EYES ON SHIPS IN ANCIENT GREECE

THE MID- ATLANTIC LOGBOAT REGISTRY

A TRIBUTE TO MEXICO'S PILAR LUNA
CONTENTS

04 NEWS AND EVENTS

06 MEET THE STAFF OF INA’S BRC

10 A NEW REGISTRY OF OLD LOGBOATS
   BY ROBERT HAYES, MARY HAYES, AND JOHN BROADWATER

16 PIGMENT, COLOR, AND THE EVIL EYE IN ANCIENT GREECE
   BY CLAIRE ZAK

20 BULLS ON THE ANCIENT MEDITERRANEAN
   BY SHEN KAPAHNKE

22 BOOK REVIEWS

25 TRIBUTE: PILAR LUNA

ON THE COVER: Ken Trethewey exposes a marble ship’s eye discovered during INA’s excavation of the fifth-century B.C. Classical Greek ship at Tektaş Burnu, Turkey (2000). ©INA Photo by Don Frey
**NEWS & EVENTS**

We Bid Fond Farewell to an Old Partner and Welcome New Ones

**INA REMEMBERS DICK VANN (1941-2020)**

All of us at INA are deeply saddened to report the death of Dr. Richard D. Vann, whose career at Duke University Medical Center was instrumental in the development of dive safety. A former diving engineer and U.S. Navy diver, Vann conducted important scientific studies on decompression sickness, surface intervals, and dive tables for over 40 years. As Vice President of Research at the Divers Alert Network (DAN), Vann authored the oxygen decompression dive tables used to safely conduct tens of thousands of dives on INA excavation projects at Uluburun, Tektaş Burnu, and Kızılburun, Turkey. His passing leaves behind a legacy of safer diving around the world.

**CONGRATULATIONS NEW PH.D.S**

INA is pleased to recognize three recent Ph.D. graduates of the Nautical Archaeology Program at Texas A&M University! In February, Dave Ruff, 2015 recipient of the Claude Durhuus Archaeology Grant, defended his dissertation *A Roman Ship Scuttled Near Salona in the Gulf of Kvarnel, Croatia*; in March, INA Diving Safety Officer John Littlefield defended his dissertation *David and the David-Class of American Civil War Era Torpedo Boats of Charleston, South Carolina*; and in April, INA grant recipient Doug Ingels defended his dissertation *The Abwir Boat-Burial: Change and Continuity in the Nautical Technology and Funerary Practices of Third Millennium Egypt*. Heartiest Congratulations to All Three Ph.D.s!

**WELCOME NEW INA STAFF**

We are delighted to announce the return of Grace Tsai as INA Archivist and Webmaster! Grace is a Ph.D. candidate in the Nautical Archaeology Program and Principal Investigator of the Ship Biscuit & Salted Beef Research Project. Grace enjoys traveling and has studied abroad in Italy, Egypt, and Turkey, taught English in a village in the Caucasus Mountains of Georgia, and has summited Mt. Kilimanjaro and parts of the Andes. INA also welcomes Bethany Becktell as the new Assistant Editor of the INA Quarterly. Bethany earned a M.A. in Ancient Near Eastern and Egyptian Studies from New York University and is interested in Bronze Age Egypt and Cyprus. She worked in public education for four years before embarking on a Ph.D. in the Nautical Archaeology Program. In her free time, Bethany plays the piano and the flute, and enjoys running, baking, and photography.

**NEW DIRECTOR OF BODRUM MUSEUM**

The INA family welcomes Hüseyin Toprak as the new Director of the Bodrum Museum of Underwater Archaeology in Turkey. Toprak was recently assigned to the post by the General Directorate of Museums and Cultural Heritage, and is responsible for overseeing the conclusion of the museum’s massive three-year restoration. Before coming to Bodrum, Toprak graduated from Atatürk University with a degree in Archaeology and worked as an archaeologist in the Anamur Museum. Anamur is the southernmost point on Turkey’s Mediterranean coast and home to the once thriving Roman and Byzantine city of Anemurium. We are excited to work with Hüseyin Bey as he takes the helm of one of the most famous museums in the world!

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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The opinions expressed in the INA Quarterly articles are those of the authors and do not necessarily reflect the views of the Institute.

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

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**2021 INA FUNDING UPDATE**

The countless disruptions and cancellations caused by the COVID-19 Pandemic have also affected more than a dozen INA field projects scheduled for 2020. These projects have been rescheduled for 2021 and awarded funding has been rolled forward so that project directors will have access to those funds in 2021.

The INA Archaeological Committee is currently accepting proposals for new projects that did not receive funding during the 2019-2020 cycle. Proposals for new projects in 2021 will be considered on a case-by-case basis.

The INA Publications Committee is currently accepting proposals for the third annual $25,000 grant from the George and Ann Bass Endowment for Nautical Archaeology Publications, to be awarded in 2021. Preference will be given to books that result from INA-affiliated excavations.

Applications for all INA funding are due October 1, 2020 and can be downloaded online at www.nauticalarch.org/funding

Questions? Email us at info@nauticalarch.org
MEET THE STAFF
of INA’s Bodrum Research Center (BRC)

NAME: Adem Şirin
POSITION: Night Guard, 11 Years

Where were you born? Where did you grow up?
I was born in a village in eastern Turkey called Mollakamer, which is close to Iğdır. When I was 18 years old, I came to Bodrum to work.

Tell us about your family.
I am the third of five children. I have two older brothers and two younger sisters. I am married and have a daughter.

What did you enjoy about school?
When I was student, I played volleyball, ran track, and did traditional Turkish folk dance. I continued folk dance for several years of my adult life as well.

Were you interested in archaeology as a child?
I learned about archaeology from working at INA, but now I realize that I had an undiscovered interest in it from an early age. As a child, I collected different pebbles and tried to join broken ceramic jars and tiles. I would make glue with sugar to join the pieces back together. I would make games with broken amphora handles. I enjoyed trying to glue every broken thing I saw.

What is your first memory of INA? How did you come to work for INA?
The people from my village helped with various construction projects at the BRC and that’s how I was introduced to INA. I began working with them temporarily when Tuğrul Türanlı was the director of the BRC. After I completed my military service, I visited INA again and the new director, Tuba Ekmekçi, knew me and trusted me, so she hired me as a night guard. I have been working here for 11 years now. Thank you, Tuba!

How long have you worked for INA?
I’ve worked for INA since May 2008. I am one of two night guards at the BRC.

What do you like most about your job?
I like seeing the results of my work: when an artifact is mended and complete and has been approved by Cemal Pulak then that object is done! I like being a small part of bringing history to light through what I do.

What has changed in the three decades you have worked for INA?
Throughout the 37 years I have worked for INA, the people have changed: head conservators, directors, and museum administrators. But for 37 years I have been mending artifacts and what hasn’t changed is that I love my job!

NAME: Gülser Kazancıoğlu
POSITION: Senior Conservation Technician, 37 Years

Where were you born? Where did you grow up?
I was born and raised in Bodrum, Turkey, where the BRC is.

Tell us about your family.
My father is from Kos and my mother is from Rhodes. They were part of the compulsory population exchange between Greece and Turkey and arrived in Turkey in the late 1930s. I have eight siblings; my two brothers were born on Kos and the rest of us were born in Bodrum. Two of my siblings, one brother and one sister, retired after working for the Bodrum Museum of Underwater Archaeology. I have two disabled sisters, and my siblings take care of them. I also have two sons, one of whom is married.

What did you enjoy about school?
When I was student, I played volleyball, ran track, and did traditional Turkish folk dance. I continued folk dance for several years of my adult life as well.

Were you interested in archaeology as a child?
I learned about archaeology from working at INA, but now I realize that I had an undiscovered interest in it from an early age. As a child, I collected different pebbles and tried to join broken ceramic jars and tiles. I would make glue with sugar to join the pieces back together. I would make games with broken amphora handles. I enjoyed trying to glue every broken thing I saw.

What is your first memory of INA? How did you come to work for INA?
I heard that INA was hiring temporary help so I went to the Bodrum Museum for an interview with Cemal Pulak. When I saw all the glass pieces from the Serçe Limanı shipwreck I was shocked, and I thought “I am in heaven!” There were millions of broken fragments waiting to be mended. All the different colors and shapes! I was incredibly excited.

How long have you worked for INA?
I am a senior conservation technician and I mend pottery. I have been working for INA for 37 years!

What do you like most about your job?
I like seeing the results of my work: when an artifact is mended and complete and has been approved by Cemal Pulak then that object is done! I like being a small part of bringing history to light through what I do.

What has changed in the three decades you have worked for INA?
Throughout the 37 years I have worked for INA, the people have changed: head conservators, directors, and museum administrators. But for 37 years I have been mending artifacts and what hasn’t changed is that I love my job!
MEET THE STAFF

NAME: Süleyman Türel
POSITION: Grounds Team, 25 Years
Where were you born? Where did you grow up?
I was born and grew up in Bodrum.
Tell us about your family.
I am married and have two daughters. I am one of five siblings who all live in Bodrum.
What did you enjoy about school?
I enjoyed working with animals and playing football.
Were you interested in archaeology as a child?
No.
What is your first memory of INA?
I was recommended to work at INA by a friend who was working during INA’s construction.
How long have you worked for INA?
Since 1995. I am a gardener and do all the other things for the BRC premises.
What do you do for INA?
The variety of the plants in the BRC garden still surprises me.
What do you like most and least about your job?
Working in the garden is my favorite thing. I like my job and nothing bothers me.
What has surprised you (good or bad) about your job?
The variety of the plants in the BRC garden still surprises me.

NAME: Tûba Ekmekçi Littlefield
POSITION: BRC Director, 28 Years
Where were you born? Where did you grow up?
I was born and grew up in Karşıyaka, İzmir.
Tell us about your family.
I am married and have a beautiful daughter who lives in Istanbul and attends university there. My grandparents are from Greece and Albania, but my parents were born in Turkey. I have a sister who is a vice principal at a private high school in İzmir.
What did you enjoy about school?
I was a very good student mostly (but not in science) and participated in lots of extra-curricular activities as well. I was on the basketball team, diving team, and was a reserve swimmer on the college swim team. I was also part of the traditional folk-dance team and played several musical instruments while also working part time for a public relations company as a hostess of government officers and globally famous VIP guests visiting İzmir.
Were you interested in archaeology as a child?
Absolutely! My grandparents’ house was just under the Acropolis of ancient Pergamon. When I visited them, I was the nightmare of the excavation team. Along with some of my cousins, I always wanted to be an archaeologist and/or have a job around water, but my parents wanted me to study law. All my university entrance choices were for law schools, but the night before the entrance exam, I woke up in the middle of the night and erased all the codes for law schools and filled in codes for archaeology departments. I admitted changing the codes to my parents when I was in my third year of university classes!
What is your first memory of INA?
I started working at INA after a recommendation from a friend who was working during INA’s construction.
How long have you worked for INA?
Since 1995. I am a gardener and do all the other things for the BRC premises.
What do you do for INA?
The variety of the plants in the BRC garden still surprises me.
Archaeological studies in the southeastern U.S. have revealed that Native Americans were crafting and using dugout canoes for thousands of years. Within the Mid-Atlantic region, numerous pre-contact (i.e., prior to contact with the first Europeans) dugout canoes have been discovered, the oldest dating back more than 4,000 years. First-hand accounts of European explorers Thomas Harriot and John Smith, along with Theodore DeBry’s detailed engravings of John White’s drawings, tell us how Native Americans constructed dugout canoes and relied on them for transportation, fishing, defense, and the projection of power. Canoe builders used fire and tools made of stones, shells, and adzes to hollow out and shape logs in various forms and sizes to meet their needs. Observing the importance and versatility of dugouts, English and French settlers soon acquired canoes from the indigenous people they encountered. They also used their iron axes and adzes to hew out tree trunks to make their own canoes. Early colonial settlers were heavily reliant on logboats for transportation, commerce, fishing, and exploration of the Chesapeake Bay and its tributaries as well as the shallow sounds of what is now North Carolina. With the abundance of large-diameter pine and bald cypress trees, as well as the cheap cost of construction, boat builders over time fashioned multi-log vessels of up to nine or more logs; their design and function were tied closely to the oyster industry and the transport of agricultural goods. Even after European style plank-on-frame boats became more common, log-built boats continued to be used well into the late 19th and early 20th centuries until there were no longer any suitably sized trees to construct them. There is no doubt that the dugout canoe used for millennia by Native Americans is the evolutionary precursor to the multi-log boats constructed in the Mid-Atlantic region. In Chesapeake Bay: A Pictorial Maritime History, M.V. Brewwington, the preeminent Chesapeake Bay watercraft historian, recognized that, “Throughout the course of development from canoe to [multi-log] bateau, the original dugout log bottom was always apparent in this most truly American craft.”

The Mid-Atlantic Logboat Registry

In 2018 under the auspices of the Maritime Heritage Chapter of the Archeological Society of Virginia, we launched the Mid-Atlantic Logboat Registry, an ambitious project to catalog all known logboats in Maryland, Virginia, and North Carolina, in order to analyze and classify the evolution and development of these significant vernacular watercraft. The registry is based solely on one criterion: the boat’s hull must be log-built. Our goal is to create a searchable, multi-variable database for the Mid-Atlantic region that will serve as a resource for researchers interested in the comparative study and history of logboats. Over the past two years our team has been cataloging logboat data obtained from a variety of sources. The heart of the registry is the archived archeological files maintained by the Maryland Historical Trust, the Virginia Department of Historic Resources, and the North Carolina Department of Natural and Cultural Resources. Other information sources include graduate student theses and dissertations, professional journals, archived newspaper and magazine articles, state and national historic registries, museum and historical society record searches, and prominent books on log-constructed boats. Much of our work involves collaboration with the three State Historic Preservation Offices, museums and historical societies to identify known or possible logboats, obtain their provenance, collect additional archived data, and take measurements, drawings, and photographs. We also work with private citizens and property owners to document known or suspected logboats that are in their possession.

Details Included in the Registry

We currently have cataloged 181 logboats, including 109 single-log dugout canoes (52 recorded as pre-contact), and 72 multi-log (2 to 9-log) boats. The principal wood types documented...
for hull construction are pine and bald cypress. Occasionally, we found laboratory confirmation of wood type included in the archival record. Otherwise wood type identification in the archival records appears to be based on the prevailing tree species available and traditionally used by local boat builders. Radiocarbon dating was used to make an age and time period (pre- vs. post-contact) determination only for the single-log-dugout canoes. In the absence of radiocarbon dating, archival records indicate that a determination as to whether a single-log dugout canoe was pre- or post-contact is based on the presence of observable charring from fire (pre-contact) or iron tool (adze and axe) marks (post-contact). The scarcity of laboratory data leaves considerable room for doubt concerning the documented age and wood type, especially on poorly preserved specimens.

**SINGLE-LOG CANOES**

Seventy-eight of the 109 single-log dugout canoes in our registry are from North Carolina, including 52 that have been identified as pre-contact. Radiocarbon dating for 30 of the single-log dugout canoes reveals ages ranging from about 2400 B.C. to A.D. 1810. Unique to North Carolina is the discovery of 47 dugout canoes in six natural lakes; 25 of these are from Lake Waccamaw. All are considered pre-contact, ranging in age from 2400 B.C. to A.D. 1400, with the largest ones over 30 ft in length. The canoes are associated with other archaeological artifacts, such as spear points, cooking vessels, and pottery, dating back to almost 9000 B.C., indicating that the area around the lake supported a significant indigenous community for thousands of years. With the exception of four canoes, all were left in situ. Both pre-contact and post-contact dugout canoes have been found in Lake Waccamaw, N.C. Radiocarbon dating shows that these canoes were fashioned and used on the lake for several hundred years between the early 1400s and the late 1800s. State historical information indicates that European colonists settled in the area around the lake, harvesting timber and producing shingles. The Underwater Archaeology Branch of the North Carolina Department of Natural and Cultural Resources has conserved many of the dugout canoes discovered throughout the state, loaning them to state museums, parks, government facilities, and academic institutions for display. No pre-contact logboats have been identified in Virginia or Maryland. Possibly the oldest dugout canoe from Lake Drummond and the Dismal Swamp offer the possibility of finding multiple logboats in a single natural lake-wetland environment. The area has a well-documented history of Native American and “Maroon” (escaped slaves) settlements, logging, shingle production, and trapping. So far, our registry includes one post-contact single-log dugout canoe and two multi-log boats from this area. Discoveries of single-log dugout canoes in Virginia and Maryland have been chance events, usually occurring after major floods or during severe droughts. With very few exceptions, finds consist of only a single-log canoe or fragment along a shore or embedded in a bank with no other associated cultural material. Historically, log canoe use along the Chesapeake Bay’s tributaries was widespread. David Virginia in our registry was documented by Ben McCary in 1964 and is in storage at The Mariners’ Museum and Park in Newport News, VA. The fragmentary canoe was found in Powhatan Creek in the area of the original (1607) Jamestown settlement. McCary suggested a date of around 1630 for the canoe because of the presence of both charring and iron tool marks, and the location where it was found. He interpreted the canoe as having been initially constructed by Native Americans and later reshaped by colonists for their own needs. One explanation regarding why our registry contains fewer entries from Maryland and Virginia is that those states do not possess the numerous natural lakes found in North Carolina. The natural resources of the lakes provided long-term subsistence for the indigenous populations and later supported European settlement and trade in naval stores, lumber, and shingles. In Virginia only Moran, Senior Researcher at the Deltaville Maritime Museum in Virginia, has cited several sources, including census records from the 1800s that document families owning several canoes for work and personal transportation. Such regional historical records may be key for identifying potential canoe sites for further investigation.

**MULTI-LOG WATERCRAFT**

To date, only seven multi-log boats from North Carolina have been documented in the registry. Of these, six are of two-log construction and may be linked to the unique split-log design influenced by the French Huguenot settlers, according to Michael Alfred in *Origins of Carolina Split-Dugout Canoes*.

*Opposite page, top and bottom left:* Pre-contact dugout canoe showing charring. Post-contact dugout canoe showing tool marks. Right: Recovery of pre-contact canoe, Lake Waccamaw, NC.
Maritime archaeologists with the North Carolina Department of Natural and Cultural Resources believe that several of the state’s natural lakes may still hold dozens of undiscovered pre-contact dugout canoes.

Virginia and Maryland, by contrast, dominate in the number of multi-log boats, with 65 documented in the registry. In Chesapeake Bay Log Canoes and Bugeyes, M.V. Brewington identifies Poquoson, Pocomoke, and Tilghman as the primary methods of multi-log boat construction, each aptly named according to the Chesapeake Bay region where it originated. The Poquoson method, called “rack of eye” by Brewington, was a technique handed down over generations of local boat builders in Poquoson, Virginia. David Moran’s research discusses in detail the Poquoson-style canoe, as well as the influence of skilled African-American boat builders on its design. The Pocomoke and Tilghman construction methods used by Maryland boat builders relied on half-model design and rising lapstrake and carvel planking, respectively. Canoes of three-log and five-log construction were typically double-ended, powered by sail, up to 35 ft in length, and built specifically for oyster tending. Competition among the watermen to get harvested oysters to market gave rise to competitive sailing races on the Chesapeake Bay that continue to this day. The registry includes 21 racing canoes from Maryland listed on the National Register of Historic Places that were constructed from the 1860s through 1947 primarily using the Tilghman method. Today, the majority of these canoes are privately owned, have been restored, and continue to race competitively.

During the mid- to late-1800s there were thousands of log canoes on Chesapeake Bay working the oyster beds. With the advent of the gasoline engine, many of the sailing canoes were either converted to engine power or were deemed obsolete and abandoned. The introduction of dredging in the 1870s, and the increased demand for oysters, resulted in the construction of larger multi-log buggies and bays, some exceeding 60 ft. Our registry includes three of these fully restored and operational nine-log workhorses of the Chesapeake Bay: the 53-ft dredging buggy Edna Lockwood built in 1889 at Tilghman Island, MD and currently at the Chesapeake Bay Maritime Museum in St. Michaels, MD; the 60-ft bays and bays were converted to logboats in 1956 at B. Tonnis built in 1899 at Crab Island, MD and homeported at the Calvert Marine Museum in Solomons, MD; and the 62-ft Poquoson-style bays built in 1924 at Seafood, VA and berthed at the DelMarVa Maritime Museum in Delaware, VA.

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THE EYES HAVE IT: Pigment, Color, and the Evil Eye in Ancient Greece
BY CLAIRE ZAK

In ancient Greece, from the Late Bronze Age through the Hellenistic period, there are abundant artistic representations of warships and commercial merchant vessels on Greek pottery, wall paintings, mosaics, and sculptural reliefs. Many of the ships depicted include what appears to be an eye on the bow, the first appearing in the early seventh century B.C. Two well-known examples include the Siren Vase depicting Odysseus reclining in a kylix by Exekias showing Dionysus reclining in a ship. At least 14 examples of marble eyes (ophthalmoi) have been identified around the Mediterranean, perhaps functioning as votive offerings, architectural fixtures, or protective ships’ eyes that would have been affixed to the bow. It is most likely that these enigmatic objects are the latter, functioning similarly to the severed head of the Gorgon Medusa, which served to protect against equally terrifying evil beings. Even though pigment has been noted on the majority of these marble eyes, little chemical analysis has been published. By taking into consideration Greek perceptions of color and sight, I propose that color and pigment played an important role in the apotropaic and decorative function of ophthalmoi on Greek ships.

The first marble eyes found were recovered from Piraeus, the port city of Athens, and published in 1963 by Carl Blümel and in 1978 by Chrysovala Saatsoglou-Paliadeli. These eyes appear anatomically correct with curved eyelids and a central round hole, signifying the pupil. The cornets of these eyes are comprised of three to five concentric rings of pigment, and several eyes exhibit traces of red paint on their inner surface, suggesting they were fixed to a red surface. Because of lost records and vague acquisition methods that surround the Piraeus marble eyes, there is neither a firm dating sequence nor a specific archaeological provenance, but it has been suggested that these eyes were associated with the Zea Shipsheds that housed the Athenian trireme warships.

The first example of marble eyes firmly associated with an ancient ship in an archaeological context came from the Tektaş Burnu shipwreck off the coast of western Turkey. Excavations by the Institute of Nautical Archaeology (INA), under the direction of INA Founder George Bass and INA President Deborah Carlson, uncovered two marble discs incised with concentric rings and stained with dark pigment. Troy Nowak made the argument, based on painted pottery depictions, that round eyes were affixed to merchant vessels, while the more naturalistic shapes, such as the Piraeus marble eyes, were employed on warships. Both of the discs have central lead spikes with which the eyes were attached to the ship’s planks. The sinking of the wreck dates between 440 and 425 B.C., so the marble eyes also date to the fifth century. Two other groups of ships’ marble eyes have been found off the Israeli coast and in the Athenian Agora. Two marble discs from Israel, one from the Megadim shipwreck and one from the Yavneh-Yam anchorage, are similar albeit larger in diameter than the discs found at Tektaş Burnu. The disc found at the Yavneh-Yam anchorage has eight bands of pigment while the disc from the Megadim shipwreck does not readily appear to have any decoration. During a century of excavations in the Athenian Agora, three marble eye fragments have been discovered. Their terrestrial context, as opposed to those ophthalmoi found in underwater contexts, is especially puzzling. These eyes are sculpted similarly to the Piraeus eyes with a naturalistic shape and curved eyelids. While the fronts of the eyes do not appear to have been stained with pigment (which might be the result of the object’s fragmentary nature), the back of the third eye fragment is covered with red stain, similar to many of the Piraeus eyes.

Along with the iconographic and archaeological examples, literary sources provide insight into the nature and function of ships’ eyes. Perhaps most importantly, in a section dedicated to the equipment required for the proper operation of a trireme, the Piraeus Naval Inventories of the fourth century B.C. make clear that the ophthalmoi of some ships were lost or broken. Nowak believes that this definitively indicates that eyes were separate attachments to hulls rather than painted on. While presently there is no physical, archaeological evidence of eyes painted on ancient ships, it is important to remember that the sample size of marble eyes is quite small (as is the sample size of excavated ancient Greek shipwrecks). It is logical, therefore, to consider application techniques that would allow ship’s eyes to be painted directly on the hull. Pliny, writing much later in A.D. 77–79, provides an overview of historical painting in his Natural History, including an encaustic technique where wax is mixed with a pigment and applied to a wood or stone surface. Curiously, Pliny mentions that this technique cannot be used on walls “but is common for ships of the navy, and indeed nowadays also for cargo vessels,” serving as both decoration and waterproofing. Encaustic painting examples have been discovered...
McDaniel and Albert Potts theorize that the evil eye stems from ophthalmological defects or abnormalities. Individuals possessing unusual eyes were considered predisposed to casting the evil eye. Many pre-Socratic and Classical notions of vision proposed that sight was conducted by emitting a ray that then reached the viewer's subject. McDaniel and Potts postulate that the pupil, emitting a ray of vision, was considered by ancient Greeks to be the active portion of the eye. “It is obvious, therefore, that […] nothing could so enhance the magical power of an individual as to increase the number of his pupils, the openings through which the eye emitted all its shafts, envious, amatory, morbiferous, etc.” Archaeological examples of ancient marble ships’ eyes contain multiple concentric rings of pigment, which could represent multiple pupils. Perhaps the number of rings correlates with an ability to counteract the evil eye. Thus, the greater number of rings represented on a ship’s opthalmus, the more amatory, the more protective. The pigment rings of ships’ marble eyes may well represent the four natural elements in the form of primary colors. By invoking this color spectrum, perhaps the ancient Greeks were seeking protection from the elements themselves, as well as from the envy of others who desired these ships’ eyes that used all the colors of nature with the greatest number of pupils were effective talismans against all the threats of nature. With the help of elemental pigmentation on their ships’ eyes, ancient Greek sailors could hope to repel the threat of bad winds, storms, fire, and ultimately shipwreck.

ACKNOWLEDGMENTS

I am grateful to Dr. Debbie Carson for her encouragement to submit this article and insightful comments throughout the process. Olivia Close and Bethany Becktell also provided great suggestions. Another special thanks to Olivia Thomas for scouring the INA archives for me.

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THE EYES HAVE IT

found at terrestrial sites, such as the Roman Egyptian mummy portraits from the Fayum. Archaeological evidence, however, for the technique used on ships remained scant until excavations in the harbor at Pisa, Italy revealed that the first century A.D. hull of Ship C (an oared ship named Alkedo, meaning Seagull) exhibited encaustic painting using red, white, and possibly black pigments mixed with beeswax and pine resin. A ship’s hull painted red would explain the red pigment traces found on the reverse of some marble eyes. It is possible that a ship’s eyes could have been painted with the encaustic technique, either on a marble-shaped eye or directly onto the hull. The pigments used on hulls and ships’ eyes seem to exhibit the same palette of colors — red, white, and black — with the addition of yellow and blue, potentially indicating another layer of meaning. In the current literature, there has been only one mention of elemental analysis by means of X-ray fluorescence spectrometry (XRF), and this particular instance was unsuccessful in identifying the paint composition. Other analyses in the future could greatly benefit the conversation regarding material and color composition of these opthalmoi.

Several pigments found at other archaeological sites stand as viable candidates, including red lead oxide or a red ocher of hematite. In the shipsheds at Naxos, Sicily, archaeologists found the sampuys evidence of paints from red hematite and a yet-undeveloped blue pigment. Discoveries of red and yellow pigments have been made on the above-mentioned hull of Ship C at Pisa. Another possibility for the red and yellow colors could be the use of orpiment, an arsenic-sulfide, known also as realgar. Orpiment “of even the finest-colored gold” is mentioned by Pliny several times in Natural History as a pigment frequently used in the encaustic technique. A papyrus (Pap. Cairo 3432) dating to the fifth century B.C. found on Elephantine Island in Egypt even gives instruction on how to paint a hull with orpiment, perhaps using the encaustic technique. The stains found on the Zea and Tektaş Burnu shipsheds’ eyes are red or yellow, possibly from orpiment or hematite, ingredients that were likely used in naval ship decoration.

Ancient Greek color theory, modern ideas of vision, and literature on pigments can elucidate the purpose of concentric pigmented rings on many of the marble eyes. The bands of colors exhibited in the marble eyes from Zea and Tektaş Burnu include black, white, red, yellow, and possibly even blue. On Colors, a work attributed to Aristotle, begins the discussion of color with the statement that the “simple colors” are those of the elements, drawing a connection with the tangible environment. White (light) and black (the complete absence of light) are the simplest of colors, while other colors result from a mixing of light and dark.

Marble eyes from Zea and Tektaş Burnu shipwrecks may even be evidence of an increase in the active portion of the eye. “It is obvious, therefore, that […] nothing could so enhance the magical power of an individual as to increase the number of his pupils, the openings through which the eye emitted all its shafts, envious, amatory, morbiferous, etc.” Archaeological examples of ancient marble ships’ eyes contain multiple concentric rings of pigment, which could represent multiple pupils. Perhaps the number of rings correlates with an ability to counteract the evil eye. Thus, the greater number of rings represented on a ship’s opthalmus, the more amatory, the more protective. The pigment rings of ships’ marble eyes may well represent the four natural elements in the form of primary colors. By invoking this color spectrum, perhaps the ancient Greeks were seeking protection from the elements themselves, as well as from the envy of others who desired these ships’ eyes that used all the colors of nature with the greatest number of pupils were effective talismans against all the threats of nature. With the help of elemental pigmentation on their ships’ eyes, ancient Greek sailors could hope to repel the threat of bad winds, storms, fire, and ultimately shipwreck.

SUGGESTED READING

I. prow of the merchant ship is in the form in the International Journal of Nautical sail. Lionel Casson published the sherd depiction of a merchant ship with a furled of the nautical community was its rare 1995 visit to the Museum of Antiquities a black-figure vase that he saw during a .1/2 SPRING/SUMMER 2020 introduced an interesting sherd from INA Quarterly . As outlined by Casson, Stephanus of Opposite page: bulls on the sea motif is featured in many Greek ship depictions even though the horse heads can be seen in depictions of bird heads on Bronze Age ships, and had lion heads, there is ample evidence on ancient ships; Egyptian war galleys head decorations were not uncommon on ancient ships with Phoenician, Greek, and Roman ships. The numerous associations of bulls with the sea, gods of storms and rivers were also personified as bulls, including the Greek water god Acheloos and the Phoenician storm god Baal-Haddu/Sapon. The bull also has interesting associations with fertility and rebirth, especially in cave sanctuaries where the bull was a prominent sacrificial victim. From the fifth to the second millennium B.C., the constellation Taurus arrived with the vernal equinox, marking the beginning of spring and the sailing season. It is possible that bull-gods were the creation of farmers interested in the cycles and success of agriculture which preceded the association of the same gods with sailing. The numerous associations with Phoenician, Greek, and Roman ships show that the bull was clearly connected to spiritual matters of the sea. Bull horns and figureheads may have offered a sense of protection by evoking the gods who assumed the form of a bull.

Apart from ships and stories that document the association of bulls with the sea, gods of storms and rivers were also personified as bulls, including the Greek water god Acheloos and the Phoenician storm god Baal-Haddu/Sapon. The bull also has interesting associations with fertility and rebirth, especially in cave sanctuaries where the bull was a prominent sacrificial victim. From the fifth to the second millennium B.C., the constellation Taurus arrived with the vernal equinox, marking the beginning of spring and the sailing season. It is possible that bull-gods were the creation of farmers interested in the cycles and success of agriculture which preceded the association of the same gods with sailing. The numerous associations with Phoenician, Greek, and Roman ships show that the bull was clearly connected to spiritual matters of the sea. Bull horns and figureheads may have offered a sense of protection by evoking the gods who assumed the form of a bull.

BULLS ON THE ANCIENT MEDITERRANEAN
BY SHERI KAPAHNKE

In the Spring 1997 issue of the INA Quarterly, INA Founder George Bass introduced an interesting sherd from a black-figure vase that he saw during a 1995 visit to the Museum of Antiquities at the University of Heidelberg in Germany. The importance of this sixth-century B.C. sherd for Bass and the rest of the nautical community was its rare depiction of a merchant ship with a furled sail. Lionel Casson published the sherd in the International Journal of Nautical Archaeology (INAna) in 1996 where he raised another rare aspect of the image, the prow of the merchant ship is in the form of a bull’s head. Casson noted that animal head decorations were not uncommon on ancient ships; Egyptian war galleys had lion heads, there is ample evidence of bird heads on Bronze Age ships, and horse heads can be seen in depictions of Phoenician ships. The Heidelberg sherd observed by Bass remains unique among Greek ship depictions even though the bull on the sea motif is featured in many stories from ancient Greece. As outlined by Casson, Stephanus of Byzantium cited the Greek geographer Artemidorus (ca. 100 B.C.) as writing that the settlement Tauroeis was named because the ship that brought the settlers had the figurehead of a bull. Little is known about what bull embellishments looked like. The Heidelberg sherd that Bass observed depicts the bull’s head fully formed and smooth and with no indication of horns, a defining feature of the bull. Although, from the archaeological remains of shipwrecks comes evidence of animal horns filled with the proembolion, a projecting feature designed to protect the ship’s ram from going too far into an enemy vessel. Other iconography suggests, however, that the horn shape was significant beyond a functional use as there are representations that include both a proembolion and a horn projection. Bulls were not only depicted on seagoing ships, but occasionally in Greek and Roman myths and plays bulls themselves were seagoing. The mythological stories of Europa and Phaedra both feature a malicious bull emerging from the sea. In the Rape of Europa, Zeus appears on the coast of Phoenicia in the form of a bull and swims Europa to Crete on his back. There she gives birth to the half-man, half-bull Minotaur. The earliest reference to the story is from Homer’s Iliad (14.321). In the well-known Greek tragedies of Sophocles and Euripides, the Cretan princess Phaedra was rejected by Hippolytus; in response, Theseus sent a bull from the sea to ambush Hippolytus and gore him to death. Senea’s version of the story from ca. A.D. 54 features a puzzling allusion to the Europa story where the bull’s hooves (ungulae) are directly associated with a ship’s oars (remus). Rather than a sea creature, a large bull emerging from an environment in which it does not belong would evoke a sense of the supernatural. It may be that the Greeks hoped their ships would create a similar awesome, fearsome spectacle in the guise of bulls at sea.

This page: Sherd depicting merchantman with bull’s head, Inv. no. 25/08. Opposite page: Fragment of wall covering of ship, 3rd cent. B.C., Inv. no. NF. 82-526.

SUGGESTED READING

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underwater archaeologists, identifies for three professional levels of Italian Charter that distills a concise framework agenda for the future of Italian underwater the book also sets forth an ambitious archaeological research in Italy. More than the proceedings of the 2016 Italian CHARLIE WILLIS ISBN 978-8832831122 415 PAGES FORUM EDIZIONI 2019 Il Patrimonio Culturale Sommerso. Ricerche e proposte per il futuro dell’archeologia subacquea in Italia Edited by Massimo Capulli

At its heart, this volume represents the proceedings of the 2016 Italian National Conference on Underwater Archaeology that featured a wide range of papers regarding current underwater archaeological research in Italy. More than a collation of individual papers, however, the book also sets forth an ambitious agenda for the future of Italian underwater archaeology, catalyzing in a “Carta” or Charter that distills a concise framework of goals for the field. This charter outlines the necessary qualifications for three professional levels of Italian underwater archaeologists, identifies those responsible for the management of underwater cultural heritage (UCH), proposes pathways for dissemination of Italian underwater archaeological research to public and professional spheres, and recommends solutions for the in situ preservation of Italian submerged cultural heritage. Building on the 2001 UNESCO Convention, which provides the best framework to improve and coordinate international strategies for the protection, research, and management of UCH, Capulli and Tomorlotti present practical applications of UNESCO’s in situ preservation policy for UCH. They briefly describe new and relatively low-cost technologies involving underwater video with internet access to monitor underwater archaeological sites. The authors focus specifically on a metal structure with removable square grids placed on the Grado 2 shipwreck to ensure its protection in situ while providing visual access to visitors and allowing archaeologists to excavate the site. Bruno et al. present possible solutions for the preservation of submerged terrestrial sites, outlining the efficacy of cleaning the brickwork and mosaics at Borsa, followed by a wax coating. While these systems seem to be an effective solution to implement UNESCO’s in situ preservation policies, they do not provide protection against natural risk factors such as currents. Moreover, in-situ protection has an associated economic cost and does not prevent the natural deterioration of any underwater archaeological site over time. This is an issue that still needs to be addressed by the specialists despite good initiatives by many Italians. La Rocca and Emma provide an intriguing case study for the integration of technology aimed at documenting, analyzing, and presenting deep-water sites. Using the deep-water shipwrecks of the Panama-Asiatic islands, the authors outline the process of creating geo-referenced 3D models using photogrammetry, which can also serve as a tool for public interaction, providing museum visitors with a unique experience of these largely inaccessible sites through virtual reality.

Another interesting chapter that shows the value not only of incorporating new technologies but also of interdisciplinary approaches that re-examine past projects is the paper by Disantataro et al. The authors reinterpret the wrecks of La Madonnina A and B investigated by Peter Throckmorton off the coast of Taranto in the 1960s. Archaeologists nowadays tend to focus on new research projects, but projects that reassess old collections can generate as much new data as any recent archaeological project. This is an aspect to be taken into account when managing museum collections and previously excavated sites, especially since new technologies allow archaeologists to approach collected data in a manner that was unthinkable a few decades ago. This volume also offers two papers that outline multi-faceted projects for the study of fluvial landscapes. These, one by Capulli and one by Asta, illustrate the UCH of two northern Italian rivers, the Stella the Baccighione, within the fulcrum of human lifeways over the centuries. They trace the human impact on and the human interaction with these riverine settings as well as their importance within the ancient economic and social systems. The Capulli paper in particular showcases the diversity of finds from the Stella River spanning from the millennium and discusses the potential of the river as a training ground for new underwater archaeologists. Finally, Fazzini and Zarrarini explore the often-overlooked submerged prehistoric landscape of Italy. The authors have compiled a list of the key prehistoric excavation sites in the rivers, lagoons, and along the coasts of Italian territory while also presenting the major challenges that impede the discovery and analysis of such sites in Italy. This paper is more than an annotated bibliography, however, as it includes a passionate plea on the part of the authors for the Italian academy and ministries to value the submerged prehistoric landscape and to support more dedicated institutional campaigns to preserve and analyze this aspect of the Italian past.

This volume is beautifully imagined, with high-quality graphics and images, and provides a comprehensive approach to the current state of underwater archaeology in Italy, outlining the latest projects carried out in this country at the time of the 2016 conference. It could have been enhanced by some organization of the conference papers to orient the reader—whether thematically, geographically, or chronologically. Furthermore, the majority of projects included in this publication correspond to pre-Classical and Classical periods, with only a few later examples. It is unclear whether there were no significant research projects on later periods conducted in Italy at the time, or if those projects were not included in the present volume. Nevertheless, the list of projects presented in this publication reveals the scope of Italian underwater archaeology. Despite the majority of the chapters being relatively short, thorough bibliographies at the end of each chapter are included, which allow specialists and scholars to access detailed information regarding each of the projects; the writing style suits both scholarly and general audiences. Furthermore, the methods and practices described in this volume are clearly focused on site protection and preservation of UCH are a useful addition to the current literature on underwater archaeology all over the world.

Serious students of globalization are familiar with the Manila galleons as the final link in the creation of a fully global political economy. The movement of Chinese goods to the West spans some 4000 years. Eastern goods were considered superior, leading to a drain on European gold and silver and the construction of economic prospects, pushing Europeans to search for a direct route to the East. The masses of silver and gold from the mines of Mexico and Peru would allow Europe to participate in the more advanced Asian global economy. Sailing directly from Spain to Asia meant contending with dominant Portuguese and later Dutch and English mercantilist competitors. Sending precious metals from Mexico or Peru overland to the East into pirate-infested
Caribbean waters, oriented to Europe, and only then along the Silk Routes, was dangerous and inefficient. The successful roundtrip voyage from Acapulco to Manila in 1565 offered Spain a solution to many of its commercial problems and completed a truly global trade and payments circuit.

What is ignored from this macro-perspective is the infrastructure that developed as a result of the Manila Galleon trade: the production of trade goods, seaports, new shipyards, land transport, local exchange, and cultural interaction. This volume addresses these issues. The great value of this work rests with its status as an archaeological survey of the full range of the galleon trade from the production kilns of inland China to the distribution of the world, in Chapter 15 Castillo and Fournier trace the artistic impact of Asian ceramics on the creation of the Mexican majolica motifs that are now identified as traditional.1

This is a sophisticated work that will be of most interest to research libraries and specialists. The volume includes excellent photographs of porcelain finds that are much appreciated given the quest to establish connections between specific production areas in the East and archaeological finds in galleon wrecks or at sites in the West. Less well-presented are the maps that might help non-specialists orient themselves. Multiple reproductions of historic maps purport to show the route across the Pacific, but these are too small to be useful. Maps of regions or local areas are not always of the highest quality, and many that would have been sincerely appreciated are absent. One solution would have been to collect those maps identified by the authors and present them as a set. Similarly, readers must navigate varying chronological systems. During designations based on names of dynasties (Chinese and Japanese), artistic periods, or Western numerals, need not be converted into a single imperialistic form, but a thoughtful unified chronograph would have made for a helpful appendix. Finally, dealing with the language traditions of scholars from multiple places is always a challenge. Readers should be tolerant of this. The intellectual payoffs are worthwhile.

When I accepted an invitation from Pilar Luna to conduct a 3½ week night-school course in underwater archaeology at Mexico’s National Institute of Anthropology and History (INAH), I had no idea that my first and only visit to Mexico would be one of my most memorable experiences. On 3 January, at Mexico City’s International Airport, Pilar met me and my assistant, Donald Keith, veteran of several INA excavations and a doctoral candidate at Texas A&M.

The visit that followed was made unforgettable by Pilar, a remarkable host who introduced us to myriad facets of his country. After many of our two-hour classes, she made sure that at least one of the students took us home for dinner, to introduce us to local dishes with local families. Our free afternoons were filled with surprises. One day she hired a small canvas-covered boat on a crowded canal in Mexico City, which we were serenaded with Mexican music by a band on a passing boat and treated to Mexican snacks by food vendors on other nearby boats. On other days she drove us to ancient ruins including Mexico City’s Temple Mayor, which she had helped excavate, and the immense pre-Columbian city of Teotihuacan. On another trip she took us to an outdoor lunch surrounded by peacocks in Cuernavaca.

Our overall purpose for being in Mexico, however, was to train artifact specialists to locate and excavate wrecked ships of discovery, conquest, colonization, defense, and trade in Mexican waters. A planned field exercise on a known historic wreck near Veracruz was aborted by stormy seas, but without hesitation Pilar moved to Plan B and drove Don and me north to the Lake of the Half Moon (Laguna de Media Luna) for a “reckless” excavation. For her impressive diving ability, organizational skills, and upbeat personality I invited Pilar to join my veteran team in Turkey to help excavate an 11th-century A.D. shipwreck. She accepted and was a most welcome addition.

1 GEORGE BASS

The great value of this work rests with its status as an archaeological survey of the full range of the galleon trade from the production kilns of inland China to the distribution of goods...along the major trade routes of New Spain.
In June, 2005, Pilar and I were in Campeche for a field school she was conducting. One day she took me to the Museo de Arqueologia Subacuatica Fuerte de San Jose where we saw, among other major finds, the 16th century bronze cannon we raised from Cayo Nuevo in 1979. It was a bittersweet reunion between the three of us. We were quiet for a while. I observed that the cannon is now safe in a proper museum, looking pretty much the same as when we first saw it on the seabed in spite of the passage of 26 years. Pilar said “Yes, half a millennium is nothing—if you are a bronze cannon! We, on the other hand are already showing our age. But long after we are gone and forgotten the cannon will still be around, most likely joined by many other marvelous finds discovered and cared for by future generations of underwater archaeologists and conservators we helped train.”

-DONALD KEITH

When I first met Pilar at the 1980 Society for Historical Archaeology (SHA) Conference in Albuquerque, we shared the instant bond of our two passions: Mexican archaeology and archaeology beneath the sea. Pilar encouraged me by facilitating my study of a dugout canoe discovered and excavated years earlier during subway construction, and then placed on display at the INAH in Mexico City.

That summer, Roger Smith invited us to participate in the Cayman Islands Project. Roger grouped us on the same team and we developed a lasting personal and professional bond that continued for 40 years. It may have been on this project that Pilar introduced me to her favorite poem, by Antonio Machado, which she loosely translated from Spanish to English as, “Walker there is no road – you make the road as you walk.” And so Pilar dedicated her life to building capacity, educating, inspiring, and protecting Mexico’s and the world’s underwater cultural heritage. Pilar encouraged those she walked with - to make their own paths too.

-SHEILA MATTHEWS

As members of the International Committee on Underwater Cultural Heritage (ICUCH) from the late 1990s, Pilar and I traveled to meetings around the world, always advocating for the protection and management of underwater cultural heritage, and taking a few extra days to enjoy cultural experiences in some of the world’s greatest cities. It was an enormous privilege to share the 2016 SHA Award of Merit with Pilar, Dolores Elkin, and Toni Carrell in recognition of our work during the 2001 Convention negotiations, where the Portuguese delegate called this unofficial team, each of whom served with a different States Party or NGO, “Las Chicas Radicales.”

Pilar was wise and calm, prepared equally for challenge or success; she was quietly fearless. Yet, in spite of her worldly accomplishments, Pilar’s core philosophy was that when we leave this earth, we take with us only what we have become as human beings.

-ROBERTO JUNCO

Pilar was wise and calm, prepared equally for challenge or success; she was quietly fearless. Yet, in spite of her worldly accomplishments, Pilar’s core philosophy was that when we leave this earth, we take with us only what we have become as human beings.

-Peggy Leshikar-Denton

Pilar was more than a boss and a respected archaeologist in the field. Despite the many accomplishments of her prestigious career, and the many positions she held, she never lost the human touch. She would always take the time to ask about your personal situation. When working with her Pilar was more of a mother figure than a respected scholar. Pilar taught us all valuable lessons about how to do underwater archaeology, but even more important, she inspired us to value and protect underwater cultural heritage.

-SHEILA MATTHEWS

SPECIAL THANKS to Donald Keith and Peggy Leshikar-Denton for providing many of the wonderful photos included here.
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