

2012

Ironclad Revolution: The History, Discovery and Recovery of the USS Monitor

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<https://dx.doi.org/doi:10.21220/s2-6ta9-r518>

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Ironclad Revolution: The History, Discovery and Recovery of the USS *Monitor*

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A Dissertation presented to the Graduate Faculty
of the College of William and Mary in Candidacy for the Degree of
Doctor of Philosophy

Department of History

The College of William and Mary
January 2012

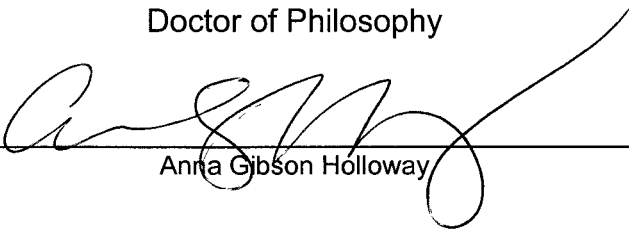
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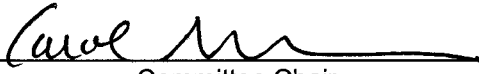
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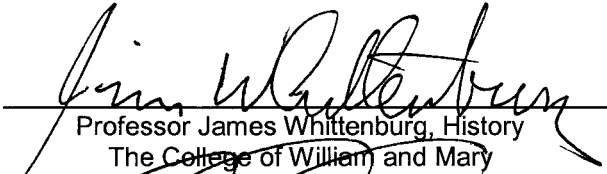


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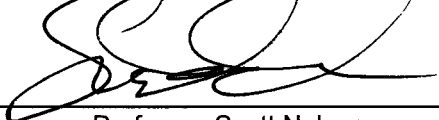
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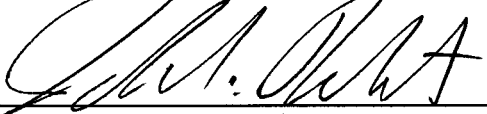
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ABSTRACT PAGE

On the afternoon of March 8, 1862, the Confederate ironclad ram Virginia, built upon the burned-out hulk of the steam screw frigate Merrimack, crawled slowly into Hampton Roads to challenge the Union blockade of the Confederate coastline. Before nightfall, the Virginia had wreaked havoc upon the Union blockading fleet: the USS Cumberland lay at the bottom of the Roads, her flags still defiantly flying while the surrendered USS Congress blazed ominously in the harbor until exploding spectacularly in the early morning hours of March 9.

The USS Monitor—a vessel of a radical new design and completely untried in battle—arrived too late to make a difference on the 8th, but met the Virginia on the morning of the 9th in a contest that signaled the first time ironclad had met ironclad in combat. While their four-and-a-half-hour battle ended in a draw, it changed much of the future course of naval warfare. Within days of the engagement, navies around the world were declaring an end to wooden construction and moving forward with their own ironclad building programs—many of which predated both the Monitor and the Virginia. Furthermore, the Monitor's rotating gun turret design freed vessels from the strictures of broadside tactics by allowing the guns, rather than the entire vessel, to be turned, and ushered in a new element of battleship design. Neither the Virginia nor the Monitor lived out that year, however. The Virginia was destroyed in May of 1862 by her own crew to keep her from enemy hands, while the Monitor succumbed to a nor'easter on New Year's Eve off the coast of Cape Hatteras.

Discovered in 1973, the Monitor was designated a National Marine Sanctuary in 1975 under the auspices of the National Oceanic and Atmospheric Administration (NOAA). Since 1987, The Mariners' Museum in Newport News, VA has served as the principal repository for artifacts recovered from the wrecksite and is currently conserving over 210 tons of the Union ironclad in the Batten Conservation Complex.

This dissertation serves as the text for the catalogue of the award-winning exhibition, *Ironclad Revolution*, which opened at The Mariners' Museum in 2007. The author serves as curator of the USS Monitor Center. Drawing from artwork, archival material and the recovered artifacts themselves, this work seeks to tell the full story of the Monitor: her history, discovery, recovery, and conservation.

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For Mama and Daddy

Acknowledgments

If someone had told me fifteen years ago that I would one day trade in wooden ships for ironclads, and square sails for steam, I would have told them that they were crazy and clearly did not know me well.

That was before I met the *Monitor*.

This curious little ironclad and the men who built her, served on her, and died with her, as well as the men and women who discovered, recovered, and now maintain and conserve her have become as much a part of my everyday existence no matter how many miles and fathoms, or decades and centuries separate us.

And yes, the *Monitor* is a she, no matter what the current Navy custom is today. To me it seems somehow wrong to take that pronoun away from “our little *Monitor*.” Relegating her to an “it” somehow removes the soul from a vessel, though she was not a delicate girl by any means. She drank, smoked, belched, roared, reeled and staggered like a drunk man, if you read the words others used about her. She went by the names Ericsson’s Folly, Tin can, rat trap, cheesebox. Yet she became the hope of a nation, the home for some 108 men over her brief life above the waves, and the nursery for countless creatures aquatic over the course of a century and a half, serving proudly as America’s first National Marine Sanctuary under the auspices of NOAA.

She first came into my life in 2000, when I became Director of Education at The Mariners’ Museum in Newport News. Little did I know that she and her officers and crew would become as familiar as old friends, or seem like long lost members of

my family. To the 108 men who sometimes called themselves “The *Monitor* Boys,” I give my eternal thanks.

But this dissertation would never have seen the light of day had it not been for Professor Carol Sheriff and Professor Jim Whittenburg from the Department of History at The College of William and Mary. They had been there with me at the beginning of my “gradual school” career and were determined to see me through to the end. They, along with Professor Scott Nelson, convinced me to switch time periods, and dissertation topics mid-stream. And they were right to do it! I cannot thank them enough for all of their continued support, cheerleading and expertise, as well as the rest of the faculty and staff of the Lyon Gardner Tyler Department of History.

My colleagues at The Mariners’ Museum have gone above and beyond any call of museum duty to make it possible for me to complete this work. Thanks to Mary Ann Cleary and John Hightower for seeing my potential as curator of the *Monitor* story, Tim Sullivan and Dr. Bill Cogar for making sure that this work could get done, as well as the incredible staff here at The Mariners’ Museum and my colleagues past and present at NOAA’s *Monitor* National Marine Sanctuary. Thanks to Dr. John Broadwater for his assistance and insightful comments in preparing this manuscript, and in teaching me to love the little cheesebox. Thanks to John as well as David Alberg and Jeff Johnston from NOAA, and Captain Bobbie Scholley and MDSU TWO for letting me tag along on some of the expeditions (and not laughing at my sad little seasick self) and for providing me access to these national treasures. Thanks also to the staff of The Mariners’ Museum Library and Archives at

Christopher Newport University, and especially Bill Barker, Tom Moore, Bill Edwards-Bodmer, and Dr. Jay Moore, for helping me paw through primary source documents from the 19th, 20th and 21st centuries.

One of our fabulous volunteers, Lona Ross, likely does not realize how important all of her incredibly insightful questions were to me were in preparing for this. I thank her for keeping me on my toes with the minutiae of the 19th century. Thanks also to Collections Technician Cindi Verser for her love of early telegraph history which is truly infectious. Priscilla Hauger, Anne Marie Millar, Jeanne Willoz-Egnor, Frederick Wallace, and Lyles Forbes have all put up with my distractions with good humor, and have been massively supportive! I want to thank David Krop, Marcie Renner, Curtiss Peterson, Eric Nordgren, Elsa Sangouard, Will Hoffmann, Tina Gutshall, Gary Paden, Michael Saul and all of the staff and volunteers of the *Monitor* Conservation Project in years past for all of the phone calls in the past decade that began with the words, “Anna, you need to come over here and *see* this!”

My co-curator Jeff Johnston, along with Len Soccolich, Judy Vannais, Scott Guerin, David Lenk, the groovy John Quarstein, Sara Johnston, David Dwyer, Sidney Moore, Kimberly Hansin, Two Rivers Studios, Pyramid Studios, Batwin + Robin, Susannah Livingston, and a cast of thousands all played major roles in creating the USS *Monitor* Center exhibition. Their good humor, incredible skills and willingness to do some pretty bizarre things for the sake of the exhibition are the stuff of legend. I cannot thank them enough.

Of course, the greatest support comes from friends and family, for though they may not have been there in the gallery every day with me, the constant of their

friendship, love, and support is what sustained me through this massive project.

Special thanks go to Anne Marie Millar, Alex Ruble, and J. Michael Moore for being my daily cheering section, and to others around the world who sent their best thoughts and encouragement online.

Immense thanks go to Duane and Pat Holloway for their love and friendship, and for accepting me into their brood and cheering me along. And mere words seem too lacking, but I would like to thank my parents, Tom and Greta Gibson for...well, for absolutely everything. I would not have made it this far without them. They have gone above and beyond for me countless times with their love, support, friendship and discussions of recipes, and I hope I can someday return the favor.

Finally, I want to thank my husband Jim for loving me and the kitties. His patience, humor, and gourmet cooking have sustained me throughout my shift from sail to steam, from shot to shell, and from wood to iron in the many years of *Monitor* madness. I can think of no one else with whom I would rather sail, or in this case *steam* away.

Introduction

On the afternoon of March 8, 1862, the Confederate ironclad ram *Virginia*, built upon the burned-out hulk of the steam screw frigate *Merrimack*, crawled slowly into Hampton Roads to challenge the Union blockade of the Confederate coastline. Before nightfall, the *Virginia* had wreaked havoc upon the Union blockading fleet: the USS *Cumberland* lay at the bottom of the Roads, her flags still defiantly flying while the surrendered USS *Congress* blazed ominously in the harbor until exploding spectacularly in the early morning hours of March 9. The USS *Monitor*—a vessel of a radical new design and completely untried in battle—arrived too late to make a difference on the 8th, but met the *Virginia* on the morning of the 9th in a contest that signaled the first time ironclad had met ironclad in combat. While their four-and-a-half-hour battle ended in a draw, it changed much of the future course of naval warfare. Within days of the engagement, navies around the world were declaring an end to wooden construction and moving forward with their own ironclad building programs—many of which predated both the *Monitor* and the *Virginia*. Furthermore, the *Monitor's* rotating gun turret design freed vessels from the strictures of broadside tactics by allowing the guns, rather than the entire vessel, to be turned, and ushered in a new element of battleship design. Neither the *Virginia* nor the *Monitor* lived out that year, however. The *Virginia* was destroyed in May of 1862 by her own crew to keep her from enemy hands, while the *Monitor* succumbed to a nor'easter on New Year's Eve off the coast of Cape Hatteras.

In 1978, just five years after the discovery of the Civil War ironclad USS *Monitor*'s wreck site, Lieutenant Edward Miller, USN, optimistically proclaimed in his work *U.S.S. Monitor: The Ship That Launched a Modern Navy*, that "only now can the complete story of the USS *Monitor* be written."¹ Miller knew that only through the investigation of the archaeological remains of the vessel could she truly be understood. Yet by the end of his work he acknowledged that to write the truly complete story would require a recovery and conservation effort that was beyond the technological and financial capabilities of the research teams and agencies involved with the *Monitor* at that time. He ends the volume with the hope that the discovery of the site "will not be the end of the *Monitor* story, but only a new beginning."²

On March 9, 2007, the National Oceanic and Atmospheric Administration (NOAA) and The Mariners' Museum opened the USS *Monitor* Center in Newport News, Virginia—a few short miles from the scene of the first battle between ironclads 145 years earlier. This state-of-the-art facility features an 18,000-square-foot exhibition, as well as a 20,000-square-foot conservation lab where the artifacts from the USS *Monitor*'s wreck site (NOAA's *Monitor* National Marine Sanctuary) are undergoing conservation. Adjacent to the facility is The Mariners' Museum Library and Archives, home to the largest collection of documents, drawings, plans, and publications concerning all aspects of the USS *Monitor* story, including the NOAA *Monitor* National Marine Sanctuary Archival Collection.

¹ Edward M. Miller. *U.S.S. Monitor: The Ship That Launched A Modern Navy*. (Annapolis, MD: Leeward Publications, 1978), 1.

² *Ibid.*, 109.

This dissertation, which will serve as the text for the exhibition catalog for the USS *Monitor* Center, is a project with which I have been associated for ten years. Arranged in eight chapters, it will follow the basic thematic layout of the *Monitor* Center but will not slavishly reproduce the gallery text. Rather, this work provides an original, in-depth narrative of each of the thematic areas using art, artifact, and archival material, highlighting that which is on display and introducing new information not covered in the galleries. Most significantly, as the archaeological and conservation work on the *Monitor* artifacts is ongoing at The Mariners' Museum, this work will introduce new information regarding the construction, modifications, and material culture of the USS *Monitor* that has never before been published. Thus, for the first time, the complete range of the USS *Monitor* story can be told—from inception to destruction, from discovery to recovery. As curator of the USS *Monitor* Center project, I have unique access to all of this material.

While there are several themes I encountered in the design of the *Monitor* Center exhibition, one in particular stands out as unique in the historiography of the vessel. In the world of engineering and ship design, there is often a vast gulf between the “as-planned” and “as-built.” With her production guaranteed in only 100 days, the USS *Monitor* presented a unique challenge to her inventor and to the multiple and far-flung companies that produced her various parts for assembly at the Continental Iron Works in Greenpoint, Brooklyn. The plans and shop drawings that the *Monitor*'s creator, John Ericsson and his right-hand-man Charles MacCord produced for the *Monitor* were crucial to the success of the experimental warship. Turret plates rolled in Baltimore, Maryland, needed to conform with the machinery

produced by Delamater Iron Works in Manhattan and the entire assembly had to fit neatly—and with a water-tight seal—onto the hull which was taking shape at Continental in Brooklyn. Plans needed to be followed exactly if this experiment were to work and be completed in record time. Yet archaeological work done on the USS *Monitor*, both on the wreck site and at The Mariners' Museum, reveals a significant number of changes and alterations from the original plans. This work, paired with recently discovered correspondence amongst the contractors and builders of the USS *Monitor*, has given historians new opportunities to explore the construction and story of the “Yankee cheesebox,” as one southern newspaper reporter called her at the time of the battle in reference to her cylindrical turret. Much of what was changed between the design phase and the construction phase was a direct result of consideration of the human factor— men were going to be living aboard this near-submarine—with all of its systems, save ordnance, housed below the waterline, for months at a time, for the first time in history.

Another theme that has seldom been addressed in the literature on the *Monitor* is the psychological impact of the new, untried design of what would eventually become an entire classification of vessels (sixty turreted vessels would be in various stages of service or construction by the end of the war).³ “The *Monitor* Boys,” as the original crew referred to themselves, understood that they were creating history when they stepped on board the *Monitor* for the first time. They would exist in a submarine world with artificial lighting, a world where the very air

³ David Mindell’s *War, Technology and Experience Aboard the USS Monitor*, published in 2000 with a new edition forthcoming in March, 2012, is the exception to this omission in literature concerning the psychological effects of going to sea in an ironclad.

they breathed would be pumped in and out by means of coal-fired steam engines. The hierarchy of place within a vessel would be topsy-turvy with the officers forward (in the “before the mast” position), the crew midships, and the engine receiving pride of place all the way aft. The sailors would be separate from their enemy both physically and psychologically, with only the commanding and executive officers being able to view the enemy vessel with any real certainty.

All modifications to the *Monitor* (aside from those necessitated by battle damage) were a direct result of man having to coexist with machine in a way not heretofore done. The archaeological work unfolding on the wrecksite and in our laboratories yields new information each day that will help in illustrating the daily life on board the *Monitor*. For example, in the summer of 2007, conservators uncovered brass sight holes in the turret. These holes appear to have been added to the original design to afford more viewing opportunities for the officers within the turret. NOAA archaeologists have also found gun tools within the turret, modified from the traditional tools of a wooden sailing vessel in order to operate in the confines of an iron turret.

The impact of the *Monitor* on popular culture is another theme that has been little addressed, save for in David Mindell’s *War, Technology and Experience Aboard the USS Monitor* -published in 2000, and Jerry Harlowe’s *Monitors: The Men Machines and Mystique* of 2001. Their work, along with research I conducted throughout the creation of the USS *Monitor* Center exhibition revealed that the *Monitor* immediately captured the minds of men and women throughout the northeast in the days, weeks and months following the March 9, 1862 battle.

Following the war, however, she became an enduring symbol of American ingenuity, strength and stability throughout the United States from the 1880s until the 2010s. The results of this research became the most recent exhibition installed with the USS *Monitor* Center at The Mariners' Museum, entitled "'Up Pops the *Monitor*': The Battle of Hampton Roads in Pop Culture."⁴

The immediate effect of the Battle of Hampton Roads upon McClellan's controversial Peninsular Campaign of 1862 was profound. The mere presence of the *Virginia* through mid-May of that year made gunboat support along the James River an impossibility for Union forces and kept much of the Union fleet confined to Hampton Roads and the York River, thus delaying McClellan's already cautious and slow actions during his Peninsula Campaign. The presence of the *Monitor*, though less effective against shore batteries than previously hoped by the Ironclad Board of the US Navy, served as an important morale booster to both troops and the northern public in general as she became a symbol of hope as well as of Yankee ingenuity. Chief Engineer Isaac Newton wrote to his mother that "the 'morale effect' of the presence of the *Monitor* is the principle reason why we are kept here" on the James River, and added rather drolly that "if that's the case morale effect must be pretty well strewed along the river in these parts from the number of times we have passed up and down."⁵

⁴ David Mindell, *War, Technology and Experience aboard the USS Monitor*, (Baltimore, MD: Johns Hopkins University Press, 2000); Jerry L. Harlowe, *Monitors: The Men Machines and Mystique*. (Gettysburg, PA: Thomas Publications, 2001).

⁵ Letter from Isaac Newton to his mother, 30 June, 1862, Isaac Newton Papers (MS13), The Mariners' Museum, Newport News, VA.

The long-term effect of the March 9th battle had ramifications for both the Civil War in general and the design of warships in specific. Both the *Monitor* and the *Virginia* served as prototypes for classes of vessels that drew upon their innovative designs. The ironclad rams of the Confederacy and the turreted monitors of the Union saw action in the Atlantic, Gulf, and Western rivers. The monitor design continued as the principal coastal and riverine warship in North and South America as well as Europe until the turn of the century when the dreadnought design superseded the ironclad with its emphasis on high-speed, heavily-armored vessels with big guns within the main battery, all of a uniform caliber. While ironclads existed before the *Monitor* and *Virginia*, their meeting on March 9, 1862 ushered in the next phase of naval warfare, where machine and armament become paramount. The author Herman Melville summed it up rather gloomily:

*Yet this was battle, and intense --
Beyond the strife of fleets heroic;
Deadlier, closer, calm 'mid storm;
No passion; all went on by crank,
Pivot, and screw,
And calculations of caloric.*

He ends with the pronouncement that “War shall yet be, but warriors/Are now but operatives....”⁶ In this way, the first battle of ironclads marked a shift in warfare that would be manifested in many ways during what some historians have called both “the last battle of the musket war,” as well as “the first modern war.”⁷

⁶ Herman Melville, *Battle-Pieces and Aspects of the War*, New York, Harper & Brothers Publishers (1866), 61-62.

⁷ Brent Nosworthy, *The Bloody Crucible of Courage: Fighting Methods and Combat Experience of the Civil War*, New York, Carroll & Graf Publishers, 2003. 643.

Sources and Methodology

At The Mariners' Museum, we are fortunate to have the Western Hemisphere's finest maritime library, which is home to the nation's largest collection of archival material on Civil War ironclads, with a particular emphasis on the USS *Monitor*. In 1987, The National Oceanic and Atmospheric Administration (NOAA) chose The Mariners' Museum to be the principal repository of all of the artifacts recovered from the *Monitor* National Marine Sanctuary as well as the National Archives and Records Administration (NARA) satellite site for the *Monitor* National Marine Sanctuary Archives. This archival material includes all written, photographic, and video documentation of the wrecksite dating from its discovery in 1973 as well as ancillary material created for NOAA and the Department of Cultural Resources of the State of North Carolina by Captain Ernest Peterkin, USNR (ret.), William N. Still, and others, documenting the construction of the USS *Monitor*. With the exception of Lt. Ed Miller's 1978 work, William Still's report, and Captain Peterkin's catalogue raisonné of John Ericsson's and Charles McCord's drawings and plans, very little of this archive has been made available to the public except through the USS *Monitor* Center exhibition. This archival information, paired with the ongoing excavation of the wrecksite and active conservation of the recovered parts at The Mariners' Museum, will be invaluable in outlining the technological story of the creation of the *Monitor*.⁸

⁸ Capt. Ernest W. Peterkin, USNR (Ret.), *Drawings of the U.S.S. Monitor*, U.S.S. Monitor Historical Report Series, Volume 1, Number 1, 1985, (Washington, DC: United States Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, 1985); Edward M. Miller, *U.S.S. Monitor: The Ship That Launched A Modern Navy*, (Annapolis, MD: Leeward Publications, 1978);

The personal histories of the officers and men of the *Monitor* are a crucial, sadly under researched element of this story, and one that I am in a unique position to exploit. Using the manuscript collections at The Mariners' Museum, NOAA, the National Archives and the Naval Academy Museum, I was able to pair artifacts with archival material and bring the personal stories to life – pairing silverware with letters home, engine gauges with photographs and drawings. The social history of life on board the US Navy's first ironclad will essentially place flesh on the bones of the technological story for our visitors, but more importantly add significant information to the relatively small number of works on the social history of the Civil War navies.

The broader context of the ironclad age and its impact on both the American Civil War and future warship design is a subject for which the larger holdings of The Mariners' Museum's library and archives are well suited. Plans for later-class monitors, as well as later warships, will aid in tracing the technological developments initiated by the *Monitor* in both American and European ship design. Logbooks, personal letters, and journals written by officers and sailors serving on ironclads and within the steel navy can help to add the human component to a field that is more often focused on technology and the inner workings of machinery than on the day-to-day usage of the equipment.

William N. Still, *Monitor Builders: A Historical Study of the Principal Firms and Individuals Involved in the Construction of the USS Monitor*, (Washington, DC: National Marine Initiative, Division of History, National Park Service, Department of the Interior, 1988).

Historiography

For 145 years, the USS *Monitor* has been the subject of countless articles, monographs, essays, comic books, and children's books. Her story reaches from the latter half of the nineteenth century to the present and works associated with the *Monitor* fall into four major categories: antiquarian, technological, social, and archaeological.

Adopted in March of 1862 as a symbol of American ingenuity (her Swedish inventor notwithstanding), the *Monitor* was a celebrity in her own right and the majority of nineteenth-century writings about the vessel and her crew range from the antiquarian histories at best, to the grossly inaccurate popular press at the very nadir of the subject. Exceptions to this rule are the technical analyses done by Benjamin Franklin Isherwood in early 1862 and *Contribution to the Centennial Exhibition* by John Ericsson detailing his own contributions to the scientific community on the occasion of the nation's centennial.⁹ Eyewitness accounts of the Battle of Hampton Roads – written specifically for newspapers, weeklies, and magazines throughout the latter half of the nineteenth century, and culminating in a flurry of reminiscences on the occasion of the fiftieth anniversary of the war—focus on the personal recollections which are often flawed and blatantly fabricated to glorify the writer. Nevertheless, accounts of the battle by participants as diverse as the *Monitor's* executive officer, Lt. Samuel Dana Greene and CSS *Virginia* crewman Pvt. Richard Curtis, provide a prosaic, yet accurate view of the events of March 9,

⁹ Benjamin Franklin Isherwood, *Experimental Researches in Steam Engineering, Volume 1*, (Philadelphia: William Hamilton, Hall of the Franklin Institute, 1863).; John Ericsson, *Contributions to the Centennial Exhibition*, (New York: The Nation Press, 1876).

1862. Francis Butts' recollection of the final moments of the *Monitor* is more typical, in that events are fabricated or conflated to serve the ego of the writer while merely entertaining the reader. Subsequent archaeological work has proven Butts wrong on several accounts, rendering his recollection of his personal role in "The Loss of the *Monitor*" largely apocryphal.¹⁰

Unembellished firsthand accounts remained in archives and attics until the Civil War centennial. The publication of the edited letters of *Monitor* Paymaster William Keeler in 1962 was the first major transcription of letters written home from the *Monitor*. The annotations by editor Robert Daly help place the *Monitor* within the broader historical context of the 1862 Peninsular campaign in specific and the American Civil War in general. However, the publication's primary value is as a vehicle to give greater access to Keeler's letters. These letters, which are whimsical, detailed, and thoughtfully constructed, are thankfully written by a neophyte naval officer, albeit one who had sailed before on a commercial vessel. Keeler's ignorance of naval life and protocol means that he explains much in detail that is lacking in a more seasoned officer's writings. Keeler also understood very

¹⁰ Samuel Dana Greene, "In the 'MONITOR' Turret" in *Century Magazine*, Volume XXIX, New Series, Volume VII; Francis Banister Butts, *The Monitor and the Merrimac: Personal Narratives of Events in the War of the Rebellion, Being Papers Read Before the Rhode Island Soldiers and Sailors Historical Society*. (Providence: N. B. Williams, 1890).; Richard Curtis, *History of the Famous Battle Between the Iron-clad Merrimac, C.S.N., and the Iron-clad Monitor and the Cumberland and Congress, of the U.S. Navy, March 8th and 9th 1862, as Seen by a Man at the Gun*. (Hampton, VA: Houston Printing and Publishing House, 1957).

quickly that he was writing for a much larger audience than his wife (she sent one of his letters to the local newspaper for publication) and added details accordingly.¹¹

William Marvel's *The Monitor Chronicles: One Sailor's Account* adds the letters of crewman George Geer to the canon, though Marvel sacrifices transcription for narrative, leaving much of Geer's writings still unpublished. However, Geer's unvarnished view of life on the berth deck acts as a particularly useful counterpoint to Keeler's more genteel outlook of the wardroom. While Marvel does draw upon Keeler occasionally to fill in the gaps in some of Geer's more laconic letters, to date there has been no side-by-side comparison of the two with the exception of the USS *Monitor* Center exhibition. Ancillary to these two works is Alvah Hunter's memoir of life aboard the USS *Nahant*, edited by Craig Symonds, and Surgeon Charles Ellery Stedman's sketchbooks from the same vessel. While the *Nahant* is a *Passaic*-class monitor (the next iteration of the *Monitor* design by Ericsson), much of Stedman's and Hunter's experience below decks parallels that of Keeler and Geer and provides additional layers of interpretation for daily life on board ironclad vessels.¹²

Secondary materials are plentiful, though most were written before any extensive recovery work had been done at the wreck site. The battle between the *Monitor* and *Virginia* provides the focal point of William Davis's 1975 misnamed work, *Duel Between the First Ironclads*. A spirited retelling of the familiar story, Davis wrote this as part of his "Civil War Library" series in order to address the oft-

¹¹ William Frederick Keeler, *Aboard the USS Monitor: 1862; the Letters of Acting Paymaster William Frederick Keeler, U.S. Navy, to his Wife, Anna*, edited by Robert W. Daly. (Annapolis, MD: U.S. Naval Institute Press, 1964).

¹² William Marvel, ed. *The Monitor Chronicles: One Sailor's Account: Today's Campaign to Recover the Civil War Wreck*. (New York: Simon & Schuster, 2000); Craig L Symonds, ed. *A Year on a Monitor and the Destruction of Fort Sumter by Alvah F. Hunter*. (Columbia, SC: University of South Carolina Press, 1987).

overlooked naval aspect of the war by focusing on one of the best-known naval actions. By his own admission, Davis is not a naval historian, yet his slim volume remains one of the best overviews of the first duel between ironclads. Less detailed, yet more widely distributed was James Tertius deKay's *Monitor* from 1997. deKay's primary goal is to clear up popular misconceptions about the *Monitor*; first, that she and her opponent the CSS *Virginia* were not the first ironclads, and second, that the *Monitor's* battle record is more important than any technological innovations which she represented. The first misconception deKay addresses is by far the most pervasive of popular notions concerning the *Monitor*, and he acknowledges the ironclads *Gloire* of France and Britain's HMS *Warrior*, both of which preceded both *Monitor* and *Virginia*. But his primary thrust is the story that leads up to the March 9 battle, and he all but ignores the technological legacy of the *Monitor* in an effort to address what he perceives as the second major misconception. In terms of the pure re-telling of the story, novelist James L. Nelson's more recent non-fiction work, *Reign of Iron* (2004) does a far better job of balancing the battle record of the *Monitor* with her technological innovations, making the primacy of those innovations his major concern. Yet like deKay and Davis before him, Nelson covers no new ground.¹³

David Mindell's *War, Technology, and Experience Aboard the USS Monitor*

(2000) was the first book in 25 years to add a new perspective to the *Monitor* canon.

¹³ William C. Davis, *Duel Between the First Ironclads*, (Garden City, NY: Doubleday & Company, Inc., 1975); Nelson, James L. *Reign of Iron: The Story of the First Battling Ironclads, the Monitor and the Merrimack*, (New York, Harper Collins, 2004); James Tertius De Kay, *Monitor: The Story of the Legendary Civil War Ironclad and the Man Whose Invention Changed the Course of History*, (New York: Walker, 1997).

Instead of narrating the battle of Hampton Roads, Mindell looks within the *Monitor* herself to the psychological realm of the changing face of naval battle. In the case of the *Monitor* – the fact that the battle *had* no faces, hidden as they were behind several inches of iron – this was a true sea change for the ironclad sailors.

In the realm of maritime social history, the *Monitor* has featured more prominently within two recent publications: *Life in Mr. Lincoln's Navy* by Dennis Ringle, and *Union Jacks* by Michael Bennett. Both works are general in nature, yet draw upon the rich holdings of the Library of Congress and National Archives to create overviews of Civil War naval life. Ringle's work, published in 1998, unfortunately did not have the benefit of the letters of George Geer or Jacob Nicklis, which came to light after his research had been completed. Bennett's work does have the benefit of the Geer archive, yet because of the sweeping nature of his work cannot deal with the unique nature of serving within the first Union ironclad, and how the men responded to both their new environment and newfound fame.¹⁴ John Quarstein's most recent book, *The Monitor Boys*, was undertaken under my supervision and provides new biographical information about the men on board the *Monitor*. Quarstein applied a similar treatment to the men of the CSS *Virginia* in the forthcoming *Sink before Surrender: the Crew of the CSS Virginia*. Works concerning Confederate sailors' lives – whether on the *Virginia* or other ironclads – are far less satisfying and border on the antiquarian.¹⁵ Only the CSS *Alabama* and CSS

¹⁴ Dennis Ringle, *Life in Mr. Lincoln's Navy*, (Annapolis, MD: Naval Institute Press, 1998); Michael J. Bennett, *Union Jacks: Yankee Sailors in the Civil War*, (Chapel Hill, NC: University of North Carolina Press, 2004).

¹⁵ John Quarstein, *The Monitor Boys: The Crew of the Union's First Ironclad*, (Charleston, SC: History Press, 2011); John Quarstein, *C.S.S. Virginia: Mistress of Hampton Roads* (Appomattox, VA: H.E.

Shenandoah have been given a more scholarly treatment, and they fall outside of the scope of my dissertation project.

Clad in Iron: The American Civil War and the Challenge of British Naval Power, by Howard Fuller of Wolverhampton University adds new perspectives as well. Fuller's focus is on the British response to the American ironclad program. This, coupled with Donald Canney's *The Old Steam Navy: The Ironclads* and William Roberts' *Civil War Ironclads: The U.S. Navy and Industrial Mobilization*, place the USS *Monitor* in a broader context. Roberts' work in particular explores the overall industrial program launched by the US Navy. Contrary to revolutionizing the Navy, however, this ambitious industrialization and ship-acquisition program, Roberts contends, actually set navy shipbuilding back by nearly 20 years because of mismanagement and wartime pressures.¹⁶

In the context of Civil War historiography, both the *Monitor* and the *Virginia* have been at best a chapter, and at worst a footnote in the millions of pages written on the larger conflict. While each land battle has been covered in excruciating detail, the naval battles have been treated in a cursory way in many of the otherwise excellent Civil War overviews, despite the important role played by the Union blockade. Bruce Catton acknowledged the immediate impact of the Battle of Hampton Roads – and the effect on the nascent Peninsular campaign in *This*

Howard, Inc, 2000) This volume will be updated and reissued under the new title *Sink Before Surrender* in March 2011; R. Thomas Campbell and Alan B. Flanders, *Confederate Phoenix: The CSS Virginia*. (Shippensburg, PA: Burd Street Press, 2001).

¹⁶ Howard Fuller, *Clad in Iron: The American Civil War and the Challenge of British Naval Power*, (Annapolis, MD: Naval Institute Press, 2010); Donald L. Canney, *The Old Steam Navy, Volume 2: The Ironclads, 1842-1885*, (Annapolis, MD: Naval Institute Press, 1993); William H. Roberts, *Civil War Ironclads: The U.S. Navy and Industrial Mobilization*, (Baltimore, MD: The Johns Hopkins University Press, 2002).

Hallowed Ground: The Story of the Union Side of the Civil War. He writes of the Virginia in particular, that “just by staying afloat [she] was paralyzing Union activity on the James River.” Harry Hansen’s *The Civil War: A History*, devotes a chapter to the Battle of Hampton Roads, but treats it in isolation, making no pronouncement on the wider impact of the confrontation.¹⁷

James McPherson acknowledges the influence of both the *Monitor* and the Virginia on ship design in *Battle Cry of Freedom*, but remarks that the ironclads which followed afterwards “had little effect on the course of the war.”¹⁸ This is a notion that has remained prevalent throughout Civil War historiography, yet grossly underestimates the impact of Ericsson’s design and subsequent improvements upon it. Involvement of monitor-class vessels in engagements in North Carolina, Charleston, Mobile Bay, and the James River in Virginia was crucial to the success of the Union’s blockade, demonstrating again and again the power of iron over wood, and the ingenuity of the monitor design. While it was a slow strangulation, the blockade succeeded in starving the Confederacy on many levels. In particular, European involvement, so desperately desired by the Confederacy, was not realized in part due to the fear that John Ericsson so presciently commented upon when he named the *Monitor*. Writing to Assistant Secretary of the Navy, Gustavus Vasa Fox in January of 1862, Ericsson proclaimed that

there are other leaders who will also be startled and admonished by the booming of the guns from the impregnable iron turret. “Downing Street” will hardly view with indifference this last “Yankee Notion,” this monitor. To the

¹⁷ Bruce Catton, *This Hallowed Ground: The Story of the Union Side of the Civil War*, (Hertfordshire, UK: Wordsworth Editions, 1998), 132; Harry Hansen, *The Civil War: A History*, (New York: Penguin Putnam, Inc., 1961).

¹⁸ James McPherson, *Battle Cry of Freedom*, (New York: Oxford University Press, 1988), 378.

Lords of the admiralty the new craft will be a monitor, suggesting doubts as to the propriety of completing those four steel clad ships at three and a half million apiece. On these and many similar grounds, I propose to name the new battery "Monitor." ¹⁹

The "four steel clad ships" to which Ericsson refers, were vessels that Confederate Secretary of the Navy, Stephen Mallory, had sent agents to Europe to purchase for his nearly nonexistent Confederate navy. The performance of the *Monitor* in the March 9 battle, which was watched keenly by British observers in Hampton Roads, did much to create doubts in England about not only potential support for the Confederacy, but also about the efficacy of their own ironclads against this new monitor-class of vessels. As historian Howard Fuller suggests, the threat of this "war....that was never fought" between the Union and Great Britain had a devastating effect upon the Confederacy, and the "cotton for cannon" strategy upon which the Confederacy depended was never realized in large part due to the mere presence of the Union ironclads.²⁰

Fortunately, the role of naval engagements in general during the Civil War has been addressed in a number of publications, though Civil War naval history still has not entered the mainstream of Civil War historiography. Overviews of the entire war typically hop from battle to battle and by their very nature focus on the major naval figures and engagements, leaving the bulk of naval experience untapped. In *By Sea and by River: The Naval History of the Civil War*, published

¹⁹ John Ericsson to Gustavus Vasa Fox, quoted in William Conant Church, *The Life of Ericsson, Volume I* (Honolulu, HI, University Press of the Pacific, 2003), 255.

²⁰ Howard Fuller, "This Country Now Occupies the Vantage Ground," *The Battle of Hampton Roads: New Perspectives on the USS Monitor and CSS Virginia*, (New York: Fordham University Press, 2006), 138.

during the Centennial, author Bern Anderson lamented that “the naval history of the Civil War, probably because it is less spectacular on the whole, has not received attention commensurate with the history of the land campaigns.”²¹ The tenacity of the Union blockade, he writes, ultimately did spell victory for the Union cause. Forty years later, Spencer Tucker continued Anderson’s lament in his aptly titled *A Short History of The Civil War at Sea*, hoping that with his entry into the oeuvre that the naval war will “at last ...receive the attention it so richly deserves.”²² Tucker’s work, though brief, focuses largely on the technological aspects of the naval war but covers no new ground despite the intervening 40 years. More useful by far are the series by Coast Guard historian Robert Browning and independent historian Jack Coombe, both of whom have turned their attention to looking at the regionally deployed Union blockading squadrons, thus providing far more substance to the narrative and the analysis, and both continuing in the apologia for the dearth of Civil War naval history.²³

The *Monitor’s* story in the twentieth and twentieth-first centuries has yet to be satisfactorily written, in part because the story is still unfolding. Recent works by diver Gary Gentile and geologist Robert Sheridan about the recovery of the *Monitor* seem more concerned with providing criticisms of NOAA oversight of the wreck

²¹ Bern Anderson, *By Sea and by River: The Naval History of the Civil War*. (New York: Da Capo Press, 1962), v.

²² Spencer C. Tucker. *A Short History of the Civil War at Sea*. The American Crisis Series: Books on the Civil War Era, No. 5. (Wilmington, DE: Scholarly Resources, Inc. 2002), xiii.

²³ Robert Browning, Jr.. *From Cape Charles to Cape Fear: The North Atlantic Blockading Squadron during the Civil War*. (Tuscaloosa, AL: The University of Alabama Press, 1993); Jack D. Coombe, *Gunsmoke Over the Atlantic: First Naval Actions of the Civil War*, (New York: Bantam Books, 2002).

than they are with information of historical significance.²⁴ Paul Clancy's 2006 work, *Ironclad: The Epic Battle, Calamitous Loss, and Historic Recovery of the USS Monitor* is an excellent overview of the 2002 turret recovery mission. Clancy had the good fortune to be on the Derrick Barge *Wotan* during the 2002 turret recovery and continued his association with the project during the excavation phase at The Mariners' Museum, giving him firsthand knowledge of the initial discoveries. Clancy's work juxtaposes the historical events with the recovery efforts, paralleling Union sailors' experiences with those of the men and women of Mobile Diving and Salvage Unit TWO (MDSU2) on the recovery barge.²⁵ However, much of the information about the discovery and recovery still lies in the NOAA archives, waiting for the final report to be written over the next few years.²⁶ An upcoming publication by John Broadwater, former manager of the *Monitor* National Marine Sanctuary, entitled *USS Monitor: A Historic Ship Completes its Final Voyage* promises to be the most complete popular work concerning the recovery of the vessel, with a release date of March 2012.

So this is not merely "another book on the Civil War."²⁷ By bringing to bear the wealth of materials available at The Mariners' Museum and at NOAA's *Monitor* National Marine Sanctuary, this companion piece to the exhibition *Ironclad*

²⁴ Gary Gentile, *Ironclad Legacy: Battles of the U.S.S. Monitor*, (Philadelphia: Gary Gentile Productions, 1993); Robert E. Sheridan, *Iron From the Deep: The Discovery and Recovery of the USS Monitor*, (Annapolis, MD: Naval Institute Press, 2004).

²⁵ Paul Clancy, *Ironclad: The Epic Battle, Calamitous Loss, and Historic Recovery of the USS Monitor*, (New York: International Marine/McGraw-Hill, 2006).

²⁶ A report which is currently being undertaken by Dr. John Broadwater and Jeff Johnston of NOAA. I am on the advisory panel for the review of this report.

²⁷ Scott Nelson and Carol Sheriff. *A People at War: Civilians and Soldiers in America's Civil War* (New York: Oxford University Press, 2007), viii.

Revolution, will answer a need articulated by Mariners' Museum management, NOAA personnel and most importantly by our visitors.

Chapter 1: Setting the Stage

The State of the Navy

Naval battle tactics during the early nineteenth century reflected the technology of warships that had changed little in five centuries. The maneuvering of warships was at the mercy of wind and currents, which meant that the destructive power of broadsides was limited by the necessity of having to turn the ship to re-aim the guns. The smoothbore cannon carried by ships of war had limited range and firepower. All of this began to change dramatically in the first half of the nineteenth century with the introduction of steam-powered ships and ordnance with improved firepower.

Facing these innovations, wooden sailing warships were increasingly vulnerable to enemy attack and in need of armor to protect them from the devastating new projectiles. However, despite the rapid advancements made in motive power, firepower, and warship construction, the US Navy remained philosophically opposed to adopting these improvements in large part because of the advancement system used by the US Navy. The Officer corps had a limited number of appointments, and advancement occurred as a result of retirement or death. A number of superannuated officers who had made their careers in the early part of the century stood in the way of technological progress. A series of reforms initiated at mid-century were aimed at correcting this obstacle to advancement for younger officers. However the prolonged reluctance to embrace new technology in

the decades before the Crimean War (1853-1856) left the US Navy with a largely obsolete fleet as the specter of Civil War began to loom in the middle of the century.

The Russian-Turkish war on Russia's Crimean Peninsula, fought between 1853 and 1856, marked an important transition in the history of war at sea. Explosive shells, steam power, and iron armor were used on a large scale for the first time, an innovation spurred on by the exigencies of war. Engagements at Sinope and Kinburn dramatically demonstrated the effectiveness of these new technologies and signaled the transition between traditional and modern methods of naval warfare.

The Shift From Sail to Steam

Effective steam power for use upon ships had come about in the waning decades of the eighteenth century. But it was not until 9 March, 1814, that the US Congress authorized the construction of a steam warship to be designed by Robert Fulton, a pioneer of commercial steamers in North America. The construction of the ship began on 20 June 1814, at the civilian yard of Adam and Noah Brown, and the catamaran-like ship was launched on October 29. The ship was never formally named; Fulton christened it *Demologos* or *Demologus*, though following his death in February 1815, the ship was named *Fulton*.²⁸

By the time she was completed, the war for which *Demologos* had been built had ended. After sea trials she was delivered to the US Navy in June 1816. She saw only one day of active service, when she carried President John Tyler on a tour of New York Harbor. A two-masted lateen rig was added by the orders of her first

²⁸ Andrea Sutcliffe, *Steam* (New York: Palgrave Macmillan, 2004), 213.

commander, Captain David Porter. Steam power would prove to be a revolutionary innovation. Without being at the mercy of wind and currents, steam engines would make it easier for a warship to maneuver in battle; however, the prototype *Fulton* proved effective only in harbor defense.

In 1821 her armament and machinery were removed. The remainder of her career was spent laid up in reserve; after 1825 she served as the floating barracks for Brooklyn Navy Yard. She came to an end on June 4, 1829 in a gunpowder explosion. Steam seemed to the Navy to be far more suitable to merchant shipping.

The SS *Savannah*, a commercial packet vessel, was the first steamship to make the transatlantic crossing solely under steam power. Launched in 1818, the *Savannah* was classed as an auxiliary paddle steamship. Its paddlewheel engine was intended for auxiliary use only, as it was also a fully rigged sailing vessel. However, on May 22, 1819 it became the first ship to cross the Atlantic without using its sails. The sight of a steamship was so novel that as the *Savannah* passed the coast of Ireland, fireboats were dispatched to it because it was thought the vessel was on fire.²⁹

The USS *Mississippi* was launched in 1841, and together with her sister ship, the USS *Missouri*, marked the beginning of the real US steam navy. The *Mississippi* was a side-wheel steamer that carried ten shell guns. The success of the *Mississippi* as Commodore Perry's flagship in the Indian Ocean, during the Mexican War, and as part of Perry's expedition to Japan, prompted the construction of six side-wheel warships in the 1850s. While paddle-wheel technology was a propulsion system

²⁹ Robert Gardiner, ed., *The Advent of Steam: The Merchant Steamship Before 1900*, (London: Conway Maritime Press, 1993), 75-6.

superior to sail power, the paddler design had two major weaknesses. The location of the paddles on the sides of the ship and the need to extend the profile of the engine above the main deck limited space for armaments. This limited firepower was coupled with the ship's great vulnerability. One shot could destroy the paddle wheel or the engine thereby disabling the ship.³⁰

While radical innovation was of limited interest to the Navy, efficiency and protection of assets was of great interest. Lured to America by US naval officer, Captain Robert Stockton, the Swedish-immigrant engineer, John Ericsson designed the experimental USS *Princeton*. Commissioned in 1843, *Princeton* was the first steam-screw warship in any navy. Ericsson first received a patent for his propeller design in 1836. His improved design from 1839, still used by navies around the world, allowed for the ship's propulsion system to be positioned entirely within the hull. This was an important innovation in warship design because a ship's paddlewheel (or side-wheel) was vulnerable to enemy fire. Clearing the decks of the engine and paddlewheel also allowed for many more guns to be mounted. In addition to introducing the screw-propulsion to warship design, the *Princeton* also incorporated several other of Ericsson's innovations. It was the first warship with machinery entirely below the waterline, the first to burn anthracite coal, and the first to use fan blowers for the furnace fires.

John Ericsson's innovative propulsion system for the USS *Princeton* included two vibrating lever engines, three tubular boilers, and a six-bladed screw propeller, fourteen feet in diameter. The introduction of propellers revolutionized steamship

³⁰ Donald Canney, *The Old Steam Navy, Volume Two: The Ironclads, 1842-1885*, (Annapolis, MD: Naval Institute Press, 1993), 4.

propulsion, as they were much more efficient and less liable to damage than the cumbersome paddlewheel.³¹

Two new guns were placed on the *Princeton* as well. The massive, wrought-iron *Oregon*, designed by John Ericsson, featured a strengthened breech which increased the safety of the gun and protected it against explosion. Large iron hoops had been heated and placed around the breech. Upon cooling, they contracted, forming a tight seal. The massive pressures found within the gun upon firing were easily contained, and ordnance officers fired the gun over one hundred times before it was proofed for a fifty-pound charge. Robert Stockton designed the second gun, called the *Peacemaker*. While similar in appearance to Ericsson's gun, it had neither the same safety features nor the extensive proofing of the *Oregon*. The breech had additional metal added to it, but no banding, and the gun had only been fired five times before being placed on the *Princeton* for demonstration.³²

Ericsson was invited to demonstrate his new model vessel for the naval hierarchy, but Stockton, "who was not disposed to share the credit of success," according to Ericsson's biographer Church, left Ericsson at the dock in New York and proceeded to Washington, D.C., without him. Over two hundred guests were on board the USS *Princeton* on February 28, 1844, including President Tyler and his Cabinet. Captain Robert S. Stockton, fired the two new 12-inch shell guns to impress the dignitaries. The trip went without incident, until it was decided to fire the *Peacemaker* a final time. The gun, taxed beyond its capabilities, burst when fired,

³¹ Church, *Life of Ericsson*, 132, 134.

³² Jeff Kinard, *Artillery: An Illustrated History of its Impact*, (ABC-CLIO, 2007), 202.

killing seven, including the Secretary of State and the Secretary of the Navy, and wounding twenty, including Stockton, himself.

Stockton immediately requested an inquiry, wishing to exonerate himself. Accordingly, the members of the inquiry convened on board the *Princeton* on March 5, 1844 and began questioning Stockton as well as other experts and eyewitnesses.³³ Stockton invited Ericsson to the inquiries concerning the incident, but as Stockton had anticipated, Ericsson declined, reasoning that he was innocent. Ericsson wrote, "I must be permitted to exercise my own judgment in this matter, and I have to state most emphatically that since Captain Stockton is in possession of an accurate working plan of his exploded gun my presence at Washington can be of no use...."³⁴

Though the normal course of events would have required Ericsson to be subpoenaed, Stockton was able to insure that Ericsson's wish not to attend was honored. Given that Ericsson's knowledge as an engineer would have proven the fault lay with Stockton, it is not surprising that Stockton did not want Ericsson to attend. Yet he used Ericsson's absence as proof that the Swedish inventor was culpable. Inexplicably, the Navy and the President absolved Stockton of the blame for his role in the failure of his gun, and the President even asked Stockton to build a similar gun to the *Peacemaker* following the inquiry. Stockton shifted the fault to Ericsson. Stockton also ensured that the US Navy did not pay the Swedish engineer

³³ *Accident on Steam Ship "Princeton"*, Report Number 479, 28th Congress, 1st Session, House of Representatives, (Washington, D.C.: 1844), 3.

³⁴ Church, *Life of Ericsson, Volume I*, 141.

for his work on the *Princeton*, and the tragic incident resulted in bad relations between the Navy and Ericsson for almost twenty years.

The episode also contributed in small part to the Navy's reluctance to build steam screw warships for another ten years, though the propulsion system had no bearing upon the tragic accident. The fact that it was associated with John Ericsson was enough. Ericsson's original propeller was removed from the *Princeton*, though the vessel quietly received another propeller of Ericsson's design a few years after the incident.³⁵ The naval officers involved in the inquiry also expressed concerns over the use of experimental weapons, thus creating another impediment to quick progress within the US Navy.³⁶

The Shift From Shot to Shell

In 1822, French Brigadier General Henri-Joseph Paixhans published *Nouvelle Force Maritime et Artillerie*, in which he advocated standardization of caliber and the use of shell guns in naval armaments. Two years later, Paixhans demonstrated the effectiveness of an 80-pounder shell gun against a wooden ship. The warship was virtually demolished by only sixteen shells.³⁷

Simultaneous with improvements to shell guns, Major Giovanni Cavelli of the Sardinian Army introduced the first effective rifled gun in 1845. Cavelli's guns featured a two-grooved, rifled barrel with a ribbed, cylindrical, conical shell. A

³⁵ Olav Thulesius, *The Man Who Made the Monitor: A Biography of John Ericsson, Naval Engineer*, (Jefferson, NC: McFarland & Co., 2007), 64-5.

³⁶ *Accident on Steam Ship "Princeton"*, Report Number 479, 28th Congress, 1st Session, House of Representatives, (Washington, D.C.: 1844), 3.

³⁷ John Quarstein, *The Monitor Boys: The Crew of the Union's First Ironclad*, (Charleston, SC: The History Press), 17.

conical explosive shell could be hurled at a target with greater velocity, accuracy, and penetrating power than that of smoothbore guns.

The devastating impact of shell guns on wooden vessels was demonstrated at the Battle of Sinope, November 1853. Within two hours, six Russian ships-of-the-line, armed with 68-pounder shell guns, destroyed the Turkish wooden fleet, including seven frigates, two corvettes, two transports, and two wooden steamers. The wooden hulls were shattered and set afire. This episode demonstrated the vulnerability of wooden ships to modern shellfire and rang the death knell for the use of wooden vessels in naval warfare.³⁸

American ordnance expert John A. Dahlgren designed and produced the first IX-inch shell gun in 1850. The design developed into a curved shape with double vents with the greatest weight of metal at the point of greatest strain, the breech. These guns, with their smooth exterior, curved lines, and thickness at the breech resembled soda water bottles. The IX-inch gun was considered very safe and

³⁸ **Solid shot** was the most basic form of projectile for naval guns. It was typically cast-iron round projectiles which were ideal for battering the hulls of wooden ships, decimating a crew, wrecking cannon, and cutting down masts. Solid shot could be heated to create glowing hot shot that would lodge in a ship's timbers causing the vessel to catch fire.

Expanding shot was designed specifically for use against wooden warships. They were compact when loaded and fired but then tumbled and spread in flight. Chain shot (a chain connecting two cannon balls) and extending bar shot (two iron lengths closed together when loaded and extended out when fired) were the two major types of expanding shot. Expanding shot was very effective for slicing an enemy ship's rigging and cutting down the crew.

Spreading shot was used as an anti-personnel weapon. Canisters or stands of smaller iron balls could be loaded easily. The container holding the small shot was broken up by the shock of firing and the shot spread out to cover a wide area. Spreading shot had a very short range, but was extremely effective against a ship's crew.

Explosive shells were hollow projectiles filled with gunpowder that were detonated by metal fuses and could be set to explode on or after impact. These shells would penetrate the wooden walls and explode, tearing gaping holes in the side of target vessels, setting them on fire, and rendering them inoperable. Explosive shells proved to be more devastating against wooden warships than all of the types of solid shot combined.

accurate. One officer noted that gun crews handled Dahlgrens “with as much confidence as they drink their grog.”³⁹

Despite the stunning success of explosive shells at the Battle of Sinope, awareness of the vulnerability of US Navy warships to shell guns grew slowly. Dahlgren, in charge of US experimental ordnance, became the principle advocate for the Navy to mount shell guns in its ships. He believed that inferiority in overall number of ships might be offset by superior ordnance. Dahlgren also advocated the concept of “integrated batteries,” that is, a battery of identical guns to streamline loading.

The IX-inch shell gun was to become the most common broadside, carriage-mounted gun in the US Navy during the Civil War. The Dahlgren was also produced in VIII-inch, XI-inch, XIII-inch, XV-inch, and XX-inch versions.

The Shift From Wood to Iron

The development of effective shell guns that could destroy wooden vessels led to the need to armor ships against such attacks. A small, yet growing number of younger officers and engineers within the US Navy as well as visionaries within the legislature were more willing to experiment with new technologies, including iron hulls and iron-cladding. One such experiment began in the 1840s. But the “Stevens Battery,” approved by Congress in 1841 at a cost of \$600,000, was never completed as designed and an experimental iron-hulled vessel, the USS *Allegheny* in 1844, was

³⁹ Captain James Alden, interviewed January 23, 1865 in *Reports of the Committees of the United States Senate For the Second Session Thirty-Eighth Congress, 1864-1865*. (Washington, DC: Government Printing Office, 1865), Section C, Conduct of the War Relative to Heavy Ordnance, Part 2, 172.

a dismal failure.⁴⁰ However, the USS *Michigan*, launched in 1843, proved more successful. Though classed as a steam auxiliary iron gunboat, the *Michigan* was truly a hybrid vessel. The hull, though made of iron, was modeled on the hull of a clipper-bowed sailing ship and was outfitted with a three-masted rig topsail schooner or barkentine rig. On deck were two sidewheels powered by a unique power plant consisting of two single-cylinder, 36 x 96-inch non-compound, inclined engines which drove two cranks on the single paddle shaft. These side wheels took up a great deal of deck space, significantly reducing the warship's broadside power. Though flawed, she represented one of the US Navy's first ventures in iron warship-building and she remained in service on Lake Erie until 1923.⁴¹

By 1855, the French and the British had joined Turkey in their fight against Russia. The French had learned the value of ironclad vessels from the astounding destruction of the Turkish wooden fleet by shell guns at the Battle of Sinope in 1853. The French Navy built three light draft floating batteries armored with thick iron plates, the *Devastation*, *Lave*, and *Tonnante*. Resistant to the enemy's solid shot and shells, they were able to fire from within a thousand yards of shore. In October 1855, the British and French fleets, including the floating batteries, destroyed the land fortification at Kinburn, while suffering little damage and few casualties. Thus,

⁴⁰ Stephen Small, "The Ship That Couldn't Be Built" in *Naval History*, Oct2008, Vol. 22, Issue 5; The Stevens Battery was an ironclad designed in response to the threat of another war with Great Britain, a war which never materialized. Nevertheless, the concept was very similar to aspects later found in the CSS *Virginia* and USS *Monitor*. Three versions of the vessel were attempted, though only a small, test version ever made it off the ways. This small version of the Stevens' concept, the USS *Naugatuck*, did see action with the *Monitor* in the James River in May, 1862, but, like the *Princeton* before her, was considered a failure when her gun exploded. Ultimately, the Stevens Battery concept would cost over \$2 million and would never be completed. The uncompleted vessel was sold for scrap in 1881. The hull had to be blasted apart, it was so strong.

⁴¹ Bradley A. Rodgers, *Guardian of the Great Lakes: The U.S. Paddle Frigate Michigan*, (Ann Arbor, MI: University of Michigan Press, 1996), 31.

the performance of shell guns at Sinope and ironclads at Kinburn began to alter the design of future fighting vessels in Europe.

The performance of their floating ironclad batteries at the Battle of Kinburn convinced the French of the batteries' strategic value and the French navy immediately began building ironclad vessels. The first true seagoing ironclad vessel to result from this effort was the *Gloire*, launched in 1859. The design of the *Gloire* incorporated improvements to three major weaknesses of the *Devastation*: unprotected gun ports, unseaworthiness, and weak engines. The *Gloire* combined increased speed, firepower, and protection. The improved French frigate was built of wood and plated with 4-1/2"-thick iron from stem to stern. The *Gloire* mounted fourteen 8.8-inch and sixteen 6.4-inch rifled breech-loading guns. It rated 13.5 knots under steam. The armored frigate also had three masts. But, the sails were meant to be only an auxiliary power source under certain conditions. The *Gloire* was not intended for the high seas. The frigate rolled badly. Consequently, it made a poor gun platform.

To the British Board of Admiralty, the foreign expansion program initiated by Napoleon III, coupled with the escalation of the French ironclad shipbuilding program and the modernization and fortification efforts at Cherbourg, all seemed to indicate the possibility of a French invasion. The British were impressed with the performance of the French ironclad batteries at Kinburn, and had kept a keen eye on the progress of the *Gloire*. Not to be outdone by the French, the Royal Navy immediately began an ironclad construction project of its own, launching HMS *Warrior* in 1860. The *Warrior* was the first large seagoing, iron-hulled warship and

was meant to counter the *Gloire*. She was larger than the *Gloire* and longer than any other wooden warship in existence at the time. Although rigged with sails, she was meant to operate primarily with her engines. Featuring the most powerful battery of the day and the fastest speed, the *Warrior* could outrun what she could not outgun.⁴²

In 1855, the Delafield Commission, a team of US Army officers, including Major Richard Delafield, Major Alfred Mordecai, and Captain George McClellan, traveled to Europe to assess firsthand the technical and tactical changes in naval architecture and armaments during the Crimean War. Their correspondence and the resulting report suggested improvements focused on advanced armaments and steam-powered armored vessels equipped with the most advanced ordnance to compete with modern European navies.⁴³

While the Navy adopted the use of shell guns and the screw propeller, it remained uninterested in building ironclad ships.⁴⁴ However, the advances in Europe did not go unnoticed by some associated with the Navy. Stephen Russell Mallory, a Senator from Florida, served as chair of the Senate Naval Affairs Committee, a body that dealt with issues of discipline, retirement, and ship design. Through Mallory's efforts, the navy slowly began a shift away from decades of tradition towards a new model which reflected the best research from all arenas; both European and American, both merchant marine and naval. Mallory believed

⁴² Interestingly, HMS *Warrior* never fired a shot in anger throughout her career. She is now a museum ship, docked in Portsmouth, England.

⁴³ Major Richard Delafield, *Report on the Art of War in Europe, 1854, 1855, and 1856*. (Washington, DC: George W. Bowman, Printer, 1860).

⁴⁴ The USS *Congress* was the last purely sailing vessel built. Commissioned in 1840, she was outfitted with powerful shell guns in broadside.

that ships of war not only needed to be able to destroy their opponents, they needed to be able to withstand enemy fire.⁴⁵ Mallory understood the value of iron-cladding, but also understood the uneven success of past iron ship programs. Therefore, he advocated for stout wooden hulls of white oak, live oak and pine, heavily reinforced. Thus, with his committee's backing, Congress authorized the construction of the *Merrimack* class of US Navy warships. This was the first large-scale investment by the US Navy in two of the three technological innovations demonstrated so successfully in Europe. These frigates incorporated screw-propulsion and shell guns. The screw propeller allowed the propulsion system to be placed below the waterline, and thus protected from enemy gunfire. This created more space on deck for a greater number of guns, something that Mallory was adamant be implemented.⁴⁶

The *Merrimack* mounted forty guns, twenty-four of which were IX-inch Dahlgrens. Built at the Charlestown Navy Yard, near Boston, the *Merrimack* was the first to be completed and was launched on June 14, 1855. A newspaper of the time proclaimed the USS *Merrimack*, "one of the finest specimens of naval architecture ever built."⁴⁷ With her steam-screw propulsion system and powerful Dahlgren guns, The USS *Merrimack* represented the state of the art for the US Navy six years before the outbreak of war. Yet, the *Merrimack* was still a large wooden sailing vessel. She incorporated a steam screw propeller in addition to the traditional masts and sails.

⁴⁵ *Congressional Globe*, 33rd Congress, Second Session, Senate, 1855, 355.

⁴⁶ *Congressional Globe*, 33rd Congress, Second Session, Senate, 1855, 355.

⁴⁷ *New Hampshire Patriot and State Gazette*, June 20, 1855, 3.

The *Merrimack* class was really designed to operate under sail. The steam engine was to be used only for going in and out of port and maneuvering in battle.

Six vessels comprised this new class, all named for American rivers: USS *Colorado*, USS *Merrimack*, USS *Minnesota*, USS *Niagara*, USS *Roanoke*, and USS *Wabash*. Three of these frigates, the USS *Minnesota*, USS *Roanoke*, and USS *Merrimack*, would come to play major roles in the upcoming war.⁴⁸

⁴⁸ Paul Silverstone, *Civil War Navies: 1855-1883*, (Annapolis, MD: Naval Institute Press, 2001), 15-17.

Chapter 2: The Seeds of War

In late 1860, the dominoes began to fall. The first was the election of Republican Abraham Lincoln to the US presidency. The Democratic vote split between Northern candidate Stephen Douglas and Southern candidate John Breckenridge. Matters were complicated further by Constitutional Unionist John Bell, who carried the upper South. Lincoln won with only 40% of the popular vote, but 59% of the electoral vote. Secessionists in the lower South believed the Republican Party was determined to abolish slavery, so they quickly moved to separate from the Union. The run-up to war had begun.

Just six weeks after the election of Lincoln, South Carolina voted to secede on December 20, 1860. In Charleston, the Congressional Delegation issued the following ordinance which read, in part: *We, the people of the State of South Carolina, in convention assembled, do declare and ordain... that the union now subsisting between South Carolina and other States, under the name of the "United States of America," is hereby dissolved.*⁴⁹ South Carolina was the first of the states to leave the Union, and would lobby other southern states to secede. By March of 1861, Mississippi, Florida, Alabama, Georgia, Louisiana and Texas had followed suit.

Early on the morning of April 12, 1861, Confederate General P.G.T. Beauregard ordered the bombardment of Union-held Fort Sumter in Charleston Harbor. Sixty-eight men, under the command of Major Robert Anderson, held the

⁴⁹ *Journal of the Congress of the Confederate States of America 1861-1865, Vol. I* (Washington, DC: Government Printing Office, 1904). 7.

fort for thirty-four hours before eventually surrendering in the face of a hopeless situation. One observer wrote: "All the pent-up hatred of the past months and years is voiced in the thunder of these cannon...."⁵⁰ With these shots, the American Civil War—the bloodiest, most divisive conflict the country has ever known—was under way.

On April 15, 1861, President Lincoln quickly called for 75,000 volunteers from loyal citizens to "put down the rebellion." Originally called to serve for only 90 days, these men and boys poured into Union town centers throughout the spring and summer of 1861, their uniform buttons polished and their bands merrily playing - fired with patriotic enthusiasm.⁵¹

Virginians were split, politically and ideologically, over the issue of secession. But when Lincoln called for volunteers to fight their southern brethren, many in Virginia felt they had to take a stand. On April 17, 1861 Virginia seceded, soon to be followed by Arkansas, North Carolina and Tennessee. Virginia Governor John Letcher wrote to the US Secretary of War, "I have only to say that the militia of Virginia will not be furnished to the powers at Washington You have chosen to inaugurate civil war, and having done so, we will meet it in a spirit as determined as the Administration has exhibited toward the South."⁵² With the loss of Virginia, the fight for control of Hampton Roads began in earnest.

⁵⁰ William Merrick Bristol, quoted in "Escape From Charleston" in *American Heritage*, April 1975, Volume 26, Issue 3.

⁵¹ Abraham Lincoln, *Complete Works, Volume II*, edited by John Nicolay and John Hay. (New York: The Century Company, 1894), 34.

⁵² Edward McPherson, *The Political History of the United States of America During the Great Rebellion*. (Washington, DC: James J. Chapman, 1882), 114.

Union war strategists knew that the Confederacy would have to rely on continual, steady trade with Europe in order to acquire the manufactured goods needed to conduct a modern war. Looking to cut off such trade, On April 19, 1861, Lincoln issued a proclamation “to set on foot a blockade of the ports” of South Carolina, Georgia, Alabama, Florida, Mississippi, Louisiana, and Texas—all states that had joined the Confederacy. The blockade of Virginia and North Carolina followed on April 27.⁵³

Blockade and Anaconda Plan

The burning question for Lincoln was how to restore the Union. His general-in-chief, Winfield Scott, realized that the Union would have to attack and invade the South, and that therefore the Confederates would be fighting close to home and close to their sources of supply. Scott needed time to expand his tiny regular army to attack, but above all he needed to cut off the Confederate supply lines. Scott proposed to put the squeeze on the South by enforcing a naval blockade that stretched over 3,500 miles of coast from Virginia to Mexico and up the Mississippi from New Orleans to New Madrid Bend. And this so-called “Anaconda Plan” could only succeed over time: the South would not starve overnight, so patience was an essential part of Scott’s strategy. While the South suffocated, the Union army would attack and triumph.

The Confederates needed a strategy to defend and keep open their harbors. Ironclad vessels and advanced armaments could provide the defense and blockade-

⁵³ McPherson, *Political History*, 149.

runners could keep the trade flowing. The Confederacy could also use commerce raiders to disrupt Union commercial shipping. The Confederacy might not have a large naval force, but it could make the war very difficult for the Union in this manner.

The South's economy depended on the cotton trade, so a blockade was a disaster in the making. At first, the blockade-runners were successful: the blockade captured only about one in ten Confederate vessels at the start of the war. This allowed the Confederacy to bring in most of the weapons, shoes, food, and medicine it needed. But by war's end, the blockade was capturing one in three Confederate vessels, destroying the southern economy, and hampering the war effort by severely limiting the goods and war material that could enter the South .

Both the Union and the Confederacy wanted control of the deep-water harbor of Hampton Roads. For the Union, it offered access to the southern Atlantic coast—the target of Scott's "Anaconda Plan." In addition, rivers running into the Roads offered direct links to crucial Confederate sites: the Elizabeth River provided an avenue to Gosport Navy Yard, and the James River led directly to the Confederate capital city of Richmond. For the Confederates, control of Hampton Roads meant direct access to the Union capital of Washington, D.C., and to Baltimore, an important industrial and shipping center within the Union.

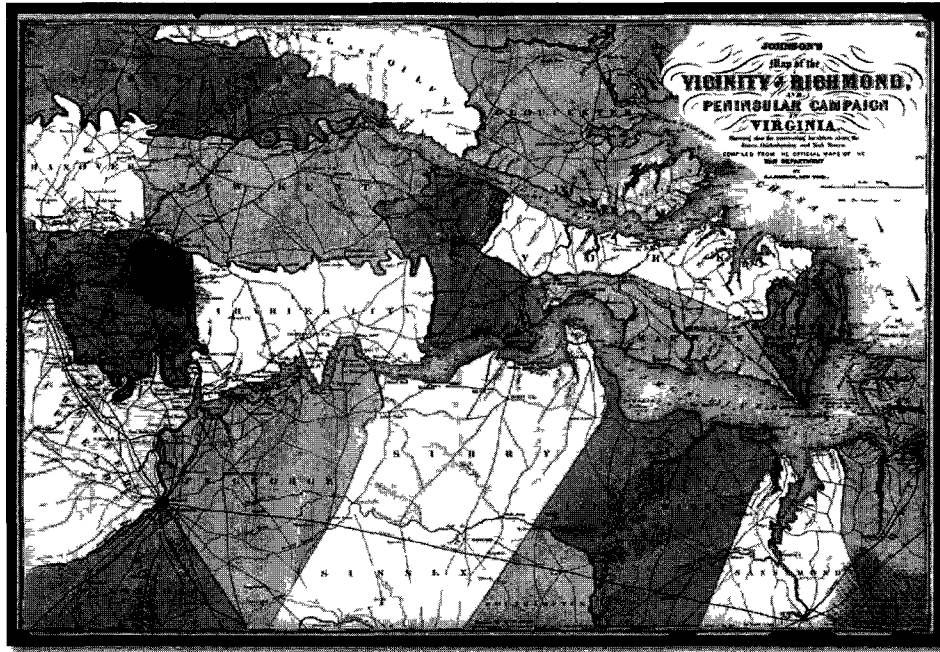


Figure 1 - Johnson's Map of the Vicinity of Richmond and Peninsular Campaign in Virginia, 1869, Courtesy of the Library of Congress

In late April, 1861, a Virginia “secessionist” wrote in the Confederate-friendly *Baltimore Exchange*: “There are now twelve vessels of war in the Roads, and Norfolk and the James River ports are for the present effectually blockaded. Commodore Pendergrast who is in command, is universally detested by the inhabitants of this place.”⁵⁴ Federal forces also had control of the tip of the Virginia Peninsula on the north side of Hampton Roads, from Camp Butler at Newport News Point to Fort Monroe at Old Point Comfort. Confederate forces controlled the Peninsula from Newmarket Creek westward and had constructed three major lines of fortifications to protect Richmond. Confederates also controlled the Southside of Hampton Roads including the towns of Norfolk and Portsmouth.

⁵⁴ Quoted in *New York Times*, May 5, 1861 from an article in the *Baltimore Exchange*, April 30, 1861.

The State of the Navy – 1861

Abraham Lincoln appointed Gideon Welles to be Secretary of the Navy. Welles, however, was not a naval man as such. In fact, Lincoln chose Welles more for his politics than his webbed feet. The son of a shipping merchant, Welles was a lawyer, a journalist, and a politician. Also, as a newly minted Republican, Welles had avidly supported Lincoln's nomination at the 1860 Republican Convention in Chicago, though it may have been as much to keep William Seward from the nomination as it was to secure it for Lincoln. Welles, like many former Democrats, had been opposed to Seward on the grounds that Seward stood for wasteful government spending, an "imperial" federal government, and was an advocate for stronger ties to Great Britain. Lincoln, nonetheless, appointed his onetime rival Seward as his new Secretary of State. Welles, Lincoln reasoned, would provide a good balance to the Whiggish notions of Seward and others within Lincoln's cabinet, and furthermore, Lincoln specifically wanted "a man of democratic antecedents from New England."⁵⁵ Welles' navy experience had come through his position as Chief of the Bureau of Provisions and Clothing for the Navy in the 1840s. Welles became a favorite with political cartoonists and was dubbed the "Rip Van Winkle of the Navy Department" in part because of his enormous white beard, but also for his secrecy and avoidance of the press.⁵⁶ Welles' assistant secretary, Gustavus Vasa Fox, however, had a great deal of naval experience.⁵⁷

⁵⁵ Bern Anderson, *By Sea and By River: The Naval History of the Civil War*, (New York: Da Capo Press, 1962), 3-4.

⁵⁶ *Harper's Weekly*, August 31, 1861, 560

⁵⁷ Anderson, *By Sea and By River*, 4-5.

The Navy these men inherited in 1861 was not exceptional, but neither was it moribund. Younger officers, though unable to advance as rapidly through the ranks because of the tenure system, were not bound so much by naval custom as their elders. They would be the generation to accept the new technologies in ways the older officers who had spent their entire careers on wooden sailing vessels could not. In addition, the Naval Academy had been established in 1850 at Annapolis expressly for the training of new naval officers. So at mid-century, American naval officers were well-trained – and spent the majority of their time on exploratory or diplomatic missions.

By 1861, the US Navy had ninety ships, but only fifty-two were considered serviceable. Of those, only four were in northern waters where they could be easily deployed against the rebellion. Four vessels were in Pensacola, Florida, and one was in the Great Lakes. Twenty-four vessels were spread out around the world in the Mediterranean, the Pacific, off the coast of Africa and Brazil and in the Caribbean. The rest were laid up “in ordinary,” which meant that they were undergoing repairs of some sort or were simply mothballed.⁵⁸ Furthermore, this was a deep-water navy, ill-suited to coastal and harbor engagements, which would be precisely what they would encounter during the war to come.

In the Confederacy, there effectively *was* no navy. There was, however, a Secretary of the Navy, for President Jefferson Davis had appointed former Florida senator Stephen Russell Mallory to that post. In the 1850s, Mallory had been the chairman of the U.S. Senate Naval Affairs Committee and an active backer of naval

⁵⁸ Donald Canney, *Lincoln's Navy: The Ships, Men and Organization, 1861-1865*, (London: Conway Maritime Press, 1998), 17.

reform. Mallory was a visionary, and had followed the developments in the Crimea closely. Shortly after his appointment, he wrote that the Union “has built a navy; we have a navy to build.”⁵⁹ This new navy would need to be comprised of “a class of vessels hitherto unknown to naval service,” combining steam power, devastating ordnance, and iron sides if it was to be effective.⁶⁰

The Confederacy also had a large pool of naval officers from which to draw. Nearly 300 officers had resigned their commissions and “gone south.” Unfortunately, they had few crew members to command. Most career sailors hailed from the North, and the Confederacy’s problems were compounded by the fact that for some time now the South had relied almost exclusively on northern ships to carry cargo.

The South also had no large vessels upon which to draw. What did exist, however, was a large number of coastal and river craft. The only private shipyard in the Confederacy was in New Orleans. The other two were Federally controlled – Gosport Navy Yard in Portsmouth, Virginia, and Pensacola in Florida. There were no major foundries save one, the Tredegar Ironworks in Richmond, Virginia.

The South had rail transport, but only ten ports had rail connections to the interior and of these only six had interstate rail. All but Norfolk had shallow waters, thus keeping larger vessels from entering directly. The infrastructure of the roads system in the Confederacy was also substandard, with very few paved roads. Even the Confederacy’s population was lacking in comparison to the North: there were

⁵⁹ *Official Records of the Union and Confederate Navies in the War of the Rebellion*, Series 2, Volume II (Washington, DC: Naval War Records Office, 1921), 51.

⁶⁰ *Civil War Naval Chronology: 1861-1865*, (Washington: Naval History Division, 1961), 11.

nine million people in the Confederacy, but 3.5 million were enslaved. The North had a population of over twenty million, the vast majority of whom were free. Even though barred from active service in the Union army until 1863, blacks were able to serve in the Union Navy, though limited initially to the lowest pay rating of “boy,” at the outbreak of the war.⁶¹

Gosport

Gideon Welles understood that Gosport Navy Yard in Portsmouth, Virginia, would be a tempting target for pro-secessionist Virginians. Therefore, Welles ordered Flag Officer Garrett J. Pendergrast, commander of the USS *Cumberland*, to keep his ship in Gosport Navy Yard “and, in case of invasion, insurrection, or violence of any kind, to suppress it, repelling assault by force.” At the same time, however, Welles, ordered the Navy Yard’s Commander, Charles Stewart McCauley, to remove all public property from Gosport—in this case, any of the warships “in ordinary” there.⁶² This would include the *Merrimack*, the *Germantown*, the *Plymouth* and the *Dolphin*. McCauley was to prepare the vessels in the yard for departure. Welles was particularly keen to have the *Merrimack* moved to Philadelphia to keep her from harm’s way, for though she was undergoing repairs, she was still a formidable weapon that Welles wanted to keep for the Union, and out of the hands of the Confederacy.⁶³

⁶¹ Michael J. Bennett, *Union Jacks: Yankee Sailors in the Civil War*, (Chapel Hill: University of North Carolina Press, 2004), 163-4.

⁶² In this case, these vessels “in ordinary” were laid up in the dockyard with their ordnance, masts, sails and rigging removed and the upper deck roofed over to protect the interior spaces.

⁶³ ORN, Series I, Volume 4, 274-6.

On April 14, 1861, Commander James Alden and US Navy Chief Engineer Benjamin Franklin Isherwood arrived at Gosport Navy Yard to find that McCauley had done very little. Alden had orders to take command of the USS *Merrimack* and bring her to Philadelphia if it appeared that evacuating the Navy Yard was the only recourse. But Union naval officials still held out hope that the Yard and the vessels and material within it could be saved. Assessing the situation, Isherwood immediately set to work reassembling the *Merrimack's* engine. He had crews working at a feverish pace around the clock. Meanwhile, Welles continued to apply pressure to the hapless McCauley to protect the Navy's assets at the Yard. The worst thing that could happen, in Welles' estimation, would be to allow the Yard, with its drydock, to fall into enemy hands.⁶⁴

Isherwood completed repairs to USS *Merrimack*. Though Isherwood proclaimed the frigate ready for sea, Yard Commander McCauley denied approval for the *Merrimack* to leave Gosport. Given the tenuous state of affairs following the news of secession, and the timidity of McCauley, Flag Officer Hiram Paulding was ordered to take command of Gosport Navy Yard. Paulding left the Washington Navy Yard with 100 marines on Board the 8-gun steamer USS *Pawnee*.⁶⁵

Meanwhile, Virginia Governor John Letcher ordered Major General William Booth Taliaferro of the Virginia Militia to Norfolk to occupy Gosport Navy Yard. Citizens in Norfolk and Portsmouth created their own 'Vigilant Committee' and

⁶⁴ ORN, Series I, Volume 4, 276 – 280.

⁶⁵ ORN, Series I, Volume 4, 280.

began placing disruptions to navigation (sunken ships and boats) off Sewell's Point to hinder Union access into and out of Gosport Navy Yard. ⁶⁶

On April 20, Virginia militia forces began advancing on the Yard. Although the Union had done a great deal of work to rescue as much as possible, ultimately the plan shifted to one which would destroy the Yard and its drydock so that the Confederates could not use these assets against the Union. McCauley's hesitation was caused by a number of factors: the seemingly conflicting orders from Secretary Welles; elaborate ruses carried out by the local citizenry to make McCauley believe that vast numbers of troops were coming into the city; the resignation of most of his senior officers who left their commissions for the Confederacy, and the desertion of most of his yard workers who were also sympathetic to the Confederate cause; and finally, McCauley's heavy drinking. Therefore, ships that had been nearly ready for departure were instead scuttled and burned to keep them out of Confederate hands. Though Union naval officers tried their best to ensure the utter destruction of the Yard, Confederate sympathizers captured the two men tasked with blowing up the drydock and rendered useless the kegs of powder they had planted. The Yard was damaged, but not destroyed.⁶⁷

Fleeing Union naval forces burned the USS *Pennsylvania*, *Germantown*, *Raritan*, *Columbia*, *Dolphin*, *Delaware*, *Columbus*, and *Merrimack*. The latter three vessels sank at their moorings in the conflagration. Union forces chose not to destroy the USS *United States* (she would become the CSRS *Confederate States*), principally because they considered her too old and decrepit. However, they also

⁶⁶ Quarstein, *A History of Ironclads*, 67.

⁶⁷ ORN, Series I, Volume 4, 288-298.

spared her out of veneration for her years of service, as she was the first of the original six frigates commissioned in the United States Navy in 1797. The USS *Cumberland*, built as a frigate in 1842, had been converted (razeed) into a sloop-of-war in 1857, and was certainly serviceable. Equipped with new rifled guns, she was also a formidable vessel and one that Welles' was anxious to save. Union sailors towed her to safety by the eerie light of the burning Yard.⁶⁸

And what of McCauley? Despondent, he refused to leave Quarters A and had to be bodily removed and placed on board the *Cumberland*. By the end of 1861, he was retired, having been promoted to the rank of Commodore. McCauley never forgot the chaos of the final days at Gosport, however. The loss of ships and material was troubling enough to him, but the resignation of his officers and their subsequent service with the Confederacy hurt him deeply. He recalled, "I could not believe it possible that a set of men, whose reputations were so high in the Navy, could ever desert their posts, and throw off their allegiance to the country they had sworn to defend and protect." His obituary is a sad testimony to the bitter end of a once glorious career. In the May 23, 1869 edition of the *New York Times*, a brief notice was posted about McCauley's death. It reads: "The Congressional Committee appointed to investigate the affair failing to exonerate him entirely from blame in the matter, he felt that his honor as an officer had been wounded, his reputation blemished, the effect of which was to plunge him into the deepest melancholy, and

⁶⁸ Ibid.

causing disease of the heart, of which he died." The war would have many casualties who did not die in battle. McCauley was one such.⁶⁹

The sunken *Merrimack* posed a significant interference with navigation in the waters near the Navy Yard for the Virginians who immediately seized control of the Yard following the Union departure. Thus the new commandant, French Forrest, entered into a contract on May 18, 1861 with the Norfolk firm of B & J Baker Co. of 3 Campbell's Wharf to raise the hull. On May 30 brothers Barnabas and Joseph Baker successfully raised the burned-out hull of the *Merrimack* from the Elizabeth River. Barnabas, who lived in Portsmouth, and Joseph, who lived in Berkeley, along with their partner E.M. Stoddard of Portsmouth prided themselves on being specialists in salvage and "submarine diving." Using their heavily weighted, surface-supplied diving suits, they were able to repair holes in the hull of the vessel, whereupon they used a steam pump on one of their tugs to pump the water out.⁷⁰ Confederate Naval Constructor John Luke Porter ordered the hull moved to the drydock, and found that the "bottom of the hull, boiler and heavy and costly parts of the engine [were]...but little injured."⁷¹

In the aftermath of the destruction of Gosport, the Virginia State Navy (which would shortly be subsumed into the Confederate Navy on June 8, 1861) had acquired several damaged yet serviceable pieces of war materiel; scores of pieces of ordnance, three damaged Union ships, the *Merrimack*, *United States*, and *Germantown*; and claimed for itself the finest granite dry dock in the country.

⁶⁹ *New York Times*, May 23, 1869.

⁷⁰ Norfolk City Directory, 1861

⁷¹ John W.H. Porter, *A Record of Events in Norfolk County, Virginia, From April 19th, 1861 to May 10th, 1862*, (1892; reprint, Portsmouth, VA: Edwards Brothers, Inc., 1996), 332.

Chapter 3: “A Class of Vessels Hitherto Unknown to Naval Service”

Confederate Navy Secretary Stephen Russell Mallory knew that no ordinary vessel would be able to break the Union blockade. Mallory had studied European naval technology, including ironclads, and he urged Confederate President Jefferson Davis to “adopt a class of vessels hitherto unknown to naval service.”⁷² Since time was short, Mallory began a two-pronged effort to obtain ironclads. Some he would try to purchase in Europe. Others he would have built within the Confederacy. However, if the Confederate Navy was to build its own ironclad, it needed a design. In a meeting with Mallory in late June, 1861, ordnance expert Lt. John Mercer Brooke presented an idea for an ironclad with submerged ends and a sloped casemate housing a battery of powerful rifled guns. At the same meeting, Naval Constructor John Luke Porter presented a model (likely a paper plan) of a floating steam battery which also featured a casemate design. Porter’s plan offered nearly 360 degrees of firing ability from a gun deck which could accommodate six XI inch Dahlgren smoothbores.

William Price Williamson, a naval engineer who had also resigned his commission in the US Navy, was present at the meeting as well to give advice on propulsion for the nascent ironclad. “By unanimous consent,” the three men, with Mallory’s blessing, agreed on a design that combined elements of both Brooke’s and Porter’s concepts. Porter offered to draft the new plan.⁷³ Only one problem remained, however. The Confederacy had no quick way to produce a suitable

⁷² ORN, Series II, Volume 2. 51. .

⁷³ George M. Brooke, Jr., ed. *Ironclads and Big Guns of the Confederacy: The Journals and Letters of John M. Brooke*, (Columbia, S.C.: University of South Carolina Press, 2002), 22.

engine to power an ironclad of any design. But it did have the engine salvaged from the *Merrimack*. However, her engine was designed for a deep draft frigate, not Brooke and Porter's floating battery. Williamson suggested that perhaps the *Merrimack* herself could be converted into an ironclad. .⁷⁴

Returning to Portsmouth, Porter set about adapting Brooke's concept to the *Merrimack* while Williamson surveyed the engines. By July 11, 1861, the ironclad project was officially under way; Secretary Mallory issued orders to French Forrest at Gosport to "... build, equip, and fit [the *Merrimack*] in all respects according to her designs and plans[Y]ou will see that the work progresses without delay to completion."⁷⁵ The projected launch date for the converted vessel was November 1861.

The first task was to remove the burned portions and assess the overall condition of the hull. Finding the hull sound, workmen then began the process of cutting the hull down to a straight line about three feet above the waterline. This would provide the platform upon which they could construct the casemate. Meanwhile, Williamson had the task of overhauling the engine. This was the engine that had caused the *Merrimack* to be at Gosport for repairs, so Williamson was already aware of its shortcomings. His task was made even more difficult by the fact that the engine had spent some time at the bottom of the Elizabeth River. Components needed to be cleaned or replaced and re-lubricated. Unlike the

⁷⁴ George M. Brooke, 25.

⁷⁵ *Battles and Leaders*, vol. 1, 717.

Merrimack, which used sails as her principal means of motive power, this new ironclad would have only an engine to power the vessel.⁷⁶

The first dilemma was trying to ascertain how thick the iron needed to be to withstand US Naval ordnance. Accordingly, Ordnance officer John Mercer Brooke ordered tests as he was relatively sure that one-inch-thick plate, the thickest the nearby rolling mill at Tredegar was able to produce, would not be enough to protect the converted *Merrimack*. A test conducted on Jamestown Island in early October 1861 showed that he was correct: solid shot from an 8-inch Columbiad shattered an iron plate and traveled five inches into the wood backing. Brooke calculated that two two-inch thick layers of iron, backed by nearly two feet of wood would be needed for the casemate. Tredegar was forced to retool its machinery to produce two-inch-thick plate, which had to be shipped from Richmond to Norfolk. Transportation by land down the peninsula or on James or York Rivers was impossible because of the Union Army at Fortress Monroe and the Union Navy's blockading fleet in Hampton Roads. The material thus took a circuitous route from Richmond, down into North Carolina, then back up to Gosport from the south.⁷⁷

The sloped casemate of the nascent *Virginia* would become the feature which would define Confederate ironclads (as well as some Union ironclads) throughout the war. The new vessel's casemate, or shield, was 170 feet long, beginning twenty-nine feet from the bow. The walls of the casemate would be twenty-eight inches thick, constructed in five layers of eight-inch-wide by eight-foot-long sections of

⁷⁶ Besse, Sumner, *C.S. Ironclad Virginia and U.S. Ironclad Monitor*, (Newport News, VA: The Mariners' Museum, 1996), 26-27.

⁷⁷ Quarstein, *CSS Virginia*, 37.

timber and iron. The layers were arranged from interior to exterior thus: four inches of oak board laid horizontally; eight inches of yellow pine studs laid vertically; twelve inches of white pine studs laid horizontally; two inches of iron plate laid horizontally; finally, the exterior showed two inches of iron plate laid vertically.⁷⁸ This shield was a clever piece of work. The alternating horizontal and vertical layers made it resilient and nearly impossible to penetrate. The layers of wood could provide shock absorption, and additional “knees” (brackets of live oak) were added to the design to fit under the original *Merrimack* gun deck which supported the weight of the casemate. The roof and the casemate walls worked together like an arch, protecting the guns and gun crew.

Naval constructor Porter calculated all of this would require 1,000 tons of iron. However, by the summer of 1861, Tredegar Iron Works in Richmond had already used up its pre-war supply of iron. Hundreds of tons of old tools, obsolete guns, and railroad iron had to be melted down and rolled into plate to armor the converted vessel.

The USS *Merrimack*, before conversion

Tonnage	3,200 tons
Length	305 feet
Beam	51 feet, 4 inches
Draft	23 feet (average)
Speed	9 knots (average)

⁷⁸ Brooke, *Ironclads and Big Guns*, 44.

Engines	Two horizontal, back acting; two cylinders; 72 inches in diameter, 3-foot stroke
Armor	None
Armament	Fourteen 8-inch smoothbore guns of 63 cwt Two 10-inch smoothbore guns Twenty-four IX-inch Dahlgren smoothbore guns
Complement	519

The CSS *Virginia*, after conversion

Tonnage	3,200 tons
Length	262 feet, 9 inches
Beam	51 feet, 4 inches
Draft	22 feet (average)
Speed	4 – 5 knots
Engines	Two horizontal, back acting; two cylinders; 72 inches in diameter, 3-foot stroke
Armor	4-inch iron plate (on the casemate)
Armament	Two 6.4-inch Brooke rifled cannon Two 7-inch Brooke rifled cannon Six IX-inch Dahlgren smoothbore guns (two modified for hot shot)

	Two 12-pounder howitzers on deck
	1,500-pound cast-iron ram
Complement	320 ⁷⁹

The still-unfinished Confederate ironclad was finally christened, launched, and commissioned as the CSS *Virginia* on February 17, 1862. Even with her new design, many people, including the ironclad's own crew, continued calling the *Virginia* by her old US Navy name, the *Merrimack*. But *Virginia* was her name, "not *Merrimac*," wrote Col. Charles Norris of the CSA, for that had "a nasal twang equally abhorrent to sentiment and to melody, and meanly compares with the sonorous sweetness of '*Virginia*.' She fought under Confederate colors, and her fame belongs to all of us; but there was a peculiar fitness in the name we gave her. *In Virginia, of Virginia iron and wood, and by Virginians was she built, and in Virginia's waters, now made classic by her exploits, she made a record which shall live forever.*"⁸⁰

The CSS *Virginia* may not have been the ironclad that Brooke, Porter, Williamson and Mallory had initially envisioned, but she was menacing nonetheless. Her design included a number of features that made the *Virginia* a formidable warship—one capable of taking on the powerful Union navy single-handedly. One of the most unique features of the *Virginia* was her sloping armor. The casemate design, based on the Barnard Principle of a 36° slope, was a radical departure from the more upright walls of wooden warships. Angling the sides was a simple strategy

⁷⁹ Besse, 7-8.

⁸⁰ William Norris, *The Story of the Confederate States' Ship "Virginia" (Once Merrimac): Her Victory over the Monitor*, Reprint in *Southern Historical Society Papers* 41 (September 1916), 220.

for deflecting shot and preventing it from penetrating the casemate's walls—and it worked. The principle of sloped sides can still be seen in today's armored tanks.⁸¹

The *Virginia* was an extraordinary looking ship. Brooke specified that her ends should be submerged two feet to improve her buoyancy and speed. The design also protected the ship from enemy fire, for nothing could be seen of her afloat but the casemate itself. Mallory observed, "The novel plan of submerging the ends of the ship and the eaves of the casemate was the peculiar and distinctive feature.... It was never before adopted."⁸² Because her deck was designed to be almost awash when at sea, Brooke devised a rough breakwater on the bow to keep water from splashing into the bow gunports.

Though the *Virginia* was to be a very modern vessel, she had a quite ancient secret below the waterline upon her bow—a ram. The ram was an ancient naval weapon, but when steam propulsion replaced wind power, naval engineers gave the ram another look. Mallory knew that ramming could be a devastating offensive tactic, and that "even without guns the [*Virginia*] would be formidable."⁸³ Given the gunpowder shortage in the South, this was an inspired move, for the 1,500-pound ram could easily punch through the sides of the Union's wooden ships.

Displacement, too, was a critical calculation, and unfortunately, Porter was mistaken in his estimates. When the *Virginia* was launched in February 1862, the armored shield barely reached below the water's surface. As the ship consumed both fuel and ammunition in the course of combat, she would ride even higher in the

⁸¹ John Gross Barnard, *Notes on Sea-Coast Defense*, (New York: D. Van Nostrand, 1861), 60.

⁸² John Mercer Brooke, *The Virginia, or Merrimac; Her Real Projector* (Richmond, Va: William Ellis Jones, 1891), 18.

⁸³ *Ibid.*

water, perhaps even exposing the wooden hull to enemy fire. Executive Officer Catesby Jones complained, "We are least protected where we need it most."⁸⁴ Problems continued to crop up: the last-minute addition of the ram resulted in a cracked flange, and the connection between the new casemate and the existing hull was not a good fit. All of these weaknesses would have serious consequences in battle.

Because Mallory desired a massed concentration of firepower, the gun deck of the *Virginia* became a crowded and dangerous place. The sharp slope of the casemate meant only seven feet of headroom and a beam of thirty feet. In order to allow room for recoil and loading, the guns had to be staggered along the two broadsides.⁸⁵ Ten guns could fit on the deck this way, but handling the guns during combat was tricky. Still, Brooke wanted to give the *Virginia* the most devastating battery she could carry.

The USS *Merrimack*'s engines may have been weak, but her guns were not. In fact, the Confederates kept some of the *Merrimack*'s original IX-inch Dahlgrens as part of the CSS *Virginia*'s battery, and supplemented with other IX-inch Dahlgrens that had been cast at Tredegar and were on hand at Gosport.⁸⁶ The Dahlgrens were already powerful guns, but Brooke made them even more devastating by modifying two of them to fire hot shot. A special furnace was installed in the engine room to prepare shot for the guns during combat.

⁸⁴ Brooke, *Ironclads and Big Guns*, 70.

⁸⁵ John Luke Porter, plans for gun deck and general plan, MS 1651, MS 1655, The Mariners' Museum Library and Archives.

⁸⁶ The gun marked "Trophy No. 1" on display at The Mariners' Museum was one of the *Virginia*'s IX-inch Dahlgrens. It clearly displays marks consistent with Tredegar.

Four more guns rounded out the battery. At the bow and stern was a 7-inch Brooke rifle (actually a banded and sleeved IX-inch Dahlgren) on a pivot mount which allowed it to be moved to three available gunports. In the broadsides there were two 6.4-inch Brooke rifles that were modified 32 pounders.

The new “Brooke” gun was the type of weapon the Confederates needed to confront the Union navy. Superior in “strength, precision, and range” to any other cannon available in America, the Brooke gun owed its success to the banding of the gun at the breech, which prevented it from bursting when fired.⁸⁷ These 32-pound guns were prototypes for the 6.4-inch Brooke rifle. Brooke installed the 7-inch rifles of his own design in the CSS *Virginia*’s bow and stern, each mounted on a pivot that allowed the gun to be aimed through one of three gun-ports at the ends of the casemate. This arrangement offered greater flexibility in aiming the gun without having to turn the ship.

With the clash of ironclads in mind, Brooke also designed a flat-headed, wrought-iron elongated shot, or bolt, for use in his rifled cannon, a weapon that could punch a hole through armor plate. But in the rush to complete the CSS *Virginia*, Brooke instructed Tredegar Iron works to concentrate on producing explosive shells instead. After all, he reasoned, the *Virginia*’s first engagement would be with wooden ships.

Steering the new ironclad would not be easy, although it would not be radically different from any large sailing vessel. Porter designed a pilothouse at the forward end of the vessel, a conical cast iron structure protruding from the top of

⁸⁷ Stephen Mallory, quoted in Brooke, *Ironclads and Big Guns*, 224.

the casemate. However, he had to compromise ease of viewing with protection for the men within the structure. Access to the pilot house was via a ladder on the gun deck. While Porter's plans clearly show the positioning of the ladder, the operation of the forward pivot gun made the construction of a fixed ladder impossible. It is likely that a rope ladder was used instead. When the *Virginia* was under way, the platform might hold the captain and his lieutenant, and one or two pilots. An auxiliary steering wheel may have been installed within the pilot house, with steering ropes running aft to the original tiller/rudder mechanism of the old *Merrimack*. Principal steering would have taken place aft, with an iron wheel constructed for the new ironclad. Instructions from the pilothouse would have been relayed either by speaking tube or by crew runners whose job was to convey instructions from the pilothouse to the wheel.

Believing that the secession of Maryland from the Union was imminent, Captain Franklin Buchanan, first Superintendent of the United States Naval Academy, Mexican War hero and Commandant of the Washington Navy Yard when the war broke out, resigned his commission in the US Navy on April 22, 1861 and waited for Maryland to become part of the Confederacy. Recent events in his home state had certainly led him to that belief. There had been bloodshed on Pratt Street in Baltimore as citizens sympathetic to the Confederate cause attacked a Massachusetts regiment three days prior to Buchanan's resignation. The regiment responded with gunfire, killing twelve. The press was having a field day, and all signs pointed towards a Confederate Maryland. Buchanan, reflecting on it later, even said that at the time, "the belief was general throughout the state that she was

virtually OUT of the Union." When Maryland's secession did not come to pass, Buchanan requested reinstatement in the US Navy. Secretary Gideon Welles immediately rejected the request. Buchanan was left with no recourse other than to join the Confederate navy.⁸⁸ He was appointed as Flag Officer for the Confederate fleet in Hampton Roads on February 24, 1862.

While there was an excellent pool of former US navy officers from which to choose, ordinary sailors were harder to find. When recruiting stations in Norfolk and Richmond failed to yield the 320 men needed to man the CSS *Virginia*, artillerymen from nearby Confederate Army units were recruited. Finally, on March 6, 1862, the last contingent was mustered when Captain Thomas Kevill and his United Artillery Company (Co. E, 41st Virginia Volunteer Infantry) volunteered to go on board the Ironclad Steamer *Virginia*.⁸⁹ Also among Kevill's company was Isaac Huff Walling, a professional diver from New Jersey who had assisted Baker and Company in raising the *Merrimack*.⁹⁰

⁸⁸ Craig Symonds, *Confederate Admiral: The Life and Wars of Franklin Buchanan*, (Annapolis, MD: naval Institute Press, 1999), 137-8.

⁸⁹ Quarstein, *CSS Virginia*, 67.

⁹⁰ *Ibid.*, 282. According to his service records, Walling joined Kevill's unit on April 19, 1861. Porter's *A Record of Events in Norfolk County...* recounts that Kevill's artillery unit began life as the United Fire Company, which Kevill had created before the war to provide the businesses of downtown Norfolk with a fire department. Many downtown business owners and employees were members of this volunteer fire department, and their membership transferred from the United Fire Company to the United Artillery on April 19. Stationed at Fort Norfolk, Kevill's Company was called upon to provide the final 31 crew members needed to complete the *Virginia's* complement. Kevill asked for thirty-one volunteers and the entire company stepped forward. Therefore, Kevill chose thirty-one men "whom he thought best qualified, by physical strength, to do the heavy work which was required of them...." In Porter, *Norfolk County*, 296-7. NARA M 324 Compiled service records of Confederate soldiers Roll 0869, "Isaac H. Walling."

Chapter 4: “The Navy Department will receive offers...”

The knowledge that the Confederates were building an ironclad vessel prompted the Union into action. With the backing of Congress, the Navy Department took out advertisements in a number of newspapers across the northeast in early August, 1861. The *Boston Daily Journal*, *New York Enquirer*, *Philadelphia Evening Bulletin*, *New York Times*, and *The Baltimore Clipper*, among others, ran notices through the second week in August requesting proposals for ironclad steam vessels:

The Navy Department will receive offers from parties who are able to execute work of this kind, and who are engaged in it, of which they will furnish evidence with their offer, for the construction of one or more IRON-CLAD STEAM VESSELS-OF-WAR, either of iron or of wood and iron combined, for sea or river service, to be of not less than ten no over sixteen feet draught of water; to carry an armament of from eighty to one hundred and twenty tons weight, with provisions and stores for from one hundred and sixty-five to three hundred persons, according to armament, for sixty days, with coal for eighty days. The smaller draught of water, compatible with other requisites, will be preferred. The vessel to be rigged with two masts, with wire rope standing rigging, to navigate at sea.

A general description and drawings of the vessel, armor and machinery, such as the work can be executed from, will be required.

The offer must state the cost and the time for completing the whole, exclusive of armament and stores of all kinds, the rate of speed proposed, and must be accompanied by a guarantee for the proper execution of the contract, if awarded.

Persons who intend to offer are requested to inform the Department of their intention before the 15th August, instant, and to have their propositions presented within twenty-five days from this date.⁹¹

⁹¹ *New York Times*, August 15, 1861, p. 7.; The National Archives also holds the receipts for payment to run the ad in *Saturday Evening Gazette* – Boston, MA , *Boston Daily Journal* – Boston, MA , *Boston Daily Advertiser* – Boston, MA , *Providence Journal* – Providence RI , *New York Commercial Advertiser* – New York, NY , *Morning Courier and New York Enquirer* – New York, NY , *New York Times* – New York, NY , *Sunday Mercury* - New York, NY , *Philadelphia Daily News* – Philadelphia, PA , *Philadelphia Evening Journal* – Philadelphia, PA , *North American* – Philadelphia, PA , *Baltimore Clipper* – Baltimore, MD , *Baltimore Patriot* – Baltimore, MD , *National Republican* – Washington, DC and *National Intelligencer* – Washington, DC (RG45, File: US Navy, Box 22)

With the advertisement in the appropriate publications, all Gideon Welles needed was a group to review any forthcoming proposals. Chief Naval Constructor John Lenthall had expressed the opinion that many naval officers held in the spring of 1861 that “the necessarily large size, the cost and the time required for building an iron cased steam vessel is such that it is not recommended to adopt any plan at present.”⁹² Welles knew that for the ironclad project to be successful, the panel would require men who had no known opposition to the construction of ironclads; therefore, Welles could not empanel Lenthall, who would have been an appropriate choice otherwise. Accordingly, on August 8, Commodore Joseph Smith, Commodore Hiram Paulding, and Commander Charles Davis found themselves members of the Ironclad Board of the US Navy. Though extremely experienced naval officers, these three were by no means experts on ironclad technology, but they had not expressed any overt opposition to the concept, so they fit Welles’ requirements.

Joseph Smith was the senior member of the Ironclad Board. Born in Boston in 1790, Smith had already distinguished himself during the Battle of Lake Champlain in 1814, fought in the Second Barbary War in 1815, and by 1861, at the age of 71, had been tirelessly commanding the Navy’s Bureau of Docks and Yards for 15 years. Smith understood the need for technical innovations in naval construction from a practical standpoint. However, he may also have had a personal interest in outfitting the Union navy with the best current technology had to offer.

⁹² Donald L. Canney, *The Old Steam Navy, Volume Two: The Ironclads, 1842 – 1885*, Annapolis, MD, Naval Institute Press, 1993, 8. Lenthall, like many, believed that the war would be over long before such vessels could even be completed. Union fortunes at Bull Run in July, 1861 would alter that opinion significantly.

His son, also named Joseph, was in the US Navy, and was currently stationed in Hampton Roads as Executive Officer of the USS *Congress*, uneasily waiting to see what was to become of his former ship the *Merrimack* in the hands of the Confederacy. The elder Smith was keenly watching the situation as well.

Hiram Paulding was born the same year as the venerable frigate USS *Constitution* – 1797. Therefore it was fitting that his first berth was on that same vessel when he entered the service as a midshipman in 1811 at the age of 14. A veteran of the battle of Lake Champlain in 1814, he continued his ascension within the US Navy, serving in the Mediterranean, Pacific, Caribbean and South Atlantic before entering what he believed would be his last service before retirement – commander of the Home Squadron. But the impending sectional crisis kept him active and the Navy required his services in Washington, D.C., at the Navy Department where his career became inextricably linked to current and future events in Hampton Roads. Paulding had been placed in charge of, albeit too late (and according to pundits at the time, too ineffectually), the evacuation of Gosport in April of 1861.⁹³ Following his service with the Ironclad Board, he found himself commandant of the New York Navy Yard where ironclads would eventually become standard fare. Whatever his personal opinion of ironclads and steam-powered vessels, his professional life from 1861 onward was dominated by them.

Commander Charles Henry Davis was not Welles' first choice for the Ironclad Board, his extensive technological experience notwithstanding. Welles had hoped that ordnance expert Commander John Dahlgren would fill that role. But Dahlgren

⁹³ Horace Greeley, *The American Conflict: A History of the Great Rebellion In the United States of America, 1860-'64*, Volume I, O.D. Case & Company, Hartford, CT, 1864, 475-7.

requested that he be relieved of this particular duty, for the same reasons he had turned down the position of ordnance chief – paperwork got in the way of research, experimentation, and development.⁹⁴ Davis, who was already begrudgingly engaged in Navy Department business in Washington, D.C., was tapped for the job instead.

Born in Boston in 1807, Charles Davis was a scholar with a penchant for adventure. While a student at Harvard University, he received an offer to enter the Navy as a midshipman and leapt at the chance for practical experience.⁹⁵ He was assigned to the frigate *United States*, first encountering the vessel at Gosport Navy Yard in Portsmouth, Virginia, in 1823, where he also first served with then-lieutenant Hiram Paulding. After 17 years of active sea-service, Davis began work on the Coastal Survey (the organization that would later become a primary component of the National Oceanic and Atmospheric Administration, or NOAA) and eventually the *Nautical Almanac*, which he was working on in 1861 when war broke out. Both a sailor and a mathematician, Davis was certainly an appropriate substitute for Dahlgren – and while he was the youngest member of the Board, he would prove to be the most skeptical member.

By early September 1861 the Ironclad Board had received sixteen proposals. Many of them were promising. The preeminent clipper-ship builder, Donald McKay of Boston, had actually submitted his design to the Navy earlier in 1861, before the

⁹⁴ Robert J. Schneller, Jr., “A State of War is a Most Unfavorable Period For Experiments”: John Dahlgren and U.S. Naval Ordnance Innovation During the American Civil War,” *International Journal of Naval History*, Vol. 2, No. 3, December 2003.
http://www.ijnhonline.org/volume2_number3_Dec03/article_schneller_dahlgren_dec03.htm#_edn25

⁹⁵ Davis would eventually receive his degree in 1841. Charles H. Davis, *Life of Charles Henry Davis, Rear Admiral, 1807-1877, By His Son*, Boston, Houghton, Mifflin & Company, 1899, 4 – 9.

specifications were published in August. Despite not conforming explicitly to the specifications listed in the advertisement, his was a design which the group felt had great merit, but ultimately the Board rejected the overall proposal because of the \$1,000,000 price tag McKay had demanded.⁹⁶ Edward Sabine Renwick, a successful mechanical engineer with wide-ranging interests, presented a “novel” design which the Board believed would “attract the attention of scientific and practical men.”⁹⁷ However, questions of stability and feasibility plagued Renwick’s proposal and the Board wanted experts to review the plan. Yet, like McKay’s proposal, Renwick’s plan’s greatest failing was in its price tag: \$1,500,000.

Designer Charles Whitney and Thomas Fitch Rowland, owner of Continental Ironworks in Greenpoint, Brooklyn, had submitted a plan for an ironclad vessel to the Navy in April, 1861, which was included in the proposals the Ironclad Board was to consider. However, Whitney and Rowland’s design was not accepted for fear that it could not bear the weight of the armor.⁹⁸ Though Rowland’s proposal was rejected, he still found himself very much involved in the ironclad program.

Continental Ironworks would be one of the principal contractors with the US Navy

⁹⁶ McKay would mount a press campaign to criticize the Ironclad Board for their shortsightedness. In a letter dated January 24, 1862, but not printed in the *New York Times* until March 23, 1862, McKay states that “It appears, then, that, for the future, our fleets will be constructed, not after the well-known principles of naval architecture, but the wildest schemes may be adopted in the construction of our ships, if they are only offered under a guarantee! Such a course will make us the laughing-stock of the whole world, and yet, it appears that our Navy Department intends to carry out the same system on a larger scale in the construction of the twenty iron-cased vessels lately voted (?) to be built by Congress!” *New York Times*, March 23, 1862

⁹⁷ Renwick would best be known for his “thermostatic incubator” which revolutionized the poultry industry in 1884. Edward Sabine Renwick, See *The thermostatic incubator: its construction and management, together with descriptions of brooders, nurseries, and the mode of raising chickens by hand*, (Self-published, 1884).

⁹⁸ Though rejected in 1861, the plans for this vessel were revised and the result was the USS *Keokuk*, a hunchbacked ironclad with two stationary gun platforms. The *Keokuk* was commissioned in December, 1862. Canney, *The Old Steam Navy, Volume Two*, 11.

in ironclad construction. Locomotive designer William Norris of Philadelphia submitted an iron ship with no armor, while Henry Dunham of New York wanted \$1,200,000 for a proposal that had neither drawings nor specifications. Other plans were also missing information and were similarly rejected. The Board's response to the proposal submitted by William Kingsley of Washington D.C. was the most terse. One can imagine their surprise at receiving a proposal for a "*rubber-clad* vessel, which we cannot recommend." After much debate, the three officers chose two proposals for construction. Both designs represented only a moderate departure from traditional warship design. One of these would be named the *New Ironsides*, the other the *Galena*.⁹⁹

Merrick and Sons of Philadelphia used the basic design of the British ironclad *Warrior* for the USS *New Ironsides*. The Ironclad Board considered this plan "the most practicable one for heavy armor." With a projected price of \$225,000 and a completion time of nine months, the *New Ironsides* was a bargain, and with an angled casemate of made of 4-1/2 inches of iron plate, a submerged ram, and a battery of sixteen heavy guns, the *New Ironsides* would eventually become the most powerful of the Civil War ironclads.

The iron gunboat USS *Galena* was to be a 210-foot-long, sail-rigged vessel with six guns in her broadside. Designed by Samuel H. Pook of Connecticut, son of the successful naval architect Samuel M. Pook, she would feature a curved, sloped casemate, 3 1/4 inches of iron plate, and an unarmored deck. While the four months

⁹⁹ Canney, *The Old Steam Navy, Volume Two*, 15. ; *Abridgment ... containing the annual message of the president of the United States to the two houses of Congress ... with reports of departments and selections from accompanying papers, Volume 1* (Washington, D.C.: U.S. Congress, 1861), 748-752.

projected construction time seemed unrealistic, the price of \$235,250 was extremely attractive. The conservative *Galena* was the sort of vessel that would appeal to the Ironclad Board, but she had a secret advantage, too: Pook's design was submitted by Cornelius S. Bushnell, a powerful Connecticut financier with connections in Congress.¹⁰⁰

Bushnell had long been acquainted with the sea, having captained a sixty-ton schooner by the age of sixteen. He had dabbled in the grocery business in his early twenties, but made his fortune by investing in the struggling New Haven & New London Railroad. Realizing that a connecting route between New York and Boston would be highly lucrative, he invested in connecting the New Haven & New London to the Stonington line, and on to Boston, contracting with Erastus Corning and John Flack Winslow of the Albany Ironworks in Troy, New York, and with John Griswold, owner of the Rensselaer Ironworks, also in Troy. Only thirty-two years old at the outbreak of the Civil War, Bushnell was a millionaire with a desire to serve the Union while still serving his own financial interests.¹⁰¹

Bushnell took great interest in the affairs of the US Navy and was well acquainted with Gideon Welles. Upon receiving word about the Confederates conversion of the *Merrimack* into an ironclad, Welles quickly drafted a Bill to put

¹⁰⁰ Canney, *The Old Steam Navy, Volume Two*, 20.

¹⁰¹ *Record of service of Connecticut men in the army and navy of the United States during the War of the Rebellion*. (Hartford, Conn.: Press of the Case, Lockwood & Brainard Co., 1889), 958; Discharge papers reprinted in *The Story of the Monitor*, (New Haven, CT: The Cornelius S. Bushnell National Memorial Association, 1899), 50. . Records indicate that while in Washington, D.C., he joined the Washington Clay Guards on April 18, 1861, a unit made up of non-District residents for the immediate protection of the White House and President Lincoln in the days following Fort Sumter. Bushnell, along with the rest of the volunteers was discharged two weeks later when reinforcements arrived. Abraham Lincoln "cheerfully" signed the discharge.

before Congress which would authorize the construction of ironclad steam vessels for the Union Navy to combat the Confederate threat. However, the bill was largely ignored, and Welles determined that a businessman of some influence might better be able to persuade members of Congress to support the bill. Therefore, Welles enlisted fellow Connecticut native Cornelius Bushnell to personally carry the bill to Capitol Hill and use his influence with Connecticut congressman James E. English, to move it forward. English was member of the Naval Committee and also represented Bushnell's district in Connecticut. With Bushnell's influence and English's backing, the bill soon passed both House and Senate and was quickly signed by Lincoln.¹⁰²

In fact, with his insider knowledge that Congress was preparing to authorize the creation of an Ironclad Board, Bushnell submitted Pook's design for the *Galena* on June 28, 1861, just days before the vote. Congress approved the bill on July 4, 1861. \$1,500,000 would be available for the construction of ironclad vessels. Bushnell, who owned a shipyard in Connecticut, was more than ready to offer his services as soon as the Navy required them, and maintained a residence at the Willard Hotel in Washington, D.C., throughout the summer in order to monitor the progress of the Ironclad Board.

Bushnell was not the only businessman spending time in D.C. hoping for a contract with the Navy, however. Another Cornelius—Cornelius Delamater—also spent time in Washington, D.C., during the summer of 1861 seeking favor with the Navy Department. A successful New York businessman, Delamater had taken a small company, The Phoenix Foundry, and transformed it into a major iron works

¹⁰² "Negotiations for the Building of the 'MONITOR'" in *Battles and Leaders*, Volume I, 748-750.

which dominated the waterfront between 13th and 14th Streets in Manhattan. The Cornelius H. Delamater ironworks was one of the largest such establishments in New York, and certainly the largest under a sole-proprietor.¹⁰³ Delamater's particular friend was the Swedish engineer John Ericsson, with whom he had partnered on many projects and with whom he commiserated on the deplorable treatment Ericsson had received at the hands of the US Navy following the *Princeton* affair of 1843. Both Delamater and Ericsson believed that much of the blame for Ericsson's continued blacklisting emanated from the mouth and pen of Benjamin Franklin Isherwood, Chief of the Naval Bureau of Steam Engineering. In the summer of 1861, Delamater traveled to D.C. in part to seek a contract with the Navy, but in fact he also desired to figuratively "finish off Mr. Isherwood if possible, which I think I owe it to my country to do."¹⁰⁴ In a letter to his friend Ericsson, Delamater remarked that he had met with Secretary Welles twice, but had "no expectation of any contract or immediate good to result to me or to us from my present stay."¹⁰⁵ Delamater was not one to give up, however, and continued to visit D.C. throughout the summer, staying at the Willard Hotel. There he grew well-acquainted with his fellow petitioners, including Cornelius Bushnell.

Despite Bushnell's insider knowledge and influence, the Ironclad Board questioned the seaworthiness of Bushnell's *Galena*. "The objection to this vessel," they wrote in their report, "is the fear that she will not float her armor and load

¹⁰³ J. Leander Bishop, *A History of American Manufactures: 1608 – 1860, Volume III*, Third Edition. (Philadelphia: Edward Young & Co., 1868), 128-130.

¹⁰⁴ William Conant Church, *The Life of John Ericsson*, reprint, (Honolulu, HI, University Press of the Pacific, 2003). 242.

¹⁰⁵ *Ibid.*

sufficiently high, and have stability enough for a sea vessel. With a guarantee that she shall do these, we recommend on that basis a contract.”¹⁰⁶ Though the date is not recorded, a few days prior to September 13, 1861, Bushnell was leaving the Willard Hotel when he chanced upon Cornelius Delamater on the steps of the building. Bushnell confided that he had a contract for the *Galena* but that the plans needed review. Delamater suggested to Bushnell that he consult with Delamater’s friend John Ericsson, in New York City.¹⁰⁷

This was the same John Ericsson who had been blamed for the “Peacemaker” explosion on board the USS *Princeton* in 1843. Ericsson, born on July 31, 1803 in Värmland, Sweden, had been a child prodigy, was working alongside his engineer father on a national canal project by the time he was eight. At 16 he was put in charge of 600 men and drew up plans for a cross-country canal. After serving seven years in the Swedish army, Ericsson immigrated to London in 1826 to look for better opportunities. There, in partnership with John Braithwaite, he produced designs for engines that ran on heat rather than steam, and also created a steam-screw propeller for the British Royal Navy (which they ultimately rejected in favor of one created by a British-born citizen).¹⁰⁸

In 1836 Ericsson married nineteen-year-old Amelia Byam. By 1839, Ericsson was in severe financial straits and had even spent some time in debtor’s prison. He felt it was time to move on. Ericsson’s work in England was not going unnoticed on

¹⁰⁶ *Abridgment ... containing the annual message of the president of the United States to the two houses of Congress ... with reports of departments and selections from accompanying papers, Volume 1* (Washington, D.C.: U.S. Congress, 1861), 748-752.

¹⁰⁷ *The Story of the Monitor*, 20.

¹⁰⁸ Church, *Life of Ericsson, Volume One*, 61.

the other side of the Atlantic. His talents caught the eye of American naval officer Robert F. Stockton, who invited Ericsson to come to the States in 1839. Amelia stayed behind in London. While she eventually joined Ericsson in New York, she returned to England shortly thereafter and never saw her husband again, though they never divorced.¹⁰⁹

His relationship with the US Navy appeared more promising. But this came to an abrupt end with the 1844 USS *Princeton* tragedy. With that avenue closed, Ericsson returned to some earlier ideas, including his “caloric” (hot air) engine and something he mysteriously called a “sub-aquatic system of naval warfare.”

Always ahead of his time, Ericsson had envisioned an ironclad steam-powered warship as early as 1826. But the outbreak of the Crimean War in 1853 spurred him to finish designing his ironclad. In September of 1854 he submitted a full set of plans to Napoleon III of France, who turned them down. Undaunted, Ericsson set his drawings aside and waited.¹¹⁰ Upon hearing of the Navy’s desire for ironclad designs in August of 1861, Ericsson quickly drafted a letter to offer his services and enclosed drawings of his novel ship. However, Ericsson addressed the letter to Abraham Lincoln, not the Ironclad Board. Dated August 29, 1861, Ericsson’s letter outlined the Swede’s successes, and did not mention the *Princeton*. Ericsson told Lincoln that “attachment to the Union alone impels me to offer my services at this fearful crisis—my life if need be—in the great cause which Providence has

¹⁰⁹ Church, *Life of Ericsson, Volume One*, 116 .

¹¹⁰ Peterkin, *Drawings of the USS Monitor*, USS *Monitor* Historical Report Series, Volume 1, Number 1, (Washington, D.C.: US Department of Commerce, 1985), 36-45. The essential elements of what would become the USS *Monitor* were already apparent in this revolutionary design. The vessel was to be constructed entirely of iron, with all of her machinery and living quarters located underwater. Only the deck and a semi-globular revolving gun turret—the ship’s most radical feature—would ride above the water line.

called you to defend.”¹¹¹ Neither the letter nor the plans found their way into the Ironclad Board’s deliberations, however.

Bushnell arrived in New York the following day and visited Ericsson in his office on Franklin Street in lower Manhattan. Bushnell laid out the plans for the *Galena*. Ericsson agreed to examine them and told Bushnell to return for an answer the next day. Accordingly, Bushnell returned the following day and Ericsson informed him that the *Galena* “will easily carry the load you propose and stand a six-inch-shot at a respectable distance.” Ericsson then asked Bushnell if he had time to look at Ericsson’s own design. Bushnell recalled that Ericsson then “produced a small, dust-covered box” within which was a model and a plan for his “sub-aquatic system of naval warfare.” Also in the box was a medal and letter of thanks from Napoleon III. Bushnell was impressed with what he saw and begged Ericsson to loan him the model and plan to bring before the Navy for consideration. Ericsson agreed and Bushnell immediately left for Hartford, Connecticut, where he knew Gideon Welles was staying. Upon seeing the model, Welles urged Bushnell to “lose no time” in returning to Washington to bring the model before the Ironclad Board.

The Ironclad Board was not pleased when it learned that the design Bushnell was promoting belonged to John Ericsson. But Bushnell would not give up on Ericsson’s strange design. He used his friendship with Welles and his acquaintance with Secretary of State William Seward to gain a meeting with both President Lincoln and the Ironclad Board on September 13, 1861. Lincoln, who took a keen interest in war technology, was impressed with Ericsson’s cunning paste-board

¹¹¹ Church, *Life of Ericsson, Volume One*, 246-247.

model which had a moving turret and tiny guns. Lincoln reportedly held the model in his hand and said, "All I have to say is what the girl said when she stuck her foot into the stocking. It strikes me there's something in it."¹¹²

Commodore Smith and Captain Paulding were willing to consider Ericsson's proposal. But Captain Smith adamantly refused, even with the President's endorsement. He told Bushnell to "take the little thing home and worship it, as it would not be idolatry, because it was in the image of nothing in the heaven above or on the earth beneath or in the waters under the earth."¹¹³

Bushnell realized the only way to truly persuade the board was for Ericsson to explain his strange vessel in person, for, as Bushnell reasoned, "Ericsson is a full electric battery himself."¹¹⁴ Bushnell left for New York to persuade Ericsson to come to Washington. But Ericsson was adamant in his refusal to speak with the Navy. Bushnell had to play to Ericsson's vanity to get the imperious Swede to Washington. Bushnell recalled that he told Ericsson, "Paulding says that your boat would be the thing to punish those Rebels at Charleston." He continued on with the praise: "You have a friend in Washington – Commodore Smith. He worships you. He says those plans are worthy of the genius of an Ericsson." Then Bushnell slyly mentioned that "Captain Davis wants a little explanation in detail which I could not give." But Ericsson *could* explain, and told Bushnell, "I will go to-night!" With that, Bushnell

¹¹² Cornelius Bushnell, quoted in a letter to Gideon Welles, 1877 in *Project Cheesebox: A Journey Into History*, Volume I, Annapolis, 1974, 57.

¹¹³ *Ibid.*, 58.

¹¹⁴ Cornelius Bushnell, quoted in a letter to Gideon Welles, 1877 in *Project Cheesebox: A Journey Into History*, Volume I, Annapolis, 1974, 59.

“knew that the success of the affair was assured. Ericsson and Bushnell left for Washington immediately.¹¹⁵

To Ericsson’s surprise, when he arrived at the Navy Department on September 15, 1861, he found that not only was he not expected, but that his plan had been rejected. Bushnell had conveniently left that bit out. When Ericsson inquired as to the reasons for the rejection, Commodore Smith replied that because of the vessel’s apparent instability, “it would upset and place her crew in the inconvenient and undesirable position of submarine divers.”¹¹⁶

Ericsson chided the Board for its lack of vision in a speech now lost, but those present recalled that he ended his soliloquy with the stirring admonition “Gentlemen ... I consider it to be your duty to the country to give me an order to build the vessel before I leave this room.”¹¹⁷ Cornelius Bushnell recalled that Ericsson “carried the Board and Secretary Welles as if by storm,” and the Board, clearly moved by Ericsson’s impassioned speech, conferred briefly and asked him to return at 1 p.m.¹¹⁸ Prompt as always, Ericsson returned at the appointed hour to find Commodore Paulding alone in the Board room. Paulding asked Ericsson a few more questions about buoyancy and stability to which Ericsson responded in full; Paulding declared afterwards that “I have learnt more about the stability of a vessel from what you have now said than all I knew before.”¹¹⁹ But Ericsson still did not have a contract, and the Board continued to deliberate. He was asked to return at 3

¹¹⁵ Ibid., 59.

¹¹⁶ Ibid., 64.

¹¹⁷ Ibid., 64.

¹¹⁸ Ibid. 83.

¹¹⁹ Ibid., 65.

p.m. at which time he found Gideon Welles awaiting him, along with a promise for a contract.

Building the *Monitor*

On September 21, 1861, Commodore Joseph Smith sent a brief letter to John Ericsson informing him that the Ironclad Board had “reported favorably on your proposition for an iron-clad gunboat.” For Ericsson, the merits of his gunboat were self-evident, and he did not need three superannuated naval officers to tell him this. The letter’s tacit acknowledgement that he stood to regain his favorable standing with the US Navy was most important to Ericsson. However, Smith sullied the sentiment by adding that “there seems to be some deficiencies in the specifications” and that “some changes may be suggested.” Knowing that he had added fuel to Ericsson’s caloric fire, Smith closed the letter with the request that Ericsson had “better come on and see to the drawing of a contract,” adding, almost as though in sotto voce, “if we can mutually agree.”¹²⁰

Despite the rocky beginnings with the Ironclad Board, it seemed as though there might be civil negotiations between Ericsson and Smith at the outset of the formal relationship. Even as Smith was penning his letter to Ericsson on September 21, Ericsson was writing a letter to Smith which bordered on congenial. Ericsson wrote excitedly that he intended “to furnish a condenser for making fresh water,” as well as ships boats – including “an India rubber boat to be folded up and carried below, to be used in case of need after the destruction of the deck boats.” He also mentioned that he had been paying particular attention to “the construction of a

¹²⁰ Commodore Joseph Smith to Captain John Ericsson, 21 September 1861, Naval War Records, Bureau Files, Vol. 2634, page 25, Record Group 45; National Archives Building, Washington, DC.

temporary rigging to be put up in case of need.”¹²¹ Ericsson then dashed off a letter to Cornelius Bushnell authorizing the Battery’s primary financial backer to “amend and complete my specifications of an impregnable floating battery, in accordance with any request of Commodore Smith.” Ericsson added that he was ready “to comply with any modification he [Smith] may see fit.” To Smith, he wrote that “Messrs. Winslow and Griswold from Troy” were hard at work executing “the contract for building the battery.”

Winslow and Griswold were the same gentlemen with whom Bushnell had worked on the railroad extension project before the war. He now turned to them for assistance in the two ironclad contracts in which he was involved. John Flack Winslow was not only managing partner of the Albany Ironworks he was also an investor in the Rensselaer Ironworks—both firms would be sub-contracted to supply the angle and bar iron and the spikes and bolts needed to assemble Ericsson’s ironclad. John Griswold, with controlling interest in the Rensselaer Ironworks, oversaw the project’s complex financing, and navigated the political waters in which the project was already embroiled.¹²² Winslow, Griswold and Bushnell also put up seed money in return for a quarter interest in the enterprise and an equal share in any later Ericsson ironclads. There was no written agreement

¹²¹ Captain John Ericsson to Commodore Joseph Smith, 21 September 1861, Naval War Records, Bureau Files, Vol. 2600, page 5, Record Group 45; Naval War Records, Bureau Files, Vol. 2600, Page 23, National Archives Building, Washington, DC.

¹²² Elected mayor of Troy in 1855, he became a congressman in 1862. Winslow and business partner Griswold would later be instrumental in bringing the Bessemer process of iron working to America, the two men holding the patent to the process.

regarding shares between the four. Winslow recalled that “it was simply a verbal agreement and nothing more....”¹²³

Ericsson had claimed he could deliver an ironclad in 90 days, but Ericsson had already been hard at work even before the contract was signed on October 4, 1861. Ericsson himself, confident that nothing would go awry with the negotiations, had already begun work on the engine which would power his gunboat. He hastened to add that the government had no need to worry about his over eagerness to begin the project, for the engine “will do for driving our propeller vessels should it not be wanted for war purposes.”¹²⁴ Thus the vibrating side-lever engine was already taking shape at Delamater’s foundry. To further streamline the construction, Ericsson chose to significantly modify his original plans. A conventional pair of Dahlgren smoothbore guns in the turret replaced the steam-powered gun and torpedo he had hoped for. The globular cupola soon became a cylindrical turret, and the sloping deck became a nearly flat deck—just as unconventional, but much easier to construct.

Still wary of Ericsson, navy officials wanted to make sure that he and his partners would bear all the risk if the ironclad project failed. The contract drawn up for Ericsson’s “Iron Clad Shot-Proof Steam Battery” gave the Navy ample opportunity to get out of paying for the ship. The Navy’s description of the

¹²³ Letter from John Flack Winslow to James Swunk, September 1891, reprinted in Francis B. Wheeler, *John Flack Winslow and the Monitor*, (New York: Francis B. Wheeler, 1893), 53-4.

¹²⁴ Captain John Ericsson to Commodore Joseph Smith, 27 September 1861, with enclosure to Cornelius Bushnell, 23 September 1861, Naval War Records, Bureau Files, Vol. 2600, page 23, Record Group 45; National Archives Building, Washington, DC.

contracted vessel also showed a stubborn adherence to old technology and a lack of confidence in Ericsson's radical vision.

The contract with the Navy, dated October 4, 1861, had few surprises. For the Navy's part, officials provided Ericsson with an additional ten days to build his gunboat. Ericsson had claimed that he needed ninety days – the Navy offered one hundred. In that time, Ericsson was to build an

Iron Clad Shot-Proof Steam Battery of iron and wood combined on *Ericsson's* plan; the lower vessel to be wholly of iron and the upper vessel of wood; the length to be one hundred and seventy-nine (179) feet, extreme breadth forty-one (41) feet, and depth five (5) feet or larger if the party of the first part shall think it necessary to carry the armament and stores required, the vessel to be constructed of the best materials and workmanship throughout, according to the plan and specifications hereunto annexed forming a part of this contract ¹²⁵

The contract acknowledged Ericsson's considerable experience with ship design, unsurprising given its principal authors – John Griswold, John Winslow, and Cornelius Bushnell. Items which Ericsson had mentioned to Smith, and which had been in the original advertisement appeared, including the "*Masts, Spars, Sails and Rigging.*" This rigging was far more substantial than the "temporary rigging ...in case of need," however. The contract specified that the rigging must be of "sufficient dimensions to drive the vessel at the rate of *six knots* per hour in a fair breeze of wind." Yet in all of Ericsson's letters written to Smith and Bushnell concerning the contract, Ericsson makes no mention of his dismay about the robust nature of the rigging.¹²⁶ Ultimately, though Ericsson himself had first mentioned the possibility of

¹²⁵ NARA RG45; Box 49 file 1, Naval War Records, Bureau Files, Vol. 2600, National Archives Building, Washington, DC.

¹²⁶ The documentary record is at odds with James Tertius deKay's assertion that Gideon Welles "allowed his staff to put together a remarkably mean-spirited contract for the ship, a business

rigging, it appears that he ultimately chose to ignore that particular stipulation in the contract, and the topic did not come up again.

The changes to the contract upon which the Navy insisted included the stipulation that Ericsson, Bushnell, Winslow and Griswold assume the entire financial risk of the undertaking. In this respect, one former *Monitor* crewman recalled, the contract for the ironclad was “a veritable iron clad too.”¹²⁷ The document read, “When the work shall have progressed to the amount of Fifty thousand dollars in the estimation of the Superintendent of the vessel on the part of the United States, that sum shall be paid to the party of the first part,” in this case John Ericsson as principal and John Griswold, John Winslow and Cornelius Bushnell as sureties. Thereafter, the syndicate would receive similar payments, minus twenty-five percent held in reserve, which would “be retained until after the completion and satisfactory trial of the vessel, not to exceed ninety days after she shall be ready for sea.”¹²⁸

Very little in the contract was unexpected, and, as one *Monitor* crewman later recalled, “the risks were readily and most gladly accepted.”¹²⁹ Yet there was one provision that had been in the early drafts of the contract that gave John Winslow

document that was totally out of keeping with the enthusiastic support he had shown Ericsson only a few days before.” Any “harsh terms and arbitrary nature of the document” were penned with the full knowledge of the backers. In deKay, *Monitor: The Story of the Legendary Civil War Ironclad and the Man Whose Invention Changed the Course of History*, Walker and Company, New York, 1997, 95. The contract itself is held at the National Archives and Records Administration, Washington, DC.

¹²⁷ David Roberts Ellis, ‘The Story of the Monitor,’ unpublished manuscript, 4.

¹²⁸ Contract between Gideon Welles, John Ericsson, John Griswold, John Winslow and Cornelius Bushnell, October 4, 1861, MS341, Series II, The Mariners’ Museum Library and Archives.

¹²⁹ David Roberts Ellis, ‘The Story of the Monitor,’ unpublished manuscript, 5. Many crew members were intimately acquainted with the details of their vessel’s construction, some having participated in parts of the building process, while others were stationed on the receiving ships in Greenpoint, Brooklyn while the construction was going on. and post-war were in great demand on the lecture circuit.

pause. The Navy would only consider the vessel acceptable – and thus pay the investors the full amount – if it was successfully tested under enemy fire for ninety days after she was ready for sea. While on the surface this was a reasonable request, there were concerns about its interpretation. Cornelius Bushnell explained to Joseph Smith:

Captain Ericsson, Griswold, and myself were better pleased with the wording of your contract for Ericsson's Battery, than with the one executed and sent forward, but Mr. Winslow had an idea that the three months, in the last clause might be construed by other parties than yourself, as allowing three months to test the vessel in active service under the enemies fire before the Government would be justified in paying for, or accepting the same.¹³⁰

This addition to the contract and the attendant risk the investors would have to bear proved almost too much for Winslow, who considered withdrawing his support. Bushnell remained calm, as there were other investors waiting in the wings – or so he reported to Smith. But Bushnell and Ericsson both desired to keep Winslow within the fold. Ericsson, for his part, agreed with the stipulation, but insisted that he would support the contract revision for the sake of retaining Winslow. Ericsson was supremely confident in his design. He wrote to Smith on October 2, "It is hardly necessary for me to say that I deem your decision to test the impregnable battery under the enemy's fire, before accepting, perfectly reasonable and proper. If the structure cannot stand this test, then it is indeed worthless."¹³¹ Discussions between Bushnell, Ericsson, Griswold and Winslow ensued and Ericsson was pleased to report on October 4, that "Mr. Winslow after mature

¹³⁰ Bushnell to Smith, September 28, 1861. NARA RG 45, Box 49, file 1, Naval War Records, Bureau Files, Vol. 2600, Page 28, National Archives Building, Washington, DC.

¹³¹ Ericsson to Smith, October 2, 1861. NARA RG 45, Box 49, file 1. Naval War Records, Bureau Files, Vol. 2600, Page 36., National Archives Building, Washington, DC.

reflection, now admits the propriety of your testing the battery under the enemy's fire."

To save time, nine contractors and an unknown number of subcontractors worked simultaneously in at least seven different cities to produce the components for assembly at Continental Ironworks in Greenpoint, Brooklyn. The plan submitted by Continental's young owner, Thomas Fitch Rowland, may have been rejected by the Ironclad Board, but his services were needed nonetheless. It was an incredibly complex manufacturing process—but then, this would be no ordinary ship. A member of the *Monitor's* crew would later recall, "Thus the war for the moment was being carried on not at Hampton Roads but at Norfolk and Brooklyn, and the victory was to depend, not only upon the bravery of the officers, but upon the speed of the mechanics. It was a race of constructors...."¹³²

The industrial capabilities of the Union made it possible to even consider building an experimental vessel in 100 days. Ironworks throughout New York State worked to manufacture the raw and finished materials needed to build Ericsson's Battery. Yet New York boasted no foundry capable of rolling the 192 plates needed for the most important feature of the vessel—the rotating gun turret. The turret was composed of eight layers of one-inch-thick iron.¹³³ The thickness of the iron was not an issue for the New York companies; rather, the problem was the nine-foot length of each plate. The only foundry within the Union capable of rolling plates up to ten feet in length was in Baltimore, Maryland—Abbott and Sons in the Canton area of

¹³² David Roberts Ellis, 'The Story of the Monitor,' unpublished manuscript, 9,

¹³³ Drawings done by draughtsman Charles McCord in October 1861 indicate a thickness of 15/16 rather than one inch. From Peterkin, *Drawings of the U.S.S. Monitor*, 448.

the city. Thus, Thomas Rowland of Continental Ironworks, with Charles Whitney acting as his agent, subcontracted with Abbott to make the plates. Horace Abbott, originally from Massachusetts, had purchased the Canton Ironworks foundry in Baltimore in the 1830s because of its proximity to both marine and rail transport. Abbott maintained an office in New York in order to take advantage of lucrative contract opportunities in the North, however.

Table 1 shows the principal companies involved in the *Monitor's* construction along with the elements they supplied. However, there were many more companies scattered throughout the northeast that all had a part to play in rushing the vessel to completion. Receipts from John Griswold's papers reveal the names of several more companies who supplied services or smaller items, and makers marks found by Mariners' Museum conservators have added new information to the list. (Table 2)

Company	Supply to Monitor	Location
Holdane & Company	125 tons armor plate, bar and angle iron	New York City
Albany Ironworks	Angle & bar iron, spikes, bolts – hull plates, floor plates, deck plates, midships bulkhead	Troy, NY
Rensselaer Ironworks	Angle & bar iron, spikes, bolts – hull plates, floor plates, deck plates, midships bulkhead	Troy, NY
Niagara Steam Forge	Port stoppers	Buffalo, NY
H. Abbott & Sons	Armor plate for turret	Baltimore, MD
Novelty Ironworks	Assembled turret	New York City
Delamater Ironworks	Main Engine, boilers, propeller, other machinery	New York City
Clute Brothers Foundry	Turret engines, gun carriages, anchor windlass, engine room grates	Schenectady, NY

Continental Ironworks	Assembled vessel	Greenpoint, NY
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Table 1: Principal *Monitor* companies¹³⁴

Company	Supply to Monitor	Location
James Gregory	brass valves	New York City ¹³⁵
Eagle Steam Saw Mill	timber	Greenpoint, NY
Black & Secor	screw bolts	New York City
Thomas Peterson	installed boilers	Greenpoint, NY
H.R. Worthington	supplied bilge pumps	New York City
George A. Kingsland	carpenter, built ship house	Greenpoint, NY
E.W. Barstow	anchor and anchor chain	New York City
Bussing, Crocker & Co	screws and bolts, insurance	New York City
Chrisman & Durbin	iron plate (boilermakers?)	Jersey City, NJ
E. Bootman & Son	painters (31 Corlears St.)	New York City
B.K. Dickerman	ships furniture	New York City
Wm. D. Andrews & Brothers	unknown articles	New York City
Benjamin Fike	unknown	New York City
E.S. Hidden/E. Williams	Deck lights? (registered patent afterward for ironclad deck lights)	New York City
J.W. Atwater	unknown service January 30	New York City
Thomas Shepard	unknown service	New York City
E.V.	possibly china and ceramics, other	New York

¹³⁴ William Still, *Monitor Builders: A historical study of the principal firms and individuals involved in the construction of USS Monitor* (Washington, DC: National Maritime Initiative, Division of History, National Park Service, Dept. of the Interior, 1988).

¹³⁵ Discovered on a brass valve, recovered in 2001. Discovered mark on a second brass valve in October 2011.

Haughwout & Co.	domestic furnishings	City
Smith, Hegeman & Co.	poss. Iron	New York City
Victor Giroud	Engine room clock	New York City ¹³⁶
John Powers	Tri-cock valve assemblies on main steam engine, manometers	New York City ¹³⁷
William Sewell	Manometers	New York City

Table 2: Additional *Monitor* suppliers¹³⁸

¹³⁶ Discovered in 2008 on the inner workings of the engine room clock, recovered in 2001.

¹³⁷ Discovered in 2011 on the valve assemblies and manometers, recovered in 2001.

¹³⁸ Unless otherwise noted, information is derived from the USS *Monitor* Design and Construction Collection, MS335, The Mariners' Museum Library and Archives, Newport News, VA.

One hundred days was a short time in which to construct this new vessel, however, and Commodore Smith had been counting each one down. The engine, already under construction before the contract with the navy was signed, was one of the first systems to be successfully tested on the vessel. By late December of 1861 the engine had been installed inside the hull of the ship, and on December 31, 1861, Alban Stimers wrote to Commodore Smith that “the engines and propeller of the Ericsson Battery have been operated by steam this day, and ...their performance was highly satisfactory.”¹³⁹ Construction was moving along, but clearly not fast enough to satisfy Smith. Under pressure to deliver an ironclad vessel to Hampton Roads before the *Merrimack* could be completed, Smith was clearly anxious. His communications to Ericsson and Stimers, which had been friendly yet formal through most of the construction became more terse. On January 14, Smith sent just a single sentence to Ericsson: “The time for the completion of the shot-proof battery according to the stipulations of your contract, expired on the 12th instant.”¹⁴⁰ The following day, Smith sent an equally brief communication to Lieutenant John L. Worden, who had recently been released by the Confederates in a prisoner exchange. Worden had the dubious distinction of being the first prisoner-of-war of the conflict, for his role in delivering the orders to reinforce Fort Sumter to the commanding officers in Pensacola. In fragile health as a result of his captivity, he nonetheless had been tapped for a special assignment. Smith’s letter read: “I enclose

¹³⁹ Stimers telegram to Smith, December 31, 1861, NARA RG 45: Naval War Records, Bureau Files, Vol. 2601, 112., National Archives Building, Washington, D.C.

¹⁴⁰ Smith telegram to Ericsson, January 14, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2634, 153., National Archives Building, Washington, D.C.

a copy of the contract with Captain J. Ericsson, 95 Franklin Street, New York, for an ironclad battery, for your information and government as commander of said battery.”¹⁴¹ The vessel may not have been completed, nor had she been named, but she had a commanding officer.

Her name was not long in coming, however. John Ericsson, as the titular owner of the ship until she proved herself successful under enemy fire, had the honor and responsibility of naming his ironclad. He chose the name *Monitor* in order to convey a sense of both observation and warning. In a letter dated January 20, Ericsson wrote to the Assistant Secretary of the Navy, Gustavus Vasa Fox:

New York

January 20, 1862

*Gustavus V. Fox
Assistant Secretary of the Navy
Washington, D.C.*

Sir:

In accordance with your request, I now submit for your approbation a name for the floating battery at Greenpoint. The impregnable and aggressive character of this structure will admonish the leaders of the Southern Rebellion that the batteries on the banks of their rivers will no longer present barriers to the entrance of the Union forces. The iron-clad intruder will thus prove a sever monitor to those leaders. But there are other leaders who will also be startled and admonished by the booming of the guns from the impregnable iron turret. "Downing Street" will hardly view with indifference this last "Yankee Notion," this monitor. To the Lords of the admiralty the new craft will be a monitor, suggesting doubts as to the propriety of completing those four steel clad ships at three and a half million apiece. On these and many similar grounds, I propose to name the new battery, "Monitor."

Your obedient servant,

¹⁴¹ Smith to Worden, January 15, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2634, 154. , National Archives Building, Washington, D.C.

By January 24, 1862, the guns were still not on board and John Worden indicated that while he would be able to sight them within the turret, it would take three or four days to do so properly. The first gun arrived on the 25th and Smith was reassured that the launch of the *Monitor* would take place on the 29th of January if the weather and tide cooperated.¹⁴³ Ultimately, the launch occurred on January 30. Only a shell of the turret was on board—one quarter of the plates—nor was all the coal or stores on board. So the vessel floated high, but more importantly than that to most observers was the fact that she floated at all. Both Stimers and Ericsson sent telegrams to Smith informing him of the successful launch. The *New York Times* reported on the 31st: “Yesterday morning, the Ericsson battery was launched from the ship-yard of Mr. T.F. ROWLAND, Greenpoint. L.I. Notwithstanding the prognostication of many that she would break her back or else swamp, she was launched successfully.”¹⁴⁴ The remainder of the turret was brought on board on the 31st and the work on the battery was an around-the-clock venture. A private communication from Ericsson to Smith reveals a vulnerability in the imperious Swede not normally seen. He admitted to Smith that he was worried about the amount of freeboard the new ship would expose. He had calculated eighteen inches of freeboard, but admitted to Smith that “I do not see how we ever can get down so

¹⁴² Ericsson, *Contributions*, pp 493-494. Bushnell, upon receiving word that the vessel would be called *Monitor* suggested to Smith that the Mystic River ironclad, initially called *Galena*, should be named *Retribution* instead. Then Navy kept the name *Galena*.

¹⁴³ Ericsson to Smith, January 24, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2602, 47. National Archives Building, Washington, D.C.

¹⁴⁴ *New York Times*, January 31, 1862

deep as not to show 21 inches of vessel out of the water.”¹⁴⁵ Stimers was not concerned, however, and with the distribution of coal and ordnance, the vessel did display the eighteen inches that Ericsson had predicted. Smith added to Ericsson’s stress by thanking him for his letter, and adding “She is much needed **now**.”¹⁴⁶

Though Smith took an intense interest in the vessel, he had not actually seen her as his office was in Washington, D.C. Therefore, his instructions to Worden on February 6, 1862 were based on his knowledge of the contract language which required certain features to be present on the vessel. He instructs Worden to “inspect her outfits; see to the rigging, sails, ground tackle, boats, stores, and to the vessel generally.” Smith further reminded Worden that the vessel would not be accepted by the Navy until she had proved herself under fire, after which, Worden was to “report in full upon her performance, as the acceptance of the vessel will depend principally upon your certificate.”¹⁴⁷ While there is no indication of Worden’s reply, Smith reminded him a week and a half later of the necessity of the vessel to carry “spars and sails which shall propel her six sea miles per hour with a fair wind.”¹⁴⁸

The most defining feature of the newly named *Monitor* was her rotating gun turret, which was first put into operation on February 17, 1862. Both Alban Stimers and John Flack Winslow sent their observations to Smith, with Stimers reporting

¹⁴⁵ Ericsson to Smith, January 31, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2602, 58. National Archives Building, Washington, D.C.

¹⁴⁶ Smith to Ericsson, February 3, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2634, 171. National Archives Building, Washington, D.C.

¹⁴⁷ Smith to Worden, February 6, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2634, 178. National Archives Building, Washington, D.C.

¹⁴⁸ Smith to Worden, February 13, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2634, 186. National Archives Building, Washington, D.C.

that the turret turned at two and a half revolutions per minute under twenty-five pounds of steam.¹⁴⁹ On February 25, 1862, Lieutenant John Worden made the first entry in his new vessel's logbook. It read:

Remarks 25th February 1862

Comes in with fine weather

At 3 o'clock P.M.

Received crew from Receiving Ship

North Carolina

Vessel put in commission

by Capt. Almy

This day ends with

clear cold weather¹⁵⁰

The US Navy had taken provisional possession of Ericsson's *Monitor*. A volunteer crew, culled from the men awaiting assignment on board the receiving ship *North Carolina*, stepped on board their new home that same day.

Just what was this vessel that now resided at the Brooklyn Navy Yard? She was a strange craft, nearly a submarine, with only her signature turret visible at any distance. It was the turret that defined her. John Ericsson, though not a humble man, never claimed credit for inventing the turret. He attributed the original concept for a round defensive turret to the ancient Greeks. His associates in the construction of the new battery, however, were worried about possible infringement on a more recent turret design. Theodore Timby, an American inventor, held a patent on the turret concept. Born in Dover, New York, in 1822, Timby first conceived of the

¹⁴⁹ Stimers to Smith, February 17, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2602 87. National Archives Building, Washington, D.C.

¹⁵⁰ Logbook of the USS *Monitor*, February 25, 1862, 1.

rotating gun turret when he was nineteen-years-old. Between 1841 and 1848 Timby presented his plans to a variety of US government officials, including Mississippi Senator and Smithsonian regent Jefferson Davis, but no one in the government showed any active interest. In 1856 Timby sought an audience with Emperor Napoleon III of France to promote his turret concept but the emperor was also uninterested. Concurrent with Timby's efforts, Cowper Coles, a captain in the British Royal Navy had put his own turret design into action near Sebastopol. The protective turret sat atop a raft and worked well enough that Coles drafted plans and applied for a patent as early as 1859.¹⁵¹

These previous turrets and their patents had not gone unnoticed.

Recognizing that Timby had a patent, in 1862 Ericsson's financial backers arranged to pay Timby a royalty for every turret constructed on an Ericsson vessel. Coles' patent, held in Great Britain, was simply ignored by Winslow, Bushnell, and Griswold. Timby never received all of the money due to him, however, and long after the war, newspaper articles continued to appear which sought to set the record straight about Timby's invention of the turret.¹⁵²

¹⁵¹ *Specification of Cowper Phipps Coles: Apparatus for Defending Guns, &c.*, 1859 Coles continued to perfect his creation and in 1866 the Royal Navy agreed to the construction of a low-freeboard turreted vessel called HMS *Captain*. Unfortunately, the need for auxiliary sails and rigging to make the *Captain* a seagoing vessel also made her unstable – and led to the death of Coles, who went down with his invention in 1870.

¹⁵² *New York Times*, February 16, 1887, 2.; *Brooklyn Daily Eagle*, June 24, 1900, 5.; Public interest in the war surged during the 20th anniversary of the conflict in the 1880s. Popular magazines such as *Century* published articles written by the participants in famous battles, which sparked this new interest. The deaths of Ericsson, and others associated with the Monitor also fueled this resurgence in interest. Interestingly, John Flack Winslow's memorial booklet, published after his death in 1892 contains a large section devoted to the exoneration of Theodore Timby and his contribution to the *Monitor*. In Francis B. Wheeler, *John Flack Winslow, LL.D. and the Monitor*, (Poughkeepsie, NY: Francis B. Wheeler, 1893), 54-66.

Composed of 192 one-inch-thick iron plates, the *Monitor's* turret stands nine feet high and has an external diameter of twenty-one feet, four inches. The plates, to be bolted and riveted together in eight concentric layers, were rolled at Abbot & Co. in Baltimore, Maryland, and shipped to Brooklyn for assembly. Conservators at The Mariners' Museum have discovered Roman numerals engraved on the tops of the recovered turret plates but have yet been able to determine whether these numbers were placed on the turret plates at Abbott for use by crews in Brooklyn for reassembly, or if they served another purpose.

A central shaft supported the turret from below, and provided the means by which the turret could be raised. This shaft rested on a wedge-shaped "key" which was drawn inward by means of turning a large bolt with a wrench. When fully engaged, the key could raise the turret two and $\frac{3}{4}$ inches, leaving enough space between the turret and the brass ring on which it sat for the turret to turn freely.¹⁵³ The innermost course of iron plate in the turret sat $\frac{1}{2}$ inch lower than the other seven courses, thus concentrating the turret's weight on a smaller area and producing a watertight seal. Inside the turret, Ericsson designed a set of diagonal braces which could be tightened with large turnbuckles. This bracing was needed to keep the turret from sagging on its central shaft. The original plans for the turret indicated only one set of these diagonal courses, which ran from the center of the roof of the turret diagonally down to points in the deck to the starboard and port. When the turret was recovered in 2002, archaeologists discovered a second set of diagonal braces running fore and aft. Because this second set of braces does not

¹⁵³ Peterkin, *Drawings*, 472.

appear in the presentation plan of the *Monitor* (presented to Continental Ironworks owner Thomas Fitch Rowland following the completed construction of the vessel), this has led NOAA and Mariners' Museum staff to believe that these braces were a last-minute addition before the vessel left New York.

The turret was powered by two small steam or "donkey" engines mounted directly below the deck beams, each at a 45-degree angle to the centerline of the vessel. As initially designed, a crank handle mounted on the starboard bulkhead of the turret controlled the starting, stopping and reversal of the turret. This appears to have been the mechanism in use during the March 9, 1862 battle, based on official reports, but no archaeological evidence of this mechanism exists within the turret. A brass plate housing a lever and bearing the words "Left" "Stop" and "Right" has been excavated, however, and may indicate a later change in the turret mechanism.

Two gunport shutters dominated the forward bulkhead of the turret, covering the scalloped gunports. These massive, coffin-shaped structures were pierced with holes, to allow the shafts of gun tools to pass through the shutters so that gun crews servicing the guns would not be exposed to potential enemy fire. The cylindrical nature of the turret dictated that each shutter would have to swing inwards, towards the other by means of block and tackle, effectively allowing only one gun to be fired at a time.¹⁵⁴

The *Monitor* was armed with two XI-Inch Dahlgren shell guns that were located inside the revolving gun turret. The cast iron guns were over thirteen feet

¹⁵⁴ This deficiency was fixed on April 17, 1862. The log indicates that during the first dog watch (4 - 6 p.m.) that the crew "succeeded in getting both guns run out at once." *Monitor* log, April 17, 1862 entry, 42.

long with a bore diameter of eleven inches. Each gun weighed approximately nine tons. Rear Admiral John A. Dahlgren designed the guns, numbers 27 and 28, which were manufactured at Robert P. Parrott's West Point Foundry in Cold Springs, New York, in 1859. Though guns had been ordered for the vessel, delays in construction had allowed other naval officers the opportunity to appropriate them. Fearing that the lack of designated guns for the vessel would absolve the contractors from the strictures of the contract, Smith ordered that guns be taken from another vessel to be used on the *Monitor*. Thus, guns 27 and 28 were removed from the gunboat *Dacotah* in order to arm the *Monitor*.¹⁵⁵

Though he wanted to equip his vessel with these powerful guns, Ericsson faced a major design challenge because of them. Physics dictated that a thirteen-foot-long gun needs an equal amount of room for recoil. However, the turret was only twenty-feet in diameter in its interior. Though Ericsson initially wished to saw off the muzzles of the guns to accommodate them within the turret, Dahlgren himself objected to the danger this could impose upon the gun crews within the turret. Thus, Ericsson was required to design two gun carriages that could arrest the recoil motion of the guns within the small interior of the turret. These carriages, built of iron, wood and brass components, each had a friction gear that allowed a series of iron fins on the underside clamp together on wooden friction slides. Wheels mounted vertically were paired with horizontal rollers to slide on the iron

¹⁵⁵ Smith telegram to Navy Department, Washington DC, January 21, 1862, NARA RG 45: Naval War Records, Bureau Files, Vol. 2602, 41. National Archives Building, Washington, D.C.

rails the carriages were mounted upon.¹⁵⁶ The friction gear, properly employed, was capable of arresting the recoil of the gun safely.

Thin sheets of iron served as mantelets, or shields to keep the nuts and bolts holding the turret plates together from becoming shrapnel within the turret while under fire. These mantelets gave the interior of the turret a smooth appearance. Whitewash on the interior surfaces took advantage of available light, which streamed in through the railroad rails that made up the roof overhead. These rails could be covered with a series of thin iron plates perforated with holes to provide ventilation while under fire or in heavy weather. Tubes attached to the ventholes on the two XI-inch Dahlgren guns within the turret allowed the noxious fumes of the guns to be vented out under these conditions.

The turret was designed to have up to twenty four awning stanchions attached to its roof to provide shade and shelter from the elements, as well as a rope lifeline to keep the crew from tumbling off in heavy seas. Extant photos of the *Monitor*, taken in July 1862, show twelve stanchions deployed to hold the canvas awning, which was hoisted up a central support to create an umbrella-like effect. This awning, and the stanchions, could be easily removed and stowed below when the ship went into battle.

Two sliding hatches for external access were in the roof above, and hatches for access from below were in the wooden decking of the turret. In order to access these hatches, the turret had to be turned to align these hatches with openings in

¹⁵⁶ Peterkin, *Drawings*, 525-526.

the deck below. A ladder attached to the outside of the turret allowed access to the weather deck from above.

The vessel itself was 173 feet in length and 41'6" in the beam, with a 10'6" draft. Her upper hull (or deck) was wooden, clad in two layers of thin iron plate, and her lower hull and keel were constructed of iron plate and angle iron bolted or riveted together. The weather deck consisted of two layers of ½-inch-thick iron plate spiked to a backing of 7- by-14-inch pine planks. At the bow and stern the deck formed overhangs, which protected the anchor well at the bow and the propeller and rudder assemblies at the stern. Both anchor and propeller could be accessed by removing plates on the main deck if in need of service.

Besides the turret, the most striking feature on the weather deck of the *Monitor* was her rectangular iron pilothouse. Within this small structure, the commander had only a ½-inch slit through which to view the world. Ericsson had located the pilothouse at the bow about fifty feet forward of the turret. Unfortunately, this arrangement effectively limited the *Monitor's* ability to fire her guns dead ahead. Ericsson would later admit that "excepting the omission to place the pilot-house on the top of the turret, the original *Monitor* was a perfect fighting machine."¹⁵⁷

Though a machine, the *Monitor* would be the home to between fifty-eight and sixty-three men throughout her career. The accommodations for these men, however, were not the norm for a traditional naval vessel. On every warship in the US Navy, a certain physical hierarchy obtained. The commanding officer lived

¹⁵⁷ Mindell, *War, Technology and Experience*, 75.

furthest aft, in the largest and finest quarters. Just forward of him, his officers found their accommodations. Living amidships were the petty officers and the aptly named young “midshipmen” and the common sailors on the orlop or gun decks, and in the forecastle, or “before the mast.”¹⁵⁸ However, because part of the ingenuity of the design of the *Monitor* lay in the placement of all systems save ordnance below the waterline, the engine had to be placed aft, in the space traditionally allotted to the commanding officer. Thus, Ericsson threw naval tradition aside in his design and placed the captain’s quarters as far forward as possible, just abaft the anchor well and pilothouse. Officers would live abaft the captain in small, yet well-appointed cabins to the starboard and port of the officers ward room. A wooden bulkhead would separate these officers from the berth deck where the crew and a few unfortunate junior officers lived. Ericsson was aware that this unorthodox layout might be a difficult thing for seasoned officers to bear. Therefore, he outfitted the officers quarters quite elegantly, and at his own expense.

The presentation plan of the *Monitor* shows some detail of the interior of the officers’ quarters, including elaborately decorated wood paneling with darker wood trim. But to get a clearer picture of the absolute Victorian excess that prevailed within these small quarters, it is necessary to turn to the writings of the very men who lived there. William F. Keeler, the paymaster of the vessel, provides the most detailed description of the area. A 40-year-old businessman from Illinois, Keeler became acting assistant paymaster on the *Monitor*, where he kept the ship’s accounts, ordered provisions, and issued pay to the crew. He was a keen observer

¹⁵⁸ Lavery, *Nelson’s Navy*, 207.

with free time on his hands, and he wrote 79 letters to his wife, Anna, in 1862 alone. These letters now offer us a window on the world of the *Monitor*.

Hoping she would be able to picture his daily life, Keeler sent a sketch to his wife. He wrote, "Here is a plan that will give you a little idea [of how my room looks] - A is my desk, B is the door let down to write on, the iron chest is placed underneath."

Keeler continued, "C is the door, D is the shelf in which is my washbowl, underneath is another shelf in which holes are cut (remember that at sea nothing is placed on a shelf, but in it) for my slop jar... &c &c all of nice white ware with '*Monitor*' ... in gilt letters."

No detail was too small for Keeler: "Over the wash bowl is a small shelf for hair brush, comb &c. ...[and] a large looking glass in a gilt frame. The floor ... is covered with oil cloth, ... a tapestry rug & ... a fine, soft goat's hair mat." Keeler continues: "F.F. are two closets,... but they are so high up & so far back that it is unhandy to get at them. Under the berth are four drawers. [They] ... are all of black-walnut, the curtains are lace and damask, or an imitation I suppose."

To improve ventilation for the wardroom and the cabins that flanked it, Ericsson designed the space with short partitions and doors with louvered panels. Unfortunately, the features that allowed air to circulate also allowed voices to carry. Keeler complained, "While writing now, every word spoken ... around the ward room table is as audible as if they were seated by my elbow." Poor privacy-starved Keeler wrote in March 1862, "I had to laugh when [you said] ...you hope I will ... read it in quiet, for in the cabin were [several men]... discussing iron clad ships...

while another ...[was] reading in a loud tone the 'personals' of the 'N.Y. Herald' interspersed with intended witticisms." ¹⁵⁹

It was difficult to provide natural light within the vessel. Therefore Ericsson installed a series of oil lanterns every 6 to 9 feet along the port and starboard sides of the vessel. Elegant brass sconces to hold them were purchased ready-made from suppliers in New York such as E.V. Haughwout in lower Manhattan. William Keeler described the lighting in the staterooms: "The only objection is they are too dark. I have all my writing to [do] by candlelight & lamps are always burning in the ward room. If the sun ever shines again it may light us up a little better." A series of decklights, 6-inch-diameter holes set into the deck with thick glass in iron frames, let light into each stateroom. The wardroom had two of them. The decklights were often covered with water when the deck was awash, but the light got through anyway and, according to Keeler, "when the sun shines bright it is sufficiently light to read and write without difficulty."¹⁶⁰ The decklights could be opened to allow in fresh air when conditions allowed, and at least once, Keeler found his decklight used as a mailbox when a fellow officer delivered Keeler's mail through the opening.¹⁶¹

In contrast to the damask and lace of the officers' quarters, the berth deck was a utilitarian space of 16 feet by 25 feet, stretching from the staterooms to a point beneath the turret. This was where the crew of about 49 men slept in hammocks, taking turns keeping watch. Oil lamps provided most of the light, for there were no deck lights to let daylight into the crew's quarters. When the upper

¹⁵⁹ Keeler letter to Anna, March 5, 1862 in *Aboard the USS Monitor*, 26.

¹⁶⁰ Keeler letter to Anna, March 14, 1862 in *Aboard the USS Monitor*, 48.

¹⁶¹ Keeler letter to Anna, August 19, 1862 in *Aboard the USS Monitor*, 210.

hatches were opened, the crew enjoyed more light and air. Storerooms, including the powder magazine and the shell room, bordered the berth deck. Sitting just 20 feet away from Keeler's elaborate cabin, Fireman George Geer wrote to his wife, Martha: "I have for my desk a water pail turned upside down...." In another letter, Geer apologized for not writing more, saying, "If you could see how I am writing this you would not expect a very long one. I am on the Hammocks, where I cannot sett up strait and can hardly move my arms."¹⁶²

Another feature of the *Monitor* was a concession to the men who would have to live in this machine. Ericsson equipped his vessel with below-the-waterline toilets, designed to keep the men safe from both the enemy and the elements when nature called. These "heads," or toilets bore no resemblance to any marine head that had come before: these were the first flushing toilets ever installed below the waterline on a ship. Ericsson's system of a pump and waste tube allowed waste to be safely discharged into the sea. The men found it important to follow the precise operating directions; this toilet could turn into an unwelcome bidet if the proper sequence was not followed, which the ship's first surgeon found out, much to his embarrassment.¹⁶³ The commanding officer had a private head in his cabin, while the officer's head was located amidships on the port side. The crew shared two heads located amidships on the starboard side.¹⁶⁴

¹⁶² Geer letter to Martha, April 25, 1862, MS10, The Mariners' Museum Library and Archives

¹⁶³ Copy of Samuel Dana Greene letter to his mother, March 14, 1862, John Worden Papers, MS16, Series 1, The Mariners' Museum Library and Archives

¹⁶⁴ USS *Monitor* Presentation Plan, Thomas F. Rowland Collection, 1861-1903: MS376, The Mariners' Museum Library and Archives, Newport News, VA.

A central iron bulkhead divided the berthdeck from the galley and the engine room. The engine, its attendant boilers and condenser, and the two small Worthington bilge pumps took up much of the aft half of the vessel. On either side of the engine, large iron coal bunkers held the eighty tons of hard anthracite coal the vessel was able to carry—forty tons per side.

The design of the vessel's 400 horsepower engine, referred to as a vibrating side-lever engine, was a favorite of John Ericsson's and had proven successful in his earlier ships. Before Ericsson developed this engine design in the 1840s, steam engine pistons had operated in a vertical motion and had taken up a great deal of space. In a warship, these engines were vulnerable to enemy fire since they rose above a vessel's waterline. Ericsson's design allowed the pistons to move horizontally. This meant that the height of the equipment was greatly reduced and the new engine could be mounted below the waterline—and safe from enemy fire. Sitting on a raised, diamond plate floor, the engine dominated the space, and left very little room for movement around it. Small walkways allowed the engineers access to the brass oil cups that could be found attached to every part of the engine needing lubrication. Hard tallow, placed in the cups, would melt with the engine's heat and the liquid fat could drip in slowly.¹⁶⁵ Paint traces found on recovered pieces indicate that the engine room was very likely a colorful place. The diamond plating appears to have been painted a royal blue, while the engine may have been red or green. Bright brass pieces, including the steam gauge, the silver-faced clock and the elegantly curved brass reversing wheel dominated the face of the engine,

¹⁶⁵ This resulted in an engine room that likely smelled of bacon says *Monitor* engine expert, Rich Carlstedt, in a research presentation at The Mariners' Museum, Spring 2011.

along with the brass engine register. After cleaning the marine growth the register, conservators discovered that the face of this piece had the word "MONITOR" engraved on it in elaborate script, with the date 1862 engraved below the dials. This was the first object bearing the vessel's name to be recovered from the wrecksite.

On March 3rd, 1862, the *Monitor* was ready for her next sea trials. The logbook for that day read thus:

Remarks March 3/62

From Midnight to 4 Am. Weather light & clear wind from N

G Frederickson

From 4 to 8 AM. Wind & weather same

J. Webber

From 8 to Meridian weather thick from N.E. at 10 AM. A board of commission composed of Com. Gregory Chief Eng Garvin

Naval Cons Hart came on board to witness the trial trip at 10:30 AM hove up Anchor & started from yard under full head of steam & proceeded down Harbor in Tug Boat Rapid wind N.E.

Louis Stodder

From Meridian to 4 PM at 20 minutes past.

First of firing blank cartridges 2nd a stand of grape, 3rd with canister with a full charge of powder 2:15 with 30 lbs steam making 50 Revolutions turned with helm hard a starboard turned in 4 min 15 sec within a compass of 3 times her length & proceeded towards the yard against a strong ebb tide vessel going at the maximum speed of 6&1/4 knots an hour Greatest no of rev's attained 64

G Frederickson

From 4 to 6 PM thick rainy weather with strong N.E. wind Came (to) anchor at Navy Yard with 5 fathoms water & 20 fathoms of chain

J. Webber

From 6 to 8 PM Wind and weather same at 6 PM put L, Murray in irons

Louis Stodder

*8 to From 8 to Midnight thick rainy weather strong
N.E. wind At 9 PM released ward room steward at: 10 PM
Norman McPherson & John Atkins deserted
taking the ship's cutter & left for parts unknown G Frederickson
So ends this day¹⁶⁶*

The *Monitor* had been taken out for a test spin, quite literally, the morning of March 3. Turret turning, guns working, the new crew put her through her paces, steaming around in circles she “turned with helm hard a starboard ...in 4 min 15 sec within a compass of 3 times her length,” Master’s Mate George Frederickson had written while he stood the afternoon watch. Commodore Gregory, Chief Engineer Garvin and Naval Constructor Hart had come on board to observe this experimental vessel’s trial run. The undercurrent of this visit does not come through in the logbook entry, however. But given the events of a week prior, one can imagine John Ericsson’s head spinning just as surely as his turret over this visit.

It was originally on February 26 that a defect had been found in the steering gear. This was a defect that sent the *Monitor* “first to the New York side then to the Brooklyn & so back & forth across the river, first to one side then to the other, like a drunken man on a side walk, till we brought up against the gas works with a shock that nearly took us from our feet,” recalled Paymaster William Keeler.¹⁶⁷ It also kept the *Monitor* away from Hampton Roads a few more days until Ericsson could correct the problem.

The press stood by to report on what they had now dubbed “Ericsson’s Folly” and there were some naval personnel in the Naval Yard who intimated that they

¹⁶⁶ Logbook of the USS *Monitor*, March 3, 1862, 8.

¹⁶⁷ Keeler letter to Anna, March 4, 1862 in *Aboard the USS Monitor*, 21-23.

would have to pull the ironclad into drydock and install a rudder that they knew would work—a steering mechanism NOT of Ericsson’s design. But given that Ericsson still owned the vessel, Ericsson was not willing to allow this to happen. According to his biographer, William Conant Church, he turned bright red at the suggestion and roared “The *Monitor* is MINE, and I say it shall not be done. Put in a new rudder ! They would waste a month in doing that; I will make her steer just as easily in three days.”¹⁶⁸ The Navy observers were there to make sure that he had followed through with that boast.

But testing the new steering mechanism was not the only excitement that day. While the logbook reported that the guns were tested that afternoon, what is not reported is what actually happened during the test firing. As previously noted, the XI-inch Dahlgrens which were installed in the *Monitor*’s turret each weighed approximately 9 tons, fired a 165 pound shot and were thirteen feet long. Such a gun needs approximately twice its length for recoil room, or twenty-six feet. The turret, however, was only twenty-one feet in diameter.

The gun carriages within the turret were two of a kind, custom made for the *Monitor* and the *Monitor* alone. Friction gears tightened with a handscrew served to stop the recoil if operated properly. Unfortunately for Alban Stimers who was to demonstrate the working of the guns, Ericsson had not made the braking mechanisms uniform. As Stimers turned the screw on carriage number one to the right to increase the friction did precisely the opposite and, upon firing, one massive Dahlgren leapt backwards from its carriage and smashed its cascabel into the turret

¹⁶⁸ Church, *Life of Ericsson*, 256.

bulkhead. Assuming erroneously that the second carriage must be a mirror image of the first, Stimers reversed his action and sent the second Dahlgren crashing into the turret bulkhead. Before she had even seen battle, the *Monitor* had **two** large dents *inside* her turret. Those same dents remain there to this day, and this testament to human error can be seen when the turret's conservation tank is drained.

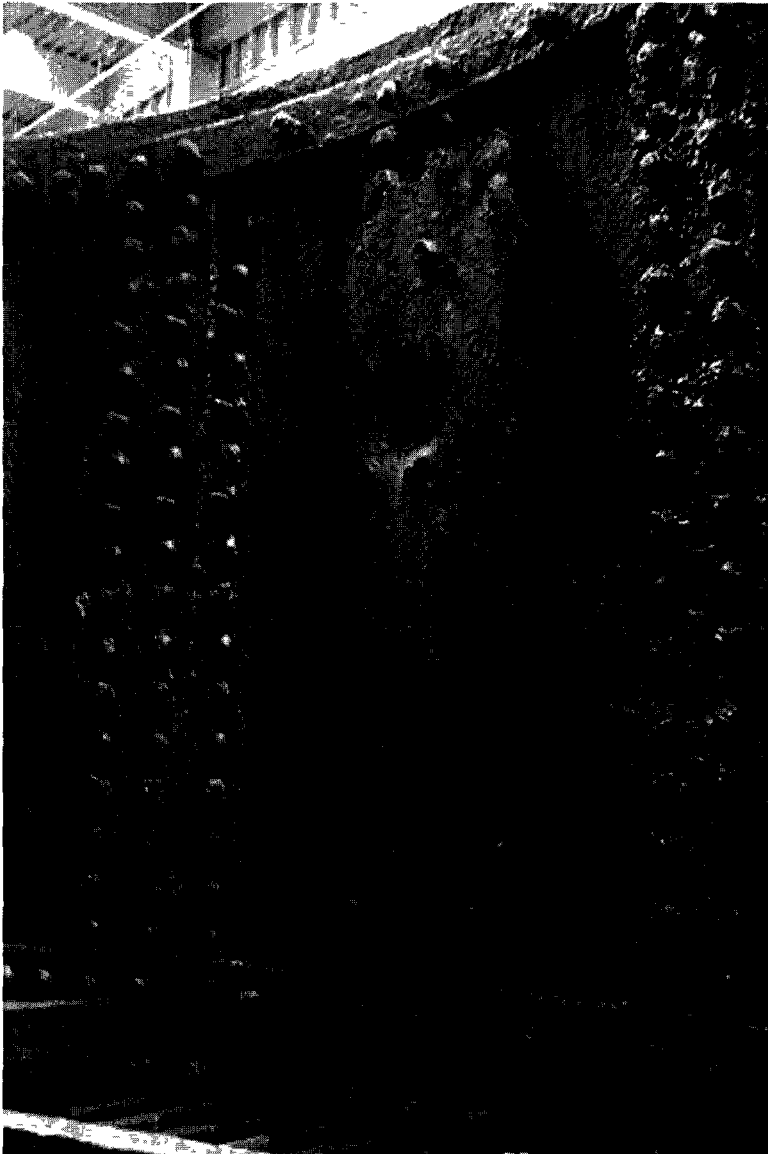


Figure 2 Dent in turret bulkhead, August 2011 excavation season, Photo by author

While all of this was occurring in the turret, the ward room steward had taken a bottle for a spin as well. The log indicates that he was put in chains during the first dog watch that day and was released at nine that evening.¹⁶⁹ Others words are needed to fill in the story, however: Paymaster William Keeler wrote to his wife about the goings-on in his strange new home:

It was a dismal rainy day & our wet iron decks were anything but comfortable to stand upon. We had an awning fitted over the top of the turret, running up to a point in the center like a tent & under this we managed to keep pretty dry, going down below occasionally to warm. Commodore Gregory & other notables from the Yard were with us & arrangements were made on board to give them a dinner suited to the occasion. The preliminaries were all right, but unfortunately we found upon seating ourselves at the table that 'the wisest plans of mice & men gang aft a'glee'....for to sum it all up in one short sentence, the Steward, upon whom it all depended, was drunk. I suppose he had been testing the brandy & Champaine before putting it upon the table. As may be supposed it was a decided failure - the fish was brought in before we had finished the soup, & Champaine glasses were furnished us to drink our brandy from & vice versa."¹⁷⁰

The log reveals the name of the steward: L. Murray. This was Lawrence Murray – a 34-year- old native New Yorker who stood 5'6" with striking blue eyes, a fair complexion, and a singularly bald head. According to Keeler, Murray “yelled & hollowed & begged & plead....[but] was pretty well sobered before he was released & appeared a good deal humbled & mortified....” Yet he was back at the bottle the next day – and was “ironed & shut up in one of the chain lockers.”¹⁷¹

¹⁶⁹ The sailor's work day was divided into six, four-hour watches in which half the crew stood watch while the other half relaxed or slept, alternating every four hours. In order to keep the same men from having to stand the same overnight watch each night, the 4 p.m to 8 p.m. watch was divided into two two-hour watches called the first dog and the last dog watch. There is no known etymological history of the name.

¹⁷⁰ Keeler letter to Anna, March 4, 1862 in *Aboard the USS Monitor*, 21.

¹⁷¹ Keeler letter to Anna, March 4, 1862 in *Aboard the USS Monitor*, 22.

At 10 p.m., the log entry indicates that Norman McPherson and John Atkins, two of the volunteer crewmembers, expressed their discomfort with being on an experimental vessel by stealing the ship's boat and leaving "for parts unknown."¹⁷² It seems that the test voyage had not inspired a great deal of confidence in some of the volunteer crew. Very little is known about Norman McPherson, but John Atkins has a bit more to his story. He and McPherson, like many of the *Monitor* volunteers, had been on the receiving ship *North Carolina* when Lieutenant Worden had come calling for a crew. Atkins was taller than some, nearly 5'10", and hailed from Baltimore. Thirty-six-years-old, hazel eyes and brown hair, he and McPherson were clearly determined to get off the *Monitor* by any means possible. The *New York Times* reported only the successes of the day, however. The only negative comment made was that "the compass in the iron pilot-house did not work altogether satisfactorily, but no difficulty is apprehended with regard to being able to adjust it."¹⁷³

All of this excitement had occurred before the vessel ever left New York, but that same day she finally received orders to head south. A dispatch from Hiram Paulding instructed Lieutenant Worden to "proceed with the *Monitor* under your command to Hampton Roads and on your arrival report to the senior naval officer there," adding "when the weather permits."¹⁷⁴ The weather remained difficult for the next two days, though, and the *Monitor's* departure was delayed until March 6.

¹⁷² Logbook of the USS *Monitor*, March 3, 1862, 8.

¹⁷³ *New York Times*, March 4, 1862.

¹⁷⁴ ORN, Series I, Volume 6, 649.

While the *Monitor* was designed by Ericsson to be a seagoing vessel, no one was willing to take any chances with her. So accordingly, on Thursday, March 6, the *Monitor* left the Navy Yard with a small fleet. The steam tug *Seth Low* took the *Monitor* in tow, in company with the steamers *Sachem* and *Currituck*. By 4 p.m. they had left New York Harbor and were heading south. However, Gideon Welles had issued new orders to the *Monitor* at the advice of General George Brinton McClellan, who felt that the *Monitor* could best benefit the Union by clearing the Potomac River in advance of McClellan's planned troop movements. McClellan was preparing to move troops south to Urbanna, and then to proceed overland to Richmond. Welles telegraphed the Navy Yard in New York with orders for the *Monitor* to "proceed immediately to Washington," but the message arrived two hours after the *Monitor* had left. A vessel carrying the new orders raced to reach the *Monitor* but was unsuccessful.¹⁷⁵ The message did reach Commodore Marston in Hampton Roads, however.

Executive Officer Samuel Dana Greene recalled that "[o]n the following day a moderate breeze was encountered, and it was at once evident that the *Monitor* was unfit as a sea-going craft."¹⁷⁶ The log indicates initially a Force 4 on the Beaufort Scale, but it is somewhat telling that after a point the officers of the watch ceased trying to estimate what force the wind was. This was perhaps in part due to the fact that the men were trying to keep their vessel afloat. Compounding their difficulties, the leather belts of the engine had grown sodden and stretched with the influx of

¹⁷⁵ ORN, Series I, Volume 6, 681.

¹⁷⁶ Greene, "In the 'MONITOR' Turret" in *Century Magazine*, Volume XXIX, New Series, Volume VII, 755.

sea water into the engineering spaces. With stretched belts, the ventilators were unable to blow. Noxious fumes began to fill the engine room. Most of the crew ended up on top of the turret that impossibly long night. Paymaster William Keeler wrote that “things for a time looked pretty blue, as though we might have to ‘give up the ship.’”¹⁷⁷ Samuel Dana Greene said of his first five days underway on the *Monitor*, “I think I lived ten good years.”¹⁷⁸

As the *Monitor* steamed south, Commodore John Marston of the USS *Roanoke* and Union naval commander in Hampton Roads received his own telegram from Gideon Welles. It read:

*Send the St. Lawrence, Congress, and Cumberland into the Potomac River. Let the disposition of the remainder of the vessels at Hampton Roads be made according to your best judgment after consultation with General Wool. Use steam to tow them up. I will also try and send a couple of steamers from Baltimore to assist. Let there be no delay.*¹⁷⁹

Welles sent this message on the 7th. He then sent a second message telling Marston to await additional orders carried by Assistant Secretary of the Navy Gustavus Vasa Fox who was traveling to Hampton Roads on the 8th.

¹⁷⁷ Keeler letter to Anna, March 6, 1862, in *Aboard the USS Monitor*, 30.

¹⁷⁸ Greene letter to Mary Greene, reprinted in 48th Congress, Second session of the Senate, Report 1162, 4.

¹⁷⁹ ORN, Series I, Volume 6, 687.

Chapter 5: The Battles of Hampton Roads

March 8, 1862

The same storm that nearly sank the *Monitor* on her trip south had kept the CSS *Virginia* in port as well. It was not until the morning of March 8, 1862 that the weather appeared acceptable for taking the Confederate ironclad out into Hampton Roads. With workmen still aboard, the commanding officer, Franklin Buchanan, ordered his crew to ready the ersatz vessel for a cruise. Most believed that this would be a shake-down (test) cruise, but Buchanan had confided in his officers that he intended to take the vessel directly into battle. As the crew cast off the mooring lines, the workmen, who had been installing the fore and aft gunport shutters leapt to the dock. The *Virginia* was underway. Those observing her departure kept eerily silent, recalled some of the crew years later. As the *Virginia* neared Craney Island, commander Franklin Buchanan reportedly said, "Sailors, in a few minutes you will have the long looked for opportunity of showing your devotion to our cause. Remember that you are about to strike for your country and your homes. The Confederacy expects every man to do his duty. Beat to quarters!" Then he reminded them, "The whole world is watching you today."¹⁸⁰

Privately, Buchanan must have had mixed feelings. Like many others in this war he would soon be opening fire upon his own flesh and blood. His brother Thomas McKean Buchanan was the Paymaster on board the USS *Congress*.

¹⁸⁰ H. Ashton Ramsay, "The Most Famous of Sea Duels: The Story of the *Merrimac's* Engagement with the *Monitor*," and the Events That Preceded and Followed the Fight, Told by a Survivor. *Harper's Weekly*. February 10, 1912, 11-12. Unfortunately, many of the accounts of the battle were written several decades later, so the words of the men must be regarded as approximate at best, and examples of poetic license with the passage of time at worst.

As the *Virginia* steamed down the Elizabeth River, both banks were crowded with people. Many were just curious about the ship's strange appearance. Some refused to believe in her, shouting, "Go on with your old metallic coffin!" Those with a richer sense of history realized that the day had finally come: that "here was to be tried the great experiment of ram and iron-clad in naval warfare."¹⁸¹

Saturday, March 8, 1862 was laundry day for the crews of the Union's North Atlantic Blockading Squadron in Hampton Roads, Virginia. The rigging of the wooden vessels was festooned with blue and white clothing, drying in the late winter sun. Shortly after noon, the quartermaster of the USS *Congress*, which was anchored off Newport News Point, saw something strange through his telescope. He turned to the ship's surgeon and said, "I wish you would take the glass and have a look over there, Sir. I believe *that thing* is a'comin' down at last."¹⁸²

That "thing" was the CSS *Virginia*. The Confederates had been converting the burnt-out hull of the steam screw frigate *Merrimack* into a casemated ironclad ram at Gosport Navy Yard on the Elizabeth River. It had taken nine months for the conversion, and Flag Officer Franklin Buchanan, was impatient to strike at the blockading fleet. March 8, 1862 would be the *Virginia's* sea trial, as well as her trial by fire.

The men of the North Atlantic Blockading Squadron, who had grown weary of waiting for the *Virginia* to come out, now scrambled to prepare for battle. In the

¹⁸¹ Hardin Littlepage, quoted in Quarstein, *CSS Virginia: Mistress of Hampton Roads*, (Appomattox, VA: H.E. Howard, Inc., 2000), 74.

¹⁸² Edward Shippen, *Thirty Years at Sea: The Story of a Sailor's Life*, (New York: J.B. Lippincott & Co., 1879), 280.

panic of the moment, and with the tide at ebb, several vessels ran aground, including the USS *Congress* and the USS *Minnesota*.

The USS *Cumberland* was Buchanan's first target. With his guns firing at the wooden ship, Buchanan rammed the *Cumberland* on her starboard side. The hole below her waterline was large, and the ship immediately began to sink, nearly taking the *Virginia* with her. Scores of Union sailors from the *Cumberland* died at their guns, or went down with their ship; guns still firing and flags still defiantly flying.

The *Virginia* broke free, and steamed slowly into the James River. The men on the stranded *Congress* began to cheer, thinking they had been spared the same horrific fate. That cheer was cut short, however, when they saw that the *Virginia* had made her ponderous turn.¹⁸³

The *Virginia's* withering firepower tore into the USS *Congress* for nearly two hours. With most of the crew dead or wounded, including the commanding officer, the next in command, Lieutenant Commander Austin Pendergrast surrendered the *Congress*. Enraged at Union shore batteries which continued to fire upon the white flag, Buchanan ordered the *Congress* to be set afire, and then began personally firing back at the shore with a rifle. He quickly became a target on the exposed top deck of the *Virginia*. Wounded, he turned command over to his Executive Officer, Lieutenant Catesby ap Roger Jones, who returned the *Virginia* to her moorings that evening. Falling darkness and a receding tide had saved the steam frigate USS *Minnesota* from the same fate as the *Congress* and *Cumberland*.

¹⁸³ Shippen, 282.

March 9, 1862

The mood in Hampton Roads was one of disbelief and for some, resignation. Major-General Wool of the US Army kept Washington informed of events via the telegraph, the lines of which had been repaired late in the day. The news that he sent to Secretary of War Stanton at 8:30 p.m. from Fortress Monroe was bleak:

The *Merrimack* came down from Norfolk to-day, and about 2 o'clock attacked the *Cumberland* and *Congress*. She sunk the *Cumberland*, and the *Congress* surrendered. The *Minnesota* is aground and attacked by the *Jamestown*, *Yorktown* and *Merrimack*. The *St. Lawrence* just arrived and going to assist. The *Minnesota* is aground. Probably both will be taken. That is the opinion of Captain Marston and his officers. The *Roanoke* is under our guns.¹⁸⁴

Wool continued ominously, "It is thought the *Merrimack*, *Jamestown*, and *Yorktown* will pass the fort to-night." Secretary Stanton took this news to heart, reportedly peering out the window of the White House to see if the Confederate ironclad and her consorts had already arrived on the Potomac, stating in an alarmist fashion that it was "not unlikely we shall have a shell or cannonball from one of her guns in the White House before we leave this room."¹⁸⁵

Had the men of the *Monitor* not been aware of the impending completion of the reconfigured *Merrimack*, the scene that greeted them in Hampton Roads would have been something nearly inconceivable to them – more akin to a chapter out of a fantastical novel than a safely blockaded harbor. Even before the incredible destruction was visible to them, the officers and crew heard the distant sounds of booming guns as the *Monitor* approached the mouth of the Chesapeake Bay at 3

¹⁸⁴ ORN, Series I, Volume 7, 4 – 5.

¹⁸⁵ Gideon Welles, in *The Annals of the War*, 24-5.

p.m.¹⁸⁶ Nearing Fortress Monroe, Paymaster William Keeler recalled, "As we neared the harbor the firing slackened & only an occasional gun lit up the darkness." Yet the horror of the day's events had sent civilians into a panic and Keeler noted that as the *Monitor* drew closer to the scene, "vessels were leaving like a covey of frightened quails & their lights danced over the water in all directions."¹⁸⁷

At 7 p.m., a local pilot sent to bring the ironclad into the harbor confirmed what the men already suspected – the *Merrimack* had come out and had had her way with the Union fleet.¹⁸⁸ The news seemed to slow time instantly for the crew. William Keeler recalled that the *Monitor* "crept slowly on & the monotonous clank, clank, of the engine betokened no increase of its speed" while the "moments were hours."¹⁸⁹ Yet, within the hour the *Monitor* came to anchor off Fortress Monroe whereupon Lieutenant John Worden reported to Commander Marston on board the *Roanoke*.¹⁹⁰ Despite having received orders to send the Union ironclad immediately to Washington for the defense of the Capitol, Marston determined that the best way for the *Monitor* to protect Washington was to engage with the *Merrimack* in Hampton Roads. Marston ordered Worden to render assistance to the grounded *Minnesota*, still trapped on Hampton Flats. Worden immediately sent a message to Secretary Welles, stating that "I arrived at this anchorage at 9 o'clock this evening, and am ordered to proceed immediately to the assistance of the *Minnesota*, aground near Newport News."¹⁹¹

¹⁸⁶ Log of the USS *Monitor*, March 8, 1862, 13.

¹⁸⁷ Keeler, March 9 1862 letter to Anna, in *Aboard the USS Monitor*, 31.

¹⁸⁸ Log of USS *Monitor*, March 8, 1862, 13

¹⁸⁹ Keeler, March 9, 1862 letter to Anna in *Aboard the USS Monitor*, 31.

¹⁹⁰ Log of USS *Monitor*, March 8, 1862, 13.

¹⁹¹ ORN, Series 1, Volume 7, 5.

Therein lay a problem. The *Monitor* would need a pilot to guide her to the *Minnesota* through the difficult waters of Hampton Roads. Despite only drawing eleven feet, the *Monitor* was still at risk of running aground. Yet there was no pilot to be found willing to guide the *Monitor* to the *Minnesota*, and remain with the ironclad throughout whatever action might come the following day.¹⁹² Acting Volunteer Lieutenant N. Goodwin of the US Bark *Amanda* detailed his own Acting Master, Samuel Howard, to the *Monitor*.¹⁹³ With a skilled and willing pilot on board, Worden quickly had the *Monitor* under weigh and reached the side of the *Minnesota* by 10 pm.¹⁹⁴

News of the *Monitor's* arrival quickly spread among Union forces. Assistant Adjutant General W. D. Whipple telegraphed General Wool that “[it] has infused new life into the men” on shore.¹⁹⁵ The men on the *Minnesota* were perhaps a bit more skeptical, and Lieutenant Samuel Dana Greene, who was sent on board the *Minnesota* to inquire of Captain Van Brunt what manner of assistance the *Monitor* might render to the stranded vessel recalled, “An atmosphere of gloom pervaded the fleet, and the pygmy aspect of the new-comer did not inspire confidence among those who had witnessed the destruction of the day before.”¹⁹⁶ Nevertheless, Captain Van Brunt of the *Minnesota* wrote in his official report dated March 10, 1862, that “all on board felt that we had a friend that would stand by us in our hour

¹⁹² Pilots were generally civilians and thus could refuse the assignment. It was later reported in the *Evening Press* of March 18, 1862 that ‘After the *Monitor* arrived twenty Baltimore pilots refused to take her to Newport News, excusing themselves because they did not know the channel when, at any other time, they would have jumped at the chance.’ Quoted in ORN, Series 1, Volume 7, 31.

¹⁹³ ORN, Series 1, Volume 7, 31.

¹⁹⁴ Log of the USS *Monitor*, March 8, 1862, 13.

¹⁹⁵ ORN, Series 1, Volume 7, 5.

¹⁹⁶ Samuel Dana Greene, in *Battles and Leaders*, Volume 1, 722.

of trial.”¹⁹⁷ The real question on all minds, however, was whether the *Monitor’s* presence would make any difference against the seemingly unstoppable might of the Confederate monster.

The burning *Congress* provided an eerie backdrop to the fevered activities in Hampton Roads, along with the “considerable noise” floating across the water from Confederate celebrations at Sewell’s Point.¹⁹⁸ Observers on the French vessel *Gassendi* reported that, for the Union fleet, “everything seemed desperate on the evening of the 8th...everything was in confusion at Fort Monroe....”¹⁹⁹ Most desperate of all was the *Minnesota’s* situation. Men from the Bark *Amanda* had commandeered the *America*, whose captain and crew had refused to render assistance, and taken the steam tug to the *Minnesota* where from 11 pm to 4 am they attempted, unsuccessfully, to pull the frigate to safety. Despite the fact that “seven or eight guns had been thrown overboard and some others spiked [on the *Minnesota*],” more ammunition was brought on board for the pending engagement. Personal possessions such as bags and hammocks, were placed on the *Whitehall* in the event that the *Minnesota* had to be abandoned and scuttled. Making the situation seem even more desperate, the *Minnesota* remained under fire until after midnight; however, this fire did not come from the enemy, but from the *Congress* which lay broadside to the *Minnesota*. Exploding munitions on the doomed vessel occasionally sent shot flying as though the unseen hand of an enemy was still firing. “By chance,”

¹⁹⁷ ORN, Series 1, Volume 7, 11.

¹⁹⁸ Joseph McDonald, *How I Saw the Monitor-Merrimac Fight*, The New England Magazine Vol XXXVI, No. 5, July 1907, 548-553.

¹⁹⁹ ORN, Series 1, Volume 7, 71.

recalled Joseph McDonald, who was stationed on the tug *Dragon*, which lay next to the *Minnesota*, “we escaped injury.”²⁰⁰

Around 12:40 a.m., the flames of the *Congress* reached the ship’s powder magazine and the whole of Hampton Roads was treated to a dreadful fireworks display. William Keeler recalled that “it was a scene of the most terrible magnificence. She was wrapped in one sheet of flame, when suddenly a volcano seemed to open instantaneously, almost beneath our feet & a vast column of flame & fire shot forth till it seemed to pierce the skies. Pieces of burning timbers, exploding shells, huge fragments of the wreck, grenades & rockets filled the air & fell sparkling and hissing in all directions.”²⁰¹ Despite being over two miles from the dying vessel, the explosion was so intense it “seemed almost to lift us out of the water,” Keeler wrote. Crewman David Ellis marveled at the brilliant colors, “not unlike the colors of the rainbow.”²⁰² The explosion was felt for miles around.

Having barely survived the first test of the *Monitor*’s seakeeping capabilities, the men were eager to have a chance to test out her fighting prowess and with the heightened senses that come with adrenalin and lack of sleep, the men prepared their untried vessel for the battle that they were certain would come in the morning. David Ellis summarized years later what he believed most of the men were thinking in those overnight hours: “We were about to enter a crisis; a life and death grapple, with a huge and victorious antagonist, possessing extraordinary powers of

²⁰⁰ Joseph McDonald, *How I Saw the Monitor-Merrimac Fight*, The New England Magazine Vol XXXVI, No. 5, July 1907, 548-553.

²⁰¹ Keeler, March 6-9 letter to Anna, in *Abord the USS Monitor*, 40.

²⁰² David Ellis, unpublished ms, 25.

aggression.”²⁰³ Though the men had not yet seen this antagonist in person, they had seen what she could do. The worry was compounded by what the men had experienced in their sea trials and their trip south. “Would she stand the test?” they wondered. “What if she behaved as badly in battle as she had done in the storm?”²⁰⁴

At 4 a.m. all hands were roused. Those who had not been standing watch had attempted to rest, “laying down where we could get a chance.”²⁰⁵ The men readied their vessel for battle, first covering the deadlights with their iron covers, then removing the blower pipes and smoke stacks. The *Monitor* would have as low a profile in the water as possible.

Upon first light on March 9, the men of the *Monitor* got their first close-up look at the *Minnesota*, whose ravaged sides towered over the tiny ironclad.²⁰⁶ The men of the *Minnesota* also got their first real look at the *Monitor*. Desperation mounted on board the frigate, and “the men were clambering down into the smaller boats – the guns were being thrown overboard & everything seemed in confusion.”²⁰⁷ Bags and hammocks, barrels and provisions went over the side of the *Minnesota*, “some of which went into the boats & some into the water, which was covered with barrels of rice, whiskey, flour, beans, sugar, which were thrown overboard to lighten the ship.”²⁰⁸

²⁰³ Ellis, unpublished ms., 26.

²⁰⁴ Ibid.

²⁰⁵ Driscoll in Berent, 24.

²⁰⁶ Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 33.

²⁰⁷ Ibid.

²⁰⁸ Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 32.

Just after dawn on March 9, the men of the *Virginia* tucked into a hearty breakfast made all the more festive by two jiggers of whiskey for each man.²⁰⁹ In contrast, the *Monitor's* exhausted crew sat together on the berth deck eating hardtack and canned roast beef, washing it down with coffee. Crewman Robert Driscoll recalled that:

Capt. Worden came down from the turett [sic]. He addressed the crew of 38 men all told besides the officers. He reminded us that we had all volunteered[sic] to go with him that now having seen what the *Merrimac* had done and from all appearances was now capeable [sic] of doing and that the fate of the *Cumberland* may soon be ours that if any one regretted the step he had taken he would put him on board the Roanoke.²¹⁰

Despite their fatigue, the crew leapt to their feet and gave Worden three cheers. Not a single man took Worden's offer.²¹¹

As the morning fog lifted and the dark bulk of the *Virginia* appeared to be moving towards the *Minnesota*, Lieutenant Worden of the *Monitor* inquired of Captain Van Brunt what his intentions were. Van Brunt replied, "If I cannot lighten my ship off I shall destroy her." Worden assured Van Brunt that he and the *Monitor* would "stand by you to the last if I can help you." Van Brunt curtly replied, "No Sir, you cannot help me."²¹² The exact words the men of the *Minnesota* called out to the "little pigmy" *Monitor* are unrecorded, but William Keeler wrote that "we slowly

²⁰⁹ William R. Cline "The Ironclad Ram Virginia - Confederate States Navy." *Southern Historical Society Papers*32 (January-December 1904): 243-49.

²¹⁰ Irwin Berent, *The Crewmen of the USS Monitor: A Biographical Directory* Prepared for Underwater Archaeology Unit, Division of Archives and History, Department of Cultural Resources, State of North Carolina. (Washington, DC: NOAA, United States Department of Commerce. *USS Monitor National Marine Sanctuary Historical Report Series*, Number 1. 1985.), 24.

²¹¹ *Ibid.*

²¹² Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 33.

steamed out of the shadow of our towering friend no ways daunted by her rather ungracious replies.”²¹³

Intense fog early on delayed the *Merrimack*'s assault upon the stranded *Minnesota* so it was not until 8:00 a.m. that the men on the *Merrimack* could make out the ravaged hull of the *Minnesota*. They also saw what appeared to be “a shingle floating in the water, with a gigantic cheesebox rising from its center” sitting alongside the frigate. The *Merrimack* fired the first shot – a warning of sorts – through the *Minnesota*'s rigging shortly before 8:30. The *Minnesota* returned fire, as did the cheesebox. Confederates who had been following the Northern newspapers knew then that the cheesebox was the anticipated “Ericsson’s Battery.” Observers on shore, such as Sallie Brock Putnam, recalled that the *Monitor* was “of midnight hue, which, like a thing of darkness, moved about with spirit-like rapidity.”²¹⁴

Lt. Worden watched the approaching battle from the deck of the *Monitor*. Logue and Keeler, who, as Surgeon and Paymaster respectively were considered “idlers” who stood no watch, were able to climb atop the turret to survey the scene. A second shot from the *Virginia* “howled over our heads & crashed into the side of the *Minnesota*,” recalled Keeler. Worden, ascending the turret to return to his pilothouse found the two men – neither of whom had seen battle – and sternly warned them: “Gentlemen, that is the *Merrimac*, you had better go below.”²¹⁵ Not waiting for a second warning from their soft-spoken commander, the two quickly

²¹³ Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 33.

²¹⁴ Putnam, Sallie Brock, 1845-, *Memoir of Sallie Brock Putnam*, in *Richmond During the War: Four Years of Personal Observation*. (New York, NY: G.W. Carleton & Co., 1867), 389.

²¹⁵ Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 34.

complied, with Worden following after. The iron hatch cover was put in place, effectively sealing the men inside their vessel.

What the men remembered most about the moments before the battle was the silence. The morning was serene. “Not a ripple could be detected or a sound heard....everything seemed so still, so peaceable, so serene, as if soothed and tranquilized and beautiful by a special benediction from heaven,” recalled David Ellis.²¹⁶ “Every one [sic] was at his post, fixed like a statue,” Paymaster William Keeler recalled of the morning of March 9, 1862. “The most profound silence reigned” on board the *USS Monitor*, and “if there had been a coward heart there its throb would have been audible, so intense was the stillness.”²¹⁷

Worden took his place in the pilothouse, along with pilot Samuel Howard and quartermaster Peter Williams, who steered the vessel throughout the battle. In the turret, Executive officer Samuel Dana Greene assembled his gun crews – eight men per gun. Bos’un’s mate John Stocking and seaman Thomas Lochrane served as gun captains. Acting Master Louis Napoleon Stodder assisted Greene while Alban Stimers, who was on board as an observer, personally worked the turret gear. Acting Master John J.N. Webber commanded the powder division on the berth deck with gunner’s mate Joseph Crown. Firemen John Driscoll and George Geer were positioned at the foot of the turret ladder where they passed up shot to the gun

²¹⁶ Ellis, unpublished ms. 26-27.

²¹⁷ Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 33.

crews above.²¹⁸ In the engine room, Chief Engineer Isaac Newton commanded the working of the engine, along with engineers Albert Campbell and Robinson Hands.

The nagging questions about the vessel's capabilities intensified, and with good reason: the turret mechanism was already rusty from the seawater that had poured in during the voyage, the speaking tube between pilothouse and turret was completely disabled early in the action, the men had not been drilled at the guns and thus "were not prepared to act in concert." To make matters even more precarious in the face of the *Virginia's* 10 powerful guns, the 19 men inside the turret knew that because of the peculiar installation of the gunport shutters, only one gun could be run out at a time.²¹⁹

To the astonishment of Captain Van Brunt on the *Minnesota*, the *Monitor* moved directly towards the *Merrimack*, placing herself between the ironclad and her prey.²²⁰ By putting his vessel in this position, Worden was risking being hit by both combatants as both were firing ricochet shots.²²¹ The men in the turret, as well as below, waited in suspense in the dim light of the interior for the first shot to strike the *Monitor*. The "infernal howl...of the shells as they flew over our vessel was all that broke the silence & made it seem still more terrible," recalled Keeler. As the *Monitor* came alongside the hulking iron casemate, Greene in the turret asked permission to fire. Keeler relayed the request and returned with the reply "Tell Mr. Green [sic] not to fire till I give the word, to be cool & deliberate, to take sure aim &

²¹⁸ Greene, *In the Monitor's Turret, Battles and Leaders* vol. 1, 723.; Berent, 24. Geer, letter 3-10-62 to Martha, Geer Letters, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

²¹⁹ Keeler, March 6-9 letter to Anna, in *Aboard the USS Monitor*, 40.; Greene, "In the *Monitor* Turret," *Battles and Leaders*, vol. 1, 724.

²²⁰ Greene, "In the *Monitor* Turret," *Battles and Leaders*, vol. 1, 724.

²²¹ This was akin to skipping stones across water – but gave vessels line-of-sight firing capabilities with increased accuracy.

not waste a shot.”²²² Within yards of the *Merrimack*, Worden called all stop to the engines and sent the command to Greene to “Commence firing!”²²³ Greene then “triced up the port, ran out the gun, and, taking deliberate aim, pulled the lockstring.”²²⁴ The eerie silence within the *Monitor* was thus finally broken with the report of her first XI-inch Dahlgren, which jarred the crew considerably, but nonetheless “was music to us all.”²²⁵

The *Monitor* was now being tested under enemy fire, just as the contract had specified. The officers and crew of the *Monitor* were forced to improvise given their difficult interior layout and the broken speaking tube. Paymaster Keeler and Captain’s Clerk Daniel Toffey, both landsmen, were tasked with relaying communications between the pilothouse and the turret, a 150-foot round trip each time. This was a risk, as their inexact understanding of maritime order or custom could potentially result in a devastating miscommunication. But there was no one else to spare for this duty as each man on the crew had a specific task and the disabling of the speaking tube had not been anticipated.

A “rattling broadside” which could have easily as come from the *Minnesota* as the *Merrimack* soon slammed into the turret. The gunners quickly realized that their gun platform was unharmed. They showed more confidence now that they knew “the shots did not penetrate; the tower was intact and it continued to revolve.”²²⁶ Engineer Campbell told his wife triumphantly that “we were hit twice

²²² Keeler to Anna, March 13 letter, 34.

²²³ Greene, *In the Monitor’s Turret, Battles and Leaders*, Vol. 1,723.

²²⁴ Greene, *In the Monitor’s Turret, Battles and Leaders*, Vol. 1,723.

²²⁵ Keeler letter to Anna March 9 – 13, in *Aboard the USS Monitor*, 35.

²²⁶ There seems to be no consensus on this, only that the *Monitor* was hit by friendly fire throughout the battle.

from the *Minnesota*...but it don't make much difference who fires at us."

²²⁷Ericsson's inclusion on the interior of the turret of the thin metal mantelets insured that the nuts, bolts and rivets holding the eight layers of iron plate together did not turn into more "friendly fire" within the confines of the 21-foot cylinder.

In fact, the turret proved difficult to *stop* revolving once in motion. Though Stimers attempted to start and stop the turret on Greene's command, the level of accuracy in aiming that was desperately required could not be achieved with the "novel machinery" which had never been tried in battle. The conventions applied to traditional broadside tactics soon went by the wayside as well. Though the men had carefully marked the stationary portion of the deck beneath the turret with chalk marks to indicate starboard and port bearings, and bow and stern, the marks were soon obliterated by both the movement of battle and the sweat which fell from the gunners "like rain."²²⁸ Worden, who was stationary in the pilothouse continued to give commands in the traditional way. When relayed Greene's query "How does the *Merrimac* bear?" Worden's reply of "on the starboard beam" was of little use.²²⁹

Eventually, Greene, Stimers and the gun crews settled on a method of dealing with their perplexing "revolving drum." They let it continue to revolve, firing "on the fly" when the enemy target came in sight, then stopping it with the gunports turned away from the enemy for reloading. At times, Stimers let the turret continue to turn. At two and a quarter rotations per minute, there was no danger of dizziness. For

²²⁷ Letter from Albert Campbell to wife Clara, March 10, 1862 in *Perspectives on the Civil War*, The Mariners' Museum, Newport News, VA publication date unknown, 23.

²²⁸ Keeler letter to Anna March 9 - 13, in *Aboard the USS Monitor*, 35. The temperature within the turret was measured at 150 degrees during the Battle of Drewry's Bluff in May.

²²⁹ Greene, "In the *Monitor's* Turret," *Battles and Leaders*, vol. 1, 725

observers on shore, at least, the turret was an absolute marvel to watch, and its movements belied the confusion and frustration within. Confederate signal Corps officer William Norris recalled as he watched the battle that “during all this time, the *Monitor* is whirling around and about like a top, and by the easy working of her turret, and her precise and rapid movement elicits the wonder and admiration of all.”²³⁰

Though the men may have admired the machinery, the rotation of the turret was frustrating to the crew of the *Merrimack* as well. This was an entirely new kind of warfare. Lieutenant John R. Eggleston of the *Merrimack* recalled that “We never got sight of her guns except when they were about to fire into us. Then the turret slowly turned, presenting to us its solid side, and enabled the gunners to load without danger.”²³¹ Thus the *Monitor*'s gunports became the particular target which the *Merrimack*'s gun crew focused upon, as that seemed to be the most vulnerable point upon the armored drum, though at the time, the *Merrimack*'s gunners did not realize *how* vulnerable. Because of the limited space within the *Monitor* herself, the crew was small. So small, that had a shot entered the turret, this “would have ended the fight, as there was no relief gun's crew on board.”²³² Dents seen in the photographs taken by James Gibson in July of 1862, and indeed upon the actual turret itself, show that most of the *Merrimack*'s fire was trained upon that area.

²³⁰ Norris, William, *The Story of the Confederate States' Ship "Virginia" (Once Merrimac)* Baltimore, John B. Piet, Printer, 1879. 8.

²³¹ Eggleston, “Captain Eggleston's Narrative of the Battle of the Merrimac,” *Southern Historical Society Papers*, Vol. 41 (1916), 166 - 178.

²³² Greene, “In the Monitor's Turret,” *Battles and Leaders*, Vol. 1, 723.

But the first shots fired deliberately at the turret were grapeshot rather than solid shot or exploding shell. Despite being the object of enemy fire, the men within the turret wanted to see what was happening. Though ordered not to, one of the gunners simply could not help himself and stuck his head out of the gunport for a view of the Confederate ship. Unharmful, he drew his head back in and with a broad grin reported that “the d----d fools are firing canister at us.”²³³ In fact, there was very little solid shot on board the *Merrimack* as she had no need for it against the wooden walls of the Union fleet at Hampton Roads. Nor did she have the armor-piercing bolts designed for the Brooke rifles on board. These bolts were not yet ready, nor was it thought she would need them.

Seeking to find any sort of vulnerability upon the *Monitor*, several of the crewmen on board the *Merrimack* took up rifles, and were ordered by Lieutenant Hunter Davidson to “take one of those guns and shoot the first man that you see on board of that Ship.” Gunners Richard Curtis and Benjamin Sheriff took “positions at the bow port,” Curtis on the starboard side and Sheriff on the port side, “both on our knees, but not in prayer.” Having come directly alongside the *Monitor*, Curtis peered right into one of the gunports, looking for a target.²³⁴ Sheriff frantically called out to Curtis “look out Curtis, look out Curtis,” which Curtis “was doing with all my might.” But “while looking for that man I saw one of her guns coming slowly out of her ports

²³³ Keeler letter to Anna March 9-13, in *Aboard the USS Monitor*, 35.

²³⁴ Note – the forward pivot gun of the *Merrimack* was never moved out of its central position. Had the pivot been turned to where Curtis was kneeling, the battle would have had a very different outcome.

and looking me squarely in the face, Sheriff and myself thought it was time to move, which we did quickly. Saw no man, fired no gun.”²³⁵

After a point in the battle, many of the gun crews on the *Virginia* stopped firing their guns altogether. Taking a quick turn through the gun deck, Lieutenant Jones found Lieutenant Eggleston’s division at ease. When Jones asked, “[W]hy are you not firing, Mr. Eggleston?” Eggleston recalled that he responded, “Why, our powder is very precious...and after two hours incessant firing I find that I can do her just about as much damage, by fashing [snapping] my thumb at her every two minutes and a half.”²³⁶

After about two hours of battle, it became necessary to replenish the ammunition in the turret. This necessitated having the turret hatches aligned with the deck hatches below. Worden moved his ship away from the *Merrimack* to accomplish this task. He also had an intense need to know how well his vessel had weathered the battle so far. To the surprise of his officers and crew, Worden appeared in the turret, climbed out and descended to the weatherdeck below. Alarmed by this bold move, and worried for Worden’s safety, a crewman called out, “Why Captain, what’s the trouble?” Worden replied, “I can’t see well enough from the pilot house....I will go back, but I wanted to get a moment to take in the whole situation.” He quickly returned to the safety of the turret, however.²³⁷ Completing the rearming of the turret, Worden swung the *Monitor* back into battle.

²³⁵ Memoir of Richard Curtis as quoted in *Perspectives on the Civil War*, The Mariners’ Museum, Newport News, VA publication date unknown, 19.

²³⁶ Norris, William, *The Story of the Confederate States’ Ship “Virginia”(Once Merrimac)*, (Baltimore, John B. Piet, Printer, 1879), 9.

²³⁷ David Ellis, unpublished ms, 29.

When the *Monitor* withdrew, Jones seized the moment to bear down upon the *Minnesota*. Jones apparently had not conferred with his pilot, however, and the move caused the *Merrimack* to run hard onto the Middle Ground shoal. Upon returning to battle, Worden brought his vessel near to the *Merrimack* and began to fire relentlessly into her, attempting to find a chink in her armor. Had Worden known precisely the construction of the *Merrimack's* armor, or had he been privy to the amount of coal burnt the day before, he might have been successful. The *Merrimack's* load had been so lightened from the day before that a shot "between wind and water" would have taken her down quickly.²³⁸ Fearing the worst, Jones and his engineers

...had to take all chances. We lashed down the safety valves, heaped quick-burning combustibles into the already raging fires, and brought the boilers to a pressure that would have been unsafe under ordinary circumstances. The propeller churned the mud and water furiously, but the ship did not stir. We piled on oiled cotton waste, splints of wood, anything that would burn faster than coal. It seemed impossible the boilers could long stand the pressure we were crowding upon them. Just as we were beginning to despair there was a perceptible movement, and the *Merrimac* slowly dragged herself off the shoal by main strength. We were saved.²³⁹

Finally safe, and assessing the situation, Jones realized that while the *Monitor's* armor made her invulnerable to shot, her "sub-aquatic" nature could potentially be her undoing. His approach was twofold. First, he attempted to ram the vessel, reasoning that she might be vulnerable below the waterline. Jones was

²³⁸ H. Ashton Ramsay, "The Most Famous of Sea Duels: The Story of the *Merrimac's* Engagement with the *Monitor*," and the Events That Preceded and Followed the Fight, Told by a Survivor. *Harper's Weekly*. February 10, 1912, 11-12.

²³⁹ *Ibid.*

not aware that the ram had gone down with the *Cumberland* the day before. Nonetheless, he prepared the *Merrimack* for ramming. This was no easy task, however, as it took nearly half an hour just to maneuver the vessel into ramming position and required over a mile of sea room to build up enough momentum to make the collision deadly. On board the *Monitor* the men realized what Jones was planning and were worried. Like the men on the *Merrimack*, they knew how vulnerable their own lower hull was. Though iron, the hull was merely ½ inch thick and the men had seen the results of the *Merrimack's* ram upon the *Cumberland*;— her flags still defiantly flying as she rested on the bottom of Hampton Roads. Not knowing how far the presumed ram on the *Virginia* was, they braced for the impact. But the *Monitor* was a nimble craft, and was able to veer away, receiving only a glancing blow, the results of which can be seen in James Gibson's photos, which were taken in July of 1862.

Thus far in the battle, cannon fire had not worked, small arms had not worked, and ramming had not worked against the *Monitor*. But Jones had another plan. Accordingly, he called for volunteers to board the *Monitor*. Their weapons would be peacoats and grenades. The coats would be used to "blind" the pilothouse. As there was no access to the outer deck (except via the top of the turret), it would be nearly impossible for a *Monitor* crewman to remove the coat. Grenades tossed down the funnels or into the turret would wreak havoc within. As the *Monitor* drew near the *Merrimack* yet again, the volunteers stood ready to leap aboard. Realizing this – or perhaps hearing the call of "boarders away!" – Worden ordered the two

Dahlgrens double shot with canister, but was able to quickly veer away, thus thwarting the plan.

The gunners on the *Merrimack* took the opportunity as the *Monitor* was turning, to continue shelling the *Minnesota*. The tug *Dragon* which was stationed alongside the *Minnesota* was ordered to cast off as they were interfering with the *Minnesota's* return fire from the lower tier of her guns. Just as the *Dragon* pulled away a shell from the *Merrimack* hit the boiler on the tug, wounding three men severely.

The *Monitor* had completed her turn and made for the *Merrimack's* fantail, attempting her own ramming maneuver when the *Merrimack's* rifled stern gun fired directly into the *Monitor's* pilothouse at a range of ten yards. The blast tore open the structure, cracking one of the huge iron "logs" and lifting the top. Lieutenant Worden, though protected somewhat by the heavy iron logs, took the full force of the explosion in the face. Though stunned and temporarily blinded, Worden gave the order to "sheer off" with the helm to starboard.²⁴⁰ Paymaster Keeler and Surgeon Logue helped Worden from the pilothouse and Keeler ran to relay the news to Greene, who left the turret to assess the situation. Still standing at the foot of the pilothouse ladder, Worden told his officers, "Gentlemen I leave it with you, do what you think best. I cannot see, but do not mind me. Save the *Minnesota* if you can."²⁴¹ He turned command of the *Monitor* over to Greene and was led to his stateroom where he was attended upon by Surgeon Logue. The officers conferred and determined to return to battle, despite their wounded leader and damaged

²⁴⁰ Greene, "In the *Monitor's* Turret," *Battles and Leaders*, Vol. 1, 726.

²⁴¹ Keeler letter to Anna March 9-13, in *Aboard the USS Monitor*, 38.

pilothouse. However, because the *Monitor* had veered off into shoal water while the men assessed the damage, the distance between the two ironclads was now over a mile. To Greene, it appeared obvious that the *Merrimack* was in retreat. Keeler wrote that “she seemed inclined to haul off & after a few more guns on each side, Mr. Greene gave the order to stop firing as she was out of range & hauling off.” Anxiety over their wounded leader, combined with Worden’s continued concern over the safety of the *Minnesota*, caused Greene to abandon the chase and return to the side of the *Minnesota* – to both protect it, and to evacuate Worden from the *Monitor* so that he could receive proper treatment for his wounds.²⁴²

Catesby Jones on the *Virginia*, seeing the *Monitor* out of action and heeding the warnings of his pilot that the tide was receding, made a course for Gosport in order to repair the damage done to his vessel. Richard Curtis recalled that as they headed back to Portsmouth he “looked once more through the port and saw the ‘Monitor’ going as fast as she could toward Fortress Monroe, she had given up the fight.”²⁴³ Both sides claimed victory.

Thus, as naval battles went, it was largely uneventful. The two ironclads danced a slow pas de deux with one another for four hours, testing their capabilities and their armor. But they did so before an international audience. The importance

²⁴² Worden “frequently asked from his bed of pain of the progress of affairs, and when told that the *Minnesota* was saved, he said ‘Then I can die happy.’” Greene, “*In the Monitor’s Turret, Battles and Leaders*, Vol. 1, 727. Greene would be troubled throughout his life about the public perception of his actions that day. While northern newspapers initially excused the lack of pursuit – “The *Monitor* did not pursue, probably on account of the heating of her guns, or some other equally good reason,” reported the *New York Tribune* just days after the battle. But questions would persist and become more shrill and minatory as time passed. The preparation of Greene’s 1884 memoir apparently brought the old demons back. Greene shot himself before the article went to print.

²⁴³ Memoir of Richard Curtis as quoted in *Perspectives on the Civil War*, The Mariners’ Museum, Newport News, VA publication date unknown, 19.

of the two-day battle lay not so much in who won the field on the final day, however. The immediate importance for the Confederates was that they had destroyed Union vessels and had kept the James River from being an easy roadway to Richmond for the Union. For the Union, the blockade, though battered, had been maintained. For the US Navy, Gideon Welles felt that “the action of the 10th [9th], and the performance, power, and capabilities of the *Monitor*, must effect a radical change in naval warfare.”²⁴⁴ For the world, however, the importance had less to do with an action in a civil war in America, and more to do with the future of warship design.

Steam-powered, ironclad vessels made more impervious to both shot and shell soon took the place of the wooden walls of the great Age of Fighting Sail. Steam power and the revolving gun turret would assure that the graceful white wings of sailing ships would give way to the black coal smoke that broke the ships free from old broadside tactics.

²⁴⁴ Welles to Worden, March 15, 1862 in ORN Series I, Volume 7, 38.

Chapter 6: After the Battle

The *Philadelphia Inquirer* of March 10, 1862 reported the following concerning the telegraph cable repairs that were ongoing in Hampton Roads, the cable having parted on the 8th:

The cable to replace the portion lost off Cape Henry ...was landed at Cape Charles at 1 o'clock this (Sunday) afternoon, by Mr. W.H. HEISS, Assistant Manager for the Government telegraphs, who had the immediate charge of the work. Its completion at this opportune moment, to bring the news of the splendid victory of the *Monitor* and the disabling of the *Merrimac*, has saved the county from great anxiety and expense. The delay in the completion of the cable connection has been owing entirely to the continued boisterous weather.²⁴⁵

Thanks to this repair, the news of the battle between the two ironclads had arrived in Washington, DC , New York City and beyond on the evening of March 9. Gustavus Vasa Fox, Assistant Secretary of the Union Navy, had been one of the many thousands to witness the battle. His first telegram that evening was to Gideon Welles reporting on the events of the day, adding that, though her commanding officer was wounded in the battle, "the *Monitor* is uninjured and ready at any moment to repel another attack."²⁴⁶ A second telegram went out a few moments later, from Fox to Ericsson in New York, letting the inventor know that "your noble boat has performed with perfect success, and Worden and Stimers have handled her with great skill. She is uninjured."²⁴⁷ The young telegraph operators at Fortress Monroe steadily tapped out the messages that could now reach points north.

²⁴⁵ *Philadelphia Inquirer*, March 10, 1862, 4. This was the same 'boisterous weather' that kept the *Merrimack* in port on March 6 and nearly sank the *Monitor*.

²⁴⁶ ORN, Series I, Volume 7, 6.

²⁴⁷ ORN, Series I, Volume 7, 7.

Writers from the *New York Times* meanwhile also sent their reports with a Baltimore-bound boat, which left Fortress Monroe at 8 p.m.²⁴⁸

The *New York Times* headlines on March 10 shrieked the news “Desperate Naval Engagements in Hampton Roads,” along with eleven other sub-headlines that took up more space than the actual article. The initial account of the battles of March 8 and 9 as reported by the *Times* observers was printed with the caveat that it was based on what the writer could see through a spyglass at eight miles distance, and from accounts gleaned from “a few panic-stricken non-combatants who fled at almost the first gun from Newport’s News[sic].”²⁴⁹ Later editions printed official telegrams from Fortress Monroe stating that “[e]arly this morning [the *Monitor*] was attacked by the three vessels – the *Merrimac*, the *Jamestown* and the *Yorktown*. After five hours’ contest they were driven off – the *Merrimac* in a sinking condition.”²⁵⁰ The *Philadelphia Inquirer*, in addition to reporting on the cable repairs, devoted the entire front page to the events in Virginia, complete with a map of Hampton Roads outlining both Union and Confederate positions and a dotted line showing the “Route of Reble [sic] Tugs & Sloops” out of Norfolk.²⁵¹

Confederate newspapers naturally told a different story. The Monday, March 10, 1862 edition of the *Norfolk DayBook* crowed about the success of the *Virginia* with the headlines “The Hated Cumberland Sunk!” and “Large Number of Yankees Shot and Drowned!”²⁵² The *Macon Daily Telegraph* from Georgia reported on the

²⁴⁸ NYT, March 10, 1862 early edition, 1.

²⁴⁹ Ibid.

²⁵⁰ NYT, March 10, 1862, late edition, 1

²⁵¹ *Philadelphia Inquirer*, March 10, 1862, 1

²⁵² *Norfolk DayBook*, March 10, 1862, reprinted in the *Macon Daily Telegraph*, March 13, 1862, 3.

“perfect success” of the resurrected *Merrimac*, which “dashed among the Federal craft like a porpoise in a shoal of herrings, scattering, sinking, burning and destroying everything within her reach.” The appearance of the *Monitor* was downplayed, the Union ironclad described as the “curious and formidable nondescript, Erricsson’s [sic] floating battery,” upon which the *Virginia* inflicted considerable damage. The *Monitor* was not a worthy opponent for the *Virginia*, as she was “in no respects a ship” and their meeting was “no fair test of the power of the ram,” as the *Monitor* was more akin to a rock than an adversary. Editors called for more “Merrimacs” to be built. It was clear that the ersatz ironclad *Virginia* had frightened the Union, and particularly the denizens of “Lincolndom,” or Washington, D.C. Editors of the *Macon Daily Telegraph* had also received copies of the *New York Herald’s* account of the battle in which the *Virginia* was said to have left the battle in a sinking condition. The *Telegraph* made a point to report that she had, in fact, returned to Norfolk uninjured.²⁵³

The mail steamer *Arabia* made her normal run from New York to Liverpool via Queenstown and delivered the news to the British papers. Editions of the *New York Times*, *New York Tribune* and others made their way to London, Dundee, Sheffield and beyond. The news became general throughout Britain by March 26, with most major papers having reported some version of the battle by the 30th of the month. Most was repetitious of the American press, with little editorial comment. But by the 31st, the commentary began to take over. Editors at *The London Telegraph* assessed the facts of the battle, and declared that once the action

²⁵³ *Macon Daily Telegraph*, Macon, GA, March 11, 1862, 2., *Ibid.*, March 14, 1862, 1.

was over and “the combatants had had enough...the Merrimac withdrew to Norfolk, and the Monitor to Fort Monroe, like Ajax and Hector, with divided honors.”²⁵⁴ The commentary ends with an exhortation: “We must learn all about this great encounter, and give up, though with a sigh, the thought of ships less costly or complete than the Merrimac and her antagonist. It is fortunate we have already the beginning of our iron navy; we must forge and rivet the rest, at all convenient speed, for we cannot surrender the empire of the sea, and the little Monitor admonishes us that it must belong, for the future, to the best ironmongers.”²⁵⁵

The same day in Parliament, while “the business [of the battle] was of no interest” in the House of Lords, the discussion in the House of Commons echoed the sentiments beginning to be expressed in the news. Monies which had been designated to improve shore defenses at Portsmouth seemed to be ill-spent by some, who argued that funds should instead go to building a fleet of “small iron-plated vessels.”²⁵⁶ Though the debate was eventually dropped in that session, the panic seizing many in Britain was palpable. A commentator with the *Times* mocked the fear when he wrote, “We trembling English, who are thought at New York to be so terribly alarmed as to what will become of the 700,000 fighting men so soon as the war is over, and who are struck with fear lest they should all come over in the Merrimac and the Monitor and blot out this little island, may be re-assured now.” Presumably, the Americans would not have time to attack England as they would be

²⁵⁴ Reprinted in *The Belfast News-Letter* (Belfast, Ireland), Monday, March 31, 1862; Issue 15238

²⁵⁵ Reprinted in *The Belfast News-Letter* (Belfast, Ireland), Monday, March 31, 1862; Issue 15238

²⁵⁶ *Dundee Courier and Daily Argus* (Dundee, Scotland), Tuesday, April 01, 1862; Issue 2695

too busy collecting taxes which would be used to pay the already large war debt.²⁵⁷ But the feeling was general that “[i]n the present state of affairs, something should be done, and at once, if we desire to retain our ancient position among nations.”²⁵⁸

The appearance of the *Monitor* did much to shore up flagging spirits in the Union, particularly after the disheartening losses at Bull Run and in the western theater. The “90 day war” had now been going on for nearly a year. Her “victory” over the “rebel monster” was one that she shared in equally with her men. The officers and crew of the little ironclad were celebrated, to be sure, but the vessel herself became a celebrity in her own right. While ships have always been assigned human attributes, the *Monitor* seems to have been assigned even more sentience than most and was lauded in the same way a human hero would be.

The public on both sides of the conflict in America, and indeed, on both sides of the Atlantic, could not get enough information about the vessels and their officers and crew, it seemed. Engravers rushed to get images of the fight to the curious masses, often letting speed get in the way of accuracy (something that continued to gall John Ericsson). In the South, editors commented on the inaccuracies in the Northern press as well, (inaccuracies concerning the victory of the *Monitor* and the defeat of the *Virginia*) and printed sensational pieces in which the Union naval officers of the *Congress* and *Cumberland* were portrayed as guileless buffoons. All of this was represented as “positive fact.”²⁵⁹ The weekly newspapers such as *Harper’s* and *Leslie’s* in America published pictures of the battle by March 22, and the

²⁵⁷ Reprinted in *The Belfast News-Letter* (Belfast, Ireland), Monday, March 31, 1862; Issue 15238

²⁵⁸ *Dundee Courier and Daily Argus* (Dundee, Scotland), Wednesday, April 02, 1862; Issue 2696

²⁵⁹ *Macon Daily Telegraph*, (Macon, GA), Saturday, March 15, 1862, 2.

Illustrated London News in England followed the next week. *The Penny Illustrated Paper* followed suit in early April, allowing those less affluent in London to also see the two strange vessels that were on everyone's mind.

Fears over imagined ironclad attacks seized the imagination of many, from Secretary of War Edward Stanton's nervousness in Washington, DC, to British acknowledgment that the English had, in fact, been admonished by the little *Monitor*, turned to laments of another kind. The romance of battle, if such a thing could be said to truly exist, seemed as vulnerable as the wooden walls of the *Cumberland* had proven to be in Hampton Roads.

The men themselves, though aware during the battle that they were, in fact, making history, understood that their role was somewhat different from that of fighting sailors of the past. Following the battle, routine on the vessel carried on as usual. Gustavus Vasa Fox came on board at the dinner hour, expecting to find a disabled vessel and lists of killed and wounded. Instead, he found the officers having a "merry party...enjoying some good beef steak, green peas, &c." Surprised, he exclaimed, "Well, gentlemen, you don't look as though you were just through one of the greatest naval conflicts on record." Samuel Dana Greene answered, half in jest, "No Sir, we haven't done much fighting, merely drilling the men at the guns a little."²⁶⁰ Other members of the crew joked that one of their number, an "old deaf

²⁶⁰ Keeler to Anna, March 9-13 letter, in *Aboard the USS Monitor*, 39.

salt” who was on the berth deck, “innocently asked ‘whereabouts the fighting was’” during the battle.²⁶¹

But the men on the *Monitor* felt this subtle shift first – even before they left New York. There is a wistfulness that hovers around the edges of their letters home. In February, William Keeler assured his wife that her “*better half* [would] be in no more danger from rebel compliments than if he was seated with you at home.” He continued, perhaps lamenting more for himself than to reassure his wife, that “there isn’t even danger enough to give us any glory.”²⁶²

“I experienced a peculiar sensation, I do not think it was fear, but it was different from anything I ever knew before,” wrote Keeler to his wife in a long narrative of the battle, stained with the sweat and dirt of the long days. “We were enclosed in what we supposed to be an impenetrable armour – we knew that a powerful foe was about to meet us – ours was an untried experiment & our enemy’s first fire might make it a coffin for us all.” Yet he ends the long report saying “I think we get more credit for the mere fight than we deserve, any one could fight behind an impenetrable armour – many have fought as well behind wooden walls or behind none at all.” The credit, he felt, should go to their courage in actually volunteering to go to sea in an untried experimental vessel.²⁶³ Keeler, though this was his first time in battle, was no stranger to sailing ships, having sailed around the world seeking his fortune in the 1840s and ’50s. His understanding of the enormity of what happened on March 9th must be seen through that lens.

²⁶¹ From the *London Times*, Reprinted in *The Belfast News-Letter* (Belfast, Ireland), Monday, March 31, 1862; Issue 15238

²⁶² Keeler letter to Anna February 13, 1862 in *Aboard the USS Monitor*, 11

²⁶³ Keeler letter to Anna March 9-13, 1862 in *Aboard the USS Monitor*, 34.

In contrast, Fireman George Geer had never been to sea for any extended period, and volunteered with the Navy because he viewed it as having better benefits than the Army. He wrote to his wife Martha, "I often thought of you and the little darlings when the fight was going on and what would become of you should I be killed but I should have no more such fears as our ship resisted every thing [sic] they could fire at her as though they were spit balls [sic] [.]"²⁶⁴ His was the view of a young man who already understood steam and iron technology and accepted the vessel stoically, and without the longing for the past. The acknowledgment that the nature of warfare was changing came quickly in the days after the battle. A reporter from the *London Times* wrote,

Another point to be noticed is the apparently harmless character of a conflict between two of the new monsters. If the five hours' battle now on record is to be an example, the art of defence has gone beyond that of attack, and a sea fight will become more of an amusement than the tournaments between the mail-clad knights of old. There will be a great noise and smoke, a vast expenditure of powder, a deafening rattle of cannon balls on iron plates, a sickening smell of sulphur, and that is all. After all the gun powder has been burned, and all the shot and shell fired away, the two ships may be steered away from each other, to get a few flawed plates replaced, and a fresh supply of ammunition, preparatory to a fresh engagement. Is that to be the character of future sea fights?"²⁶⁵

Mere days after the battle, author Nathaniel Hawthorne visited the "Rat Trap" as he called the *Monitor*. With her coming, he felt that "all the pomp and splendor of naval warfare are gone by." She signaled a sea change that would breed "a race of enginemen and smoke-blackened cannoneers, who will hammer away at

²⁶⁴ Geer to Martha, March 10 1862, Geer Letters, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

²⁶⁵ Reprinted in the *Dundee Courier and Daily Argus* (Dundee, Scotland), Wednesday, March 26, 1862; Issue 2690

their enemies under the direction of a single pair of eyes.” Saddest of all, he felt, was that “heroism...will become a quality of very minor importance.”²⁶⁶

Within a few hours of the March 9 battle, the news was spreading around the country, and the *Monitor* and the *Merrimack* rapidly found their way into people’s speech, into their lives, and into their homes. At the first annual commencement of the Bellevue College, on Monday, March 10, 1862 “one of the finest audiences ever collected” at Irving Hall in New York City listened to remarks from several faculty members, including the inspirational words of Dr. Chapin to the graduates. Chapin used the newspaper headlines to make his point, “that whatever difficulty would arise, science would meet it.” To thunderous applause, Chapin declared that whenever “some portentous *Merrimac* of evil [came] floating out on the waters of our humanity...there was always some Ericsson Battery...some scientific *Monitor* to beat it back.”²⁶⁷

Decks of playing cards featuring the two ironclads appeared for sale on the streets of New York City before the summer of 1862, and Currier and Ives, along with other lithographers, rushed to get images of the battle onto the walls of the public.²⁶⁸ With no photographs of the battle or of the ships to use as references, however, some of the early depictions were based on eyewitness accounts and wishful thinking. Although Hampton Roads was an amphitheatre of sorts for the 20,000 observers who watched the battles of March 8 and 9, not all of them had a

²⁶⁶ Nathaniel Hawthorne, “Chiefly About War Matters” in *The Complete Works of Nathaniel Hawthorne, Volume 12*, (New York: Houghton Mifflin Company, 1883), 336-338.

²⁶⁷ *New York Times*, March 13, 1862, 3

²⁶⁸ Curiously, the New York-based Currier and Ives chose for one of their initial offerings an image of the events of March 8th. It did not sell well.

clear view of the wide-ranging, smoke-filled engagements, so even those who were there were not quite sure what they had seen. The newspapers and printmakers would not let accuracy stand in the way of a sale, however, and provided the public with a vast number of images from which to choose.

Musicians and composers likewise jumped on the ironclad bandwagon. Stephen C. Foster, working in New York, addressed his adopted city's pride in the New York-built *Monitor* in a broadside published shortly after the battle of Hampton Roads:

*The Merrimac, with heavy sway,
Had made our Fleet an easy prey:
The Monitor got in the way;
 And that's what's the matter!
So health to Captain Ericsson,
I cannot tell all he has done:
I'd never stop when once begun:
 And that's what's the matter!
CHORUS – That's what's the matter
The Rebels have to scatter;
We'll make them flee
By land and sea;
And that's what's the matter.²⁶⁹*

Other composers wrote patriotic marches, gallops and polkas, while a popular broadside entreated Captain Ericsson with the musical plea, "Oh, Give Us A Navy Of Iron!."

Southern scribes were no less eloquent; a broadside issued in late March focused on the terror the *Virginia* had inspired in Washington. In it, Seward warns Lincoln that "Jeff. is out in the Merrimac, He's laid the "Congress" on her back; And

²⁶⁹ Broadside 'That's What's The Matter' by Stephen C. Foster, published by Chas. Magnus, 12 Frankfort St. NY. 1862

driven the "Cumberland" off the track , And will chase US yet out of Washington."

Clearly the two ironclads had struck a chord in popular culture on both sides.

Union supporters around the country adopted the *Monitor* as a national symbol. The supplement to the San Francisco *Evening Bulletin*, July 4, 1862, excitedly reported that the "Fourth of July commenced earlier than usual this year. Instead of patiently waiting until midnight it went off half cocked on the evening of the third, as the sun sank." All night long in this West Coast city, thousands of miles removed from Hampton Roads, the firecrackers continued to go off until finally at sunrise, as though the populace could not stand another moment of anticipation, the bells began tolling throughout the city—a joyous sound to all but those who had indulged too much the evening previous.

Over forty thousand flags festooned the city, and finally, by 11 a.m., several divisions organized themselves and made up a parade which stretched for blocks; led first by military units, the parade also sported firemen, riggers and stevedores, several occupations and fraternal societies as well as ethnic organizations. Wagons "loaded dangerously with brewers" followed giant milk-cans in festooned carts while costumed children, brass bands and the Sons of the Feenian Brotherhood marched loudly down the street. The fifth division of the parade appeared, "headed by Hunnewell's brass band, who before they get through the march may injure their lungs if they have not a care. 'The Union must and shall be preserved,' is the leading motto of this part of the long yet attractive pageant...."

The piece-de-resistance in this part of the procession, though, came lumbering slowly along in the rear; "a monster model of the famous *Monitor*, 41 feet

long and 10 feet in the beam” which was almost one quarter the size of the original, still on duty in the James River in Virginia. To populate the ersatz ironclad with a crew, there were “any number of little jack tars” there to help man the “two big guns in the revolving turret.” The float was well received, though its handlers found it “rather harder to handle in our streets than was its famous namesake in Hampton Roads.” All this was followed by a parade of wagons, one of which bore the slogan “Pure Beef for friends of the Union – the points of our knives for its foes.”²⁷⁰ A new broadside ballad hit the streets of Philadelphia shortly after the March 9 battle. It boasted: “The Monitor went smack up to the Merrimac, and upon her sides played Yankee Doodle Dandy, O!” The *Monitor* and her crew had become celebrities of the same magnitude as Jenny Lind. From the derisive jeers of January 30 had come an adoration bordering on the idolatry that Commander Charles Davis had warned Bushnell against back in the late summer of 1861.²⁷¹

While the men of the *Monitor* recalled the silence before the battle, what they recalled after was the realization that “there [wasn’t] enough danger to give us glory.” The author Herman Melville summed it up rather gloomily when he wrote of the battle of the ironclads in his poem *A Utilitarian View of the Monitor’s Fight* from *Battle Pieces* of 1866:

*Yet this was battle, and intense --
Beyond the strife of fleets heroic;
Deadlier, closer, calm 'mid storm;
No passion; all went on by crank,*

²⁷⁰ From the *Evening Bulletin – Supplement*, San Francisco, Saturday Evening, July 5, 1862 Vol. XIV, No. 76,1

²⁷¹ Davis said “take the little thing home and worship it, as it would not be idolatry, because it was in the image of nothing in the heaven above or on the earth beneath or in the waters under the earth.”

*Pivot, and screw,
And calculations of caloric.*

He ends with the pronouncement that “War shall yet be, but warriors/Are now but operatives...”²⁷² The ironclad age may have made war efficient , but many of the men were not comfortable settling into their new role of “operatives.”

Following the battle, the *Monitor* became a celebrity, a tourist attraction, and the object of a tug of war between the Army and the Navy. She also required repairs, and a new commanding officer as well. Thus early on the morning of March 10, she repaired to Fortress Monroe and later in the day received Thomas O. Selfridge as her next commanding officer.²⁷³ Selfridge had been attached to the USS *Cumberland* when she came under fire of the *Virginia* on March 8. He had survived by jumping overboard as the vessel was sinking. Now he found himself on the ironclad that had challenged the might of the rebel monster. He regaled the crew with his tales of the events of March 8 on board the doomed *Cumberland*.²⁷⁴ But his appointment was brief, and he was relieved as soon as Lieutenant William N. Jeffers could arrive to take command of the ironclad. A brilliant ordnance officer, Jeffers was Flag Officer Goldsborough’s choice to be the new commanding officer. He would have the longest tenure of any commanding officer on the *Monitor*. Though he had not yet been aboard the *Monitor*, when he first took possession of her he felt he knew her, and expressed his dismay at how the press had reported on the Union ironclad a bit *too* well. He remarked to a newspaper reporter who was on hand that if he [Jeffers] “knew as much of the *Merrimac* from newspaper

²⁷² Herman Melville, *Battle-Pieces and Aspects of the War*, New York, Harper & Brothers Publishers (1866).61-62.

²⁷⁴ Keeler letter to Anna, March 31, 1862 in *Aboard the USS Monitor*, 65.

descriptions and pictorial representations and diagrams as the rebels know of the *Monitor*, I would go up and sink her before sundown!”²⁷⁵

Because the Confederates had confounded General McClellan’s brilliant Urbanna plan, forcing him to resort to his less brilliant Peninsular plan, McClellan had obviously not been able to neutralize the *Virginia* before she came out on March 8. But with the *Monitor* now on hand, McClellan reasoned that this would be easy. Yet neither McClellan nor Goldsborough wished to risk failure. Further complicating matters, President Lincoln himself had ordered that the *Monitor* not be risked in any fruitless confrontation with the *Virginia*. Her weaknesses were now known. The *Monitor* crew chafed under this restriction, and felt as though they were being treated in the same way that “an over careful house wife regards her ancient china set—too valuable to use, too useful to keep as a relic, yet anxious that all shall know what she owns & that she can use it when the occasion demands though she fears much its beauty may be marred or its usefulness impaired.”²⁷⁶ The ship had been placed in “a big glass case...for fear of harm coming to us.”²⁷⁷ The *Virginia* seemed to taunt them, as she remained just out of their reach, “smoking, reflecting, & ruminating” each day until sunset when “she slowly crawled off nearly concealed in a huge, murky cloud of her own emission, black & repulsive as the perjured hearts of her traitorous crew,” lamented Keeler.²⁷⁸

²⁷⁵ *Bangor Daily Whig & Courier*, April 19, 1862, 2.

²⁷⁶ Keeler letter to Anna, March 30, 1862 in *Aboard the USS Monitor*, 63.

²⁷⁷ Keeler letter to Anna, April 15, 1862 in *Aboard the USS Monitor*, 83.

²⁷⁸ Keeler letter to Anna, April 15, 1862 in *Aboard the USS Monitor*, 106.

While William Keeler referred to their new commander Jeffers as a “cool, cautious, careful brave man,” many members of the crew felt otherwise. The lack of action against the *Virginia* was wearing upon them, and the crew believed it to be the fault of Jeffers himself, rather than a result of following overly cautious orders. On April 24, 1862, the crew posted a letter to Lieutenant Worden:

1862

April 24,

U.S. *Monitor*

To our Dear and Honored Captain,
Dear Sir,

These few lines is from your own crew of the *Monitor* with their kindest love to you their Honored Captain hoping to God that they will have the pleasure of welcoming you back to us again soon for we are all ready, able and willing to meet death or anything else only give us back our own Captain again. Dear Captain we have got your pilot house fixed and all ready for you²⁷⁹ when you get well again and we all sincerely hope that soon we will have the pleasure of welcoming you back to us again for since you left us we have had no pleasure on board of the *Monitor*. We once was happy on board of our little *Monitor* but since we lost you we have lost all that was dear to us. Still we are waiting very patiently to engage our antagonist if we could only get a chance to do so. The last time she came out we all thought we would have the pleasure of sinking her but we all got disappointed for we did not fire one shot and the Norfolk papers say we are cowards on the *Monitor* and all we want is a chance to show them where it lies. With you for our captain we can teach them who is cowards but there is a great deal that we would like to write to you but we think you will soon be with us again yourself. But we all join in with our kindest love to you hoping that God will restore you to us again and hoping that your sufferings is at an end now and we are all so glad to hear that your eye sight will be spared to you again. We would wish to write more to you if we have your permission to do so but at present we all conclude by tendering to you our kindest love and affection to our dear and honored Captain.

We remain until death your affectionate crew....

The *Monitor* Boys²⁸⁰

²⁷⁹ Repairs to the pilothouse were not fully complete until May 5, 1862 according to the log book. Logbook of the USS *Monitor*, May 5, 1862, 52.

²⁸⁰ April 24, 1862 letter, John Lorimer Worden papers, Abraham Lincoln Library and Research Collection, #80-1364, ALS, 1 p., AE, 1.

Despite the sentiments of the men, Worden was not returned to the *Monitor* and Jeffers would remain with the vessel until August.²⁸¹

Bushnell's ironclad *Galena* arrived in Hampton Roads the same day that the crew posted their letter to Worden and joined the other vessels in the Union Blockade which also included a small ironclad battery, the *Naugatuck*, the miniature offspring of the permanently stalled Steven's Battery project.²⁸² At 100 feet in length, the *Naugatuck* carried a single large gun in its tower, a stationary turret-like structure. While the men on the *Monitor* were happy to have the support, neither of these two ships appeared to be any sort of a match for the *Virginia*. Admiral Goldsborough was unimpressed with the *Galena*, saying she was "beneath naval criticism."²⁸³

In the early morning hours of May 3, Acting Master Edwin Gager noted in the *Monitor's* log book that the sound of "[h]eavy firing in the direction of Yorktown" was heard throughout the Roads, a sound which continued throughout the day.²⁸⁴ This was the sound of the final day of McClellan's siege on Yorktown. Having overestimated the Confederate force significantly, and lacking the Union gunboat support he had requested (as the menace of the *Virginia* seemed a more immediate and real danger, which led Goldsborough to keep the fleet in the Roads), McClellan

²⁸¹ Geer letter to Martha, July 1, 1862, George Geer Papers, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

²⁸² Log book of the USS *Monitor*, April 24, 1862, 48.

²⁸³ Quoted in Keeler letter to Anna, May 4, 1862 in *Aboard the USS Monitor*, 102. Goldsborough reiterates this statement in his unofficial correspondence to Gustavus Vasa Fox following the Battle of Drewry's Bluff, dated May 21, 1862 in *Confidential Correspondence of Gustavus Vasa Fox, Volume I*, 272.

²⁸⁴ *Monitor* Log book, May 3, 1862, 51.

believed that siege was the only way to take Yorktown.²⁸⁵ The Confederates at Yorktown, under the command of General John Bankhead Magruder, took this opportunity to abandon the old colonial port, massing their forces further west up the peninsula. Like Mahone the year before, Magruder had created a ruse to provide the illusion of a great number of troops, and many of the guns at Yorktown were nothing more than large wooden logs painted black. The Confederates had “magnified their defences and humbugged,” wrote Fox to Goldsborough.²⁸⁶

President Lincoln arrived in Hampton Roads in May of 1862, a not-so-subtle message that the President was growing increasingly impatient with his “Little Napoleon,” General McClellan. Accompanied by Secretary of War Edwin Stanton and Secretary of the Treasury Salmon Chase, the men arrived in the USRCS *Miami* on the evening of May 6.²⁸⁷ Acting Volunteer Lieutenant William Flye wrote in the *Monitor’s* log on May 7 that at “1 P.M. President Lincoln & suite came on board.”²⁸⁸ Lincoln, who was keenly interested in new technology and in the vessel he had approved in the fall of 1861, desired to see the *Monitor* for himself. He had read with interest all of the official reports of the battle and his questions to the officers and crew showed that he had studied their vessel in detail.²⁸⁹ Lincoln did not stay long, however, on his first visit to the *Monitor*. As he and his party were departing, the cry went up that the “*Merrimac* was...coming around Sewall’s Point apparently

²⁸⁵ Dougherty and Moore, *The Peninsula Campaign*, 82.

²⁸⁶ Fox to Goldsborough, May 7, 1862 in *Confidential Correspondence of Gustavus Vasa Fox, Volume I*, 266.

²⁸⁷ USRCS stands for United States Revenue Cutter Service, the forerunner of the US Coast Guard.

²⁸⁸ Log book of the USS *Monitor*, May 7, 1862, 53.

²⁸⁹ Keeler letter to Anna, May 7, 1862 in *Aboard the USS Monitor*, 107.

bound straight for us.”²⁹⁰ Yet like so many other appearances of the Confederate ironclad, this was yet another tease. That evening, President Lincoln personally led a reconnaissance party onto the Norfolk shore and, while there, accepted the surrender of several civilians, all actions which McClellan had failed to do despite Lincoln’s urging.

The weeks of inaction were finally over, and the men of the *Monitor* prepared their vessel for the bombardment of Sewell’s Point with incendiary shells. The *Monitor* was joined by the *Seminole*, *Dacotah*, *Susquehanna*, *San Jacinto* and *Naugatuck*. The fleet rained “an uninterrupted storm of iron...into the rebel defenses,” except for the *Naugatuck*, which, far to the rear of the action, sent exploding shells into the midst of her own fleet. Captain Jeffers remarked to his paymaster, “Why the beggar...we are in more danger from him than the enemy!”²⁹¹ Lincoln and his party remained far nearer the action than the tiny *Naugatuck*.

The attack was of short duration. The Confederate forces within the fortifications were small in number and were unable to return effective fire. Shelling continued throughout the following day, and the *Virginia* continued to be a menacing, yet distant presence. Still under orders not to engage the Confederate ironclad directly, Jeffers left her alone, to the chagrin of his men. They did not want the *Galena* or any of the other gun boats to be the vessel that destroyed the *Virginia*. Let them have the *Jamestown*, *Yorktown*, and *Teaser*, only save the “Big Thing,” as the men called the *Virginia*, for the *Monitor*. They desired to once again take her on

²⁹⁰ Keeler letter to Anna, May 7, 1862 in *Aboard the USS Monitor*, 107.

²⁹¹ Keeler letter to Anna, May 8, 1862 in *Aboard the USS Monitor*, 110.

single-handed, “as a crowning glory to our career so finely commenced,” wrote Keeler.²⁹²

Lincoln’s personal reconnaissance had identified the Ocean View section of Norfolk as a likely spot to begin the invasion. Accordingly, on the morning of May 10, 1862, Union forces landed on the shore and began moving inland. By 5 p.m. they had reached downtown Norfolk where the Mayor, William Lamb, had staged an elaborate surrender ceremony involving presenting the “keys to the city” to the Union commander, a ruse which allowed the Confederate army time to leave the town. A principal objective for the Confederates was to destroy the Navy Yard. In an eerie replay of the events of April 20, 1861, flames once again engulfed Gosport, this time set by Confederate hands. In the frantic rush, Confederate Major General Benjamin Huger neglected to inform Commander Josiah Tattnall, now in command of the CSS *Virginia*, that Norfolk had fallen earlier than anticipated.

The *Virginia* was now without a home and Tattnall was faced with a dilemma. If he attempted to attack the Union fleet, he had some hope of destroying several vessels before being sunk, or worse, captured. He rejected this plan because of the risk of being taken. Making a run for the open waters of the Bay was impossible because the only channel deep enough for his vessel’s deep draft ran directly between the massive guns of Fortress Monroe and the Rip Raps (now Fort Wool). Though an ironclad, the *Virginia* could not withstand that withering fire. Some officers reportedly suggested that they abandon her to the enemy, wait for the celebration they knew would come, and sink the ram with the carousing Union

²⁹² Keeler letter to Anna in *Aboard the USS Monitor*, 114.

sailors on board. However, the only viable option was to lighten the vessel's load enough to allow her to pass over the James River bar and thus allow her to steam to Richmond for that city's defense.

Accordingly, all available material was taken off the ship, with the crew working well into the night throwing everything they could overboard. They had succeeded in gaining three feet of draft when the wind abruptly changed around midnight. The *Virginia's* pilots opined that the westerly wind would drive the tide out more significantly and the vessel could never get past the bar. Only one course of action remained. Just as she had been destroyed to keep her from enemy hands a little over a year before, now the vessel faced destruction by her own men once again. At 2 a.m. the call was given for the *Virginia* crew to "splice the main brace" by drinking a double ration of grog. Then Tatnall ordered the vessel run aground at Craney Island and the men told to evacuate. A small detachment rigged the vessel to explode, and set her ablaze. Richard Curtis, who had manned one of the *Virginia's* guns recalled, "[t]hus the finest fighting ship that ever floated on American waters at that time came to an untimely end at the hands of her friends, with no enemy within 8 or 10 miles of her--a sad finish for such a bright beginning."²⁹³

Early in the morning of May 11, 1862, fireman George Geer recalled that "a very large Explosion took place and nothing could be seen of the Merimack [sic] after it."²⁹⁴ The *Monitor* boys had been robbed of their chance to destroy the Confederate ironclad. They steamed up the Elizabeth River towards Norfolk the

²⁹³ Richard Curtis, *History of the Famous Battle*, part two.

²⁹⁴ Geer letter to Martha, May 11, 1862, George Geer Papers, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

following morning. On the way the *Monitor* crew got their first glimpse of what was left of the *Virginia*. Several collected souvenirs to send home. Arriving in Portsmouth, they tied up at the *Virginia*'s old moorings in Gosport, under the curious and quietly hostile eyes of the locals. Lincoln and his retinue steamed past the *Monitor*, the President doffing his signature hat to the crew and bowing in thanks for their part in the action. After a brief conference, Goldsborough ordered Jeffers back to Hampton Roads and then on to Richmond the next day.²⁹⁵

The *Monitor* and the *Naugatuck* began to move up the James River. While fortifications at Day's Bluff in Isle of Wight County lobbed a few shots at the *Monitor*, no one was harmed. Rendezvousing with the *Galena*, *Aroostook* and *Port Royal* at Jamestown Island, the *Monitor* and *Naugatuck* led the fleet further up river. As the width of the river began to close in, Confederate sharpshooters who haunted the banks of the James River became a principal concern. The men of the *Monitor* thus found themselves largely confined below. Anchoring at night, the fleet set pickets on shore, with the men of the various vessels standing two hour picket duty throughout the night.²⁹⁶

While the two ironclads would not meet again in battle, their crews would meet once more at Drewry's Bluff. Catesby ap Roger Jones, who had commanded the *Virginia* against the *Monitor* on March 9, would face the Union ironclad again, commanding many of the same men. Leaving their burning vessel behind, several of the crew of the *Virginia* moved west, following the James River, to a bend a few

²⁹⁵ Keeler letter to Anna, May 12, 1862, in *Aboard the USS Monitor*, 121.

²⁹⁶ Geer letter to Martha, May 15, 1862, MS10, Geer Letters, The Mariners' Museum Library and Archives,; Newton letter to his Mother, May 14-19, 1862, Isaac Newton Papers, MS13, The Mariners' Museum Library and Archives, Newport News, VA.

miles downriver from Richmond. There, high on a bluff stood the fortifications known as Fort Darling, where the Confederates had placed several large guns. The *Virginia's* consorts, the *Jamestown* and *Yorktown*, were found by the Confederates to be more useful as sunken obstructions to navigation than as gunboats. The Confederates had robbed the Union fleet of two more prizes, it seemed.

On May 15, 1862, the Union fleet began its attack on Fort Darling, situated high on Drewry's Bluff. Captain Jeffers, attempting to aim the guns more effectively, stationed himself behind a barricade of rolled-up hammocks atop the turret for part of the action.²⁹⁷ Yet there was no possibility of claiming victory for the *Monitor* in this engagement; she and her consorts could gain no advantage over the fortification up on the bluff, nor could the *Monitor* elevate her guns far enough, a serious design flaw that would make turreted vessels ineffective against such high fortifications. The ventilation within the turret, though fine during the cool morning of March 9, was inadequate to handle the warm May day. Temperatures within the turret rose to an oppressive 140 degrees and several of the gunners fainted from a combination of the heat and gases from the gunpowder and engine, as well as smoke and heat from lamps and the "emanations" from the sixty men who had been enclosed in the "fetid atmosphere" for hours. The *Monitor* proved to be "a mighty hot concern in warm weather."²⁹⁸

The *Monitor's* sister-ironclad the *Galena* engaged with the fortifications at Drewry's Bluff as well, but as Goldsborough had intimated, the *Galena's* design

²⁹⁷ Jeffers to Goldsborough, May 22, 1862 in ORN Series I, Volume 7, 27.

²⁹⁸ Newton letter to his Mother, May 14-19, 1862, Isaac Newton Papers, MS13, The Mariners' Museum Library and Archives, Newport News, VA.; Jeffers to Goldsborough, May 22, 1862 in ORN Series I, Volume 7,27.

proved to be entirely unable to withstand the plunging fire from the bluff and was pierced through seventeen times. The fleet was forced to retreat down the James. It was reported, though the story is perhaps apocryphal, that Lieutenant John Taylor Wood, formerly of the CSS *Virginia*, called out from the fortification: “Tell Captain Jeffers *that is not the way to Richmond.*”²⁹⁹

The aftermath of the battle on board the *Galena* was a scene of horror to the men of the *Monitor* who went aboard to assess the situation. Body parts lay strewn throughout the gun deck with brains and lumps of flesh spattered on the guns, tackle and bulkheads. The *Monitor*, in contrast, sustained three hits to her turret and no casualties, though many men were reported ill the following day as a result of “river water & foul air in the ship.”³⁰⁰ The crew also expanded by one, when during the night of May 16, 1862, a young black man rowed to the *Monitor* from the north shore of the James River. Thinking him to be a Confederate boarder, the men standing watch fired a warning shot and sounded the alarm that a boarding party had been sighted. Twenty-four year old Siah Carter, an escaped slave from Shirley Plantation, called out to the crew that he was a black man, and no threat.³⁰¹ Because of his knowledge of the area, he was taken aboard as a crew member—contraband of war—and rated as a cabin boy.

²⁹⁹ Robert Alonzo Brock and Virgil Anson Lewis, *Virginia and Virginians: eminent Virginians ... History of Virginia from settlement of Jamestown to close of the Civil War, Volume 2* (Richmond, VA: H.H. Hardesty, 1888), 437.

³⁰⁰ Keeler letter to Anna, May 12-16, 1862 in *Aboard the USS Monitor*, 130; Geer letter to Martha, May 16, 1862, George Geer Papers, MS10, The Mariners’ Museum Library and Archives, Newport News, VA.; Log book of the USS *Monitor*, May 16, 1862, 57.

³⁰¹ Keeler letter to Anna, May 12-16, 1862 in *Aboard the USS Monitor*, 130; Geer letter to Martha, George Geer Papers, MS10, The Mariners’ Museum Library and Archives, Newport News, VA.; Log book of USS *Monitor*, May 16, 1862, 57.

The experience at Drewry's Bluff showed the limitations of the *Monitor's* design. While Alban Stimers had already relayed many of his observations to Commodore Smith, and Secretary Welles in March and April, Captain Jeffers was eager to share his observations with Goldsborough, and other navy official because several other vessels of this type had been ordered as early as March 17, and were already being built:

First. With her present guns, she cannot engage another iron-plated vessel of good construction with advantage. The ball has not sufficient velocity to penetrate, and must rely on its smashing effects only. It would not penetrate, though it might shatter, an inclined side of four (4) inches, well backed with wood, or our own vertical side.³⁰²

The *Monitor's* XI-inch Dahlgrens with their fifteen-pound charges were clearly not powerful enough to effect any damage on a Confederate ironclad. The next class of monitors under construction, the *Passaic* class, would carry an XI-inch and a XV-inch Dahlgren in their larger turrets. He continued:

Second. Although she manoeuvres very quickly, her speed is not six knots at a maximum. She must, therefore, as against a vessel, await the enemy's pleasure to close, and is much trammelled, as herein before stated, by the limitation of the field of fire to 220° of the 360°.

Jeffers had experimented with the turret's range of fire prior to moving up the James River. He found that the guns could not be fired forward any nearer than 30° to either side of the pilot house without deafening the persons within. He told Goldsborough: "I tried this experiment myself, and the pain and stupefaction caused by the blast of the guns satisfied me that half a dozen similar discharges would render me insensible." Furthermore, he found, that it was not prudent to fire aft

³⁰² Lieutenant William Jeffers in *Report of the Secretary of the Navy in Relation to Armored Vessels*, (Washington, D.C.: Government Printing Office, 1865), 29.

within 50° to either side of the boilers as any mistake could cause the boilers to leak at best, and explode at worst.

He further pointed out that this vessel design would only be effective against a fortification if both were at the same level, yet he felt that being a small target yielded a monitor-class vessel some level of safety. He also observed that “a solid shot, of ten-inch and higher calibres, fired with heavy charges, striking near the same spot half a dozen times at short ranges, would dislocate the turret plates, drive in fragments, and end by coming through.” But most crucially, he wrote to Goldsborough, was her mode of ventilation, for “either in action or at sea, the loss of the vessel might readily be cause by *the failure of a leather belt.*”³⁰³

By June, the *Monitor*'s log book entries become a litany of temperatures, and both the vessel and the men began to cranky. One June 2, 1862, William Flye noted that “at 5 am got underweigh & proceeded up the river followed by the rest of the fleet. At 8 am anchored in consequence of a derangement of the engine.”³⁰⁴ This fault in the engine meant that the blowers were not functioning properly as a result. On June 12 Flye, standing the afternoon watch wrote, “[A]t 1 pm thermometer stood 142 degrees inside the galley, the door being open and the blowers of the engine being in action.” By the next day at noon, Acting Master Louis Stodder was able to report that the “thermometer stood at 165 in the galley.” On the 14th the engine was once again deranged and the temperatures soared. The celebrated flushing toilets were heated to a fetid 131 degrees. A cool front brought some relief for the next several days, but at 1:30 a.m. on June 23, Stodder and his watch discovered a fire

³⁰³ Jeffers to Goldsborough, May 22, 1862 in ORN, Series I, Volume 7, pp 27-29.

³⁰⁴ Log book of USS *Monitor*, June 2, 1862, 66.

around the stovepipe of the galley. Though they were able to extinguish it, there was enough damage to take the galley out of commission for several days.³⁰⁵ During this time, John Ericsson rather uncharacteristically sent a sympathetic note to his friend Isaac Newton saying, "I admit that you have had a very severe trial and cannot imagine anything more monotonous and disagreeable than life on board the *Monitor*, at anchor in the James River, during the hot season." ³⁰⁶

To make matters worse on the James, Paymaster Keeler had initially miscalculated the timing of fresh provisions, so they had gone up river at a deficit. Geer complained to his wife about how the Paymaster was new and green and because of his inexperience they were having to use molasses in their coffee. Supplies did arrive, however, and while the men complained about all of the tasty sesesh beef walking around on the banks of the James, they did eventually manage to get fresh food throughout the summer. In fact, Keeler noted that "...a portion of our iron deck has been converted into a stock yard containing just at present, one homesick lamb, one tough combative old ram, a consumptive calf, one fine lean swine, an antediluvian rooster & his mate, an old antiquated setting hen..."³⁰⁷

The late spring and summer of 1862 was a difficult one for the *Monitor* boys. Unable to return fire effectively against shore batteries, suffering from the heat, bad food and incessant mosquitoes, they found that they spent their time up the James River ultimately more for national morale than for any direct martial purpose. Chief

³⁰⁵Log book of USS *Monitor*, June 1862, 66-80.

³⁰⁶ Ericsson to Newtown, June 26, 1862, Isaac Newton Papers, MS13, The Mariners' Museum Library and Archives, Newport News, VA. Ericsson also praised Newton's penmanship, saying that Newton was "quite an exception to the general rule that engineers write miserably..."

³⁰⁷ Keeler to Anna, June 16, 1862 in *Aboard the USS Monitor*, 156.

Engineer Isaac Newton quipped to his mother that “if that’s the case morale effect must be pretty well strewed along the river in these parts from the number of times we have passed up & down....”³⁰⁸ In the heat the officers were also chafing under the ultimate command of Admiral Goldsborough, a man “whose principle qualifications are immense size, big feet & the faculty of using neat, heavy round oaths when the occasion permits,” recalled Newton. What galled both officers and men was the fact that while they were sweltering on the James, Goldsborough was “quietly rustivating on board the *Minnesota* in Norfolk Harbor.”³⁰⁹

The officers joined the lamentations of the crew over the command of Lieutenant William Jeffers, whom they all agreed was an ordnance genius, but the praise largely stopped there. Newton wrote, “Although I acknowledge the professional ability of our commander I must say he is the personification of selfishness....” George Geer, promoted by Newton to the rank of Engineer Yeoman following the Drewry’s Bluff engagement, was less generous: Jeffers was a “damd old Gluttonous Hogg,” he wrote Martha, and added that “I hope the curse of Hell will rest on him.”³¹⁰ Keeler merely remarked of the experience, “[W]hat with heat, mosquitoes & a gouty captain have nearly gone distracted...” and lamented Jeffers’ “extreme selfishness & his want of decisive energetic action.” The effusive Keeler had lost his confidence in the captain as well.³¹¹

³⁰⁸ Newton to his mother, June 30, 1862, Isaac Newton Papers, MS13, The Mariners’ Museum Library and Archives, Newport News, VA.

³⁰⁹ Ibid.

³¹⁰ Geer letter to Martha, July 1, 1862, George Geer Papers, MS10, The Mariners’ Museum Library and Archives, Newport News, VA.

³¹¹ Keeler letter to Anna, June 23, 1862 in *Aboard the USS Monitor*, 162.

The fleet attempted to steam up the Appomattox River in late June in an attempt to destroy a railroad bridge at Swift Creek and thus cut off a critical supply route for the Confederates. Isaac Newton complained that “the inevitable *Monitor*” was going to be “dragged along up this dirty shoal river, gracious only knows for what purpose except to be stuck & abandoned.”³¹² On the evening of June 26, a spectacular diverting fire was taken up by the *Galena* and the *Port Royal* so the small gunboats could achieve their objective. Yet the Appomattox proved too treacherous; The *Monitor*, together with three gun boats “got in a perfect mess on the bar,” recalled Newton and several vessels ran aground. In addition, many in the small boats detailed to row ahead and set fire to the bridge feared that there might be Confederate sharpshooters along the banks of the river which had narrowed considerably around the fleet as they steamed further in. The assembled officers of the small fleet determined it was too dangerous to press on, and the fleet, once they had been re-floated, in some cases had to steam backwards out of the narrow river. One small steamer, the *Island Belle*, could not be refloated and was destroyed.

The mission was a failure, according to Keeler; “Four or five thousand dollars worth of ammunition expended, one Steamer...burned, a large quantity of whiskey drank, with what result? A number of people badly frightened & the corner of a house knocked off....”³¹³ It was an ignominious chapter in the *Monitor*'s career, yet one that went largely unmentioned. Historian Chuck Veit writes that “[i]n the end, all was for naught, and, had the story of the Appomattox River raid not been lost in

³¹² Newton to his mother, June 30, 1862, Isaac Newton Papers, MS13, The Mariners' Museum Library and Archives, Newport News, VA.

³¹³ Keeler letter to Anna, July 4, 1862 in *Aboard the USS Monitor*, 169-171.

the climax of the Seven Days Battles, any serious investigation of the failed raid would have resulted in rejoicing that it had not ended much the worse for the Navy and the nation.”³¹⁴

There was one small success shortly after the Appomattox raid, however. In the final days before McClellan’s retreat, the *Monitor* and the steamer *Maratanza* happened upon their old foe the CSS *Teaser* at Turkey Island in the James River. Commanded by Hunter Davidson, late of the CSS *Virginia*, the *Teaser* was transporting Confederate army officers to locations near Chaffin’s Bluff on the James. Two shells from the *Maratanza* disabled the *Teaser* and all on board leapt into small boats and “skedadled” ashore, leaving papers and other war material on board. Among the items captured were diagrams of mines laid by the Confederates in the James River near Richmond, and, of particular importance to the men of the *Monitor*, Hunter Davidson’s private memorandum book which outlined a clever attack plan on the *Monitor* which had been forthcoming. Diagrams of the *Monitor* were included, with written instructions on how the *Monitor* was to be “boarded from four tugs at the same time...by men carrying turpentine, ladders, fire balls, wedges, sheets of metal, chloroform &c.”³¹⁵

Ultimately, the Union did not take Richmond in the spring and summer of 1862. The *Monitor* had spent her time on the James, first supporting McClellan’s advance, and then, with the failure of the Seven Days campaign in early July, his retreat. Her morale effect had not been enough to take Richmond. Yet the public still

³¹⁴ Chuck Veit, “The Raid That Wasn’t: The Navy Attack on the Petersburg Railroad, 26-28 June 1862,” http://www.navyandmarine.org/ondeck/1862AppomattoxRaid.htm#_ftnref31, 2007.

³¹⁵ Keeler letter to Anna, July 4, 1862 in *Aboard the USS Monitor*, 183-184.

wanted to know more about her. From the entreaties of Confederate spy Rose Greenhow to come on board to “see how you look inside,” as she was being taken back to Richmond as part of a prisoner exchange, to continued coverage in *Harper’s Weekly*, the *Monitor* and her men were celebrities.³¹⁶ Yet all of the images of the vessel to that point had been hand drawn, painted, or engraved. Therefore, as the Union fleet retreated down the James River, Union photographer James F. Gibson came on board to document the celebrated ironclad and her crew. It was also hoped that Gibson’s visit to the ironclad would coincide with President Lincoln’s next visit.

Both Gibson and Lincoln visited the *Monitor* on July 9, 1862, as she lay anchored off Berkeley Plantation on the James River. Lincoln arrived at 7:45 a.m., before Captain Jeffers was awake. Lincoln had a boat sent for Goldsborough to attend him on the *Monitor*. The meeting was apparently brief, and both men left before Jeffers ever made his appearance. Goldsborough had been relieved of command and Captain Wilkes would be taking over as Flag Officer that afternoon.³¹⁷ Gibson arrived in the afternoon as well and though the President had left, he took eight photographs of the men of the *Monitor*, the only known photographs of the vessel extant. Some of the shots seem composed in order to take in the still-visible battle damage on both the hull and the turret while other shots are clearly taken to show the officers and crew. One image of the crew shows a young black man crouched in the foreground, possibly Siah Carter from Shirley Plantation. Next to him a makeshift galley sits on the weather deck, a remnant from the fire on June 23. Another crew shot shows the men more relaxed, some playing checkers while

³¹⁶ Keeler letter to Anna, June 3, 1862 in *Aboard the USS Monitor*, 145-6.

³¹⁷ Log book of *USS Monitor*, July 9, 1862, 84.

another reads the newspaper, seemingly unaware his portrait is being made. Three photographs show the officers in various combinations, joined by a Lieutenant from the *Galena*. A final photograph shows Jeffers alone, a visual testament to his alienation from his men. Copies of the photographs were given to the men, some of whom sent them home to their families.³¹⁸ The fatigue and frustration is lined upon their faces.

William Keeler on hearing Wilkes's appointment in Goldsborough's stead expressed his frustration with naval affairs to his wife: "A great mistake is made in appointing superannuated old fogies whose life & energies are used up to these important commands when a younger man of life, energy & enterprise is so much needed."³¹⁹ To add to their woes, the news had been spread that the Confederates had been working upon a "*Merrimac* No. 2" known as the *Richmond*. Originally under construction at Gosport, her incomplete hull had been towed to Richmond in advance of the fall of Norfolk in May, and Confederate deserters had described her progress to the *Monitor* crew over the summer. Each puff of smoke on the horizon seemed to the men of the Union fleet to be a harbinger of the new Confederate naval threat. "*Merrimac-on-the-brain*" was as "disease" thought to be rampant among the Union navy command. The Confederate army for its part would occasionally shell the Union positions, and small shore batteries battered Union gunboats on patrol, further adding to the discontent. Then, in mid-July came the unkindest cut of all: the US Congress passed an act banning spirituous liquor on board Union vessels unless

³¹⁸ Keeler letter to Anna, July 25, 1862 (1st letter) in *Aboard the USS Monitor*, 192-193. Wilhelm Durst in a letter home, Irwin M. Berent Collection, MS164, The Mariners' Museum Library and Archives, Newport News, VA.

³¹⁹ Keeler letter to Anna, July 25, 1862 (2nd letter) in *Aboard the USS Monitor*, 195.

for medicinal purposes. The ban would take effect on the first of September, though any alcohol already on board at that time would be allowed. The grog ration would be a thing of the past, and for many men, the slight raise in pay in exchange for the ration would be cold comfort. Bottles of hair tonic and bitters found in the wreck of the *Monitor* may be examples of attempts to circumvent this ruling. One day after the order went into effect, Officer's Steward Lawrence Murray, who had so fumbled the luncheon service during the *Monitor's* sea trials on March 3, was granted leave and returned from his time ashore quite drunk. Upon coming aboard the *Monitor*, he seized an axe and tried to kill the Paymaster's steward. Placed in chains on the deck, Murray rolled or jumped overboard (accounts differ) and his body was not recovered until September 5.³²⁰

Other changes were in store for the *Monitor*. On August 15, Captain Jeffers announced that he would be leaving for a position in which he would supervise the building of more ironclads. Clearly his recommendations to Goldsborough had borne fruit. On the 18th, he was relieved of command by his replacement, Commander Thomas Holdup Stevens, late of the *Maratanza*.³²¹ Chief Engineer Isaac Newton was detached from the vessel on August 20. Like Jeffers, he would be overseeing the construction of more ironclads.³²²

³²⁰ Keeler letter to Anna, September 3, 1862 in *Aboard the USS Monitor*, 216, and September 6, 1862, 217; Log book of USS *Monitor*, September 2, 1862, 112

³²¹ Log book of USS *Monitor*, August 18, 1862, 104. Stevens continued the ratings of all petty officers on board save that of David Cuddeback, the Captain's steward. Cuddeback took the tablecloth from the Captain's rooms, a maroon wool piece with the name *Monitor* embroidered on it in gold lettering. Cuddeback's descendants donated the tablecloth to the Virginia War Museum in Newport News in the 1990s and it is currently on display at Lee Hall Mansion in Newport News, VA.

³²² Log book of USS *Monitor*, August 2, 1862, 105.

Drewry's Bluff and another assault on the Appomattox seemed to be a real possibility for the *Monitor* in late August, and preparations were underway for the eventuality of both. However, on the 28th the fleet received orders to proceed down the James River to Hampton Roads, where they anchored, a few yards from the sunken *Cumberland* on August 30.³²³ The feeling of freedom of the salt air, and from being targets of Confederate sharpshooters, was palpable. Other changes were afoot as well. Stevens was detached from the *Monitor* in mid-September, having "won the respect & esteem" of the men. In contrast to his predecessor Jeffers, Stevens had made the vessel "seem like another place, his treatment of his officers & men has been so kind & pleasant."³²⁴ John Pine Bankhead, a career navy man from South Carolina and a cousin to Confederate General John Bankhead Magruder, would be their new commander. With Bankhead's arrival, a new log book was started. The old log book was sent to the Navy Department.

The late September days in Hampton Roads would be pleasant ones for the crew of the *Monitor*. Fresh seafood abounded and fresh vegetables and some fruits were still available. The men experimented with hand grenades in anticipation of the new *Merrimac's* appearance. Despite the relative calm, it was with great relief that the *Monitor* was finally ordered to the Washington Navy Yard for repairs on September 30 1862. Her hull was fouled with seven months of marine growth and her engines had been in need of repair since June. Taken under tow of a small tug, the *Monitor* slowly made her way to Washington. Arriving at the Navy Yard, the men

³²³ Log book of USS *Monitor*, August 28, 1862, 109; Keeler letter to Anna, August 3, 1862, 213.

³²⁴ Keeler letter to Anna, September 8/11, 1862 in *Aboard the USS Monitor*, 218.

were transferred to the US Steamer *King Philip* for accommodations which were much more spacious than the ironclad they had inhabited for so many months.

The vessel was turned over to the workmen in the Yard the following Monday. The men of the *Monitor* would be able to take a well-deserved leave and visit their loved ones.

Chapter 7: The Last Cruise of the *Monitor*

The *Monitor* herself received a warm welcome when she arrived at the Yard, and several curious citizens tried to catch a glimpse of the ironclad from small boats that swarmed the perimeter of the Navy Yard. On Saturday, October 6, before most of the officers and crew could begin their leave, the *Monitor* was opened to the public. Keeler wrote that “[t]he docks were lined with carriages—& it was in fact a perfect jam—no caravan or circus ever collected such a crowd....”³²⁵ The men enjoyed the attention, especially that of the large number of ladies who came to see the ship, and the officers and crew were delighted to stand at the bottom of the steep ladders on board to greet the ladies—and look up their skirts.³²⁶ That evening, guards were stationed at the dock in order for the officers and crew to be able to eat their evening meal without the intrusions of the public. Navy officials tightened security during the repairs, but bowing to public pressure, they placed a small ad in the *Washington Daily Intelligencer* on Thursday, November 6, 1862, which read: “The ‘MONITOR’ will be open to the public this (Thursday) afternoon, from one o’clock until sunset. This is the only opportunity the public will have to see her. Passes will not be required at the navy yard gate.” The same paper reported later that, once again, “all the city flocked to the Navy Yard” to see it.³²⁷ Soldiers, sailors, civilian men, women and children all turned out to tour the celebrated ironclad. This time, however, most of the officers and crew were still on leave, not to return until later that night. Seeking souvenirs, the crowds took whatever they could remove, as

³²⁵ Keeler letter to Anna, October 6, 1862 in *Aboard the USS Monitor*, 228.

³²⁶ *Ibid.*

³²⁷ *Washington Daily Intelligencer*, Thursday, November 6, 1862; Saturday, November 8, 1862.

there was very little security to stop them. Acting Master Louis Stodder recalled that “[w]hen we came up to clean that night, there was not a key, doorknob, escutcheon – there wasn’t a thing that hadn’t been carried away.”³²⁸

Rushing to complete the work on the vessel, workmen at the Navy Yard continued painting and installing woodwork and ironwork (and replacing those items that had been taken by the tourists) while officers and crew began moving ships stores, coal, and their personal possessions back on board. Finally, on November 9, though “everything was tumbled aboard after a fashion,” the *Monitor* left Washington, D.C. and returned south to her “old moorings off Newport News.”³²⁹ The *Monitor’s* time at the Washington Navy Yard had yielded several changes to the vessel. On their return in early November, the men found that their ship had undergone a transformation. A telescopic smoke pipe some 30 feet in height had been installed and everything gleamed with fresh paint. The berth deck had been raised up significantly to afford storage space underneath, and the storage rooms to either side of the berth deck had been reduced by several feet, leaving far more room for living quarters. Additional blowers for ventilation had been installed, a result of Jeffers’ observations over the summer. Iron cranes and davits had been affixed to the weather deck for new ship’s boats. This arrangement was far preferable to towing boats or lashing them to the deck. New awnings had also been provided to shade both turret and weather deck. She was like a new vessel.

³²⁸ Louis Stodder in Irwin Berent Papers, MS164, The Mariners’ Museum Library and Archives, Newport News, VA.

³²⁹ Keeler letter to Anna, November 11, 1862 in *Aboard the USS Monitor*, 230.

Newspapers reported that the dents in the turret had been marked with the names of the sources from whence they came. Keeler wrote to his wife that they were marked "'Merrimac,' 'Merrimac's prow,' 'Minnesota,' 'Fort Darling'"³³⁰ The guns were also engraved. The starboard gun bore the name ERICSSON on the breech, with the words MONITOR & MERRIMAC beneath in smaller letters. The port gun, named WORDEN, also bore the names of the two vessels in the March 9 battle. The engravings still exist, discovered on the Dahlgren guns in the turret in the fall of 2002. The marks on the dents on the turret have apparently not survived. Conservators at The Mariners' Museum completed the removal of marine concretion from the recovered turret in August, 2011 and found no markings extant.

The changes to the vessel were not the only new things on board. There were new officers and crew as well. Some men had been officially detached from the vessel when she arrived in Washington while others sought to detach themselves in less official ways, deserting for better appointments, or through drunken mishaps.³³¹ Several new crewmen came on board in Washington, including Buffalo native Jacob Nicklis, who left that place, then volunteered for the *Monitor* with his friend Isaac Scott. Nicklis "did not want to volunter[sic] for her but all the rest of the boys from our place did so [he] joined with them."³³² In all, twenty men came on board to replace the crew that had either been reassigned or had deserted.³³³ There

³³⁰ *Milwaukee Daily Sentinel*, Volume XIX, Number 241, October 9, 1862; Keeler letter to Anna, November 17, 1862 in *Aboard the USS Monitor*, 232.

³³¹ Wilhelm Durst would claim to have been "shanghai'd" while on a drunken spree and found himself unable to rejoin the *Monitor*. Nevertheless, he "remembered" the events of the sinking later in life.

³³² Jacob Nicklis letter to father, November 16, 1862, Jacob Nicklis Papers, MS 363The Mariners' Museum Library and Archives, Newport News, VA

³³³ *Monitor* crew list, Irwin Berent Papers, MS164, The Mariners' Museum Library and Archives, Newport News, VA.

were replacement officers as well. Dr. Daniel Logue had resigned his commission and had been replaced by Dr. Greenville Weeks, while Second Assistant Engineer White was replaced with Third Assistant Engineer Samuel Augee Lewis. Norman Knox Atwater came on board as Acting Ensign, and Master's Mate George Frederickson, who had been on board since before the ship had a name, was promoted to Ensign as well.³³⁴

On Christmas Eve 1862, orders came in for the USS *Monitor* to proceed to Beaufort, North Carolina, then presumably to Charleston, though it was not stated in the orders.³³⁵ On Christmas Day, both officers and crew observed the holiday with both work and festive food and drink. Some of the crew had leave to go ashore and encountered the crew of several British vessels that were in port. The men mingled together "on the best of terms till the parties got too much whiskey when a fight would have to decide who was the best man of the two." William Keeler, who was ashore and witness to the brawl said that by the evening, "there seemed to be a sort of general mass, black eyes, bloody noses, & battered faces seeming to predominate."³³⁶

The next few days, while the crew waited for the weather to clear, they placed oakum between the turret and its brass deck ring, though they did not seal it with pitch. They bolted and caulked the gun-port shutters, caulked the pilothouse slits, and secured iron covers over the deck lights. George Geer wrote to his wife that he sealed the hatches with "Red Lead putty, and the Port Holes I made Rubber

³³⁴ Keeler letter to Anna, November 17, 1862 in *Aboard the USS Monitor*, 232; *Monitor* crew list, Irwin Berent Papers, MS164, The Mariners' Museum Library and Archives, Newport News, VA.

³³⁵ ORN, Series I, Volume 7, 341.

³³⁶ Keeler letter to Anna, December 25, 1862 in *Aboard the USS Monitor*, 250.

Gaskets one inch thick and in fact had every thing about the ship in the way of an opening water tight." They needed to be cautious, for they were about to enter the Graveyard of the Atlantic. In the midst of the preparations, Albert Campbell, Second Assistant Engineer, was injured while working on the engine and was removed from the ship. He would not make the trip south.³³⁷

On December 29, two massive hawsers were passed from the *Monitor* to the vessel assigned for the ocean tow—the USS *Rhode Island*. The *Monitor*'s small boats were transferred to the consort vessel where they could be kept safe.³³⁸ At 2:30 p.m. John Bean, a local pilot, came on board the *Rhode Island* and the two vessels got underway. The weather was clear and pleasant, and John Bankhead wrote that there was "every prospect of its continuation." As the *Monitor* was leaving Hampton Roads, her former commander, John Worden, was entering the roadstead in another monitor, the USS *Montauk*. The *Monitor* and *Rhode Island* passed Cape Henry at 6 p.m. and thus entered the Atlantic Ocean.

Just before dawn on December 30, the USS *Monitor*, in tow of the USS *Rhode Island*, began to "experience a swell from the southward" and as the day progressed the clouds increased "till the sun was obscured by their cold grey mantle." Officers and crew amused themselves by watching three sharks swim alongside the ship. Soon, however, the sea began to break over the vessel, the waves white with foam. As the weather grew worse the men were forced to go below decks. At 5:00 p.m. the

³³⁷ Geer letter to Martha, December 28, 1862, George Geer Papers, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

³³⁸ Copy of USS *Rhode Island* Log, Ernest Peterkin Collection, MS390, Series 6, subseries 3, The Mariners' Museum Library and Archives, Newport News, VA.

officers sat down to dinner in the wardroom, joking about being free from their “monotonous inactive life.”

As the *Monitor* prepared to round Cape Hatteras, waves hit the turret so hard it trembled. But the crew was elated: “Hurrah for the first iron-clad that ever rounded Cape Hatteras!” they cried. “Hurrah for the little boat that is first in everything!”³³⁹ By 7:30 p.m. one of the hawsers snapped and the *Monitor* began rolling wildly. The increased motion forced out some of the oakum under the turret and water started pouring in through the gaps.

The situation below deck was serious. The water level had risen to one inch in the engine room, and Captain Bankhead ordered Engineer Watters to put the Worthington bilge pumps to work. Water had also reached the coal bunkers and the coal was growing wet to keep up the steam in the engines. The pressure, which normally ran at 80 pounds, had dropped to 20 pounds—dangerously low. The Captain ordered the large centrifugal water pump into action. Mountainous waves crashed over the *Monitor's* deck as the storm intensified. The pilothouse was almost continuously under water. Many of the men were on top of the turret. Bankhead “signalized several times to the *Rhode Island* to stop.”³⁴⁰ The engineers reported that the pumps were having no effect.

At 8:45 p.m., the *Rhode Island* stopped. For a moment the *Monitor* seemed to ride more easily. But the wind kept picking up. The waves now began “...burying her

³³⁹ Grenville Weeks, “The Last Cruise of the *Monitor*,” *Atlantic Monthly*, XI, March 1863, 366-372.

³⁴⁰ ORN, Series I, Volume 8, 347.

completely for an instant, while for a few seconds nothing could be seen of her from the *Rhode Island* but the upper part of her turret surrounded by foam.”³⁴¹

At 10 p.m. the engineers told Bankhead that the water was more than a foot deep in the engine room—so deep that the blowers were spitting water. Surgeon Weeks wrote “...the vessel’s doom was sealed; for with [the fires’] extinction the pumps must cease, and all hope of keeping the *Monitor* above water....”³⁴² The men organized a bucket brigade, but it did no good except to lessen the crew’s panic. Weeks recalled, “Some sang as they worked, and... the voices, mingling with the roar of the waters, sounded like a defiance to Ocean.”³⁴³

At 10:30 p.m. Bankhead gave the order for the red distress lantern to be hoisted. The engines were slowed to preserve steam for the pumps. But the decrease in speed made the hawser taut, and the ironclad became unmanageable. Bankhead called for volunteers to cut the towline. Master Louis Stodder, Boatswain’s Mate John Stocking, and Quarter Gunner James Fenwick climbed down the turret, but eyewitnesses said that Fenwick and Stocking were swept overboard and drowned. Stodder managed to hang on to the safety lines around the deck and cut through the hawser with a hatchet.

At 11:00 p.m. Bankhead sent the signal to the *Rhode Island*, “Send your boats immediately, we are sinking!” Commander Trenchard called for the *Rhode Island*’s engines to be stopped and her boats “away to the rescue!” The first boat, a launch, was commanded by Ensign A.O. Taylor. The second, a cutter, was commanded by

³⁴¹ “The Wreck of the *Monitor*,” *Harper’s Weekly*, January 24, 1863, 60.

³⁴² Grenville Weeks, “The Last Cruise of the *Monitor*,” *Atlantic Monthly*, Volume XI, March 1863, 369.

³⁴³ *Ibid.*

Master's Mate Rodney Browne. Bankhead had the *Monitor's* engines stopped as well. Two boats from the *Rhode Island* reached the *Monitor* and Bankhead ordered Lt. Greene "to put as many men into them as they would safely carry."³⁴⁴

Their power cut, the *Monitor* and the *Rhode Island* were drifting dangerously close together. One of the launches was caught between them and suffered damage, but remained afloat as sixteen men climbed in. The *Rhode Island* tried to pull away, but the hawser Stodder had cut had become entangled in the paddlewheel and was pulling the ships closer together. Sailors from the *Rhode Island* worked to cut the ships loose as they rolled heavily on the waves. Finally, the lines were freed and the *Rhode Island* began to drift away.

To get to the rescue boats, the men had to cross the rolling, storm-swept deck. Keeler described "Mountains of water ... rushing across our decks...the howling of the tempest, ... the bubbling cry of the strong swimmer in his agony and the whole panorama of horror which time can never efface from my memory."³⁴⁵ At midnight, Ensign William Rodgers launched the third boat from the *Rhode Island*. The distance between the two ships had increased considerably, and Browne's cutter was almost unmanageable. As it approached the *Monitor*, it collided with Taylor's overloaded launch trying to make its way to the *Rhode Island*. Surgeon Weeks, in the launch, reached out to the oncoming boat. The two boats scraped heavily as they passed, catching Weeks' right hand between the two, crushing three fingers and wrenching his arm "from its socket...."³⁴⁶

³⁴⁴ ORN, Series I, Volume 8, 348.

³⁴⁵ Keeler letter to Anna, January 6, 1863, in *Aboard the USS Monitor*, 258.

³⁴⁶ Grenville Weeks, "The Last Cruise of the *Monitor*," *Atlantic Monthly*, Volume XI, March 1863, 370.

Shortly after midnight the water overcame the engine and the *Monitor's* pumps stopped, and with them any hope of saving the ship. Bankhead reportedly said, "It is madness to remain here any longer ... let each man save himself."³⁴⁷ The boats from the *Rhode Island* were still coming to rescue the *Monitor's* half-drowned crew, but it was clear that not everyone would make it in one trip. Desperate men had to cling to the top of the turret until the lifeboats returned.

Browne's cutter arrived soon after Bankhead's call to abandon ship. He recalled, "We had now got in my boat all of the *Monitor's* crew that could be persuaded to come down from the turret for they had seen some of their shipmates who had left the turret for the deck washed overboard and sink in their sight." Many of the men who did leave the foundering ship threw shoes, clothing and possessions back into the turret so they would be able to swim if they needed to.³⁴⁸ Those same possessions were found by conservators and archaeologists following the recovery of the turret in August, 2002.

Paymaster William Keeler later gave a moment-by-moment account of his escape from the *Monitor*: "...I divested myself of the greater portion of my clothing to afford me greater facilities for swimming ... & attempted to descend the ladder leading down the outside of the turret, but found it full of men hesitating but desiring to make the perilous passage of the deck." Keeler's saga continued: "I found a rope hanging from one of the awning stanchions over my head & slid down it to the deck. A huge wave passed over me tearing me from my footing...I was carried ...ten or twelve yards from the vessel when ... the wave threw me against the

³⁴⁷ Ibid., 371.

³⁴⁸ Keeler letter to Anna, January 6, 1863 in *Aboard the USS Monitor*, 258-259.

vessel's side near one of the iron stanchions which supported the life line; this I grasped with all the energy of desperation & ...was hauled into the boat...."³⁴⁹

John Bankhead returned to his cabin for his coat, and other small personal possessions. He took "one lingering look and ... left the *Monitor's* cabin forever." Master's Mate George Fredrickson returned a watch he had borrowed from another officer, saying, "Here, this is yours; I may be lost." Some of the men refused to leave—or simply couldn't. Francis Butts recalled that Engineer Samuel A. Lewis was too seasick to leave his berth.³⁵⁰

On board the *Rhode Island*, Surgeon Samuel Gilbert Webber reset Weeks's arm and amputated parts of three fingers.³⁵¹ Weeks came back to stand on deck with his *Monitor* shipmates, watching the sad drama unfold: "we watched from the deck of the *Rhode Island* the lonely light upon the *Monitor's* turret – a hundred times we thought it had gone forever, – a hundred times it reappeared, till at last...it sank and we saw it no more."³⁵²

Browne and his men in the cutter were making "but slow progress" when the *Monitor's* light disappeared for good. Then, turning back to the *Rhode Island*, they were horrified to see her "...steaming away from us, throwing up rockets and burning blue lights – leaving us behind." Captain Trenchard searched for them all night and into the next day, when the search was abandoned and the *Rhode Island*

³⁴⁹ Ibid.

³⁵⁰ Francis Butts, "The Loss of the *Monitor*" in *Century Illustrated Monthly Magazine*, Volume XXXI, New Series Volume IX, 300.

³⁵¹ Grenville Weeks, *The Last Cruise of the Monitor*, "Atlantic Monthly", Volume XI, March 1863, 372.

³⁵² Ibid.

steamed for Beaufort. Picked up by the schooner *A. Colby* the following day, Browne and his crew returned to the *Rhode Island* to be greeted by “hearty cheers.”³⁵³

Forty-seven men were rescued from the USS *Monitor* before she slipped beneath the waves. Sixteen were lost—either washed overboard while trying to reach the rescue boats or trapped inside the foundering vessel. Upon mustering the crew upon the *Rhode Island*, John Bankhead found the following men missing:

Landsman William Allen

Acting Ensign Norman Knox Attwater

Yeoman William Bryan

1st Class Boy Robert Cook

Landsman William H. Eagan

Quarter Gunner James R. Fenwick

Acting Ensign George Fredrickson

2nd Assistant Engineer Robinson Hands

Officer’s Cook Robert H. Howard

1st Class Fireman Thomas Joyce

3rd Assistant Engineer Samuel Augee Lewis

Coal Heaver George Littlefield

Landsman Daniel Moore

Seaman Jacob Nicklis

Boatswain’s Mate John Stocking

1st Class Fireman Robert Williams³⁵⁴

³⁵³ ORN, Series I, Volume 8, 348.

NOAA archaeologists and Mariners' Museum conservators have found within the turret artifacts specifically associated with four of the sixteen men who perished. All are pieces of silver or silver-plated tableware, and all are of different patterns, indicating that they had likely been brought from home by the individual officers or crewmen. Among them is a spoon bearing the initials "NKA." Norman Knox Attwater, Acting Ensign, came on board the *Monitor* in November of 1862. He originally hailed from New Haven Connecticut and was acquainted with William Keeler's father in-law. There is also a fork with the name "G.Frederickson" engraved upon it. George Frederickson, Acting Ensign was on the *Monitor* from the very beginning. Initially rated as Master's Mate, he had been promoted to Acting Ensign in November of 1862. Frederickson's hand was one of several to record entries in the log of the *Monitor* and his young face peers out from several photos of officers taken by James Gibson in the summer of 1862.

Three pieces of tableware recovered to date bear the initials "SAL" as well as the letters "USN. Samuel Augee (or Auge) Lewis, was the 3rd Assistant Engineer, arriving to take up his commission in November 1862. Paymaster William Keeler wrote on November 17th of the new officers on board, "Then in the place of Mr. White we have a Mr. Lewis from Baltimore, a mere boy, nearly a cypher in our little society."³⁵⁵ Recalling the events of December 30/31 1862, Francis Butts wrote

I think I was the last person who saw Engineer S.A. Lewis as he lay seasick in his bunk, apparently watching the water as it grew deeper and deeper, and aware what his fate must be. He called me as I passed his door,

³⁵⁴ William Keeler in *Annual Report of the Secretary of the Navy*, (Washington: D.C.: Government Printing Office, 1863), 27.

³⁵⁵ Keeler letter to Anna, November 17, 1862 in *Aboard the USS Monitor*, 272.

and asked if the pumps were working. I replied that they were. "Is there any hope?" he asked; and feeling a little moved at the scene, and knowing certainly what must be his end, and the darkness that stared at us all, I replied, "As long as there is life there is hope."³⁵⁶

A large silver spoon bears the initials "JN." This spoon is more than likely the property of Jacob Nicklis, a 21 year-old sailor from Buffalo, New York. Nicklis came on board the USS *Monitor* as Ship's Number 61 on November 7, 1862 when the *Monitor* was undergoing repairs at the Washington Navy Yard. Standing at 5'7", Nicklis had grey eyes, light colored hair and a "ruddy complexion" according to his enlistment record. The son of a Buffalo tailor, Nicklis had enlisted in the Navy at age 16, but re-enlisted in 1862 for a one-year term. Nicklis wrote a letter to his father on December 28, 1862. It was a brief letter, with the promise that a longer one would follow once the *Monitor* had arrived safely at her next station. He told of his Christmas dinner, which he said "was a good one" and cost him a dollar. He mentioned that they had eaten "chicken stew and then stuffed turkey, mashed potatoes, plum pudding and nice fruitcake with apples for dessert." While he did not care for his accommodations on the *Monitor's* berth deck, he conceded that he at least had "plenty to eat and drink" including rations of sea biscuits and "what they call coffee." He ends his letter with the admonition to his father, "Do not answer this letter until you hear from me again, which I hope will be shortly. They say we will

³⁵⁶ Francis Butts, "The Loss of the *Monitor*" in *Century Illustrated Monthly Magazine*, Volume XXXI, New Series Volume IX, 300. Butts drew from Grenville Weeks accounts published a few months after the sinking, as well as Samuel Dana Greene's account. Butts very likely embellished his account over time, but his is the only mention of Lewis during the sinking.

have a pretty rough time going around Hatteras, but I hope it will not be the case."³⁵⁷

Conservators and historians are still unsure how these pieces of tableware came to be in the turret. In all there are over thirty pieces, along with the remains of a drawer and a chest. It is possible that one or more of the men were trying to bring the ship's silver chest with them, and then thought better of it. It is also possible that the chest fell into the turret sometime after the sinking. They are, however, poignant reminders of the loss suffered by the *Monitor's* crew.

The *Rhode Island* returned to Hampton Roads with the remaining crew from the *Monitor*, the *Rhode Island* crew sharing their warm clothing with the *Monitor* boys.³⁵⁸ Upon arriving at Fortress Monroe, the survivors rushed to send letters home to assure their families and friends that they were safe. George Geer sent two letters, one to his wife Martha, which was brief and bereft of detail:

U.S. Steamer Rhode Island
Jany 2 1862 [sic]

Dear Wife

I am sorry to have to write you that we have lost the *Monitor*, and what is worse we had 16 poor fellows drowned [sic]. I can tell you I thank God my life is spaired [sic]. Besides the 16 we lost one boat that was sent from this Steamer with 11 semen [sic] in is missing. We have crused [sic] two days for them, and have given them up for lost. I have not time to write you any more, but do not worry. I am safe and well. Write to Troy and let them know I am safe.

Your Loving
Husband
Geo S. Geer³⁵⁹

³⁵⁷ Nicklis letter to his father, December 28, 1862, Jacob Nicklis Papers, MS363, The Mariners' Museum Library and Archives, Newport News, VA.

³⁵⁸ Webber letter to Nannie, January 2, 1863, Private collection.

³⁵⁹ Geer letter to Martha, January 2, 1863, George Geer Papers, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

A second, longer letter, went to Geer's brother which had more harrowing details of the sinking; details Geer wished to keep from his wife in order not to worry her.³⁶⁰ In contrast, William Keeler spared no detail in his letter home, telling his wife that "The *Monitor* is no more...what the fire of the enemy failed to do, the elements have accomplished."³⁶¹

³⁶⁰ Geer letter to Gilbert Geer, January 13, 1863, George Geer Papers, MS10, The Mariners' Museum Library and Archives, Newport News, VA.

³⁶¹ Keeler letter to Anna, January 6, 1863, in *Aboard the USS Monitor*, 253.

Chapter 8: Discovery and Recovery

The Union navy chose not to search for the *Monitor*. Captain Bankhead's official report estimated that she had gone down in 300 feet of water,³⁶² making the wrecksite far too deep for existing recovery methods. In addition, the *Monitor* had only two guns, and thus was not worth a major recovery effort even if the conditions had been slightly better. Thus, other than those Union navy crews looking for survivors immediately after the sinking, no one had actively searched for the vessel since December 31, 1862. However, in 1950, while testing General Electric's newly developed Underwater Object Locator (UOL) Mark IV south of the Cape Hatteras Light in North Carolina, the crew of a United States Navy vessel detected a submerged object approximately 140 feet in length. Because this general area had been identified as a likely resting place for the USS *Monitor*, the crew speculated that this could in fact be the lost ironclad. Unfortunately, strong currents prevented the deployment of any divers, so there could be no visual affirmation of the acoustic signal at that time.³⁶³

Although inconclusive, the UOL operation did generate enough interest for the Office of Naval History to open a "*Monitor* file." However, the Navy chose not to pursue recovery at that time, and the press coverage of the Navy's decision led to a new interest in the lost Union ironclad.³⁶⁴ Raynor McMullen, a retired postal clerk from Michigan, organized the USS *Monitor* Foundation in Washington, D.C.

³⁶² ORN, Series I, Volume 8, 345-349.

³⁶³ Robert Sheridan, *Iron From the Deep: The Discovery and Recovery of the USS Monitor*, (Annapolis, MD: Naval Institute Press, 2004), 37.

³⁶⁴ Student editors at the Harvard *Crimson* proclaimed (likely tongue in cheek) that they were part of an "American Students for Raising the *Monitor*" movement in April 1951 and wrote a poem rebuking the Navy for its decision. *Harvard Crimson*, April 14, 1951.

McMullen offered a \$1,000 reward to anyone who could locate and recover the *Monitor*. His offer once again drew the attention of the Navy.³⁶⁵ In an unusual move, Assistant Secretary of the Navy R.H. Fogler made the recommendation on September 30, 1953 that the *Monitor* be formally abandoned as she was deemed no longer “essential to the defense of the United States,” in large part because no one truly knew where she lay. Accordingly, she came under the auspices of the General Services Administration (GSA) as Federal surplus. This removed certain restrictions from the vessel and opened up the possibility for civilian groups to actively search for the *Monitor*.

In 1955, Marine colonel and diver Robert Marx publicized that he had found the *Monitor* in shallow water off the coast of Cape Hatteras. Marx claimed that his find was consistent with a story told by inhabitants of Hatteras Island in North Carolina that shortly after the sinking, several bodies of Union sailors had washed up onshore at Buxton and had been buried by the locals. Marx believed that this information indicated that the vessel had drifted toward land before sinking. Though he claimed to have found the ship with her distinctive turret in forty-five feet of water, he was unable to relocate the site again. Thus there was no evidence, other than his claim, that it was the *Monitor*. A separate group, North Carolina Tidewater Services, Inc., used Marx’s coordinates to search for the vessel in 1967, but found nothing.

Concurrent with these early efforts, Captain Ernest W. Peterkin, of the Naval Research Laboratory in Washington, D.C., had begun collecting information about

³⁶⁵ Telephone call with McMullen’s granddaughter, Margo Heiden, 2005.

the *Monitor's* final moments and plotting her possible course based on information he gleaned from firsthand accounts and the log of the USS *Rhode Island*. Begun as a personal project, Peterkin's study would intersect with his professional career as new technological developments in underwater photography became more viable. In 1970, the Laboratory began testing a new system of underwater strobe photography, pioneered by Dr. Harold "Doc" Edgerton of the Massachusetts Institute of Technology, off the coast of North Carolina. Peterkin, through his research, had pinpointed a possible location for the *Monitor* and suggested testing the equipment on those coordinates. The location he proposed was well offshore in deeper water and beyond the easy reach of most search groups. While his initial calculations proved to be inaccurate, Peterkin continued to work on pinpointing the location based on his knowledge of the historical record, which did not indicate the shallow water location championed by Marx. By 1973, Peterkin had formulated a new theory of the wreck's location, sixteen miles southeast of Cape Hatteras.

The lure of Marx's shallow-water theory was strong, however, and news items about each search for the elusive *Monitor* piqued the imagination of numerous groups. Michael O'Leary, with the USS *Monitor* Foundation, and Roland Wommack's Trident Foundation both mounted expeditions in the early 1970s using Marx's shallow-water theory. Neither group was successful, but news items of these searches convinced a group of midshipmen from the Naval Academy in Annapolis to take up the search in 1973, initially as a casual desire to do some wreck diving. However, their enthusiasm for the project grew and they scheduled an expedition to

Hatteras under the tutelage of Bill Andahazy of the Naval Research and Development Center in Annapolis in the spring of 1973.

The initial trip of the midshipmen was disastrous with high winds and heavy seas keeping them shorebound. They tried again in July 1973, with the assistance of a Navy research aircraft equipped with magnetometers. The group had two target areas they wanted to survey from the air: Marx's shallow-water site and a site further offshore, based on the midshipmen's analysis of the historical documents, and Peterkin's assistance. Returning with their data and film footage, the group turned their summer venture into a year-long academic project, entitled *Project Cheesebox*.

John Broadwater, leading a team organized by Underwater Archaeological Associates, Inc and Marine Archaeological Research Services, Inc., spent time surveying the area near Marx's coordinates during that same summer, eventually teaming up with the USS *Monitor* Foundation.³⁶⁶ Meanwhile, the National Geographic Society had agreed to sponsor a team from Duke University's Marine Laboratory in Beaufort, North Carolina. Led by John Newton, marine superintendent for the oceanographic program at the Duke Marine Laboratory, the group had enlisted the help of Harold "Doc" Edgerton of MIT. Edgerton, in addition to his work on strobe photography, had also been instrumental in the development of side-scan sonar technology since the 1950s, and had used the system to assist in locating Henry VIII's lost warship *Mary Rose* in 1967.³⁶⁷ Edgerton believed the *Monitor*

³⁶⁶ John Broadwater, *USS Monitor: An Historic Ship Completes Its Final Voyage*. Forthcoming, 24.

³⁶⁷ Side scan sonar is a specialized sonar system for searching and detecting objects on the seafloor. It transmits sound energy in the shape of a fan and analyzes the return signal, or echo, that has

would be a good target to test improvements to his side-scan sonar. Accompanied by Gordon Watts from the North Carolina Division of Archives and History, Dr. Robert Sheridan, a geologist from University of Delaware, Dorothy Nicholson from National Geographic Society, Newton's daughter Cathryn, and other researchers, Newton and Edgerton set out in the Duke University research vessel *Eastward* for a two-week survey of possible sites in the waters off Cape Hatteras, using the historical record rather than Marx's theories. Sheridan hoped to conduct a geological survey of the continental shelf off Hatteras, and had secured the principal funding for the mission.

While Sheridan's work had gone reasonably well, none of the possible sonar or magnetometer targets had been promising, save for one, which turned out to be a fishing trawler.³⁶⁸ However, on August 27, 1973, on the last day of the expedition, a "long amorphous echo" appeared on the side-scan recorder. Though the team was scheduled to return, they remained on site for three additional days attempting to film and photograph the target. Edgerton's deep sea camera became snagged on the wreck and had to be abandoned, leaving only blurry television footage and the side scan information to help the team determine whether they had found the *Monitor*. Gordon Watts spent the next five months studying the tapes, trying to tease out any information that would positively identify the wreck as the *Monitor*. Knowing the

bounced off the seafloor of other objects, such as shipwrecks. The strength of the return echo is continuously recorded creating a "picture" of the ocean bottom in which objects that protrude from the bottom create a dark image (strong return) and shadows from these objects are light areas (little or no return).

³⁶⁸ Later identified during the 2009 expedition, conducted by *Monitor* National Marine Sanctuary staff, as the YP-389, sunk during World War II by a German U-Boat.

interest of the midshipmen at the Naval Academy, he showed the film to them as well.

There are possibly hundreds of shipwrecks in the treacherous waters off Cape Hatteras. Everyone who had been searching for the *Monitor* believed that the wreck would present a very distinctive and easily identifiable form to search for—in essence, the cheesebox (turret) on a raft (hull). No one had contemplated the possibility that the raft might be on top of the cheesebox —no one expected the *Monitor* to be upside down. However, Watts chose to change his expectations. Assuming that the ship could potentially be upside down, with the turret displaced underneath the hull, he found that the video began to make sense. He had pieced together a photomosaic from the video images, and he showed it to several colleagues, including John Broadwater. "When I looked at the mosaic," said Broadwater in a 2004 interview with the *Daily Press*, "I saw some similar elements. But I didn't see the *Monitor* -- and I didn't think that anybody would have the nerve to say that it was...Then Gordon asked me to pretend that the *Monitor* had landed upside down...That's what did it. That's when everything in the picture fell into place and started to make sense...That's when the *Monitor* was found."³⁶⁹ Watts had shared his findings with John Newton in early 1974, but the two waited to announce the news.

The Naval Research Laboratory had scheduled a conference in Washington, D.C. on March 11, 1974 to bring together all of the groups who had been searching for the *Monitor*. The purpose was to assess all of their finds in order to choose probable sites for

³⁶⁹ "Discovering the USS *Monitor*," *Daily Press*, Sunday, July 18, 2004.

study in the summer of 1974 in order to test the capabilities of the *Alcoa Seaprobe*, a research vessel outfitted specifically for photographing underwater features. Given the interest in the *Monitor*, this seemed the perfect mission to test the vessel. However, at a joint press event of Duke University and the North Carolina Department of Archives and History held on March 7, 1974, Newton and Watts announced that they had positively identified the wreck of the *Monitor*. Though there were many skeptics present at the subsequent Naval Research Laboratory Conference later that week, the Navy agreed to take the *Seaprobe* to the newly announced site. During this expedition, the first still photographs of the ship were made, and pieced together into the first full photomosaic of the wreck.

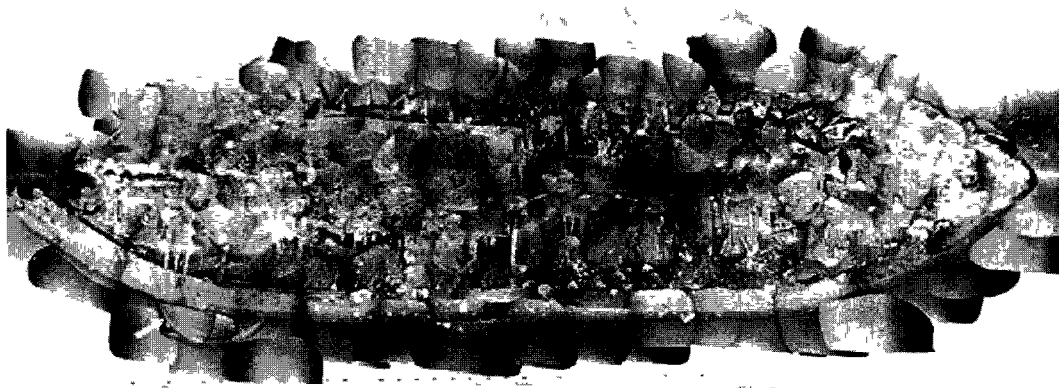


Figure 3 - 1974 Photomosaic. Turret can be seen on lower left.

Researchers assessed the condition of the ship and found there was extensive damage to the stern. A large portion of the stern armor belt was missing and the area surrounding the propeller and rudder assemblies showed extensive damage. This damage to the stern seemed to indicate that the vessel struck the bottom stern-first. Analyzing the wreck, historians surmised that after wallowing in the storm-tossed sea the *Monitor's* bow was lifted by a wave causing all of the water to roll to the stern. Combining with the tremendous weight of her 30-ton steam

engine the ship pitched stern first and began to sink vertically. The 173-foot long ironclad did not have far to go to come to rest 240 feet below the surface and at some point turn in the water column, probably once to starboard. The stern quickly struck the bottom, causing the turret to dislodge from the brass ring and slide down the deck toward the stern. Then the massive turret fell off and landed on the ocean bottom. The port side of the *Monitor's* armor belt came to rest over a portion of the turret, partly burying it in the sandy bottom.

Finding the wreck of the *Monitor* was a true accomplishment. Yet there remained the problem of protecting it. Since the site had been announced, it was possible that unscrupulous wreck divers might strip the wreck. The Governor of North Carolina suggested that the *Monitor* site might be a candidate for national marine sanctuary status.

Through the Marine Protection, Research and Sanctuaries Act of 1972 (often referred to as the "Ocean Dumping" Act), Congress authorized the Secretary of Commerce to designate specific areas as national marine sanctuaries in order to protect plant and marine mammal breeding grounds, coral reefs, cultural resources, and a variety of marine habitats. This Federal protection would promote comprehensive management of their special ecological, historical, recreational and aesthetic resources. Although the *Monitor* site was primarily a cultural resource, not a natural resource, the *Monitor* National Marine Sanctuary was the first sanctuary established under the Act on January 30, 1975 (the 113th anniversary of the vessel's launch). The sanctuary was to consist of a vertical column of water one-mile in diameter located on the eastern Continental Shelf 16.1 miles southeast of Cape

Hatteras.³⁷⁰ The National Oceanic and Atmospheric Administration (NOAA) would oversee the sanctuary program.

Once federal protection was established for the wreck site under the *Monitor* National Marine Sanctuary, archaeologists began to explore and document the wreck and, eventually, recover portions of the Civil War ironclad. From 1974 through 1995, a series of thirty-four public and private expeditions collected a wealth of data and artifacts.³⁷¹ The first major artifact recovered was the iconic red signal lantern in 1977, which was also the last thing reported seen by the rescued crew before the vessel went down in 1862. A variety of small finds such as mustard and pepper bottles, wood paneling, hull fragments and ceramics were also recovered during that time, as well as the unique, four-fluked anchor. NOAA was not a collecting agency, however, and conservation work as well as curation and storage of the artifacts were not centralized. Therefore, in 1986, NOAA issued a Request for Proposals (RFP) to find a single institution that could serve as a repository for the objects.³⁷² In 1987, The Mariners' Museum in Newport News, Virginia, was selected to be the official repository. The recovered artifacts were transferred there to be included in a permanent display.³⁷³

Charting a New Course for the USS *Monitor*

By 1996 it had become evident that if there were to be a recovery effort for major artifacts from the wreck of the USS *Monitor*, it would have to occur within ten

³⁷⁰ Marine Protection, Research and Sanctuaries Act, 16 U.S.C. § 1431-1445, October 23, 1972.

³⁷¹ See appendix for list of expeditions.

³⁷² Federal Register, Volume 51, Number 171 (Thursday, September 4, 1986).

³⁷³ Cooperative agreement between the National Oceanic and Atmospheric Administration and The Mariners' Museum, July 13, 1987.

years. The wreck showed significant deterioration since it had been discovered in 1973. A major collapse of the hull appeared imminent. The *Monitor*, as a cultural resource under the Sanctuaries Act, was thus deemed a “threatened resource” because cultural resources are considered “non-renewable.”³⁷⁴

The wreck was endangered because it is situated in a dynamic environment. This area of the Atlantic sees the confluence of cold water from the northern Labrador Current, and warm water from the southern Gulf Stream. These volatile conditions often give rise to violent storms—the kind in which the *Monitor* sank—creating strong bottom currents that can scour out sections of the ship over time. The salty marine environment is also very corrosive to iron and other types of metal, of which the *Monitor* was largely constructed.

NOAA had to make a decision to either allow nature to take its course or to recover some of the larger historically significant components in order to preserve as much of the *Monitor* as possible.

In 1996 Congress issued a mandate to the Secretary of Commerce, the department that oversees NOAA, to produce a long-range, comprehensive plan for the management, stabilization, and recovery of artifacts and materials from the *Monitor*. NOAA developed the plan, entitled *Charting a New Course for the Monitor*. The plan outlined a variety of options from physical stabilization and cathodic protection, to selective recovery of key components, to recovery of the entire ship, or even burial of the entire site. After weighing the advantages and disadvantages of each option, Sanctuary staff made the recommendation to use a combined method

³⁷⁴ Federal Register, Volume 62, Number 233 (Thursday, December 4, 1997).

of physically shoring up the wreck for stability in conjunction with recovering selected significant components.³⁷⁵

Since the adoption of the 1998 recovery plan, *Charting a New Course for the Monitor*, the primary goal of NOAA and the *Monitor* Sanctuary has been the protection of the wreck and safe recovery of artifacts. While this has been primarily an archaeological process, not all aspects of the recovery have been purely archaeological. Some damage to the wreck was necessary to achieve the recovery of significant components. NOAA determined that some sacrifices were required in order to safely recover and preserve the most historically significant parts of the ship rather than let them deteriorate in the corrosive Atlantic environment. This process has been accurately termed “rescue archaeology.”

***Monitor* 1998: Recovery of the Propeller**

The first NOAA expedition to the *Monitor* Sanctuary after the adoption of the *Monitor* preservation plan was primarily to lay the groundwork for major artifact recovery on future expeditions. Experts gathered data and mapped and photographed the overall configuration of the wreck. The expedition focused on the stern areas of the wreck including the engine room, turret, and area beneath the hull. Exposed artifacts were mapped and recovered to protect them from possible damage. While propeller removal was slated for Phase 3 of the preservation plan, when NOAA and the Navy returned to the site in 1998 they found weather and bottom conditions perfect for recovery. Divers made the final cut through the solid iron shaft and brought the propeller to the surface, making it the first artifact

³⁷⁵ National Oceanic and Atmospheric Administration, *Monitor* National Marine Sanctuary, *Charting a New Course for the Monitor*, April 1998, 28-36.

recovered under NOAA's long-range plan. It was also the largest component recovered to date and was the first major artifact recovered since the anchor in 1983. On June 5, 1998, the propeller of the *Monitor* broke the surface of the water for the first time since 1862 when the ship was in the Washington Navy Yard.

The *Monitor's* propeller is one of few surviving examples of what experts say was John Ericsson's most important contribution to the development of naval power – improvement in propulsion. The recovered segment of propeller shaft is about 11 feet long and the cast iron propeller is nine feet in diameter. Together they weighed just over 6 tons.

Once at The Mariners' Museum, the *Monitor's* propeller underwent electrolytic reduction. During this process, corrosion products were reduced to more stable forms, concreted sediment spalled off the propeller, and harmful salts migrated into the storage solution. When electrolysis was complete, the propeller was coated with protective wax to prepare it for exhibition.

***Monitor* 1999 – 2000: Preparing for Engine Recovery**

NOAA/Navy expeditions to the *Monitor* National Marine Sanctuary in 1999 and 2000 laid the groundwork for the engine recovery operation planned for 2001. The *Monitor* 1999 expedition was primarily a survey operation. Navy divers surveyed and assessed the lower hull and engineering spaces to facilitate plans for shoring the hull and recovering the engine. Archaeologists mapped exposed objects and geotechnical data was acquired in the vicinity of the turret. The expedition was also a training opportunity in mixed-gas diving and salvage operations for personnel

from the Navy's Mobile Diving and Salvage Unit TWO (MDSU TWO), located at Little Creek in Norfolk, Virginia.

Monitor 2000: Paving the Way

During the summer of 2000 NOAA, the US Navy, The Mariners' Museum, and other organizations embarked on a series of expeditions to prepare for engine recovery. NOAA divers documented the engine and with the help of Navy divers, placed a system of stabilizing grout bags against the ship's deteriorating hull to protect against collapse. They also raised the aft section of the propeller shaft and skeg to prepare the steam engine for recovery.³⁷⁶

The development of the Engine Recovery Structure (ERS) is another example of technological advancement inspired by the *Monitor*. The *Monitor's* engine could not be rigged to be lifted directly to the surface, because the engine was extremely fragile after spending one hundred forty years submerged in a volatile, marine environment. Therefore, the Engine Recovery Structure was designed to protect the engine during its lift to the surface and transfer to The Mariners' Museum where it could begin its lengthy conservation. The ERS contained three principle components: the bridge frame, a moveable spreader, and an engine lifting frame (ELF) suspended from the spreader. The bridge portion of the Engine Recovery Structure was positioned over *Monitor's* engine in 2000 to support the lift planned for the next season.

³⁷⁶ The skeg supported the rudder and propeller shaft, which projected a distance of almost 30 feet from the stern. The 28-foot long, 7,000-pound skeg was hauled up from the water at 11:00 a.m. and placed on the deck of the barge.

The *Monitor* 2000 Expedition was a success. On July 27, 2000, Navy divers recovered another section of the propeller shaft with a coupling and stuffing box. The following day, divers also recovered the *Monitor's* skeg. The removal of the skeg and shaft section enabled divers to more easily map the condenser in the engine room in preparation for the excavation of that area. The 28-foot long, 7,000-pound skeg was hauled up from the water at 11:00 a.m. and placed on the deck of the barge.

***Monitor* 2001: Recovering the Steam Engine**

The 2001 field season consisted of five expeditions to the sanctuary conducted in three phases, involving personnel from NOAA, the US Navy, the Mariners' Museum, the National Undersea Research Center at the University of North Carolina at Wilmington, the Maritime Studies Program at East Carolina University, and the Cambrian Foundation. In addition to recovery of the thirty-ton engine, the expedition goals also included the removal of a section of the armor belt and initial archaeological excavation of the turret in preparation for its recovery in 2002.

Monitor 2001 employed the latest diving technology in the mission to recover the steam engine. For the first time, the Navy used a civilian saturation diving system that greatly increased dive time. The expedition also conducted open, deep-water salvage training using mixed gas surface supplied divers. There were more than 70 divers from 12 Navy Dive Commands working on *Monitor* 2001. On a single day the expedition achieved a record 26 hours of bottom time, 10 hours of surface supply diving, and 16 hours of saturation diving. Thus, the recovery of the

Monitor's unique 'vibrating side lever' engine was one of the most complex underwater archaeological recovery projects ever conducted.³⁷⁷

The engine recovery structure had successfully remained in position over the stern of the wreck from the *Monitor* 2000 Expedition. In 2001 NOAA and the Navy used the structure to slowly lift the engine out of the wreck. A spreader assembly was used to position the ELF directly over the engine room. In order to safely recover the engine, Navy divers worked around the clock for four weeks to remove the remnants of lower hull plating and free the engine from the wreck.

Because the engine was weakened by 140 years of corrosion, all of its components had to be secured to the ELF by dozens of cables and straps. Once the engine was rigged, divers severed all piping, supports, and connections in preparation for the engine to be hoisted. Once rigged, the entire engine unit was raised two feet using hydraulic rams mounted on the spreader. Divers inspected the rigging and then slung heavy-duty cargo nets beneath the engine. The engine was then raised another four feet and inspected again. After a final check of the weather, divers attached steel lifting cables to the ERS and the entire 120-ton structure was raised to the surface at 11:56 a.m. on July 16, 2001.

***Monitor* 2002: Recovering the Turret**

³⁷⁷ The Saturation Diving System consists of two pressure chambers, a central mating chamber, and a personal transfer capsule or diving bell. The diving bell transports saturation divers between the surface pressure chambers and the *Monitor*. Two SAT divers remained under pressure for a week or more and worked eight-hour shifts. Divers utilizing this system accomplished more involved tasks than surface-supplied divers, who were limited to 30 or 40 minutes. Surface supply divers used a mixture of 85% helium and 15% oxygen allowing them to descend up to 300 feet without increased risk of nitrogen narcosis, or "the bends." The gas was supplied through umbilical hoses from the surface system. The umbilical also allowed for two-way communications. Video cameras and lights mounted on the helmets enabled those on the surface to see exactly what the diver saw and allowed NOAA archaeologists to supervise the divers.

The written goals of the *Monitor 2002* expedition seemed almost too simple, given the monumental task at hand. A few words for each step of the process belied the hours of planning, the 24/7 operations needed to complete the task and the sheer number of personnel required for the mission. The operations manual, revised shortly before the NOAA/Navy team left for Houma, Louisiana, listed the nine goals associated with *Monitor 2002* in laconic fashion:

Goal 1: Remove deck and armor belt segments, as necessary, to provide sufficient access to the turret for the planned rigging and recovery operations.

Goal 2: Excavate contents of the turret down as far as possible, mapping and photographing features and artifacts as they are encountered.

Goal 3: Install the spider assembly atop the turret.

Goal 4: Place the support platform on the seabed near the turret.

Goal 5: Rig supports for the guns, carriages, port shutters and roof beams, as appropriate.

Goal 6: Lift the turret assembly and secure atop the support platform..

Goal 7: Raise the turret and contents and place them on the derrick barge.

Goal 8: Transport the turret to Newport News and transfer to a smaller barge for delivery to The Mariners' Museum.

Goal 9: Continue the Navy program of realistic and challenging salvage training using surface-supplied saturation diving methodology.³⁷⁸

³⁷⁸ *Monitor Expedition 2002 – Turret Recovery Expedition to the Monitor National Marine Sanctuary: Expedition Operations Manual*, Revised Draft, 27 May 2002. US Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Marine Sanctuaries Division. 6.

The manual also listed a timeline for the expedition that spanned from mid-May for loadout of the derrick barge *Wotan* in Houma, to the final offloading at Naval Amphibious Base, Little Creek on 25 July. This would give the expedition a cushion of two weeks before the barge, Navy personnel and funding had to disappear. A notation in the manual pointed out that “all dates are estimated” and that it was subject to “equipment availability, weather, funding and other factors.”³⁷⁹ All would become issues before the recovery was over.

Historians and archaeologists believed that the recovered turret would reveal much about the final moments of the *Monitor*. Excavations done by Navy divers while the turret still lay on the ocean floor revealed many features and artifacts that had been guessed at, but not proven until the summer of 2002. The two principle questions the team had were: Had the guns remained within the turret, and, more soberingly, was the turret a gravesite for any of the sixteen who went down with the vessel? Engineering expertise could deal with the first eventuality, which would necessitate additional supports to keep the gravity-mounted roof of the turret from giving way during the lift. Forensic Anthropologist Eric Emery from the military’s Central Identification Laboratory at Joint Base Pearl Harbor-Hickam, Hawaii (CILHI) was on board the *Wotan* to address the second issue.

Before the operation even began, there were problems. Instead of deploying at the wreck site as planned, the *Wotan* had to make an unplanned visit to Hampton

³⁷⁹ Ibid., 12-13.

Roads for emergency repair of its 500-ton capacity crane, throwing the schedule off by 10 days before the first diver could enter the water. Finally, on June 24, NOAA and US Navy personnel departed Norfolk, Virginia aboard the *Wotan* for NOAA's *Monitor* National Marine Sanctuary. After arriving they deployed eight 20,000-pound anchors to maintain position over the wreck. Next, they removed debris from *Monitor's* stern. A 30-ton section of hull structure was removed after cutting through layers of iron and wood. After nine days, *Monitor's* turret was completely uncovered for the first time since it sank on December 31, 1862.

With the turret exposed, divers began to install the 57,000-pound lifting frame, known as the "spider" and began excavating the interior of the turret. The turret was filled with layers of iron fragments, iron concretions, coal, and other hull debris. Excavation proceeded smoothly until July 10 when the weather turned, and squalls, thunderstorms, and strong bottom currents slowed operations. By 4:00 a.m. on July 10, surface-supplied diving had to be suspended, but saturation diving continued.

The question of whether the turret roof had remained intact during the sinking was answered on July 12, 2002 when divers uncovered the distinctive gun carriages and the smooth iron of the guns themselves. This discovery signaled to the team that the turret could indeed be a time capsule. Excavations on July 24 confirmed that the roof rails were in place, and on the 26th divers discovered bones, which analysis showed to be human. The pace of the recovery necessarily had to slow. Though the divers were able to recover some of the remains, they found that a large portion of the bones were concreted to the roof rails. Given the timetable the

team was working against, full recovery of the bones in situ on the ocean floor was not an option. Thus, the remaining excavation of the turret occurred on board the *Wotan*, and then continued at The Mariners' Museum throughout the summer and fall of 2002, and each summer thereafter. Ultimately, NOAA archaeologists recovered two sets of human remains, which were sent to CILHI to await identification.

The expedition crew worked 24-hours a day, in two twelve-hour shifts, as they raced the clock to raise the turret. The *Monitor* expedition 2002 had funding enough only to work on the Sanctuary for 45 days. On August 1, only eight days of funding remained, and the weather over the Graveyard of the Atlantic was getting progressively worse. For two days, currents, winds, and tidal surges prevented the lifting of the turret. The natural elements that drove the *Monitor* to ocean bottom 140 years before seemed to be conspiring to keep her in her grave.

A break in the weather finally came on August 5. The bottom currents lightened and work resumed to connect cables from the lift-crane to the spider. Just before 5:00 p.m. the crane operator lifted the turret gingerly a few feet off the ocean floor and placed it carefully on a lift platform designed to support the base of the inverted turret, ensuring that the roof remained in place. At 5:45 p.m. the turret broke the surface of the Atlantic Ocean for the first time in almost 140 years. Cheers went up from the crew assembled on the deck of the *Wotan*. Captain (select) Barbara "Bobbie" Scholley, the Navy's On-Scene Commander for the expedition, said,

“For a bunch of pretty tough, hoo-yah deep-sea sailors, there was an awful lot of hugging going on on the barge.”³⁸⁰

On August 9, 2002, the *Monitor*'s turret, borne by the barge *Wotan*, made its way back to Hampton Roads. As it passed by Fort Monroe, the US Army fired a twenty-one-gun salute. Morning traffic slowed on the *Monitor-Merrimack* Bridge Tunnel as the turret passed near the site where it made history battling the *CSS Virginia*. Transferred to a smaller barge at Newport News Shipbuilding's Advanced Shipbuilding and Carrier Integration Center (VASCIC), the turret continued on its trip up the James River where thousands of spectators lined the banks or took to yachts, sailboats and kayaks to watch the revolutionary naval icon make its way to The Mariners' Museum the following day where it was placed in a 90,000 gallon steel tank for archaeological and conservation work.

The turret recovery of 2002 was the last major recovery effort undertaken by NOAA on the *Monitor* wreck site, although smaller NOAA-led expeditions as well as several private dive groups have returned each year to document and monitor the condition of the site. A number of hurricanes, tropical storms and nor'easters have passed over or near the site since 2002, and NOAA staff have documented some deterioration of the wreck, including the collapse of the midships bulkhead in 2004.³⁸¹

While no major recoveries are planned for the near future, there remain within the wrecksite components of great significance. Much of the crew areas in the forward part of the ship have yet to be excavated. They are believed to still contain

³⁸⁰ Mariners' Museum interview with Captain Bobbie Scholley, March 8, 2003.

³⁸¹ “USS *Monitor* Suffers Severe Damage,” *Daily Press*, July 8, 2004.

many personal objects that belonged to the men serving aboard the *Monitor* in 1862. There is also much that could still be learned about the construction of the vessel. Of particular interest are the donkey engines and gears associated with the turning of the turret, the armor belt, and the toilets.

While the major recoveries are over, new information about the vessel's construction, the crew and the *Monitor's* final moments continues to be found in the conservation process. Two hundred and ten tons of artifacts are housed onsite at The Mariners' Museum within the *Ironclad Revolution* exhibition, in climate-controlled storage, or in the Batten Conservation Complex. Here, conservators, archaeologists, engineers and historians work daily with the artifacts to extract both chlorides and information. Over a thousand artifacts have already been conserved, and are on display at The Mariners' Museum or at other institutions around the country. There are, however, well over a thousand artifacts still undergoing active treatment. Of these, the largest and most complex artifacts are the turret, condenser and engine. While the objects are stable, they will need many more years of treatment before they can be displayed or stored safely outside of their chemical or water baths. Current estimates are that the project, as it is currently configured, will not be complete until 2029.

Epilogue

The artifacts recovered from the *Monitor* give historians insight into this nascent world of American ironclad technology, but her story provides insight into how this experimental craft took on a character that caught the attention of the Union, and later the nation. She first went by the names “Ericsson’s Folly,” “Tin can,” “rat trap,” and “cheesebox,” but soon became known throughout the Union as “Our Little *Monitor*.”³⁸² While there would be many other monitor-class vessels built, there would only ever be one *Monitor*, a fact that her officers and crew were quick to point out.³⁸³ Her design informed the design of other vessels, and provided several cautionary tales in the process, yet she remained unique among them, because she was the first.

The men who served aboard her were as unique as their vessel in the minds of the public. They were lauded as heroes wherever they went, and found that they would not be allowed to spend their money once it was known they were “Monitors.”³⁸⁴ Though 108 men can be documented as having served aboard the original *Monitor*, countless others claimed to have served—their desire to be connected with the mythical qualities of this first turreted vessel was so great.

After March 9, both Union and Confederacy put their ironclad-building programs on the fast track. Over the course of the war the Union would lay down 64 monitors as well as 19 other armored vessels. The Confederacy would lay down 22

³⁸² Small copper coins, bearing the image of the *Monitor* and the phrase “Our Little *Monitor*” were struck in 1863 as patriotic tokens. The Mariners’ Museum has several examples in its collection.

³⁸³ George Geer, William Keeler and Isaac Newton all reassure their relatives that the coming of other monitor-class vessels would do nothing to diminish their status as having served on the first.

³⁸⁴ Keeler letter to Anna, March 11, 1862 in *Aboard the USS Monitor*, 42.

casemate rams of the 40 ironclads it built or bought. Some vessels were more successful than others—but most were plagued by problems in the same areas as their prototypes: speed, power, stability, seaworthiness, and draft. The design of the *Passaic* class monitors, which were under contract immediately following the *Monitor's* success, improved on flaws found in the original *Monitor*. They had thicker hull plating, better steering, and an improved pilothouse, which was mounted on top of the turret. They carried a lop-sided combination of one XI-inch and one XV-inch Dahlgren. The USS *Passaic* was traveling around Cape Hatteras the same night as the *Monitor*. Though she had difficulties, her design (and the decisions of her commanding officer) saved her from the same fate as the *Monitor*. The *Canonicus* class of Ericsson monitors followed in 1863. Larger still than the *Passaic* class, these monitors carried two massive XV inch Dahlgrens in their turrets. The *Onondaga*, *Monandnock* and *Miantonomoh* were double-turreted monitors, the latter two designed specifically for open ocean, with thirty inches of freeboard.³⁸⁵ The USS *Roanoke* began her career as a steam frigate in 1857 and was present at the Battle of Hampton Roads. Steaming to New York after the battle, the *Roanoke* was decommissioned in later March 1862. Shipwrights at Novelty Iron Works in New York City then cut the *Roanoke* down to her gundeck and then refitted her with three turrets and iron armor. Relunched and commissioned in 1863, the *Roanoke* was the only monitor to carry three turrets.³⁸⁶

³⁸⁵ Following the war, the *Monadnock* undertook the longest sea voyage of any monitor up to that point when she steamed from Philadelphia to California in 1865-1866. The *Miantonomoh* crossed the Atlantic in 1866 and toured northern Europe, including Russia.

³⁸⁶ Silverstone, *Civil War Navies*, 4.

Other designers incorporated the monitor concept into their designs. James Eads had success with his riverine ironclads in the western waters, including sternwheel monitors. Others were not as successful, however. The *Casco* class, designed by Ericsson's former right-hand man, and *Monitor* officer Alban Stimers, was a disaster. These single-turret monitors with a turtle back deck were designed to operate in shallow rivers. The class had serious design flaws, and only four of twenty ships constructed were commissioned. The class had insufficient freeboard—one vessel only had three inches of deck above the waterline after the turret was installed. Several *Casco* class vessels were converted to turret-less torpedo boats armed with spar torpedoes. A Congressional inquiry into the construction of the *Casco* class monitors in 1865 came to the conclusion that the class would have been successful “had Mr. Stimers consulted with Mr. Ericsson as he had been instructed to do, and as he had done from the time the first monitor was contracted for.”³⁸⁷

Regardless of their successes or failures, none of these later monitors would capture the imagination of the American public in the same way the original *Monitor* did, however. Her men were popular on the lecture circuit, her shape was popular in art, advertising, and home appliance design, and her designer, John Ericsson, was celebrated as a national hero on the occasion of his death in 1889, forty-six years after being maligned for the *Princeton* affair. A massive procession including the majority of naval personnel from the Brooklyn Navy Yard, followed his coffin

³⁸⁷ Speech of James Wilson Grimes in *The Navy in Congress*, (Washington, D.C.: Franck Taylor, 1865), 7.

through the streets of New York. His coffin was borne by several of the men who had helped build his unique vessel, the *Monitor*.³⁸⁸

Surgeon Grenville Weeks wrote the most fitting epitaph for both the *Monitor* and her designer. In March 1863, shortly after the loss of the *Monitor*, Weeks wrote an account of the sinking for *Atlantic Monthly*. He recalled that within two days of the sinking the surviving officers and crew were back at Fortress Monroe, and the unreality of what they had been through set in, with the week “seeming...like some wild dream.” He continued:

One thing only appeared real: our little vessel was lost, and we, who, in months gone by, had learned to love her, felt a strange pang go through us as we remembered that never more might we tread her deck, or gather in her little cabin at evening.

We had left her behind us, one more treasure added to the priceless store, which Ocean so jealously hides. The *Cumberland* and *Congress* went first; the little boat that avenged their loss has followed; in both noble souls have gone down. Their names are for history; and so long as we remain a people, so long will the work of the *Monitor* be remembered, and her story told to our children's children.³⁸⁹

Edward M. Miller, one of the eight midshipmen to go looking for the *Monitor* in the summer of 1973, echoed Weeks' words when he wrote in 1978 that he hoped that the “complete story of the USS *Monitor* [could] be written.”³⁹⁰ That story is unfolding each day in the conservation labs and archives at The Mariners' Museum, and in the one-mile column of water, sixteen miles off Cape Hatteras that comprises the *Monitor* National Marine Sanctuary.

³⁸⁸ “Captain Ericsson's Funeral,” *New York Times*, March 11, 1889. Cornelius Bushnell, Cornelius Delamater, Thomas Rowland and Charles MacCord were among the pallbearers.

³⁸⁹ Grenville Weeks, *Atlantic Monthly*, Volume XI, March 1863, 372.

³⁹⁰ Edward M. Miller. *U.S.S. Monitor: The Ship That Launched A Modern Navy*. (Annapolis, MD: Leeward Publications, 1978), 1.

Appendix A: Recovery Timeline, 1974 – 1995

The first twenty-one years of exploration on the *Monitor* wreck site are presented in this Expedition Timeline, compiled by Jeffrey Johnston (NOAA), Judy Vannais (DMCD, Inc.) and Anna Gibson Holloway (The Mariners' Museum) for the exhibition *Ironclad Revolution*.

August 12 – 16, 1974

Expedition Team:

- US Coast Guard Search

June 9 – 10 and 16, 1976

Expedition Team:

- Duke University Marine Laboratory, *Monitor* Research and Recovery Foundation (MRRF), and the University of Delaware

Expedition Goals and Achievements:

- Magnetic and acoustic data were collected from the wreck.

April 4 – 8, 1977

Expedition Team:

- MRFF and the University of Delaware

Expedition Goals and Achievements:

- Tests were conducted on speed and direction of bottom currents in the Sanctuary.
- Core samples were taken to study sediments around wreck.

July 17 – August 2, 1977

Expedition Team:

- NOAA, Harbor Branch Oceanographic Institute, North Carolina Division of Archives and History, and the US Navy

Expedition Goals and Achievements:

- An extensive photogrammetric survey was made of the wreck
- The first on-site exploration using occupied submersibles and divers.
- The brass signal lantern was recovered. The lantern was located on ocean bottom forty feet north of the turret

June 9 – 14, 1979

Expedition Team:

- Cousteau Society

Expedition Goals and Achievements:

- Using standard SCUBA equipment divers film the wreck.

August 1 – 26, 1979

Expedition Team:

- Harbor Branch and N.C. Division of Archives and History

Expedition Goals and Achievements:

- Supported by the R/V *Johnson* and the submersible *Johnson-Sea-Link I* underwater archaeologists excavated the forward section of the hull.
- Numerous small artifacts were recovered.

August 21 – 19, 1983

Expedition Team:

- NOAA, Harbor Branch, and East Carolina University

Expedition Goals and Achievements:

- The first phase of research to stabilize the wreck and to investigate the feasibility of major recovery operations is begun aboard the R/V *Johnson*.
- The four-fluked anchor was recovered. The anchor was located 150 yards SW of the wreck. The anchor was transported to East Carolina University for conservation.

August 2 – 11, 1985

Expedition Team:

- NOAA, Eastport International, and the National Trust for Historic Preservation

Expedition Goals and Achievements:

- Supported by the R/V *Peter W. Anderson* sonar images of wreck were made.
- Two recording meters were placed on the bottom to record the currents, temperatures, and salinity in the water column around the wreck

May 25 – June 9, 1987

Expedition Team:

- NOAA, Eastport, and the U.S. Navy

Expedition Goals and Achievements:

- ROV *Deep Drone* was used to conduct corrosion studies and a structural survey of the wreck.

June 1 – 2, 1990

Expedition Team:

- NOAA and Harbor Branch

Expedition Goals and Achievements:

- Excellent visibility at the site allows the team aboard the R/V *Seward Johnson* and the *Johnson Sea Link I* to capture some of the best video and photographic images of the wreck.
- Changes in the wreck, aft of the midships bulkhead were noted.

June 5 – 13, 18 – 22, 1990

Expedition Team:

- Privately funded expedition by Roderick Farb

Expedition Goals and Achievements:

- Using standard SCUBA equipment divers obtained high-quality video and photographic images of the wreck.

June 30 – July 11, 1990

Expedition Team:

- Privately funded expedition by Gary Gentile

Expedition Goals and Achievements:

- Divers using mixed-gas scuba made still and video images of the wreck.

July 25 – 27, 1990

Expedition Team:

- NOAA, Harbor Ranch

Expedition Goals and Achievements:

- Aboard the R/V *Edwin Link* and using the submersible *Johnson-Sea Link II* still and video images and surveys of the area aft of the midships bulkhead were made.
- An intact glass lantern chimney was recovered.

July 28 – August 5, August 25 – 31, 1990

Expedition Team:

- Farb *Monitor* Expedition

Expedition Goals and Achievements:

- Video and still images of wreck were made using hand-held equipment.

June 20, 1991

Expedition Team:

- NOAA and Harbor Branch

Expedition Goals and Achievements:

- Aboard the R/V *Edwin Link* an emergency inspection of the wreck site was carried out in response to a Coast Guard report of an unauthorized anchoring within the Sanctuary. Using the submersible *Johnson-Sea Link I* a visual inspection of the site was carried out which revealed evidence of recent impact on the face of the turret and port armor belt and a noticeable change in the position of the rudder skeg and propeller.

August 31 – September 1991

Expedition Team:

- Farb *Monitor* Expedition

Expedition Goals and Achievements:

- Poor bottom conditions limited the success of the expedition.

October 4 – 5, 1991

Expedition Team:

- NOAA, Harbor Branch

Expedition Goals and Achievements:

- On board the R/V *Edwin Link* and using the submersible *Johnson-Sea Link I* recent changes in the wreck were documented. These included a section of the lower hull that had begun to separate forward of where the skeg and propeller shaft exit the hull, and a crack in the port side armor belt approximately one meter from the stern.

May 16 – 24, 1992

Expedition Team:

- Farb *Monitor* Expedition

Expedition Goals and Achievements:

- High-quality photographs of the wreck were made using hand-held cameras. Measurements of the wreck were taken for comparison with computer-generated studies.

August 30 – September 4, 1992

Expedition Team:

- Farb *Monitor* Expedition

Expedition Goals and Achievements:

- Observations made included several condiment bottles within the wreck forward of the midships bulkhead; the skeg had shifted farther to the north leaving a larger gap in the lower hull, and additional plating had separated from the armor belt.

September 11 – 12, 1992

Expedition Team:

- NOAA and Harbor Branch

Expedition Goals and Achievements:

- Aboard the R/V *Edwin Link* assessments were made of the wreck using the submersible *Johnson-Sea Link I*.
- Precise GPS positions for the wreck were obtained.
- Areas of change in the wreck were documented, and still and video images were recorded.

September 21 – 26, 1992

Expedition Team:

- Peter Hess Expedition

Expedition Goals and Achievements:

- High-quality still and video images were made of the wreck.

July 26 – August 11, 1993

Expedition Team:

- NOAA, Harbor Branch and U.S. Navy

Expedition Goals and Achievements:

- Using the R/V *Edwin Link*, an open diving bell, and the submersible *Johnson-Sea Link II* a photographic study of the wreck was made with hand-held and video cameras.
- Damaged and deteriorated areas of the wreck were documented in detail, but on site activities were limited due to adverse weather.

August 15 – 20, 1993

Expedition Team:

- Farb *Monitor* Expedition

Expedition Goals and Achievements:

- Measurements of the wreck were made for continued comparison.
- Six condiment bottles located forward of the midships bulkhead were photographed, mapped, and recovered.
- Severe hull deterioration and the exposure of the bottles were determined to be probably due to current scouring.

August 23 – 27, 1993

Expedition Team:

- Gentile-Hess Expedition

Expedition Goals and Achievements:

- Measurements of the wreck were made for continued comparison.
- High-quality still and video images of the site were recorded.
- An ironstone dinner plate, a condiment bottle, and a pair of brass oarlocks were photographed, mapped, and recovered.

September 28, 1993

Expedition Team:

- NOAA and Harbor Branch

Expedition Goals and Achievements:

- An emergency survey of the wreck was made to document any damage from Hurricane Emily – no damage was observed.
- A brass lamp fitting was recovered

June 11 – 13, 1994

Expedition Team:

- NOAA

Expedition Goals and Achievements:

- A 6,000-pound anchor was placed approximately 200 feet southwest of the wreck and a sub-surface buoy attached to the anchor 50 feet below the surface.

August 8 – 13, 1994

Expedition Team:

- Lander Expedition

Expedition Goals and Achievements:

- High-quality photographic images of wreck were made for use in generating a photogrammetric map of the site.
- Twenty exposed artifacts were photographed, mapped, and recovered, including condiment and apothecary bottles, bottle fragments, and a plate fragment.

August 16, 1994

Expedition Team:

- NOAA, Harbor Branch, and the US Navy

Expedition Goals and Achievements:

- An annual site assessment was carried out.
- NOAA and navy personnel examined the wreck to evaluate recovery options.
- Using the R/V *Sea Diver* and the submersible *Celia*, a controlled video study of the wreck was carried out. Only one submersible dive was completed due to adverse weather conditions.

August 16 – 19, 1994

Expedition Team:

- Farb *Monitor* Expedition

Expedition Goals and Achievements:

- High-quality photographic images of the wreck were made.
- Adverse weather severely limited dives.

August 21 – 26, 1994

Expedition Team:

- Lander Expedition

Expedition Goals and Achievements:

- High-quality photographic images of the wreck were made
- Adverse weather severely limited dives.

September 26 – 28, 1994

Expedition Team:

- US Navy Reconnaissance Expedition

Expedition Goals and Achievements:

- A planned inspection and survey in preparation for 1995 mission to recover the *Monitor*'s propeller was severely affected by strong currents at the site.

September 24 – 26 and October 21, 1994

Expedition Team:

- Special Use Permit – Non-research Dives

Expedition Goals and Achievements:

- The first non-research dives were conducted under the direction of Captain Arthur Kirchner.
- Divers were permitted to observe and photograph the wreck but were not allowed to come into contact with the ship or any artifacts that might be observed.
- Expeditions were limited due to adverse surface and sub-surface conditions.

August 31 – September 6, 1995

Expedition Team:

- Lander – Tysall Expedition

Expedition Goals and Achievements:

- Quality still images were made.
- Adverse weather limited dive operations.

August 12 – October 21, 1995

Expedition Team:

- NOAA, the US Navy, The Mariners' Museum, the National Underwater Research Center/UNC at Wilmington, and Key West Diver, Inc.

Expedition Goals and Achievements:

- Recovery of the *Monitor*'s propeller
- Only three NOAA dives were made on four separate trips due to severe weather conditions that affected the region for two months.
- The propeller was prepared for recovery but the operation could be completed because of severe weather conditions.

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The Norfolk Daybook

The Philadelphia Inquirer

Raleigh News and Observer

Virginian Pilot

Washington Daily Intelligencer

Vita

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