 15th century B.C. Later, in the Iron Age, it was to the port of Jaffa that Hiram of Tyre sent timber in rafts for the building of Solomon's Holy Temple, as well as his royal palace (2 Chronicles 2:16). Similarly, Ezra (3:7) describes the importation by sea of cedar logs in the late sixth century B.C. to the port of Jaffa for use in the construction of the Second Holy Temple. And, of course, it was from Jaffa that the prophet Jonah (1:3) tried—unsuccessfully—to flee from the Lord on board a ship sailing to Tarshish, which is probably to be identified with the Tartessian culture of southern Spain (quite literally "the end of the world," for Jonah). These, as well as other ancient references, make it clear



PHOTO: A. BURKE, COURTESY THE JAFFA CULTURAL HERITAGE PROJECT

The monumental gateway of Ramses II at Jaffa. The gateway is a reconstruction based on surviving architectural elements.



that Jaffa served as an important port for the Judean/Israelite hinterland during the first millennium B.C. What they *do not* tell us is where ancient Jaffa's harbor was located. Today Jaffa has a small cramped harbor, which would have been even less useful prior to major changes carried out during the British Mandatory period (1920-1948). Indeed, the first-century A.D. Jewish historian Flavius Josephus was only the first in a long line of writers to note how poorly suited was the western harbor for shipping.

In the spring of 2013, Aaron Burke asked me to advise him on the creation of a maritime/nautical component to

name, the "Bassa" (this term has entered modern Hebrew slang to indicate an emotional depression). Already in 1903, the Reverend J.E. Hanauer had proposed that the modern Bassa was a remnant of the "Solomonic" harbor of Jaffa that existed at the mouth of the Ayalon River. Furthermore, early maps and illustrations, beginning with M. Jacotin's map, made during Napoleon's Egyptian Campaign (1798-1999) still show a body of water existing in this spot. Slightly later, in 1839, David Roberts painted Jaffa from the north showing a low-lying area to the east of the city.

Aaron and I walked the streets to

If the Bassa indeed had served as the ancient harbor of Jaffa, it might contain the hulls of long-forgotten seagoing Bronze Age, Iron Age, and Persian-period ships, for which we presently have only limited evidence.

complement his land excavation of the tel. When we met that summer, my first question to Aaron was whether he knew of any geographical depressions in the vicinity of ancient Jaffa that might indicate the site of a silted harbor.

It turned out that that, indeed, a large geographical depression exists east of the tel, known locally by its Arabic

see the location of the depression in the modern city of Jaffa. Even today it is possible to follow the contours of the slope in the streets of modern Jaffa, but almost the entire area was covered with either buildings or asphalt. More or less in the center of the Bassa, however, lies Groenigen Park, a large green zone and a perfect location to carry out the type of geoarchaeological study that could answer our questions regarding the Bassa's ancient relationship with the Mediterranean Sea. Could the Bassa have served as an inland, estuarine harbor of the Ayalon River for the ancient site of Jaffa? I reminded Aaron that we now know that the best place to find well-preserved hulls of ancient ships is not under water but rather on land, in places like silted harbors, as has been demonstrated, for example, at Pisa, Italy and at Yenikapi, in Istanbul, Turkey. If the Bassa indeed had served as the ancient harbor of Jaffa, it might contain the hulls of long-forgotten seagoing Bronze

Age, Iron Age, and Persian-period ships, for which we presently have only limited evidence.

As a second avenue to providing Jaffa with a nautical dimension, I suggested carrying out a deep-water survey near Jaffa to search for shipwrecks of all periods (as opposed to only ancient wrecks). Ronnie Sade, an independent master navigator, had once offered to share multibeam data from a survey that he had conducted for the Israel Geological Survey and define potential shipwreck targets. Ronnie helped me locate an appropriate ship and Remote Operated Vehicle (ROV) that would allow us to survey in the 50-250 meter (164-820 feet) depth range. I settled on the *Ocean King*, a 41-foot catamaran owned and operated by Ishay Natzchan.

THE LAND SURVEY

During the spring of 2014 Aaron and I worked together to generate a project budget, find funding for the project, and locate the appropriate staff members and graduate students. For the land part of the project I recruited geoarchaeologist Dr. Rick Dunn of Norwich University, Vermont.

We also needed a paleontologist, someone who could identify the microfauna in the cores that we were planning to take: by identifying their skeletal remains it would be possible to determine the progressive environmental changes in the area and whether it was ever connected to the sea. In theory we could create an absolute chronology of changes in the area of the Bassa by means of optically stimulated luminescence (OSL), which measures the time since quartz grains

Opposite page from top: Reliefs from Sargon II's (722-705 BC) palace at Khorsabad depicting Phoenician seafarers transporting logs behind their ships supplies a visual context to the biblical description of the transport of timber by sea; **This 1918 photo of the entrance to Jaffa's rocky seaward harbor showing "the Rocks of Andromeda" illustrates its poor quality as a natural harbor.**

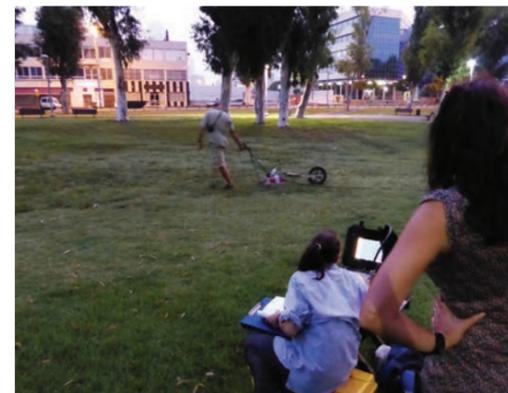
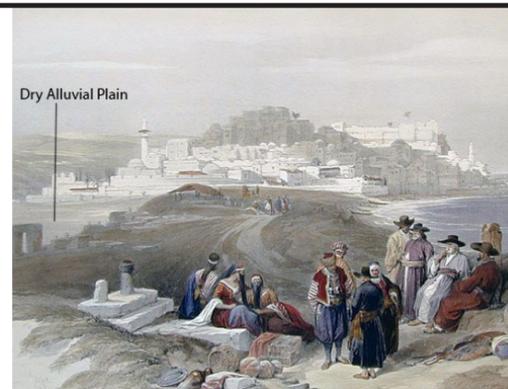


TOP PHOTO: S. WACHSMANN, COURTESY MUSÉE DU LOUVRE; BOTTOM PHOTO: F. HURLEY, COURTESY MITCHELL LIBRARY, STATE LIBRARY OF NEW SOUTH WALES

AUTHOR



SHELLEY WACHSMANN
Meadows Professor of
Biblical Archaeology, Texas
A&M University



Our plan was to "see" into the earth in two ways: by geological coring with a Geoprobe, as well as by using ground-penetrating radar (GPR) to look for anomalies in the park that might indicate either harbor facilities or vessels that went down with their ballast and/or cargo onboard.

were last exposed at the surface and radiocarbon dating of organic materials from the same strata in which the microfauna were found. Aaron contacted the Geological Survey of Israel and asked if they could recommend a qualified paleontologist, and that is how Dr. Simona Avnaim-Katav joined our team.

Our plan was to "see" into the earth in two ways: by geological coring with a Geoprobe, as well as by using ground-penetrating radar (GPR) to look for anomalies in the park that might indicate either harbor facilities or vessels that went down with their ballast and/or cargo onboard. For this I called on Dr. Jessie Pincus, who runs a company that supplies GPR services to archaeological projects in

Israel. Graduate student Krister Kowalski from Mainz University, Germany, an expert in Geographic Information Services (GIS), rounded out the team.

Graduate studies have as much to do with apprenticeship as with classroom attendance so I wanted to give students in Texas A&M University's Nautical Archaeology Program an opportunity to experience two very different forms of archaeological field work. Karl Krusell, Veronica Morriss, and Douglas Inglis signed up for the land portion of the project, scheduled for August. Veronica and Douglas were to continue in September on the deep-water part of the project when Megan Licklitter-Mundon and Holly Perdue would join them.

Unfortunately, a chain of events, beginning in mid June, led to thousands of terrorist rockets being fired indiscriminately into Israel from the Gaza Strip and to Israel's retaliation with Operation Protective Edge. This impacted many

This page, clockwise from top: Detail of M. Jacotin's 1799 map of the region of Jaffa showing a body of water in the Bassa; David Roberts' 1839 painting of Jaffa and its environs, view to the south shows a flat area, possibly a dry alluvial plain, to the east of Jaffa; Jessie (at the controls) and Simona watch as Rick pulls the GPR device over a planned core site. **Opposite page:** The "Groenigen Park core team" at the end of two intense days of probing. From left: Rick Dunn, Shelley Wachsmann, Simona Avnaim-Katav, Tomer Shaki, Rami Rotmann, and Moaiid Azbarga.

MAP: ERAN LAOR CARTOGRAPHIC COLLECTION; LEFT PHOTO (BOTTOM): S. WACHSMANN

people, often in horrific ways. For us, it meant that the project had suddenly gone on life support. All the foreign excavations in Israel shut down, including Aaron's at Jaffa. I had no choice but to cancel student participation in the land portion of the project. I left for Israel in early August still hoping to carry out the work with staff only.

On August 25 Simona, Rick and I met at Groenigen Park and marked over a dozen points for coring. The next morning we began work in the dark at 5:00 AM with Jessie carrying out quick GPR spot checks at the coring locations: even with all the permits, if we were to hit something while drilling, I would be responsible, so I wanted to be as careful as possible.

Using a Geoprobe corer, we completed work the next day. We had eight cores, some of them drilled to 13 meters (42.7

feet). We had succeeded in collecting all the data necessary for Rick and Simona to map out a sedimentological and stratigraphic history of the Bassa. In October Jessie returned, and with Krister's help, carried out a comprehensive GPR survey of the most interesting parts of Groenigen Park. Jessie is currently crunching these data while Rick is collecting samples for pollen analysis and is conducting analyses for grain size distribution and organic content. Simona is about to start examining cores for microfossils. In December, Rick is scheduled to return to Israel to work with Simona on completing the description and sampling of cores and to begin the geological synthesis of these data.

How the land part of the Ioppa Maritima Project moves forward now depends on the results of the analyses of the cores and the GPR survey. Was the Bassa connected to the Mediterranean Sea? If so, when? Will the GPR survey reveal tantalizing anomalies that may represent the cargoes or ballast of ancient hulls buried in the sediment beneath Groenigen Park? Look for a report on the deep-water survey component of the 2014 Ioppa Maritima Project in the next issue of the *INA Quarterly*.

ACKNOWLEDGMENTS

I thank the MacDonald Center for the Arts & Humanities for its generous support of the Ioppa Maritima Project.



FOLLOW INA ONLINE: Check out the Ioppa Maritima project blog for updates and additional photos, or take a look at other INA project blogs: <http://nauticalarch.org/blogs>





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2



3

1. Aboard Danielle Feeney's yacht *Andrea* 2. Ortaköy Mosque and Bosphorus Bridge 3. Tuba Ekmekçi, John De Lapa, and Ned Boshell 4. Cocktail reception at INA's Bodrum Research Center 5. Debbie Carlson, Zafer Gül, and Özlem Doğan

HIGHLIGHTS OF THE 2014 BOARD MEETING IN TURKEY

INA Directors and Officers gather in Istanbul and Bodrum, Turkey to celebrate another successful year and prepare for upcoming projects in 2015

Every autumn, INA's Board of Directors comes together to learn about the results of ongoing INA surveys, excavations, and research, and plan for future projects. The 2014 annual meeting took place over five days in Istanbul and Bodrum, Turkey. Highlights included tours of the Istanbul

Naval Museum and Bodrum Museum of Underwater Archaeology, a spectacular cocktail reception along the Bosphorus hosted by our friends at the Turkish Institute of Nautical Archaeology (TINA), and unforgettable lunch aboard Danielle Feeney's yacht *Andrea*, visits to the Carian

archaeological sites at Euromos, Labranda, and Milas, and dinner among the ruins of the Mausoleum of Halicarnassus, one of the seven wonders of the ancient world. We invite you to share some of many fond memories and meet the people who make INA such a vibrant and fabulous family!



4



5



6. John De Lapa and Dana McGinnis
7. Cemal Pulak describes the Ottoman Galley *Kadirga* in the Naval Museum
8. Tracy Culp, Bill Culp, and Carl Douglas
9. Bob Walker, Terry Ray, and Laurie Ray



10. In the Temple of Zeus at Euromos
11. Lucy Darden, John Cassils, John Williams, Suzy Williams, Nina Cassils
12. Jim Kjorlien, Susan Katzev, Sheila Matthews
13. Sheila Matthews, Kroum Batchvarov, Rebecca Martin, Özlem Doğan
14. Exceptional lunch aboard *Andrea*

RETROSPECTIVE:
**ABOARD HİDAYET KAPTAN'S BOAT,
ÜNLÜOĞLU (1979)**

Taken 35 years ago during INA's excavation of the medieval glass wreck at Serçe Limanı, Turkey, this photo features some of the world's most accomplished underwater archaeologists and their family members. **How many can you identify?**



TOP ROW

(LEFT TO RIGHT)

Fred van Doorninck
Hasan Karayığit
Bob Adams
Sheila Matthews
Hasan İncirlioğlu
Nejat Çınar
Christie van Doorninck
Tim Williamson
Gordon Bass
Mehmet Demirel
Sezgin Gökmen
Halil Demirel
Robin Piercy
Lara Piercy
Hidayet Ünlüoğlu

MIDDLE ROW

(LEFT TO RIGHT)

Cemal Pulak
Sema Pulak
Sanne Biehl Frey
Maja Biehl Frey
BJ van Doorninck
George Bass
Nergis Günsenin
Ann Bass
Oğuz Alpözen
Faith Hentschel
Tufan Turanlı
Gülen Seiler-Cingisiz

BOTTOM ROW

(LEFT TO RIGHT)

Feyyaz Subay
Pilar Luna
Netia Piercy
Dory Slane
Alan Bass
Don Frey



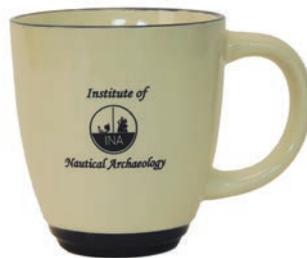
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