

# MAHS NEWS



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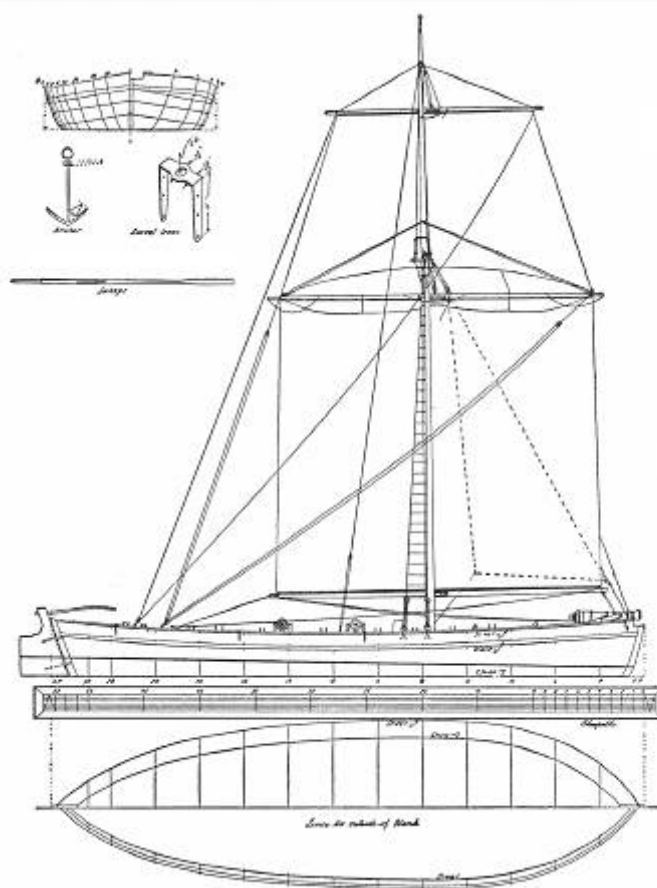
## Nautical Drawings by H.I. Chapelle: New Items Added to the Smithsonian Catalogs

By James Smailes

To those who have studied maritime history, sailing ship development in the United States, or those with just an interest in the subject, the name Howard I. Chapelle (1901 - 1975) should be familiar as an author, naval architect and artist of numerous drawings. But what is not conveyed in Chapelle's books is the enormous volume of materials he assembled that formed the basis of his research. His collection of drawings of warships, clipper ships, trading vessels, work boats, barges, row boats and every conceivable type of trade craft must number in the thousands of sheets. Some are beautiful, final ink drawings on linen, Mylar or vellum while others are pencil drawings on yellow paper, vellum or brown craft paper. Some of the pencil drawings contain hand written notes about the vessel, adding details on when the ship was built, by whom or for whom, where launched, mast and spar dimensions, ship size and displacement, ordnance, crew size, or other ships that had been built to the same plan.

The scale of his life's work became apparent to me last year when I began working at the Smithsonian as a "Behind-the-Scenes" volunteer in the Maritime History Section of the Transportation Collections under Dr. Paul Johnston, Curator of Transportation, Maritime History and a MAHS Advisor. The first task I was assigned was to help update the two catalogs for warship plans and commercial ship plans by adding new drawings transferred from the Naval History Section to the Transportation Collection. The eighth editions of the

*continued on page 3*



*The Gunboat (gundalow) Philadelphia, from Chapelle's The History of the American Sailing Navy, W.W. Norton and Company, 1949.*

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## Notes from the Prez – Steven Anthony

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When Tom Berkey announced the MAHS annual pool session it reminded me that our Introductory Course in Underwater Archaeology was coming to a close for the 21<sup>st</sup> consecutive year and it was time once again to shake out the gear in preparation for the summer driving season. Winter seemed to go by in a flash this year because we had so much going on. The upcoming summer season will be busy as well.

We reported in the last newsletter that MAHS was awarded a Non-Capital Grant from the State of Maryland to perform a survey and synthesis of the Bodkin Creek river basin. In September, Geomar conducted a remote sensing survey to identify shipwreck targets in the search area. In October, a team of MAHS divers assisted Geomar with the first of many ground truthing projects to come. Several old wooden shipwreck structures were located and identified by the Geomar/MAHS dive teams. Maryland State Underwater Archaeologists, Dr. Susan Langley and Dr. Brian Jordan, were invited to assist with the examination and evaluation of these sites in May. The first structure we investigated exhibited characteristics of log canoe construction that were typical of bugeyes and similar work vessels indigenous to the Chesapeake Bay area. MAHS will continue working with Geomar and the state underwater archaeologists to investigate more targets throughout the summer months.

In addition to the maritime investigations, Dennis Knepper began the terrestrial archaeology portion of the Bodkin Creek survey. In January and February, along with Dave Shaw, Tom Berkey, and Phillip and Jenny Kalmanson, he investigated many of the land sites identified during our archival research in the Maryland Historical Trust library. He also interviewed several local citizens who offered a wealth of historical information about the area surrounding the creek. See the following article for more on this aspect of the project.

Tom Berkey became enamored with the historical events relating to the sinking of the *Lion of Baltimore* and over the winter months commenced in depth archival research on privateers. Dave Shaw and I picked up a research lead as well and found the ship logs for the *HMS Menelaus* in the Archives at Kew, England. With the kind and expert assistance of Don Kentopp, MAHS was able to retrieve copies of the logs and ship's muster from the library in England and will contribute those files to the Maryland Historical Trust library at the completion of our project.

Another important development occurred over the

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MAHSNEWS will consider articles and notices for publication which enhance public awareness and appreciation of maritime history, archaeology, and heritage preservation.

catalog are being prepared now and reflect updated information as well as the addition of 278 drawings by Chapelle and others that had not been in earlier catalogs. Additional drawings are being cataloged and will be added to the ninth edition

#### The Behind-the-Scenes

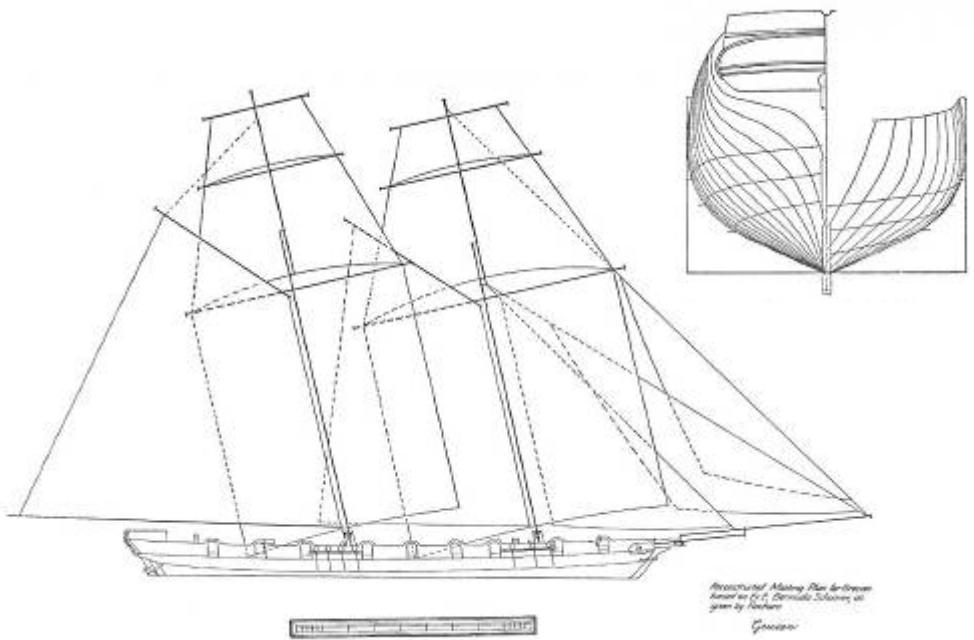
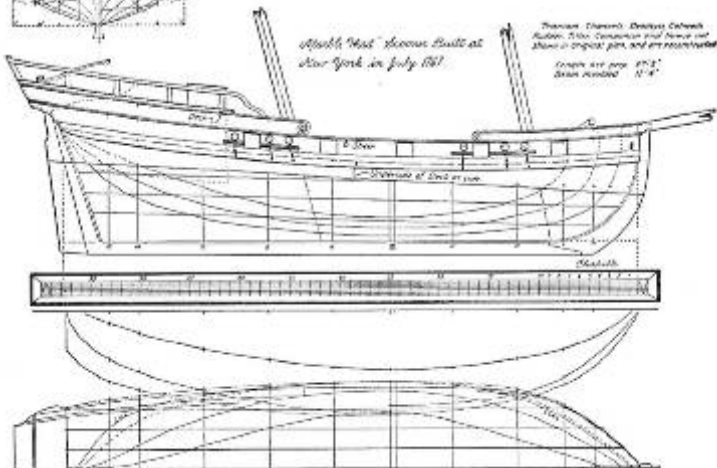
Volunteer Program (BVP) provides assistance to Smithsonian staff by recruiting and placing individuals who wish to contribute their time and expertise to specific areas of study within the Institution. Volunteers work with staff members on both short-term and long-term projects. Opportunities are generally available in archives; libraries; administrative offices; conservation laboratories; and curatorial divisions related to art, history, and science collections.

Placements are determined by matching volunteer qualifications, knowledge, interests, and availability with project requirements. Volunteer assignments can be arranged in most disciplines and museums. For those with foreign language abilities, translation service opportunities are also available. More information can be found at [http://www.si.edu/Encyclopedia\\_SI/volunteer/behindsc.htm](http://www.si.edu/Encyclopedia_SI/volunteer/behindsc.htm).

The collection of warship and watercraft plans at the National Museum of American History (NMAH) represents a major technical resource for marine historians, archaeologists, scholars, artists and ship model and boat builders. These collections complement



*Outboard Profile, Half Breadth, and Body Plan of the American schooner Marble Head, from Chapelle's The History of the American Sailing Ships, W.W. Norton and Company, 1935.*



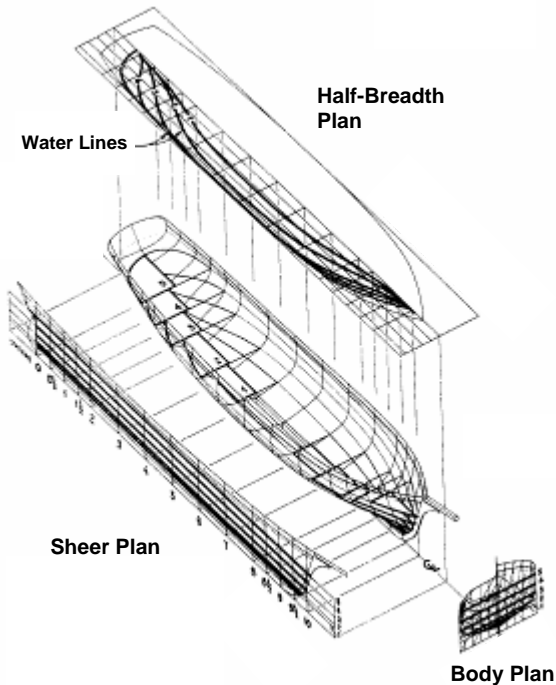
*Lines and masting plan of the schooner, H.M. Grecian, from Chapelle's The American Fishing Schooner, W.W. Norton and Company, 1973.*

the museum's collection of rigged ship models and builders' half-hull models (which is the nation's most comprehensive chronological holding) depicting the evolution of American naval technology from the Colonial era to the present. Black line reproductions of many of these plans, as well as ordnance drawings and ship model photographs, are available for sale to the public and are presented in three catalogs: 1) *Ship Plans List, Maritime Collection*; 2) *Smithsonian Collection of Warship Plans*; and 3) *The Maritime Administration Ship Plans Collection*. Further information can be found at <http://americanhistory.si.edu/csr/shipplan.htm>.

Most of the warship plans collection consists of what are referred to as lines drawings representing the shape of a ship's hull. These drawings are often supplemented with other plans showing deck layouts, spars, standing and running rigging, sails and ordnance. These more detailed drawings are of great assistance to those preparing full-rigged models or ship portraits. A few notable ships have exceptionally detailed sets of plans, such as the frigate *Constitution* and the Continental gunboat, or gundalow, *Philadelphia*, and include structural and decorative details, ship fittings and armaments. The gunboat *Philadelphia*, recovered in 1935 from Lake Champlain, is on display at NMAH. Most of the warship plans are reproduced in Chapelle's book, *The History of the American Sailing Navy*, published in 1949.

The Smithsonian collection of watercraft plans is made up of a number of collections donated to or commissioned by the NMAH over the years. The largest elements are the Chapelle collection and the Historic

American Merchant Marine Survey (HAMMS), a Work Projects Administration (WPA) program from 1936 and 1937 that gathered information on American maritime history and provided work for unemployed marine architects. Chapelle served as head of the New England section.



The Maritime Administration (MarAd) collection was obtained in 1990 from that agency and represents 55 designs of Liberty ships, Victory ships, tankers, troop ships, some of the earliest container ships, cargo and passenger vessels, survey vessels, and the first roll-on/roll-off vessels developed for the US Navy. An average of more than two dozen sheets preserved for each of the vessel types include outboard and inboard profiles (elevations), capacity plans, general arrangements, various sections, deck plans, lines and offsets. Details for propellers and fairwaters, stocks, rudders and accommodation plans were also preserved. Included in this collection are detailed drawings for such famous ships as the passenger ship *United States* and the world's first nuclear passenger and cargo vessel, the *NS Savannah*, launched in 1962. Hopefully the collection will grow as more MarAd materials become available.

The Chapelle collection is the legacy of Howard Irving Chapelle, who was Curator of Marine Transportation at the Smithsonian for ten years from 1957 to 1967. While at the Museum, he directed the planning and construction of hundreds of ship models for the Hall of Merchant Shipping. Chapelle retired in 1971, becoming Historian Emeritus in the museum. The majority of the Chapelle plans are from his published

works, which span 40 years and include every major type of working sailing vessel used on the east coast of North American and many from the west coast. In addition to the published plans, there are yacht plans from articles, the plans for a book on pilot boats that Chapelle was working on at the time of his death in 1975, and a number of yacht and fishing boat designs drawn by Chapelle in the 1930s to 1950s when he was an active naval architect. Many of these designs were based on traditional workboats and sailing craft from the 18<sup>th</sup> through the early-20<sup>th</sup> centuries.

## LINES LIFTING

Lines lifting is the gathering of dimensional data needed to produce what are referred to as lines drawings of a ship's hull. The lines are lifted from the hull's exterior, occasionally the interior, or builder's half-models. Lines describe the hull's shape as a series of intersections between the exterior hull surface and four sets of imaginary planes that pass through the hull:

**Sections or Body Plans** – the line created by passing a plane side to side (athwartship) perpendicular to the vessel's vertical centerline.

**Water Lines** (shown in the illustration to the left) – horizontal lines, running fore and aft, and perpendicular to the vertical centerline plane and section planes; they are not necessarily parallel to the floating waterline.

**Buttock Lines** – these planes are vertical, run fore and aft, and are parallel to the central vertical plane passing through the keel and deck centerline. Buttock Lines are the intersection between the buttock planes and hull surface. These are presented on starboard side in the **Sheer Plan**

**Diagonals** – pass fore and aft at angles through the hull and are used to present curves in the hull surface.

For a thorough discussion of how lines and sections are used to describe a ship's hull see *Guidelines for Recording Historic Ships* by Richard K. Anderson, Jr. 1988.

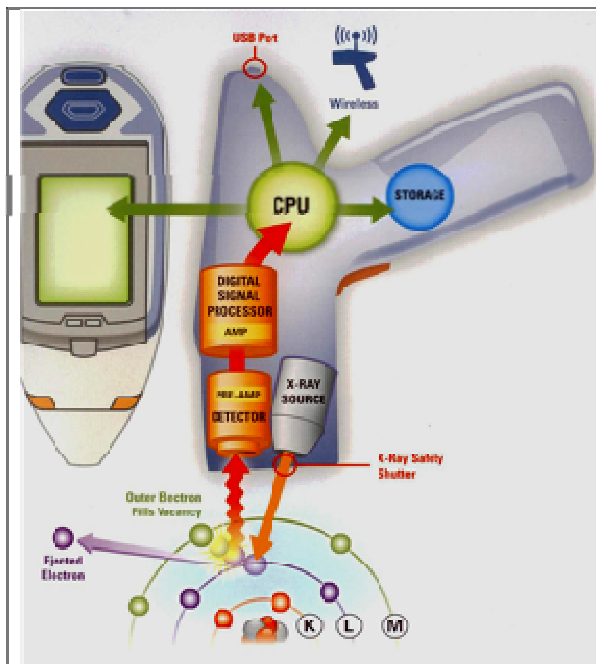
A majority of the plans in the Smithsonian collection are not original builder's plans, but are, for the most part, the result of field documentation: the process of taking the lines off historic vessels and half models, and at least one drawing scaled up from a detail on an engraving. As a result, complete construction details and tables of offsets are often not available. ⚓



# Elemental Analysis of Submerged Archaeological Artifacts Using X-Ray Fluorescence

By Raymond Hayes, Julia Kleyman, Bill Utley, and Robert Neyland

The NITON XRF analyzer (Thermo-Fisher, Co.) has been used to determine the elemental composition of a variety of unknown specimens from underwater archaeological sites. These specimens include powders, waxes, residues, coatings and marine sediment. Not only does the NITON instrument provide qualitative information about the chemical composition of these substances, it also gives quantitative data indicating the amount of each element and the relative concentrations of elements to one another. In essence, a fingerprint of the unknown specimen is provided by x-ray fluorometry.



*Schematic of NITON XRF Analyzer. The x-ray beam activates electrons in the specimen that are detected and processed to yield qualitative and quantitative data about its elemental constitution. The data are projected onto the screen for real time information for the researcher. Image by Thermo-Fisher, Co.*

X-rays are a form of short wavelength, high-energy radiation. When directed at a material, x-rays can produce ionization or the ejection of electrons from the component atoms resulting in low-energy radiation. This radiation, referred to as fluorescence, can be measured precisely and characteristic patterns in the measurements can provide virtual fingerprints of the constituent elements. The NITON analyzer discharges a high energy x-ray beam that penetrates the sample target, activating the release of energy from outer shell electrons. This energy is reflected, collated and

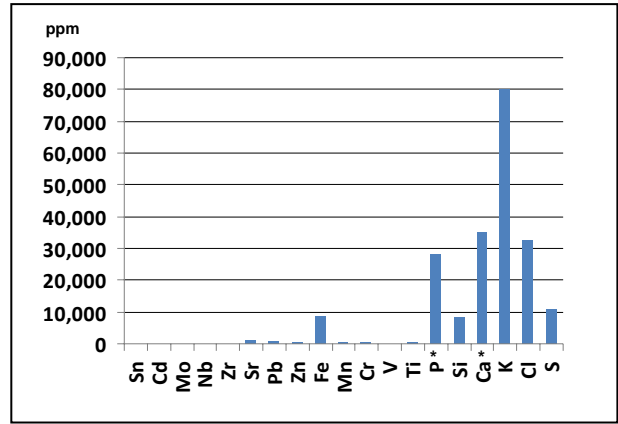
analyzed within the instrument and is expressed as cpm (ppm) per kiloelectron volts. The discharge distinguishes emissions ranging from magnesium through uranium in the periodic table of elements. Metal alloys, soils, paints, clays, and environmental contaminants (e.g., toxins and pollutants) have been evaluated with this unit.

Of particular importance, the instrument is hand-held, portable, battery operated and practical for application in the field as well as in the laboratory. Spectral and numeric data are recorded within a short time interval (e.g., 2 minutes) and are displayed in real-time. These data are also stored in memory so as to be downloaded into a PC for review and analysis.

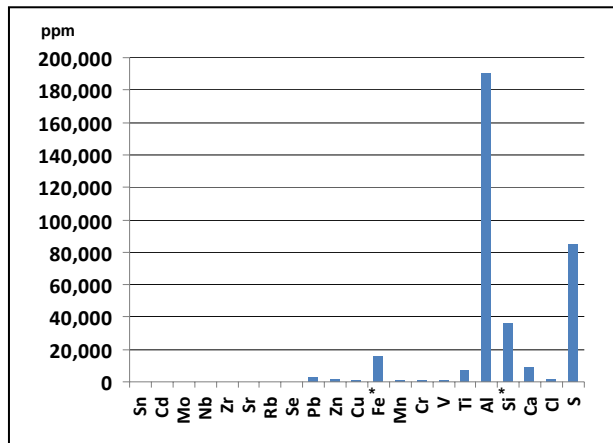
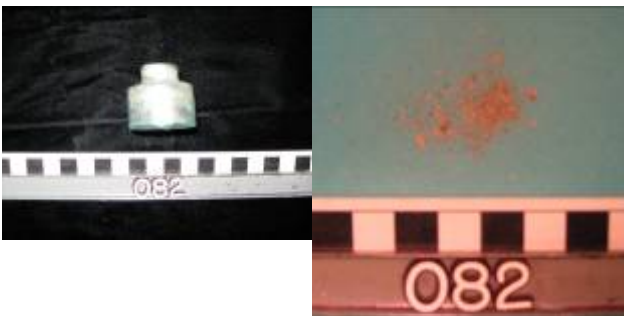
For archaeometry, the NITON analyzer has been used previously to compare and contrast clays and pigments in southwestern Native American pottery. It has also been used to examine paintings on canvas. However, this instrument has not been applied to the chemical analysis of artifacts from submerged contexts in underwater archaeological studies. Based upon our experience with the NITON, chemical fingerprinting as an analytical tool for studying artifacts recovered from underwater sites provides meaningful adjunctive data that extend interpretations of archaeological finds.

The first specimen we analyzed in this project was recovered from the USS *Tulip*, a Civil War gunboat from the Potomac Flotilla, that sank in 1864. The substance in question was a white powder in a medicine bottle. Analysis indicated that the ingredients of the substance were primarily calcium (Ca), phosphorus (P), potassium (K), and chlorine (Cl), with lesser amounts of iron (Fe) and strontium (Sr). The levels of each of these ingredients was much higher than that of natural sea water and in the range of thousands of parts per million in the sample. The Ca would complex with PO<sub>4</sub>. The Cl would be found as a chloride, such as KCl, NaCl or CaCl<sub>2</sub>. Fe and Sr are ingredients in plant products, although organic constituents are invisible to the XRF analyzer. We suggest that the bottle contained at least calcium phosphate and potassium chloride, perhaps with organically-bound trace metals. A possible medical application of calcium phosphate is as a nutritional supplement for remineralization. Potassium chloride is likewise used to treat hypokalemia (potassium deficiency) and to replenish other electrolytes.

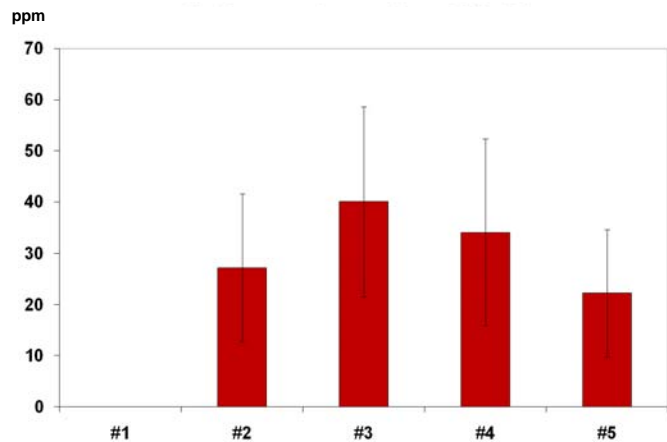
Another specimen from USS *Tulip* was from a bottle recognizable as an inkwell (see Figure 3). The chemical fingerprint of that mixture revealed the



ALS-084 Medicine bottle containing white powder with the elemental composition shown in the histogram as ppm (\*note that the relative concentrations of Phosphorus (P) and Calcium (Ca) are extremely high, and thus they have been rendered as fractions to allow the other elements to display on the chart). Image by Thermo-Fisher, Co.



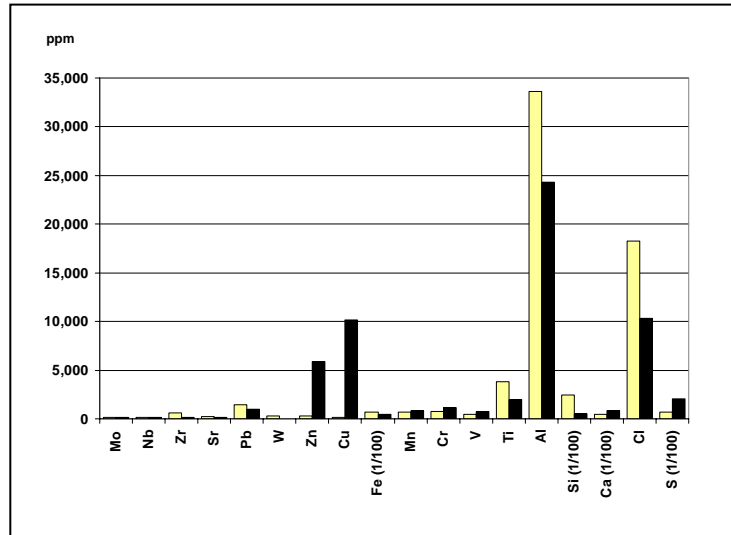
TUL-082. Inkwell containing a tan-colored particulate substance rich in metals such as Iron (Fe), Aluminum (Al), Lead (Pb) and Titanium (Ti), shown in the histogram as ppm (\*note Iron (Fe) and Silicon (Si) rendered as fractions).



Unidentified specimen recovered from the deck of CSS Alabama and thought to be putty, machine grease, or "white lead." Lead (Pb) concentrations through the thickness of the specimen shown on the right. No lead was detected at the surface, but concentrations increased towards the center of the specimen (#3). Moreover, the brown surface film contained four times the maximum Pb value in the specimen itself. Image by Thermo-Fisher, Co.



Fort Story Wreck,, Virginia Beach, Virginia. Inset shows detail of caulking. Photo by the author.



Elemental fingerprints for caulking from Fort Story wreckage (Virginia) in white and Fort Young wreckage (Caribbean) in black. Image by Thermo-Fisher, Co.

presence of iron (Fe), aluminum (Al), lead (Pb), zinc (Zn), strontium (Sr) and rubidium (Rb). The variety of metal components was indeed similar to that found in iron-gall inks from the 19th century, confirming the interpretation based on the shape of the bottle. Furthermore, aluminum is normally added as a gelling agent to prevent spreading of ink after application and its presence in the specimen may suggest that this ink was used for tattooing, a common activity among sailors. The light brown color is a consequence of the breakdown of pigments in seawater.

A unique artifact, a white putty-like substance was recovered from the deck of CSS *Alabama*, a Confederate raider lost in 1864. The material was originally



suggested to be an anti-fouling paint additive referred to as “white lead.” The results of XRF analysis initially did not reveal the presence of lead, somewhat to our surprise. We sectioned the specimen and took samples at 5-mm increments beginning at the surface and extending through the center of the

object. Lead concentrations increased toward the center supporting the identification as most probably a compound of lead carbonate and lead hydroxide  $(PbCO_3)_2 \cdot Pb(OH)_2$ , commonly known as white lead. In addition, we noted and analyzed a brown surface film of apparent biological origin covering the specimen. The film contained four times the maximum lead concentration of any of the samples from the specimen itself, suggesting that lead from the substance was in some way accumulating in the biofilm.

A comparison of caulking removed from spaces between hull planking on two shipwrecks, one from Virginia Beach, Virginia, and the other from the Caribbean, indicated distinct differences. These fingerprints likely reflect the uniqueness of materials used during the building or repair of the ships. For example, XRF analysis indicated high concentrations of copper and zinc in the caulking specimen from the Caribbean wreck. The finding was likely related to copper sheathing on the Caribbean vessel that was not present on the Virginia wreck. Coupled with other information from the site or from archival records, the findings may suggest the nationality of origin or the time period of construction for each vessel.

When unknown substances are discovered within a submerged site, they might be personal effects of the officers or crew, galley ingredients, or supplies left on the ship’s decking. Chemical analyses of these materials may illuminate the identity of the substances, even after 100 years of exposure to a hostile environment below the surface of the sea.

Results of this study indicate the potential for integration of elemental chemical analyses into investigations of unknown substances that are recovered during underwater archaeological projects. As an addition to any archaeological study, these data offer valuable interpretative information for submerged site assessment.

Based upon a presentation from the underwater symposium at the Middle Atlantic Archaeological Conference, Ocean City, Maryland, March, 2009. ⚓



# MAHS River Surveys: Updates of the Wicomico River, Pamunkey River, and Bodkin Creek Survey Projects

By Dennis Knepper, Tom Berkey, and Steven Anthony

**M**AHS is currently engaged in several large-scale projects in Maryland and Virginia that have kept many of our volunteers busy over the last year or so. As reported in previous issues of *MAHSNEWS*, two of the projects—the Pamunkey River Project, in Tidewater Virginia, and the Bodkin Creek Survey, on the Chesapeake Bay—involve extensive archaeological surveys of regional streams. The third project focuses on individual wrecks on the Wicomico River, in Salisbury, Maryland.

## Wicomico River

**A** series of wrecks has been recorded along a short stretch of the Wicomico River south of Salisbury's downtown business district. Steve Bilicki, maritime archaeological consultant with BRS Cultural Resource Specialists, conducted a side-scan sonar survey of parts of the river late in 2006 with the help of Salisbury University undergraduate student, Jennifer Gardner. Four sites were discovered in the downtown area: 18WC185 (Upper Wicomico #1), a hull fragment from an unidentified wooden ship which was observed in the sonar survey; 18WC186 (Salisbury Wreck #1), a rectangular barge; 18WC187 (Salisbury Wreck #2), a large centerboard vessel, possibly a schooner; and 18WC188 (Salisbury Wreck #3), a Higgins Landing craft, or LCVP, short for landing craft vehicle, personnel. The last three wrecks were observed lying in the sediments along the shoreline at low tide.

MAHS was asked by Dr. Susan Langley, Underwater Archaeologist for the State of Maryland, to document the remains, and volunteers have worked periodically at the sites since the winter of 2006. This year we focused on the centerboard wreck, 18WC187. Because of the location of the site along the low water mark of the estuary, we have treated it as terrestrial, working there at seasonal low tides when the wreck is partially exposed. These very low tides typically occur in the dead of winter which, as some of our volunteers reminded us, is due to planetary mechanics. That is, the earth is nearest the sun in winter, adding to the tidal forces generated by the moon. At first glance this seems counter-intuitive, since one would think that being closer to the sun should mean warmer weather. But actually the seasons are the result of the tilt of the planet's axis rather than our elliptical orbit.

So, this winter we made three trips to the site, working in small teams of experienced volunteers since time and space on the tidal flats are both limited. While



*Centerboard Wreck, 18WC187, Wicomico River, Salisbury, Maryland. Photo by D. Knepper.*

tides were predicted to be almost one foot below mean low tide on each occasion, several other factors contributed to keeping water levels fairly high. On two weekends, rains during the previous days led to increased runoff which kept the wreck site partially submerged. In addition, winds blowing upstream also kept water from flowing freely downstream. Nevertheless, cold but intrepid MAHS volunteers were able to collect good data, filling in details of a site map begun in 2007-2008.

We also located the aft end of the wreck, where it lies along the drop-off to the navigable channel of the river. This is probably not the stern of the vessel since the hull appears to have been truncated at this point, possibly during dredging of the channel at some time in the past. As measured, the wreck is at least 22 meters in length, corroborating evidence from the partial beam measurements and the sizes of the frames and hull planks that the vessel was large.

Additional work may be conducted at the site to further document framing and fastener patterns, the



configuration of the centerboard and trunk box, and to better define the aft end of the wreck.



*Phillip and Jennifer Kalmanson measure the trunk box on the Centerboard Wreck, 18WC187, Wicomico River.  
Photo by D. Knepper.*

## **Pamunkey River**

Work continues on research phases of the Pamunkey River project. During the Civil War, the Union supply depot for campaigns on Richmond in 1862 and 1864 was located along the river at White House Landing, a property belonging to the Custis family, and by some accounts, the site of Martha Dandridge Custis's marriage to George Washington. In the spring of 1862, the Confederates scuttled over 60 schooners and steamers in the river near White House Landing in an attempt to delay the advance of combined U.S. amphibious forces. Later, when Union advance stalled, many vessels were abandoned here during the retreat southward to the James River.

Beginning in 2003, MAHS initiated a search for archaeological evidence of these campaigns. In 2004, MAHS teamed with archaeologists from NOAA and Washington College, in Chester, Maryland, to complete a side-scan sonar survey of 14 miles of the Pamunkey, from Cumberland to Garlick's Landing. Side-scan images were recorded and linked to specific locations on nautical charts of the river, indicating that a large number of submerged anomalies are present in the area. MAHS field schools in 2004 and 2006 focused on a series of hull remains at White House Landing thought to represent canal barges used in the Union campaigns. Also in 2006, a terrestrial survey of the White House plantation site (44NK0048) was conducted using thermal imaging equipment in an attempt to locate a pair of graves reportedly on the property. No evidence of the graves was found.

Work conducted in the past year included additional research at the National Archives, in Washington, D.C., undertaken by J. Michael Moore, Registrar at Lee Hall Mansion in Newport News, Virginia. Moore was assisted by MAHS volunteers Tom Berkey, James Smailes and David Shaw. The documents at the Archives are generally divided into Record Groups (RG) by the Federal agencies that originated or received them. With the assistance of the archivists, documents from the following RGs were reviewed:

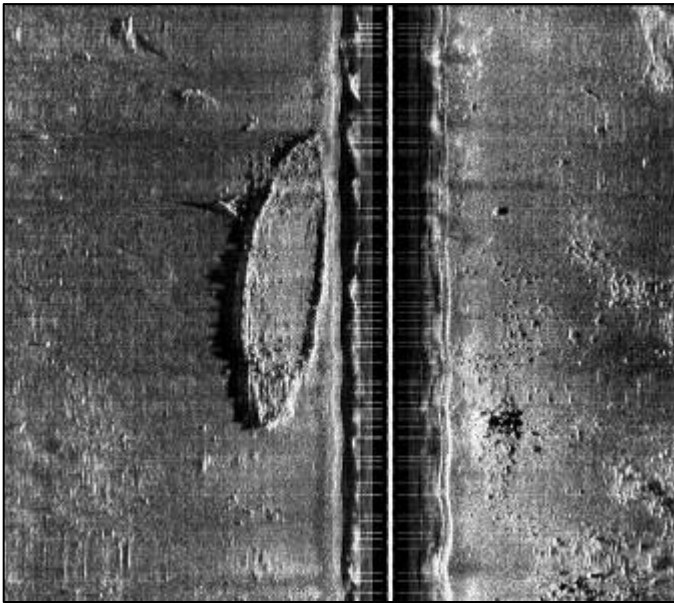
1. Record Group 92, Records of the Office of the Quartermaster General, Transportation, 1834-1917, List of Chartered Vessels, 1861-1863, E 1413. 2 volumes.
2. Record Group 107: Office of the Secretary of War (correspondence).
3. Record Group 192 Records of the Office of the Commissary General of Subsistence (Army).
4. Record Group 393, Continental Army Command Records Part I, Register of Vessels Arriving and Departing from Fort Monroe, June 1862-June 1864, Vol. 223, Department of Virginia and North Carolina, E 5188.

We have also initiated compilation and writing of a preliminary report aimed at publication in a regional archaeological journal

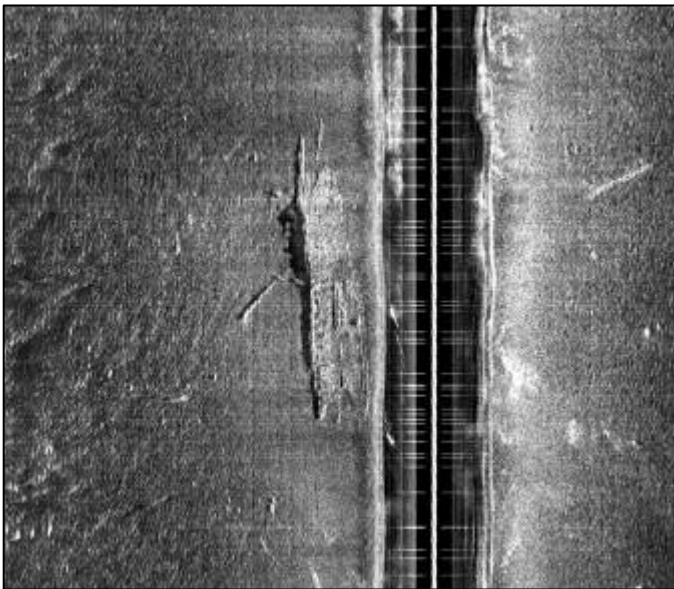
## **Bodkin Creek Survey**

MAHS received a Non-Capital Historic Preservation Grant from the Maryland Historical Trust (MHT) in August of 2008 to conduct a comprehensive historical and archaeological survey of Bodkin Creek. Situated just below the mouth of the Patapsco River and the approaches to Baltimore, Bodkin Creek is a strategic location for commerce and shipping as well as a significant military location.

The MAHS survey of Bodkin Creek is a comprehensive study that encompasses the entire maritime environment along the estuary, including underwater, shoreline and terrestrial locations. The project includes intensive archival research; a remote sensing survey of underwater portions of the creek estuary and its bayside approaches; and a survey of known terrestrial sites along the shores of the estuary. A report summarizing the archaeology and history of the area will be completed at the end of the survey. An additional task involves reconditioning a side-scan sonar unit that was donated to MHT, as well as preparing a user manual for the unit. The sonar unit will then be made available to volunteer groups working in State waters.



*A clearly defined vessel-shaped image from the side-scan sonar survey of Bodkin Creek. Image courtesy of GeoMar, LLC.*



*Articulated vessel remains detected during the side-scan sonar survey of Bodkin Creek. Image courtesy of GeoMar, LLC.*

As reported in the last issue of *MAHSNEWS*, the initial step in the survey involved research at the MHT archaeological site files in Crownsville, Maryland, to determine what archaeological surveys have been conducted in the region in the past and what sites have been recorded. The archaeological sites that have been documented range from prehistoric Native American camps and shell middens to Hancock's Resolution, an eighteenth-century plantation, and further to nineteenth and twentieth-century canals and wharves.

Field work began over Labor Day weekend of 2008 with a remote sensing survey conducted by GeoMar, LLC. The survey ran for 12 consecutive days,

employing a Klein 595 Digital side-scan sonar in tandem with a Marine Magnetics Explorer magnetometer. Ten-hour days were spent on the water during which a 2.5-square-nautical-mile area was scanned on systematic search lanes. Many targets were identified, both inside the mouth of the creek and beyond, into the Bay. Several very distinct wreck shapes were recorded by the side-scan sonar as well as a variety of non-descript features, both acoustic and magnetic. Although there was little apparent correlation between the two sets of results, at least on first glance, post-processing of the data continues.

On the following Columbus Day weekend, MAHS volunteers dove on several of the sonar targets, particularly those with the most distinctive ship structure. Targets with significant sonar profiles were reacquired, scanned from several angles, and marked with buoys. Divers confirmed that two of the wrecks were wooden, with apparent stem posts, frames and planking. The third wreck appeared to be metal. More detailed identification of the targets was hampered by poor visibility and marine growth which covered most of the features.

In December, when the water was colder and clearer, MAHS revisited several of the sites to conduct further documentation of the wrecks. Working again with archaeologists from GeoMar, LLC, a small ROV was deployed on one of the targets. Video from the ROV showed frames and hull planking, and artifacts including a ceramic bowl fragment. Although volunteers were ready to go into the water, the ROV images were so clear that putting divers on the wrecks was not considered necessary at that time. All agreed that it was better watching video of the features in the comparatively warm cabin of the research boat than swimming around in 45-50 degree water.

During the winter months, MAHS volunteers also conducted archival research at the National Archives and other locations. With the assistance of the archivists, Tom Berkey reviewed documents from the following RGs:

1. Record Group 45 Naval Records Collection of the Office of Naval Records and Library E574-Indexes to Correspondence Concerning Applications for Letters of Marque Vol 1.
2. Record Group 41 Records of the Bureau of Marine Inspection and Navigation, Field Office (Custom House) Records Baltimore, MD, Vessel Documents and Related Material 1774-1955, for Certificates of Registration and Enrollment and Carpenters Certificates from the Collector of Customs at Baltimore.

Berkey also visited the Library of Congress to examine the Samuel Smith Family Papers at the Manuscript



*GeoMar's ROV being prepared for deployment in the Bodkin Creek survey. Photo by D. Shaw.*



*ROV image showing a large ceramic sherd on one of the wreck sites. Photo courtesy of GeoMar, LLC.*

Reading Room. Samuel Smith was the militia commanding general responsible for the defense of Baltimore during the War of 1812.

Additional work during the months of February and March included initiating the terrestrial portion of the survey. The aim of this part of the project was to visit as many of the recorded terrestrial site locations as might be practical in order to assess current conditions at the sites. Two weekend visits to the creek were required to examine all of the sites, and a variety of MAHS volunteers participated. We were graciously and ably assisted in this work by James Morrison, President of the Friends of Hancock's Resolution, and Henry Schmidt,

President of the Hancock's Resolution Foundation. Morrison is a long-time resident of Gibson Island and has become an expert on local history. Schmidt is a tenth-generation Hancock, and he and his family own property along much of the northern and western shores of the creek. Both gentlemen were valuable sources of historical information, not only regarding the early history of Hancock's Resolution and the War of 1812, but also regarding the later history of the area, from the late-nineteenth century on into the twentieth century. The wealth of information was such that we returned in April to conduct an oral history interview which will be included in the final report. ⚓

## **USS *Monitor* Conservation in the Classroom**

*By Erin Secord*

Conservators with the USS *Monitor* Project at The Mariners' Museum have developed a chemistry field trip program for students aged 11-17. The program's content and context is based on the degradation and conservation of metal artifacts recovered from the USS *Monitor* shipwreck. The program has been popular with teachers and students due to both the topics and to the hands-on demonstrations. The program is designed to meet the Virginia School Board's Standards of Learning and to introduce the fields of marine archaeology and conservation to a young audience.

The Chemistry in Conservation program complements The Mariners' Museum's (TMM) existing education programs. TMM's education department delivers programs to over 20,000 participants a year via on-site, in-school and internet-video presentations. All

TMM programs have a hands-on interactive component that takes advantage of the extensive TMM collections. The Chemistry in Conservation program is thus able to use the on-site conservation of *Monitor* artifacts to demonstrate physical and chemical properties and changes.

The program is presented to students by USS *Monitor* Project conservation staff. The content of the program deals mainly with the physical and chemical changes metal artifacts experience during marine burial and subsequent conservation treatment. A general outline of the program includes:

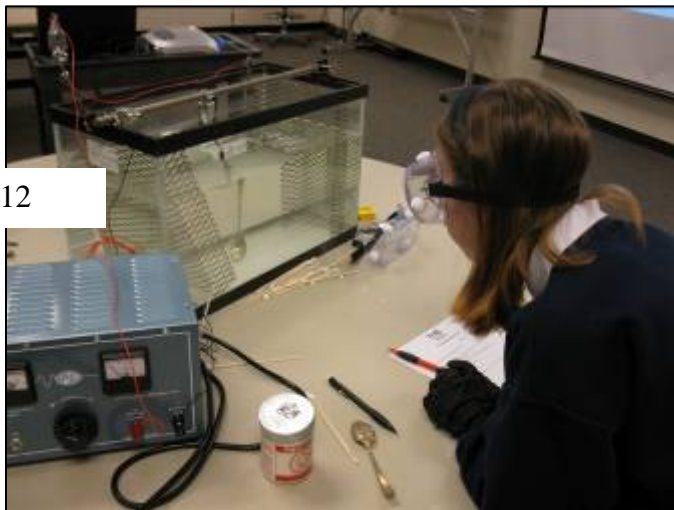
- Brief history of USS *Monitor*, including historical and technological significance
- Introduction to how artifacts develop concretions during burial
- Discussion of how accretions can be removed from artifacts



- Presentation of silver artifacts recovered from *Monitor* and discussion of their physical and chemical properties
- Explanation and demonstration of oxidation and its effects on silver metal
- Discussion and demonstration of physical conservation methods for silver
- Discussion and demonstration of chemical conservation methods for silver
- Evaluation of physical and chemical conservation methods

The science content of the program gives students the tools to understand, explain and predict the chemical changes that silver metal undergoes during the demonstrations. Though prior knowledge varies with grade and time of year, introducing new concepts and vocabulary to explain observed phenomena is applicable to any age group. Students are familiar with concepts of rust, polish, and electric circuits but are often not able to describe the chemistry behind the processes. By the end of the program, the students are able to explain how silver metal can tarnish and be made bright again.

Silver metal was chosen because its chemical reactions are quick and obvious. Oxidation is demonstrated by exposing bright silver spoons to ammonium sulfide gas. Ammonium sulfide gas is cheaply and readily available in single-use stink bombs. The bright silver spoon will change into shades of dark brown and black within a few minutes due to the formation of a silver sulfide tarnish.



*Electrolytic reduction of a tarnished silver spoon. Photo courtesy of The Mariners' Museum.*

The oxidized spoon is then treated by the students using physical and chemical means. The physical treatment involves applying a polish to the spoon to restore the bright finish. Part of the group discussion asks the students to explain how the polish restores the



*A selection of spoons from the USS Monitor site that have been treated by electrolytic reduction. Photo courtesy of The Mariners' Museum.*

bright finish and to identify the by-products of the process. The chemical treatment method involves applying electrolytic reduction to the spoon in a solution of sodium sesquicarbonate. The apparatus for this method is the most intricate component of the program and must be carefully performed for the safety of the students. A small electrolytic reduction setup is made using a fish tank, a direct current power supply, stainless steel anodes, a 2% sodium sesquicarbonate solution in water, and connecting wires and clips. The spoon is placed into the circuit and the power turned on. The reduction of tarnish is rapid and produces bubbles of hydrogen and oxygen on the surface of the spoon. After a few seconds of treatment, the spoons are removed from the apparatus and compared with the hand-polished spoons. The students then share which method they prefer and what they think the applications are of each. This discussion is very interesting because the students provide analysis of the methods, including how a physical treatment may be safer for one type of artifact while a chemical treatment may be more efficient for large or numerous artifacts.

The Chemistry in Conservation program allows conservators to introduce the fields of marine archaeology, recovery, and conservation in the context of a science lesson. For some students, particularly those home-schooled, this may be their first "lab experiment" and their first interaction with applied scientists. The program will continue to be presented at TMM and is currently being developed for Internet Video Conference delivery. There is great potential for other science-based education programs focusing on *Monitor* conservation and marine archaeology in general.

*The author is a conservator at The Mariners' Museum in Newport News, Virginia. This article was adapted from a presentation at the 2009 Middle Atlantic Archaeological Conference held in Ocean City Maryland. ⚓*

# Middle Island Life Saving Station, Lake Huron, Michigan

By Andrew J. Weir

The frequency of shipwrecks in the vicinity of Lake Huron's Thunder Bay in the latter part of the nineteenth century led to the establishment of many U.S. Life-Saving Service Stations in the area. The need for an institutionalized life saving service was brought to the forefront after the navigation season of 1870-1871, which claimed 214 lives on the Great Lakes. One of these stations, the Middle Island Life Saving Station (MILSS), is located on the Michigan shore of the lake, near the city of Alpena. Middle Island, so named for its location halfway between the northern point of Thunder Bay and Presque Isle, is located approximately one-half mile offshore.

Abandoned since the 1950s, the remains of MILSS are located on land currently owned and managed by the Michigan Department of Natural Resources (MDNR). The MDNR informed Mr. Wayne Lusardi, Michigan State Maritime Archaeologist at the Thunder Bay National Marine Sanctuary, that they were preparing to dispose of all structural remains at the station to prevent hazards to visitors. The MDNR agreed to postpone demolition of the site until thorough documentation could be conducted. An archaeological field school was organized for that purpose, serving as the final documentation of both structural and archaeological remains of the station prior to their removal.

The MILSS

Field School ran from Monday, July 11, through Friday, July 22, 2005. The project was designed and implemented as a cooperative effort between the PAST Foundation of Columbus, Ohio; the Thunder Bay National Marine Sanctuary and Underwater Preserve of Alpena, Michigan; and Commonwealth Cultural Resources Group, Inc. (CCRG) of Jackson, Michigan. The field school was developed as a tool to teach students basic terrestrial site documentation techniques and to explore the ways in which archaeological

information is used to understand the physical evolution of a site during its history, the activities undertaken by people who worked and lived at the site, and how the site has changed since its abandonment in the mid-twentieth century.

Two students and four volunteers participated in the field school. The students, Stephen and Ryan Riordan, used the field school as their Eagle Scout Leadership Service Project. The field school was directed by the author, who served as Project Archaeologist for CCRG, and State Maritime Archaeologist Lusardi. Mr. Weir used the field school as the basis for his 2007 East Carolina University master's thesis: *A Historical and Archaeological Analysis of the Middle Island Life-Saving Station: Applying Site Formation Theory to Coastal Maritime Infrastructure Sites*.

The MILSS was built in the early 1880's and was manned by crews that trained extensively in the use of boats and other lifesaving equipment. The station worked in conjunction with the Thunder Bay Life

Saving Station, located 14 miles to the south, and the Presque Isle Life Saving Station, located 14 miles to the north. These life-saving stations were among the busiest on Lake Huron, assisting hundreds of vessels every year and



*U.S. Life Saving Service Station at Middle Island in the late-nineteenth century. Photo courtesy of the Great Lakes Lighthouse Festival Museum.*

saving thousands of lives. The MILSS was decommissioned and abandoned in 1950's, leaving the station's structures and various artifacts behind. The island itself is completely uninhabited, with a working lighthouse as the only functional structure remaining.

The MILSS site is unique since only a few historic life-saving stations still exist on the Great Lakes. Those located on the mainland have generally been demolished and re-developed. Occasionally structures will be preserved, such as the boathouse at Whitefish Point, though often the reconstructions are not entirely



*Boathouse and Keepers House at MILSS. Photo courtesy of the Great Lakes Lighthouse Festival Museum.*



*Remains of the Boathouse and Keepers House at MILSS in 2005. Photo by the author.*

historically accurate, based solely on speculation or not located in their original positions. The Vermillion Life-Saving Station, owned by Lake Superior State College, is the closest parallel to the Middle Island station, though it too suffers from the ravages of time. At the time of the field school, the remains of the Middle Island station had been virtually undisturbed since the station's abandonment and offer an unparalleled look into the history of these stations.

Although the structural aspects of life-saving stations command most attention, separating the stations from the men who worked there would be impossible. The men are what link the brick, mortar and timbers of the stations to the larger maritime community. They are the ones who created the stories which have captured the imagination of maritime enthusiasts from around the world. In order to gain a better understanding of the MILSS and the men who worked it, Stephen Riordan went to the National Archives and Records Administration in August of 2004 and photocopied numerous original documents pertaining to the station. Included in these documents are Preliminary Wreck Reports, Wreck Reports, Articles of Engagement for Surfman, Certificates of Medical Inspection of Seaman, Report of Change in Crew, and numerous hand-written correspondence between the station and various departments. Although this is certainly not a comprehensive look that the primary source documentation concerning MILSS, a review of these documents gave a descriptive look into the bureaucracy required to run a life-saving station.

The most prominent features of the site were the standing structures and the structural remains. Based on the comparison between the archaeological record and historical photos there were at least 19 structures associated with MILSS. At the time of the project, the keeper's house, the boathouse, the privy, and a small

shed were the only standing structures left on the site. Fortunately, the field school crew was able to locate numerous historic photographs of the station to which they could compare the structural remains.

During the two-week field study the crew created detailed architectural drawings of the boathouse and the main keeper's house, created a detailed overall site map using a total station and GPS, excavated the privy associated with the boat house, excavated the cistern and a cellar of one of the domestic structures, photo-documented the entire site, and did a controlled surface collection of all diagnostic artifacts. In addition to the investigation at the main site, the crew also created a preliminary photo-mosaic and scaled drawings of a shipwreck, locally believed to be the *Portsmouth*, which is located in shallow waters adjacent to the Life-Saving Station.

According to historic photographs, the most dominant feature of the station was the boathouse complex, consisting of the boathouse and the keeper's house. The original floor plan of the boathouse shows that the structure had three stories. The first floor consisted of the boat room and the crew's dining room. The second floor consisted of the crew's day room, a spare room, and another room whose description is illegible on the floor plan. The third floor consisted of the crew's dormitory. The boathouse had completely collapsed prior to the field school.

One of the more striking features of the boathouse was the floor, composed of tongue and groove cedar which doubled as the boat ramp for launching the surfboats into the small harbor. It was mostly covered by the structural debris associated with the boathouse collapse. Another unusual feature of the boathouse was a concrete room that was only accessible through the floor at the rear of the building. Based upon the size of



the room and the location near the kitchens of the boathouse and the keeper's house, this room was likely a cold storage area. Detailed investigation of the room was hampered by three rather large turkey vulture chicks that had taken up residence inside.

After completion of the field portion of the project, a series of photographs was found that show a group of buildings in context with known features of the site. Despite the fact that the field crew knew that this would likely be the last comprehensive investigation of the site, they failed to locate several prominent features noted in the photographs.

The pictures, taken in 1974, show four structures: a white, house-like structure; a smaller, shingled domestic structure; and two outbuildings. Despite an extensive survey of the site during the two-week field investigation, no evidence of these structures appeared in the archaeological record. Due to the substantial nature of the structures, it is believed that sometime between the 1950's decommission of the station and 1974 they were removed from the island.

Logic dictates that although the structures themselves may be gone, some evidence of their foundation or other types of architectural supports should still exist. Archaeological site investigations at the Thunder Bay Island Life-Saving Station revealed several limestone foundations that were the only remnants of the structures associated with the station, with the exception of the intact boathouse. Since MILSS was built during the same time period as the Thunder Bay Island station, it is reasonable to assume that

similar construction techniques were used for both stations. Upon completion of the investigations on Middle Island, however, this proved not to be the case. The answer to this puzzle lies in three factors: construction technique; accessibility to resources (i.e., the proximity to Alpena); and type of ground surface.

Like the larger buildings at the site, the missing structures probably did not have substantial foundations. Thus after removal of the structures themselves, no evidence of their existence remained. As in the construction of the keeper's house, the posts of the missing structures were likely the only supports and, as part of the framing of the building, would have been removed with the structure. The shallow depth of these posts and the rocky nature of the ground erased any evidence of their positions and of the structures they supported, once the structures were removed.

Overall, the MILSS Field School was a great success. An important component of the project was an interactive web site developed by the PAST Foundation. Visitors, via the internet, could follow the project through daily updates, panoramic photographs, and background information about the crew, the station and archaeology in general. In addition to its use as a teaching tool, the data gained during the two-week study served as the final recorded history of this life-saving station prior to its demolition.

*The author would like to thank Mr. Wayne Lusardi for his contributions to this article. More information is available at: <http://www.pastfoundation.org/Middle Island> . ⚓*

## Heritage Protection in the English Marine Zone

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*By Mark Dunkley*

In April 2008, the Government of the United Kingdom (UK) published the Heritage Protection Bill. This innovative document proposed legislation to enable a wholesale revision of the existing law that protects the historic environment in England and Wales out to the 12-mile limit of the Territorial Sea. However, Parliamentary time was not found to take the Bill forward in the current session and so introduction of new legislation has been delayed. Despite this perceived setback, the staff at English Heritage know that the Government remains committed to the historic environment and intends to publish a statement on its vision and priorities later in 2009 and introduce legislation at the earliest opportunity.

English Heritage has therefore set up a dedicated Heritage Protection Reform Team to act as a new focus for reform, and we believe that we can still achieve



*Stern Carving on HMS Colossus. All photos courtesy of English Heritage.*

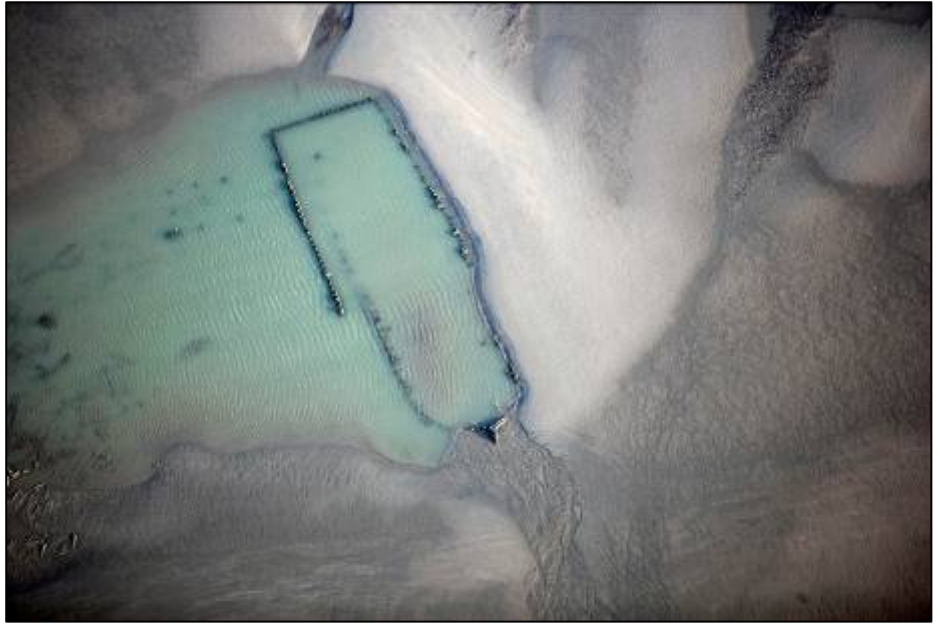
many of our goals to improve the designation system, widen public involvement, and simplify protection process without the need for primary legislation.

The marine strand of this strategy is to be undertaken by a Maritime Designation Advisor, appointed to initiate and lead project planning and management to both support and take forward key maritime projects. The policy background to English Heritage's approach to the marine historic environment is framed by the Government's adoption in 2005 of the Annex to the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage as best practice for archaeology. Where a marine heritage site qualifies for statutory protection, it is intended that future designation decisions will be based on special architectural, historic, archaeological or artistic interest. Detailed *Principles of Selection* will define what is 'special' in the marine environment with particular reference to 'vessels'. Our *Conservation Principles*, published in April 2008 and available online (<http://www.english-heritage.org.uk/server/show/nav.9181>), will provide the framework for making consistent, well-informed and objective conservation decisions while our innovative methodology for the *Risk Management* of Protected Wreck Sites, published in November 2008 and also available online (<http://www.english-heritage.org.uk/server/show/nav.001002003007002>), will assist with strategic prioritization.

In addition, English Heritage is working towards producing clearer designation records for marine sites, termed *designated asset descriptions*, to bring them into line with buildings and monuments. A formal consultation on strategic designation will commence in early 2009 which is likely to include submarines, East India Company vessels, and inter-tidal wreck sites. We are also mindful that the Marine and Coastal Access Bill will provide some level of protection for marine heritage in English waters.

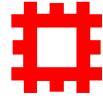
While it is disappointing that Parliamentary time

*Left: A bronze cannon from the West Bay wreck, a designated wreck site, discovered in 2004 by recreational divers. Assessment determined that the site consists of a low mound of heavily concreted iron bars containing an iron gun, also heavily concreted, and a possible seventeenth-century muzzle-loading bronze gun (shown at right) of European or Eastern origin. The bronze gun dates the site no later than 1750, but perhaps as early as 1627.*



*Remains of the Dutch cargo ship Amsterdam, a designated wreck site. Built in Amsterdam in 1748, the Amsterdam was 150 feet long, with 54 guns on her upper and lower gun decks. She sailed from Texel for Java on 8 January 1749 under the command of Willem Klump, in a convoy of five other ships. On the 26 January 1749, the Amsterdam was beached at Bulverhythe after the crew mutinied. During her short voyage 50 people had died and 40 more were sick or dying from an unknown disease - possibly 'yellow fever'.*





## What is English Heritage?

## ENGLISH HERITAGE

English Heritage is the UK Government's statutory advisor on the historic environment. Officially known as the Historic Buildings and Monuments Commission for England, English Heritage exists to protect and promote England's spectacular historic environment and ensure that its past is researched and understood. Their powers and responsibilities are set out in the National Heritage Act (1983) and reports to Parliament through the Secretary of State for Culture, Media and Sport (DCMS).

English Heritage is probably best known for the more than 400 historic sites, such as Stonehenge, in its care and open to the public. Less well known is their role in looking after the historic environment as a whole, including historic buildings, monuments and areas, and archaeological remains. Their activities not only ensure the preservation of the UK's historic surroundings for the future, but also encourage people to appreciate and enjoy this heritage today. It also maintains a public archive, the National Monuments Record (NMR), which contains more than 10 million historic photographs, plans, drawings, reports, records and publications.

was not found to take forward the Heritage Protection Bill at this time, English Heritage welcomes the Government's firm commitment to the historic environment. Although legislation is still required to create a unified list of all heritage assets and identify marine heritage sites on the basis of 'special interest,' the Heritage Protection Reform program is already underway. It is estimated that more than two-thirds of the changes set out in the Government's Heritage White Paper (as published in March 2007) can go ahead without primary legislation. Whatever happens,

changes to the way in which our marine heritage is enjoyed, understood, valued and cared for is in progress, and public engagement will be at the heart of this process.

*The author is Maritime Designation Advisor, Heritage Protection Reform team, for English Heritage. For more information on Heritage Protection Reform, see: [www.english-heritage.org.uk/heritageprotection](http://www.english-heritage.org.uk/heritageprotection) *

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*continued from page 2*

winter. MAHS was finally able to convert its Diving Into History Video series to DVD format with the able assistance of Mary Price at Videolabs and Mark Benjamin, who provided a substantial amount of personal time in the creation of new graphics for the DVD series. Many thanks to both of them for helping us achieve this long awaited conversion.

The MAHS annual Field School is scheduled for June 18 to 21. It will be conducted on Molasses Reef near Key Largo where an unidentified shipwreck site was found near the site of the *Slobodna* wreck. Florida State Underwater Archaeologist, Roger Smith, has requested a video survey of the site, and MAHS volunteers will be working on that task in conjunction with our annual Field School training program.

Please be sure to mark your calendar for our upcoming membership meetings and annual picnic in

August where you can learn more about these and other exciting opportunities in underwater archaeology available to MAHS members.

See you on the water,

Steven Anthony  
President





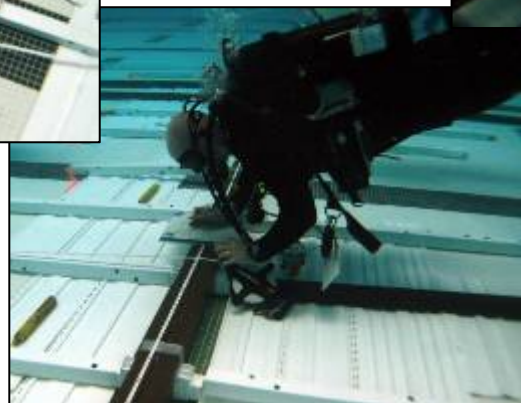
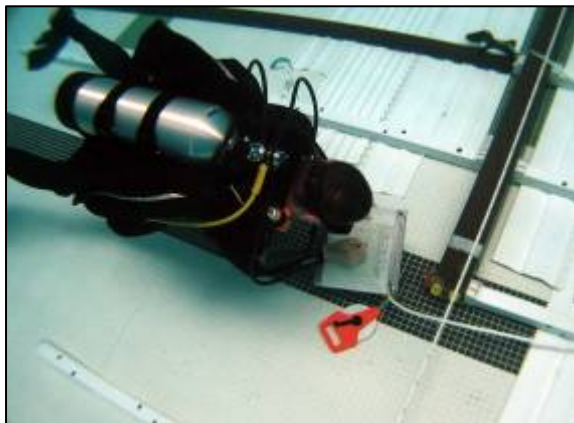
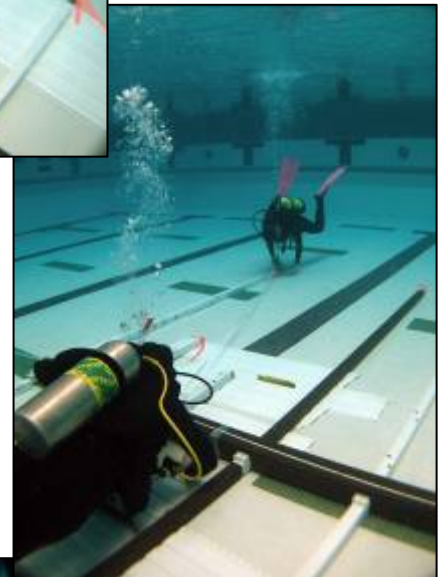
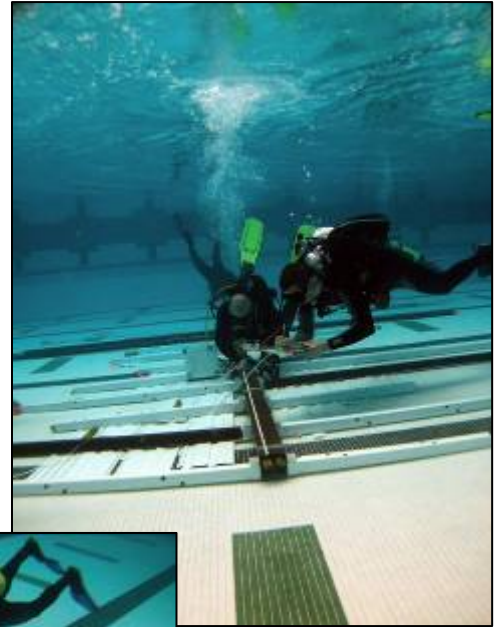
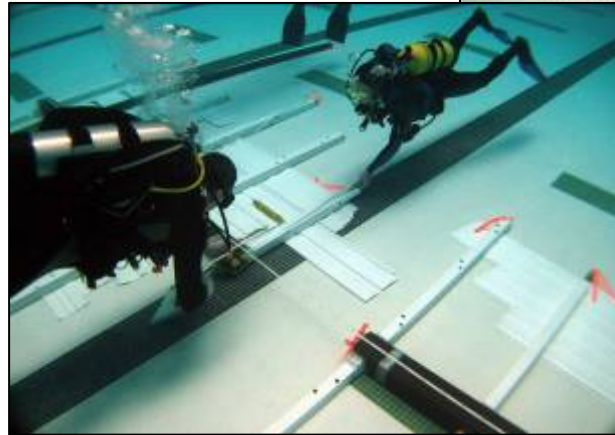
## MAHS Underwater Archaeology Class Pool Session 2009

The 2009 Pool Session was held once again at the George Mason University Natatorium.

MAHS volunteers assembled the mock shipwreck, *Lil' Sinkenteen*, on the bottom of the pool. The students meanwhile practiced the trilateration mapping techniques they had learned in the classroom, first through a dry-land exercise, then in the water on the mock wreck.

The class split into buddy teams, were assigned areas of the wreck site to map, did buddy checks, and conducted their dives under the watchful eyes of MAHS instructors.

*Photos by D. Knepper* ⚓



MARITIME ARCHAEOLOGICAL AND HISTORICAL SOCIETY

Statement of Ethics

The Maritime Archaeological and Historical Society is organized for the purpose of enhancing public awareness and appreciation of the significance of submerged cultural resources and the science of maritime archaeology. In pursuit of this mandate, members may come in contact with unique information and cultural material associated with terrestrial and underwater sites containing evidence of the history of humankind. To protect these sites from destruction by commercial salvors and amateur souvenir hunters, the Society seeks to encourage its members to abide by the highest ethical standards. Therefore, as a condition of membership and pursuant to Article 2, Section 1 (A) of the bylaws, the undersigned executes this statement of ethics acknowledging adherence to the standards and policies of the Society, and further agrees as follows:

- 1. To regard all archaeological sites, artifacts and related information as potentially significant cultural resources in accordance with federal, state, and international law and the principles and standards of contemporary archaeological science.
2. To maintain the confidentiality of the location of archaeological sites.
3. To excavate, or otherwise disturb an archaeological site solely for the purpose of scientific research conducted under the supervision of a qualified archaeologist operating in accordance with the rules and regulations of federal, state, or foreign governments. Artifacts shall not be removed until their context and provenience have been recorded, and only when the artifact and related data have been designated for research, public display or otherwise for the common good.
4. To conduct oneself in a manner that protects the ethical integrity of the member, the archaeological site and the Society, and prevent involvement in criminal violations of applicable vandalism statutes.
5. To observe these ethical standards and aid in securing observance of these standards by fellow members and non-members.
6. To recognize that any member who violates the standards and policies of the Society shall be subject to sanctions and possible expulsion in accordance with Article 2, Section 4 of the bylaws.

Signature \_\_\_\_\_ Date \_\_\_\_\_

(Revised 1993)

MARITIME ARCHAEOLOGICAL AND HISTORICAL SOCIETY
P O Box 44382, L'Enfant Plaza, Washington, DC 20026
Application for Membership

Membership in the Maritime Archaeological and Historical Society is open to all persons interested in maritime history or archeology whether or not they are divers. Members of MAHS have first preference for enrollment in all courses and other activities and projects of the Society. To join MAHS, please sign the Statement of Ethics above and send it to MAHS along with your check and this application form.

Name (print) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (H) \_\_\_\_\_ (O) \_\_\_\_\_ (FAX) \_\_\_\_\_

Email \_\_\_\_\_

Skills (circle): research/dive/photo/video/communications/drawing/writing/first aid/other:

DUES ENCLOSED
\$30 Individual
\$35 Family
\$50 Sponsor
\$100 Patron

Please mail this form along with your check to: MAHS at P.O. Box 44382, L'Enfant Plaza, Washington DC 20026.

General membership meetings of the Maritime Archaeological and Historical Society (MAHS) are held at 7:30 p.m. on the second Tuesday of each month. MAHS meets at McLean High School, in McLean, Virginia, except in July, August and December. The school is located on Davidson Road, just inside the Capital Beltway (I-495) - use Exit 45, coming from Maryland, or Exit 46, coming from Virginia. Meetings in July, August and December are held at other locations for special events and holiday parties. Please join us and bring a friend.  
{Check the website [www.MAHSNet.org](http://www.MAHSNet.org) for e-mail advisories about any schedule changes.}



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## Renew Now!

It's time to renew your membership in MAHS. It's easy. Just complete the application form on the inside back cover and sign the Ethics Statement, enclose a check for your dues, and mail! Thank you!

