Monitor National Marine Sanctuary Activities Report

CHEESEBOX

Vol. 3, No. 1

*Conservation of the **Monitor** Anchor:*

Progress Report

The ***Monitor*** anchor was placed under electrolytic reduction in its cylindrical tank, which measures approximately 1 1/2 m in diameter, on September 15, 1983. The following steps were carried out:

1. The anchor and attached chain were checked for electrical continuity and it was discovered that the anchor was electrically continuous through both of the bolted-on flukes and the shackle that attaches it to the chain. This was expected, since these parts appeared to be in very close mechanical contact. What was not expected was that the 14 1/2 links of anchor chain were electrically continuous, which probably indicates that the chain was under tension with the links pressed tightly together as they encrusted. This could have occurred if the anchor had "grabbed" before the ***Monitor*** hit bottom.

Conservator Curtiss Peterson examines the *Monitor* anchor during routine cleaning.

2. Measurements were taken to estimate the surface area of the anchor so that the current density could be determined. Based on the measurements, there are approximately 19,600 cm^2 of surface area, resulting in approximately .0003 $amps/cm^2$ of average current density behind the encrustation.

3. The anchor was attached to the power supply by a wire which was attached to the shackle at the top of the shaft. The chain was attached to the power supply by a wire attached to the link adjacent to the shackle, where the encrustation had been broken during recovery. Five sections of #304 stainless steel annode with a combined surface area of .9 m were placed around the anchor and suspended in the tank approximately equidistant from the anchor and chain.

4. After being filled with approximately 2,500 l of Greenville city water, 2.5 k of technical grade sodium hydroxide (NaOH) were added to the solution, the anchor and chain were attached to the power supply, and electrolytic reduction was begun.

On November 7, 1983, the tank was drained and the anchor removed, cleaned, and examined. The encrustation was cracked and loosened around parts of the chain link adjacent to the shackle, revealing an area of of reconstituted surface with the word "WOOD" cast into the crossbar of the link. The rest of the encrustation was intact and appeared to be in good condition. The tank and anodes were cleaned, the anodes were reattached, and the tank was refilled with electrolyte as before. The anchor appeared to be exhibiting satisfactory progress. The encrustation was still largely intact, indicating that reduction was not occuring so rapidly in places as to cause it to break apart.

Following is a series of measurements taken of the anchor on November 7, 1983:

Height	54"
Top of shaft	5 1/2 × 3 1/2"
Shaft just above bolts	7 × 3 1/2"
Bolt on flukes	22" tall
Boss on bottom	3"
Nut comes out	6"
Rectangle	15 × 7 × 4 × 4"
Fluke (half-heart) width	8"
length	14"
thickness	4 - 5 1/2"
Opposite fluke identical except full heart	
Other two flukes identical, one half-heart, one full heart	

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The anchor is carefully replaced in the conservation tank by Mr. Peterson with assistance from William Craft of East Carolina University.

CHEESEBOX

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Conservation of the Anchor

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The anchor was removed from electrolytic reduction and examined on November 18, 1983, in order to replace the anodes in the tank with sections of #318 steel 3/8-inch mesh, which were molded around the anchor and chain to give more even coverage. Eight kg of technical-grade sodium hydroxide were added to the solution to reduce the rate of anode dissolution.

On January 26, 1984, the solution was drained and the anchor removed for cleaning and examination. Arrangements had been made with the project archaeologist to do extensive photography of the anchor at this time.

The stainless steel mesh exhibited only slight deterioration, as was expected. The encrustation on the anchor was still largely intact. There was some loss on the tips of two flukes and on the chain link that bears the word "WOOD." Light tapping on the encrustation on the shaft and flukes revealed areas that sounded hollow, indicating that it was separating from the surface of the metal. Care is now being taken not to damage this fragile encrustation, as it still affords the reducing surface beneath some protection from free oxygen in the solution.

Immediate plans call for the continuation of electrolytic reduction at the present rate, checking the progress of the artifact at least monthly, until reduction of the surface is complete.

On February 25, 1984, the solution was changed and the anchor cleaned and examined. The encrustation on the anchor and chain is still largely intact with the exception of the "missing" side of the cast-with-the-shaft, half-palm fluke, where it is beginning to flake off. The encrustation on the shaft appears to be loosened over a larger area than on the last examination. Following completion of the examination the anodes were repositioned, the tank refilled, 7.6 kg of sodium hydroxide added to the solution, and the power supply turned on.

The anchor will continue to be removed from its tank for cleaning and examination approximately every four weeks throughout the conservation process, which is expected to take another eleven months to complete.

Curtiss Peterson
University of South Carolina

Artist's rendering of the *Monitor* as she appeared at the time of her engagement with the CSS *Virginia*.

*The **Monitor**: Fragile Survivor*

In appraising the historical significance of those time-battered remains that rest today in the ***Monitor*** National Marine Sanctuary, the modern observer is confronted with a wide range of technological comparisons — partly with other notable mid-nineteenth century ironclads —that makes any attempt at such evaluation a deliberate search for adequate perspective. Happily, modern naval scholarship builds on a foundation of broad international perspective bequeathed by such astute pioneering works as Herbert W. Wilson's *Ironclads in Action* (1898); James Phinney Baxter's *Introduction of the Ironclad Warship* (1933); and Kommandorkaptagn R. Steen Steensen's more recent work, *Vore Panserskibe* (1968).

For openers, it is necessary to recall that the iron*clad* era, of which ***Monitor*** was a singularly arresting product, preceded the era of the iron ship — the modern era of the iron *framed* as well as iron *sheathed* vessel. All who have begun to consider the awesome task of the ***Monitor***'s safe and total recovery face the fact that her wooden raft, with its timber frames and planking, not to mention intricate joinery — not only constitutes an exceptionally fragile if critical element of her fabric but also has actually lain peculiarly exposed — upside down — on the ocean floor for well over a century. She could have met a worse fate — broken on a reef or battered apart by enemy gunfire — but the excellent photographs already available are not encouraging as regards her timber structure.

Consider for the moment that the ***Monitor***, though nominally lost, is indeed one of the rare survivors of that era. Unlike nearly all of her type, she managed to escape the salvor's remorseless ball and smelter. She may indeed not be in as sound condition as the luckless **Tecumseh**, lying in the shallows off Fort Morgan at the entrance to Mobile Bay, or indeed the Swedish monitor located in Norwegian waters within the last five years by archaeologists of the Norsk Sjøfartsmuseum. And yet, as a relatively secure survivor, she has not suffered the abuse visited on several other survivors of the Civil was era, notably the **Muscogee** and the **Cairo**. Not yet, and, we must resolve, *never*!

There are aspects, both technical and historical, about this lonely survivor that merit particular re-emphasis. By no means the first ironclad, ***Monitor*** was nevertheless the world's first *turreted* ironclad. While few of our countrymen are aware of the numerous armorclads laid down by the British and French navies well prior to the Civil War, or indeed of our own Navy's distressing experience with the Stevens Battery, they are well aware of the priority of **Merrimack**'s conversion that produced such feverish reaction in Washington and provided so dramatic a setting for the ***Monitor***'s entrance.

Recall that the ***Monitor***'s historic duel with the casemated **Virginia** was but one of the first engagements between ironclads maneuvering under steam. Other obscure episodes, cited by Bernard Brodie from the Crimean War, are generally unknown and of highly marginal significance in comparison to the international reaction to the engagement of March 9, 1862.

The encounter at Hampton Roads, fought under circumstances that threatened McClellan's army with an entrapment situation similar to that which befell Cornwallis, attracted a worldwide attention that derived in no small part from the striking dissimilarity of the combatants: the 3500-ton **Virginia** with her heavy casemated battery pitted against what Ericsson confidently regarded as his impregnable cupola battery. The outcome appeared to vindicate the Swedish inventor, as well as relieve the embarrassed Union army commander, effectively persuading the Navy Department that the monitor type was indeed a viable means of projection armored batteries against

Confederate blockade breakers and perhaps even coastal fortifications. Regardless of the numerous other innovations that Ericsson had engineered into the ***Monitor***, Hampton Roads revealed the limited effectiveness of the **Virginia**'s casemated battery against a mobile, low freeboard opponent, while demonstrating the impregnability and all-round fire capability of Ericsson's small armored battery. It is well worth recalling the inventor's assurance to President Lincoln late in August 1861,

> *". . . the revolving turret of my proposed battery is made 8 inches thick, in addition to which the outward curvature of the turret will on dynamic consideration materially assist the resisting capability of the iron. Apart from the great strength of the turret, it should be borne in mind that but few balls will strike so accurately in the center of the turret as not to glance off by angular contact."*

We should look more closely at the evolution of the cupola or turreted battery, for it, more than ***Monitor***'s low profiled raft and tapered underbody, was the most distinctive element of this novel weapons system. Ericsson was disarmingly adroit in later advancing the primacy of his own conception of a cupola battery, observing that,

> *"A house or turret turning on a pivot for protecting apparatus intended to throw warlike projectlies is an ancient device: I believe it was known among the Greeks. Thinking back, I cannot fix any period of my life at which I did not know of its existence."*

Such prose is indeed disquieting. It makes me wonder if researchers have combed French naval archives for evidence bearing on Ericsson's purported offer of a turreted armorclad design to Napoleon III in 1854, shortly after the Emperor had ordered ten casemated batteries for operations in the Black Sea. The claim has generally been accepted by historians of naval technology, together with the sequel that the Swedish inventor broke out the plans and model for this conception late in August 1861 when Cornelius Bushnell of New Haven sought his advice on design of the early Union ironclad **Galena**, the encounter credited with generating the ***Monitor*** project.

Much discussion might be expended on the relative chronology of those cupola proposals developed by Theodore R. Timby of New York and by Captain Cowper P. Coles of the Royal Navy. The fact remains, that Ericsson's turret conception was the first to take actual form, in his "impregnable" battery, weighing heavily in the international acclaim which he was subsequently accorded. Regarding much of the technical minutiae still locked in the ***Monitor*** National Sanctuary, however, we can hazard little useful comment.

John Ericsson is reported by his early biographer to have destroyed much of his professional correspondence and plans dating from the period prior to 1862. Several models and considerable correspondence survives in the American Swedish Historical Foundation at Philadelphia, as well as material in the New York Public Library. We need to explore the surviving papers of his associates, the ***Monitor*** syndicate, for the *Guide to the Microfilm Edition of the John Ericsson Papers.* Its editor, Dr. Ester Chilstrom Meixner, reveals much of our problems in alluding to "Over 3000 drawings. . . executed by Ericsson for this revolutionary ship." It may finally prove that only the ***Monitor*** herself can recreate many of those missing plans.

Philip K. Lundeberg
Smithsonian Institution

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The Construction, Contents and Condition of the Wreck of the U.S.S. ***Monitor***

The engagement between the U.S.S. ***Monitor*** and the U.S.S. **Virginia** is probably one of the most memorable naval events in American history. The David and Goliath aspect of the battle, the dramatic application of revolutionary technology in ship design, the fortuitous arrival of the ***Monitor*** and the abrupt interruption of the Union fleet's destruction made clear to the nation that it had reached a great historical moment.

Rediscovery of the ***Monitor*** and the commemoration of her resting place as a marine sanctuary rekindled a national interest in her future. Plans are being considered by government and private organizations for operations in the sanctuary. However, before a comprehensive program at the ***Monitor*** Marine Sanctuary can be developed, it will be helpful to understand as fully as possible the archaeological and environmental aspects of the site, especially if complete or even partial recovery of artifacts becomes a goal.

My purpose in discussing the construction, contents and condition of the ***Monitor*** wreck site is to provide a preliminary concept of some of the archaeological aspects of the object of our attention during this conference. Because of the fragmentary nature of documentation on the ***Monitor***, the lack of detailed study and extrapolation of existing records and expedition findings and the fact that much more remains to be discovered from a systematic examination of the wreck site, the coverage given here will be incomplete.

The U.S.S. ***Monitor*** had three distinct configurations during her one-year lifetime. Launched at Green Point, Long Island, on January 30, 1862, she was 173 feet overall, had a beam of 41 feet 4 inches, was 10 feet from keel to deck and displaced about 1,000 long tons. Her double-ended hull carried a 21 1/2-foot diameter turret amidships containing two 11-inch smoothbore Dahlgren guns, an armored pilothouse up forward and two square smoke pipes and blower pipes aft.

After the battle with the **Virginia** on March 9, 1862, the ***Monitor's*** pilothouse was armored with wood and iron. The Virginia summer made a turret awning a necessity. In Washington in October, the ship was scraped and painted and the berth deck was modified for additional storage and ventilation. There the Navy's chief engineer, B.F. Isherwood, conducted a 72-hour, full-power test of her propulsion machinery. As a result of this test, he added a chimney to the interconnected smokeboxes 41 feet above the grates to help get up steam faster than could be accomplished by the blower system.

A later accident and the hurried recall of the ***Monitor*** reduced the height of the smokestack to 31 1/2 feet. Later, at the suggestion of Paymaster Keeler, an iron rifle screen was added to the turret for protection against small arms fire. The ship that sank off Cape Hatteras on December 31, 1862, was not the familiar and populat image of a "cheesebox on a raft."

Although there are many aspects of the wreck to be considered if recovery is contemplated, the hull at this point is the object of primary interest. Where most naval and merchant iron ships of that period employed a shell plating structure of fore-and-aft, in-and-out strakes, as did the later monitors, the ***Monitor's*** shell plates were laid athwartships and flush riveted. In addition, she had no structural keel, stem or sternpost, and no major internal longitudinal members. Lastly, the ship had only one complete, structural bulk-head supporting the turret gear amidships and consequently no flooding control compartment system, a fatal design feature.

According to a contemporary drawing, the false keel of the ***Monitor*** is formed by disking the bottom plates in approximately a 6-inch section of arc that runs the full length of the bottom. Preliminary examination of bottom photography has not indicated such a feature, but stereogra-

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Wreck of the *Monitor*

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phic photography taken by the Harbor Branch expedition in the summer of 1977 may reveal this shape.

A sample of the 1/2-inch bottom plating recovered from the wreck by the Harbor Branch expedition verifies the riveting at 6-inch intervals across the bottom of the 3-inch angle iron main frames. Corrosion marks left on the recovered plate indicate that the plates were riveted to the adjoining plates with inside butt straps with a 7/8-inch rivet at 2 1/2-inch intervals.

The deck beams are supported inboard by 2 1/2-inch wrought iron stanchions, which rest on the ends of the "floor timbers." The stanchions are bolted rigidly to the floor timbers but are connected at a single point under the deck beams. Some 80 stanchions are used throughout the ship. Additional traverse stability is given to the cross section by a 2 1/4-inch, wrought iron, square-diagonal brace connected between the top of each deck stanchion and the lower edge of the beam bracket.

The 55 main frames are spaced 36 inches apart and formed of 3-inch wide and 6-inch deep angle iron on the 36-degree sloping sides. The lower sides and bottom of the main frames are bolstered by a 15-inch long, and probably half-inch thick, iron one-piece plate. On-site photographs of the wreck indicate that these frames were pierced with limber holes to allow circulation of the bilge water.

Four-inch angle irons were riveted to both sides of the top of these floor timbers for stiffening and to provide a surface for the foundations of machinery, boilers, berth deck and anchor hoister room. The bottom and sides are further supported by 3-inch angle irons placed between the main frames. The lower edge of the side plates is bent up horizontally and single riveted to the bottom plates. The chine, therefore, is formed by this lap and is unsupported between frames.

At the top of the sloping sides, the plates are bent horizontally to allow space for a double row of rivets attaching the overhang of the vessel to the underwater hull. The extension of this plating varies in width from a few inches on the sides to 12 feet at the bow and 30 feet at the stern.

The juncture of the bottom of the overhang and the sloping sides around the stern is reinforced for the last three frames with a heavy angle iron riveted to the hull and the overhang. The plating of this extension appears to be laid athwartships and butt-strapped.

The 5-feet, 3/8-inch thick vertical bulwark of the vessel sides is riveted at the bottom to an angle iron that runs the length of the ship and is itself riveted to the outer edge of the overhand plates. The side plates are probably butt-strapped between frames and are currently of unknown length. They could be at least 15 feet, according to Ericsson's description of the side armor. A 4-inch angle iron is riveted to the outside of the top edge of the bulwark. Another 4-inch "heavy" angle iron is riveted to the inside of the bulwark 10 inches below the top to support the deck beams.

The 55 deck beams are 10-inch square white oak and range from about 3 to 36 feet in length. The ends of the beams are attached to the sides by 3/8-inch trapezoidal iron brackets 2 feet by 4 1/2 feet and riveted to vertical angle irons on the interior of the bulwark. This bracket is bolted to the face of the beam with five 7/8-inch diameter bolts, which provide additional strength and rigidity to the sides.

At every beam end, a 3/8-inch iron bracket is riveted perpendicular to the side from bow to stern. A 30-inch long, half-inch thick iron shelf extends outward horizontally from the lower edge of the bulwark and is riveted to the bottom of the angle brackets, leaving the armor shelf open to the sea. The shelf is bolstered in the center by another angle iron between the brackets for the length of the vessel. Two and a half feet of horizontal

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Conservation Treatment of the ***Monitor*** *Lantern*

(Masters Mate) Browne saw the red light on the ***Monitor***, about a mile away, as they desperately pulled to reach her. ". . . we made but slow progress and before we reached her, her light disappeared."[1]

Conservation has now been completed on this brass navigation lantern recovered from the *Monitor* site in 1977.

The lantern was recovered from the ***Monitor*** National Marine Sanctuary on August 2, 1977 by the joint NOAA-North Carolina-Harbor Branch Foundation expedition. During a photogrammetric survey of the site, underwater archeologist Gordon Watts spotted what first appeared to be a tin can lying half covered by the sand.[2] On closer inspection, the object proved to be a brass lantern with a red glass lens. The lantern was recovered by diver Richard Roesch from its resting place on the sea floor, 30 feet north of the ***Monitor***'s inverted turret.[3]

The lantern is composed of five major elements: an exterior support cage with a hanging ring at the top, the vent cap and top cover, the base element and lamp insert housings, the glass lens, and the oil lamp reservoir insert.

A fragment of the oval maker's label remains on the top cover. The fragment is mineralized; no core metal remains. During preliminary treatment a series of rubbings was taken by Robert M. Organ in an effort to decipher the raised letters. The rubbings were later photoenhanced to reveal the initials "Wm. PORT . . ." and the numerals "232 . . ." along the lower boundry of the label fragment. Trow's commercial directory lists the firm of "Wm. Porter 232 Water Street" under the heading of "Lantern Makers" in their New York City directory for the years 1859-61. This identification is confirmed by contract agreements with the Porter firm in the archives of the Naval History Center.

Examination

The lantern measures 17-1/8" (43.4cm) tall. The outside diameter of the vent cap is 4" (10.0cm); the top cover 7-1/8" (18.1cm); and the foot, 7-5/8" (19.5cm).

The support cage has six arms; three have been badly distorted. The cage is secured with solder joins where it penetrates the top and base elements. This in turn locks the entire assembly together.

The vent cap and top cover are composed of front sections shaped by spinning and joined mechanically by overlapping and interlocking with a rolling mill. The cap is perforated just below one of these joins to allow heat to escape. Large portions of the top cover are missing.

The base element features a lashing ring on one side. There may have been a matching ring on the opposite side where a hole now appears. The foot of the base is rolled where the retaining plate meets the side wall. This retaining base piece provides a catch for the lamp insert.

The lamp insert measures 4" (10.3cm) tall and 6-1/8" (15.6cm) in diameter across its base. It features a large fuel reservoir to increase the time between refilling operations, a difficult and hazardous duty aboard ships. The fuel may have been whale oil, in common use during the period. A small plug-cap covers the refil port. The wick area is badly corroded and details of the wick housing are lost except for evidence of a threaded cover with a serrated edge. The lamp insert also features two spring-clips on opposing sides that project through slots in the base piece and terminate with tab ends. The tabs are pinched together to allow passage of the lamp into and out of the lens housing. The clips are still surprisingly springy in spite of their corroded condition.

The glass lens accounts for most of the present weight of the lantern. Its Fresnel-type outer shell was mold-blown in a three piece mold: vertical seams are noted at 120° arc intervals. Its red color is due to an inner flashing of red glass blown into the clear lens body. The lens has suffered multiple breaks and cracks. The break pattern exhibits no impact point which would indicate a physical blow as the cause. Instead, the pattern of damage suggests a thermal shock; the hot lens of a lighted lantern being plunged into a cold, wintry sea.

Preliminary (Aqueous) Treatment

The lantern was received at the Naval Research Laboratory (NRL) on August 4, 1977, immersed in water. It was placed in a crate lined with polyethylene bags and filled with tap water. A trace of sodium carbonate was added to prevent the water from becoming acidic, and a fungicide was added to inhibit slime growth. After three weeks at NRL the lantern was transferred to the Smithsonian Institution's Conservation Analytical Laboratory (CAL).

The lantern was received by CAL on August 25, 1977, crated and immersed in the NRL solution. The object was transferred to a vertical glass tank by Robert Organ to allow visual monitoring of subsequent treatment. Desalination was begun by washing in changes of deionized water. The process was followed by regular measurements of electrical conductivity supplemented with tests to detect chlorides at times when the conductivity of the water was at a maximum.

"Delay in washing out was caused by the presence of silt and shell inside the lantern. This was not removable through the break in the metal top while the fragile lantern stood upright in its glass container. Therefore, a close-fitting horizontal container was made which would permit manipulation of the lantern from both ends while under water. Removal of silt by suspension in siphoned water was attempted but failed. Tilting allowed some loose silt to fall out through the hole above the lens. A second operation recovered more silt plus shell and the outer glass was cleaned of calcareous deposits by rubbing with the fingers. Shells and broken coral were teased out from between the oil reservoir and body and from inside the vented top using beechwood sticks. More silt and shell were removed by a third manipulation in both hands under water in the horizontal tank but despite care and support-pads the ventilator top separated from the body of the crack. the freed top could not be passed bertween the wires of the lantern for examination but was found to be lined with fine silt to a depth of about 10 mm. Silt was removed by fingers followed by a jet of tap-water. During these manipulations the oval label cracked across. Visual examination of the fracture suggested that the label was entirely mineralized and brittle."[4]

"After chloride concentration in the soak-water had been reduced to below the level of detectability, the water was exchanged for a 4.6 percent solution of benzotriazole without any intermediate drying-out. Then, after washing to remove excess corrosion-inhibitor, the lantern was allowed to dry out very slowly in order to avoid crystallization of reagent which could disrupt the surface mineralization. The lantern was kept in a closed vessel at room temperature bathed in vapor of benzotriazole."[5]

The wet-phase treatment for the removal of soluble chlorides lasted twenty months. The corrosion inhibition bath in benzotriazole solution lasted sixteen weeks. After excess inhibitor was rinsed away the drying process required an additional six weeks.

Thereafter, for a period of three years the lantern was left undisturbed to enable proper evaluation of the stabilization effort.

Post-Aqueous Treatment

On March 22, 1983 the lantern was removed from its storage vessel by the author, who completed the treatment.

In order to gain access to the bottom of the lantern, and to relieve the base element of the weight of the glass lens, a form-fitting support block was manufactured as follows: A paper template of the Fresnel lens profile was made to serve as a guide in shaping a brass wire which was then attached to a masonite harp. The harp was clamped to a ring stand and adjusted to rotated in the same arc as the lens' circumference. An electric current was passed through the wire, creatin enough heat to melt through a polystyrene foam block, creating a negative replica of the lens. Once on the support, the base became accessible.

A careful visual examination of the join between the base element and the lamp insert (visible through losses in the base as well as from underneath) led to the conclusion that the two elements were not fixed by corrosion as was previously thought. Wedges of 5 mil polyester sheet (Mylar) were inserted between the two elements to clear debris and ensure that they were not bonded by corrosion. A long copper rod was also employed through the areas of loss in the top element to loosen the tightly packed debris surrounding the top of the lamp insert. The insert was successfully removed after a few hours of careful cleaning. Approximately 600 grams of loose debris were also removed during and after removal of the lamp insert.

Burial accretions, fauna, and debris were removed mechanically. Approximately 60 grams of material were removed. Tools used included scalpels, glass-bristle brushes, nylon bristle brushes, and compressed air. The procedure was as follows: Coarse debris and accretions were removed with scalpel blades. Fine debris was then dislodged with a glass-bristle brush. Compressed air was employed to remove dust and brush splinters. Finally, a nylon bristle brush dipped in acetone was used to rinse and degrease the surface. The glass element was also cleaned using cotton wool and swabs moistened with a mixture of 10 parts deionized water, 8 parts ethanol, and one part ammonia, taking care that adjacent metal surfaces were not wetted.

After cleaning, the lantern was rephotographed. The metal/mineral surfaces were given a coating of acrylic resin to provide a measure of surface consolidation, to retard interaction with atmospheric pollutants, and to create a receptive surface for subsequent application of reinforcing materials described below.

Physical reinforcement of the metal, especially the base, was provided by applications of a non-woven polyester tissue saturated with a transparent, cold-setting, polyester resin applied to the interior surface. This technique was also employed to secure the detached vent cap. A hydrophobic fumed silica powder was added to the resin. This ingredient imparts thixotropic properties to the mixture, thus preventing dripping and running before the resin cures.

The two large voids in the top element were also compensated with these materials. A dental wax impression was made from the opposite side of the element to serve as a couch for the resin mix and tissue. After curing, the pieces were cut to fit with a flexible-shaft hand-tool. They were secured with polyester "bandages" applied to the interior surface.

The interior surface of the base ele-

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ment was lined with polyester and tissue to help support the weight of the glass.

The missing section of the foot ring was compensated by casting resin in a flexible tube with the proper inside diamter. The tube was secured in the proper curvature with clamps until the resin set. The tube was then cut away and the solid core was trimmed for installation

After physical reinforcement and compensation had been completed, Dr. Landeberg (Div. of Naval History, NMAH) was consulted concerning cosmetic compensation. He selected a "monochrome approach" which renders the fills easily discernible but harmonious and unobtrusive. The medium employed for inpainting was a solvent-based acrylic resin paint.

The glass element received no further treatment. It would be unwise to introduce adhesives into the cracks unless those surfaces were first thoroughly cleaned. This cannot be accomplished without removal and disassembly of the lens element, which also cannot be accomplished without dismantling the exterior support cage. There is some solace in the fact that the housing locks all the pieces together.

Plans are being considered to exhibit the ***Monitor*** lantern at the National Museum of American History in Washington, D.C.

NOTE: A variety of analytical techniques were employed in the study of the lantern, including x-radiography, x-ray diffraction, metallography (optical microscopy), scanning electron microscopy, and emission spectrography (laser microprobe). This report does not deal with the results of these analyses because they are in preparation for publication in the science/-conservation literature.

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Kory Berrett
Winterthur Museum

FOOTNOTES

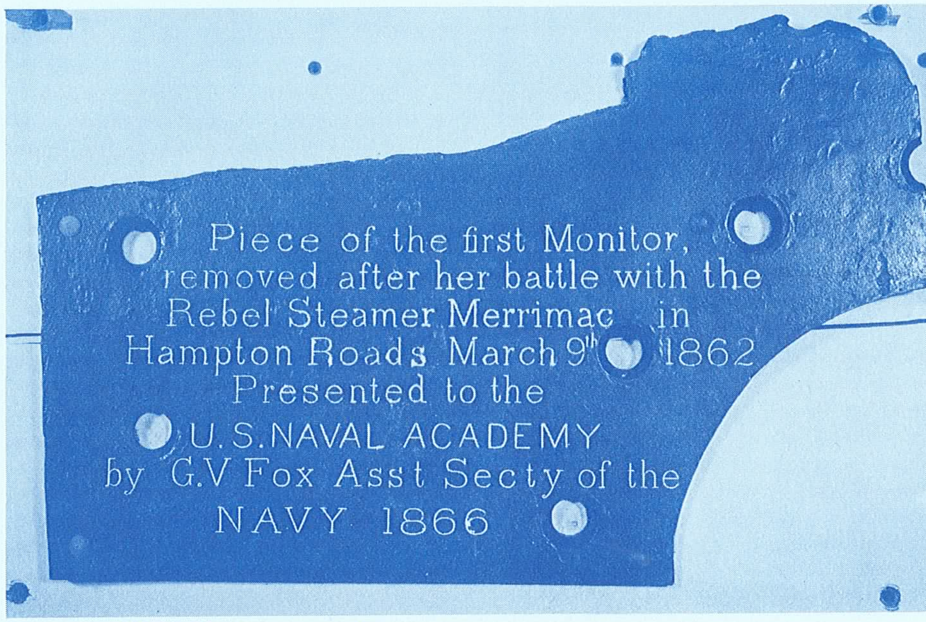
[1]Miller, Lt. Edward M., *USS Monitor*, Leeward Publ. Inc. (1978), p. 78.

[2]Childress, Lt. Cdr. Floyd, "The Lantern," NOAA Magazine, **7** 4 (October 1977).

[3]"Update on the Monitor Marine Sanctuary: Chronology of the USS Monitor," *NOAA Newsletter* (March 1980).

[4]Organ, Robert M., "First Interim Report," CAL (October 1978), unpublished.

[5]Organ, Robert., "Second Interim Report," CAL (April 1980), unpublished.



Fragment of USS *Monitor* armor plate.

Monitor Tributes At The U. S. Naval Academy

A short distance from where our future naval leaders troop to the colors on a parade field named for Rear Admiral John L. Worden, former commander of USS ***Monitor***, is the U. S. Naval Academy Museum. Among the treasures housed in this institution are several fragments removed from the ***Monitor***, the vessel whose ten month service revolutionized naval architecture, engineering, and naval warfare.

Of the nearly fifty artifacts in the collection of the Museum directly related to ***Monitor*** and her brief but dramatic existence, only eight items were ever part of her structure itself. The other material including manuscripts, models, prints, and commemorative medals and objects are just reflections of her famous history. Among the eight only a flag remains as the entity it once represented during her time afloat. The remainder are like chips off the great pyramids of ancient Egypt, merely souvenir fragments of a once mighty fighting ship.

The flag, a United States ensign, was given to the Museum by Rear Admiral Richmond Pearson Hobson who earned through his skill and valor a Congressional Medal of Honor in the Spanish American war commanding yet another famous vessel named **Merrimac**. The flag reputedly flew from ***Monitor*** before, during, and/or after her battle with CSS **Virginia**. The documentation on it is incomplete. Supposedly it was given by a crew member, possibly one assigned to raise and lower flags, to the father of Admiral Hobson's wife, George H. Hull. Either Hull or Mrs. Hobson loaned the flag to Henry E. Huntington for display in his noted library and gallery in San Marino, California, founded in 1919. The flag was withdrawn from the Huntington in 1935 and placed at the Naval Academy. It is known that a second ***Monitor*** flag was collected and given to the Museum of the City of New York by Christian A. Zabriskie. There is even pictorial evidence that ***Monitor*** at times flew two ensigns, one aft and one fore, instead of flying the usual jack at the bow.

A closely related item to the flag in the Naval Academy collection is a nearly foot-long section of a flagstaff of ***Monitor***. A cylindrical piece of wood, 3 3/4 inches in diameter and tapered at one end for insertion in its deck hole, a very old, handwritten paper label glued to it testifies it is a portion of the ***Monitor***'s flagstaff and says that it was the property of Daniel Toffey, a clerk to his uncle, Captain John L. Worden. The souvenir was passed on to Toffey's daughter, Mrs. Horace L. Hotchkill, who in turn placed it at the Naval Academy in 1931. Toffey remained with ***Monitor*** throughout her career and was aboard the fateful December night off Cape Hatteras when she sank.

Two additional wooden objects were reputedly made from ***Monitor*** material but the exact source or part of the ship from which they were made is not known. A smoothly turned, oak wood cup measures 2 5/16 inches tall and 2 1/4 inches in diameter. It is marked under its base "from the original ***Monitor*** lost at sea December 1862/W. F. Keeler." William Frederick Keeler was her Paymaster. The cup was donated by George Y. Worthington, Jr., in 1940. The second is a walking stick or cane, 32 1/2 inches in length, with a silver disc on top engraved: "David Brown/Monitor & Merrimac/1862." The cane was presented to the Museum in 1940 by Dr. Ford Keeler Brown, a direct discendant of David and Fanny Brown, the latter being the younger sister of Paymaster Keeler. It reputedly contains wood from both USS ***Monitor*** and CSS **Virginia** (ex-USS **Merrimack**).

The best relic from ***Monitor*** at the Naval Academy is a section of her armor plate, the material which made her noteworthy in history. It is a one-inch thick slab of iron, measures 32 by 20 inches in its maximum dimensions, has five bolt holes, an is marked in white paint as having been placed at the Naval Academy by Assistant Secretary of the Navy Gustavus V. Fox in 1866. It was undoubtably the first ***Monitor*** memento to arrive at the school in Annapolis, having been removed during her overhaul at the Washington Navy Yard in the fall of 1862.

Two additional metal fragments trace their lineage to the same autumn overhaul. According to the donor, Allen H. Babcock, his grandfather, Commodore (later Rear Admiral) Andrew A. Harwood, Commandant of the Washington Navy Yard, had artisans take a turret plate removed for replacement and fashion small souvenir anchors from it. In 1924, Mr. Babcock presented to the Museum one of these miniature anchors, barely measuring one-inch-by-one-inch in size. It is only a two-fluked anchor and does not represent the unique four-fluked anchor which John Ericsson designed for ***Monitor***. In 1946, Mr. W. J. Eck of Washington, D. C., gave a small metal paperweight with a neatly turned acorn grip made from ***Monitor*** armor plate. From the correspondence Mr. Eck's interest in the vessel seemed to stem from plate made by the Albany Iron Company, Troy , New York, which supplied armor plate for the ship. His dutch name might indicate ancestry from the Hudson Valley and from an original hand which manufactured material for ***Monitor***.

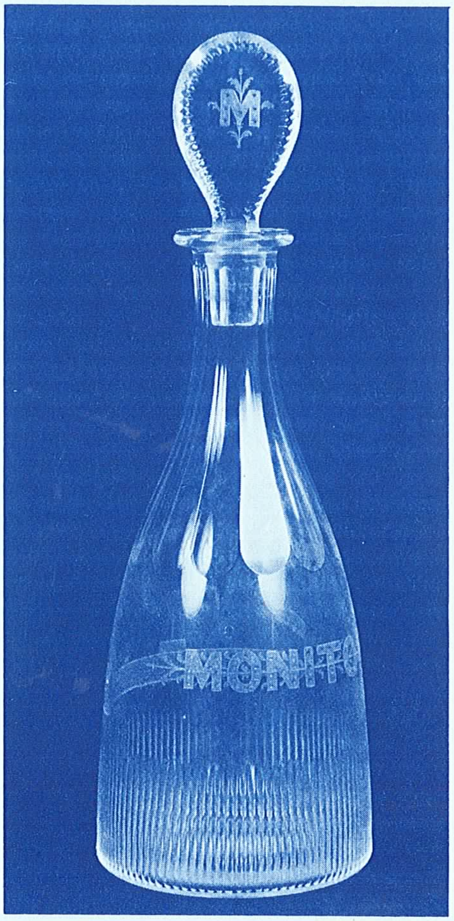
Specimen of drapery material used in USS *Monitor* (1862).

The most intriguing object in the collection is a swatch of white cloth printed to form patterns of flowers and leaves. It measures 16-by-20 inches and is reputely a specimen of draperies used aboard USS ***Monitor***. Why would they have needed draperies aboard a windowless ship-of-war? In a letter to his wife dated March 5, 1862, Paymaster Williams F. Keeler describes his state room aboard ***Monitor*** and relates that "the curtains are lace and damask, or an imitation I suppose." Keeler continues: "Captain Ericsson fitted our rooms up at his own expense and has been very liberal. I have been on board of nearly all the vessels that have been here and have seen no room as handsomely fitted up as ours." He even records that "oil cloths" were used on the floors. Draperies were evidently used as hangings on the bulkhead or to provide privacy in sleeping areas. The swatch of material was given the Museum by the same Dr. Ford Keeler Brown who presented the wooden cup referred to earlier.

Besides the eight objects from the physical ship the next most important group of items in the Naval Academy Museum are manuscripts written by men who served aboard her. Best of these are the 900 pages comprising the original letters of Paymaster William F. Keeler who served on ***Monitor*** throughout her career. These poignant, lively and very readable epistles are addressed to his wife, Anna. The portion of them dealing with ***Monitor*** were edited by Professor Robert W. Daly and published by the U. S. Naval Institute in 1964 under the title *Aboard the USS Monitor: 1862*.

Another important manuscript is a nine page letter of Lieutenant Samuel Dana Greene written to his parents from on board the ***Monitor*** at Hampton Roads on March 14, 1862. Greene, who relieved Worden as commander, tells about the trip from New York to Hampton Roads and about the battle with **Virginia**. This too has been published by the Naval Historical Foundation.

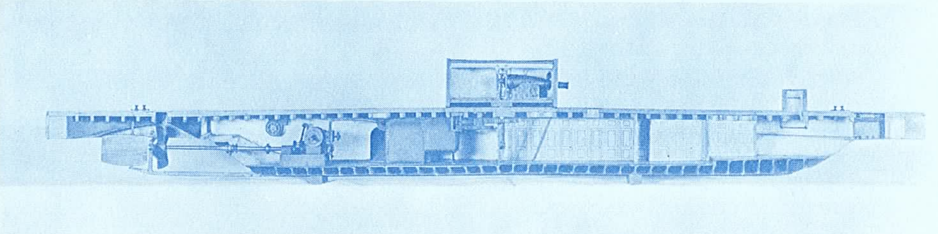
The Museum has two excellent 1/4 inch scale ship models of ***Monitor***. A sectional model purchased in 1953 is believed to have been built by a contemporary of the vessel, possibly one of her engineers, or at least by someone who had access to and had studied her drawn plans. A comparison to the drawings at Stevens Institute of Technology shows the accuracy of the interior in this cutaway model. The second model was executed by Frank A. Craven on contract for the Navy Department in the 1930s. Craven's outstanding work made visitors to the New York World's Fair in 1939 see the radical departure in naval architecture rendered by John Ericsson's design.



Decanter given Commander William N. Jeffers for commanding USS *Monitor*.

Chief among the commemorative objects in the collection are two glass decanters originally given by the "***Monitor*** Boys" to their fourth commanding officer, Lieutenant Commander (later Commodore) William N. Jeffers when he departed the vessel in August 1862. Whether these decanters had seen service in the ship's wardroom or were made specifically for presenting the departing commander is unknown. Standing nearly thirteen inches tall and etched with a likeness of the ships and its name they were donated to the Museum by the Commodore's daughter-in-law in 1936 without documentation.

(Continued on page 9)



Cut-away model of USS Monitor (1862).

Wreck of the *Monitor*

(Continued from page 4)

and vertical oak timbers rest on the shelf and are spiked through the angle brackets in a fore and aft direction, up through the bottom of the shelf. These are bolted to the side at the foreard ends between the brackets.

The side armor consists of five 1-inch iron plates. The three outer plates are 60 inches high, the fourth plate is approximately 36 inches high and the inner plate is 30 inches high. According to contemporary drawings, the plates are spiked on the timber backing with 1 1/4-inch blunt bolts.

The final structural member of the hull is the upper decking. The main deck is 7 inches of pine, appearing to be laid in planks 1 foot wide. The planks are spiked to the oak deck beams. Two courses of 1/2-inch iron plate are spiked to the deck planks. The arrangement of the side armor and the deck plates is assumed to be as shown in drawings from a **Canonicus** class monitor, there being no detailed information on the ***Monitor's*** armor and deck plating below the first course.

Reviewing the basic construction features of the ***Monitor's*** hull, it can be seen that the strongest part of the vessel is the girder, made up of the inner bulwark and the armor shelf connected by the braces. The wooden deck beams, decking and armor backing, which formed essential parts of the hull's structural integrity, may now, after a century of immersion in a hostile environment, be relatively insecure or nonexistent tie points.

From the ***Monitor's*** construction specifications and drawings, official correspondence, allowance lists for vessels of the ***Monitor's*** class and the accounts of life aboard, a fairly reasonable estimate can be made of the number and possible location of the contents at the ***Monitor*** wreck site. To date, only a few objects are known to have been recovered, namely a deck light cover, the hull plate and the marine lantern suspected to have been the one flying on the night of the sinking. A piece of the damaged turret armor reported to have been removed in Washington is in the possession of the Naval Academy Museum.

One approach to estimating the wreck's contents is to examine the organization of the ship's departments and the allowances provided for a third and fourth-rate steamer, the classes that seem to have been assigned to monitors. A count of the types of articles allowed is shown in the following table. A count in this table could represent various numbers of items—e.g., one hand saw, one box of a thousand copper tacks, 50 pounds of red lead, one set of surgical instruments. The number of individual items could be much greater than 1,478, and 5,000 should not be unreasonable. In addition to the naval allowances are all the crew's personal effects. If we estimate 25 items for each enlisted man and perhaps 50 for each officer, we have approximately 1,500 additional artifacts from this source alone.

TABLE I

Estimate of the U.S.S. ***Monitor's*** *Allowances for Two-Month Supply*

Department	**Number of Classes of Articles**
Navigator	254
Engineer	160
Boatswain	184
Carpenter	298
Gunner	187
Medical	204
Paymaster	126
Stationary	65
	1,478

The approximate location of major components of the ship is shown in sketches made at sea before the beginning of the Alcoa **Seaprobe** photography runs. These inverted views show the arrangements of the machinery spaces featuring the boilers, main engine, blowers, rudder and propeller; the turret gear amidship and the berth deck wardroom, anchor hoist and well.

From the videotape and photography taken by the Eastward discovery expedition in 1977, a detailed picture emerges of the external appearance of the ***Monitor*** wreck site. The mosaic of the Alcoa ***Seaprobe*** photography prepared by the Navy gave the first complete picture of the wreck and the model constructed by the Harbor Branch Foundation makes the damage easier to comprehend.

The hull is upside down and the edge of the port quarter is resting on the turret, which separated from its midship position sometime during the sinking process. The starboard side of the ship is almost entirely buried in the sand at the ocean bottom.

The most remarkable feature of the wreck is the structural integrity of the armor belt and shelf of the port side. It appears to be completely rigid, undistorted and entirely clear of the bottom from bow to stern. Beginning with the stern, a large portion of the starboard overhang and armor belt is missing. The skeg that supports the propeller post and rudder is intact, but the rudder is dislodged and reportedly lying on the bottom. The four-bladed 9-foot diameter propeller has separated from the shaft and has been observed in the wreck.

Proceeding forward, we observe that the plates are missing on the port side opposite the main engine. Through this opening, one can reportedly see objects that appear to be major machinery components.

Forward of the midship traverse bulkhead, the hull is almost completely collapsed. Examination of photography indicates that the 15-inch floor timbers in this area are scattered in all directions, several lying fore and aft. This distribution indicates to me that some force greater than the sinking impact or gravity has acted on this area. A World War II depth charge attack may offer an explanation. One such incident of 1943 in this area has been identified by the U.S. Naval Historical Center but requires additional investigation.

Although the sample plate recovered from the wreck in 1977 may not be typical of the remainder of the hull, the X-ray mosaic taken at the Naval Research Laboratory indicates various degrees of metal loss. This 60-pound portion of a hull plate that was dislodged by the Edgerton camera was originally a half-inch thick and now averages only 3.9 millimeters. A few rivets remain. Samples from this plate have been prepared for metallurgical analyses under the coordination of the North Carolina Division of Archives and History. Much of the metal in the wreck appears to be in better condition than this plate.

The turret is also of great interest, but I have said little about it because it seems to be complete and intact.

We can see that the ***Monitor's*** hull is no longer an integral body. Little is known of the condition of the hundreds of plates and thousands of rivets that form the structure. The interior of the wreck is unexplored. There is no information on the buried portions of the hull, which make up at least a third of the structure and most of its contents.

I believe that much more has to be learned about and from the wreck before the feasibility of recovery can be addressed properly. To this end I would recommend the following:

a. A continuing study of the historical records;
b. Development of comprehensive engineering descriptive material and drawings;
c. Construction of a detailed model of the ship in its configuration at the time of the sinking;
d. Construction of a model of the wreck site; and
e. On-site explorations to provide information unavailable in documentation or by extrapolation.

With this information, an orderly approach can be made to determine the feasibility of recovery and to set up long-range goals for the first American marine sanctuary. The future of one of America's most famous naval vessels deserves a consideration commensurate with the great heritage she helped to provide our nation.

Ernest W. Peterkin
USNR (ret)

(Reprinted by permission of National Trust for Historic Preservation. Mr. Peterkin is currently preparing a detailed catalog of the ***Monitor's*** contents for publication.)

John Ericsson Day In Sweden

"John Ericsson Day" in Sweden was celebrated in Filipstad on July 31, 1983. It was highlighted by the second annual re-creation of the historic battle of the ironclads

The festivities began with a cermony at John Ericsson's mausoleum. A wreath, in the form of the four-bladed screw propellor invented by Ericsson, was placed on the mausoleum by America's Ambassador to Sweden, Franklin Forsberg. The Honor Guard was composed of members of the Vasaw Order, Odd Fellows Lodge, and the Swedish Army Reserves. Flags from the United States and Sweden were prominently displayed while military bands played the national anthems of both countries.

An address was given by Filipstad's Municipal Advisor, Sten Fogde. John Ericsson Society President, Kjell Lagerstrom, then gave greetings from the United States and stated that Ericsson is even more famous in the United States than in Sweden.

After the ceremony at the mausoleum, a mass was held at the Church of Filipstad. This was followed by a Swedish folk festival at the lakeside. Vocal entertainment was provided by Ann-Charlotte Harvey accompanied by guitarist Kjell Hansson. Dances, both contemporary and traditional, were performed by the Gundega Ballet.

***"John Ericsson Day"* in Sweden (1983) 2nd annual re-creation of the famous battle of the ironclads USS *Monitor* and CSS *Virginia* (*Merrimac*).**

Following the folk festival were additional addresses by Ambassador Forsberg and Wilhelm Wachtmeister, Sweden's Ambassador to the United States. Both men praised the good relations between the two countries.

The celebration was climaxed by a dynamic re-enactment of the first battle between ironclad warships, the USS ***Monitor*** and the CSS *Virginia* (*Merrimac*). The same large, quarter-scale models from the previous year were used, but the *Virginia*'s maneuverability was vastly improved. Both ships were now powered by outboard motors, and this intensified the drama of the epic battle. Some four thousand spectators cheered as the ***Monitor***'s gun turret revolved into targeting position, met with equally dramatic retaliatory salvos from the *Virginia*. Cannons and pyrotechnics were used to simulate the smoke and firing from the ships; six thousand kronens ($1,000 U. S. currency) were spent on special effects. Kjell Lagerstrom commented that the billowing smoke and booming cannons were extremely effective. The battle lasted some thirty minutes.

Sponsors for this event included The Emigrant Register of Karlstad, Filipstad's Cultural Commission, Odd Fellows and Vasa Order of America.

Alazar Templeton
John Ericsson Society, New York

Monitor Tributes at Academy

(Continued from page 7)

The remainder of the objects associated with ***Monitor*** are commemorative coin-medals, prints, and photographs. The half-dozen medals and several dozen prints mostly depict scenes of the battle of March 9, 1862, with varying degrees of inaccuracy. The contemporaneous versions showing the most famous naval engagement in Hampton Roads were important propaganda during the Civil War and have survived today as rare collectors' items.

The purpose served today by all the above referenced artifacts preserved in this repository is to inspire an interest in history and in the lessons of our past accomplishments and failures in our naval leaders of tomorrow - the brigade of Midshipmen. The U. S. Naval Academy Museum is an important adjunct to the education of these men and women, and, secondarily to all people interested in our naval heritage. Hopefully, the flag, the section of armor plate, the ship models, and other souvenirs of USS ***Monitor*** will provoke further study and wider knowledge of the brief and dramatic career of what one graduate of the Academy has called "the ship that launched a modern navy."

James Cheevers
U. S. Naval Academy Museum

List of Publications

Publications on research conducted for the U.S.S. ***Monitor*** National Marine Sanctuary are available to the public upon request. Please contact the editors.

- ☐ Brennan, William J. "An Historic Ship Launches an Important Marine Program." NOAA Reprint. Vol. 5, No. 2. April 1975.
- ☐ Childress, Lt. Cdr. Floyd. "The Lantern." NOAA Reprint. Vol. 7, No. 2. October 1977.
- ☐ D'Angelo, Schoenewaldt Associates. *Preliminary Engineering Feasibility*. 1981.
- ☐ Hill, Dina B. (edited by) *Analysis and Preservation of Hull Plate Samples from the* ***Monitor***. 1981.
- ☐ Jannaman, Joan P. and Diana M. Lange. ***Monitor*** *National Marine Sanctuary Activities Book*. 1983.
- ☐ Miller, Edward M. *Rate of Deterioration of the U.S.S.* ***Monitor***, *Its Measurement and Impact*. 1983.
- ☐ Muga, Bruce. *Engineering Investigation of the U.S.S.* ***Monitor***. 1982.
- ☐ Peterkin, Capt. Ernest W. (USNR, Ret.) *Drawings of the U.S.S.* ***Monitor***. 1983
- ☐ Southwest Research Institute. *A Feasibility Study for Transmission of a Live Televison Picture of the U.S.S.* ***Monitor*** *to Visitors Centers Onshore*. 1982.
- ☐ Still, William N. *Archival Sources: A Study of Unpublished Sources Found in Washington, D. C. area and New York City Concerning the Engineering and Technical Aspects of the U.S.S.* ***Monitor***. 1981.
- ☐ Tucker, Rockwell, G. *Environmental Data*. 1981.
- ☐ Watts, Gordon P. *Investigating the Remains of the U.S.S.* ***Monitor****: A Final Report on 1979 Site Testing in the* ***Monitor*** *National Marine Sanctuary*. 1982. (Temporarily out of print).
- ☐ Watts, Gordon P. and James A. Pleasants, Jr. *U.S.S.* ***Monitor****: A Bibliography*. 1981. ($2.00 per copy, make checks payable to: N. C. Division of Archives and History).
- ☐ 1983 ***Monitor*** National Marine Sanctuary Management Plan. 1983.

John Ericsson Society To Sponsor Creativity Contest

The annual meeting of the John Ericsson Society (JES)was held on January 25, 1984 at the Church of Sweden, New York, New York. President Kjell Lagerstrom called the meeting to order at 1:30 P.M. The minutes of the previous meeting were read by Vice President Arnold Abrahamson and approved. The annual Treasurer's report was presented by Arthur Peterson. Auditors Erik Haglund and Erik Eliasson stated that they had reviewed the report and recommended approval; the motion passed. President Lagerstrom summarized the activities of the Society for 1983.

Director of Research, Alazar Templeton, then presented buttons and bumper stickers commemorating the August 1983 ***Monitor*** research expedition to all members. These items were received with great enthusiasm; they were donated to the JES by Gloria Thompson, of NOAA's Sanctuary Program Division.

Arnold Abrahamson reported that he had visited the John Ericsson Junior High school in December 1983. Officials there have expressed a keen interest in a school-wide contest focusing on John Ericsson and the USS ***Monitor***.

It was decided that Alazar Templeton will present her ***Monitor*** slide program, "IRONCLAD VICTORY," on March 9, 1984, to increase an awareness in the identity of John Ericsson and to celebrate the 122nd anniversary of the famous battle of the ironclads. The JES will sponsor a "John Ericsson Creativity Contest" in the spring of 1984, open to all students of the school. Prizes of several hundred dollars in savings bonds are to be awarded. The presentations to contest winners will be made at the site of the Ericsson Memorial in Battery Park, Manhatten, on March 9, 1985.

JES Historian, Erik Eliasson then described the compilation of documents and data that he and fellow Historian, Michael Lydon, have completed, and he stressed the importance of preserving this material. Several suggestions were made regarding the possibility of publication of this data.

It was announced that JES member Erik Tornquist has recently been awarded the John Ericsson Medal by the American Society of Swedish Engineers. The Medal will be presented on February 11, 1984.

The report of the nominating committee was then read. The Society was disappointed to hear the resignations of Arthur Peterson, Treasurer (an officers of the Society for over twenty years), and Alvalene Karlsson, Secretary. The meeting concluded with the election of the following officers for 1984: President, Kjell Lagerstrom; Vice Presidents, Arnold Abrahamson, Fred Ekvall, Erik Haglund and Gunnar Lundstedt; Secretary, Robert Templeton; Treasurer, Nils Nordin; Director of Research, Alazar Templeton; Chaplain, Pastor Evert Olson; Historians, Erik Eliasson and Michael Lydon; and Directors, Erik Eliasson, Dagmar Kerr, Bo Ljung, Michael Lydon and John Wennstrom.

Alazar Templeton
John Ericsson Society, New York

The Pilot House

This is the first issue in our new series of three issues of *Cheesebox* per year. The format for the spring and winter issues will remain the same as the previous issues with a variety of articles on all aspects of the ***Monitor*** National Marine Sanctuary. The summer issue will be devoted to one subject or one particular aspect of the sanctuary. The August 1984 issue will be a commemorative issue dedicated to the eleventh anniversary of the location and identification of the remains of the ***Monitor***. This issue will include articles by principals in the 1973 expedition that resulted in the location of the ***Monitor*** as well as information on earlier unsuccessful searches for the wreck.

Following the 1979 expedition, NOAA produced a documentary film on the history of research in the ***Monitor*** National Marine Sanctuary with emphasis on the thirty-day project carried out in 1979. Copies of the film, titled "Down to the ***Monitor***," are available for showing by agencies, institutions, public service organizations, and other interested parties at no charge.

Under the current cooperative agreement with NOAA, the faculty and staff of the Program in Maritime History at ECU are developing a "canned" slide presentation that will also be made available for showing upon request. The slide presentation will be accompanied by background information and material to be distributed to the audience. In addition, members of the ***Monitor*** project team are available, as time and funding permit, to present programs on the ***Monitor*** to conferences, educational institutions, and public service organizations.

For further information, please contact the editors of *Cheesebox*.

The editors wish to express their appreciation to the National Trust for Historic Preservation for allowing us to reprint papers from "The ***Monitor***: Its Meaning and Future," the April 1978 national conference on the ***Monitor***. More of these papers will appear in future issues of *Cheesebox*.

Program in Maritime History
and Underwater Archaeology
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Greenville, NC 27834

Monitor National Marine Sanctuary Activities Report
CHEESEBOX

Funding by the National Oceanic and Atmospheric Administration