

The  
INA

# quarterly

MAGAZINE OF THE INSTITUTE OF NAUTICAL ARCHAEOLOGY

## Does it Matter? Making a Difference with Nautical Archaeology

### A Moment Frozen in Time

Klondike Gold Rush Steamboat Revealed

### Setting Sail on the Red Sea

Reconstruction of an Ancient Egyptian Seafaring Ship

SUMMER 2009 • Volume 36 • No. 2



## FOUNDERS

George F. Bass, Ph.D., Chairman Emeritus†, Michael Katzev (deceased), Jack W. Kelley†

## Officers/Administration

James P. Delgado, Ph.D., President\*  
Cemal M. Pulak, Ph.D., Vice President  
Kevin J. Crisman, Ph.D., Vice President  
Ella F. Kegler, Chief Financial and Administrative Officer  
Chasity M. Hedlund, Accounting Manager  
Ann Elizabeth Moore, Membership and Reception  
Tuba Ekmekçi, Director, Bodrum Research Center  
Özlem Doğan, Finance Manager, Bodrum Research Center

INSTITUTE OF  
*Nautical*  
ARCHAEOLOGY



## Board of Directors & Officers

Dr. Oğuz Aydemir • Robert D. Ballard, Ph.D. • Edward O. Boshell, Jr. • John Cassils, M.D. • Gregory M. Cook  
Lucy Darden\* • Thomas F. Darden • John De Lapa • Carl Douglas • Claude Duthuit • Danielle J. Feeney\*  
Charles P. Garrison, M.D., Vice Chairman\* • Donald Geddes III, Chairman\* • James Goold, Secretary & General Counsel\*  
Dr. Robert Hohlfelder, Ph.D. • Charles Johnson, Ph.D. • Mustafa Koç • Captain Alfred Scott McLaren, USN (Ret.) Ph.D.  
Alex G. Nason • George E. Robb, Jr. • Andrew Sansom, Ph.D.\* • Ayhan Sicimoğlu • Clyde P. Smith, Treasurer\* • Jason Sturgis  
Peter van Alfen, Ph.D. • Frederick van Doorninck, Jr., Ph.D.\* • Robert L. Walker, Ph.D.\* • Lew Ward  
Peter M. Way, Past Chairman\* • Robyn Woodward, Ph.D. • Sally M. Yamini

## Associate Directors

Ercan Acikel • Gordon W. Bass • George R. Belcher • Raynette Boshell • Allan Campbell, M.D. • Stephen Chandler  
William C. Culp, M.D. • Glenn Darden • Nicholas Griffis • Jeff Hakko • Robin P. Hartmann • Faith Hentschel, Ph.D.  
Susan Katzev • William C. Klein, M.D. • Selçuk Kolay • Anthony Marshall • Thomas McCasland, Jr. • Dana F. McGinnis  
Michael Plank • Anne Darden Self • Lynn Baird Shaw • Betsey Boshell Todd • Mary Tooze • Garry A. Weber  
Roger A. Williamson, Ph.D.

## Nautical Archaeology Program Faculty, Texas A&M University

Deborah N. Carlson, Ph.D., Assistant Professor, Sara W. and George O. Yamini Fellow  
Luis Filipe Vieira de Castro, Ph.D., Assistant Professor, Frederick R. Mayer Faculty Fellow of Nautical Archaeology  
Kevin J. Crisman, Ph.D.† Associate Professor, Nautical Archaeology Faculty Fellow  
Donny L. Hamilton, Ph.D., George T. & Gladys H. Abell Chair in Nautical Archaeology, Yamini Family Chair in Liberal Arts  
Cemal Pulak, Ph.D., Frederick R. Mayer Faculty Professor of Nautical Archaeology  
C. Wayne Smith, Ph.D., Associate Professor, INA Faculty Fellow  
Shelley Wachsmann, Ph.D., Meadows Professor of Biblical Archaeology

## Nautical Archaeology Program Emeritus Faculty, Texas A&M University

George F. Bass, Ph.D.  
George T. & Gladys H. Abell Chair in Nautical Archaeology, Yamini Family Chair in Liberal Arts, Distinguished Professor, Emeritus  
Frederick H. van Doorninck, Jr., Ph.D.  
Frederick R. Mayer Faculty Professor of Nautical Archaeology, Emeritus

## Maritime Archaeology Program Faculty, Flinders University

Mark Staniforth, Ph.D., Associate Professor  
Jennifer McKinnon, Lecturer  
Emily Jateff, Associate Lecturer  
John Naumann, Teaching Support Officer

## INA Research Associates and Affiliated Faculty

J. Barto Arnold, M.A. • Kroum Batchvarov, M.A. • Piotr Bojakowski, M.A. • Lilia Campana • Arthur Cohn, J.D.  
Claire Alike Collins • Katie Custer, M.A. • Mariá del Pilar Luna Erreguerena, M.A. • Ben Ford, M.A. • Donald A. Frey, Ph.D.  
Jeremy Green, M.A. • Elizabeth Greene, Ph.D. • Donovan Griffin • Jerome L. Hall, Ph.D. • Frederick Hanselmann, M.A.  
Heather Hatch • Kenzo Hayashida, M.A. • Faith D. Hentschel, Ph.D. • Nicolle Hirschfeld, Ph.D. • Frederick Hocker, Ph.D.  
Jun Kimura, M.A. • Carolyn G. Koehler, Ph.D. • Bradley A. Krueger • Justin Leidwanger, M.A. • Margaret E. Leshikar-Denton, Ph.D. • Asaf Oron, M.A. • Ralph K. Pedersen, Ph.D. • Robin C.M. Piercy • John Pollack • Mark Polzer  
Juan Pinedo Reyes • Donald Rosencrantz • Jeff Royal, Ph.D. • Randall Sasaki, M.A. • George Schwarz, M.A.  
Tufan Turanlı • Peter van Alfen, Ph.D. • Cheryl Ward, Ph.D. • Gordon P. Watts, Jr., Ph.D. • Robyn Woodward, Ph.D.

Welcome to the summer issue of *The INA Quarterly*, dedicated to what we do together as the Institute of Nautical Archaeology. Feature articles include a discussion on why nautical archaeology matters; the history, technology and refit of INA's survey submersible *Carolyn*; and the reconstruction of an ancient Egyptian oceangoing ship. We also say goodbye to two members of INA's family, Duncan Boeckman and Bill Searle.

As the summer draws to a close, a number of this year's field projects are reporting in with their results, which we will be sharing with you in the coming months. For a taste of what's to come, we highlight one of these endeavors: the Klondike Gold Rush shipwreck survey in Canada's Yukon.

As I reported in the last issue of the *Quarterly*, INA stands in a position of relative strength. It has focus, a strategic plan, a dedicated core of supporters, an engaged and committed board of directors, and it continues to attract support, including donations and grants. INA has a clear sense of its mission, its focus, and its priorities. There are exciting, ongoing projects that will yield enthusiasm and interest as well as archaeological and historical knowledge, and partners and alliances that will continue to enable INA to conduct its work and fulfill its mission.

Within the next 12 months, INA will mark its 50th anniversary with the return to Cape Gelidonya of Dr. George Bass, Claude Duthuit and other members of the original team and a new scientific archaeological mission will begin at what is considered the birthplace of modern, underwater archaeology.

At the same time, we will continue our mission, with a special emphasis on those key elements that we need to focus on as we pass the 50-year benchmark:

- Saving the endangered past through advocacy and action;
- Demonstrating and supporting "best practice" in everything we do;
- Collaborating and partnering on an international scale with universities, programs, scholars, students, museums, organizations, and institutes;
- Sharing knowledge with a diverse and global audience through a wide variety of media and particularly enhancing our ability to do so through the Internet;
- Demonstrating the relevance of what we do and why we do it;
- Mentoring and supporting the next generations of nautical archaeologists;
- Being cost effective and strategic in our work; and
- Being socially and environmentally responsible.

This season has seen many projects take place on the water, on shore, in the laboratory and in the archives. This work that is at the heart of what we do as the Institute of Nautical Archaeology.

Thank you for your interest in INA, and for your support. It makes a difference.



Jim Delgado  
President



Jim hovers over a mound of amphorae from a 4th-century AD Roman wreck discovered by the RPM Nautical Foundation off the Albanian coast.

PHOTO Howard Phoenix, RPM

# C ontents

SUMMER 2009 VOLUME 36 • No.2



5

## Does it Matter?

The relevance of nautical archaeology in today's world.



8

## 2009 Field Report

The Klondike Gold Rush shipwreck survey.



10

## Sailing on the Red Sea

Reconstruction of an ancient Egyptian ship.



12

## Partners Down Under!

Flinders University and INA make it official.

1

## ON THE COVER

Windlass on the bow of *A.J. Goddard*  
PHOTO **Donnie Reid** of Ocean Photography.

15

## INA Bookmarks

4

INA Quarterly • SUMMER 2009

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

*The INA Quarterly* (ISSN 1090-2635) is published four times per year by the Institute of Nautical Archaeology.

**President/Publisher**  
James P. Delgado, Ph. D.

**Editor**  
Sandra Robson

**Art Direction & Design**  
*Blackberry Creative*



**Institute of Nautical Archaeology**  
P.O. Drawer HG,  
College Station,  
Texas 77841-5137 USA

email [info@inadiscover.com](mailto:info@inadiscover.com)  
phone (979) 845-6694  
fax (979) 847-9260  
[www.inadiscover.com](http://www.inadiscover.com)

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 [inaeditor@inadiscover.com](mailto:inaeditor@inadiscover.com)

© August 2009 by the Institute of Nautical Archaeology. All rights reserved.

# Does it matter?

## Making A Difference With Nautical Archaeology

*Editor's Note: In times of uncertainty, economic and otherwise, we have an increased tendency to examine the relevance and importance of all human endeavors... from healthcare and education to scientific exploration and the fine arts, all are under scrutiny. In our human penchant for ranking, we who pursue all of the above are judged and listed according to a perceived importance to the world at large. So why does nautical archaeology matter? What difference does it make in the scheme of things and why is supporting organizations like INA important?*

*In the following article, INA President Jim Delgado examines the relevance and importance of the work undertaken by this organization in particular, and of nautical archaeology in general. In fact, his reasoning can easily be applied to the study of all facets of human history.*

*A quick online search reveals that there are many opinions and perspectives being expressed out there, some of them reasoned and articulate, others decidedly less so. No matter where you stand on the exploration, preservation and study of human history, there is no doubt that this topic inspires passionate discourse.*

*We invite you to add your voice to the discussion and would welcome your letters to the editor on the subject.*

Email [inaeditor@inadiscover.com](mailto:inaeditor@inadiscover.com)

Mail Institute of Nautical Archaeology, P.O. Drawer HG College Station, Texas 77841-5137 USA

Attn: INA Quarterly Editor

As we approach 2010, the half-century anniversary of nautical archaeology, this is a perfect time to ask provocative questions. Why should society care about nautical archaeology? Why should people support an organization like the Institute of Nautical Archaeology? In a world with so many diverse needs, challenges and problems, how does INA, and how does nautical archaeology, make a difference?

The study of history, whether the record as written or interpreted from the physical remnants, can inform us of the how, what and why of past events. It can also fill in the gaps of history, restoring to the world knowledge, and perhaps important lessons seemingly lost but recovered through archaeological discovery and science. The process of discovery, scientific analysis and testing a hypothesis is fascinating and commands our interest, as millions of television viewers of science specials and fictional dramas like CSI will attest. Sites and artifacts from the past provide more than a collection of facts, names and dates. They provide tangible reminders of lives and achievements, triumphs and tragedies past, made real because they can be seen and touched.

INA was founded to make a difference in the preservation, study and understanding of the archaeological remains of humanity's seafaring past. That past, as represented by lost and

abandoned ships, their cargoes, ancient ports, harbors, sunken settlements and drowned cities, is a precious resource. Because the oceans cover 78 percent of the earth, the remnants of humanity's endeavors on the water are a dominant and important part of the record of our time on this planet. Seafaring is a common thread that has united cultures, nations, faiths and beliefs throughout most of the past.

In the past four decades, INA and its partners and associates have together excavated the world's oldest wreck at Uluburun, Turkey and the drowned pirate city of Port Royal, Jamaica. We have recovered the lost art treasure trove of medieval Islamic glass from the Serçe Limanı wreck in Turkey and excavated a tiny ship from the first decades of Spain's presence in the New World at Molasses Reef—the oldest wreck yet found in this hemisphere. We have studied the shattered remains of the massive Mongol fleet sent by fabled Emperor Kublai Khan to conquer Japan in 1281 AD, and the oldest western river steamboat in America on Oklahoma's Red River.

This work is done to the highest standard, with every fragment documented, raised with care, analyzed, and conserved in the laboratory to obtain every bit of information. We draw from the evidence not only knowledge of how ancient ships were built, but also how technology, trade



**ABOVE**  
Archaeologist Murat Tilev working on a row of copper 'oxhide' ingots (one of four rows in situ) found on the Uluburun shipwreck... one of the wealthiest and largest known assemblages of Late Bronze Age items found in the Mediterranean.

PHOTO INA Archives

### Uluburun

**What it takes to do it right...**

**10 years**  
of excavation

**22,500**  
dives

**6,613**  
hours on the wreck

Conservation efforts have been ongoing **since 1984**

Found by Mehmet Çakır  
Excavated from 1984-1994  
Excavation Director:  
Cemal Pulak

## ••• Making A Difference With Nautical Archaeology *continued* •••

James P. Delgado, President, Institute of Nautical Archaeology



### “One man’s trash is another man’s treasure”

It is easy for most of us to identify the most obvious of treasures, but would we recognize the potential in, say, an amorphous mass of rust, the sediment from an amphora or a decaying wood fragment?



#### ABOVE

Treasures from the Uluburun excavation included a gold scarab seal, a gold-clad figurine and this filleted cedar planking showing the oak tenon of a mortise and tenon joint.

PHOTO INA Archives

and the indomitable drive of humanity linked the world from its earliest civilizations. This is not a slick use of technology to simply pick up scattered coins, amphorae, or statues, make a colorful computer map, and splash them along with dramatic photos and tales of rugged adventurers wresting the secrets or the riches of the past from dangerous waters. It is attention to detail.

A scientific, controlled excavation meticulously maps every exposed fragment, even amorphous masses of rust that do not seem like much to the eye. Layer by layer, as the sediment is slowly removed, maps are constantly revised and provide the template for putting it all back together in the lab. A random scatter of broken ceramics shows how an ancient ship’s wooden superstructure collapsed as the ship rotted on the ocean floor, and an archaeologist like Frederick Van Doorninck of INA is able to reconstruct an ancient ship’s galley and offer us a sense of what it was like inside an ancient ship. Mapping a “jumble” of artifacts shows how the world’s oldest wreck, the Uluburun ship of 3,300 years ago, was packed with care to deliver a cargo representing the treasures of twelve different cultures linked by ocean trade. This helped reconstruct a complex trade network, a global (for its time) interconnection of people and goods that shows how the sea united, not divided, the civilizations of the past.

On the Uluburun wreck, more than a decade of diving also recovered fragments of wood that when pieced together, gave the world its oldest example of a “book.” Years of careful excavation of the Kublai Khan shipwrecks in Japan uncovered hundreds of fragments of ships’ hulls that, when pieced together, provided a sense of not only how these ships—some of the world’s largest, most advanced and mightiest—were built, but also how the poor repair and hasty construction of some of them doomed the Khan’s invasion of Japan in 1281, a loss previously attributed solely to a divine wind known as the kamikaze. In the skilled hands of conservators the contents of amphorae, rather than being

discarded as seemingly only silt and sand after thousands of years on the seabed, can yield a subtle form of treasure and reveal secrets from ancient pollen, seeds, and DNA.

“Indeed, we have calculated that we spend two years on conservation and research for every month we dive. My recent publication of the glass from the Serçe Limanı shipwreck did not appear until exactly 30 years after the last dives were made on the wreck, but it could not have been sooner—we first spent decades mending the vessels from a million shards, then drawing and photographing and cataloging the vessels, and then interpreting them, before putting down a single word of the book.”

—Dr. George F. Bass

INA has been at the forefront of this science since its beginnings, appropriately so since founder George F. Bass led the world’s first scientific excavation of a shipwreck to completion in 1960. INA’s conservation efforts have extended from ongoing work in the laboratory to the “bigger picture” of conservation by advocating the preservation of the world’s endangered submerged heritage and INA has been a strong voice against looting. The damage caused and the information lost to treasure hunters who dive for a flash of gold, often tearing apart the fragile remnants of the past, is unfathomable. Many sites, especially in the deep ocean, have never been salvaged or disturbed, making them virtual time capsules. They have remained untouched, but today’s technology is making it ever easier for those looking for *all that glitters* to exploit even these remote areas. INA has also argued against indiscriminate dredging and deep trawling that damages and destroys wrecks.

Most people decry looting of tombs on land... cutting off the heads of Khmer statues at Angkor to sell to collectors, digging up Civil War battlefields, and unearthing Native American grave sites and tossing aside the bones of the dead to sell the grave goods inside. Shipwrecks, too, should not be despoiled and turned into items for sale. These salvage operations often use the same technology and some of the same techniques as archaeologists do. The difference is that they and their investors have little interest in paying for DNA analysis, or reconstructing shattered fragments of wood into an ancient "book." The bottom line is different when you seek economic return, at the expense of knowledge. A few glib references to history, or claims that nothing more can be learned than what is already in the archives, do not justify treasure hunting and an approach that tries to explain away setting aside the evidence for the gold and other obvious treasures that will sell.

On every shipwreck I have ever worked on, even those of more modern vintage, we have learned things that have never been recorded or written down before—things we did not expect to find. In fact that is the entire purpose of scientific inquiry and exploration: to discover that which we do not already know. What these salvage operations see as junk or detritus, we know can reveal so much more than appearances might otherwise indicate.

Objects that come to rest in the ocean, once the ship has been torn open or sunk, settle into the embrace of silt and sand, and even as they corrode, retain their ability to inform and teach us. Rusted masses of metal, often leave perfect impressions inside a rusted "concretion," and when x-rayed, and used to create a mold, allow a conservator to create perfect casts of ancient tools and instruments—like the rare Byzantine double-headed ax recast from a concretion from the Bozburun wreck, excavated by INA off the Turkish coast.

INA works for all people, not just a few. Excavated materials are treated, analyzed and placed in museums, and the results from our

projects are compiled, written about and released to diverse audiences via print, film and the internet. Among the world's most popular museums are those that showcase the discoveries of nautical archaeologists. The Bodrum Museum of Underwater Archaeology, like the Vasa Museum in Stockholm, or the Mary Rose Museum in Portsmouth, collectively host millions of visitors each year.

We are partners in education, not only for the next generations of scientists who will work in the depths, but also for school children and those of us who retain our curiosity as life-long learners. Thanks to nautical archaeology, we know more about the dynamics of trade in the ancient world. We know about the spread of civilization and ideas through that trade, and the role of sea peoples like the Phoenicians, whose civilization was best expressed by their ships and the port cities they built. We now better understand the links between the Mediterranean and the Far East, the impact of each civilization on the other thanks not only to camels on the Silk Road but also to dhows and junks on the maritime Silk Road. We have a new appreciation for medieval art forms in Islamic glass, a detailed view of the ships of Europe's expansion into the new world, the rough and often unhealthy world of Renaissance warships, and the details of the world's oldest deep diving submarines of 150 years ago.

Those discoveries, that knowledge, would have been lost had it not been retrieved by dedicated scientists—nautical archaeologists—and shared with global audiences. Linking the past to the present, building bridges between cultures, and connecting those with an interest in our collective global heritage, by making these discoveries available for all, is the role of nautical archaeology and organizations such as INA. It makes a difference in our understanding of who we are, as a species, as members of culture or a nation, and it connects us all to the ongoing adventure of our shared human journey.

“ Whether their principal work is on land or underwater, archaeologists are in full agreement that the sale of artifacts is unethical... It does not matter whether the item for sale is a gold coin recovered from a shipwreck site or a ceramic pot removed from a grave. The sale of artifacts drives the antiquities market, contributing to the looting and undocumented salvage of our collective past. ”

—Lu Ann De Cunzio, President  
Society for Historical Archaeology

—Matthew A. Russell, Chair  
Advisory Council on Underwater  
Archaeology

—Michael Polk, President  
American Cultural Resources  
Association

—Janet E. Levy, President  
Archaeology Division, American  
Anthropological Association

—Ross Anderson, President  
Australasian Institute for Maritime  
Archaeology

—Jack W. Brink, President  
Canadian Archaeological Association

—Mike Heyworth, Director  
Council for British Archaeology

—Anthony Harding, President  
European Association of Archaeologists

—Luiz Oosterbeek, Secretary-  
General, UISPP - International Union  
of Prehistoric and Protohistoric  
Sciences

—William Andrefsky, Jr., President  
Register of Professional Archaeologists

—Dean R. Snow, President  
Society for American Archaeology

—Paul Lane, President  
Society of African Archaeologists

—Claire Smith, President  
World Archaeological Congress

For more information on the  
Society for Historical Archaeology  
and to read the complete text of  
the letter above please check the  
SHA website [www.sha.org](http://www.sha.org)

# YUKON RIVER

successful field season in the Yukon  
ed on two sites. Phase One involved  
on and photo-inventory of the tiny  
e, *A.J. Goddard*, on Lake Laberge.  
s the sole example of the small  
rs carried in pieces over the moun-  
rom Skagway, to ferry men, supplies  
a the headwaters of the Yukon River.  
d in San Francisco and Seattle, she  
ed on the shores of Lake Bennett  
winter of 1897-98, and foundered in  
in 1901.

tenacity, Doug Davidge searched  
ous Klondike vessel for 22 years. A  
rget was pinpointed on our 2008  
d its identity was confirmed by Doug  
ar. In June 2009 Doug, Jim Delgado,  
omas, Donnie Reid, and John Pollack  
st dives ever on this wreck shortly  
disappeared. We found an intact  
l lying upright in 9-11 m of 37  
ter. All components are present with  
n of the small pilothouse, stack and  
The vessel displays a riveted steel  
on bow and a novel hogging system.  
s open except for a small pilothouse;  
ins provided passengers with some  
om the elements.

ontained some clues about her  
years earlier. The main deck has ten  
nged in five pairs, and firewood is

hatches on both sides of the vessel. It was not  
possible to determine if the hull was constructed  
with transverse, watertight bulkheads, but given  
the large number of hatches observed on *A.J.  
Goddard*, this design is likely.

The boiler, engines, pitmans, eccentrics  
and paddlewheel are intact and complete.  
An engineer's station with control lever is located  
aft of a water tube boiler. The vessel has three  
steel rudders and the tillers enter the hull below  
the level of the main deck. The port side door of  
the boiler is open, and the firebox is stuffed with  
unburned wood. Apparently the crew tried to  
restart the fires as the vessel foundered.

There was no evidence of cargo on board,  
although the fate and contents of the barge are  
unknown. Nonetheless the wreck and its debris  
field contain a diverse collection of material  
culture in terms of tools, cooking utensils, and  
personal effects of the crew. These artifacts are  
the contents of a self-sufficient, working stern-  
wheeler on which the crew fed themselves en  
route and periodically had to repair their ship on  
a remote wilderness river. Woodworking and  
blacksmithing tools are abundant, and they  
include a small forge, anvil, workbench and hand  
tools. Cooking gear is the second dominant  
category of artifact. A small cook stove is on  
board, and a collection of enamel-ware, cook  
pots and bottles lie scattered around the ship.

Several long bones  
found adjacent to  
was on the menu  
with the crew in  
a coat.

Our work on *A.J.  
thorough photo-in-  
survey of the wre-  
The team also sp-  
on a second near-  
wooden-hulled *V-  
damaged and dis-**

After a crew ch-  
documentation w-  
Lindsey Thomas,  
at West Dawson,  
Whitehorse. A de-  
1898 wooden-hu-  
including several  
cross-sections. Th-  
characterized by  
carriers supportin-  
A substantial coll-  
discovered in the  
rudderposts, iron  
and the remains  
This ship is the th-  
have collected de-  
the first being the  
hulled *Evelyn*, and  
1898 composite-h-  
*Moyie* at Kaslo B.



# SURVEY

J. Pollack, D. Davidge and R. Woodward

es of a large mammal were  
o the ship, suggesting fresh meat  
. Personal artifacts associated  
lude boots and the remains of

*A.J. Goddard* consisted of a  
inventory by Reid and a baseline  
eck by Thomas and Pollack.  
ent a day with a total station  
rby site, the 36.2 m, 1898  
*Edette*, a shallow wreck heavily  
dispersed by winter ice.

ange, Phase Two involved hull  
ork by Robyn Woodward,  
Peter Helland and John Pollack  
some 550 km to the north of  
tailed hull plan of the 45.7 m,  
lled *Seattle No. 3* was prepared,  
longitudinal and transverse  
his heavily constructed vessel is  
5 massive transverse beams or  
ng the boiler and two king posts.  
ection of spare parts was  
hold, including spare rudders,  
ircles for the paddle wheel,  
of large diameter casks.  
hird vessel on which we  
tailed hull measurements,  
e 39.6 m, 1908 wooden-  
d the second being the  
hulled sternwheeler  
C, where work was



**ABOVE**

*A.J. Goddard*, first steamboat on  
Lake Bennett, loaded with men, supplies,  
and firewood, ca. 1896.

**PHOTO**

Alaska State Library  
Charles Horton Metcalf Photograph Collection  
P34-009

Lindsey Thomas (INA/TAMU) and the  
paddle wheel of *A.J. Goddard*

**PHOTO** Donnie Reid, Ocean Photography

The authors wish to  
acknowledge the  
National Geographic  
Society / Waitt  
Foundation for their  
support of Phase One,  
and Promare, INA and  
the RPM Foundation for  
their support of Phase  
Two. Additional  
financial and logistical  
support came from  
the Yukon Historic  
Resources Fund, the  
Heritage Branch of  
the Yukon Government,  
the Yukon Transporta-  
tion Museum, and the  
Vancouver Maritime  
Museum. Jim Delgado,  
Gregg Cook, Jeff  
Hunston, Tim Dowd,  
Kevin Crisman, Doug  
Olynuk and numerous  
INA members have  
been strong supporters  
and we thank all of you.  
Finally, we thank the  
Ta'an Kwach'an Council  
and elders for their  
hospitality.



# Min of the Desert

A FULL-SCALE RECONSTRUCTION OF AN ANCIENT EGYPTIAN SEAFARING SHIP

by Cheryl Ward, Associate Professor at Coastal Carolina University

Herodotus called ancient Egypt 'the gift of the Nile,' and that complex relationship is reflected in archaeological finds today. Thousands of boat and ship representations in paintings, carvings, and sculpture complement the 24 ship and boat remains that have been discovered, dating from the First Dynasty to the Persian period (c. 3030-450 BCE).

Many people mistakenly think the ancient Egyptians were tied to the Nile, and some archaeologists even suggest that the Egyptians lacked the skills to go to sea. However, recent discoveries at the pharaonic harbor of Mersa/Wadi Gawasis on the Red Sea provide direct and dramatic evidence of seafaring. The range of ship components discovered at Gawasis permitted our team to test whether the independently invented Egyptian approach to ship construction worked as well at sea as it did on the Nile. Although we have learned much about how these craft were built and see images of how they operated, we lack the most basic information about them. Were they seaworthy and watertight? Could the crew maneuver, anchor and operate the ships easily?

Sombbrero & Co.'s documentary producer Valerie Abita invested in a team created to discover the answer to these and other questions, and funded a full-scale reconstruction of a seagoing ship of the second millennium BCE. Thus, *Min of the Desert*—named for the ancient god of Coptos (modern Qift) and the Eastern Desert of Egypt—was built using the same construction technology as ships launched 4,000 years ago from Gawasis on voyages to Punt.

Our reconstruction was theoretical, with the ship's rig reconstructed primarily from reliefs in Queen Hatshepsut's mortuary temple at Deir el-Bahri, and from ship models. As there was no

wrecked ship to replicate, *Min of the Desert* was designed to be a floating hypothesis, like the trireme *Olympias*. I started out by comparing the dimensions of ship components illustrated in Hatshepsut's Punt reliefs to the Gawasis finds, and was astounded to discover consistency in height, width, and diameter of, for example, steering oar blades, beam ends, oar looms, beam spacing, and crutch height. That consistency, and links between the shape of Hatshepsut's ships and Middle Kingdom boats from Dashur, along with construction features like those in timbers from Lisht, provided the foundation for the vessel design. The recycled cedar hull planks at Gawasis, spongy with shipworm and other maritime finds, testified to characteristics of seagoing ships. Because cedar of Lebanon is an endangered species, we decided to use timber of nearly identical physical strength and other features, from 120-year-old Douglas fir of a forest near Lyons.

Our present day shipbuilders practiced ancient techniques, assisted in some cases by modern technologies such as electrical band saws for roughing out planks. The primary crew of four men and two boys who built the ship relied on hand tools made to ancient specifications, but made out of iron rather than copper. When completed the ship was 20 meters long and nearly 5 meters wide, displacing 30 tons, and was held together entirely by mortise-and-tenon joints in double lines along planks 14-22 cm (5.5-9") thick.

*Min of the Desert* first made short trips on the Nile and then in the Red Sea, before attempting the longer trial voyage south toward Sudan from Safaga along the route used by the ancient Egyptians. The Egyptians would have sailed much farther south on the Red Sea than our trials allowed and likely returned home with currents



**ABOVE**  
Captain David Vann with team leader Cheryl Ward and scientific liaison Mohamed Abdel Maguid.

At Hamdi Lahma & Brothers Shipyard in Rashid (Rosetta) with our priceless crew of sailors of lateen-rigged fishing boats on Lake Borolos near Alexandria.

The stars of the project were shipbuilders Reda and Mahrous Lahma, who brought the line drawings produced by naval architect Patrick Couser to life with the help of shipbuilder and maritime archaeologist Tom Vosmer.

**RIGHT**  
Scribing the curve  
Fitting the second strake  
*Min of the Desert*  
at Safaga

ALL PHOTOS  
Courtesy of Cheryl Ward



and a south wind (from the end of the Indian Ocean monsoon) along the Arabian coast in a sailing regime that recalled that of the Nile: sail south with the wind, and take the current north.

The 72-m<sup>2</sup> sail sat high above the deck, and the crew handled it easily despite a lack of pulleys, once they became accustomed to the rigging system during our sea trials in December and January. Our captain was David Vann, a prize-winning author and blue-water sailor, whose enthusiasm for the project was exceeded only by his patience. He, and each member of the 24-person international crew, remarked on the ship's responsiveness, as well as the efficiency and simplicity of its maneuvering and steering.

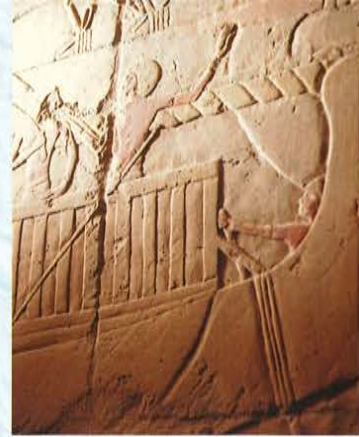
Like the ancient Egyptians, we used oars to maneuver the ship into position for raising and lowering the sail, and once to save ourselves from being blown onto a reef. Mostly, we used the sail. Our average speed was 5-6 knots, with speed bursts of up to 9 knots recorded. We stopped each night in protected, coral-lined bays like Mersa Gawasis, and noted many distinct land forms that likely served as navigation markers. Once out in the Red Sea, the ship

corkscrewed through the waves smoothly, taking only a single splash over the rail even when the wind speed reached 25 knots and the swells climbed to 2.5-3.0 m.

This remarkable adventure, documented by director Stephané Begoin for Sombrero & Co., will be broadcast in Europe and Asia beginning this fall, and on NOVA in 2010.

#### Acknowledgements

Heartfelt appreciation and thanks for creatively working to find solutions are due to many unnamed here: Valerie Abita, Director Stephané Begoin, Annouk Guerin and all the production staff; superstar liaison Mohamed Abdel Maguid; Mahrous Lahma and the brothers and employees of the shipyard; Kathryn Bard and Rodolfo Fattovich and the archaeologists at Gawasis; Robert Bischoff, Bill Greer and all the Master Craftsman studio; Captain David Vann and First Mate John Nicolini and our all-volunteer crew, and to my fellow science team members Tom Vosmer and Patrick Couser. Funding was provided by Sombrero & Co., individual volunteers, and FSU's Master Craftsman Studio and Department of Anthropology.



**ABOVE**  
Details from the mortuary temple of Hatshepsut guided our design.

Crew members David and Duncan Haldane have been part of INA projects and excavations since before they were born, including several seasons at the Sadana Island shipwreck, just north of Mersa Gawasis.



*Min of the Desert* sailing the Red Sea

## Partnership with Flinders University

The Maritime Archaeology Program (MAP) at Flinders University has recently signed a five year Memorandum of Understanding (MOU) with the Institute of Nautical Archaeology (INA) based in College Station, Texas. The MOU is primarily intended to facilitate cooperative research and education by conducting shared archaeological research and fieldwork. The first project that is currently underway is the archaeological investigation at the site of the defeat of the Mongol (Chinese) invasion fleet in 1288 at Bach Dang, near Hanoi in Vietnam. Staff and students from MAP have been involved in two fieldwork seasons at Bach Dang (in 2008 and 2009) and will be returning to Vietnam in December 2009 to contribute to the session titled "Maritime Archaeology, an introduction and its application in Vietnam" at the 19th Congress of the Indo-Pacific Prehistory Association (IPPA) in Hanoi.

MAP developed from, and builds on, undergraduate teaching in maritime archaeology, which started in the Department of Archaeology in 1996. Flinders University is now the only university in Australia, which actively teaches maritime archaeology at both undergraduate (within both the Bachelor of Archaeology and Bachelor of Arts) and graduate levels. The graduate coursework program within MAP started in 2002 (with the first graduate in 2003) and by the end of 2008 had seen 50 graduates comprising 28 Masters (MMA), 8 Diploma (GDMA) and 14 Certificate (GCMA) students from eleven different countries (USA, Canada, Australia, New Zealand, Japan, the Netherlands, UK, Luxembourg, Sri Lanka, South Africa and the Philippines). In 2009 there are about 20 full-time and part-time, both internal and external (by distance learning) students enrolled in various awards within the program. MAP faculty are Associate Professor Mark Staniforth, Lecturer Jennifer McKinnon and temporary Associate Lecturer Emily Jateff.

Associate Professor Mark Staniforth, Ph.D. is the Convenor of MAP in the Department of Archaeology where he teaches topics in under

graduate and postgraduate maritime archaeology. His research interests include the archaeology of whaling and Australian shipbuilding.

Jennifer McKinnon is a Lecturer in MAP. She joined Flinders after working as an underwater archaeologist for the Florida Bureau of Archaeology and teaching topics at Florida State University. Her research interests include Spanish colonial archaeology and submerged cultural heritage management.

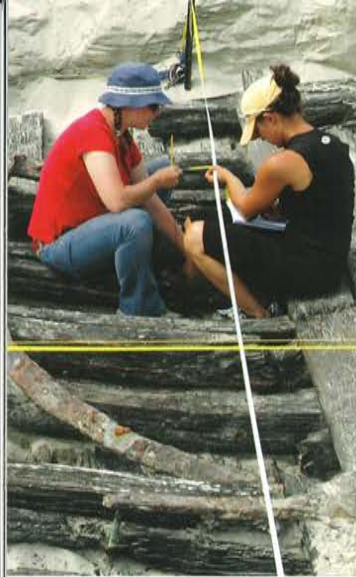
Associate Lecturer Emily Jateff is currently teaching within both the Maritime Archaeology and Cultural Heritage Management Programs in the Department of Archaeology. Her research interests are disaster management for archaeological collections, shore-based whaling, maritime foodways and cultural heritage management.

John Naumann is the MAP technical officer. He is the program's diving officer, coxswain and dive instructor. His role includes field work logistics, gear set-up, and maintenance, boats, dive planning and paperwork. Back in the Lab, he organises artefact photography, sorting and collections storage.

MAP currently has four PhD candidates: Adam Paterson, James Hunter, Debra Shefi and Jun Kimura, conducting research and occasionally teaching in MAP or for the Department of Archaeology.

PhD alumni include Dr. Nathan Richards who completed his PhD in 2003 and won the Society for Historical Archaeology (SHA) dissertation prize in 2004. Nathan is now an Associate Professor in the Program in Maritime Studies and Nautical Archaeology at East Carolina University in the US. The program's most recent PhD completion was Claire Dappert who conducted research on US-China trade in the late 18th and early 19th centuries.

Mark Staniforth  
Associate Professor, Flinders University



### ABOVE

Masters students Karson Winslow (left) and Debra Shefi excavating on the site of the Australian built ketch *Mary Ellis* during the 2006 Maritime Archaeology Field School.

PHOTO Mark Staniforth  
courtesy of MAP  
Flinders University  
(Feb 2006)

Surviving wing and fuselage section of a World War II-era American TBF/TBM Avenger aircraft located within Tanapag Lagoon, Saipan, CNMI (Commonwealth of the Northern Mariana Islands).

PHOTO James W. Hunter III  
courtesy of MAP  
Flinders University  
(23 July 2009)



## CAROLYN'S 10 YEAR AEGEAN VOYAGE

After a month long ocean voyage—this time above the waves—INA's well-loved and much used submersible *Carolyn*, arrived in Galveston, Texas. Finishing the journey over land, the acrylic sphere and spaceship-like hull wrapped for protection, *Carolyn* made the final trek to the SEAmagine Hydrospace Corporation in Claremont, California where she is undergoing a ten-year "check-up" and overhaul.

INA's founder, Dr. George F. Bass, was a pioneer in the use of research submersibles for archaeology and he commissioned the world's first submersible specifically designed for the task from the Electric Boat Division of General Dynamics. Launched in May 1964 *Asherah* was eventually sold because of the high cost of liability insurance, but George Bass remained committed to the idea. In the early 1990s, after visiting manufacturers in Europe, Asia, and North America he decided to have SEAmagine Hydrospace Corporation, design and build a new sub for INA. With funding from the Institute for Aegean Prehistory the two-person *Carolyn* (named after the wife of Malcolm Wiener, founder of that institute) was the result.

To tend *Carolyn*, INA also built the forty-five foot catamaran *Millawanda*—the Hittite name for the ancient coastal city of Miletus. Designed by Merih Karaba, who had accompanied George Bass on a diving survey in 1973, *Millawanda* became a perfect launching and retrieval platform for coastal waters in the Aegean.

In May 2000, *Carolyn* arrived in Izmir and I was there to meet Dr. Bass and the sub as it arrived in

Bodrum. Three weeks sped by as *Millawanda* was readied for its first deployment. *Carolyn's* initial dive in the Aegean, for which I acted as pilot with Dr. Bass, was a systems check to ensure that everything was in perfect order. A year later, in fall 2001, *Carolyn* undertook her first full scale expedition. In one month Dr. Bass and his crew located 14 ancient wrecks and ten probable wrecks, while diving on a dozen wrecks known from earlier years, to take GPS bearings. George Bass had waited decades for a submersible vehicle that would provide him with the access and visibility he had dreamed of since the days of *Asherah*. The ability to supervise, travel and explore at will, extended archaeological access and bottom time to levels that were impossible to achieve with scuba diving alone.

After nearly a decade in service, the time has come for *Carolyn* to head home for a check-up and refit. When she arrived back in Claremont on July 28<sup>th</sup> the sub looked in good order, and we are now beginning to go through a long check list as we assess *Carolyn* closely. INA has talked of future uses for the sub back in Turkey, such as accompanying Dr. Bass's planned 50th anniversary return to the Cape Gelidonya wreck, and has also discussed sending *Carolyn* to assist in ongoing survey work in Albania. SEAmagine will work with INA to make sure that *Carolyn* is ready for those and any other tasks as she enters her next decade of service.

William Kohnen, President/CEO  
SEAmagine Hydrospace Corporation

SEAmagine is a unique company dedicated to the design and construction of manned submersibles. It was formed in 1995 as a California corporation and for nearly 15 years, its engineering team has perfected a new concept in manned submersibles that is easily compared to an underwater helicopter. These submersibles have evolved and are available for depths ranging from 150 to 1000 meters. This includes a new design for a 4000m deep research submersible, catering to national research programs for private and national institutes.

SEAmagine has laid the foundation for a reliable, safe and certified submersible vehicle technology that provides cost effective access to the sub-sea world. Their submersibles are typically customized for specific applications and equipped with a range of accessories. These include a selection of high efficiency HID and LED underwater lights; High Definition cameras with optical fiber data electronics and HD recorders in the cabin; forward looking sonars for obstacle avoidance; Ultra Short BaseLine (USBL) position tracking with GPS positioning; Acoustic Doppler Navigation; a variety of Robotic manipulators; Fly-out mini-ROVs and custom science equipment. The available cabin workspace for the concurrent use of these tools is central to its effectiveness.



# INAre remembers

Thoughts from George F. Bass



Duncan Eugene Boeckman

## Duncan Eugene Boeckman

I first met Duncan and Elizabeth Boeckman in 1978 in a basement classroom where I spoke to the Dallas/Fort Worth Society of the Archaeological Institute of America. Because Duncan was local chairman, the Boeckmans put me up that night. Next morning, as Duncan was leaving for his law office, he turned back and asked "Do you have any literature about that institute you formed? I know some people who might be interested." I gave him an INA brochure and within days he began introducing me to future INA directors, including his brother-in-law Frederic Mayer. Soon the Boeckmans were hosting INA dinners at the Dallas Petroleum Club. Duncan then joined the INA Board, serving as chairman from 1982 to 1984. Even after he retired from the board, his behind-the-scenes help to INA remained extraordinary. When I expressed concern that some Texas A&M regents might oppose a doctoral program I wanted to establish for our better students, he held a dinner party where I sat with the chairman and vice-chairman of the Board of Regents and the governor of Texas, explaining the value of nautical archaeology; the doctoral program was quickly approved. A generous patron of the arts himself, Duncan arranged dinners where my wife, Ann, and I met others who enthusiastically supported INA. Most importantly, Duncan and Elizabeth became close friends. Since we had been their guests in Dallas, Santa Fe, and New York for operas, as well as for bird-watching at their ranch near Dallas, it gave Ann and me joy to return their hospitality in Bodrum and drive them throughout southwest Turkey. Duncan Boeckman died on April 20, 2009, at age 82.



Captain Willard F. Searle  
USN (Ret.)

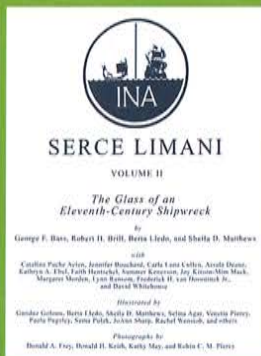
PHOTO courtesy of the  
Rubicon Foundation

## Captain Willard F. Searle, USN (Ret.)

As Supervisor of Salvage and Diving for the United States Navy, Captain Bill Searle was supporting my underwater archaeology projects in the early 1960s, long before I formed INA, obtaining surplus government equipment and on one occasion even sending a diver and a rigger to Turkey to help design a launching system at Yassı Ada for our two-person submersible *Asherah*. Thus, when I resigned from the University of Pennsylvania to incorporate INA, Bill became one of the founding directors, making the first substantial gift, which enabled the fledging institute to purchase office supplies. When I asked him why he was so helpful, he laughingly responded, "because your dad passed me in bull!" (At the Naval Academy, my father was a professor in the Department of English, History, and Government, known by midshipmen as the "Bull Department.") When the 1974 war on Cyprus temporarily ended INA's work in the Mediterranean, it was Bill who introduced INA to New World nautical archaeology by assembling a consortium of INA, the Maine Maritime Academy, and the Maine State Museum to excavate the colonial privateer *Defence*; the site had been discovered in Penobscot Bay by an MIT/Maine Maritime Academy summer course taught by Bill. I'll never forget his taking me to dive on the site in February, 1975, with ice floating on the surface! Later, when I wanted a perspective of shipwreck archaeology from a non-archaeological point of view, Bill co-authored with me the final chapter of "Ships and Shipwrecks of the Americas." Bill Searle, who fought Parkinson's disease for many years, died on March 31, 2009, at the age of 86.

# INA bookmark

TITLES ON NAUTICAL ARCHAEOLOGY & HISTORY



## Serge Limani, Vol 2 The Glass of an Eleventh-Century Shipwreck

by George Bass, Berta Lledo,  
Sheila Matthews, and Robert H. Brill  
Texas A&M University Press

9 x 12, 536 pp.  
44 color photos, 100 b&w photos.  
1000 drawings, 938 line art,  
3 maps, 17 site plans, 12 tables, 3 charts.  
Pub Date: 07/20/2009

Cloth \$150.00

Order your copy at: [www.tamupress.com](http://www.tamupress.com)

For almost a millennium, a modest wooden ship lay underwater off the coast of Serçe Limani, Turkey, filled with evidence of trade and objects of daily life. The ship, now excavated by the Institute of Nautical Archaeology at Texas A&M University, trafficked in both the Byzantine and Islamic worlds of its time. Known as “the Glass Wreck,” it bore cargo that included three metric tons of glass cullet, including broken Islamic vessels and eighty pieces of intact glassware, along with various artifacts of ship life.

This second volume of the discovery’s investigation focuses on the excavation, conservation, and study of the glass found in the wreckage.

The extensive catalog will be a valuable tool for archaeologists and scholars of Islamic glass and Islamic trade. Further, the systematic methodology and presentation of such a large undertaking will serve as a model for future study across many disciplines.

## more...

### Wulfstan’s Voyage

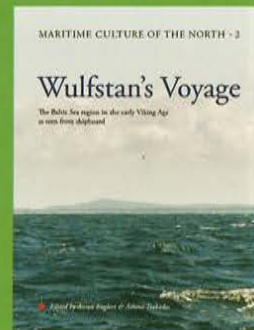
The Baltic Sea region in the early Viking Age as seen from shipboard

Edited by Anton Englert & Athena Trakadas.

Maritime Culture of the North, Volume 2, Roskilde 2009. Published by Viking Ship Museum

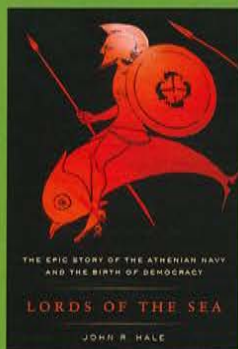
After the successful edition of the book on the voyages by the Norwegian Ohthere, *Ohthere’s Voyages*, the Viking Ship Museum now presents the less known travelogue which accompanies Ohthere’s report in the Old English version of Orosius’ world history.

Wulfstan’s account covers a voyage from the root of Jutland to the Vistula Delta – connecting the trading centres of Hedeby and Truso – and provides a rare and vivid view of the south-eastern Baltic Sea region in the early Viking Age, including aspects of inland navigation and local culture.



In order to gain a better understanding of Wulfstan’s navigational account, the Viking Ship Museum contributed with a trial voyage from Hedeby to Gdansk with the Skuldelev 1-reconstruction *Ottar of Roskilde*.

Hardcover \$106  
order your copy at:  
[www.oxbowbooks.com](http://www.oxbowbooks.com)



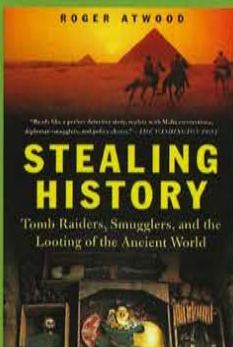
## Lords of the Sea The Epic Story of the Athenian Navy and the Birth of Democracy

by John R. Hale  
Viking Press

\$29.95  
Hardcover

Order your copy at:  
<http://us.penguin.com>

A stirring history of one of the finest fighting forces in the history of the world and the model for all other national navies to come. The Athenian navy built a civilization, empowered the world’s first democracy, and led a band of ordinary citizens on a voyage of discovery that altered the course of history. With a scholar’s insight and a storyteller’s flair, renowned archaeologist John Hale presents, for the first time, the definitive history of the epic battles, the indomitable ships, and the men—from extraordinary leaders to seductive rogues—who established Athens’ supremacy.



## Stealing History: Tomb Raiders, Smugglers and the Looting of the Ancient World

by Roger Atwood  
St. Martin’s Press

\$25.95  
Hardcover

Order your copy at:  
<http://us.macmillan.com/smp.aspx>

Roger Atwood knows more about the market for ancient objects than almost anyone. He knows where priceless antiquities are buried, who is digging them up, and who is fencing and buying them.

“This vividly written, well-researched book is a great primer for anyone interested in the ongoing struggle by archaeologists, law enforcement officials, and national governments to curb the illegal antiquities trade.”  
—Archaeology Magazine



## *Serçe Limani, Volume II* *The Glass of an Eleventh-Century Shipwreck*

GEORGE F. BASS, BERTA LLEDÓ, ROBERT H. BRILL,  
AND SHEILA MATTHEWS

For almost a millennium, a modest wooden ship lay underwater off the coast of Serçe Limani, Turkey, filled with evidence of trade and objects of daily life. This second volume of the INA's investigation of the ship focuses on the excavation, conservation, and study of the glass found in its wreckage.

9x12, 544 pp. 44 color, 100 b&w photos. 1,000 drawings. 938 line art. 3 maps. 17 site plans. 12 tables. 3 charts. Bib. Index. \$150.00 cloth

### *Critical acclaim for Serçe Limani: An Eleventh-Century Shipwreck, Vol. 1:*

"This book fixes the "Glass Wreck" in the canon of nautical archaeological research and literature."—*Nautical Research Journal*

"The clear description and the simple readable drawings set the standard for future reports."—*The International Journal of Nautical Archaeology*



We are pleased to offer INA members a 30% discount. Please use the code INA09 when purchasing books on our website at [www.tamupress.com](http://www.tamupress.com) or when ordering by phone, 800-826-8911.



**ATM TEXAS A&M UNIVERSITY PRESS** 800.826.8911 Fax: 888.617.2421 [www.tamupress.com](http://www.tamupress.com)