

# THE INA QUARTERLY



Summer 2006

Volume 33 • No. 2

---



# The INA Quarterly

Volume 33 • No. 2

Summer 2006

- 3 *Continuing the Work: The Group for the Study of Iberian Seafaring*  
Filipe Castro
- 5 *"The Edge of Empire: Iberian Ships"*  
*A Symposium at the Society for Historical Archaeology*  
Pearce Paul Creasman
- 13 *Episkopi Bay and Beyond: Recent Collaborative Fieldwork and New Prospects on Cyprus*  
Justin Leidwanger and Duncan S. Howitt-Marshall
- 23 *A Reconnaissance Shipwreck Inventory on the Yukon River*  
John Pollack and Robyn Woodward
- 25 *The Cairo Dahshur Boats Project: Update*  
Pearce Paul Creasman
- 27 Letter from the President
- 28 News and Notes

## MEMBERSHIP

Institute of Nautical Archaeology  
P.O. Drawer HG  
College Station, TX 77841-5137

Learn firsthand about the latest discoveries in nautical archaeology. Members receive the *INA Quarterly* and other benefits.

Student / Retiree.....	\$ 25
Institutional.....	\$ 100
Diver.....	\$40
Seafarer.....	\$75
Surveyor.....	\$150
Restorer.....	\$500
Curator.....	\$1,000
Excavator.....	\$2,500
Navigator.....	\$5,000

Checks, in U.S. currency, should be made payable to INA.

**On the cover:** *Nau* from "Livro de Livarte de Abreu" (mid-16<sup>th</sup> century).

ISSN 1090-2635

© June 2006 by the Institute of Nautical Archaeology. All rights reserved.

INA welcomes requests to reprint *INA Quarterly* articles and illustrations. Articles for publication should be submitted in hard copy and on a CD-ROM or 3.25 diskette (Windows format acceptable) along with all graphics. Please address all requests and submissions to the Editor, *INA Quarterly*, P.O. Drawer HG, College Station, TX 77841-5137; tel. (979) 845-6694, fax (979) 847-9260, e-mail [inaeditor@tamu.edu](mailto:inaeditor@tamu.edu). The Web site for INA is <http://ina.tamu.edu>.

The Institute of Nautical Archaeology is a non-profit corporation whose mission is to continue the search for the history of civilization by fostering excellence in underwater archaeology. The opinions expressed in *INA Quarterly* articles are those of the authors, and do not necessarily reflect the views of the Institute.

# Continuing the Work: The Group for the Study of Iberian Seafaring

Filipe Castro

When I came to Texas A&M University in 1998, I had it in mind to write a master's thesis on the reconstruction of the hull of a Portuguese Indiaman recently excavated in Portugal, and then to go home.

Seven years later I am still here, now proudly as a part of the Nautical Archaeology Program faculty, and I am still studying the ships of the Iberian Peninsula. There is so much to uncover about these ugly and, reportedly, smelly vessels! Without decorations or other particular aesthetic arrangements these vessels were, nevertheless, symbols of power and commanded respect around the world. They carried a multitude of sailors, soldiers, merchants, priests, and adventurers around the seven seas; all this in an age when there were no means of communication and each one of these ships had to be an autonomous floating city for up to eight months at a time.

We do not know much about the way these ships were conceived, designed, built, sailed, or inhabited. We do not know much about their performance. Nor do we know much about these ships as sailing machines, war vessels, living spaces, or conveyors of peoples' ambitions, dreams, and ideas.

The task of understanding such a diverse number of ships and boats, all solutions for particular problems at a particular time, is daunting. It cannot be tackled by any scholar alone; not in one life time. That is why I have organized an informal group dedicated to the study of Iberian seafaring primarily in the 16<sup>th</sup> and 17<sup>th</sup> centuries. The student response was great. Their enthusiasm was contagious, their competence outstanding, and their focus reassuring for any coordinator of such a group.

We setup weekly meetings to define strategies and list needs, in terms of research—for instance, bibliographical reviews of each subject—and in terms of resources: how much research we must do, where, for how long, and at what cost. My second ongoing effort was to identify professional niches for these students, keeping in mind that they were going to graduate and would need to get jobs, and would hopefully continue their research in this and related subjects.

Last year I thought that it was time to make sense of all this work and organize a symposium at the 2006 Society for Historical Archaeology Annual Meeting—which was held in Sacramento, California, from the 11<sup>th</sup> to the 15<sup>th</sup> of January—where all of these students could present their research and discuss it with their peers.

The symposium was approved and, even better, I received an offer to publish the proceedings from Dr. Rui Loureiro, on behalf of the municipality of Lagos. Dr. Loureiro is a Portuguese historian that, among many other things, is coordinating an incredible project in Lagos—the city where Henry the Navigator lived and worked—to study and divulge the Portuguese discoveries. He is starting a project to assess and inventory the city's nautical and underwater cultural heritage, in which the Institute of Nautical Archaeology and the Nautical Archaeology Program will play an important role.

The Society for Historical Archaeology meeting's theme this year was "Life on the Edge", and Dr. Jerome Hall, former INA president and Underwater Program Chair of this SHA's annual meeting, suggested that our symposium be called "The Edge of Empire: Iberian Ships" (Fig. 1).

This event was fully funded with two grants, one from the Luso-American Foundation and another from Dr. Peter Amaral, which allowed all students to present their research, meet people, network, and get acquainted with their



Fig. 1 *The Team at SHA.* From left to right: Carlos Monròy, Pearce Creasman, Blanca Rodriguez, Alez Hazlett, George Schwarz, Tiago Fraga, Filipe Castro, Brad Coombes, Katie Custer, Erika Laanela.  
Not pictured: Gustavo Garcia.

peer's ongoing research. In fact, these meetings offer invaluable opportunities for students to present their research, gather comments and opinions about it, network, make friendships, combine summer projects, exchange ideas, discuss practices, and, not less importantly, gossip about their universities' politics and their teachers and advisors.

Our presentations were scheduled for Friday morning, leaving the students free for the Friday afternoon and Saturday sessions and, as I learned in shock, to party hard in the traditional Friday evening Annual Banquet and Awards Ceremony!

When I was asked to change the time of the symposium at the SHA 2006 Annual Meeting, in order to accommodate a few urgent last minute schedule changes, I felt a little bit guilty about ruining my students' deserved party schedule. I was also told that very few of our colleagues would be brave enough to try to attend any symposium on the Saturday morning after the great SHA reception. I knew that all those interested in Iberian Ships would come, and I promptly agreed with the change in the schedule. I was not wrong.

The symposium started right on time and all Texas A&M University students presented their research with impeccable professionalism, keeping an exciting rhythm and faultless timing. I could not be prouder, or happier. It was an enormous pleasure to see how much work these students have done, how focused they are in their research, and how fast they are moving towards completion.

I must say that this is not the first time that students at Texas A&M University have worked on Iberian seafaring! Almost 30 years ago Robin Piercy started the excavation of a late 17<sup>th</sup>-century Portuguese frigate at Mombassa, the *Santo António de Tana*, lost in 1697 (Fig. 2).

Then, in the early 1980s, a group of students of the Nautical Archaeology Program started a number of projects related to Iberian ships (Fig. 3). In



Fig. 2. Robin Piercy during the excavation of the Mombassa Shipwreck. Photo: INA Archives

1986 they formalized their joint work in a project named EXPLADISC—an acronym for Exploration and Discovery—and developed a series of coherent projects aiming at the study of the technology of the 15<sup>th</sup> and 16<sup>th</sup> centuries that led the Europeans into the New World (see the INA Newsletter 13.1).

The many projects carried out by this group included surveying St. Anne's Bay in Jamaica and the mouth of Belén River, in Panama, in search of Columbus ships; excavating two early 16<sup>th</sup>-century shipwrecks—the Highborn Cay Shipwreck, in the Bahamas, and the Molasses Reef Shipwreck, in the Turks and Caicos Islands; and surveying a number of other shipwrecks in the Caribbean Sea.

The quantity and quality of the information gathered, organized, and produced by the first Nautical Archaeology Program group of students, in the 1980s, has been the basis for all the research carried out now by this second group of students twenty years later, and I know that their work will also be the basis of other students to come, always improving our knowledge of this amazing period of discoveries and its sailing ships.

*focastro@tamu.edu*



Fig. 3. The Exploration and Discovery group. From left to right: Donald H. Keith, Denise Lakey, Joe Simmons, Mark Meyers, Bill Lamb, Roni Polk, Harding Polk, Tom Oertling, Roger C. Smith, and KC Smith. Photo: KC Smith

# “The Edge of Empire: Iberian Ships”

## A Symposium at the Society for Historical Archaeology 2006 Annual Meeting

Pearce Paul Creasman

At precisely 8:00 am on January 15, a Saturday no-less, something great happened at the 39<sup>th</sup>-annual meeting of the Society of Historical Archaeology in Sacramento, California. A team of 11 current and former students of the Nautical Archaeology Program (NAP) from Texas A&M University together with a student and professor of the Portuguese Instituto Superior Técnico, commenced one of the best attended sessions of the five-day long conference. “The Edge of Empire: Iberian Ships” was co-organized by the nautical program’s own assistant professor Dr. Filipe Castro and myself. In his usual animated and enthusiastic manner Dr. Castro introduced the symposium and enticed an audience of nearly 60. He continued for five minutes before yielding to the visible signs of anticipation in the crowd.

During his brief introduction Dr. Castro noted that while positioned at the intersection of the Mediterranean, North Atlantic and Baltic maritime worlds, the Iberian Peninsula developed a rich and diverse collection of watercraft, each suited for its intended purpose. The design of each resulting from the natural resources available, the existing trade network in what pertained to imports of ship-building materials, and the foreign influences of the cultures to which its people was in contact at any particular time. This symposium is a contribution to our understanding of the seafaring of this region, which launched the European maritime expansion of the 15<sup>th</sup> and 16<sup>th</sup> centuries.

Dr. Castro revealed that the study of the Iberian expansion, beginning in the 15<sup>th</sup> and 16<sup>th</sup> centuries, has been the subject of thousands of books (currently including two

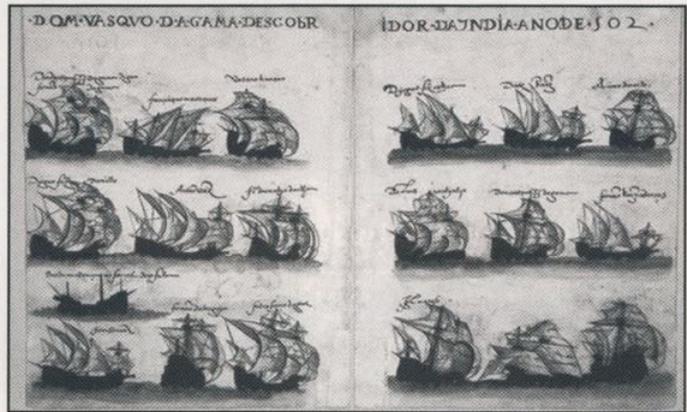


Fig. 2. Vasco da Gama’s fleet of armed caravels from a trip to India in 1502 from the mid-16<sup>th</sup> century “Livro de Lisuarte de Abreu.”

of his own, with a third on the way). However, the finer details of their ships are almost completely unknown to us (Fig. 1). There are no complete written descriptions of these vessels, the iconographical evidence is scarce, and not always reliable, and most of the archaeological evidence has been systematically destroyed since the 1950s by the treasure hunting industry.

The team from the J. Richard Steffy Ship Reconstruction Laboratory (ShipLab), in the Nautical Archaeology Program, in cooperation with the Secção Autónoma de Engenharia Naval (SAEN) of Lisbon’s Instituto Superior Técnico, is trying to build a comprehensive image of these ships, specifically the way they evolved in time, and the environment in which they were designed and built. With a number of thesis and dissertations currently in progress, and even a few completed, primarily under Dr. Castro’s guidance, a strong research group was built. This group wanted to present the collective project in a panel or special session at the 2006 meeting of the Society for Historical Archaeology. Thus, following the theme of this year’s SHA conference “Life on the Edge,” the symposium “the Edge of Empire: Iberian Ships” began.

At 8:05 George Schwarz, a master’s student in the NAP, began his presentation titled “Portuguese Caravels - What about Them?” This communication summarized his

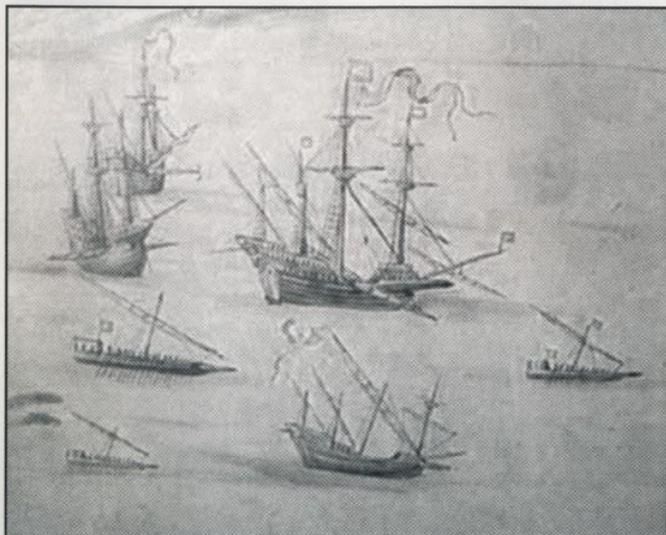


Fig. 1. Some general ship types that can be seen here include the nau, galé, galeão, fusta, and Caravela de Armada, in an early 16<sup>th</sup>-century illustration from the “Roteiro de D. João de Castro.”

research, which is directed at obtaining a comprehensive view of the caravel, one of the primary Iberian ships of discovery (Fig. 2). Early in his talk George stated that currently, there are no known extant remains of this type of vessel and the information that does exist in scholarly texts touches only briefly on the structural characteristics and shipbuilding methods used in their construction. For this reason, he encouraged researchers to look to secondary sources, including historical references, similarly built ships from the archaeo-

logical record, iconographic representations, ancient shipbuilding treatises, and ethnographic parallels to comparable boatbuilding techniques of today. By examining these various lines of evidence, scholars of Iberian seafaring are able to better understand many features of this exploratory vessel. This data, otherwise scattered and disorganized, can be analyzed and evaluated to ultimately create a more complete and accurate description of the famed caravel.

At 8:23 Katie Custer, a recent master's recipient and new PhD. student in the NAP, stepped up to the lectern to share her doctoral research titled "Portuguese Ship Iconography in the 16<sup>th</sup>-Century." She told how the Age of Discovery was widely known for the voyages of exploration by Spain and Portugal that forever changed world history. The ships known as caravels and naus were the main technological impetus of these voyages, and are largely studied as they appear in historical documents. However, little is known about them beyond the purported ideal sailing attributes as described by explorers and sailors. Keep in mind that in most cases these explorers and sailors were seldom the ones who built and designed the vessels which they wrote about. The description from an emic perspective is problematic as the finer details are often left out. Katie then noted that her doctoral research into the iconographic evidence of caravels and naus starts where the writ-

ten record leaves off (Figs. 3 and 4). This new research examines the pictorial record of these ships and intends to introduce information regarding ship construction and rigging details.

When Alex Hazlett took the stage, at 8:41, the symposium was nearly caught up, at one minute off the intended schedule. Also the topic of his doctoral research Alex offered the audience a refreshing new perspective in Iberian nautical studies titled "The Nau of the *Livro Náutico* - Construction Sequence of a Portuguese Indiaman from the late 16<sup>th</sup>-Century." Alex's introduction revealed that documents and illustrations show that the premier ship in Portugal's India trade

during the 16<sup>th</sup>-century was the nau, a beamy, three-masted ship, that both the Mediterranean and northern seafarers called a carrack. For decades these vessels carried passengers and cargo between Portugal and Asia. Despite the number of vessels involved, relatively little archaeological evidence of these ships exists.

The *Livro Náutico* is a collection of manuscripts from the late 16<sup>th</sup>-century, presently located in the Biblioteca Nacional in Lisbon. It contains much important data pertaining to the organization of the part of the Spanish Armada of 1588 that was fitted in Lisbon, and several lists of all the timbers needed for the construction of vessels. Of these manuscripts, one

pertains to the building of a 500 ton India nau. This list is available through a transcription published in the late 19<sup>th</sup>-century by Henrique Lopes de Mendonça.

Alex informed the audience that while 16<sup>th</sup>-century



Fig. 3. Portuguese iconographic evidence in paintings  
Image: National Maritime Museum, Greenwich



Fig. 4. Sculpture and engraving is also a valuable source for iconography. Photo: K. Custer, courtesy of Museu da Cidade.

shipbuilding documents predate the development of ships plans, they include theoretical treatises and detailed scantling lists, known as *Regimentos*. It is possible to reconstitute the construction of a nau timber by timber (Fig. 5), using the mathematical relations and formulas used by the Portuguese shipwrights in conjunction with the timber specifications from one of the *Regimentos*. Some iconography and early 17<sup>th</sup>-century documents include lines and images which may be used to check the reconstruction being developed in this dissertation (Fig. 6).

Promptly at 9:00 Blanca Rodriguez, a master's student in the NAP, presented "The Spanish Navy and the Ordenanzas of 1607, 1613 and 1618." She explained that during the first two decades of the 17<sup>th</sup>-century king Felipe III (1598-1621) of Spain and Portugal launched an effort to standardize all shipbuilding in the Iberian Peninsula. Triggered by the necessities of the formation of a modern state and mandated by the demands of the crown's extensive empire, these efforts of standardization constituted an important collection of information about the shipbuilding practices of that period (Figure 7). Blanca's paper analyzed the content of the three sets of laws, issued in 1607, 1613 and 1618, in the context of the history of seafaring in the early 17<sup>th</sup>-century Iberian Peninsula.

Erika Laanela, a master's student in the NAP, began the presentation of her thesis research, "A Reconstruction of a 16<sup>th</sup>-Century Spanish Nau based on the Palacio Treatise," on time at 9:20 am (figure 8). Often cited as the earliest printed treatise on ship construction, *Instrucción nautica para navegar* was published by Diego García de Palacio in Mexico in 1587, reflected the importance of seafaring for Spain's colonies. The didactic style and an early nautical glossary suggest the document was intended for non-specialists. The text describes navigational techniques, ship proportions, rigging, stores, crew, and naval tactics. Woodcuts depict the dimensions of two ships in an early attempt to illustrate a complex empirical system of hull design. Erika's research presented reconstructions of the ves-

Fig. 7. An image from the treatise of the "Instrucción nautica" of Diego Garcia de Palacio that can be used to calculate tonnage.

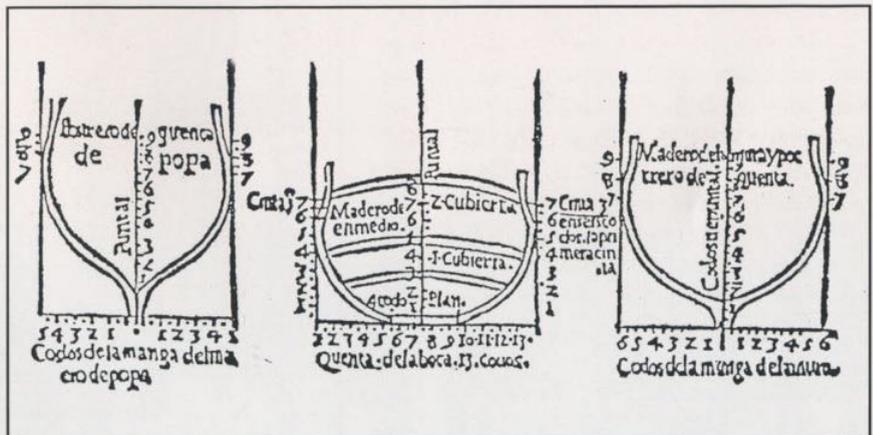


Fig. 6. Framing and planking portions on the port side. Image: A. Hazlett

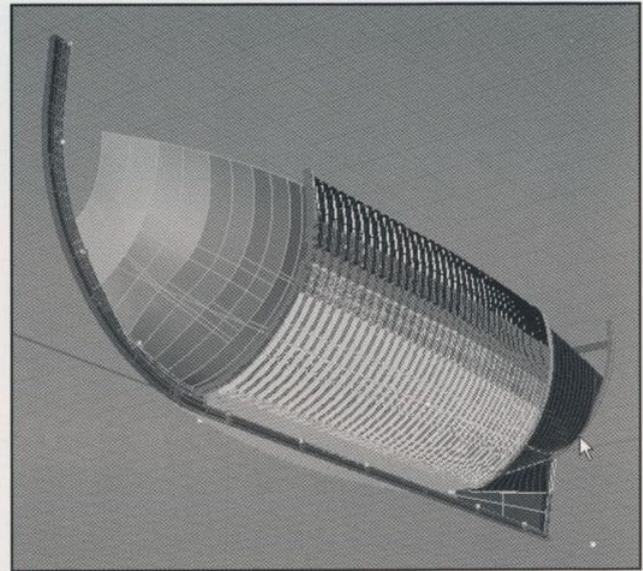


Fig. 5. An early step in reconstruction based on the late 16<sup>th</sup> century manuscript known as "Livro Náutico" and the 1616 treatise "Livro de traças de carpintaria" by Manoel Fernandez. Image: A. Hazlett

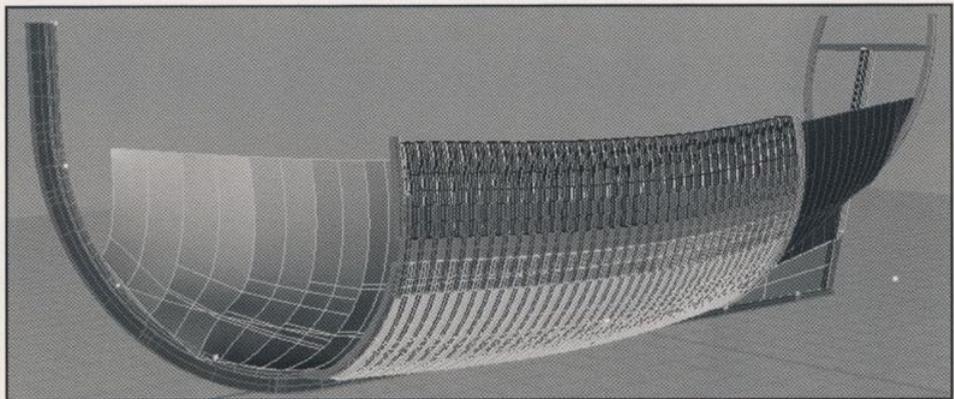




Fig. 8. Title-page of Palacio's 1587 treatise.



Fig. 9. Floor timbers and futtocks from the Pepper Wreck. Photo: Francisco Alves, CNANS Archive

ever-present fictional character Forrest Gump. Somehow, both seemed to find themselves in the middle of seemingly innumerable pivotal moments of history in their time.

Fortunately, it was Dr. Castro who followed Erika at 9:40 and he kept the air exciting. "Sailing an early 17<sup>th</sup>-Century Portuguese Indiaman," a paper presented by Dr. Castro, which was co-authored by Dr. Nuno Fonseca and Ph.D. student Tiago Santos, the latter both from Lisbon's Instituto Superior Técnico. The paper focused on a wreck discovered in 1993 at the mouth of the Tagus River, the "SJB2 shipwreck" (or Pepper Wreck) and was tentatively identified as the Portuguese Indiaman *Nossa Senhora dos Mártires* (Fig. 9). The Pepper Wreck was lost on its return voyage from Cochin, in India, on September 14, 1606, with as the name suggests, a full load of pepper corns, among other items. Its archaeological excavation led to a tentative reconstruction of the hull, based on contemporary shipbuilding texts. Further analysis of these texts allowed a reconstruction of the rigging that will be the basis for experimental tests to evaluate the intact floatability, stability, and sailing capabilities of an Indiaman (Figure 10). The tests will be carried out in Lisbon's Instituto Superior Técnico, in the Section of Naval Engineering (SAEN).

At 10:00 we remained in the 17<sup>th</sup>-

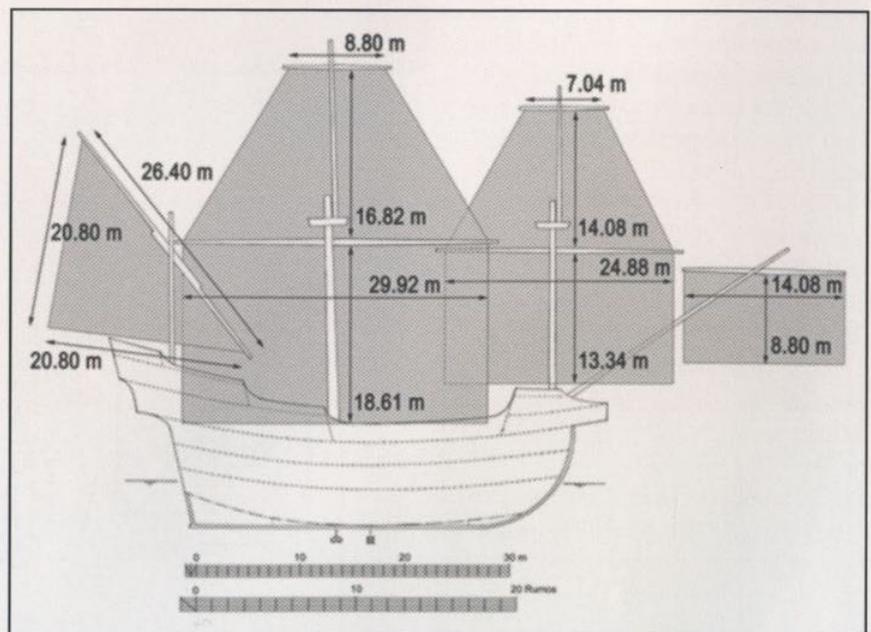


Fig. 10. Proposed rigging of the Pepper Wreck. Image: F. Castro

century when Tiago Fraga, a master's student in the NAP, presented his work on another type of ship titled, "Reconstructing a 17<sup>th</sup>-Century Portuguese Frigate: the Mombassa Wreck." He told the audience how the *Santo Antonio de Tanná*, a 17<sup>th</sup>-century Portuguese frigate (Fig. 11), is the perfect example of how collaboration between terrestrial archaeology, history and nautical archaeology can produce results to answer several questions on the history of Portuguese seafaring. The frigate was lost in October, 20, 1697 in Mombassa, which is today's Kenya. The Mombassa Wreck was partially excavated by the INA in the late 1970s and early 1980s. Tiago's research expanded on the *Santo Antonio de Tanná* story, and presented the ship's hull reconstruction. Like Alex Hazlett's presentation, this one was strong in the use of digital programs to develop as complete of an understanding of the vessel's construction as possible (Fig. 12).

Following Tiago, at 10:20, was Brad Coombes' "Spanish Shipbuilding in the 18<sup>th</sup>-Century: The Album of the Marques de la Victoria." The translation and understanding of 'the Album' in its historical context is a portion of Brad's NAP dissertation. He explained how the "Century of Light" or the Enlightenment began in Spain with the death of the last of the Habsburg ruler Carlos II, and the ascension of Phillip V and the Bourbon line. Phillip's rise to power triggered the War of Spanish Succession, the first of several wars fought by Spain during the

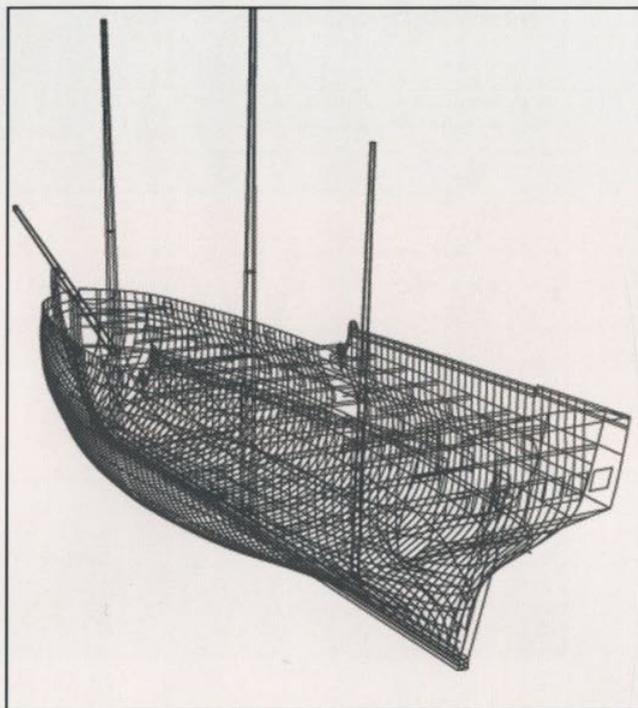
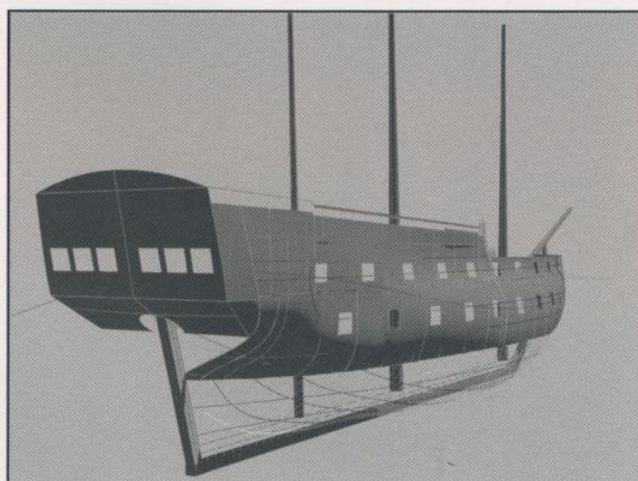


Fig. 11. *Digital lines for "Santo Antonio de Tanná."* Image: T. Fraga, with support from the Calouste Gulbenkian Foundation and the Luso-American Foundation

Fig. 12. *Partially planked starboard of "Santo Antonio de Tanná."* Image: T. Fraga, with support from the Calouste Gulbenkian Foundation and the Luso-American Foundation



18<sup>th</sup>-century to solidify the Bourbon line and maintain the Empire's vast holdings around the world.

The rule of the Habsburgs had reduced Spain's once dominant navy to a shadow of its former glory but the need to protect the Spanish trade routes to the New World and the East Indies, along with the progressive leadership of the Bourbon kings, marked a new era of naval construction theory and technology. Driven by the philosophy of mercantilism the Bourbon line encouraged the creation and assimilation of new and progressive naval architectural designs. Numerous theorists, mariners and ship-builders were the foundation for the resurgence of Spain's naval power.

Tinajero de la Escalera became Spain's first highly qualified naval administrator. Admiral Antonio Gaztañeta y de Iturrizbalagan, an administrator and naval architect would also shape Spain's new navy over the next fifty years. These men and the Bourbon kings laid the foundation for the emergence of Juan Jose Navarro de Viana y Bufalo, El Marques de la Victoria. Brad's presentation centered on the Marques' masterwork, a treatise that took 37 years to complete and illustrated the growth of the Spanish navy (Fig. 13).

At 10:40 it was my turn to take the helm. As a recent master's recipient in the NAP, my presentation "Forest and Ships in the Iberian Peninsula during the Age of Discovery," was both the introduction of my doc-

Fig. 13. A page from the Album, indicative of the detail contained throughout. Image:: following Leaf number 26 in "Álbum del marqués de la Victoria"



toral research and a case-study in Iberian naval resource management—focusing primarily on wood. As was explained in many of the previous presentations, the 15<sup>th</sup> and 16<sup>th</sup>-centuries were crucial to the economic, political and social development of the world, in large part due to exploration and expansion from the Iberian Peninsula. The primary vessels of the expansion were ships. Without the resources to build and maintain the naus, caravels, and other ships discussed during the symposium the world would certainly have developed differently, perhaps drastically. This presentation explored the methods that were employed in the Iberian Peninsula to manage, exploit and process the forests- the most valuable resource during the Age of Expansion (Fig. 14).

It is important to have similarly shaped timbers comprise the structural elements on the port and starboard sides of a ship to ensure its stability, speed, and general success at sea. However, much of the Iberian Peninsula was, and still is, comprised of a large plateau and other regions suitable for minor agricultural development. The traditional forested areas were primarily located on or near the coastal regions. Early in Iberian shipbuilding history this would have been very convenient as the population was also clustered by the water. Consequentially, these resources were explored the methods which Iberian residents used to protect their wood stores and how the methods are revealed in shipwreck timbers. Methods employed included pruning, re-planting, using non-ideal woods, and even adaptation of ship construction technique to make use of the smaller timbers that were becoming increasingly common.

Gustavo Garcia followed with another prompt start, at 11:00, and presented the results of his recently granted master's from the NAP, "Maritime Astrolabes." Traveling back another century from the previous presentation Portuguese seafarers during the 1400s began to depart from the traditional navigation technique known as dead reckoning to

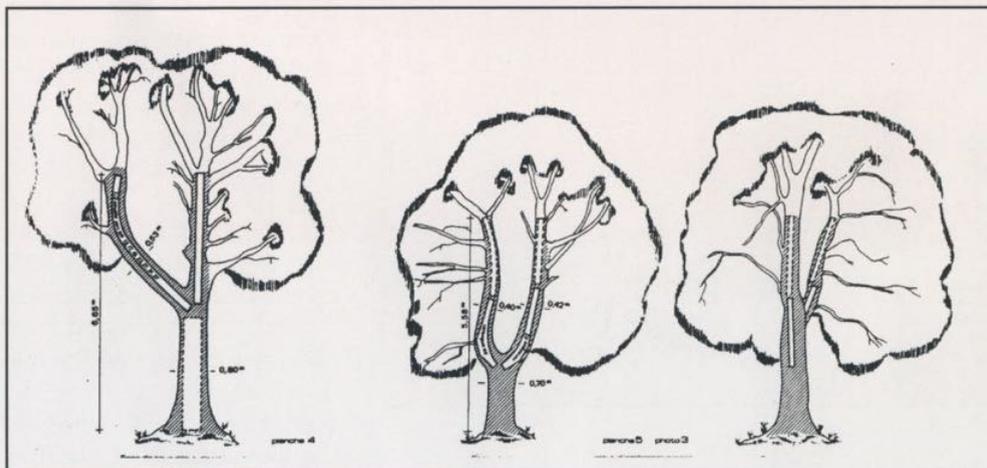


Fig. 14. A shipwright's concept of trees. Image: M. Rival's "La Charpenterie Navale Romaine," plate 109

adopt new systems more suited for their increasingly far reaching explorations along the west-African coast. At stake was the Portuguese crown's desire of finding the much coveted route to India by sailing along Africa's south coast. For decades, the genius of the Portuguese court was devoted to finding solutions to the problems confronting the navigators in their attempts to attain this goal.

The most valuable achievement resulting from this effort was a new method of navigation that consisted of measuring the angle of certain heavenly bodies above the horizon in order to determine the latitude of the observer with reasonable precision. For this purpose some instruments that traditionally belonged to the field of astronomy were adopted and adapted to be used by seamen. Among them was the astrolabe, which became the most popular nautical navigation tool by the turn of the sixteenth century (Fig. 15).

Gustavo's research built on a tradition of research regarding the mariner's astrolabe that began in Portugal in the early twentieth century. This was not a work about ships, but about the instruments and methods used by their pilots in their attempt to, sometimes more successfully than others, navigate safely and efficiently across the oceans.

The most important and exciting part of Gustavo's thesis is the catalog of astrolabes that he managed to assemble. Astrolabes are rare and precious artifacts. Partly

recovered by treasure hunters, most of the information on these precious instruments is scanty and unreliable. A small list of 21 astrolabes - all the astrolabes known to exist in the

world - was published in 1966 in Portugal. By 1987 there were 65 astrolabes in the world. Today there are perhaps as many as 85 and Gustavo has catalogued 16 new astrolabes that are not on the 1987 list.

The final presenter of the symposium was Carlos Monroy, a doctoral student in computer sciences at Texas A&M, advised by Dr. Richard Furuta, director of the Center for the Study of Digital Libraries. Carlos began on schedule at 11:20 with the "Design of a Computer based Frame to Store, Manage and Divulge Information from Underwater Archaeological Excavations: the Pepper Wreck Case." In the three hours leading up to his talk Carlos, the lone non-archaeologist among the symposium presenters, had some time to think and his product was an impromptu infomercial that sent the audience, still around 60 people, into rolling laughter.

A few moments later, Carlos began with the substance of his presentation and stated that as new scientific tools are developed to analyze archaeological data and new research questions are asked about past civilizations, the information collected in archaeological excavations, sometimes many decades ago, becomes increasingly relevant. Many archaeological excavations were never published and

much of the data collected during decades of fieldwork have been

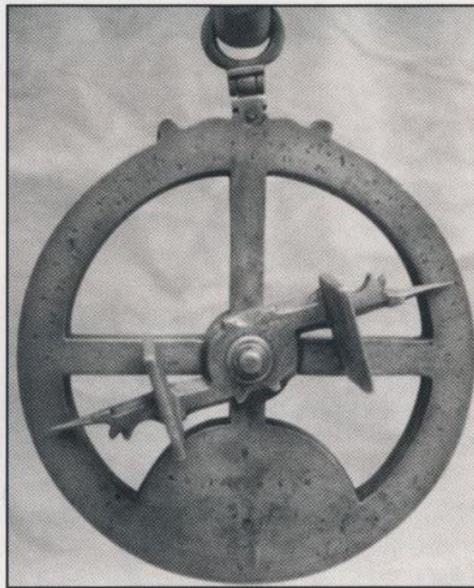
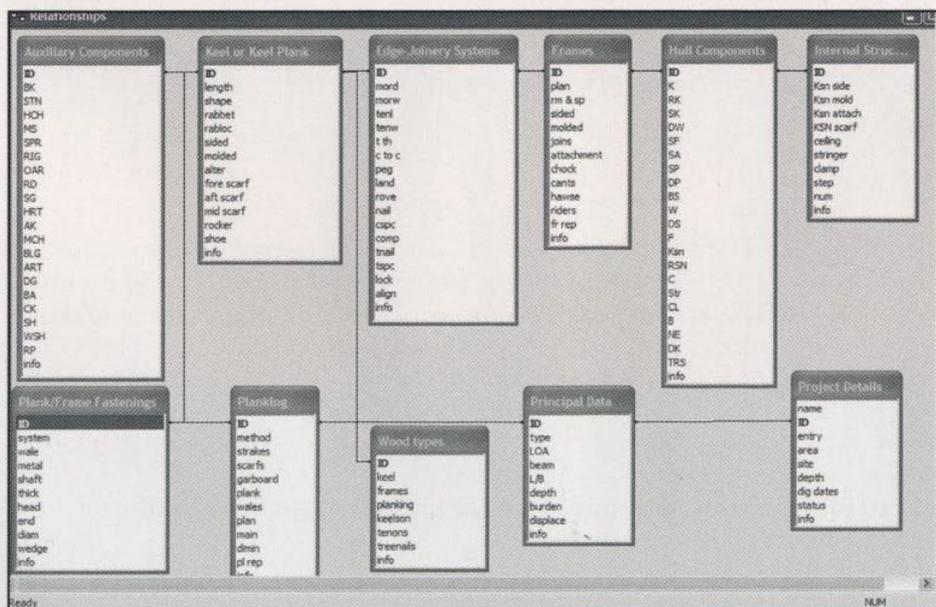


Fig. 15. *São Julião da Barra III astrolabe.*  
Photo: Pedro Gonçalves, CNANS Archive

Fig. 16. Preliminary design of one the tools of the Nautical Archaeology Digital Library: J. Richard Steffy anatomy of the ship, from his ship database. Image: C. Monroy



lost forever or were partially lost, the context of the whole information being damaged forever.

Under the guidance of Dr. Castro and Dr. Richard Furuta, professor of computer science, Carlos presented the primary objectives of developing a new framework for the "Nautical Archaeology Digital Library" (Figure 16). Five primary goals were made clear throughout the presentation, including efficiently cataloging, storage, and management of artifacts and ship remains along with its associated data produced by an underwater archeological excavation; integrating heterogeneous data sources from different media to facilitate nautical archeology research work; managing ancient shipbuilding treatises to help in the study and reconstruction of sunken ships; developing visualization tools to help researchers manipulate, observe, study, and analyze artifacts and ship remains and their relationships; and making all such findings and information acquired available over the internet to other scholars and to the general public. Given the invaluable source of information - raw and processed - generated by this proposed framework the audience responded with eager hopes that this project will be in working order as soon as possible.

After a rousing round of applause for the whole group of presenters the symposium was treated to two discussants with rich histories in the study of Iberian seafaring: Dr. Roger C. Smith, one of the original NAP students, and Dr. Brad Loewen, professor of archaeology at the Université de Montréal, Canada. Each spent approximately 20 minutes adding to the presentations. Both were flattering in their praise of the research and constructive in their criticisms, with a little humor, keeping with the light tone of the symposium. Their contributions will strengthen the research presented and helped the symposium go out with a bang (Fig. 17). A simple "thank you" here is certainly inadequate for the contributions made Dr. Smith and Dr. Loewen, but will hopefully suffice until the presentations and research are published.

Another treat for the presenters was the attendance of Dr. George F. Bass for much of the symposium. We are grateful that Dr. Bass stayed as long as he could, up to the last minute prior to being able to catch his departure flight. Earlier in the conference Dr. Bass engaged an audience of several hundred at the premier symposium with an account of the decades of work the INA has conducted, specifically regarding Bronze Age shipwrecks.

*p.creasman@tamu.edu*

*Acknowledgements:* In the name of the whole team, we would like to thank the generous sponsors of this symposium, the Luso-American Foundation and Dr. Peter Amaral, without whom it would have been impossible to organize such an impressive meeting. Not only we were able to present our research to one of the largest audiences in North-American Historical Archaeology, the attendance of the SHA 2006 was around 950 people, but we took the opportunity to meet people, get acquainted with their work, discuss professional goals and ongoing research, and network.

For further information on the Group for the Study of Iberian Shipfaring see the website at:  
<http://nautarch.tamu.edu/shiplab/index-iberian.htm>



Fig. 17. *Another group who went out with a bang.*

# Episkopi Bay and Beyond: Recent Collaborative Fieldwork and New Prospects on Cyprus

Justin Leidwanger and Duncan S. Howitt-Marshall

Over three decades ago, the Institute of Nautical Archaeology had quite a different appearance, despite some familiar faces. The early 1970s saw the newly-founded American Institute of Nautical Archaeology establish headquarters for its Mediterranean operations on the island of Cyprus. The *Kyrenia* ship, recently excavated off the island's northern coast, was then still in the early stages of research by INA Founder Dr. Michael Katzev, while another INA Founder, Dr. George Bass, resided not far away outside the capital at Nicosia. Unfortunately, the outbreak of war with Turkey and the occupation of the island in 1974 changed the situation markedly. Dr. Katzev and his team, despite these difficult political circumstances, managed to press forward with the restoration and study of their seminal wreck. Their decades of ground-breaking work continue to contribute immensely across a variety of disciplines, and have led to such innovative approaches as the ongoing *Kyrenia II* experiments. However, the future of INA fieldwork, and eventually an extensive research facility, would soon reside in Turkey.

The first efforts of the Episkopi Bay Survey in 2003 marked the return of active underwater INA fieldwork to the island, which remains a hotbed of archaeology. Throughout the three field seasons now completed, the magnitude and scope of INA's surveys have gradually expanded. The arrival of RPM Nautical Foundation in late July brought remote sensing from their research vessel *Hercules*, an exciting new technological aspect of the sur-

vey.

Joining in these efforts is the newly established Cyprus Foundation for the Protection of Underwater Cultural Heritage (THETIS). Based in Limassol, this non-profit organization is dedicated to fostering awareness and dialogue within the community regarding preservation of the Cyprus' submerged maritime heritage. Through the generous support of the THETIS Foundation, the 2005 INA survey was able to draw together an international team of archaeologists and students from the United States, the United Kingdom, Ireland, Canada, and Australia.

The summer of 2005 also inaugurated new collaboration with the Cyprus Underwater Project under the direction of Duncan S. Howitt-Marshall and the aegis of the University of Southampton's Centre for Maritime Archaeology. This project, also sponsored by the THETIS Foundation, has achieved significant success since 2002 off the west and southwest coasts.

The results discussed below are the first fruits of collaboration among these partners.

## The 2005 Episkopi Bay Survey Season

### *Avdimou Bay*

The team resumed brief investigations of a Late Roman shipwreck in the shallow waters of Avdimou Bay west of Kourion (Figs. 1 and 2). General scatters of pottery lay onshore, especially on the western headland, where

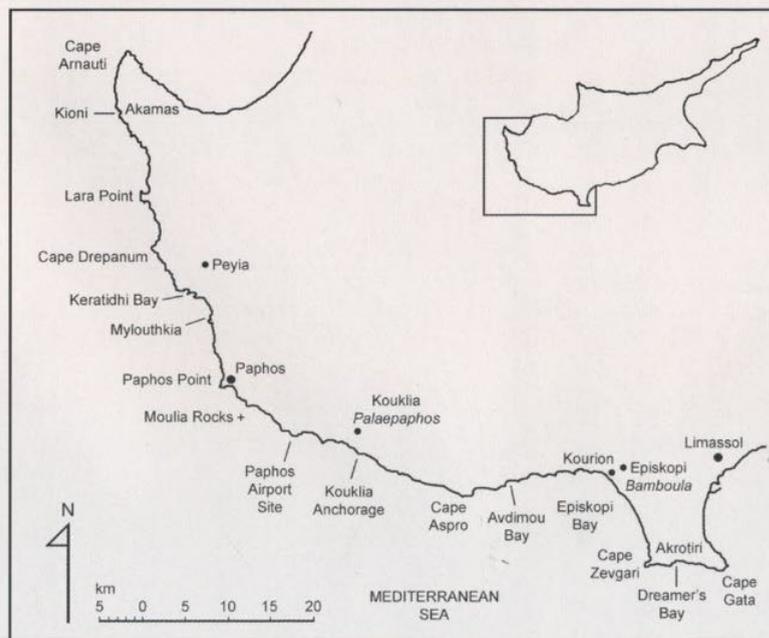


Fig. 1. Map of southwest Cyprus showing locations of work. Map: J. Leidwanger



Fig. 2. Aerial view of Avdimou Bay from west. Photo: J. Leidwanger.

*Vounari tou Kambiou*, the corresponding site onshore, clearly indicate a strong Roman presence here with hints of occupation at least a half-millennium earlier (the Late Classical or Early Hellenistic era). J.R. Leonard and S. Demesticha have probably rightly linked this unnamed site with the mysterious “Kourias” mentioned by the Augustan geographer Strabo (Leonard and Demesticha 2004).

Since the site of *Vounari tou Kambiou* is unexcavated, it is difficult to judge its size and character. A number of what appear to be storage galleries can be found on the headland to the west, while cemeteries and foundations for additional structures span the cliffs here and to the north. There can be little doubt, however, that the port town maintained contacts by sea with other coasts along the island and beyond. The brief effort in 2004 had already revealed an assemblage of eight stone anchors in approximately 10 meters of water, along with several concentrations of Early Byzantine transport amphoras and roof tiles which leave little doubt as to the most intense period of maritime commerce.

This past summer, the team initiated mapping at an intriguing stone construction in the northwest sector of the bay. Though in places 1 meter or more of vegetation obscured the structure, it is certainly the wall of an ancient

amphora fragments perhaps mark the site of some past commercial activity. Two stone anchors were added to the nine recorded in 2004, as sands shifted by winter storms variously reveal and conceal details of a seabed that may still have additional anchors lying undetected.

A brief follow-up survey of the wreck assemblage near the center of the inlet yielded several new subtypes of Gaza amphoras from Palestine, confirming the previously suggested date in the 5th or 6th century AD. The keen eyes of former Nautical Archaeology Program student Toby Jones noticed that three overgrown rocks were actually partial ancient millstones (Fig. 3). Of course, these simple devices changed little over time. The compound round and conical type recorded here (*meta*) was in use on animal-powered grain mills from at least the early Hellenistic era into late antiquity. If they are contemporary and form part of the assemblage in which they are mixed, they presumably served as ballast or supplemented the primary cargo of wine. A detailed report on this wreck is forthcoming in *Enalia*, the journal of the Hellenic Institute of Marine Archaeology (see Leidwanger forthcoming).

#### *Dreamer’s Bay*

For the majority of two weeks, the team was able to concentrate efforts on Dreamer’s Bay, a small south-facing inlet on the southern coast of the Akrotiri Peninsula (Figs. 1 and 4). A portion of the site was preliminarily surveyed during 2004, when visual inspection here yielded substantial amounts of late antique pottery. Surface sherds at Akrotiri-

Fig. 3. Millstone from Avdimou Bay. Photo: T. Jones

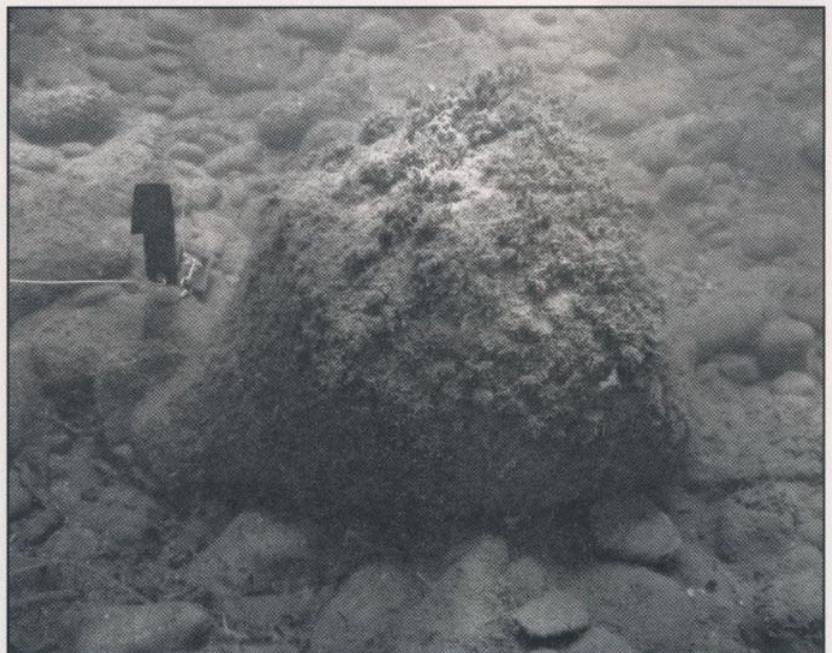


Fig. 4. Western part of Dreamer's Bay looking west. Photo: J. Leidwanger



harbor (Fig. 5). Its preserved length is over 140 meters, but the displacement of ashlar over the centuries has made the width difficult to gauge. Currently the mound reaches over 30 meters wide near its seaward end, confirming that the engineering endeavor was an ambitious one. A secondary mound just outside the northwestern terminus of the main wall may represent another feature of the port's quay. Among the other visible architectural elements are a single short pillar still protruding upright from within the wall (Fig. 6), and a second one lying toppled not far away.

More intensive work in the future should be carried out in the Dreamer's Bay area to determine the harbor's date and construction method, as well as its original dimensions. A closer look at the local geomorphology will also be vital to ascertaining the extent of change in the ancient coastline and thus the port's orientation. A subsidence of perhaps 2 meters over the past two millennia would move the ancient shoreline considerably east and create a more naturally protected shelter enhanced by this harbor engineering.

Episkopi Bay Remote Sensing

#### Episkopi Bay Remote Sensing

Following a successful endeavor by the Cyprus Underwater Project in the Paphos area during April (see below), a campaign of systematic remote sensing was undertaken in Episkopi Bay, the first effort of its kind along this southern stretch of the Cypriot coastline. The predominant winds from the west and south would have complicated any mariner's attempt to depart from ports at Kourion or Episkopi *Bamboula* (Fig. 1). Moreover, the seabed of sand and sediment here provides an excellent environment for the preservation and detection of the low mounds typically associated with ancient shipwrecks.



Thanks to the expertise of RPM Nautical Foundation, approximately 45

Fig. 5. Underwater construction at Dreamer's Bay. Photo: T. Nowak



Fig. 6. Standing pillar in the construction at Dreamer's Bay. Photo: T. Nowak

square kilometers of the seabed off Kourion and Akrotiri were surveyed with multibeam sonar. Two weeks' work with their R/V *Hercules* resulted in two sets of lengthy 12-kilometer lanes, one group running from Kourion to Cape Aspro in the west, and the second working from Kourion south to Cape Zevgari, at the southwest tip of the Akrotiri Peninsula. The *Hercules* crew recorded a total of 25 targets ranging from 29 to 92 meters deep. The 2006 season will therefore begin with dive surveys on a cluster of promising hits at depths up to approximately 40 meters. The remaining 14 targets lie beyond safe diving depths, and await inspection with an ROV.

### The CMA/INA Collaborative Project

#### *Background on the CMA Western Cyprus Underwater Project, 2002-Present*

The rich historical potential of the island's western coastline has naturally drawn the attention of a few important surveys in the past, notably Cathy Giangrande's 1983-1984 project with the London Underwater Research Group (Giangrande et al. 1987), and J.R. Leonard's Cyprus Coastal Survey (Leonard 1995a). Generally speaking, however, the scale of maritime archaeological endeavors here, like elsewhere on the island, has still been rather limited. Thus, in 2002, the Western Cyprus Underwater Project was conceived by a small group of graduate students from Southampton University's Centre for Maritime Archaeology (CMA). With funding from the Joan du Plat Taylor Award, courtesy of the Nautical Archaeology Society, and permission for non-intrusive survey from the Department

of Antiquities, the team embarked on a low-tech, diver-deployed expedition to explore six shallow water sites along a 10-kilometer stretch of coastline north of Paphos: Keratidhi Bay, two areas in the vicinity of Maniki Bay, two sites off Cape Drepanum, and South Lara Point (Fig. 1). Since 2002, 18 CMA student archaeologists have had the opportunity to hone an array of skills here, including underwater search and survey methods, position fixing, photography, and illustration.

Under the guidance of CMA Director Dr. Jon Adams, the team focused its 2002 season (three weeks in May-June) on re-assessing a limited stretch of coastline previously surveyed as part of Giangrande's 1983-1984 project (see Howitt-Marshall 2003). This first endeavor was crucial to establishing a primary research design that would endure through the project's successive seasons, namely incorporating the relationship between extant submerged and terrestrial archaeological records. For instance, in the case of Keratidhi, the direct correlation between two warehouses onshore and ceramic artifacts found in the adjacent bay was striking. Giangrande's local ethnographic research had discovered that the structures had been associated with the carob trade of the 19<sup>th</sup>-century. Ceramic material found submerged in the bay was largely consistent with the heavily glazed style of pottery typical of 19<sup>th</sup>-century. At Cape Drepanum, the association between the Hellenistic, Roman, and Early Byzantine settlements and extant material underwater was again salient, since here the team located only material conspicuously from these three periods, although without further analysis this is hard to substantiate.

Following this initial success, the CMA continued in 2004 its re-analysis of the changing coastal landscapes at Keratidhi and Maniki. It also incorporated a new area offshore from the Pre-Pottery Neolithic B site at Mylouthkia (Fig. 7), where the abundant terrestrial and submerged sites again synthesized a critical insight into the changing physical and human environment of the west coast of Cyprus (see Howitt-Marshall forthcoming).



Fig. 7. Queen's Bay (Mylouthkia) looking southwest. Photo: D.S. Howitt-Marshall

Foundation, incorporated an array of remote sensing not used for underwater archaeological investigation off Cyprus in over four decades. A four-member team from the UK's National Oceanography Centre, Southampton University CMA, and Cambridge University embarked on a two-week sidescan sonar survey of a 10-kilometer stretch of coastline south of Paphos harbor. Operating in depths from 50 to

A significant shift in the project dynamic in April 2005, made possible by generous funding from the THETIS

200 meters far offshore from Paphos to Zephyros Point, the team searched for potential wreck sites in an area known to have witnessed intense sea traffic (Fig. 8). At the treacherous Moulia Rocks, for instance, a previous diving survey of the famous "Cave of Amphoras," conducted by R. Hohlfelder and C. Brandon, recorded an abundance of pottery sherds littering the seabed around the Moulia Rocks (Hohlfelder 1995).

Coupled with that objective was a geophysical survey of the seabed in collaboration with the Cyprus Geological Survey. The dual-frequency sonar facilitated a high-resolution topography of the seabed, a vital base map for future geological and archaeological investigations aimed at neo-tectonics and paleo-coastal research. Additionally, surveying a site 2 nautical miles off Paphos yielded a significant metal scatter that may be the remains of the Turkish destroyer *TCS Koçetepe*, sunk during the 1974 invasion. At 65 to 90 meters of depth, however, the scatter was far beyond the range of the diving team, and thus the find was not groundtruthed.

In addition to this remote sensing and geophysical prospection, a joint CMA/INA team in 2005 conducted two diver-deployed surveys offshore Paphos International Airport and Kouklia *Palaepaphos* in collaboration with the THETIS Foundation.

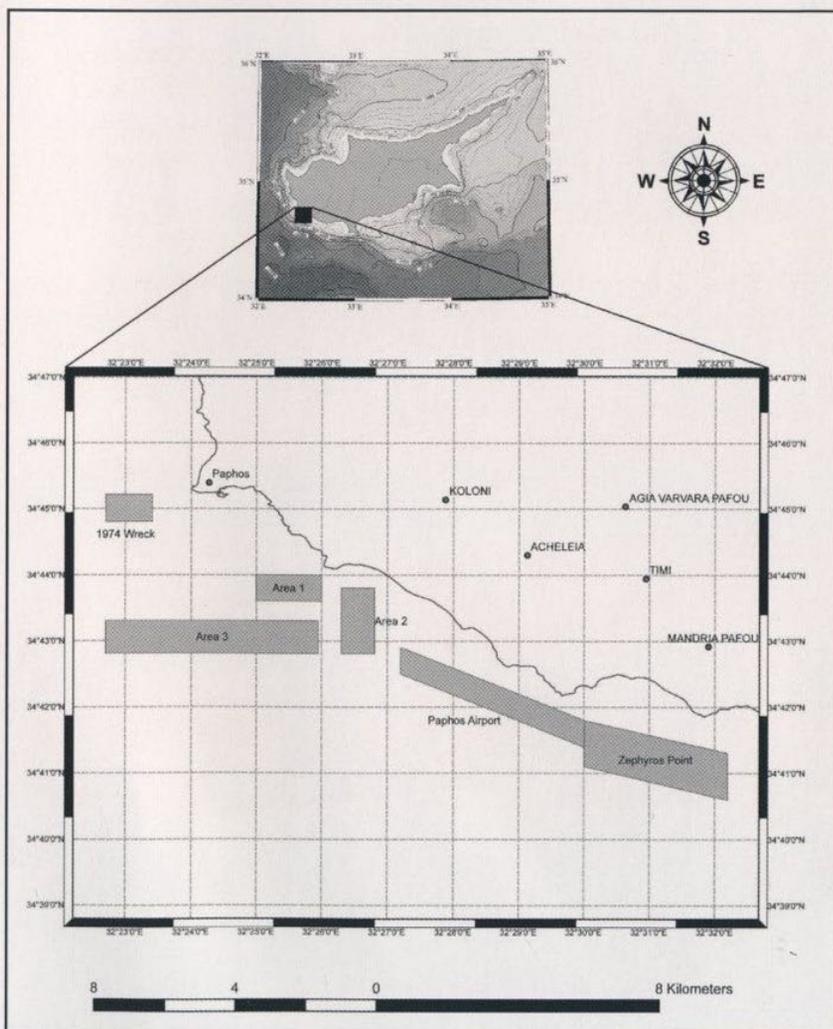
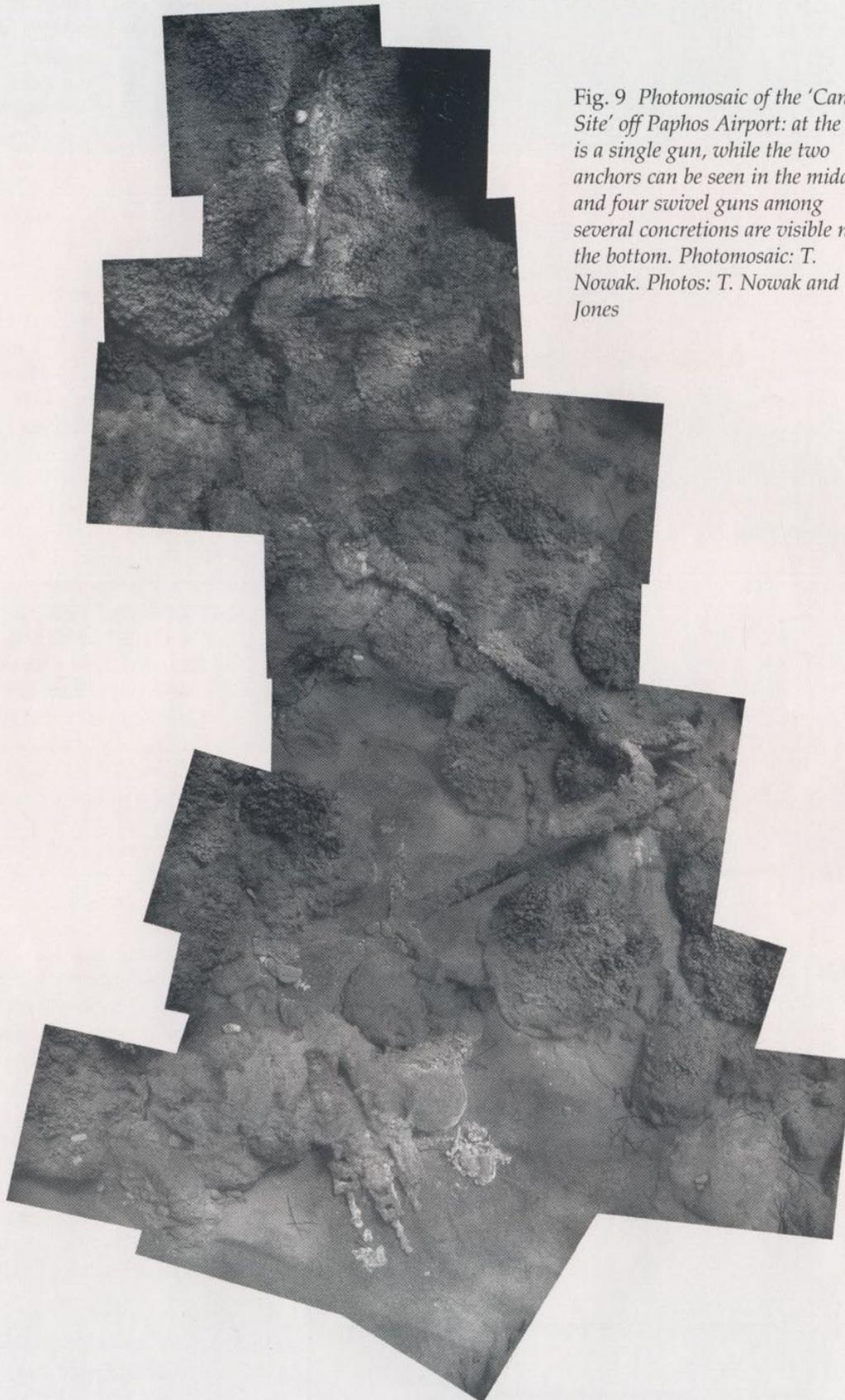


Fig. 8. Sidescan sonar search areas from the 2005 field season. Map: Fraser Sturt



*Fig. 9 Photomosaic of the 'Cannon Site' off Paphos Airport: at the top is a single gun, while the two anchors can be seen in the middle, and four swivel guns among several concretions are visible near the bottom. Photomosaic: T. Nowak. Photos: T. Nowak and T. Jones*



Fig. 10. Swivel guns from the Paphos Airport site, with breech block visible in front. Photo: T. Jones

#### *Paphos Airport – ‘Cannon Site’*

In early May 2005, Dr. Filios Sazeides showed to the THETIS Foundation two large anchors and a cannon offshore Paphos International Airport (Fig. 1). By late June, the joint CMA/INA team initiated non-destructive survey and local recording with a photomosaic. Located only about 200 meters offshore in 8 meters of water, the site immediately proved more extensive than reported, with four swivel guns, breech blocks, and several ferrous concretions possibly containing a pistol and a sword hilt, all clearly visible in the fine sandy patch of seabed (Fig. 9). The original cannon proved to be a bronze swivel gun at one end of the site, while the four new smaller swivel guns, made of iron, were found clustered together toward the opposite end of the recorded assemblage (Fig. 10). Between were two iron anchors which were missing their stocks, although one had its grapnels protruding conspicuously from the seabed. Tentative observations regarding the guns suggest a date around the earlier half of the 16<sup>th</sup>-century.

To date, the survey has revealed the potential for locating further archaeological material under the seabed here. Future work should thus aim to measure and quantify the true extent of the site either with the use of a metal detector, or more intrusively through test excavation with an airlift or water dredge. Continued monitoring of the site is essential to protecting the artifacts from illicit removal.

#### *Kouklia Palaepaphos Anchorage*

When Dr. Sazeides also reported a large assemblage of stone anchors to the THETIS Foundation, the CMA/INA team initiated a diving survey off a small, exposed beach southeast of the settlement at Kouklia *Palaepaphos*, between Kourion and Paphos (Figs. 1 and 11). After several dozen stone anchors were located during the first two days, it was apparent that the concentration was far greater than anticipated.

The first evidence of settlement at Kouklia *Palaepaphos* comes from the Late Bronze Age. During the 400 years following 1600 BC, there is archaeological evidence of imports from the Near East and Aegean. The site grew in status by 1300 BC, enhanced by the nearby Sanctuary of Aphrodite, a famous religious shrine that continued to draw visitors down into the 4th century AD. Pliny, Ptolemy, Strabo and the author of *Stadiasmos* all report here some element of an anchorage (Leonard 1995b), which the evidence amassed underwater in 2005 supports. Palaepaphos' facility may have served both as a terminus for religious pilgrims and as a point of mercantile trade.

The extensiveness of the site limited the survey team to position-fixing individual stone anchors with a hand-held GPS. Each anchor was also individually measured for height, width, thickness, hole type, size and diameter, along with any other distinguishing features. All anchors were catalogued and photographed with orientation and scale.

To date, 120 stone anchors have been recorded, although others may lie obscured beneath the sand or outside our delimited area. Of these, 24 are composite (with three holes), and 96 are simple one-hole weight anchors. The anchors range in size from 30 centimeters to over 1 meter high, and in shape from crudely carved ovals to carefully crafted trapezoids. One example is particularly significant, since it bears intentionally inscribed swirls on one face (Fig. 12).

---

The survey has demonstrated that this site is of paramount importance in the understanding of maritime communication networks on Cyprus and in the greater Mediterranean region. Further investigation should establish the true physical extent of the site. Preliminary observations were already made regarding geology, sediment types, and seabed topography. A more comprehensive inquiry into the changing coastal geomorphology and alluvial inundation would highlight issues of site attrition, and may help explain the reason for this anchorage's seemingly unsuitable exposure. The synthesis of information from both terrestrial and underwater records would enable a better understanding of the role of Kouklia *Palaepaphos* and the surrounding region in the wider maritime cultural landscape.

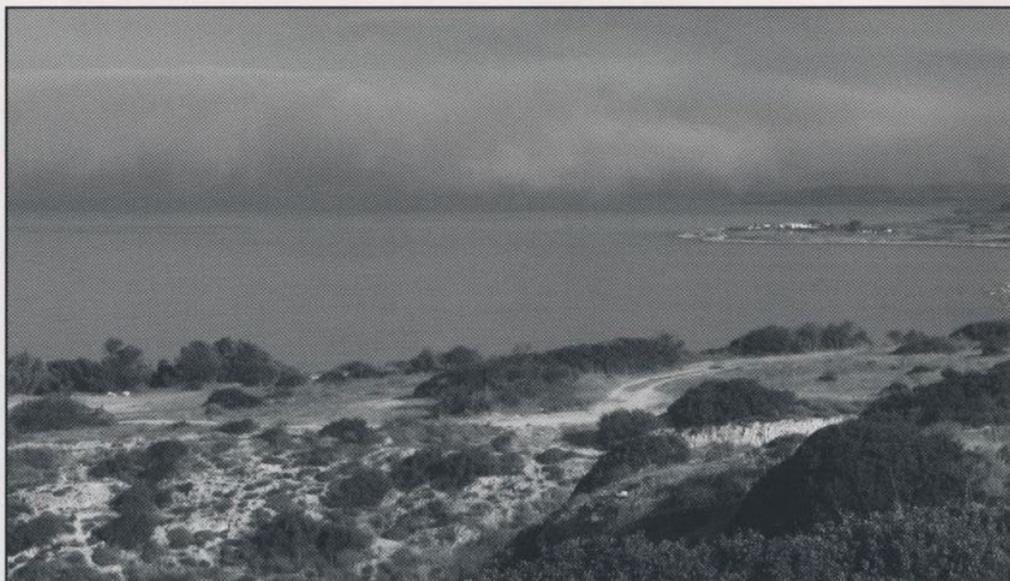
#### and Beyond...

For INA, the future promises to bring new work at the eastern end of the island, where some of its densest and most productive settlements maintained seaborne contacts with all corners of Cyprus and beyond. The treacherous promontory at Cape Greco, with its rough winds and sharply dropping seabed, provides an ideal setting, especially for remote sensing. Reports from local divers confirm the potential for finding well-preserved shipwrecks here. This new work underscores the steadily increasing pace of Cypriot maritime archaeology since the early days. The dual-authorship of this piece likewise reflects a trend toward more productive cooperative endeavors, in this case a joint CMA/INA team in association with the THETIS Foundation.

In addition to shallow diving work, the incorporation of wider ranges of more readily available remote sensing tools over the past few years promises not only to make shipwreck surveys more effective, but may also help provide answers to a variety of other maritime questions regarding, for instance, reconstruction of the ancient shoreline. One such large-scale multifaceted investigation is set to follow up at the Palaepaphos anchorage, where the largest underwater assemblage of stone anchors thus far recorded off the island attests vividly to the site's immense potential. The rough conditions of the presently exposed stretch of shore demonstrate the essential value of such lines of inquiry which aim to reconstruct the site as it existed in antiquity, and thereby ultimately help understand why the ancients chose to anchor at what today seems an unsuitable location. The already exciting but cursory results will thus be greatly enhanced through a program of remote sensing, coring, bathymetry, and GIS to provide new insight into Palaepaphos' relationship with the sea.

Likewise, the harbor constructions at Dreamer's Bay underscore the necessity of looking beyond merely the largest settlements to understand the island's apparently complex maritime landscape. The considerable proportions of the ashlar wall here represent an immense investment in commercial infrastructure for a port facility that was markedly different from the anchorage further west near Palaepaphos. Future investigations should aim to place the observed elements in the context of the reconstructed ancient coastline and underwater topography. Sonar bathymetry, combined with a better understanding of the localized subsidence, may help elucidate the harbor's original layout, including its

Fig. 11. *Palaepaphos anchorage site looking west toward the promontory.* Photo: D.S. Howitt-Marshall



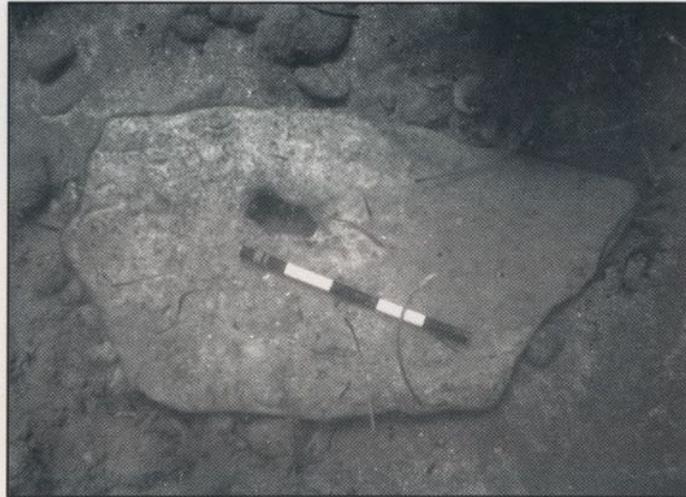


Fig. 12. Stone anchor from Palaepaphos anchorage with carved swirls adorning one face. Photo: J. Leidwanger

entrance channel and any potential outlying features.

At the same time, the threat of looting continues. Since the explosion of recreational diving and from the 1990s, the underwater realm has become increasingly accessible, prompting government agencies in the eastern Mediterranean to legislate carefully such developments. The dilemma has grown all the more acute as recreational divers' demand for a scenic site increases pressure on even the most scattered of ancient underwater debris.

The recent establishment of the THETIS Foundation, however, has provided an important step toward the public outreach and education so integral to promoting understanding between the archaeologists and the local diving community, which is a natural steward of submerged cultural heritage. After all, the Paphos Airport and Palaepaphos sites discussed above were found not by archaeologists, but by an eager spear-fisherman. The Kyrenia Ship off Northern Cyprus likewise was reported by sponge-diver Mr. Andreas Cariolou. Cooperation between archaeologists and amateur enthusiasts has been a longstanding tradition fundamental to the development of underwater archaeology in Cyprus, to the efforts of INA in particular, and to the general success of the discipline around the eastern Mediterranean throughout the decades.

*jleidwan@sas.upenn.edu*

*dsh30@cam.ac.uk*

*Acknowledgments:* The authors would like to express their appreciation to the Department of Antiquities and its staff, including Director Dr. Pavlos Flourentzos, for support of these projects and the development of maritime archaeology on the island in general. Major debts are owed to the THETIS Foundation, and to Mr. Adonis Papadopoulos and Dr. Sophocles Hadjisavvas in particular for their deep dedication and encouragement. Of course, the season could not have been so productive and so exciting without the friendly guidance of Dr. Filios Sazeides, whose love of his country and its heritage is truly inspiring.

---

JL wishes to acknowledge the generous contributions, resources, and expertise from RPM Nautical Foundation, whose Executive Committee, staff, and crew have been vital to the project. Thanks to Dr. Gisela Walberg (University of Cincinnati) for her confidence and guidance throughout three seasons. The President and staff of INA have never failed to assist from near and far. The labors of the talented survey crew are too numerous to mention, and so one can only say "many, many thanks." Other archaeologists and friends on the island and abroad have made work not only more effective, but also more pleasant: Frank and Anthea Garrod (WSBA Archaeological Society), André Leverton (HQ British Forces Cyprus), Dr. Demetrios Michaelides (University of Cyprus), and Dr. J.R. Leonard (American School of Classical Studies at Athens).

DHM expresses his sincere thanks for the encouragement and support of Cathy Giangrande (Cyprus Underwater Survey 1983-1984), and the advice and guidance of Dr. Jon Adams and Dr. Lucy Blue (CMA, Southampton University). The Joan du Plat Taylor Award from the Nautical Archaeology Society facilitated the 2002 survey, and Dr. Paul Croft and Prof. Eddie Peltenburg (Lemba Archaeological Research Centre) kindly hosted the team on three successive seasons. The hard work and organizational proficiency of Jesse Ransley and Katy Croff in 2002 and 2004 were vital, as were the energy and enthusiasm of all past and present members of the Western Cyprus Underwater Project, to whom special thanks are due.

#### Suggested Readings

Howitt-Marshall, D.S. 2003. "Cyprus Underwater Project 2002: A Preliminary Report." *Enalía* VII:29-37.

Howitt-Marshall, D.S. Forthcoming. "Cyprus Underwater Project 2004: The West Coast Revisited." *Enalía* IX.

Leidwanger, J. Forthcoming. "Glimpsing Late Antique Regional Trade from Sherds: A Case Study of a Wreck from Cyprus." *Enalía* IX.

#### Additional Sources Cited

Giangrande, C., G. Richards, D. Kennet, and J. Adams. 1987. "Cyprus Underwater Survey, 1983-1984 A Preliminary Report." *Report of the Department of Antiquities Cyprus*:185-97.

Hohlfelder, R.L. 1995b. "The Cave of the Amphoras." *Biblical Archaeologist* 58.1:49-51.

Leonard, J.R. 1995a. "The Anchorage at Kioni." In *Ancient Akamas*, Vol. 1, *Settlement and Environment*, edited by J. Fejfer, 133-70. Aarhus: Aarhus University Press.

Leonard, J.R. 1995b. "Evidence for Roman Ports, Harbours and Anchorages in Cyprus." In *Cyprus and the Sea*, edited by V. Karageorghis and D. Michaelides, 227-46. Nicosia: University of Cyprus.

Leonard, J.R., and S. Demesticha. 2004. "Fundamental Links in the Economic Chain: Local Ports and International Trade in Roman and Early Christian Cyprus." In *Transport Amphorae and Trade in the Eastern Mediterranean. Acts of the International Colloquium at the Danish Institute at Athens, September 26-29, 2002*, edited by J. Eiring and J. Lund, 189-202. Monographs of the Danish Institute at Athens 5. Athens: The Danish Institute at Athens.

# A Reconnaissance Shipwreck Inventory on the Yukon River

John Pollack and  
Robyn Woodward

In late July 2005, a small team conducted a reconnaissance survey of the famed "Thirty-mile" section of the Yukon River between the northern end of Lake Laberge and Carmacks. During the Klondike Gold Rush 1896-1901 this area of the southwest corner of Canada's Yukon Territory was the scene of one of the largest mass exoduses of people to an unknown wilderness the world has ever seen. The population mushroomed from a few thousand trappers and prospectors to over 40,000 residents that were serviced by more than 60 sternwheelers and thousands of hastily constructed flat-bottomed boats and barges. Between 1898 and 1937 more than 35 paddle-boats were lost on the river between Lake Laberge and Dawson and the majority of these wrecked in the narrow serpentine turns of the famed "Thirty-mile".

Five volunteers used two canoes and a kayak to visit a number of these remote sites scattered along this 235 km of wilderness river. In an eight-day trip we documented three significant sternwheeler sites, two minor gold dredges, and found shore debris from two additional, and as-yet unlocated, sternwheeler wreck sites.

To summarize:

*Casca I*: The bow of this 49.7 m, 1898 wooden-hulled sternwheeler lies on dry land with the stern in 2 m of water. It is a large three-dimensional wreck with an intact hull from the clamps to the keel. While the superstructure is missing, the stem-post assembly and a handful of deck beams remain. Some items of machinery are present, but the engines and boiler were salvaged and placed in the hull of the *CASCA II*. A baseline survey was made on this site and basic hull and frame measurements were taken.

*Evelyn* (renamed the *Norcom*): This 39.6 m, 1908 wooden-hulled sternwheeler sits on blocks above the ways at Shipyard Island, where it was abandoned in 1922. The engines and one of two boilers have been removed, but the vessel is intact except for the partially collapsed pilothouse and upper deck. The undamaged tiller and rudder assem-



*The Evelyn on blocks on Shipyard Island.*  
Photo: Nancy Fletcher

bly and interior of the hull were documented in some detail, as was the exterior of the stern of this flat-bottomed vessel with its three rudders. The team made a baseline survey of the main deck and documented the locations of the axle, hubs and crank that lie nearby. Although the entire superstructure is leaning and in danger of collapse, a great deal of architectural detail can be obtained from this vessel, which appears to reflect shipbuilding traditions of the mid 19<sup>th</sup> century rather than early 20<sup>th</sup>. The ship is an integral part of a maritime landscape that includes the ways, windlasses, sawpit, steam boxes and blacksmith shop of the abandoned shipyard

*Klondike 1*: This 64.0 m vessel was one of the largest sternwheelers that worked on the Yukon. Built in Whitehorse by the British Yukon and Navigation Company, the vessel sank seven years later after hitting a submerged obstacle below the "Big Eddy" at the bottom of the

*Port frames of the Casca 1 looking toward the bow.* Photo: Robyn Woodward





*Klondike 1 (left). John Pollack and Robyn Woodward on deck. Photo: Nancy Fletcher*

“Thirty-Mile”. The wooden hull now lies mid-channel with decks awash in fast water (9 km/hr). The wreck was undocumented at the time of our visit. The hull and main deck are almost completely intact and some machinery and fittings are visible in the flooded holds. The excellent condition of this site was a surprise as ice damage is common on shallow wrecks in northern waters. Detailed documentation of the hull at low water is warranted.

In addition to these three sites, we photographed and measured two small (12-20 m) gold dredges, and located minor debris from the 44.7 m sternwheeler *Columbian*, lost in 1906, and the 37.1 m sternwheeler *James Domville*, lost in 1899. Both of these latter vessels likely rest in the main current in the upper section of the Thirty-Mile, and further searches must be conducted in early June, when the visibility is best as the water will be at its lowest level. We found no trace of a sixth sternwheeler, the 30.4 m sternwheeler *La France*, lost in 1911.

The mid-western riverboats had to be redesigned to meet the requirements of the remote north. The deep, fast moving (5-6 knots) river with its constantly shifting gravel beds and sand bars presented ship-builders some unique challenges. Our reconnaissance project confirmed the Yukon contains a large number of accessible and well-preserved sternwheelers from the late 19<sup>th</sup> and early 20<sup>th</sup> century. The *Evelyn*, *Casa I*, and *Klondike 1* are all excellent candidates for further study. In particular, the *Klondike 1* is in remarkably good condition, and is nationally significant as it is the largest freshwater sternwheeler wreck known in Western Canada. It is also of interest given its link to its successor, the *Klondike 2*, built with salvaged machinery and fittings from the first vessel and now a national historic site in Whitehorse.



*Stem of the Casca 1 (above). Photo: Robyn Woodward*



*John Seiber, John Pollack and Robyn Woodward (left to right) on the bow of the Evelyn. Photo: Nancy Fletcher*

*john-pollack@shaw.ca  
rwoodward@shaw.ca*

# The Cairo Dahshur Boats Project: Update

Pearce Paul Creasman

For this summer's work on the Cairo Dahshur Boats I was able to convince my small team of fellow nautical graduate students (Fig. 1) to depart College Station on May 8th, a little more than a week before the semester's end. We arrived in Cairo by the afternoon of the 10th and took a few days to adjust to our surroundings, familiarize



Fig. 1. *The 2005 Summer Team and GC 4926- (left to right) Pearce Paul Creasman, Joshua Levin, Joshua Daniel, and Thomas Larson. Photo: J. Levin*

ourselves with the neighborhood and, of course, tour the Giza plateau and the Egyptian Museum in which we were going to work.

During our brief adjustment period the General Director of the Egyptian Museum, Dr. Wafaa El Saddik, was kind enough to help arrange our visit to Giza that can only be described as memorable. We were guided around the plateau by the site director and allowed access to some of the restricted areas, such as part of the lower halls inside the Great Pyramid. But, the event that stands out most is our experience at the Khufu Barge Museum. The Khufu barge (Fig. 2) is one of two massive 43.5 meter long ships discovered in 1954 hidden beside the Great Pyramid at Giza. This ship was exhumed from its hermetically sealed pit and reconstructed during the late 1950's and 1960's. As its name suggests, the barge belonged to the 4th Dynasty pharaoh Khufu, also known as Cheops, who ruled during the Old Kingdom from about 2585 to 2565 BC.

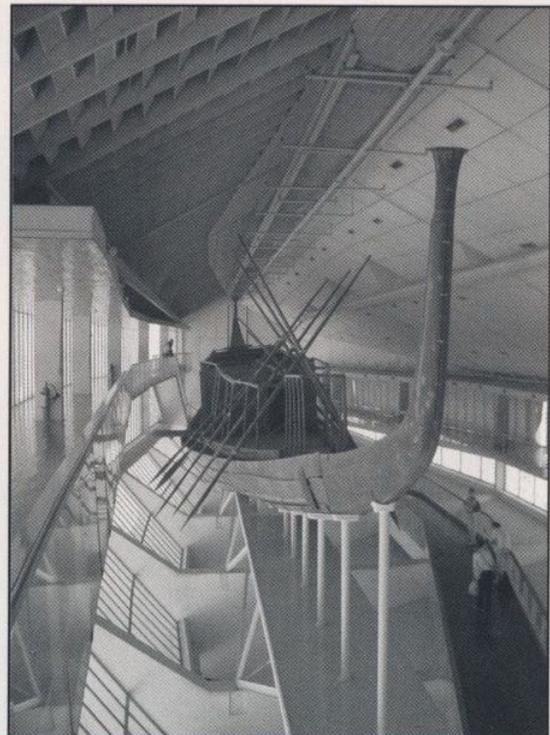
One of the team members, Joshua Levin, photographer for the Cairo Dahshur Boats Project, has been conducting research regarding the Khufu barge for some time and was specifically interested in the dimensions of the steering equipment. While there has been several quality

publications regarding the Khufu barge and its construction none has included the kind of detailed measurements Joshua required. With the influence of Dr. Wafaa in his favor, Joshua requested permission from the Director of the Khufu Barge Museum to venture out on the narrow platform that helps support the vessel and take what measurements he could manage. Permission was granted and he made his way on to the platform to begin measuring, with the help of another Cairo Dahshur Boats Project team member, Joshua Daniel (Fig. 3).

After only a few moments at work Josh and Josh were quickly interrupted by a very protective tour guide who was unaware of their permissions to take the necessary measurements. While it is quite understandable and encouraging that the guide was looking out for the well-being of the artifact, our inability to communicate with him effectively proved to be both time consuming and stressful. Several minutes of nervous tension built amongst our group and the several dozen tourists watching this scene unravel, when finally, Josh Levin and the frantic tour guide found their way to the Director's office.

In the end, Josh Levin returned to the heart of the museum, where we anxiously awaited the result of this encounter. The Director appeared and courteously stayed to watch over Josh's work. Soon the measurements were

Fig.2. *The Khufu Barge. Photo: P. Creasman*



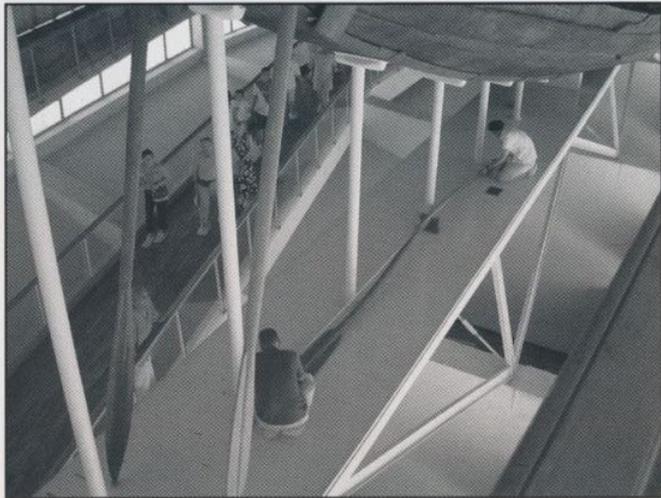


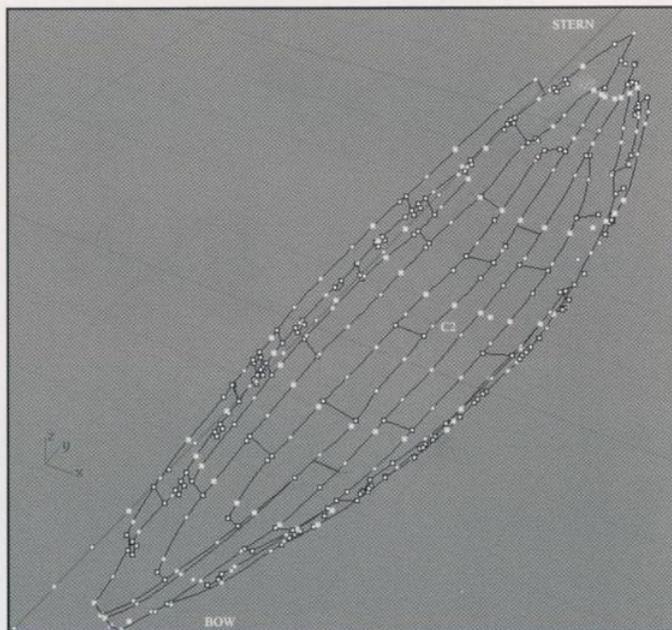
Fig. 3. Joshua Daniel (bottom) and Joshua Levin (top) taking measurements. Photo: P. Creasman

new daily culprit was harmless Tom Larson. After one week's work our presence in the museum was very comfortable and we were, on occasion, left to conduct our research thoroughly uninhibited. Work, which included photography, recordings, measuring and digital reconstructions, continued at a steady rate for several weeks.

One of the primary goals of this field session was to compile three-dimensional construction plans (Fig. 4) of the Dahshur boats that will later provide the base for an interactive "Digital Exhibit." Tom Larson was indispensable in accomplishing this goal by exercising his knowledge with the Rhinoceros® software. Joshua Daniel's work was also critical as he helped to collect the data that will reveal the philosophy behind the construction of these vessels. Lastly, many of the images captured by Joshua Levin on this project will provide the face of the Cairo Dahshur boats for years to come. Results of this project are expected in the coming year.

p.creasman@tamu.edu

*Acknowledgements:* Thanks are due to each of the following organizations for their contributions, making this project possible: the Institute of Nautical Archaeology, the Supreme Council on Antiquities (Egypt), the Board of the Egyptian Museum, the L.T. Jordan Institute of International Awareness, RPM Nautical Foundation, the Melbern G.



Glasscock Center for Humanities Research, the Texas A&M International Education Fee Scholarship, the American Express Rewards Program, and the Texas A&M College of Liberal Arts- particularly Dean Larry Oliver.

Certain individuals have also had great impact on the success of this project, most notably Dr. Wafaa El Saddik, Mme. Salwah and Waheed Edwar of the Egyptian Museum. Dr. Deborah Carlson and Dr. Filipe Castro of the Nautical Archaeology Program in the Department of Anthropology of Texas A&M each made important contributions deserving many thanks. Dr. Cemal Pulak's contributions throughout this project cannot be underestimated and for these I am extremely grateful.

For more information regarding the Cairo Dahshur boats please see my thesis (Texas A&M 2005) titled *The Cairo Dahshur Boats*.

Fig. 4. Three-Dimensional rendering of GC 4926. Image: T. Larson

---

## From the President

When the month of May rolls around each year, everything shifts into high gear for all the INA project directors. Finally the spring semester at Texas A&M University is over. All the term papers and tests have been graded and we can complete the final arrangements for the field excavations after months of planning. Additionally, we can even attend to pressing INA administrative affairs. In that regard, I would like to take this opportunity to be one of the first to welcome Dr. James (Jim) Delgado on board as the Executive Director of INA effective July 1, 2006. He is going to be a welcomed addition to INA. In mid-May, Jim came to College Station to meet with the Nautical Archaeology Program faculty, INA administrators, and me and discuss old and introduce new objectives. Simultaneously, we planned how to effectively accomplish them, with all of us working together. Jim has very ambitious goals and personally, I think the two of us are going to make a good team in forging ahead with INA's future!

Getting ready to depart for the field requires each of us to prepare to adjust to different field environments in different countries. Personally, I am ready for my summer stay in Turkey (June 1 - August 15). As was the case last year, I will be spending a lot of time at the camp that we will build at Kizilburun as Dr. Deborah Carlson undertakes the second excavation year on the 1<sup>st</sup>-century B.C. Roman marble carrier. In my opinion, I think the highlight of the season will be when the eight drums and capitol, of the huge marble column that was being shipped, are lifted off the site and placed a short distance away on the sea floor. This will give us our first view of what lies under the column and whether or not there are hull remains. It is going to be exciting and you can be assured that the balloon lifting process will be well documented and everyone can count on an interesting article on this maneuver to appear in the pages of *The INA Quarterly* in a forthcoming issue.

There is no way that I would go to Turkey this summer without a side trip to the Yenikapi excavations in Istanbul. Dr. Cemal Pulak will be giving me a tour of the subway excavations that is part of the tunnel being constructed under the Bosphorus, connecting the European and Asian sides of Istanbul. At Yenikapi, eight or more remarkable shipwrecks were discovered alongside a long-buried port. I am looking forward to seeing this land excavation of shipwrecks. Of, course, I plan to see other archaeological and historic sites in Istanbul as well.

Other 2006 summer field projects include:

- Dr. Kevin Crisman's fifth and final excavation season on the *Heroine*, a steamboat that sank in the Red River in Oklahoma in 1838.
- Dr. Filipe Castro will be conducting a summer school surveying for shipwrecks around Lagos, Portugal. Lagos has had a long seafaring tradition and is the place where Prince Henry the Navigator lived and planned Portugal's overseas expansion and the discovery of a maritime route to India.
- Dr. Shelley Wachsmann will be conducting a deep water survey in international waters of the Mediterranean.
- Mark Polzer will be investigating several shipwrecks at Bajo de la Campana in Spain.
- Dante Bartoli is mapping several early 3<sup>rd</sup>-Century A.D. underwater marble sites near Crotona in southern Italy.
- Justin Leidweinger is leading a team to continue his survey of the western end of Cyprus.

It is going to be another interesting and productive research season for INA and the subject of any number of interesting *INA Quarterly* articles. I wish an equally productive summer for all the INA members and supporters.

ciao,  
D.L.H.  
dlhamilton@tamu.edu



### To sea or not to sea

2nd international colloquium on Maritime and Fluvial Archaeology in the southern North Sea area

Bruges, 21-23 September 2006

Flemish Heritage Institute in an effort to focus more on maritime studies has created a colloquium concentrating on the southern North Sea. The three-day colloquium will concentrate on four themes related to maritime and fluvial archaeology: research, legislation, conservation and communication.

The sessions include:

Session 1: maritime and fluvial research in Belgium: an overview of the various achievements and running projects.

Session 2: Legislation related to maritime and fluvial archaeological heritage with invited representatives from the Netherlands, the United Kingdom and France. This session includes a plenary discussion on legislation and future archaeologist/sportdiver cooperation/interaction.

Session 3: International case-studies in conservation of maritime archaeological heritage

Session 4: International case-studies in communicating maritime and fluvial archaeological heritage to the public.

The keynote speaker is Dr. Donny Hamilton, president of INA.

For more information and a complete list of speakers, please refer to their website at <http://www.vliz.be/marcol/En/index.php>



### The Anna Marguerite McCann and Robert D. Taggart Lectureship in Underwater Archaeology

The Archaeological Institute of America sponsors a National lecture program which supports up to 300 lectures annually, dispersed between 102 societies in the US and Canada. The lecture program is an important part of the AIA's mission for outreach in the community by bringing the general public the latest results in archaeological research. All lectures are free and public attendance is greatly encouraged. Included in the AIA's program is the

Anna Marguerite McCann and Robert D. Taggart Lectureship in Underwater Archaeology.

This endowed lectureship was established in 1985 by Robert D. Taggart in honor of his wife's contributions to the field of underwater archaeology. Anna Marguerite McCann is a pioneering underwater archaeologist with a specialty in ancient harbors and the new robotic technology used in underwater research. Her publication, *The Roman Port and Fishery of Cosa: a Center of Ancient Trade*, was awarded the James R. Wiseman Book award of the Archaeological Institute of America in 1989.

The McCann/Taggart Lecturer is chosen by the Underwater Archaeology Committee and annually lectures to four local societies. In recent years lecturers have included Cemal Pulak, Christopher F. Amer, Cheryl Ward, Dana Yoerger and Filipe Castro. AIA is proud to announce this year's lecturer is Deborah N. Carlson.

Traditionally the series visits four societies between September and May. An additional lecture has been added this year due to generous funding.

The lecture will visit the following societies on these dates:

Mississippi/Memphis Society: Oct 24, 2006

Oklahoma City Society: Oct 25, 2006

Vancouver Society: March 6, 2007

Eugene Society: March 7, 2007

Portland Society: March 9, 2007

Deborah Carlson will also be speaking on an AIA tour through Greece and Turkey in the fall. For additional information on the tour and the lecture series see the AIA website at [www.archaeological.org](http://www.archaeological.org).



*James Delgado at the Straits of Magellan in Chile*

His undersea explorations around the world include a deep sea submersible dive two and half miles down to RMS *Titanic*, the discoveries of *Carpathia*, the ship that rescued *Titanic*'s survivors, and the notorious "ghost ship" *Mary Celeste*, as well as surveys of USS *Arizona* at Pearl Harbor, the sunken fleet of atomic-bombed warships at Bikini Atoll, the polar exploration ship *Maud*, wrecked in the Arctic and most recently a multi-year project to document the 1865 Civil War submarine *Explorer* in Panama. His archaeological work has also included 28 years of ongoing excavation of ships and collapsed buildings along the now-buried waterfront of Gold Rush San Francisco. Jim's Gold Rush work formed the basis of his Ph.D. dissertation.

Jim comes to INA after serving for 15 years as Executive Director of the Vancouver Maritime Museum in Vancouver, British Columbia. Previously, he was the head of the U.S. government's maritime preservation program and was the maritime historian for the U.S. National Park Service during a 3 year career in the NPS. As the museum's executive director Jim increased the museum's profile, added national treasures to the collection, built a major research library, quadrupled public and educational programs, and increased fundraising seven hundred percent, raising millions during his tenure.

When not at the museum, he was the host of the National Geographic International television series *The Sea Hunters* featuring best-selling author Clive Cussler. The show is now ending after five seasons. It continues to play in 172 countries to an annual audience of some 42 million, making Jim one of the best recognized underwater archaeologists on the planet. He laughingly compares that with the even larger audiences and character recognition accorded to those who appear either on "American Idol" or "Survivor." But he also appreciates the opportunity to reach people of all ages and interests who have a love of the stories and history that archaeologists work with.

His active participation in the study and preservation of shipwreck sites and maritime heritage has included a several year long founding membership in the International Commission on Monuments and Site (ICOMOS) committee on underwater cultural heritage and the presidency of the Council of American Maritime Museums.

A Fellow of the Royal Geographical Society and a Fellow of the Explorers' Club, Jim is the author or editor of 29 books and numerous articles. Two of his books, *Lost Warships: An Archaeological Tour of War at Sea* and *Across the Top of the World: The Quest for the Northwest Passage*, were both international best-sellers published simultaneously in North America and Britain. Another book, edited by Jim, is *The British Museum Encyclopaedia of Underwater and Maritime Archaeology*, which includes a number of entries on INA projects. Jim is also the author of three books for children. He is happily married to his best friend, Ann Goodhart, director of the West Vancouver Memorial Library, and is the proud father of two grown children, John and Elizabeth.

## JAMES DELGADO JOINS INA

INA welcomes Dr. James P. Delgado as Executive Director. Working closely with President Dr. Donny Hamilton and the INA Board, Dr. Delgado will be responsible for building INA's public profile, seeking new partnerships and projects, building the membership and raising funds. Dr. Delgado, who prefers being called Jim, starts his duties in July, although in some respects he is already on job and was recently in College Station meeting the INA and Nautical Archaeology Program staff at Texas A&M University. Jim describes joining INA as a dream come true, and is excited to join what he calls "the world leader in the field." "INA pioneered the field and demonstrated how best to excavate and study shipwrecks," he notes, adding he is looking forward to working with INA to build on that legacy.

Jim Delgado is no stranger to nautical archaeology or the tasks he will undertake for INA. As a practicing field archaeologist, Jim has led or participated in shipwreck expeditions around the world.

*James Delgado preparing to dive on the Russian ironclad Russalka in the Baltic.*





Thanks to Mr. John Baird and INA Supporters  
for all of your contributions to the Challenge  
Grant!

J. H. BAIRD  
2914 Attleboro Road  
Cleveland, Ohio 44120

Dear INA Supporters:

It was great to learn that the grant  
challenge has been met. Thanks to all of the  
participants.

Sincerely,

John H. Baird

JHB/trb



INSTITUTE OF NAUTICAL ARCHAEOLOGY

P.O. Drawer HG  
College Station, Texas 77841-5137

Phone: (979) 845-6694  
Fax: (979) 847-9260

Dear INA Supporter:

WOW, we did it! As all of you know, Mr. John Baird, long time Director and supporter of the Institute of Nautical Archaeology (INA) issued a challenge stating the he would match up to \$200,000 of new monies donated to INA for the Baird Challenge through December 31, 2005. Appeals were sent out to the INA membership for their assistance in meeting this challenge. I am ecstatic to report that we met and even slightly exceeded the challenge. Thank you to everyone who made this possible. John sends his own thanks as well in a note enclosed with this letter. Now INA will be able to complete the construction of the INA Bodrum Research Center Conservation Laboratory, make repairs to the INA fleet, and purchase new diving equipment.

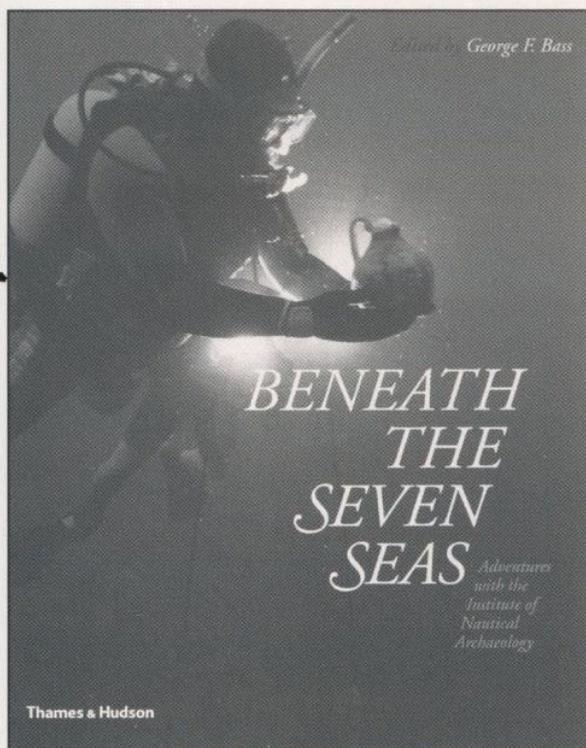
No institute has the loyal membership who supports its research mission as does INA. This letter is an acknowledgment of that fact!

Sincerely,

Donny L. Hamilton  
President

Enclosure

## STILL AVAILABLE ORDER YOUR COPY TODAY



*Beneath the Seven Seas: Adventures with the Institute of Nautical Archaeology* takes the reader around the world in firsthand accounts of more than forty of the most exciting shipwreck and sunken-city projects ever undertaken.

From the Pacific to the Mediterranean, from the Caribbean to the Red Sea, and from northern Europe and the northern United States to the Indian Ocean, archaeologists vividly describe shipwrecks from the oldest and deepest ever excavated to the remains of battles in both the European and Pacific theaters of World War II.

Dive 200 feet deep with Cemal Pulak on a royal ship that sank over 3,300 years ago off the Turkish coast, and explore with Donny Hamilton houses of the richest English colony in the New World, the infamous pirate stronghold of Port Royal, Jamaica, swallowed by the sea in 1692. Accompany famed undersea explorer Robert Ballard, discoverer of *Titanic*, as he and Cheryl Ward search for deep wrecks in the oxygen-free waters of the Black Sea. Then sail through a gale with Susan Womer Katzev on a full-scale replica of the best preserved ancient Greek ship yet raised from the sea.

The book describes the loss, within sight of loved ones, of seamen returning to Portugal in 1606, at the end of a two-year voyage to the East on the *Nossa Senhora dos Martires*, and then describes the fate of the crew of another Portuguese ship, the *Santo Antonio de Tanna*, which sank off Mombasa, Kenya, while

trying to lift the siege of Fort Jesus by Omani Arabs in 1697. It describes the foods, games, weapons, tools, and grooming implements on a ship sailed by Bulgarian merchants around A.D. 1025, carrying as cargo the largest known collections of medieval Islamic glass and glazed pottery. These are but a few of the stories from the past that are brought alive in *Beneath the Seven Seas*, illustrated by over 400 color pictures.

### Special Offer for INA Members!

This book is available now and retails for \$39.95. INA is offering a special discounted rate to its members of \$20.00 plus \$3.90 for domestic shipping and handling = \$23.90. For Texas shipping addresses, please add 8.25% sales tax = \$25.55. (Please write for international rates.)

Please send checks made payable to:  
Institute of Nautical Archaeology  
P.O. Drawer HG  
College Station, TX 77841-5137

Please include shipping information.

# INSTITUTE OF NAUTICAL ARCHAEOLOGY



## INA QUARTERLY EDITOR

Courtney R. Higgins

## OFFICERS - ADMINISTRATION

Donny L. Hamilton, Ph.D., President\*

Cemal M. Pulak, Ph.D., Vice President

Claudia F. LeDoux, Chief Accounting Officer and Assistant Secretary

Michelle Chmelar, Assistant Accounting Officer

Tufan U. Turanlı, Administrator, Bodrum Research Center

## BOARD OF DIRECTORS

William L. Allen

John H. Baird

Joe Ballew

George F. Bass, Ph.D., Founder\*

Edward O. Boshell, Jr.

Elizabeth L. Bruni

John Cassils, M.D.

Gregory M. Cook

William C. Culp, M.D.\*

Lucy Darden\*

Thomas F. Darden

John De Lapa

Claude Duthuit

Danielle J. Feeny\*

Charles P. Garrison, M.D.

Robert Gates, Ph.D.

Donald Geddes III,

Vice Chairman\*

James Gould

Past Chairman & General Counsel\*

Charles Johnson, Ph.D.\*

Gregory M. Kiez

Jack W. Kelley, Founder\*

Selçuk Kolay\*

Francine LeFrak-Friedberg

Alex G. Nason

George E. Robb, Jr.

Lynn Baird Shaw\*

J. Richard Steffy

William T. Sturgis

Frederick van Doorninck, Jr., Ph.D.\*

Robert L. Walker, Ph.D.\*

Peter M. Way, Chairman\*

Garry A. Weber

Sally M. Yamini

\*Executive Committee

## ASSOCIATE DIRECTORS

Raynette Boshell

Allan Campbell, M.D.

Nicholas Griffis

Jeff Hakko

Robin P. Hartmann

Faith D. Hentschel, Ph.D.

Susan Katzev

William C. Klein, M.D.

George Lodge

Anthony Marshall

Thomas McCasland, Jr.

Dana F. McGinnis

Michael Plank

Margaret Jane Zemias-Saglam

Betsy Boshell Todd

Mary Tooze

Robyn Woodward

## NAUTICAL ARCHAEOLOGY PROGRAM FACULTY

Deborah Carlson, Ph.D., Assistant Professor, Sara W. & George O. Yamini Fellow

Filipe 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 M. Pulak, Ph.D., Frederick R. Mayer 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 FACULTY EMERITUS

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 Professor of Nautical Archaeology, Emeritus

J. Richard Steffy, Sara W. & George O. Yamini Professor of Nautical Archaeology, Emeritus

## INSTITUTE OF NAUTICAL ARCHAEOLOGY STAFF

Esra Altınanıt-Göksu

Münevver Babacık

Mustafa Babacık

Mehmet Çiftlikli

Ozlem Dogan

Tuba Ekmekçi

Donald A. Frey, Ph.D.

Zafer Gül

Bilge Güneşdoğdu

Chasity Hedlund

Janna Jackson

Jim Jobling, M.A.

Gülser Kazancıoğlu

Bayham Kosar

Nurgül Kulah

Sheila D. Matthews, M.A.

Asaf Oron, M.A.

Muammer Özdemir

Robin C. M. Piercy

Şükran Şenyüz

A. Feyyaz Subay

Murat Tilev

Edith Trnka, Ph.D.

Süleyman Türel

Güneş Yaşar

## GRADUATE FELLOWS

Alexis Catsambis, Mr. & Mrs. Ray H. Siegfried II Graduate Fellow

Wendy van Duivenvoorde, Marian M. Cook Graduate Fellow

## RESEARCH ASSOCIATES

J. Barto Arnold, M.A.

Dante Bartoli

Kroum N. Batchvarov, M.A.

Alexis Catsambis

Katie Custer, M.A.

Jeremy Green, M.A.

Sarah Kampbell

Justin Leidwanger

Margaret E. Leshikar-Denton, Ph.D.

Bjorn Lovén

María del Pilar Luna Erreguerena

John McManamon, Ph.D.

Ralph K. Pedersen, Ph.D.

Brett A. Phaneuf

Donald Rosencrantz

Randall Sasaki

## ADJUNCT PROFESSORS

Ayşe Atauz, Ph.D.

Arthur Cohn, J.D.

Elizabeth Greene, Ph.D.

Nergis Günsenin, Ph.D.

Jerome L. Hall, Ph.D.

Faith D. Hentschel, Ph.D.

Fredrik T. Hiebert, Ph.D.

Frederick Hocker, Ph.D.

Carolyn G. Koehler, Ph.D.

Jeff Royal, Ph.D.

Cheryl Ward, Ph.D.

Gordon P. Watts, Jr., Ph.D.

## SUPPORTING INSTITUTIONS

Australian Institute of Maritime Archaeology

Boston University

Brown University

Bryn Mawr College

University of California, Berkeley

University of Cincinnati

Cornell University

Corning Museum of Glass

Departamento de Arqueología Subacuática de la I.N.A.H., Mexico

University of Maryland, Baltimore County

New York University, Institute of Fine Arts

University of North Carolina, Chapel Hill

Partners for Livable Places

University Museum, University of Pennsylvania

Texas A&M Research Foundation

RPM Nautical Foundation

Texas A&M University

The University of Texas at Austin