On March 2, 2021, George F. Bass, the Father of Underwater Archaeology, the Founder of INA and the Nautical Archaeology Program, and Distinguished Professor Emeritus at Texas A&M University, passed away while hospitalized in Bryan, Texas. George was so many things to so many people: professor, field director, mentor, role model, explorer, advocate, close friend, father, and husband. The people he inspired or influenced, the careers he launched or shaped, the attention and importance he brought to shipwreck archaeology – none of this can be quantified.

Since that sad day, dozens of you have posted moving, amazing comments on the George F. Bass Tribute page that lives on the INA website (www.nauticalarch.org). Others have authored obituaries that are being quantified. This page from left: George after a dive on the Bozburun Byzantine shipwreck (1997); George and Ann in Poland (2008); George and Ann at Cape Gelidonya (1960).

George was so many things to so many people: professor, field director, mentor, role model, explorer, advocate, close friend, father, and husband. The people he inspired or influenced, the careers he launched or shaped, the attention and importance he brought to shipwreck archaeology – none of this can be quantified. Since that sad day, dozens of you have posted moving, amazing comments on the George F. Bass Tribute page that lives on the INA website (www.nauticalarch.org). Others have authored obituaries that are being quantified. This page from left: George after a dive on the Bozburun Byzantine shipwreck (1997); George and Ann in Poland (2008); George and Ann at Cape Gelidonya (1960).

The INA Publications Committee has selected two individuals to benefit from the George & Ann Bass Endowment for Nautical Archaeology Publications in 2021. The first recipient is INA Affiliated Scholar Jeremy Green (Western Australia Maritime Museum), who is overseeing the creation of a 3D digital model of the hull of the Santo Antonio de Tanna excavated by INA at Mombasa, Kenya. The second recipient is INA Scholar in Residence John McMamon (Loyola University) who is spearheading the two-volume publication of the Byzantine shipwreck at Bozburun, Turkey. We congratulate the recipients of this prestigious annual award and applaud their hard work and commitment to publication!

"It is a great honour to receive the George and Ann Bass endowment to assist in the publication of the Santo António de Tanná excavation report. The publication involves Robin Percy, the director of the excavation from 1976 to 1980, together with Sheila Matthews and Susan Green who were all involved in the original excavation. Having worked with George Bass in the 1970s and in 1999-2021, knowing his keen interest in the wreck site and its publication, we hope to realize his desire to have the excavation report published." - Jeremy Green

"Performing any service for INA is an honor, but doing so with the support of the George and Ann Bass endowment is sublime. The funding allowed me to recruit two talented young scholars, Dr. Athena Trakadas (Danish National Museum) and Dr. Steven Catania (U. of Wisconsin) to help in completing the research, writing, and illustration of the Bozburun Shipwreck Final Report. The report will surely profit thereby." - John McMamon

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It is with deep regret that we acknowledge the passing of Dr. Roger Smith, twice an alumnus of the Nautical Archaeology Program (NAP) at Texas A&M University. After earning a Bachelor’s degree at the University of Virginia, Roger trained as a commercial diver and was drawn to Florida and the Caribbean after witnessing the negative effects of treasure hunting there. In 1978, Roger entered NAP as an M.A. student and completed a thesis on the heritage and a major figure in our field. Roger participated in several pivotal projects including the Highborn Cay, the Molasses Reef (Mexico), as well as the Bahía Wreck (Turks & Caicos), and the Bahía Mujeres Wreck (Bahamas), the Molasses Reef projects including the Highborn Cay. Roger will be sorely missed by his many friends, colleagues, NAP classmates, and members of the archaeological community.

WELCOME NEW INA ASSOCIATE DIRECTORS
INA is pleased to welcome two new Associate Directors to the Board! Dr. Josh Daniel Broadwater spent almost 20 years at the National Oceanographic and Atmospheric Administration (NOAA) and directed the raising of the turret from the USS Monitor in 2002. In 2019, John received INA’s George and Ann Bass Publication Grant for his work on the British collier brig Betty, which sank in 1781 during the Battle of Yorktown. Mr. Josh Daniel received his M.A. from the Nautical Archaeology Program at Texas A&M in 2009 and spent two seasons helping INA excavate the Late Hellenistic Column Wreck at Kaithburun, Turkey. Josh is the owner of Seafloor Solutions, LLC, consulting service and is currently working with Broadwater to locate and identify shipwrecks in the York River. Welcome aboard, Gentlemen!

WINNEW INA ASSOCIATE DIRECTORS
INA is delighted to welcome Dr. Lilia Campana, INA Affiliated Scholar and Instructional Assistant Professor in the Department of Visualization at Texas A&M University, for being selected as a 2020 Dumbarton Oaks Byzantine Research Fellow in Washington, D.C. Lilia is a naval and maritime historian of the Mediterranean whose research focuses on how ancient mathematics, geometry, and mechanical arts were applied to ship design through the centuries. More recently, Lilia was named a 2021 Fellow of the American Council of Learned Societies (ACLS). Her project, Byzantine Ship Design and Its Legacy in the West: Transmission and Application of Shipbuilding Knowledge in Venice and Beyond will be the first comprehensive study of Byzantine ship design and its impact upon 14th-century Venetian shipbuilding. We are delighted to recognize Lilia’s receipt of these very prestigious fellowships!

NEW FILM ON YENIKAPI SHIPWRECKS
INA recently partnered with EyeCandy Inc. of Houston, Texas to produce a new documentary about INAs archaeological work at Yenikapi (Istanbul), Turkey. The film, entitled Eight Byzantine Shipwrecks from the Late Harbor of Theodosius, features the work of INA Vice President Cemal Pulak, who led the recording and recovery of eight ships (including gallery) currently being conserved at INAs Bodrum Research Center. The Yenikapi excavations, which took place between 2004 and 2013, revealed over 8,000 years of the city’s history ranging from Neolithic dwellings to Ottoman cisterns. Most of the ship finds occurred in association with the Harbor of Theodosius I (A.D. 379-395), which was rendered largely inaccessible by the 11th century. We invite you to check out the 20-minute film on INA’s YouTube page.

NEW ONLINE OFFERINGS
If you are spending a substantial portion of each day in online meetings, we invite you to take your next meeting under water with one of INAs virtual backgrounds, available to download through the INA website! We also invite you to check out some of the newest merchandise available at the INA Online Store, which includes a 2021 calendar featuring INA excavations and fieldwork projects from the 1970s! Spend the rest of the year viewing rare photos from Kenya, Turkey, Cyprus, and Italy. INA members receive free shipping on all orders from the INA Online Store.

NEW FILM ON YENIKAPI SHIPWRECKS
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NAME: Bülge Güneşdoğdu Akman  
POSITION: Illustrator, 23 Years

Where were you born? Where did you grow up?  
I was born in Ankara and grew up in Izmir.

Tell us about your family.  
I have a daughter, and my parents and brother live in Izmir. My father retired from the air traffic control department of the Turkish Air Force, and my brother is an optician. My mother is an incredibly energetic person.

What did you enjoy about school?  
I have always enjoyed arts and culture. I used to collect pebbles and plants to do something with them in clay. I always loved to be creative and make things. Sports and dance were my favorite things. I still dance when I am working with my headphones on. I am also pursuing my Master’s degree in ceramic arts.

What did you enjoy about school?  
I used to collect pebbles and plants to do something with them in clay. I always loved to be creative and make things. Sports and dance were my favorite things. I still dance when I am working with my headphones on. I am also pursuing my Master’s degree in ceramic arts.

What is your first memory of INA? How did you come to work for INA?  
In 1996, when I was a ceramics student in Fine Arts at Dokuz Eylül University I visited the Bodrum Museum of Underwater Archaeology and met the famous ceramicist, Bora Sencer. He took me to INA’s conservation laboratory in the museum and introduced me to the INA team. I saw that there was a student intern from my school, which gave me the idea to also intern. The next year I applied and was accepted. I loved working on different forms of ceramics, and I wrote my graduate thesis on the Uluburun shipwreck ceramics. After that, I continued to work with INA as a volunteer every summer. As a part of my education, I learned to do artifact illustration. When INA’s former and beloved Illustrator Selma Oğuz died, INA needed an illustrator, and George Bass asked me if I would like the position. They tested me, saw that I was capable, and hired me as the illustrator.

What do you do for INA?  
Since my first year of internship in 1997, I do ceramic conservation, restoration, illustration and photography.

What do you like most about your job?  
My favorite thing is witnessing different eras in history, touching the objects from different times, and trying to understand the people and their lives. I try to use this information for self-improvement. As a result of this, I try to apply this knowledge to my artwork.

What has surprised you (good or bad) about your job?  
When I first dived inside INA’s submersible Carolyn on the Pabuç Burnu shipwreck, that was a thrilling experience for me. For the first time I saw amphoras in their ancient context!
In June 2019, a team from Texas A&M University’s Nautical Archaeology Program (NAP) traveled to Prince Edward County, Ontario to remotely record the remains of the two-masted schooner Katie Eccles, which was among the last sailing vessels engaged in commerce on the Great Lakes at the time of her loss in 1922.

**THE KATIE ECCLES**

Remotely recording a late 19th-century schooner from the final years of sail

**NAME:** Mustafa Babacık
**POSITION:** Grounds Team, 26 Years

Where were you born? Where did you grow up?
I was born and grew up in Çamlık village near Bodrum.

Tell us about your family.
I am married and have a son who just finished his military service and returned home.

What did you enjoy about school?
I liked to play football at school.

Were you interested in archaeology as a child?
No, I was not.

How long have you worked for INA?
Since 1994, for 26 years.

What do you do for INA?
I am the gardener and help with maintenance.

What do you like most about your job?
I like to work in the garden and make the BRC look nice.

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**NAME:** Öziem Doğan
**POSITION:** Financial Manager, 16 Years

Where were you born? Where did you grow up?
I was born and grew up in Germany.

Tell us about your family.
I am married and have a son. I have three brothers; one is a faculty member, one a hotel manager, and one is a sales representative.

What did you enjoy about school?
Mathematics and physics were my favorite classes.

Were you interested in archaeology as a child?
Yes.

What is your first memory of INA? How did you come to work for INA?
I started to work for INA after an interview with Tufan Turanlı.

How long have you worked for INA?
I have been working with INA for 16 years. I am the financial manager.

What do you like most about your job?
Working with numbers.

What has surprised you (good or bad) about your job?
I am very good with numbers, so nothing surprises me. But I don’t leave my desk until every kurşun is accounted for!
HISTORICAL CONTEXT

The Last Schooners Project is part of the author’s doctoral dissertation researching and recording the historical and archaeological legacy of the last sailing vessels on Lake Ontario. The 19th century witnessed the emergence of intensive maritime commerce on the Great Lakes. By 1868, the peak of sailing vessel numbers, nearly 2000 registered vessels were operating on the Great Lakes alongside steam vessels. Throughout much of the 19th century, freight transport on the lakes was controlled by sailing vessels, and it was not until 1884 that sailing tonnage was surpassed by steam tonnage.

The Katie Eccles was typical of smaller wooden two-masted schooners conducting small-scale commerce on a local level throughout the lakes, never engaging in large-scale commerce. The Eccles, which decades prior had a crew of five, was crewed by only three to cut operating costs and maintain profitability in the face of declining freight rates. Soon after leaving Oswego, the Eccles’ rudder became unresponsive. Amidst a building gale and snowstorm, the crew managed to sail the Eccles, by trimming sails alone, across the lake into the lee of Timber Island off Point Traverse in Prince Edward County. There they remained at anchor until 29 November when, with a change in the wind direction and a building gale, the Eccles began to drag anchor. The crew abandoned the Eccles for Timber Island and were rescued the following day.

The Eccles, adrift on the lake, soon foundered 8.9 km (5.5 miles) northeast of Timber Island.

By the 1920s schooner numbers had dwindled considerably through vessel losses. In 1922 before the Eccles’ loss, only nine schooners remained on Lake Ontario. The loss of the three-masted House L. Tabor, which had departed Oswego with the Eccles and was lost in the same storm reduced this total to seven by the end of that year. By 1934, the last commercial sailing vessels had disappeared entirely from Lake Ontario and the Great Lakes.

The Katie Eccles was primarily intended to participate in the grain trade on Lake Ontario. This grain trade centered on export from Canadian ports on the Bay of Quinte and the north shore to Oswego, New York for forwarding along the Erie Canal, and on the transport of grain to the elevators at Kingston for forwarding down the St. Lawrence River. The grain trade with Oswego was coded abruptly by the McKinley Tariff Act of 1890, which substantially increased the import tariffs on Canadian grain, in turn increasing sailing ships’ reliance on consignments of domestic grain for Canadian forwarders.

Small schooners would eventually be forced out of this trade as the epicenter of Canadian grain production shifted westward to the plains. By the first decade of the 20th century, the Eccles and most schooners on Lake Ontario had been relegated to trafficking consignments of coal from New York ports to Canadian ports on the north shore and Bay of Quinte. Though rates for coal were lower, the typical small scale of coal consignments deterred more expensive investment in steam vessels, which operated at a higher cost, thus limiting competition.

On the evening of 26 November 1922, the Eccles cleared from Oswego for Belleville, Ontario with a consignment of coal. The Eccles, which decades prior had a crew of five, was crewed by only three to cut operating costs and maintain profitability in the face of declining freight rates. Soon after leaving Oswego, the Eccles’ rudder became unresponsive. Amidst a building gale and snowstorm, the crew managed to sail the Eccles, by trimming sails alone, across the lake into the lee of Timber Island off Point Traverse in Prince Edward County. There they remained at anchor until 29 November when, with a change in the wind direction and a building gale, the Eccles began to drag anchor. The crew abandoned the Eccles for Timber Island and were rescued the following day.

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Small schooners would eventually be forced out of this trade as the epicenter of Canadian grain production shifted westward to the plains.
The exceptional preservation of the Eccles, with its near-complete intact hull, provides an ideal opportunity for the study and analysis of late-19th century hull designs.

Orbits at depth intervals of 1.5-5 m (3-5 ft) and parallel passes over the site in which top-down video was recorded. Direct measurements were taken onsite with a scaling bar mounted on the ROV. Post-season, these videos were imported into Agisoft Metashape Professional Edition, which estimates camera positions from embedded exchangeable image file format (EXIF) and pixel data from shared points appearing in multiple overlapping photos. Due to the large number of images required to record such a large site, the site was divided into several constituent chunks to reduce processing time. After the generation of a dense point cloud and removal of visual noise, the chunks were aligned and merged into a unified model. A mesh was then generated and overlaid with texture from pixel information. Without the capability to establish a local coordinate system onsite, some precision in the alignment of the chunks and scaling of the model was lost. Despite these difficulties, the results showed that remote telepresence photogrammetry is effective for rapid recording of sites that cannot be directly accessed.

SITE DESCRIPTION

The Eccles sits upright and intact with a slight list to port in a remarkable state of preservation, comprising a nearly complete schooner, less the upper portions of the cabin, quarterdeck, and counter, and some spars. The vessel lies pointing to the southeast in 32 m (105 ft) of water. The hull is entirely intact forward of amidships and is interrupted along its centerline by a forecastle companionway hatch and a series of three cargo hatches. The centerboard case extends from the aft beam of the forehatch to just forward of the mainmast aft of the midships hatch. Where the centerboard case crosses the hatch, a steel plate was placed over the centerboard covering planks to protect the case while loading coal from chutes. Loading would have been conducted at the main hatch and trimmed within the hold by shovellers. The deck is disrupted abaft the aft hatch, the result of the wrecking process, in which the port quarter likely struck bottom first, disarticulating it from the keel and separating the deck from the hull along the waterways as the stern settled.

The Eccles retains a near-complete set of deck gear including a brake-operated windlass, a centerboard winch, a donkey boiler, and a steam winch. The donkey boiler was a vertical boiler integrated with a steam-powered winch situated to starboard of the forecastle and forward of the forehatch. At present, the boiler has been dismantled from its base plate and lies on its side on the deck to starboard. Originally it would have been used in loading and unloading and as a halyard winch. The use of steam-powered winches enabled a reduction in the number and therefore the cost of the crew. Such winches were therefore integral to the continued viability of sail in low-volume, low-rate freight trafficking. This windlass may have been connected by a secondary pitman arm from the hoist flywheel to a steam siphon, though details were obscured and require further study. The bow retains the bowsprit and a portion of the jib boom, which remain stepped into the pawl pot, and retain their chain bowsprit shrouds, inner and outer bobstays, as well as the forestay, which along with the remainder of the standing rigging, was wire rope.

To port, the foremast doubling and foretopmast lay on the lake bottom, with the mainhead away from the hull at the port bow. The forecastle below the crosstrees is missing. The mainmast is broken off approximately 1.21 m (4 ft) above the deck, with the remaining length of the lower mast alongside the hull and overlying the foremast doubling. The shrouds of the foremast and mainmast remain attached and lay across the deck, with a large quantity of rigging obscuring much of the port bow. The near-complete assemblage of standing wire rigging includes shrouds, stays, and the standing rigging of the bowsprit. This assemblage informs rigging practices on such schooners after the widespread adoption of wire standing rigging on the Great Lakes in the late 1860s and 1870s. The Eccles seems to reflect an intermediate phase in the adoption of this technology, employing wire for shrouds but retaining traditional rigging materials - for example, the use of deadeyes and lanyards despite the availability of turnbuckles - in many aspects of the rigging.

The Last Schooners Project received generous support from INA for a field season planned for the last week of June 2020, revisiting the Katie Eccles and surveying the three-masted schooner Oliver Minut. As a result of the COVID-19 pandemic and international travel restrictions, the season was canceled. Regardless of the cancellation of last summer’s field season, reconstructing the Eccles’ hull lines, construction methods, and rigging will continue at the J. Richard Steffy Ship Reconstruction Lab.

ACKNOWLEDGMENTS

I would like to thank the Institute of Nautical Archaeology and the Texas A&M Department of Anthropology for their support of this project. Furthermore, I would like to thank the team: Christopher Doral, Timonie Frezzell, and Sue Larrie for their contributions and efforts. I finally would like to extend my thanks to José Casabán, without whom this project would not have happened.


SUGGESTED READING

Aldo MacIntyre observed that “humility … could appear in no Greek list of the virtues” (MacIntyre 2007, 159). Greek and Roman heroes hardly sought to be humble. Nor, one suspects, would ethicists today contend that humility propels the quest for the good life. Still, as the Bozburun Byzantine shipwreck illustrates, humility’s benefits should not be readily dismissed. The Bozburun ship is not a superstar like the Uluburun vessel, nor does it have the chronological cachet of the Tektaş Burnu ship, wrecked at the height of the Athenian maritime empire. The Bozburun assemblage may be more distinguished for what it lacks than what it contains. Archaeologists found no coins, no fine weights, and no identifiable personal possessions, with the possible exception of a glass carafe and goblets. Neither of the two anchors was well suited to its duty as a bower at the ready; one may be intrusive, and the wreckage yielded no spares. Among medieval cargoes, one would be hard pressed to adduce a more homogeneous collection of poorly fired amphoras. But before dismissing any historical significance for the wreck, we might pause to consider how many Lexuses are on the road today and compare that to the number of Corollas. No one admires a UPS truck for its sleek lines, but FedEx copied the design. Through a fresh look, we can see if the ship’s humble character is its virtue.

**MARITIME TOPOGRAPHY**

The ninth-century Bozburun ship had sailed into a maritime topography with three well-protected harbors at Orhaniye, Selimiye, and Bozburun and with a cluster of emporia where the crew could market their wine, replenish their water supply, and bathe in comfort. Byzantine settlements on the Bozburun peninsula utilized natural island barricades, tricky winds, and man-made fortresses to enhance local defense. The system incorporated existing structures that date back to the Rhodian Prærea in the Hellenistic era and structures built purposefully by the Byzantines beginning in the fifth and sixth centuries, prior to the Arab incursions. Defense of local agriculture and maritime commerce dictated an investment in fortification. Under the Macedonian Dynasty (A.D. 867-1056), the emperors revitalized military construction for the coastal cities of Caria. Sites were chosen to exploit the natural defenses offered by the rocky contours of the land, permit observation of activity on the sea, and allow signaling from one locale to another via guard towers.

The Byzantines equipped the Gulf of Symi with ports of call suited to handle smaller, relatively flat-bottomed sailing vessels. The settlements were laid out in a fashion that suggests they were commercial emporia. The harbor at Bozburun illustrates the broader pattern. The Bozburun peninsula shielded the port from northerly winds, and a screen of islands mitigated the sea’s force from the south-southwest. Economically, harbor activity and maritime trade compensated for the harsh terrain. A first cluster of settlements was established along the southern and western shoreline that led to the harbor inlet. At the harbor entrance along the southwestern headland, a complex of settlements served as a combined commercial and civic center, integrating Kuck Island into its fabric. It comprised one of the largest emporia along the Byzantine coast of Asia Minor. The island was equipped with port facilities. A mole now submerged protected an anchorage extending for 70 to 80 m (230 to 262 ft). It could accommodate several ships at a time when merchants preferred vessels from 12 to 20 m (39 to 66 ft) long. Associated buildings supplied warehouse space and a bath.

**Opposite page:** Doreen Danis attaches mapping labels to amphoras of the Bozburun ship cargo.
Through a fresh look, we can see if the ship’s humble character is its virtue.

No one admires a UPS truck for its sleek lines, but FedEx copied the design. The materials the builder selected showed creativity. In previous Mediterranean shipbuilding, softwoods like pine were generally employed for the planking, and hardwoods were reserved for the framing and tenons. In the case of the Bozburun wreck, the shipwright chose to use oak for the keel, posts, frames amidships, some futtocks, and most planking. The humble amphoras were small, their capacity averaged around 13 liters. The amphora type is known from Middle Byzantine sites in the Adriatic, the Aegean, and the Black Sea, the heartland of a reviving empire. It demonstrates the longevity for the Late Roman 1 style of transport jars. Strong morphological parallels were found at Cretan kilns active in the eighth and ninth centuries, but confirmation of the source awaits fabric analysis. Amphora stoppers were long considered so prosaic that they were glossed over in research. While a single exemplar of a bark stopper was recovered from the seventh-century Yassıada shipwreck, bark stoppers survived in the hundreds at Bozburun. Altogether, the Bozburun assemblage produced around 420 ceramic and bark stoppers. Their survival in such great numbers may be related to experimentation over the two and a half centuries separating the wrecks, particularly on the most suitable pine bark to employ and the quantity of resin/pitch to apply for a sealant. At least 62 amphora stoppers were found in place. Most of those were recovered from complete amphoras, but at least 11 were retrieved from upper-body partials. Other stoppers were found when the contents of an amphora were carefully sieved. At least 30 stoppers were registered as present inside a given amphora. Among the more curious find spots were amphoras which had their stopper in place and yielded one or more additional stoppers admixed in the interior sediments. One amphora disgorged three stoppers, a first sealed in place, a second in the sieved material, and a third at the bottom of the contents. There are also instances where two stoppers were found inside the same jar. Various factors may explain the oddity. Some vintages must have been double sealed. The bark stoppers received their final beveling just before installation and could be slightly off. A stopper fell inside, could not be retrieved, and had to be replaced by a new one. It seems odd that wine merchants would market their product with a stopper floating inside. They may have calculated they could so because they poured the wine from their amphora into the buyer’s container, perhaps through a sieve.

The lading pattern in the hold and its relationship to markings on the jars have supplied the best clues for the character of the commercial venture. By factoring in the number of amphoras, the size of the vessel, and the distribution of amphoras on site, it was determined that the hold accommodated at least two and possibly three layers of stacked jars. Rows of amphoras in the lowest level of the central hold remained nearly stacked, just as the stevedores left them. The others were scrambled due to the starboard list of the hull, the slope of the sea floor, and the disintegration of...
Lynx-eyed excavators noted that the amphoras were placed so that the graffiti were clearly visible, generally on the forward side of a row.
down onto the jars.

The evidence indicates that the amphoras were grouped by owner in the hold. A number of merchants and a bishop were involved in the venture. The contributors insisted that their amphoras to accumulate a cargo of around 20 tons of red wine.

LINGERING UNCERTAINTIES

The ship sank with the cargo largely intact and, apparently, with ample warning. The contributors insisting that their amphoras to accumulate a cargo of around 20 tons of red wine. The small to medium coaster that it has left us wondering where it began her voyage and where she was going. For her port of origin, Cherson on the Crimean peninsula is a possibility. The amphoras match contemporary jars produced at kiln sites in Crimea (Sukhanov 2020). Crimean pottery has been excavated at Early and Middle Byzantine sites in the Adriatic as far north as Comacchio and Venice, as well as from wrecks along the eastern coastline (Gelichi & Negrelli 2008; Kralj Zmaić et al. 2016). That would mean that the vessel had carried the wine a long way past a substantial market in Constantinople and safely navigated, fully laden, through the Bosphorus and Hellespont. It brought the wine into a region known for over a millennium for the quality of its wine. The vintages of Rhodes, Cnidos, and Samos were all highly prized, and recent evidence indicates that Ephesus was still exporting wine (Vroom 2018). There is no obvious market for Crimean wine at the southwestern corner of the Aegean peninsula. Unlike the Romans, who moved legionaries from one end of the empire to the other and thereby stimulated long-distance trade of regional wines, the Byzantines in the ninth century staffed their garrisons with troops from the local theme. To supply coastal garrisons, the imperial government might have purchased a cheap variety of wine whose transport costs nonetheless made it economical. But that is still speculative. Perhaps the humble Bozburun ship would take satisfaction in learning that archaeologists know what they do not know.

ACKNOWLEDGMENTS

Humility is rarely appropriate for the authors, who were assisted by the talented INA researchers Christine Powell, Doreen Pulak, and Frederick H. van Doorninck, Jr., all of whom are vital contributors to the forthcoming final report on the wreck.

After gathering their prized possessions, those on board scrambled into the ship’s boat or onto a handy projecting spur of the jagged rocks. So reserved is the small to medium coaster that it has left us wondering where it began her voyage and where she was going.

WORKS CITED


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PROFILE: MURAT TILEV
Team Members Reflect on a Career Spanning Three Decades

Murat Tilev was born in Ankara in 1947 and spent his childhood in the U.S., where his mother worked as a teacher, insisting that English be spoken at home. After returning to Turkey, Murat graduated from Ankara lateeli, served two years in the Turkish Armed Forces, and worked as a shipyard supervisor in Bodrum. In 1978 Murat graduated from Cape Fear Technical College in Wilmington, North Carolina with a degree in Maritime Technology and Commercial Fishing. With the backing of a native speaker in both English and Turkish, Murat stayed in North Carolina for four years as an equipment operator on the research vessel North Star, before coming to work for INA in Turkey in 1982. Over the course of five decades, Murat served as Chief Engineer on INA’s research vessel Vizavon and pilot of the submersible Carolyn. Murat became a permanent fixture on INA shipwreck surveys and excavations at Uluburun, Bozburun, Tektaş Burnu, Pabuç Burnu, and Kızılburun, among countless other projects. Since retiring from INA in 2013, Murat stays busy renovating his home in Bodrum and writing his autobiography.

I first met Murat in Bodrum, Turkey during the summer of 1990, and I worked with him every summer for the next three years on INA’s excavation at Uluburun. Murat always wore a distinctive ensemble of aviator sunglasses, silver rings, wooden sandals, and denim shorts with a sailor’s vest. He would fill dive tanks, Murat took up any slack I asked happen, whether it was a ride, a party or a fish dinner, or resuscitating an engine. His charisma lies in inviting you along on the adventure and in the laughter at any consequent misadventure.

And then there is his KNIFE. Always highly creative ‘outfits’ as he liked to call them. Needless to say, the uproar generated by his surprise soon gave way to guffaws of laughter.

Murat has been a good friend over many years with a great sense of humor inclined towards the bizarre. This combined with his great delight in dressing up would often manifest itself at the most unexpected times. One memory is from Uluburun, as dinner concluded. We were all sitting around quietly enjoying the evening when suddenly the camp lights went out and the door bust open.

A heavily disguised figure wearing many black items from a wet suit to a ladies bathing suit, burst in shouting, “On the floor everyone! Nobody move, this is the Scuba Terrorist!” The effect was dramatic and hilarious with very, very surprised people shouting and bumping about in the dark until a flash light focused on the intruder and revealed the grimacing blackened face of Murat in one of his highly creative ‘outfits’ as he liked to call them. Murat is a person of complete focus. In the summer of 1998, we were constantly rebuilding a cranky old compressor that used to eat its high-pressure valves. Murat and I could eventually change the valves in about 15 minutes, even with the compressor hot, but it was done in complete silence. No charting or joking as the job required total commitment. It was the same when riding in his car. He drove very fast, and many people were afraid to ride with him when he went back to Bodrum on a day off from Selimiye. I did it once and...
His zest is infectious, and none of us could stay angry with him for too long because it was just so much damn fun to be around him. His charisma lies in inviting you along on the adventure and in the laughter at any consequent misadventure.

discovered that it was silence for over three hours. 100% of his concentration was focused on the road, and he was probably one of the safest drivers I ever met. I have always admired that level of commitment to a task and tried to bring it to my own life.

-FRED HOCKER

Murat has been a treasured friend to Ann and me for decades. We’ve enjoyed his good company during our long stays in Bodrum and on countless field projects, and we’ve long marveled at his magic touch with anything that has moving parts.

I especially remember the summer Murat led me into the white abyss at Teşvikiye Burnu when Murat, one of the diving excavators, also kept all the machinery running like clockwork. Always in good humor, day after day, he was in charge of all the equipment: the high-pressure air compressor for filling scuba tanks, the low-pressure compressors that served our airlocks, the camp’s two large electric generators, and a water pump that drew water from the tanks of various relay boats and sent it up for fresh-water showers and other daily needs. His skill and dedication allowed us ordinary mortals to spend more time on the site plan, conservation of artifacts, and basic camp chores. At the end of the campaign I offered him special congratulations and thanks from the entire staff for going above and beyond what anyone else might have done. It was great fun sailing along the coast on surveys aboard Milasaunda, captained by Murat. Milasaunda was a catamaran designed and built to ferry, launch, and saved the day. It was a defining moment in the history of the Tektaş Burnu project that was never captured on film, but will forever be etched in my memory as a powerful reminder that hazards – and heroes like Murat – were all around us, every day.

-FEYYAZ SUBAY

For most of 2020, I was working at INA’s Bodrum Research Center (BRC) while under the care of a private nurse, who looked after my health, food, and housekeeping needs twice a day, six days a week. She was also Murat’s nurse and saw him once a week to check on his health. She told me that Murat always talks about his INA days, asks whether there is anything new going on at the BRC, and that he always wears his INA cap when he goes to the seashore café in Torba, but we always have lots of good memories and laughter about our many collaborations.

-FRED VAN DOORNICK
REVIEWS

Two recent volumes chronicle five centuries of seafaring

The Manila Galleon route across the Pacific Ocean served as a maritime trade link between three continents that lasted approximately 250 years. *Ghost Galleon* is Edward Von der Porten's personal narrative about his efforts, over two decades, to locate, document, and decipher the loss of a pioneering vessel in the history of early Pacific navigation. Any archaeologist who has run more than a few field efforts will sympathize with the familiar frustrations of plans not proceeding as proposed, anyone who has not will be enlightened to the realities of fieldwork. *Ghost Galleon* illuminates the legalistic and bureaucratic nature of archaeological investigation. Group dynamics between professionals, amateurs, beachcombers, and government officials are exposed at a raw level. The author presents issues that are ancillary and tangential to an expedition; while they do not contribute to the archaeological knowledge base, they do provide an illuminating human context for the project. *Ghost Galleon* is not an archaeological site report. Aspects of the Manila Galleon route and analysis of ceramics are braced but not in a scholarly fashion. Before his death in 2018, Von der Porten produced other publications for those who wish to dive into these fascinating subjects. *Ghost Galleon* is an archaeological memoir and a memorial to the author's efforts to make sense of one of the earliest Manila Galleon wrecks in the New World. This review is dedicated to Captain Rick Rogers (1956-2020), friend, pilot, and archaeologist who passed while flying in Hawaii. Readers will enjoy mentions of him in *Ghost Galleon*.

Dr. Michael Tuttle teaches American history at Austin Pea State University in Clarksville, Tennessee. He has worked as a maritime archaeologist for over 25 years and is Director of the Sespe Project (www.seseproject.org).

**Ferreiro points out that predictability was the most important factor for both naval personnel and merchants who ordered a ship.** Every ship or ship type is created to successfully perform a specific duty—fight the enemy's largest ships, scout ahead of a fleet, carry tobacco across the North Atlantic, sail through the Suez Canal to trade with the East, etc. As the world changed through empire-building and global trade, navy and merchant ship owners required different types of ships to successfully compete; traditional wooden ships, however, could not fulfill most of the new tasks.

In the early 19th century, shipbuilding traditions were giving way to science and engineering, wood to iron and steel, and sail to steam. As one man offered the first steam tugboat in a port, another man needed a more powerful tugboat to compete. If a country's navy built larger ships to carry heavier guns by incorporating iron structural supports into the hull, its enemy needed to develop even larger, stronger hulls or risk losing a war. The only way to repeatedly create better ship designs in a newly industrial world was to utilize engineers who attempted to apply the latest scientific data to ship design, and in some cases, experimented themselves. Thus, constructors, shipbuilders were renamed or replaced by naval architects. Ferreiro deftly describes and explains two centuries of changes by following the people who made them. He includes, in a story-telling style, personal and professional experiences of the players, including the problems, prejudices, and competitions that affected their technical advances and failures. Thus, *Bridging the Seas* is a story of the people who advanced the design of ships to better meet the changing needs of the Western World.

There are a few basic mathematical formulas for those who are interested, but Ferreiro first explains each concept in lay terms so that the reader need not master the formulas to understand the text. An important part of this second volume is Ferreiro's interpretive view of the history he presents. He shows how the major elements of naval architecture—speed and power, structure, normal stability, and stability after damage—were balanced by various designers for different reasons. He explains the need for many more designers and drafting people (men and women) as the industry shifted to iron and steel hulls. The author ingeniously uses Parkinson's Law to explain the unexpected shift in design once electronic, rather than human, computer work performed these analyses.

One of many things that nautical archaeologists are likely to find interesting is the author's discussion of how NATO navies worked together during the Cold War to gather outside information ( sitiohs, photographs of ships and their wakes, and sound recordings) in an attempt to uncover the details and design history of the Soviet Navy. Armed with that knowledge, they could determine the intended purpose of enemy ships and even Soviet naval strategies. It is similar to how archaeologists use remnants of ancient ships and related artifacts to discover design philosophies and therefore the capabilities of our ancestors.

Ferreiro has created a wonderfully rich publication that is both a good story and a learning tool for those who may not be familiar with the period. In it one can follow the major players, advances, and some interesting failures in ship design through the ages. This book is a good story about individuals and teams working hard to meet constantly changing challenges, as well as a history of technology that is easily understood by non-technical readers. I recommend *Bridging the Seas* to nautical archaeologists, maritime historians, shipbuilders, naval architects, students, and anyone who enjoys reading about human endeavors.

Dr. Warren Riess specializes in the history and archaeology of ship design and construction, especially as they pertain to merchant ships of the 18th century.

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