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Spring 1979

Conservation in Nautical Archaeology

Since the earliest, tentative steps toward scientific underwater archaeology, following the invention of the Aqualung by Cousteau and Gagnan in the 1940's, interest in the field has grown to the extent that many countries are now engaged in underwater exploration and excavation. Part of this activity has been generated by an increased awareness by the public of its cultural heritage, and a growing concern for the protection of that heritage has led to cultural resource management efforts by the United States and other countries to locate, protect, and excavate historically significant and sometimes endangered shipwrecks. Unfortunately, there are not yet sufficient numbers of nautical archaeologists to direct all projects under consideration, nor are there trained conservators or conservation facilities available to handle properly materials recovered from the sea.

Conservation entails the documentation, analysis, cleaning and stabilization of an object. The objectives of cleaning and stabilization are to protect objects and prevent their reacting adversely with the environment after recovery.

Most archaeologists do not at present have the necessary experience or training to attack the conservation problems commonly encountered in marine projects. Few archaeological programs have adequately trained staff, properly equipped laboratories, or sufficient funds and time to develop conservation techniques. Few established conservation laboratories have the facilities to treat archaeological material from shipwreck sites. Further, most institutionally affiliated conservation laboratories do not accept outside material. Others focus only on unique or singularly spectacular items from archaeological sites or collections. Some are concerned almost exclusively with paintings, frescos, textiles, and more exotic materials not commonly found in archaeological sites; little attention is given to more mundane items. Because of these shortcomings, too many archaeological projects are initiated without proper, detailed conservation considerations.

The shortage of nautical archaeologists is being alleviated to some extent by new graduate seminars at Texas A&M University. A student may now receive from the University an M.A. in anthropology with a specialization in nautical archaeology, and a further specialization in either New World or Old World studies. As related in INA Newsletters, the Institute of Nautical Archaeology in 1976 affiliated with Texas

Dr. D. L. Hamilton supervises the removal of a large concretion from its storage solution in preparation for processing in the conservation laboratory. The concretion, from the Padre Island Site, was later found to contain two anchors, one cannon, a breech-block and numerous other small artifacts.

Photo Credit: Texas Archaeological Research Laboratory.

EDITOR'S NOTE

With this issue, the AINA Newsletter becomes the INA Newsletter, following the legal change of the name of the Institute. The change was made to reflect the international character of the Institute's staff, directors, and projects.

A&M, joining there geographer Edwin Doran, an authority on watercraft of many regions, but with a special interest in the Pacific and Far East. George Bass and Frederick van Doorninck, Jr., offer courses in the history of seafaring from the preclassical through medieval periods, and J. Richard Steffy teaches the history and theory of wooden hull construction, and the techniques of wooden hull reconstruction; all three continue to devote part of each year to writing and conducting research on behalf of the Institute. Field projects, sponsored mostly by INA, provide students both from Texas A&M and from INA's Supporting Institutions the opportunity to experience excavation techniques and survey procedures that are only mentioned in classes, where emphasis is given to such topics as the economics of ancient trade, the principles of harbor construction, or tactics of Greek naval warfare. The entire program allows students to enter the field of nautical archaeology with a more thorough knowledge of all its various aspects than previously was possible. A major weakness in the academic program, however, has been in the area of conservation.

The faculty in the Department of Anthropology at Texas A&M University and the INA staff, aware of this weakness, jointly recruited Dr. D. L. Hamilton, a conservator specializing in the conservation of material recovered from underwater sites. Prior to moving to College Station last summer, Dr. Hamilton had directed the activities of the Antiquities Conservation Laboratory of The University of Texas at Austin for seven years. During that time he was responsible for teaching conservation classes, preserving all of the material recovered from the 1554 Spanish shipwrecks excavated off Padre Island under the direction of the Texas Antiquities Committee, and conducting research in conservation. The results of his work have been presented in a number of publications, the most exhaustive report being his *Conservation of Metal Objects from Underwater Sites: A Study in Methods.*

Dr. Hamilton now directs the newly established Conservation Research Laboratory at Texas A&M University, where he continues to teach and conduct research, and from which he will supervise on-site conservation for INA and/or Texas A&M projects when the need arises.

A building assigned by the University for Dr. Hamilton's work is now being modified. There remains the long and arduous task of securing the array of chemicals and equipment required of a major conservation laboratory, but already the building is adequately equipped to teach classes, handle standard conservation procedures — such as electrolytic reduction — and work on some outside projects in which students can participate as part of their training. For example, a steel hull plate recovered from the famous Civil War ironclad Union gunboat, the *U.S.S. Monitor,* has been sent to the Texas A&M Conservation Research Laboratory by the Fort Fisher Laboratory in North Carolina. Due to the present lack of facilities capable of conserving the large plate in North Carolina, students at Texas A&M will have the unique opportunity to preserve an important part of American history: a piece of the ship that battled the similarly ironclad Confederate gunboat *Merrimack (C.S.S. Virginia)* on March 9, 1862, and was lost in a storm on December 31 of the same year. When its treatment is completed, the plate will be returned for public display as a visual reminder of this epic engagement and as the earliest example of the revolutionary innovation of ironclad ships.

Dr. Hamilton uncrates a metal plate from the "U.S.S. MONITOR" prior to beginning its treatment at the newly established Nautical Archaeology Conservation Research Laboratory at Texas A&M University.

Photo Credit: Texas A&M University.

The creation of the laboratory comes only two years after the National Advisory Council on Conservation pointed out the critical need for additional conservation facilities, trained conservators, and educational programs for teaching the processes of treating archaeological material. The new laboratory is one of only five or six in the United States dedicated to the preservation of material from shipwreck sites, and the only one of its kind in the country where specialized academic courses on conservation techniques are offered.

A concern for the conservation of artifactual materials from the sea results not only from a recognition of the historical and anthropological significance of material recovered from shipwreck sites, but from an awareness that if such finds are left untreated they will suffer irreversible damage and possibly complete destruction. Because it is the responsibility of an archaeologist to see that material recovered from his site is properly conserved, the special value of conservation training for students of nautical archaeology is apparent.

In Dr. Hamilton's courses, students are introduced to the synthetic resins, adhesives and consolidants used in conservation, and are instructed in techniques of

(Cont. p. 6)

CYNTHIA EISEMAN RESIGNS AS EDITOR

The *Newsletter* was conceived by Cynthia Eiseman, who has edited and produced each number since the first appeared in 1973. Ms. Eiseman resigned as editor with the last issue, both in order to have more time for her own research and because, she felt, the center of INA activity had moved from Philadelphia to College Station. She deserves our warmest gratitude for the many thankless hours she devoted to keeping news flowing to our members — it was not easy for her to pry manuscripts from field directors spread over the globe — especially because it was a voluntary effort whose only reward was seeing the INA membership grow and INA grow with it. Until a new permanent editor is found, the *Newsletter* will be put together by those of us who are on hand at any given time. This issue is edited by Kenneth Cassavoy, one of our graduate students at Texas A&M University.

JEREMY GREEN JOINS INA

Jeremy Green first became interested in Maritime Archaeology in 1964 when he participated in the Oxford University Underwater Explorers' Club expedition to Malta. In 1967 he joined Dr. E. T. Hall's Research Laboratory for Archaeology and the History of Art, at Oxford, to develop magnetometers and metal detectors for underwater archaeological work. Green worked briefly with George Bass at Yassi Ada in 1967 and then later with Michael Katzev in Cyprus at Cape Andreas and Kyrenia. In his home waters off Britain he carried out surveys on the Armada ships *Santa Maria de la Rosa* and *Trinidad Valenceria* and the Dutch East India Company ship *Amsterdam.*

In 1971 Green joined the Western Australia Museum as Curator of Maritime Archaeology, carrying out a survey of the 1622 ship *Trial,* excavating the 1656 *Vergulde Draeck* and then directing 4 field seasons on the 1629 ship *Batavia.* During this period he also joined Sydney Wignall's project *Revenge* in Panama, worked with Colin Martin on the *Dartmouth* and assisted Robin Piercy on the Mombasa Wreck for three seasons.

Currently Green is working on photogrammetric and surveying techniques and the reconstruction of the *Batavia* in conjunction with Richard Steffy of INA. He also holds the position of Chairman of the Australian National Advisory Committee on Maritime Archaeology. Effective immediately Mr. Green joins the Institute of Nautical Archaeology as a Research Associate.

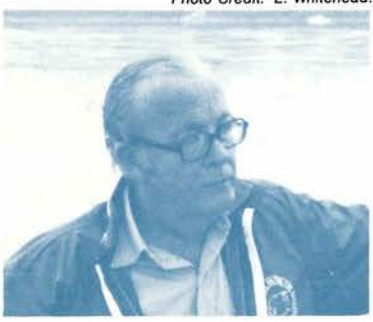
PEOPLE AND PROJECTS

Don Keith and George Bass spent nearly a month in Mexico recently, conducting a seminar on underwater archaeology for the National School of Anthropology and History . . . The Mombasa excavation is getting attention around the world, with major articles cropping up in the Athens News, Cyprus Mail, Illustrated London News, and elsewhere. Robin Piercy directed most of the campaign from a hospital in Mombasa; part of the underwater telephone booth had fallen onto his foot at the end of the 1978 Turkish campaign, breaking it badly. He writes from his bed that new INA Research Associate Jeremy Green (from Australia) and Texas A&M graduate student Roger Smith had taken up the slack . . . Roger Smith and Paul Hundley (both veterans of the *Defence* excavation) are visiting the Cayman islands for INA to complete preparations for an underwater survey planned for this summer . . . George Bass recently lectured to the University Museum in Philadelphia, the Dutch Treat Club in New York, the Congressional Underwater Explorers Club in Washington, the Greensboro chapter of the Archaeological Institute of America, and the symposium on ancient trade jointly sponsored by Duke University and the University of North Carolina.

PROFILE

With this profile of Nixon Griffis, one of INA's founding directors, the Newsletter *begins a new feature which will introduce those associated with INA to its members.*

Photo Credit: E. Whitehead.



When we called Nixon Griffis' New York office for biographical material we learned that he was in the Fiji Islands, which was not surprising since once before we had been told that he was studying whales somewhere around Tierra del Fuego. We had been surprised in 1977, however, when he arrived tired and unshaven at Serçe Liman, Turkey, bringing with him travellers' checks to tide the expedition over until cabled funds, somehow lost in the system, arrived at the local bank. Next day he took the first leg of his return trip to New York, six hours in rough seas in an open fishing boat skippered by a nervous teenager.

Nixon Griffis has a habit of turning up in faraway places. He was a working diver during the excavation of the Bronze Age shipwreck at Cape Gelidonya, Turkey, in 1960, and in later years shared the excitements and hardships of Yassi Ada. At that time he was head of Brentano's Bookstores.

George Bass and Nixon Griffis were introduced by Peter Throckmorton in 1960, when Throckmorton was showing slides, in his New York loft, of the discoveries he had made off the Turkish coast. He and Bass were looking for sponsors for the excavation of the Cape Gelidonya wreck. Others were reluctant to back an unproven pair of archaeologists, who proposed excavating an underwater site as if it were on land — especially as the true nature of the site was as yet unknown — but Nixon Griffis gambled, becoming the first individual to support modern, scientific underwater archaeology.

Griffis' love for the sea may be inherited from his great grandfather, Capt. John Limeburner Griffis, who was shipwrecked and nearly starved at sea with Herman Melville. This love continues not only through his association with INA, but in his capacity as a very active trustee of the New York Zoological Society, with a special interest in marine life, and as a past president of the American Littoral Society.

Now 62, Griffis has three children and two grandchildren. When we last saw him, he had a badly cut hand from an ornithological expedition in South America. We expect to see him on one of the INA projects this summer!

HIKMET GÜRÇAY

It is with great sadness that we have learned of the death of Hikmet Gürçay following a short illness. Hikmet Bey was Director General of Antiquities and Museums during most of the years that we have excavated shipwrecks in Turkey. It was due to his understanding that Turkey became the foremost country for underwater archaeology in the Mediterranean, and that a team of Turkish archaeologists and divers is now second to none. Under his overall directorship, the Bodrum Museum for Underwater Archaeology has become a major center for ancient maritime studies.

Hikmet Bey had recently retired as Director General and was serving as an advisor to the Turkish Ministry of Culture. He was a friend, always sympathetic to our special problems, and will be greatly missed by all of us at the Institute of Nautical Archaeology.

– G.F.B.

NAUTICAL ARCHAEOLOGY TOUR

The Institute of Nautical Archaeology is sponsoring a tour of archaeological sites in Greece and Turkey on board the "OREA ELENI", leaving Pireaus on July 7, 1979. Tour guides will be Dr. George F. Bass, Michael L. Katzev and other archaeologists on the staff of INA. The tour will include stops at Mykonos - Delos, with its ancient harbour - Samos - Ephesus (Turkey) - Bodrum, where Dr. Bass will lead a visit to the Museum of Nautical Archaeology - Serce Liman (Turkey), where the Institute is excavating the famous Islamic glass wreck (see National Geographic Magazine, June, 1978) - Marmaris - Rhodes - Thera - and arrive back in Pireaus on July 21. The "OREA ELENI" is a motor sailer carrying a maximum of 38 passengers in 17 double berth cabins and 2 four berth cabins, each with private bath, air conditioning and 110 volt light and electric extensions.

As we go to press some accommodations are still available but anyone interested in joining the expedition, or receiving more information on it, should contact the Institute immediately at 713 - 779-4101.

THE BROWN'S FERRY MODEL

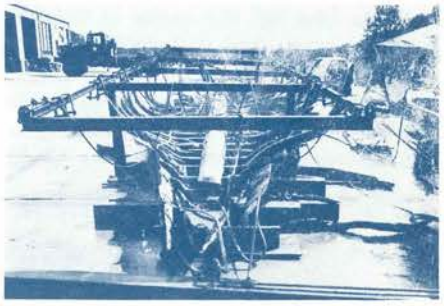
The Brown's Ferry Project was not an INA excavation. We feature it here because it represents an effort on the part of some of our staff which is unknown to many of our members. Each week we are faced with calls or letters requesting help or advice relating to matters in our field. Such inquiries are honored whenever possible. This project is an example of the extent to which such assistance is sometimes carried.

At a conference in Ottawa, I listened to a paper presented by Alan Albright, Underwater Archaeologist for the Institute of Archaeology and Anthropology at the University of South Carolina. A few months earlier he and his crew had spent seven intensive weeks raising this wreck and its artifacts and cargo from the Black River at Brown's Ferry, Georgetown County, South Carolina. Situated in 20 to 25 feet of tannin-stained water and only 25 feet from an old ferry ramp, it was covered with rocks, mud, trees, bricks, the remains of a horse and buggy, and at least two automobiles. It was carrying 25 tons of bricks as final cargo. All 10,000 of these bricks were recovered, along with cooking pots, bottles, smoking pipes, and other crew-related artifacts.

The bottom of the hull and much of its framing had survived as a unit. A large portion of side planking was still loosely attached to this structure. Most of the planking had to be removed separately, but the bottom structure was raised as a unit by suspension from an ingeniously designed metal frame. Limited by time and budget and often faced with seemingly insurmountable obstacles, Alan and his team must be complimented for their successful retrieval of these valuable relics of early Americana.

With the hull raised and stored under water sprays to keep its timbers from drying out, he now turned to us for help. Artifacts dated the wreck to around 1740. Repairs and wear to the timbers indicated the vessel had been built years before. Obviously, this was the oldest preserved hull in America and there were few people Alan could turn to for documentation and reconstruction. We could not conscientiously ignore it.

There were problems. Alan's budget was nearly depleted; ours was zero. We

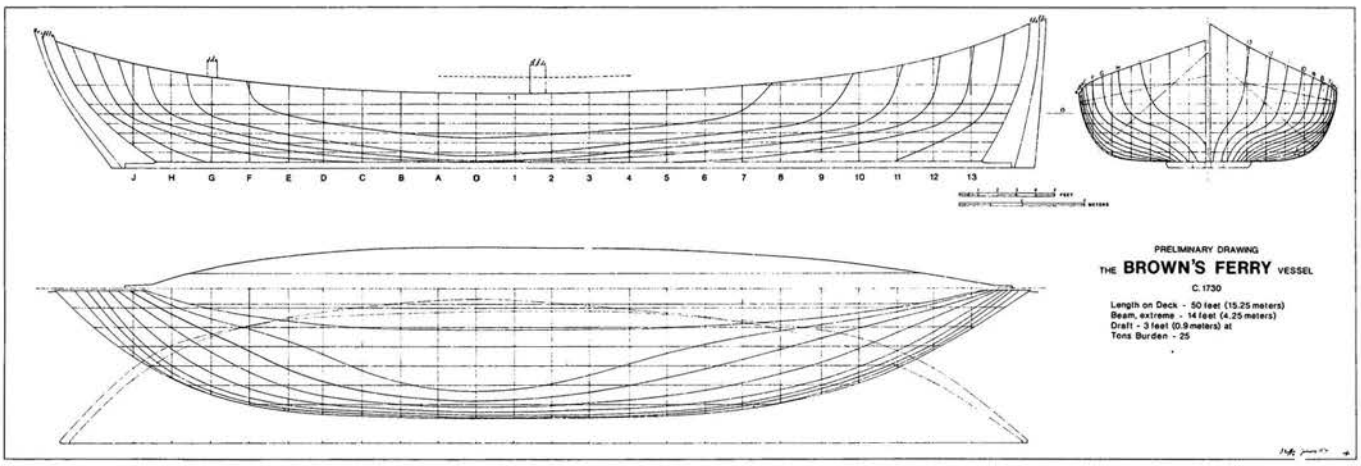


The hull and lifting frame in temporary storage at Fort Jackson. Photo by Alan Albright.

decided to do a low-cost preliminary study at first. Such a study would insure documentation of the merchantman's most important features and perhaps create enough interest to finance the preservation and reconstruction steps to follow. As I was already swamped with academic and Institute duties, it would largely be an after-hours project. Materials and supplies would have to be limited to those left over from previous projects.

Ralph Wilbanks, South Carolina archaeologist, and the author fitting bow timbers. Photo by Alan Albright.

Three days were spent in South Carolina dimensioning the hull and recording construction features. In College Station, these were converted into hull plans, a five-foot research model, and a report describing the construction features and advising on future work. All were completed within four months.



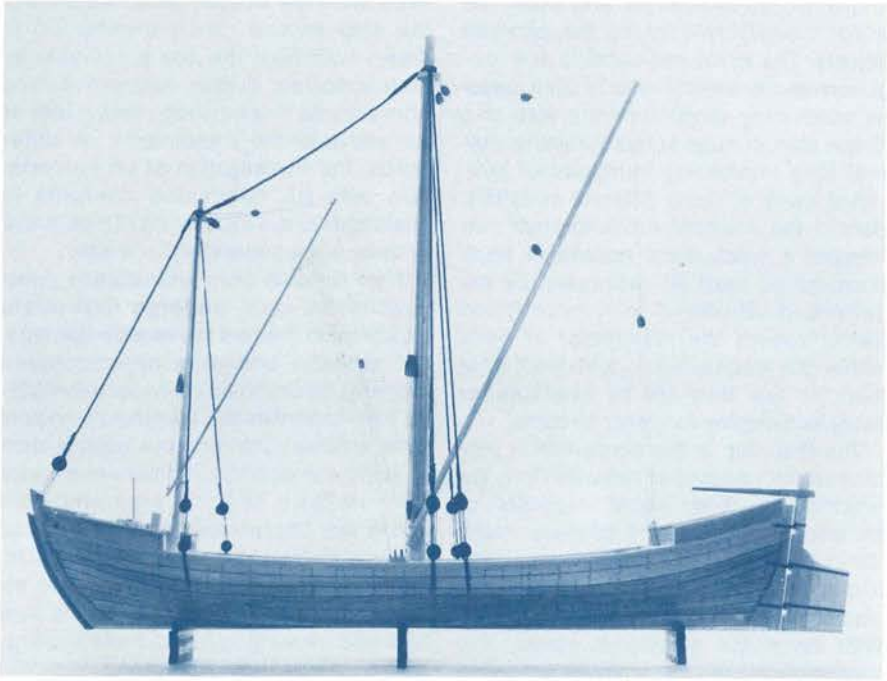
The hull lines. Drawn by J. Richard Steffy.

We didn't stop there, however. Alan expressed the desire that the model be completed beyond excavated evidence, rigged, and sent to South Carolina so that people could better visualize what the Brown's Ferry vessel looked like. We submitted articles to *Texas Antiquities* and the *International Journal of Nautical Archaeology* for publication. And all through the spring semester, the model and drawings were used as teaching tools for nautical archaeology students at Texas A&M University.

Much more information will be learned from the Brown's Ferry vessel once it has been preserved and can be more carefully analyzed. After conservation of the hull is completed, it can be quickly reconstructed and put on display. But already we have learned a great deal about this early representative of coastal transportation. Fifty-feet long at the waterline and nearly fifteen feet abeam, the hull drew less than three feet of water when carrying its rated load of between 25 and 30 tons of cargo. It was a coastal and river vessel, flat-bottomed and lacking a keel so that its draft was shallow enough to navigate over shoals or load from riverbanks where docks did not exist. Built of native woods — oak, pine, and cypress — its members were fastened with a combination of iron nails, iron bolts, and wooden treenails. The quality of construction suggests that not all the good Colonial shipwrights lived north of the Dismal Swamp. It carried a small crew, perhaps two, and had decks only in the bow and stern. We believe its two masts were either sprit or schooner rigged, although these old coasters moved along as best they could by whatever means available. Oars and poles aboard indicated she would have been rowed in calms, poled when drifting upstream with the tide or down with the current, and sailed when nature cooperated with a fresh breeze.

Last June, just before my departure for the INA field school at Castine, the model was prepared for transport. My wife, Lucille intended to accompany me on the trip north but the model and its disassembled rigging took up the entire automobile. Long accustomed to making way for my strange projects, she boarded a plane while the model and I rolled merrily along Interstate 20 headed for Columbia. At a ceremony, the model was formally presented to the President of the University of South Carolina. It has now become a travelling exhibit and is presently on display in the State House. But our work thus far represents only one step toward the final result. That result will be the reconstructed hull, a proud and permanent symbol of our maritime past.

– J. Richard Steffy



The research model as rigged and fitted for display in South Carolina. Photo by Alan Albright.

(Cont. from p. 2)
treating bone, ivory, wood, leather, pottery and the metals of antiquity — gold, silver, copper, lead, tin and iron. Emphasis is placed on the importance of field treatments that require minimal equipment and chemicals, as well as what conditions demand treatment by more complex procedures in a well equipped laboratory.

Graduate student Jody Simmons uses a pneumatic air scribe to carefully remove corrosion from an iron artifact found on a sunken Confederate blockade runner.

Photo Credit: Sheila Matthews

Some of the common problems encountered by the nautical archaeologist were faced during work on material from the 1554 Spanish Silver Fleet, from which many of the following examples are drawn:

When artifacts are recovered from a sunken ship, they are often covered with concrete-like layers of calcium carbonate, magnesium hydroxide, metal corrosion products, sand and various forms of shells, coral, barnacles and plant life which thoroughly disguise the encased objects. The terms encrustation and conglomerate are used to refer to such masses which may range from the size of a single coin to huge lumps weighing several tons containing hundreds of individual items of many different materials. Before the nautical archaeologist can interpret a wreck under excavation, each encrustation must be processed by experienced personnel to remove these items, record the placement of each within the encrustation, and then treat them so that they will be available for study and display for years to come.

The first step in the conservation process is the removal of artifacts from the encrustation. Since visual inspection of an encrustation rarely reveals much about its contents, X-ray plates are made to divulge the number, kind, condition and placement of artifacts concreted together. With the plates serving as guides, the conservator uses pneumatic air scribes to extract each specimen mechanically; notes and drawings record original locations of specimens within encrustations as work progresses.

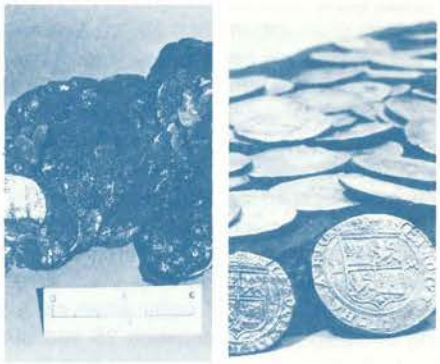
Patience and experience are required for the removal of encrusted objects without damage or loss of archaeological information. Because he must be able to identify quickly and accurately many types of specimens — and they can occur in an extraordinary variety — the conservator should be familiar with the material culture of the time and place represented by the wreck. Otherwise, it would be difficult for him to follow precisely the contour of an object in the rock-hard concretion. This can be difficult when extracting soft wooden or other organic material, or when removing silver and iron artifacts where only subtle differences distinguish stained encrustation from the corroded surface of the metal. The condition of specimens may vary greatly and will affect how they are extracted: many are so fragile that they must be impregnated with a resin before they can be fully dislodged; others may have disintegrated completely, and casts must be made of their impressions or molds left in the encrustations that covered them.

Considerable attention is given to recording the context of artifacts because the types of specimens present, and their arrangement within an encrustation, may be important to historical/archaeological interpretations. From proveniences of artifacts in an encrustation it often is possible to determine much about the nature of a ship and how its contents were stowed, even when few wooden structural parts of the ship remain. Such information is drawn both from the site plan made by archaeologists during excavation, and from records made by the conservator as he extracts the specimens. In other words, the investigation of an encrustation with its concealed contents is analogous to the excavation of a structure or excavation square within a site.

After removal from encrustation, most specimens must undergo immediate treatment to prevent irreversible damage. If a wooden artifact is not processed properly, its cell walls collapse, leaving little that resembles the specimen's original form; soluble salts in porous objects such as bone and pottery crystallize and cause their surfaces to flake; rope and cloth shrink and become brittle; silver artifacts become disfigured by corrosion products; and copper and iron specimens are attacked by hydrochloric acid coming from hydrated cholorides in the metals' corrosion products.

It is especially difficult to arrest deterioration of metal artifacts recovered from the sea. Although the condition of individual specimens of the same metal may vary greatly, artifacts of iron, copper and silver generally require more treatment than do the others. For this reason, special emphasis is given to these metals in the antiquities conservation courses. (Gold specimens are not usually affected by salt water and require little or no preservation treatment aside from washing with fresh water.) Basically, the problem is that the less noble metals corrode under a wide variety of conditions and form a number of complex corrosion compounds, especially when recovered from highly corrosive sea water.

The conservator, working with the less noble metals, especially iron, should strive to remove the corrosion-causing compounds without altering the appearance of his specimens, and, when possible, reduce the corrosion compounds to a metallic state. Five alternative methods for treating metal artifacts are commonly used: 1) electrolytic reduction, 2) galvanic cleaning, 3) water diffusion, 4) chemical cleaning, and 5) annealing at high temperatures (for iron objects only). Under given conditions, each of these techniques is useful, but electrolytic reduction is the most widely used on all metals and is the only technique that can return corrosion compounds to a metallic state.



Silver coins in encrustation and after conservation treatment.

Photo Credit: Texas Archaeological Research Laboratory.

In its simplest form, electrolytic reduction consists of attaching the metal artifact to be cleaned to the negative terminal of a D-C power supply and hanging it between two vertically suspended metal plates in a non-conducting vat. The metal plates are attached to the positive terminal of the power supply. The vat is filled with a conductive liquid such as a 2% sodium hydroxide solution or a 5% sodium carbonate solution. When the current is turned on, hydrogen evolves off the

surface of the metal specimen, reducing some of the corrosion products back to a metallic state, mechanically removing unreduced corrosion compounds from the surface of the artifact and removing all the corrosive chlorides from the metal.

Since corrosion-causing elements such as chloride, sulfides, moisture and oxygen are ever present, conservation is not completed when a metal artifact is successfully treated by electrolysis or one of the alternative techniques. Each specimen must be rinsed extensively in deionized or distilled water to remove salts that were in the electrolyte or residue of the treating chemicals. Then its surfaces must be dried and sealed from the atmosphere: silver and copper artifacts usually are coated with a clear acrylic, whereas iron specimens are immersed in molten microcrystaline wax.

Pottery, bone, textiles and botanical specimens such as seeds are also removed from encrustations with pneumatic air scribes, but a layer of encrustation is often left on them to prevent damage to their soft, fragile surfaces. Remaining encrustation and stains are removed with hydrochloric, formic or oxalic acid. Then the specimens are thoroughly rinsed in several changes of deionized water to remove all chemical residues and soluble salts. If the objects have friable surfaces or need additional mechanical strength, they are consolidated with one of several alternative synthetic resins, such as polyvinyl acetate or Acryloid B-72 after they have been dried in a water miscible alcohol.

The conservation of wooden remains has received considerable attention (see Karl Borgin, "Wood in Archaeological Research," *AINA Newsletter* Vol. 2, No. 4). Basically, as long as waterlogged wood is kept wet it retains its shape. If the wood is allowed to dry in air, however, the evaporation of water causes the weakened, water-saturated cell walls to collapse. The conservation of waterlogged wood is primarily a two-fold process involving the removal of excess water by a method that will prevent any shrinkage or distortion, and the incorporation into the wood of a material that acts as a consolidant and confers mechanical strength to the wood. Several techniques exist for the treatment of waterlogged wood, each with specific advantages and disadvantages. The most dependable techniques used in the past few years have been those that use one of the polyethylene glycol (PEG) waxes which are soluble in water and alcohol. The treatment is relatively simple, but the process is often rather lengthy.

With an x-ray plate as a guide, concreted artifacts are removed from an encrustation.

Photo Credit: Texas Archaeological Research Laboratory.

In general, the wooden specimen is placed in a dilute solution of PEG in either water or alcohol that is kept heated. Over a period of time, determined by the size and condition of the object, the concentration of PEG is slowly increased until a minimum concentration of 70-80% PEG is achieved. During the process, the PEG replaces the water in the cell walls of the wood. After treatment, when the wood is cooled to room temperature, the PEG, if it is of high molecular weight, solidifies into a relatively hard wax that maintains the shape of the wood and mechanically strengthens it.

It should be emphasized that the PEG treatment is just one technique for treating waterlogged wood. There are other techniques, such as the acetone/resin method, alcohol/ether, tetraethyl orthosilicate, and others which are often used in given circumstances.

The amount of time and money spent on the conservation of an object is highly variable and depends primarily on the nature of the specimen and its condition when recovered. A silver coin from the 1554 Spanish wrecks, for example, can usually be processed in a single afternoon. An iron anchor or cannon often takes six to twelve months. Waterlogged wood usually requires several months, but large structural parts may undergo treatment for several years. Pottery, stone, bone and small organic specimens require only a few days at most. Regardless of time and cost, the rewards are immeasurable.

We are extremely enthusiastic about the establishment of the new Conservation Research Laboratory at Texas A&M University, and the addition of Dr. Hamilton to the Texas A&M/INA staff.

The American Institute of Nautical Archaeology is a nonprofit scientific/educational organization whose purpose is to gather knowledge of man's past as left in the physical remains of his maritime activities and to disseminate this knowledge through scientific and popular publications, seminars, and lectures. The INA Newsletter is published periodically by INA and is distributed to its members and Supporting Institutions to inform them of INA's current activities. INA is an equal opportunity organization.

INSTITUTE OF NAUTICAL ARCHAEOLOGY

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