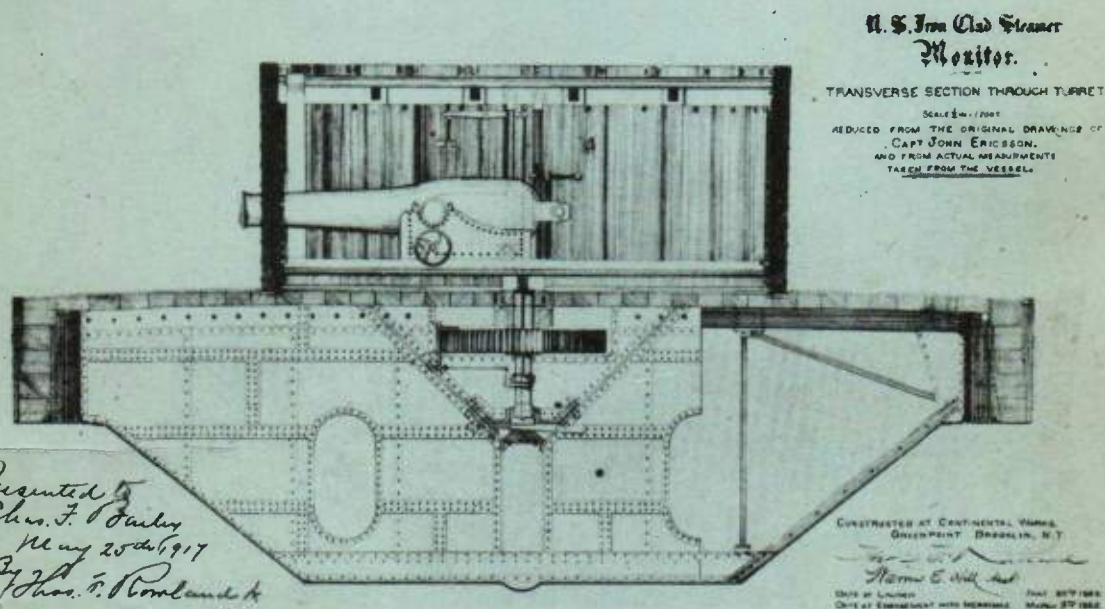


Project Cheesebox

A journey into history



Volume One

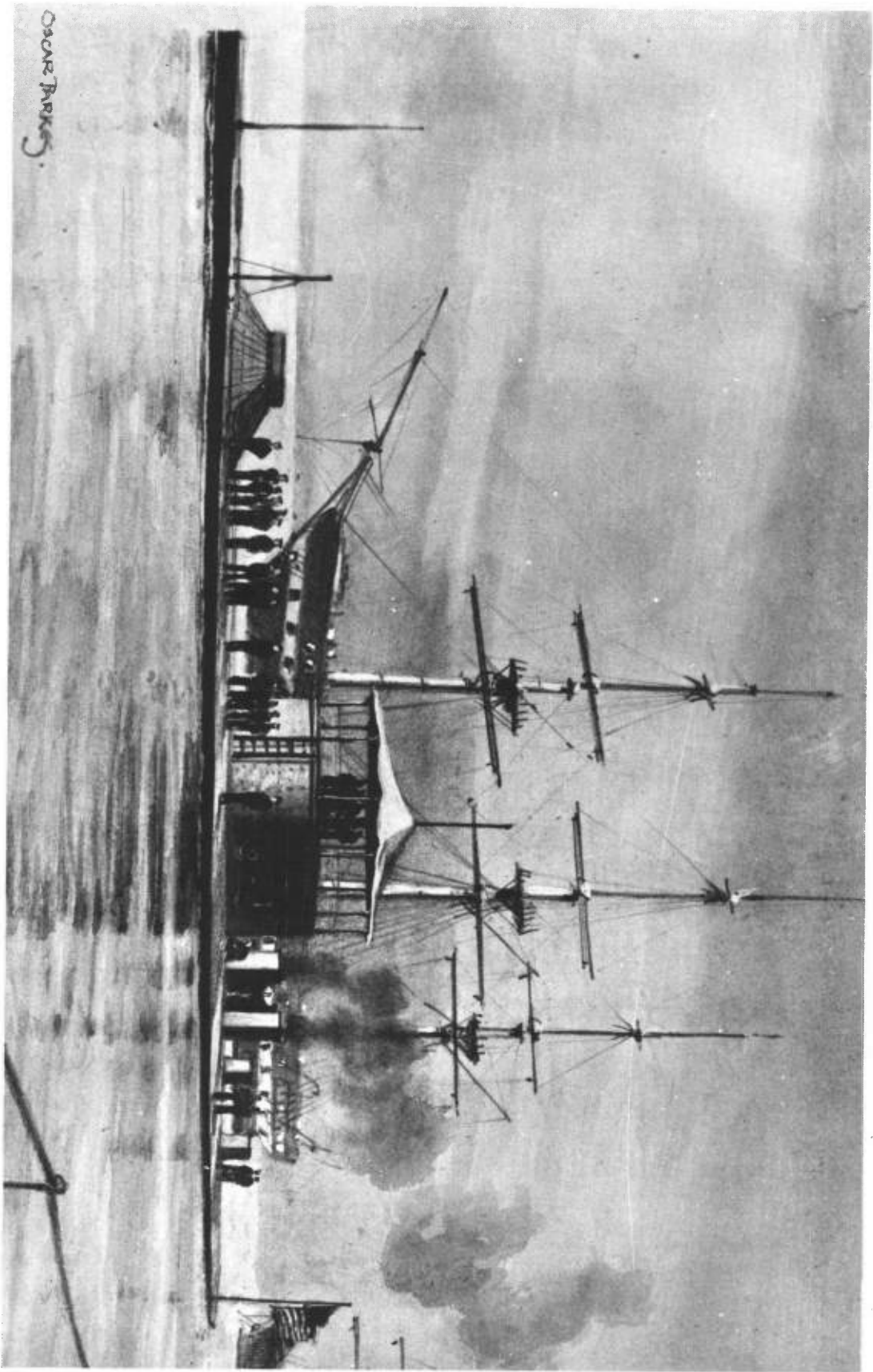
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United States Naval Academy
1974

PROJECT CHEESEBOX:
A JOURNEY INTO HISTORY

A Research Manuscript
Department of History
United States Naval Academy
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W. M. Darden, History Department, U. S. Naval Academy, Annapolis, MD



USS Monitor on James River duty. Water color
by Dr. Oscar Parks, London, England, 1936.

PREFACE

Project Cheesebox was conceived when Midshipman Michael J. Ellison, USNA '73, acquired in the spring of 1973 some new scuba gear and desired to christen it by diving on a shipwreck anywhere off the Atlantic coast. He was facetiously told by an underclassman, E. M. Miller, '74, to dive on the wreck of the USS Monitor. This is where I entered the project. Ellison was aware of my knowledge of Cape Hatteras—knowledge gained only by fishing the area.

Ellison and Miller gathered expert personnel for an expedition to Hatteras, including MAD authority William J. Andahazy. This expedition accomplished nothing except instilling more enthusiasm for locating the Monitor in the minds of Ellison, Miller and Andahazy.

For the fall semester of 1973, Midshipman Miller was able to place a course of independent research in his academic schedule. During this semester, Miller and I saw the magnificent possibility of continuing his work on the Monitor and at the same time creating a multi-discipline course involving more midshipmen. To give academic credit to the students of such a course was possible only with the approval and cooperation of the administration of the Academy. This was received and Project Cheesebox gradually became a singularly unique combination of personal innovation, diligence, practical experience and academic pursuit on the part of the midshipmen.

Midshipman Miller was the "ram-rod" of Project Cheese-
box. This project proved a long-time contention of mine—
when midshipmen are interested in accomplishing a goal,
give them the green light, and assistance when they ask for
it, and you will see that goal attained. Miller led this
group of diverse academic undergraduate majors to the pin-
nacle of success, success in the fields of history, engineer-
ing, oceanography and public relations.

Vice-Admiral Edwin Hooper, Mr. Ernest Peterkin and Mr.
William J. Andahazy, not of the official Naval Academy
family but of the U.S. Navy family, were an integral part
of Cheesebox as was Director of Research at the Academy,
Richard D. Mathieu, and Mrs. Gloria Cesnek, our most
efficient secretary.

A history teacher is most fortunate indeed to be
associated with such a team as that which worked on Project
Cheesebox!

W. M. Darden

INTRODUCTION

Project Cheesebox is a multi-disciplined research project conducted at the United States Naval Academy from April of 1973 to December of 1974. It was initiated by Midshipmen at the Naval Academy to study the history of the Civil War Iron-clad USS Monitor and to attempt to locate its hulk. Under the guidance of Professor William M. Darden of the History Department, the project was structured as a unique multi-faceted study conducive to Midshipmen with different academic majors to collaborate in collective research.

The project was divided into three phases. The first phase was the documentation of the history of the ironclad and its inventor John Ericsson. Research was completed in the major depositories of the Washington area which included the National Archives, the Library of Congress, Smithsonian Institution, Navy Library at the Washington Navy Yard, Library at the U. S. Naval Academy and the museums at both the Navy Yard and the Academy. In addition trips were made to the New York Historical Society in New York City, Fifth Avenue Library, Stevens Institute of Technology, Mariners Museum in Newport News, Virginia and the American-Swedish Historical Foundation in Philadelphia, Pennsylvania. These trips were made in an attempt to gather copies of original documents pertaining to the project and a selection will be presented in the manuscript.

Phase two was the construction of two scale models of the Monitor. The first was a tow tank model which was constructed and tested at the Naval Academy with additional tests being run at the David Taylor Model Basin, Naval Ship Research and Development Center (NSRDC), Carderock, Maryland. These tests proved interesting in the evaluation of the Monitor's seagoing capabilities and general characteristics. The second model is a cutaway model showing particulars of construction and interior details. This model is of importance as it is the first to display the interior of the ship and was an aid in the study of ship construction.

The third phase of the project was the development of search techniques and procedures to be used in searching for the lost hulk of the Monitor. Technical assistance was given by NSRDC, Annapolis, Maryland and an active search was conducted using an airborne magnetometer. Our searches were concurrent with the Duke-North Carolina expedition of August 1973 and the data that was collected from the two surveys that were flown proved valuable in the establishment of a search plan for the research vessel Alcoa Seaprobe of April 1974.

The manuscript has been organized chronologically and has been expanded to include a brief historical summary of previous modern search attempts and also a report from the Duke University expedition which is credited with the discovery and first photographs of the hulk. Hopefully, this treatment will gather much of the available material pertaining to the ship's history

and the mystery of her location in the turbid waters off Cape Hatteras. In many instances, original documents have been left intact and inserted in proper sequence, the feeling being that accounts of historical events are best told by those who were contemporary with the event. This is particularly true of John Ericsson and his Monitor.

Of the many who assisted and advised the Midshipmen, special acknowledgment is due to William J. Andahazy, Ernest W. Peterkin, Professor William Darden, Dr. Richard Mathieu, Vice-Admiral E. B. Hooper, Robert Gustafson, Robert Sumrall, George R. Lorentzen, Professor Paul Van Mater, Professor Roger Compton, W. Roloson and Harry Schwartz. A special thanks goes to Mrs. Gloria Cesnek for her patience in typing the manuscript.

This project, unique from its inception, has been extremely rewarding for the Midshipmen and others who participated. It was timely in that they were caught up in the excitement of the search and assisted in the verification of the wreck as that of the Monitor. And finally through their research, they have helped point out the historical significance of the ship so that proper steps could be taken to preserve it. All involved feel a sense of accomplishment as not only have they successfully completed what they started out to do, but also, more important a little segment of American history has finally come to light again and now for the first time the complete story of the Monitor can be told. Heretofore, all histories

of the ship were incomplete in the last chapter with the words, "lost somewhere south of Cape Hatteras." Now, through the efforts of this research project, the Duke-North Carolina team, and other search teams, the mystery of the illusive Monitor has been solved.

Edward M. Miller

Editor

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CHAPTER I

John Ericsson
A Man and His Dreams

EDITORS NOTE

The Monitor was an engineer's ship, the first of a new concept in naval construction. She was also John Ericsson's ship as every rivet and every piece of machinery carried his stamp. Her lines were conceived in his mind and her plates were impregnated with his personality. It is a peculiar process that is only known to shipbuilders and men of the sea that transforms a pile of materials into a ship. As the frames gradually take shape, the plates fitted to her and the rivets driven home, the ship emerges as an entity, as something with a purpose, that has a life of its own. This can be truly said of the Monitor. Just as her inventor was shrouded in controversy, so was his ship.

The two can never be separated. Out of the seeds in John Ericsson's genius sprouted the "Monitor concept" which through the undaunted spirit and efforts of its inventor became a reality in a time of great need.

Only a man the likes of John Ericsson would have accepted the challenge at so great a personal risk. The events of Ericsson's early life explain the why and how it all came to be: why a man of such engineering ability should be almost destitute in a foreign land for a second time and how he was able to maintain faith in himself and convince others of the merit in his designs. Staunch, prolific, stubborn in his own ideas and not easily criticized, John Ericsson can truthfully be called "The Genius of Beach Street."



JOHN ERICSSON 1803-89
AMERICAN SWEDISH HISTORICAL FOUNDATION

A BIOGRAPHY OF JOHN ERICSSON

Genius of Beach Street

By

John Carl Meyer

Midshipman First Class

United States Naval Academy

June 1974

The Genius of Beach Street

The purpose of this paper is to examine the life of John Ericsson, not just in terms of his many accomplishments, but in terms of events and their effect on the man and his character. Several incidents during the early years in Sweden and England had a great bearing on him and his work. These incidents will be dealt with in great detail, as they were the basis of his work in America.

William Conant Church, the Biographer of John Ericsson, was not consulted because of his portrayal of Ericsson as a God among men. To find out what the man was really like and what inspired him, it is important to understand his real character. Ericsson's own words and actions, the opinions of others, and some historical retrospection will be used to develop the character that was John Ericsson. Published works, original sources, speeches, writings, and interviews formed the bulk of research material used.

The years following the development of the USS Monitor will not be dealt with in depth except in terms of Ericsson's Solar Engine, Torpedo and Destroyer work. These three contributions by their futuristic design are worthy of note.

John Ericsson was born in Langbanshyttan, Vermland, Sweden on 31 July 1803 to Olof and Brita Sophia Yngstrom Ericsson. John was the third child born to the Ericsson family and was preceeded by brother Nils and sister Anna

Carolina. For four generations the family had been involved in the ownership or work of Swedish mines. Olaf was a mine inspector, mathematician, and a graduate of Karlstad College. From him, John was taught the basics of mathematics and science. His curiosity was aroused at a very early age and he enjoyed performing simple scientific experiments his father had shown him. The education of both John and Nils was continued during frequent visits to the mines. John was a quiet, withdrawn boy and did not seek out or have many friends. Nor did he have the same pursuits of other boys his age. Rather than going on family picnics or to May Day celebrations, he would walk through the forest studying and daydreaming about the world around him.¹

At five years of age, John was drawing using a compass he made from birch twigs and his mother's sewing needles. He stripped clocks and watches of their springs, and melted down his mother's spoons in the construction of a windmill. In order to complete a drawing, some very fine brushes were needed. These brushes were made by plucking hair from his mother's Russian sable cape. It would seem that John was very industrious, however, Nils was the favorite of the family and John could never understand why his brother's inferior work, as compared to his, was given so much more attention and praise. This unhealthy environment served to make John compete and try and outdo his brother in everything he

did. This situation did not affect John's love of his parents, especially his mother.²

From the sixteenth century, a plan for a canal to bisect Sweden had been discussed. In 1811, the plans for the canal were initiated. The Göta Canal, as it was called, was a gigantic project, administered by the Mechanical Corps of the Swedish Navy and designed by British engineers.³ The construction workers were from the regular navy, and were employed by the government on all construction projects that improved the condition of Sweden,⁴ Olaf got a job as engineer in charge of a blasting division at Forsvik which was a building station along the route of the Canal. The Ericssons' moved to Lake Uättern, Forsvik to be close to the Canal site. At their new home, John and Nils' education was continued through the tutoring efforts of engineers working on the Canal. They were taught English, French, Latin, Architectural Drawing, Chemistry and Mechanical Draftsmanship.⁵ Nils was now nine years old, and John was eight years old.

The chief engineer of the Canal, Count Baltzeir Bogeslaus von Platen had heard of the talents of the Ericsson boys and appointed them cadets in the Mechanical Corps of the Swedish Navy. Nils served for four years as a carpenter and cement-maker.⁶ After six months of study, John was appointed assistant niveleur or leveler, which meant that he was an assistant surveyor and engineer on the Canal project.⁷ Now at fourteen

years of age, John was promoted and moved to the east line of the Canal and placed in charge of six hundred men. An adult had to accompany John into the field and carry a stool for John to stand on so that he could look through the lens of his surveying instrument and study the drawings and plans and survey the terrain.⁸ At age fifteen John had drawn the complete three hundred mile Canal with all the machinery and tools used in its construction.⁹

At age seventeen, John was eligible for military service, and interested in an old branch of the army in which its members were stationed in the northernmost part of Sweden, Jämtland. In 1820, John resigned from the Naval Cadets and joined the twenty-third Rifle Corps of the Swedish Army engaged in special engineering and construction jobs in Jämtland, three degrees from the Arctic Circle. Contrary to his early youth, these were happy times for him. He was described by his comrades as handsome, agreeable, and made friends easily. They also relate of his dancing and singing and his relationships with the girls of the northern towns. He even wrote poetry descriptive of the Jämtland area. During this time, he developed into an exceptional athlete, and remained in good physical condition throughout his life. He also excelled in marksmanship and the science of artillery.¹⁰ These years in the military served to round out John's character, and bring out the long hidden qualities needed to face the competitive world he was heading for.

John took great pride in his personal appearance and rightly so, for he was proud of his uniform and he was interested in the daughter of one of his senior officers, Captain Jacob Lilliesköld. Although John had recently been promoted to Lieutenant, he was considered a poor candidate for a son-in-law, and Carolina was forbidden to see John. John was forbidden to enter the Lilliesköld house, and his letters to Carolina were intercepted and read by Captain Lilliesköld. Just as John had won over Carolina, he was ordered to Stockholm with letters of introduction to the Minister from England. The true love of his life bore his illegitimate son, who was placed in a foster home. Carolina finally married a Professor C. J. Schlyter, and she made no attempt to regain the custody of her son, nor did she ever see John again in her lifetime. However, every year on her son 's birthday, Carolina received a nosegay of violets from an anonymous sender, obviously John Ericsson. But when John left for England in 1826, he had no idea that he had fathered a son. It was Nils who found out about the birth of his nephew, and he searched for him until he found him in a foster home. The boy was brought to Nils' mother, Sophia, and named by her, Hjalmar Elworth: E for Ericsson, L for Lilliesköld, and worth for Kenilworth, by Sir Walter Scott. Hjalmar was raised by both Sophia and her daughter. It was not until 1872 that Hjalmar now forty-eight years old, first wrote to his father.¹¹

John Ericsson's years in Jämtland were extremely productive ones that laid the foundation for many of his later inventions. While in Jämtland, he completely mastered Euclid's Geometry. In national competition, he finished well enough to be appointed government surveyor for the northern provinces of Sweden.¹² Lt. Ericsson was assigned to prepare maps of military areas and communities in Jämtland. These maps, preserved to this day, remain in the Royal Archives in Stockholm as masterpieces in the art of map drawing.¹³ John also designed steam engines to drain ditches, and was always trying to find ways of doing things by experimenting with untried theories that were considered by other men, but never fully explored. His caloric engine was an example of this. The engine ran on the principle that air heated to very high temperatures could be used to drive engines. He took his invention to the Swedish Engineering Society, and was invited to demonstrate it in Stockholm.¹⁴ It was there that John met Adolf von Rosen, who was to become a lifelong friend. The demonstration of the caloric engine went well, as it produced ten horse power. Von Rosen persuaded Ericsson to bring this invention to the attention of the newly formed Society of Civil Engineers in London. Ericsson's commanding officer arranged for a one year leave of absence for John, and he and von Rosen set off for England in May 1826. Ericsson left Sweden with 10,000 borrowed Swedish crowns, never to return to Sweden in his lifetime. He arrived in London on 18 May 1826.¹⁵

John Ericsson demonstrated his caloric engine before the Institute of Civil Engineers located at 15 Buckingham Street on the Strand. He also presented a paper that is still on file at the Institute: Number 119, "A Description of a Method of Employing the Combustion of Fuel as a Moving Power."¹⁶ His demonstration failed, however, due to his use of a slow burning coal that produced too much heat and destroyed his engine. Ericsson was left discredited and penniless without enough money to return to Sweden.¹⁷ This was his first of many setbacks that served to harden him and make him more desirous of success. Fortunately, John had arrived in London at a very opportune time. England was in an era of "firsts" in many fields of experimentation and invention. It was not long before he was sought out by John Braithwaite, an engineer with offices on Fitzroy Square.¹⁸ Braithwaite had been present at Ericsson's demonstration and was impressed with him despite the failure of the engine. At age twenty-three, John Ericsson joined in a partnership with John Braithwaite.¹⁹ Their combined efforts produced the following inventions: an evaporator to remove salt from water, a depth-finder for ships, cutting files, hydrostatic weighing machine, engines that cut down on fuel consumption while producing a higher power output, furnaces fed by force draft blowers and centrifugal blowers, an engine to pump dry mines, and a steam engine with a surface condensor.²⁰ The first ten years of partnership produced thirty inventions.²¹

Ericsson became deeply involved in his work in the new partnership and forgot all about his military obligation. In 1827 he received a letter from his Commanding Officer informing him that his one year leave of absence had expired and he was now considered a deserter. Because of his fine work in representing Sweden in England, and a few hasty letters to influential friends in Sweden, Ericsson was reinstated into the army and promoted to the rank of Captain. John immediately resigned his commission but retained the rank of Captain for life.²²

One of his most important inventions of this time was the steam fire engine which incorporated the "Braithwaite" engine, capable of producing a stream of water through a hose that could reach the top of the tallest buildings in London. As was the case with many of Ericsson's inventions, it was rejected, this time by the London Fire Brigade because the engine took twenty minutes to get up steam and would continually have to be maintained on the line in case of emergencies. Two more "Braithwaite" steam fire engines were built. One was used at the Liverpool docks for many years, while the other was ordered by Frederick William III of Prussia for use on the Berlin Fire Brigade. An award winning model of the "Braithwaite" was demonstrated in New York City in 1840, a full decade before the steam fire engine was introduced and used in America.²³

By far, the most important invention by Ericsson during

this period in England was the steam locomotive "Novelty". In August 1829, Ericsson read of the contest sponsored by the Liverpool and Manchester Railway for the most improved steam locomotion engine. The prize was five hundred pounds sterling. The contest was held on 6 October 1829 at Rainhill, England. Ericsson and Braithwaite designed and built the "Novelty" in just seven weeks. Five entries were received, but the competition was soon whittled down to two locomotives; the "Novelty" and the "Rocket," built by George Stephenson, a renowned British engineer. The contest ran in heats over successive days ending on 16 October 1829. On the first run by the "Novelty," she attained the speed of thirty miles per hour. A reporter for the Mechanic's Magazine said:

The great lightness of the "Novelty," its compactness, its beautiful workmanship, excited universal admiration.

On her second run, she attained one mile in fifty-three seconds, a land speed record. Stephenson's "Rocket" attained twenty-four miles per hour on her first run. In fact, in all competition, the "Novelty" far surpassed the "Rocket". Unfortunately, the "Novelty" performed too well for the timid directors of the Liverpool and Manchester Railway. Ericsson at twenty-six years of age, and in seven weeks had out-performed George Stephenson, England's foremost locomotive engineer. He was able to accomplish this because he applied the inventions he had already perfected and used them to build the locomotive. That was characteristic of him, as in all he

did, he drew on his past experience and expanded what he had learned to develop something new.²⁴ The Directors of the Liverpool and Manchester Railway tried everything to get the "Novelty" out of the competition due to her underestimated performance. She actually turned out too good for the railroad's needs. In an effort to remove the "Novelty," the Directors changed the rules in the middle of the competition, forcing Ericsson and Braithwaite to make hasty alterations that taxed the engine beyond its design limitations, and the engine finally faltered. The Directors promptly disqualified the "Novelty" despite the objections of Ericsson and Braithwaite and their friends. Ericsson had lost to a less brilliant man, but made a lasting contribution to steam locomotion.²⁵

Among the many friends of John Ericsson in London was a Charles Seidler, a German shipbuilder, who was the first to introduce steam propulsion on the Rhine River. Seidler had married an English woman, whose stepsister became the acquaintance of John Ericsson. As time passed, the acquaintance turned into friendship and finally into love. John Ericsson, at thirty-three years of age married Amelia Byam, fourteen years his junior. They were wed on 15 October 1836 at St. John's Church in Paddington. When John Ericsson left England for America in 1839, he left Amelia behind for one year. When they were finally united again, they moved into the Hotel Astor in New York City. As John became more and

more involved in his work, he spent less and less time with Amelia. John admitted that he was "not fit for domestic life." Finally, Amelia could not stand to be neglected any longer, and moved back to England. There was no divorce and John faithfully sent her a yearly allowance until her death in 1866.

John Ericsson was aided in the development of the first screw propeller boat by an American, Francis B. Ogden, Esquire. Ogden was serving as United States Consul at Liverpool, England, and was an inventor in his own right with an interest in steam locomotion. He also was a pioneer in the navigation of the Ohio and Mississippi Rivers. With Ogden's help, Ericsson and Braithwaite designed and built a tugboat which featured Ericsson's newly invented screw propeller. The Francis B. Ogden was launched on the Thames River in the spring of 1837. She was nicknamed The Flying Devil because of the way she looked in operation. Tied up to the admiralty barge, aboard which were the distinguished Lords of the British Admiralty, The Flying Devil towed the barge up and down the river making six knots. The obvious success of The Flying Devil alluded the close-minded Lords of the British Admiralty, as they refused to believe that such a vessel could have a practical use, after she had just dragged them all over the Thames River. The Flying Devil was a failure that put Ericsson and Braithwaite deeply in debt. To make matters worse, Ericsson's other debts were large enough to

force his incarceration in the debtors prison. Fortunately, his brother Nils came to his rescue and secured Ericsson's release from prison.²⁷ The utter frustration of having a workable, successful invention called worthless must have really affected Ericsson. From that time on, Ericsson did not have a very high opinion for the British Admiralty, or for that matter, any government agency.

The man who had the singularly biggest impact on the life of John Ericsson was Captain Robert Field Stockton, USN. Stockton was a rich, impetuous, glory hungry, opportunist who ended up being both an aid and a detriment to Ericsson. The two men were an odd couple to be sure. Both men were a product of their times interested in many of the same goals in life, but were in reality as different as night and day. The meeting of these two men can only be described as fate. Stockton had heard that a fellow New Jersey born friend, Francis B. Ogden, had invested in the tugboat that bore his name. Stockton was very interested in steam propulsion, and wanted to study the possibilities of such a vessel to be used as a carrier of goods on the Delaware and Raritan Canal. He requested and received overseas assignment in England, and was on hand for the demonstration of the Francis B. Ogden on the Thames River.²⁸ That day in December 1837, John Ericsson, Francis B. Ogden, and Robert F. Stockton met at Trafalgar Tavern, London. Stockton was duly impressed with Ericsson and his tugboat:

I do not want the opinions of your scientific men. What I have seen this day satisfies me.²⁹

Stockton consequently ordered a vessel along the lines of the Ogden, only twice the size. The Robert F. Stockton was to be used on the Delaware-Raritan Canal in New Jersey. Ericsson proposed that the Stockton be used as a proving ground for a revolutionary naval gun capable of firing accurately regardless of the pitch and roll of the vessel. Ericsson then went on to describe in detail his plans. Stockton said:

Captain Ericsson, we will make your name ring on the Delaware.³⁰

Sensing success in the future, after so many major setbacks, Ericsson decided to outline a plan he had for a totally revolutionary vessel. The vessel was to be an iron-hulled warship, complete with steam engines below the waterline; a screw propeller instead of paddle wheels; small machinery to use less fuel; a surface condenser through which salt water was passed over steam-filled pipes to condense steam back into water; ventilation; a telescopic smoke stack that could be collapsed during battle; and new methods of mounting guns, aiming and firing them. He drew detailed sketches of the vessel for Stockton and succeeded in gaining his support. Stockton then announced:

We will call her the Princeton. Captain Ericsson, we will make your name ring on the Potomac.³¹

This could not have been better news for John Ericsson, for he had just had to overcome another setback. The Ericsson

screw propeller had gone unchallenged until 1835 when Francis Petit Smith's propeller was first employed. Ericsson's propeller had been used commercially since 1831, but Ericsson had failed to secure a patent on it until 13 July 1836, six weeks after Smith's patent. The British Patent Office refused to recognize the Ericsson propeller. This decision had a very decided effect on John Ericsson, and served to thoroughly make the British powers of government an enemy of him.³² When Stockton gave his full support to the Prince-ton project, John Ericsson was ready to accept and ready to leave England.

Stockton returned to America, only to come back to London, on overseas assignment, for the testing of the Stockton already launched on 7 July 1838. The vessel was tested on the Thames River on 12 January 1839 with Ericsson, Ogden, Stockton, and thirty invited guests aboard. Of course, the British Patent Office called the vessel unpatentable, but the London Times praised the Stockton as

an important improvement in steam navigation and conclusive proof of the success of the Ericsson propeller.³³

Stockton immediately saw the future of such a vessel in the U. S. Navy and returned to Washington to intercede for Ericsson in trying to convince the Navy Department of the worth of the Ericsson propeller. On 3 March 1839, Congress appropriated funds for three new naval vessels. The Mississippi and Missouri were to be steam paddle wheels. The third

vessel was not decided upon. Stockton went to work using his influence in Washington circles to try and secure the funds for the third vessel. In the meantime, he sent for John Ericsson to bring detailed plans for a 2000 ton vessel to be presented by him before the United States Government. Ericsson boarded the British Queen, bound for America, on 3 November 1839, never to return to England.³⁴ Ericsson brought with him his Ericsson gun and a working model of the Princeton. Stockton immediately took Ericsson to the Brooklyn Navy Yard where he arranged for several introductions. Ericsson set to work testing his gun under every possible condition. While these tests were being conducted, Ericsson received a letter from Stockton informing him of Stockton's two year leave of absence to go electioneering on behalf of the Whig candidates William Henry Harrison and John Tyler. It seems that all of Stockton's efforts to secure the approval for the Princeton had fallen on deaf ears. Stockton concluded that the time was not yet ripe for such a venture, and set out to obtain the endorsement of Congress by other means. Because of Stockton's efforts in electioneering, the Whig Party won, elevating Harrison into the Presidency.³⁵

The abandonment by Stockton, left John Ericsson in comparatively the same situation as in 1826 in London when his model Caloric Engine failed in the demonstration before the Institute of Civil Engineers. Then as in 1826, he was without friends, in a new country, living on borrowed money.

However, the optimism of John Ericsson never left him in moments of utter frustration and failure. Staying in a shabby apartment in the Brooklyn Navy Yard, Ericsson decided it was time to move. With \$750 in borrowed money from Francis B. Ogden, he moved into the expensive Astor Hotel in New York City. This course of action was common to the character of John Ericsson. When things would be going poorly, he never hesitated to spend what money he had on a new suit or some other luxury. In London, his tailor bill was so high that it contributed to his arrest and imprisonment in the debtor's prison.

Not far from the Astor Hotel was the Phoenix Foundry owned by James Cunningham. Cunningham soon retired and turned the foundry over to William Hogg and Cornelius H. DeLamater. It was good fortune of all three men that they met, for they formed an arrangement which lasted many years and proved extremely profitable for the Phoenix Foundry. But probably the most important outcome of this arrangement was the lifelong friendship established between John Ericsson and "Harry" DeLamater.³⁷

One month from the day of his inauguration, William Henry Harrison died of pneumonia, elevating John Tyler into the Presidency. Unwanted by both political parties, Tyler assumed the duties of President and offered Stockton the cabinet post of Secretary of the Navy because of Stockton's roll in making the Harrison-Tyler Ticket successful. Stockton

gracefully turned down the offer, reentered the Navy, and once more took up the cause of convincing Congress that the Navy needed the screw propeller.

Abel P. Upshur assumed the post turned down by Stockton and with his aid secured permission for the construction of the Princeton. After months of neglect, John Ericsson received a message from Stockton in July of 1841 stating that Congress had given the go ahead for his ship and ordering him to come to Washington. Happy in the knowledge that he would soon see the fruits of his labors, Ericsson set out immediately to join Stockton. When the two men met, Stockton wasted no time in giving Ericsson his first set of orders.

You must at once prepare drawings for a screw frigate of six hundred tons.

Ericsson's reply was

I know, I know, it is not a ship of the size we planned. I have remonstrated against it vigorously, I may tell you. I like yielding to no man, but I must be discreet and cannot presume the counsel further. Thus sir, we must do with what we have, and that quickly. Time is of the essence.³⁸

Stockton's next instructions came as a question,

can you give me now, very roughly mind you, an approximation of dimensions and costs?

Ericsson immediately sat down and proceeded to sketch a complete set of plans for the six hundred ton Princeton and after a short time he came up with an estimate.

I believe we may submit a maximum sum of \$75,000.³⁹

Ericsson's willingness to go along with Stockton on this

enterprise was due to the fact that Ericsson desired only to see his brainchild become a reality. He, therefore, cared nothing about monetary gain or his rights as the inventor of the ship;

. . . I freely waive my patent rights for this experiment.⁴⁰

No one could have told Ericsson that giving up his patent rights would be disastrous for he was a strong-willed man who neither sought advice nor accepted it when given. Consequently he became easy prey for an ambitious, glory-hungry Robert Stockton who now was free to exploit his "so-called" friend. Ericsson left this meeting with Stockton, promising the first set of drawings for this ship within a week. In order to devote all of his time to the design and construction of the Princeton, he hired a Samuel Risley to take care of his other contracts so that Ericsson could spend fourteen hours a day working. Completely involved in every facet of the ship's construction, Ericsson closely supervised the entire operation. Long on ideas and short on temper, he was a very difficult man under which to work.⁴¹

While Ericsson was busy working on the construction of the ship, Stockton acted as a buffer against Washington critics eager to put an end to the entire project. Stockton frequently requested from Ericsson drawings and models of the ship to be used to back up Stockton's arguments in his effort to forestall the cancellation of the project. On 22 September

1841, Stockton returned to active duty in the Navy with orders for the Philadelphia Navy Yard to act as superintendent to the building of the Princeton. The actual construction of the ship then began in November 1841.⁴²

On 7 September 1843, the Princeton was launched from Philadelphia. To say that this ship was revolutionary would be an understatement because of her many innovations. She was the first steel-hulled, screw-propelled steamship of war. She was the first steamer to have her engineering plant and all associated machinery below the waterline. She was the first ship to burn anthracite coal in her boilers. She was the first ship to use centrifugal blowers in lieu of forced draft blowers with a small collapsible pipe for the natural draft of her fixed smokestack. She was the first ship to have her counter-rotating propeller shaft connected directly to her engines.⁴³

In October 1843, the first test of the Princeton came when she was in the New York Navy Yard for the mounting of Ericsson's Oregon guns and twelve cannonades. The challenge came from the famed Great Western, the pride of the English steamship line. The race took place on 19 October 1843 before a very large crowd on the banks of the East River. Ericsson was not present for this important test of his ship's capabilities against the best opponent in the world, but Francis B. Ogden was aboard the Princeton and he recorded and evaluated the entire event at Ericsson's request.⁴⁴

The race began at 2:30 P.M. with the Great Western taking off one quarter mile ahead of the Princeton with every bit of canvas out and her paddles churning at full speed. The Princeton then proceeded to catch up, overtake, and circle the Great Western twice before returning to her berth on the North River.⁴⁵

All of the praise for the Princeton was heaped on Stockton. He was called the inventor of the ship and given full credit for

. . . the triumph in the art of naval defense.⁴⁶

Although Stockton never claimed to be the inventor, he also never gave credit to the real inventor, and permitted this injustice to continue. The opportunist that he was, Stockton set out on an addition of his own design to the ship. He felt that the Oregon guns of Ericsson were not powerful enough and he decided to build a larger, heavier gun he called the Peacemaker. What the Peacemaker turned out to be was a heavier version of the Oregon, without Ericsson's barrel strengthening rings, and without Ericsson's permission for the use of his own gun design. Had Ericsson not relinquished his patent rights in 1841, the deadly Peacemaker would never have become a part of the Princeton. Ericsson was furious over the news of Stockton's intentions and fought against its employment by explaining that an increase in weight of the Oregon would upset the balance of the instruments that controlled the gun. He also argued that the

strength of the iron would be drastically reduced due to the forging technique that had to be employed. With all of his protests in vain, John Ericsson finally realized that he had become the able tool of Robert Stockton.

On the day the Princeton was leaving for Washington, Ericsson stood waiting on the shoreline for a pre-arranged small boat to take him out to his ship to be welcomed aboard for the trip. The small boat never came, and Ericsson stood and watched as Stockton took the Princeton to Washington. The Captain's name that was supposed to ring on the Potomac was changed that day from Ericsson to Stockton.⁴⁷ Once again, a great accomplishment was virtually ruined by an instrument of government, this time in the person of Robert Stockton, and frustration was once again Ericsson's companion.

On 28 February 1844, Captain Stockton invited President Tyler, a good portion of his Cabinet, members of Congress, and other distinguished people aboard the Princeton for a demonstration of her naval gunnery superiority with the Peacemaker. The guns of the Princeton roared, as Stockton ordered volley after volley, proving the overwhelming success of the ship's ordnance. A dinner followed this demonstration during which numerous toasts were proposed in tribute to Captain Stockton and his ship. Apparently still curious about the guns, the Secretary of the Navy, Abel Upshur, requested one more demonstration of fire power. Stockton complied with this request, having a gun crew prepare for another series

of volleys, the Peacemaker was loaded and fired but the results were far from expected. Secretaries Upshur and Gilmer, Commodore Kennon and Virgil Maxcy, David Gardiner and the President's personal servant lay dead on the deck of the Princeton as the Peacemaker's breech shattered under the force of fifty pounds of gunpowder. Seventeen sailors, several other people were injured and thrown into a state of shock. Unbelievably President Tyler was uninjured.⁴⁸ Equally unbelievable was Stockton's accusation that all of the blame belonged to his

assistant, an ingenious mechanic, named Ericsson.⁴⁹

Even though a Congressional investigation freed Ericsson of any blame, the effect of Stockton's accusations remained. The Princeton was repaired and went on to serve as a useful member of the fleet until she was scrapped in 1850 immediately after Stockton's resignation from the Navy.⁵⁰

Perhaps the largest injustice done to John Ericsson was the lack of acknowledgment of what he had done for steam propulsion. Only in 1879, did recognition finally come in the form of an article from the Proceedings of the Naval Institute:

when the USS Princeton, propelled by Ericsson's screw and armed by Ericsson's wrought-iron gun, was launched, the war between armor and projectiles began. . . and the age of iron had begun.⁵¹

Looking back on the accomplishments of John Ericsson to date, one can see what events molded him, hardened him

and made him more determined. It can also be speculated that he successfully ushered in three eras up to the time he was forty years old. The first was, of course, his steam fire engine, at least ten years ahead of his time. The second was the era of the steam locomotive with his running of the "Novelty"; again too far ahead of his time for acceptance. The third era he is responsible for is, of course, the steel-hulled steamship; ahead of time once more, and a very great deciding factor in the history of this country.

In the decade following the disaster aboard the Princeton, Ericsson resigned himself to working for the Phoenix Foundry designing steam engines for use on a wide variety of ships.

In 1846, Congress sent out a circular letter to several engineers in an effort to find out

the practicability on rendering an iron vessel shot-proof.⁵²

Ericsson came up with a totally revolutionary ship. The designs he submitted were filed as Report No. 681, H.R., 29th Congress and were in essence the designs for an ironclad Monitor vessel. Congress ignored his plans as once again John Ericsson was too far ahead of his time.⁵³

The Caloric Engine, which was responsible for the emigration of John Ericsson from Sweden in 1826 evolved into a working reality in the form of a ship whose keel was laid in

April of 1852. The Caloric Engine, that ran on the principle that heated air could be used to run machinery, brought fame to its inventor even before the trial run of the Ericsson on New York Bay on 11 January 1853. Ericsson claimed that he had built the Ericsson to be used as a floating laboratory to test out his theories on the capabilities of the Caloric Engine in a ship in terms of power and speed. The idea behind the Caloric Engine was to provide a motive force comparative in power to a steam engine of a larger size, only the Caloric would be smaller, economical, and lighter.⁵⁴

The Ericsson was two hundred sixty feet in length and had a forty foot beam. \$130,400 of her \$500,000 cost went into the engines. On her trial day, the newsmen, already enthusiastic over the prospects of the ship, eagerly explored her from stem to stern. The engine room was, of course, the biggest attraction. The men were led down to the engine room through air conditioned spaces to find clean, quiet, and cool engine spaces.⁵⁵

On her first trial run, the Ericsson attained just under ten knots. Although this speed was a good deal below the Collins' steamers sixteen knots, the Ericsson used only six tons of coal in twenty-four hours, whereas the Collins' steamers used fifty-eight tons of coal in twenty-four hours.⁵⁶ The New York Tribune ran a representative article on 12 January 1853 of the reaction to the first trial run:

The age of steam is closed. The age of the caloric opens. Fulton and Watt belong to the past. Ericsson is the great mechanical genius of the present and the future.⁵⁷

The Ericsson's Caloric Engine proved itself as a power plant, however, to move a ship through the water was one thing, but to move a ship through the water with twice the speed was something that the Caloric Engine was incapable of. There was also another drawback to the prolonged use of the engine. The radiant heat generated had an adverse effect on the engine producing a rust which quickly spoiled the piston valves and other parts of the machinery.⁵⁸ These two flaws in the design were reworked by Ericsson. He experimented with several modifications to get more work out of the engines but to no avail. Finally, disaster struck the Ericsson on 27 April 1854. Underway, off Sandy Hook, New Jersey, the Ericsson ran into a sudden gale with rain and winds of eighty miles per hour. On board was John Ericsson and a small group of men and women. The ship began to take on water, and as she was being abandoned, she sank in eight fathoms of water. Salvage operations proved successful, but the cost and labor of reconditioning the ship proved too expensive.⁵⁹ Ericsson later wrote:

There was more engineering in that ship than 60
in ten monitors - it was simply a mechanical marvel.

Ericsson was able to successfully produce Caloric Engines on a much smaller scale, and he made a considerable sum from the sale. In a letter to President Abraham Lincoln of

29 August 1861, he said:

I seek no private advantage or emolument of any kind. Fortunately, I have upward of one thousand of my Caloric Engines in successful operation with affluence in prospect.⁶¹

While the Civil War was raging in 1861, John Ericsson was quietly working at his home at 95 Franklin Street, in New York City. In a cupboard gathering dust since 1854 sat a model of the ship that was to change not only the Civil War but all naval war from that time on. Three important people in Washington were the determining factors as to whether or not that model would ever make it out of the cupboard. These men were President Lincoln, Secretary of the Navy, Gideon Welles, and the Engineer in Chief of the Navy, Benjamin Franklin Isherwood.⁶²

The events that brought John Ericsson to this point in time have already been discussed. What remains now is to look back to those events and remember them and their effect on the man, John Ericsson. Early hardened by the closed minds of his superiors, Ericsson did not take much stock in the bureaucratic agencies of government, as much as he supported the government. With little patience left, he was not going to be used again like he had been so many times in the past. He was determined that the frustration he had experienced in practically all of his inventions would not be his companion this time. To design something, build it, test it, and evaluate it was Ericsson's goals on every project.

The rewards he sought were not solely monetary in nature, rather he sought to have his ideas proven, and receive the credit and acknowledgment his efforts deserved.

On 29 August 1861, Ericsson wrote President Lincoln informing him that he could provide just the vessel to enforce the Atlantic Blockade. Relating his qualifications, Ericsson left himself at the personal disposal of the President. In all the mail received in the White House from inventors, the President never saw the letter. Ericsson's old friend "Harry" DeLamater went to Washington in order to secure contracts for his foundry, and to intercede on behalf of his friend John Ericsson. In September of 1861, DeLamater ran into Cornelius Scranton Bushnell. Bushnell had just secured the contract for the ironclad Galena, but was in doubt as to whether the ship could hold all of the iron stipulated in the plans. DeLamater referred him to John Ericsson in New York. Bushnell immediately took the train to New York and met with Ericsson the next morning. Ericsson went over Bushnell's diagrams and calculations, made some evaluations, then gave Bushnell the information he sought.

She will easily carry the load you propose 63
and stand a six-inch shot at a respectable distance.

Ericsson then showed Bushnell his designs and model for an ironclad ship. Bushnell was so impressed that he gave up on the Galena and immediately went to the home of Gideon Welles in Hartford. With him he took Ericsson's plans and

model, in an effort to sell the Secretary on the concept. Welles was very enthusiastic about the entire concept, and ordered Bushnell to return to Washington to present the invention before the Ironclad Board. Arriving on 10 September 1861, Bushnell sought out John F. Winslow and John A. Griswold, owners of large foundries in Albany and Troy. These three men presented Ericsson's invention before President Lincoln who was extremely enthusiastic. He, in turn, arranged for the invention to be presented before the Ironclad Board consisting of Commodores J. Smith and H. Paulding, and Captain C. H. Davis. The Board rejected the invention because it did not follow pre-existing lines. One prominent naval officer said:

It resembles nothing in the heavens above, or the earth beneath, or the waters under the earth. You can take it home and worship it without violating any commandment.⁶⁴

Bushnell departed for New York to try and persuade Ericsson to come to Washington and explain his invention before the Ironclad Board himself. Ericsson outdid himself in convincing the Board that his ship was worthwhile. Particularly appealing was her low cost of \$275,000 and that she would be built in one hundred days. The Board sent their final decision to Congress with the recommendation to build three ironclads, the Galena, Ironsides and the Monitor.⁶⁵

Ericsson worked extremely hard on this project and completed three thousand drawings of the ship during the one hundred days of her construction. The success of the Monitor

is best described by members of the crew that sailed her and fought her in Hampton Roads.⁶⁶

The accomplishments of John Ericsson following his success with the Monitor were nothing short of futuristic. Ericsson moved from Franklin Street to 36 Beach Street in New York where he lived out the remainder of his life, working in almost complete seclusion. He hired a housemaid and secretary, Frank Taylor, to take care of his personal needs in order for him to devote all of his time to his work.

Three of his inventions will be discussed in the following paragraphs.

As Ericsson worked hard to sell his monitors to the Navy, he became obsessed with underwater warfare. He set out to prove that ironclads were obsolete "torpedo food."⁶⁷ The result of his efforts was the torpedo boat Destroyer. Ericsson believed in employing compressed air as a motive force for torpedoes. He had developed this concept in 1845 and revised it in 1854. In 1870 he was ready to submit to the Navy his plan for a torpedo twenty-five feet long, weighing fifteen hundred pounds, and carrying an explosive charge of three hundred twenty pounds. Around his torpedo, he built a small, fast gunboat, capable of attacking at short range from either bow or stern. The Destroyer had a freeboard of only six inches, contained one boiler and could develop one thousand horsepower. The torpedoes were fired from tubular

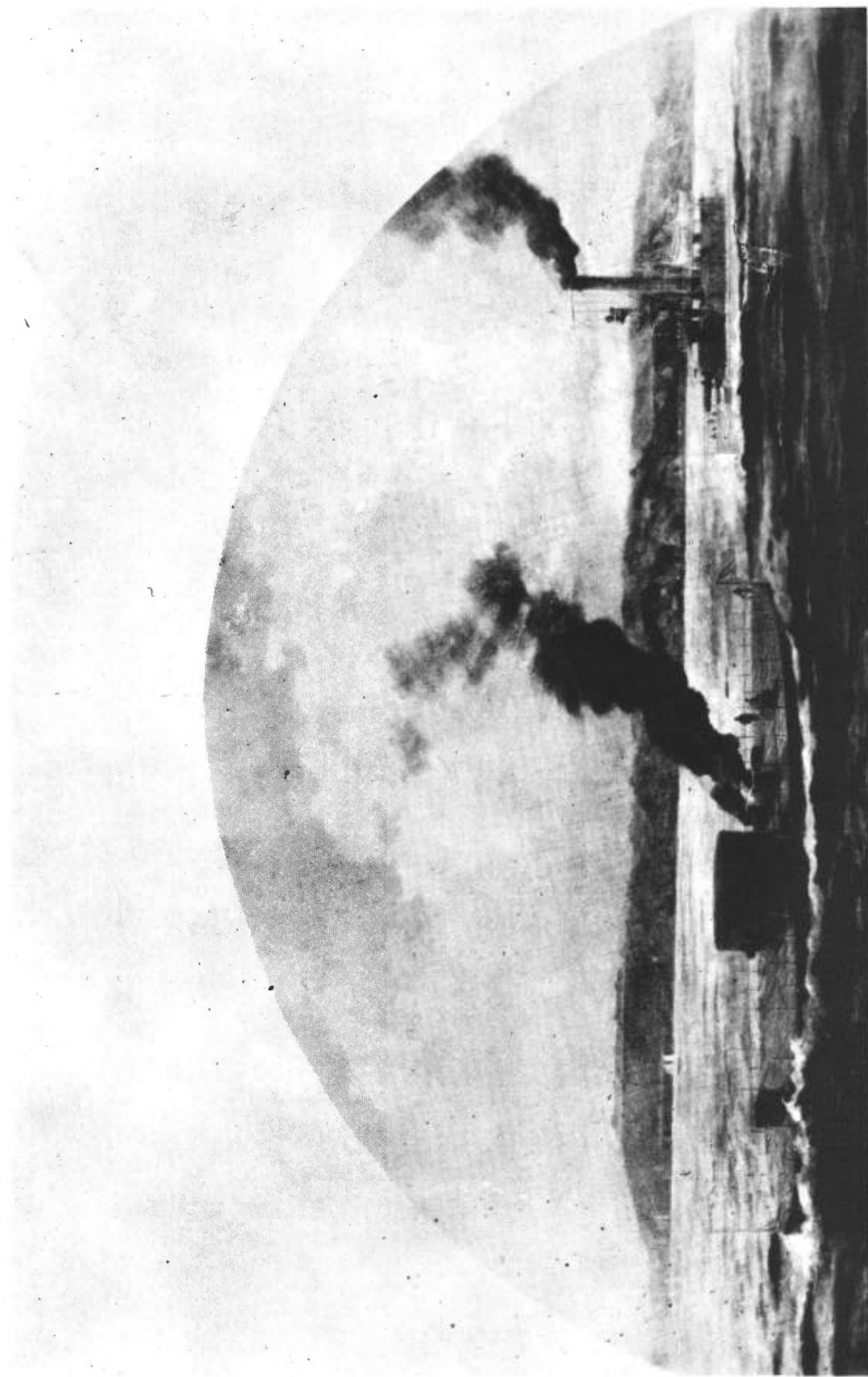
shaped containers placed in her hull.⁶⁸ Here are just two more examples illustrating how far Ericsson was ahead of his time.

The third invention of note was Ericsson's Solar Engine. He was, in fact, experimenting with the use of the sun's energy for a motive force. Along with his "Contributions to the Centennial Exposition," his work on "radiant heat" shows how extraordinary John Ericsson really was.

As Ericsson looked back on his life, he was filled with both bitterness and pride. Bitter over the close-minded bureaucracy of government, but proud of the successful application of the principles he had developed over the years. From a quiet, withdrawn boy from Sweden, he grew into a proud, outspoken, stubborn man, hardened by the realities of life yet grateful that he contributed something useful to the world.

In 1872 Hjalmar Elworth wrote to his famous father for the first time. And in 1876, he came to America to meet his father for the first time. Their relationship slowly grew until the death of Hjalmar in 1887. February 1889 brought the sad news of the death of a very close friend, "Harry" DeLamater. Realizing his days were few, he still kept right on working in his room in his house on Beach Street. At 12:29 A.M. 8 March 1889, John Ericsson passed away. He died of Brights Disease, the same ailment that took his son's life a year and a half earlier.⁶⁹ The genius of Beach Street

finally returned to his native Sweden, departing from where he had entered, the Brooklyn Navy Yard, 23 August 1890.⁷⁰



Artist portrayal of the USS Monitor, the fore-
runner of the modern battleship, leading the
USS Arkansas.

U. S. National Archives

JOHN ERICSSON CHRONOLOGY

- 31 July 1803 - born in Langbanshyttan, Vermland, Sweden.
- 1811 - Ericsson's move to Lake Vättern, Forsvik, Sweden; site of the Göta Canal.
- 1816 - John and Nils Ericsson were appointed cadets in the Mechanical Corps of the Swedish Navy.
- 1817 - Made a leveler in charge of 600 men in the construction of the Göta Canal.
- 1820 - Joined the 23rd Rifle Corps of the Swedish Army.
- 1824 - Love affair with Carolina Lilliesköld ends in illegitimate son, Hjalmar Elworth.
- May 1826 - Depart Stockholm, Sweden for London, England
- 18 May 1826 - Arrive London, England.
- 1826 - Joins in partnership with John Braithwaite.
- 1827 - Was declared a deserter, exonerated and promoted to the rank of Captain which he kept for the rest of his life.
- 1829 - Developed the steam locomotive "Novelty."
- 15 October
1836 - Marries Amelia Byam.
- Spring 1837 - Launching of the Francis B. Ogden, the first screw propeller ship.
- 1837 - Ericsson is sent to the debtor's prison.
- December
1837 - Ericsson meets Robert Field Stockton.
- 7 July 1838 - The Robert F. Stockton is launched in England.
- 12 January
1839 - The Stockton is tested successfully on the River Thames.

- 3 November
1839 - Ericsson departs England for America.
- 23 November
1839 - Ericsson arrives in New York.
- November 1841 - Construction begins on the Princeton.
- 7 September
1843 - Princeton is launched from Philadelphia.
- 19 October
1843 - Princeton outperforms the Great Western on the East River, New York.
- 28 February
1844 - Princeton goes on short cruise to demonstrate her capabilities. Peacemaker 12-inch gun explodes killing several people, including Secretaries Upshur and Gilmer.
- 1848 - John Ericsson becomes a naturalized citizen.
- 1852 - Keel laid for the Ericsson.
- 11 January
1853 - First trial run of the Ericsson.
- 19 April 1861 - Civil War begins
- 30 January
1862 - Monitor is launched.
- 9 March 1862 - Battle between the USS Monitor and CSS Virginia.
- 1864 - Ericsson moves to 36 Beach Street, the last move he made in his lifetime.
- 1866 - Wife Amelia dies in London.
- 1872 - First correspondence between Hjalmar Elworth and John Ericsson.
- 1876 - First meeting of father and son.
- 19 February
1889 - Harry DeLamater dies.
- 8 March 1889 - John Ericsson dies.
- 23 August
1890 - John Ericsson is moved back to Sweden.

FOOTNOTES

1. Ruth White, Yankee from Sweden: The Dream and the Reality in the Days of John Ericsson (New York: Henry Holt and Company, 1960), pp. 3-4
2. Ibid., p. 5
3. Ibid., p. 6
4. P. C. Headley, The Miner Boy and His Monitor; the Illustrated Story Life of Captain Ericsson (New York: George A. Leavitt Publisher, 1870), p. 40
5. White, p. 6
6. Ibid.,
7. Headley, p. 40
8. Ibid., see also White p. 7; see also Nils Y. Wessel, ed., American Swedish Historical Museum Yearbook, 1969-70, (Philadelphia: The Chancellor Press, Inc., 1970) p. 23.
9. Headley, p. 42
10. Ibid., p. 43, see also White, pp. 8-9, see also Wessel, p. 23
11. White, p. 9-10; Wessel, p. 24 and 27
12. White, p. 10; Headley, p. 46
13. White, p. 10; Wessel, p. 24
14. Ibid.
15. White, p. 11; Headley, p. 51
16. White, p. 11
17. Ibid., p. 12
18. Headley, p. 58
19. Ibid., p. 52
20. White, p. 14
21. Ibid.

22. White, p. 14 and 15; Wessel, p. 24
23. White, p. 16; Wessel, p. 24
24. White, pp. 24, 26, 33, 34, 35; Headley, pp. 53-54
25. White, p. 36 and 37; Wessel, p. 24
26. White, p. 40 and 42; Wessel, p. 25
27. White, p. 42, 44-48, 49; Wessel, p. 24 and 25;
Headley, p. 87
28. White, p. 55, 58; Headley, p. 87
29. White, p. 59
30. Ibid., p. 61
31. Ibid., p. 62
32. Ibid., p. 62-63
33. Ibid., pp. 63-64
34. Ibid., p. 65
35. Ibid., p. 70
36. Ibid., p. 71
37. Ibid., p. 72-73
38. Ibid., p. 78-79
39. Ibid., p. 80
40. Ibid., p. 80
41. Ibid., p. 82-83
42. Ibid.
43. Ibid.
44. Ibid., pp. 87, 90

45. Ibid., p. 92
46. Ibid., p. 93
47. Ibid., p. 94-95
48. Ibid., p. 110-112
49. Ibid., pp. 111, 114
50. Ibid., p. 117
51. Ibid., p. 118
52. Ibid., p. 132
53. Ibid.
54. Ibid., p. 154
See also Eugene Ferguson, "John Ericsson and the Age of the Caloric." Bulletin, Smithsonian Institution, United States National Museum, Washington, D. C., 1963, P. 45
55. White, pp. 161-162; Ferguson, p. 45
56. White, p. 160
57. Ibid., p. 164
58. Headley, p. 126; White, p. 171; Ferguson, p. 47
59. White, p. 171; Ferguson, p. 47
60. White, p. 172
61. Ibid., p. 175
62. Ibid., p. 181
63. White, p. 196, 197; Headley, p. 127
64. Headley, p. 164; White, p. 198-199
65. Headley, p. 165
66. See "Inside the Monitor Turret" by D. Greene, which follows
67. White, p. 243. For detailed description see Movable Torpedoes, J. Ericsson

- 68. White, p. 244, 245
- 69. Wessel, p. 27 and 28; White, p.261
- 70. Ibid., p. 263

CHAPTER II

EDITOR'S NOTE

After John Ericsson was so harshly ridiculed in the press for the "Princeton Affair" with no reprieve from the Congressional investigation which acquitted him of any blame, and his resulting financial hardship, he returned to the yard of his friend Harry Delameter in New York. He had no desire of ever again accepting any government contracts or dealing with the Navy Department. Once again, political manipulation had disturbed the engineer from his work.

As civil strife erupted into civil war, the government in Washington was severely crippled by the resignation of many high officials. The confusion incident to a change of administration was heightened many fold by the resignations due to secession and to the outbreak of hostilities. In this atmosphere of uncertainty and distrust, newly elected President Lincoln had to form his government. The impact this had on establishing policy cannot be overstated. In the Bureau of Ordnance and Hydrography, for example, every person save a draftsman and the messenger resigned at the outbreak of war.¹

Confronted with the problem of effecting a naval blockade of over 3500 miles of coast and the relative inexperience of many of the officials thrust into a position of importance, it is not surprising that the Navy Department hesitated in

the first months of the war to embark on an ironclad program.²

At the outset, the Department was flooded with proposals for protected warships. These included proposals for ships of iron, wooden ships plated with armor and even ships protected with rubber. Prior to March 1862, the new government had received more than 100 proposals for ironclad ships. There seemed to be general agreement that the South would resort to the construction of ironclads and that the North would have to build a fleet of iron to match them, however, no one knew what design would be acceptable.

Captain A. A. Harwood, the new Chief of the Bureau of Ordnance and Hydrography, thought

it would be hazardous to rely upon new models of vessels, however plausible, at a critical time and intended to effect decisive results.

The experience of the Navy proves beyond a doubt that wherever the construction of vessels of war have been entrusted to persons not intimately versed in the requirements of a man of war, however able in other respects, the result has been uniformly a failure in some vital point. . . .³

The Congress, hearing of the construction of ironclad ships in Europe wanted new construction to protect the northern ports.

Senator Grimes of Iowa introduced on July 19, 1861 a bill directing the Secretary of the Navy to appoint "a board of three skilful naval officers" to investigate plans of armored steamships or steam batteries, and appropriating \$1,500,000 for

the construction of one or more if the board reported favorably.

With the passing of this bill, Secretary of the Navy Welles promptly published an advertisement, dated August 7, calling for

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 nor 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 eight 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 propositions⁴ presented within twenty-five days from this date.

On August 8, Secretary Welles appointed Commodore Joseph Smith, Chief of the Bureau of Yards and Docks, senior officer of the ironclad board, with Commodore Hiram Paulding and Commander Dahlgren as his associates. At Dahlgren's own request

he was relieved from this service shortly after, and Commander Charles H. Davis appointed in his place.⁵

It is at this point where the story of how the Monitor became reality begins. In truth it was an enterprise in search of government contracts by men of means, but if private enterprise had not spurred these men to action, Ericsson's Monitor would have been a forgotten dream.

Notes

1. The Introduction of the Ironclad Warship, by James Phinney Baxter, 1933, Archon, p. 238.
2. Ibid., p. 241
3. Ibid., p. 242
4. Ibid., p. 246
5. Ibid., p. 247

NEGOTIATIONS FOR THE BUILDING OF THE "MONITOR."

Taken from

FROM SUMTER TO SHILOH

Battles and Leaders of the Civil War

Negotiations for the Building of the "Monitor."

In 1877, at the request of ex-Secretary Gideon Welles, C. S. Bushnell, of New Haven, one of the associate owners of the Monitor, embodied, in a letter to the former, his recollections of the negotiations which led to the building of that vessel. That letter immediately following, and the letter of comment by Captain Ericsson, has been sent to the editors for publication, by the Reverend Samuel C. Bushnell, son of the builder:

"HONORABLE GIDEON WELLES. DEAR SIR: Some time since, during a short conversation in regard to the little first Monitor, you expressed a desire to learn from me some of the unwritten details of her history; particularly, how the plan of the boat came to be presented to the Government and the manner in which the contract for her construction was secured.

"You doubtless remember handing me in August, 1861,¹ at Willard's Hotel in Washington, D. C., the draft of a bill which you desired Congress should pass, in reference to obtaining some kind of iron-clad vessels to meet the formidable preparations the Rebels were making at Norfolk, Mobile, and New Orleans. At that time you stated that you had already called the attention of Congress to this matter, but without effect.

"I presented this bill to the Honorable James E. English, member of Congress from my district, who fortunately was on the Naval Committee and untiringly urged the matter on their attention. The chairman of the committee, A. H. Rice, of Massachusetts,² also cooperated most heartily, so that in about thirty days,³ if I remember correctly, the bill passed both Houses, and was immediately signed by President Lincoln. The bill required all plans of iron-clad vessels to be submitted to a board of naval officers appointed by yourself. The board consisted of Admirals Smith and Paulding and Captain Davis, who examined hundreds of plans, good and bad, and among

others that of a plated iron gunboat called the Galena, contrived by Samuel H. Pook, now a constructor in the Navy Department. The partial protection of iron bars proposed for her seemed so burdensome that many naval officers warned me against the possibility of the Galena's being able to carry the additional weight of her armament.

"C. H. Delamater, of New York, advised me to consult with the engineer, Captain John Ericsson, on the matter. This I proceeded at once to do, and on supplying him with the data necessary for his calculations promptly gained the answer, 'She will easily carry the load you propose, and stand a 6-inch shot—if fired from a respectable distance.' At the close of this interview, Captain Ericsson asked if I had time just then to examine the plan of a floating battery absolutely impregnable to the heaviest shot or shell. I replied that the problem had been occupying me for the last three months, and that, considering the time required for construction, the Galena was the best result that I had been able to attain. He then placed before me the plan of the Monitor, explained how quickly and powerfully she could be built, and exhibited with characteristic pride a medal and letter of thanks received from Napoleon III. For it appears that Ericsson had invented the battery when France and Russia were at war, and out of hostility to Russia had presented it to France, hoping thereby to aid the defeat of Sweden's

hereditary foe. The invention, however, came too late to be of service, and was preserved for another issue.

"You no doubt remember my delight with the plan of the Monitor when first Captain Ericsson intrusted it to my care; how I followed you to Hartford and astounded you by saying that the country was safe because I had found a battery which would make us master of the situation so far as the ocean was concerned. You were much pleased, and urged me to lose no time in presenting the plan to the Naval Board at Washington. I secured at once the cooperation of wise and able associates in the person of the late Honorable John A. Griswold of (Troy) N. Y., and John F. Winslow of Troy, both of them friends of Governor Seward and large manufacturers of iron plates, etc. Governor Seward furnished us with a strong letter of introduction to President Lincoln, who was at once greatly pleased with the simplicity of the plan and agreed to accompany us to the Navy Department at 11 A.M. the following day, and aid us as best he could. He was on hand promptly at 11 o'clock—the day before you returned from Hartford. Captain Fox, together with a part of the Naval Board, was present.⁴ All were surprised at the novelty of the plan. Some advised trying it; others ridiculed it. The conference was finally closed for that day by Mr. Lincoln's remarking, 'All I have to say is what the girl said when she put her foot into the stocking, "It strikes me there's something in it."' The

following day Admiral Smith convened the whole board, when I presented as best I could the plan and its merits, carefully noting the remarks of each member of the board. I then went to my hotel quite sanguine of success, but only to be disappointed on the following day. For during the hours following the last session, I found that the air had been thick with croakings that the department was about to father another Ericsson failure. Never was I more active than now in the effort to prove that Ericsson had never made a failure; that, on the contrary, he had built for the Government the first steam war-propeller ever made; that the bursting of the gun was no fault of his, but of the shell, which had not been made strong enough to prevent its flattening up with the pressure of the explosion behind it, making the bursting of the gun unavoidable; that his caloric principle was a triumphant success, but that no metal had yet been found to utilize it on a large scale. I succeeded at length in getting Admirals Smith and Paulding to promise to sign a report advising the building of one trial battery, provided Captain Davis would join with them. On going to him, I was informed that I might 'take the little thing home and worship it, as it would not be idolatry, because it was made in the image of nothing in the heaven above or on the earth below or in the waters under the earth.' One thing only yet remained which it was possible to do: this was to get Ericsson to come to Washington and

plead the case himself. This I was sure would win the case, and so informed you, for Ericsson is a full electric battery in himself. You at once promised to have a meeting in your room if I could succeed in inducing him to come. This was exceedingly doubtful, for so badly had he been treated and so unmercifully maligned in regard to the Princeton that he had repeatedly declared that he would never set foot in Washington again.

"Nevertheless I appeared at his house the next morning precisely at 9 o'clock, and heard his sharp greeting: 'Well! How is it?' 'Glorious,' said I. 'Go on, go on,' said he with much impatience. 'What did they say?' 'Admiral Smith says it is worthy of the genius of an Ericsson.' The pride fairly gleamed in his eyes. 'But Paulding—what did he say of it?' 'He said, "it's just the thing to clear the 'Rebs' out of Charleston with.'" 'How about Davis?' he inquired, as I appeared to hesitate a moment. 'Oh, Davis,' said I, 'he wanted two or three explanations in detail which I couldn't give him, and so Secretary Welles proposed that I should come and get you to come to Washington and explain these few points to the entire board in his room to-morrow.' 'Well, I'll go—I'll go to-night.'

"From that moment I knew that the success of the affair was assured. You remember how he thrilled every person present in your room with his vivid description of what the little

boat would be and what she could do; and that in ninety days' time she could be built, although the Rebels had already been four months or more on the Merrimac with all the appliances of the Norfolk Navy Yard to help them.

"You asked him how much it would cost to complete her. 'Two hundred and seventy-five thousand dollars,' he said. Then you promptly turned to the members of the board, and one by one asked them if they would recommend that a contract be entered into, for her construction, with Captain Ericsson and his associates. Each one answered, 'Yes, by all means.' Then you told Captain Ericsson to start her immediately. On the next day in New York a large portion of every article used in her construction was ordered, and a contract at once entered into between Captain Ericsson and his associates and T. F. Rowland, at Green Point, for the expeditious construction of the most formidable vessel ever made. It was arranged that after a few days I should procure a formal documentary contract from the Naval Board to be signed and executed by the Secretary of the Navy, Captain John Ericsson and associates.

"I regret that this part of the matter has been misunderstood, as though you had made terms heavier or the risk greater than you ought. The simple fact was that after we had entered upon the work of construction, and before the formal contract had been awarded, a great clamor arose, much

of it due to interested parties, to the effect that the battery would prove a failure and disgrace the members of the board for their action in recommending it. For their own protection, therefore, and out of their superabundant caution they insisted on inserting in the contract a clause requiring us to guarantee the complete success of the battery, so that, in case she proved a failure, the Government might be refunded the amounts advanced to us from time to time during her construction. To Captain Ericsson and myself, this was never an embarrassment; but to Mr. Winslow, as indeed to Mr. Griswold also, it appeared that the board had asked too much. But I know that the noble old Admiral Smith never intended that we should suffer, and among the many fortunate things for which the nation had occasion to be grateful—such as the providential selection as President in those dark days of the immortal Lincoln and his wisely chosen Cabinet—was the appointment of Admiral Smith to the charge of the navy yards, who always seemed to sleep with one eye open, so constant was his watchfulness and so eager his desire that the entire navy should be always in readiness to do its part in the overthrow of the rebellion.

"I am confident that no native-born child of this country will ever forget the proud son of Sweden who could sit in his own house and contrive the three thousand different parts that go to make up the complete hull of the steam-battery

Dictator, so that when the mechanics came to put the parts together not a single alteration in any particular was required to be made. What the little first Monitor and the subsequent larger ones achieved is a part of history. . . .

Very respectfully,

C. S. BUSHNELL."

The date of the following letter from Captain Ericsson to the son of Mr. C. S. Bushnell indicates that the above letter was submitted to Captain Ericsson before it was sent to Ex-Secretary Welles:

"NEW YORK, March 2d, 1877.

"ERICSSON F. BUSHNELL, ESQ., NEW HAVEN. MY DEAR SIR:

I have read with much pleasure your father's statement to Mr. Welles concerning the construction of the original Monitor. I do not think any changes or additions are needed, the main facts being well stated.

. . . Yours very truly,

J. ERICSSON."

Captain Ericsson's version of the visit to Washington, as given in Colonel William C. Church's paper on "John Ericsson" in "The Century" magazine for April, 1879, is as follows:

"With his previous experience of the waste of time and patience required to accomplish anything at Washington, Captain Ericsson, who is not, it must be said, like the man Moses, 'exceeding meek,' would not himself go to the capital to secure attention to his ideas. There were associated with him three men of practical experience, great energy and wealth, who had become interested in the Monitor and were determined that it should have a trial. One of these was Mr. C. S. Bushnell, of Connecticut. He went to Washington, but failed in the attempt to persuade the iron-clad board that the designer of the Princeton was worthy of a hearing. Nothing remained except to induce Ericsson to visit Washington in person and plead his own cause with that rude but forcible eloquence which has seldom failed him in an emergency. To move him was only less difficult than to convince the Navy Department without him. At last a subterfuge was adopted. Ericsson was given to understand that Mr. Bushnell's reception

at Washington had been satisfactory and that nothing remained but for him to go on and complete the details of a contract for one of his vessels. Presenting himself before the board, what was his astonishment to find that he was not only an unexpected but apparently an unwelcome visitor! It was evident that the board were asking themselves what could have brought him there. He was not left long in doubt as to the meaning of this reception. To his indignation, as well as his astonishment, he was informed that the plan of a vessel submitted by him had already been rejected. The first impulse was to withdraw at once. Mastering his anger, however, he stopped to inquire the reason for the determination of the board. The vessel had not sufficient stability, Commodore Smith exclaimed; in fact, it would upset and place her crew in the inconvenient and undesirable position of submarine divers. Now, if there is anything which especially distinguishes the Monitor, with its low free-board, it is the peculiarity which it has in common with the raft it resembles—its inability to upset. In a most earnest and lucid argument, Captain Ericsson proceeded to explain this. Perceiving that his explanation had its effect, and his blood being well warmed by this time, he ended by declaring to the board with great earnestness: 'Gentlemen, after what I have said, I consider it to be your duty to the country to give me an order to build the vessel before I leave this room.' Withdrawing

to one corner, the board consulted together and invited Captain Ericsson to call again at 1 o'clock. Promptly at the hour named he appeared at the Navy Department. In the board-room he found Commodore Paulding alone. The commodore received him in the most friendly manner, invited him into his private office, and asked that he would repeat the explanation of the morning as to the stability of the vessel. Between the two interviews, Ericsson had found time to make at his hotel a diagram presenting the question of stability in a form easily understood. With this diagram, he repeated his previous demonstration. Commodore (afterward Admiral) Paulding was thoroughly convinced, and with frankness which did him great credit said: 'Sir, I have learnt more about the stability of a vessel from what you have now said than all I knew before.' This interview ended with a request to call again at 3 o'clock. Calling at 3, Ericsson was at once invited to pass into the room of secretary Welles. Here, without farther parley, the secretary informed him that the board now reported favorably upon his plan of a vessel, and wished him to return to New York and commence work upon it at once. The contract would be sent on for signature. Before this contract was received, the keel-plates for the first Monitor had passed through the rolling-mill."

EDITORS.

FOOTNOTES

1. Mr. Bushnell's recollection of the dates is inexact. The bill (Senate, 36) was introduced July 19th, in the Senate, by Mr. Grimes of Iowa, "at the instance of the Department." (Congressional Globe, 1st Session, 37th Congress, pp. 205, 344). It became a law August 3d.—EDITORS.
2. As Mr. Welles points out in his letter, this was an error of Mr. Bushnell's. The chairman of the Naval Committee was Charles B. Sedgwick, of Syracuse, New York. Mr. Rice came second on the committee.—EDITORS.
3. The time was actually fifteen days.—EDITORS.
4. Several naval officers were also present unofficially.—EDITORS.

Building of the Monitor

By

Rev. Francis B. Wheeler, D. D.

Taken from

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Building of the Monitor

The story of the Monitor has never been told. Certainly not so told that justice has been done to all connected therewith.

The world knows of her brilliant action in Hampton Roads by which our imperiled navy was saved and the fortunes of our civil war changed, but the world does not know the men who made this action possible, and a fact in American history.

The invention belongs to Captain John Ericsson, a man of marvelous ability and most fertile brain, but the creation of the Monitor belongs to two distinguished iron-masters of the State of New York, viz., the Hon. John F. Winslow, and his partner in business, the Hon. John A. Griswold. These gentlemen, if they did not go to the front, certainly furnished the sinews of war from brain and purse. In the dark days of the Republic, with earnest, heroic and patriotic purpose, under difficulties that would have appalled most men, they undertook the construction of an iron vessel, the record of which commands the admiration of the world.

It was a step which required large faith, energy and capital on their part.

They were not ship-builders, had no special facilities for constructing vessels, and knew nothing by experience of the business, and there had never been any iron war-ships built in this country; hence, for them to attempt to put

afloat any kind of a war vessel was a hazardous experiment.

When we consider that the fighting-machine to which they put hands was entirely unlike anything else in the world, and had met with nothing but disapproval from all the naval authorities to whom the matter was submitted, it will be seen that the risk they took was one such as probably no other firm ever assumed under like circumstances.

Nevertheless, they had the means needful for the experiment, and after full consideration decided, patriotically, to risk all in the attempt, and if they failed, bear the loss and the blame themselves.

The story is in this wise: Messrs. Griswold and Winslow were in Washington in the autumn of 1861, in the adjustment of some claims against the government for iron plating, furnished by them for the war-ship Galena. There, through Mr. C. S. Bushnell, the agent of Captain Ericsson, they learned that the plans and specifications for a naval war machine, or floating iron battery, presented by Captain Ericsson, found no favor with the special board appointed by Congress in 1861, to examine and report upon the subject of iron-clad ships. That board consisted of Commodores Joseph Smith, Hiram Paulding and Charles H. Davis. Ericsson and his agent, Mr. Bushnell, were thoroughly disheartened and demoralized at this failure to interest the government in their plans.

The papers were placed in the hands of Messrs. Winslow and Griswold, with the earnest request that they would examine

them, and, if they thought well of them, use their influence with the government for their favorable consideration.

Mr. Winslow carefully read the papers and became satisfied that Ericsson's plan was both feasible and desirable. Commodore Smith was seen, but his interest could not be awakened nor his objections overcome. After conference with his friend and partner, Mr. Griswold, it was determined to take the whole matter to President Lincoln. Accordingly, an interview was arranged with Mr. Lincoln, to whom the plans of Captain Ericsson were presented, with all the unction and enthusiasm of an honest and mastering conviction, by Mr. Winslow and Mr. Griswold, who had now become thoroughly interested in the undertaking. The President listened with attention and growing interest. When they were done, Mr. Lincoln said, "Gentlemen, why do you bring this matter to me? why not take it to the Department having these things in charge?" "It has been taken already to the Department and there met with a repulse, and we come now to you with it, Mr. President, to secure your influence. We are here not simply as business men, but as lovers of our country, and we believe most thoroughly that here is something upon which we can enter that will be of vast benefit to the Republic," was the answer. Mr. Lincoln was roused by the terrible earnestness of Mr. Winslow and his friend Griswold, and said, in his inimitable manner, "Well, I don't know much about ships, though I once contrived a canal-boat, the model

of which is down in the Patent Office, the great excellence of which was that it could run where there was no water. But I think there is something in this plan of Ericsson's. I tell you what I will do. I will meet you to-morrow at ten o'clock, at the office of Commodore Smith, and we will talk it all over." The night following this interview was an anxious one with Mr. Winslow, upon whom the onus of presentation and advocacy was thrown.

He scarcely slept, but went through the drawings and specifications of Ericsson, line by line, and item by item, that he might familiarize himself with the whole subject.

The next morning the meeting took place according to the appointment. Mr. Lincoln was present. The Secretary of the Navy, with many of the influential men of the Navy Department, were also there.

The office where they met was rude in all its belongings. Mr. Lincoln sat upon a rough box.

Mr. Winslow, without any knowledge of naval affairs other than that which general reading would give, entered upon his task with considerable trepidation, but his whole heart was in it, and his showing was so earnest, practical and patriotic, that a profound impression was made. "Well," said Mr. Lincoln, after Mr. Winslow had finished, "well, Commodore Smith, what do you think of it?" The Commodore made some general and non-committal reply, whereupon the President, rising from the box, added: "Well, I think there

is something in it, as the girl said when she put her leg in the stocking. Good morning, gentlemen," and went out. From this interview grew a government contract with Messrs. Winslow and Griswold for the construction of the Monitor, the vessel to be placed in the hands of the government within one hundred days, at a cost of \$275,000. The contract, however, was so burdened with conditions and restrictions that it seemed very hazardous and impossible, almost useless, to undertake the work. Government officials, evidently, had no confidence in the ability of such a vessel as was proposed; hence the conditions imposed amounted almost to an injunction upon the enterprise. After thoroughly weighing the whole subject, and with some verbal protests against its exactions, Messrs. Winslow and Griswold signed the contract on the fourth day of October, 1861, having the courage and patriotism to hazard their reputation and money in building this experimental war craft. They at once entered upon the undertaking. They wrought as by inspiration, all their other work and orders giving preference to this. The hull of the vessel was built by Thomas F. Rowland, agent of the Continental Iron Works, at Greenpoint, L. I., the plates, bars and rivets being largely furnished him from the Albany Iron Works of Troy, N. Y. The Delamater Iron Works, New York, had the manufacture of the steam machinery, boilers, propellers and internal apparatus of the turrets. The port-stoppers were assigned to Charles D. DeLancy, of Buffalo. The work was

pushed with all diligence, till the 30th of January, 1862, when the ship was launched at Greenpoint, one hundred and one days from the execution of the contract by all the parties thereto, thus making the work, probably, the most expeditious of any recorded in the annals of mechanical engineering.

The first trial trip of the Monitor was on February 19, 1862, and on that day she was delivered to the Navy Yard for her armament and stores. She had two trial trips afterward. Her first and second trips were not satisfactory; the first, because the cut-off valves had been improperly set, and would not admit the steam properly to the cylinders; the second, from some slight defect in the steering apparatus,—speedily corrected. On the 13th of January, 1862, Lieutenant Worden, now Rear Admiral, was ordered to the command of the Monitor, then on the stocks. Thus far there were grave doubts as to her success. Officers of the navy and of the mercantile marine prophesied failure, but the faith of her builders grew from her beginning. On the 20th of February, 1862, her commander received sailing orders from the Secretary of the Navy to proceed to Hampton Roads, Va., and there report to the Naval Department. On the afternoon of the 6th of March, 1862, the Monitor, with a picked crew from the war-ships North Carolina and Sabine—fifty-eight officers and men all told—left the lower bay of New York, with a moderate wind and smooth sea, in tow of a small tug,

the Seth Low, and accompanied by the United States steamers Currituck and Sachem. Those who volunteered for the crew of the Monitor were brave men. Here was a hitherto unknown and untried vessel, not floating upon the water as other vessels but nearly submerged; her deck being only eighteen inches above the water; her crew to live, if they could, below the surface; the ocean beating with its wild and restless waves right over their heads. The manning of such a coffin-like ship, face to face with such uncertainties, was an example of sublime heroism. On the 7th the wind had freshened to a strong breeze, causing a rough sea, which broke constantly and violently over her decks, forcing the water in considerable quantities through the hawser-pipes, under the turret and in various other places. At last the blowers were stopped by the violent action of wind and wave, and, there being no draught for the furnaces, the engine and fire room were filled with gas, by which the engineers were prostrated, and only rescued by being carried to the top of the turret, with the water rapidly increasing, and the motive power useless for propulsion or pumping. The tug-boat was commanded to head directly in shore, but being light and of moderate power, she could move the Monitor but slowly against wind and sea. It seemed that the ship which had cost so much, and in which so many hopes had centered, would indeed prove an utter failure.

The question arose, whether it were not best to seek a

harbor along the coast. One young officer, however, Lieutenant Stimers, who had great faith in the capabilities of the ship, urged that they go on; his counsels prevailed. Herein was a manifest providence.

Had the Monitor stayed in her course, the glory of her work would never have been achieved. Here is another bit of history worthy of special mention, viz.: Two hours after the Monitor had sailed from New York, orders came to her commander from Washington, directing him to proceed to the Potomac, where it was thought she was more needed; leaving the large fleet of war vessels at Hampton Roads to protect that place, the authorities little suspecting the aggressive powers of the Merrimac, and how poorly the whole fleet was prepared to cope with that formidable antagonist. Providentially, Lieut. Worden and his ship were beyond the reach of these commands.

The storm, to which reference has been made, did not materially injure the Monitor, so that she proceeded safely toward her destination.

As she passed Cape Henry Light, at four o'clock, on March 8, the heavy firing in the direction of Fortress Monroe indicated an engagement and very soon, from a pilot, Lieut. Worden learned of the advent of the Merrimac, and the disaster to the ships Cumberland and Congress. The Cumberland, having lost 117 men out of 300, sank with her colors flying. The Congress, set on fire, blew up, the fire having reached her magazines, Lieut. Joseph Smith, temporarily

captain, having been previously killed.

This lieutenant was the son of Commodore Smith, the President of the Naval Board at Washington, before which Mr. Winslow and Mr. Griswold had so steadily pressed the building of the Monitor. On the information of the pilot, Lieut. Worden ordered the Monitor to be prepared for action, and at nine o'clock P.M. anchored at Hampton Roads near the frigate Roanoke, Captain Marston, the officer in command, to whom he reported. The voyage was made,—now for battle.

The next morning, March 9, 1862. the Merrimac was observed under way, steaming slowly from Sewell's Point, where she had anchored during the night, to accomplish more perfectly her work of the day before.

The Monitor immediately stood for her, with crew at quarters; and the fierce and remarkable conflict began, continuing from eight o'clock A.M. to one and a-half o'clock P.M.; resulting in the discomfiture of the Merrimac, and the full proof of all that had been claimed for the Monitor. In the engagement the Monitor received no serious injury, but Lieut. Worden narrowly escaped with his life; a shell from the Merrimac exploding near the look-out hole of the pilot house, through which he was looking, filling his face and eyes with powder, and partially stunning him. His escape was marvelous, as he had withdrawn his face from the opening only an instant before the explosion. The presence of the Monitor at Hampton Roads on the morning of March 9, 1862,

was providentially opportune.

Had she remained in New York two hours longer, or been disabled on her voyage, or returned to New York, or harbored on the coast, as was agitated on the night of the 7th, what awful havoc the Merrimac would have made along the coast! There were at Hampton Roads on that memorable Sabbath morning of March 9th, 1862, seventeen government vessels, mounting in all 222 guns, beside a number of transports, chartered vessels and private property, swelling to a large amount the values of life and property exposed to the Merrimac. All this captured or destroyed, the Atlantic cities would have been at the mercy of the Rebel ram, and the Civil war would have been largely prolonged. The Monitor was built at the right time, and the men who built her and manned her seemed to have been inspired to their work. The hand of God was upon them for the salvation of the country.

Some who read this article will remember the patriotic joy that rose like waves of light through all the Northern States at the triumph of the Monitor—the ovations of praise awarded to her gallant crew and commander. At Washington the demonstrations of joy were enthusiastic and intense. Commodore Smith, whose son was killed on the Congress, meeting Mr. Winslow in one of the Navy offices, seized his hands convulsively, saying, "Winslow, you have saved our Navy, but I have lost my Joe!" In Congress, a vote of thanks to its inventor was passed and the President, with his

Cabinet, personally awarded to Messrs. Griswold and Winslow the title of "Benefactors of their Country."

Orders for more Monitors were given, and the firm of Winslow & Griswold had the confidence and gratitude of the whole American Government. The great regret was that the Monitor was not at Hampton Roads one day sooner, to save the Cumberland and the Congress, with the brave men who fell and went down in the murderous fight. All honor to the heroes who manned the Monitor on the 9th of March, 1862. Honor, too, to him out of whose brain and thought the Monitor was born. Honor, also to the men who took the thought and wrought it into substance and power for the country in its hour of direct need and peril; whose enterprise, courage and patriotism made the Monitor a fact and her encounter with the Merrimac a triumph. One of these men has passed beyond the reach of human praise—the Hon. John A. Griswold; the other, the Hon. John F. Winslow, whose pleading patriotism almost forced upon the Government the Monitor; by whose indomitable will and persistent energy the enterprise was carried through all storm of opposition to the full tide of success, still lives, at Woodcliff, on the banks of the Hudson, near Poughkeepsie—a beautiful home, well earned, and as well deserved, where, in ripening years, honored and beloved, the memory of the important part he had in the great Rebellion is one of the fondest recollections of a long and useful life. To his and his associate Griswold's wise forecast,

practical and scientific knowledge and good sense, unflagging zeal, untiring determination and intense loyalty—that burned all the brighter as the days darkened, we owe the Monitor; and without the Monitor just at the time when she entered Hampton Roads, what a set-back to national affairs there would have been!

The story, therefore, of this marvelous vessel is not well and properly told till the part these gentlemen had in her construction is made known and their names are enshrined in the affections of their countrymen as among the saviors of the Republic.

The life of the Monitor was short as it was eventful. From the 10th of March until the final destruction of the Merrimac, on the 11th of the following May, 1862, she lay at Hampton Roads, in guard and defense of manifold interests there. On the 12th of May she led the vessels that went to Norfolk, on the evacuation of that city by the Confederates, afterward proceeding up the James River as one of the flotilla under the command of Commodore Rodgers, of the iron-plated steamer, Galena. On the 15th of May she was in the engagements at Fort Darling, seven miles below Richmond, Va.; from this time until the retreat of the army from the Peninsula, she was employed in patrolling the James River, arriving on the 21st of August at Newport News, being the last vessel that came down the James River. In September following she was at the Washington Navy Yard for repairs, sailing again

for Hampton Roads in November.

On the 29th of December, 1862, she sailed for Beaufort, N. C., in company with the steamer Rhode Island, her convoy, and on the night of the 30th she foundered near Cape Hatteras. About half of her officers and crew were carried down with her; the others were saved by her convoy, the Rhode Island. The cause of her foundering is not known, though it is thought that, having lain all summer in the hot sun of James River, the oak timber which had been fitted to the top edge of the iron hull had shrunk so that in a heavy sea the water found its way through some open space, flowing in great volumes into the ship with fatal effect. Thus her career was a short one, but so marked that her name and exploits will ever have a brilliant place in the history of the great Rebellion. Marking this, in all great movements and emergencies, there is present an Almighty and a controlling hand, that men and means are raised up for special needs, and blessed are those who come into the kingdom at such times and fall into the line of their high calling.

POUGHKEEPSIE, N. Y.

(Signed) Francis B. Wheeler

Letter from C. S. Bushnell

Taken from

Magazine of American History

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Jan.-June 1885

Letter from C. S. Bushnell

EDITOR OF MAGAZINE OF AMERICAN HISTORY:

In the January number of your valuable Magazine appears a well-written article on the Building of the Monitor, by Rev. Francis B. Wheeler, D.D., giving much important information. The Messrs. Winslow and Griswold are entitled to so much honor and credit for the part they performed that it would be unjust to them to allow any erroneous impression to go down to posterity detracting from the credit and honor due to the great inventor, Captain John Ericsson, or Admiral Smith, Admiral Paulding, Secretary William H. Seward, and others, for their efforts to secure the construction of the experimental boat, the wonder of the age.

The first move Messrs. Winslow, Griswold and myself made, after I invited them to join Captain Ericsson and myself in offering to construct the Monitor on equal terms to each of us, was to call on Secretary Seward, who gave us most important assistance in accompanying us to the Executive Mansion and presenting us to President Lincoln, with the strongest assurances of his confidence in our project. Mr. Lincoln was much impressed with the novelty and simplicity of the plan of the vessel, and made the remarks and the appointment as stated by Mr. Wheeler. He met us promptly at eleven the next morning at the Navy Department, and told the story as stated, but did not draw or order a contract to be

entered into, as he said that he was powerless under the act of Congress authorizing the Board to approve but three plans out of all that should be presented for adoption. Notwithstanding his manifest approval of our scheme, and the fact that Admirals Paulding and Smith most unhesitatingly declared their willingness to give us a contract, if Captain Davis, the third member of the Board, would unite with them in recommending the same to Secretary Welles—we found it utterly impossible to obtain the unanimous consent of the Board; so that we were compelled to leave Washington sadly disappointed, and, so far as we could see, without hope. But we were made glad again when Captain Ericsson consented to go to Washington in person and meet Secretary Welles and the Board; this he did, and in the Secretary's room, with matchless eloquence and magnetism, explained the full merits of our contemplated fighting vessel. He carried the Board and Secretary Welles as if by storm, and then and there the Secretary of the Navy asked the approval of each member of the Board, which was given. Captain Ericsson so explained the proposed plan that they fully comprehended its importance. Secretary Welles gave Captain Ericsson a verbal order to construct the vessel, and requested him to have me come down the following week and get the contract executed in detail. On verbal order we commenced the construction of the little Monitor, ordering the machinery, iron and material immediately.

The next week I went to Washington to secure the promised contract. In the mean time we had become obligated for a large part of the cost of the vessel. But croakers in and out of the Navy Department had been busy at work, and the enthusiasm inspired by Captain Ericsson's grand effort of the previous week had cooled. All the Board would do was to recommend the Secretary to give us the contract as ordered, provided we would execute it with an agreement that the vessel should prove a perfect success, and if she failed of perfect success, she failed as our own property. It is worthy of note here that she was practically our property when she made her gallant fight with the gigantic Merrimac, because she had not been accepted or paid for at the time, although we had received advances on account, as is the custom in all contract work. Just here is where Dr. Wheeler fails to give Messrs. Winslow and Griswold a tithe of the credit due them. They were wealthy and cautious business men, and to execute such a guarantee as I have named cost them a great struggle and much anxiety, as it did the late Daniel Drew of New York, and the Hon. N. D. Sperry of New Haven, our bondsmen on the contract, who signed the same without other consideration or reward save the satisfaction of aiding the Government to save its life.

G. S. BUSHNELL

NEW HAVEN, Conn., January 8, 1885

This Agreement made and entered
into this Twenty fifth day of October A.D. 1861
by and between Thomas F. Rowland Agent
in behalf of the "Continental Iron Works"
Green Point Brooklyn of the first part and
Captain J. Ericson of New York Messrs
John F. Winslow and John A. Griswold
of Troy N. Y. and C. S. Bushnell of New
Haven, Connecticut parties of the second part
Witnesseth: that the party of the first
part for and in consideration of a certain
sum hereinafter mentioned to be paid to him
by the parties of the second part, hereby
covenants and agrees to furnish all the
tools and facilities, and do all the labor
necessary to execute the iron work of an
Iron Battery hull, (it being understood that
the new ship house now being erected is
at the expense of the parties of the second
part) said battery to be constructed from
the plans and directions which have been
or may be furnished the said party of
the first part by Captain Ericson.
The party of the first part hereby further
agrees to do the said work in a thorough
and workmanlike manner and to the
entire satisfaction of Captain Ericson

in the shortest possible space of time. And the party of the first part agrees to launch said Battery safely and at his own risk and cost on the East River then and there & delivering her to the parties of the second part. It is also understood that in consideration of the liberal price hereafter stipulated to be paid by the party of the second part that in case the work is not prosecuted with all the vigor and energy practicable then and in that case Captain Briggs is hereby empowered to instruct the party of the first part to employ a greater number of men or to work a greater number of hours, and which instructions the party of the first part hereby agrees to comply with in order that the work may be completed in the shortest possible space of time as contemplated by this agreement. The parties of the second part hereby agree to furnish all the material for the construction of said Battery delivering the same at the "Continental Iron Works" as soon as practicable after receiving a specification of the materials required for the construction of said Battery. In consideration of the full and faithful performance of these presents by the party of the first part, the parties of the second part hereby covenant and agree to pay the party

of the first part the sum of seven and
one half ($7\frac{1}{2}$) cents per pound (net weight)
of iron used in the construction of said
hull by the party of the first part Payments
to be made weekly in proportion to the
progress of the work, the balance remaining,
to be paid when the hull is launched

The parties to this instrument hereby or it
mutually agree that should any alteration
in the plans furnished by Captain Ericson
be desired after the same have been executed
the party of the first part shall make any
alterations that may be deemed desirable by
Captain Ericson at the expense of the
parties of the second part. Witness the hands
and seals of the said parties the day and
year before written.

Witness to the signature

J. Ericson. C. H. Macdonald.

Witness to the signature

of J. F. Winston and

John W. Bristol. C. H. Macdonald.

J. Ericson
J. F. Winston
John W. Bristol

Witness to the signature of
J. F. Winston. James Hill

James Hill

EDITOR'S NOTE

The contract for the Monitor was dated October 4, 1861, several weeks after the work had already begun. Ericsson had agreed to construct the ship for \$275,000 in a period of just 100 days. The Ironclad Board had agreed to Ericsson's design only if he would take all the risk by requiring the new warship to be proven under the enemy's guns before being fully paid leading to the interesting historical extrapolation that the Monitor technically still belonged to Ericsson when she fought the CSS Virginia. This had the additional consequence of forcing Ericsson to seek financial backing from the private sector with those who saw the promise and accept the gamble. Thus a profitable association was formed between Rowland of the Continental Iron Works who would actually build the hull, Winslow and Griswold of the Troy Iron Works who would supply the iron at 7½ cents a pound, Bushnell who had initially persuaded Ericsson to submit his design, and the engineer John Ericsson.

Reports were made to the Board concerning the progressing work and several payments in increments of \$50,000 were made so that materials could be purchased and workmen paid, but 25% of each increment was withheld pending proof of trial.

Ericsson and company were to equip the ship "complete in all parts and appointments for service." This including everything from machinery and pumps to ships china and drapes.

In addition, the builders were also to provide "masts, spars, sails and rigging of sufficient dimensions to drive the vessel at the rate of six knots in a fair breeze." This must have been an affront to the engineer's temperament as Ericsson chose to ignore this requirement, no further mention ever being made of it and history failed to record the quick-tempered Swede's remark upon reading it in the contract.

Correct Copy of Contract
for Building the Original Monitor
by John Ericsson

Dated
October 4, 1861

THIS CONTRACT, in two parts made and entered into this Fourth day of October anno domini One Thousand Eight Hundred and Sixty One, between J. Ericsson of the City of New York as principal, and John T. Winslow, John A. Griswold and C. S. Bushnell, as sureties on the first part, and Gideon Welles, Secretary of the Navy for and in behalf of the United States on the second part, Witnesseth:-

That in consideration of the payments hereinafter provided for, the party of the first part hereby contracts and agrees to construct 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 hereto annexed forming a part of this contract; and in addition to said specifications the party of the first part hereby agrees to furnish Masts, Spars, Sails and Rigging of sufficient dimensions to drive the vessel at the rate of Six knots per hour in a fair breeze of wind, and the party of the first part will also furnish in addition to the said specifications a Condenser for making fresh water for the boilers on the most approved plan. And the party of the first

part further contracts and engages that the said vessel shall have proper accommodations for her stores of all kinds including provisions for one hundred persons for ninety days, and shall carry 2500 gallons of water in tanks; that the vessel shall have a speed of Eight sea miles or knots per hour under steam for twelve consecutive hours, and carry fuel for her Engines for Eight days consumption at that speed - the deck of the vessel when loaded to be Eighteen inches above load line amidships; that she shall possess sufficient stability with her armament, stores and crew on board for safe sea-service in traversing the coast of the United States; that her crew shall be properly accommodated, and that the apparatus for working the battery shall prove successful and safe for the purpose intended, and that the vessel, machinery and appointments in all their parts shall work to the entire satisfaction of the party of the second part.

And the party of the second part hereby agrees to pay for the Vessel complete as aforesaid after trial and satisfactory test, the sum of Two hundred and seventy five thousand dollars in coin or Treasury notes at the option of the party of the second part in the following manner, to wit:- 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 on certificates of

said Superintendent, and thereafter similar payments according to the certificates of said Superintendent, deducting, reserving and retaining from each and every payment Twenty five per centum, which reservation shall be retained until after the completion and satisfactory trial of the vessel, not to exceed ninety days after she shall be ready for sea.

And it is further agreed between the said parties that the said vessel shall be complete in all her parts and appointments for service, and any omission in these specifications shall be supplied to make her thus complete; and in case the said vessel shall fail in performance of speed for sea-service as before stated, or in the security or successful working of the Turret and guns with safety to the Vessel and the men in the turret, or in her buoyancy to float and carry her battery as aforesaid, then and in that case the party of the first part hereby bind themselves, their heirs, executors, administrators and assigns by these presents to refund to the United States the amount of money advanced to them on said vessel within thirty days after such failure shall have been declared by the party of the second part, and the party of the first part acknowledge themselves indebted to the United States in liquidated damages to the full amount of money advanced as aforesaid.

And it is further agreed that the vessel shall be held by the United States as collateral security until said amount

of money advanced as aforesaid, shall be refunded.

And the party of the first part does further engage and contract that no member of Congress, Officer of the Navy, or any person holding any office or appointment under the Navy Department, shall be admitted to any share or part of this contract or agreement, or to any benefit to arise thereupon. And it is hereby expressly provided, and this contract is upon this express condition, that if any such member of Congress, Officer of the Navy, or other person above named shall be admitted to any share or part of this contract, or to any benefit to arise under it, or in any case the party of the first part shall in any respect fail to perform this contract on their part, the same may be, at the option of the United States, declared null and void, without affecting their right to recover for defaults which may have occurred.

It is further agreed between the said parties that said Vessel and equipments in all respects shall be completed and ready for sea in One hundred days from the date of this Indenture.

Signed, sealed, and
delivered in presence
W. L. Barnes
to the signatures of
J. Ericsson
John F. Winslow
John A. Griswold x
C. S. Bushnell
Jos. Smith as to signature
of G. Welles

J. Ericsson	\$\$\$\$\$\$
	\$SEAL\$
John F. Winslow	\$\$\$\$\$\$
	\$SEAL\$
John A. Griswold	\$\$\$\$\$\$
	\$SEAL\$
C. S. Bushnell	\$\$\$\$\$\$
	\$SEAL\$
Gideon Welles,	\$\$\$\$\$\$
Secy of the Navy.	\$SEAL\$
	\$\$\$\$\$\$

Southern District of New York, S.S. I hereby certify, that in my judgment, John F. Winslow, John A. Griswold and Cornelius S. Bushnell, the Sureties in the foregoing Contract, are sufficient to pay any sum that may be demanded of them in pursuance of the terms thereof. And I further certify, that I have made diligent inquiry before giving this certificate.

New York, October 4, 1861,

C. Delafield Smith,

U. S. Dist. Atty.

It is understood between the contracting parties that after the Battery shall be ready for sea and be taken possession of by the Government for the purpose of testing her properties as stipulated in the contract, such possession shall be regarded as accepting the vessel so far only as the workmanship and quality of materials are concerned, and that the test of the qualities and properties of the vessel as provided, shall be made as soon thereafter as practicable not to exceed ninety days; the reservation of twenty five per cent to be withheld until the test is made.

Gideon Welles.

THIS AGREEMENT made and entered into this twenty-fifth day of October A.D. 1861 by and between Thomas F. Rowland Agent in behalf of the "Continental Iron Works" Green Point, Brooklyn of the first part and Captain J. Ericsson of New York, Messers. John F. Winslow and John A. Griswold of Troy, N. Y. and C. S. Bushnell of New Haven, Connecticut, parties of the second part.

Witnesseth that the party of the first part for and in consideration of a certain sum hereinafter mentioned to be paid to him by the parties of the second part, hereby covenants and agrees to furnish all the tools and facilities, and do all the labor necessary to execute the iron work of an Iron Battery hull (it being understood that the new ship house now being erected is at the expense of the parties of the second part), Said battery to be constructed from the plans and directions which have been or may be furnished the said party of the first part by Captain Ericsson. The party of the first part hereby further agrees to do the said work in a thorough and workmanlike manner and to the entire satisfaction of Captain Ericsson in the shortest possible space of time. And the party of the first part agrees to launch said Battery safely and at his own risk and cost on the East River then and there -- delivering her to the parties of the second part. It is also understood that in consideration of the liberal price hereafter stipulated to

be paid by the party of the second part that in case the work is not prosecuted with all the vigor and energy practicable then and in that case Captain Ericsson is hereby empowered to instruct the party of the first part to employ a greater number of men or to work a greater number of hours, and which instruction the party of the first part hereby agrees to comply with in order that the work may be completed in the shortest possible space of time as contemplated by this agreement. The parties of the second part hereby agree to furnish all the material for the construction of said Battery delivering the same at the "Continental Iron Works" as soon as practicable after receiving a specification of said Battery. In consideration of the full and faithful performance of these presents by the party of the first part, the parties of the second part hereby covenant and agree to pay the party of the first part the sum of seven and one half ($7\frac{1}{2}$) cents per pound (net weight) of iron used in the construction of said hull by the party of the first part. Payments to be made weekly in proportion to the progress of the work, the balance remaining, to be paid when the hull is launched. The parties to this instrument hereby mutually agree that should any alteration in the plans furnished by Captain Ericsson be desired after the same have been executed the party of the first part shall make any alterations that may be deemed desirable by Captain Ericsson at the expense of the parties

of the second part. Witness the hands and seals of the said parties the day and year before written

Witness to the signature

J. Ericsson - C. W. MacCord

Witness to the Signature

of J. F. Winslow and

John A. Griswold

Witness to the Signature of

T. F. Rowland - Warren E. Hill

Specification of an Impregnable Floating Battery, composed of iron and wood, complete, ready for services excepting guns, ammunition and stores.

Length of upper part of vessel 172 feet, Beam 41 feet 4 inches, extreme depth 5 feet.

Length of lower part of vessel 124 feet, Beam at the top 36 feet, width at the bottom 18 feet, depth 6 feet 6 inches.

The bottom of upper vessel to be made of best American plate iron, $\frac{1}{2}$ inch thick, with a horizontal projection 30 inches side of the same material and substance extending all round the vessel.

This projection supports a wooden bulwark, extending also all round the upper vessel composed of white oak, the bulwark being in all parts 26 inches thick, and 4 feet 6 inches deep, firmly bolted to the said projection and to the side of the vessel. A series of brackets made of plate iron $\frac{3}{8}$ inch thick are rivetted at intervals of 3 feet to the said projection and the side of the vessel which is made of plate iron $\frac{3}{8}$ inch thick with a 4 inch angle iron rivetted at the top extending all round the vessel. A plate iron armour 5 feet deep, 6 inches thick is firmly bolted to the outside of the wooden bulwark extending all round the upper vessel.

This armour is composed of six thicknesses of plate, each one inch thick, or of three thicknesses of $\frac{3}{4}$ inch plate covered with an outer plate of 4 inch thickness, all firmly bolted

to the wooden bulwark with 1 1/4 inch bolts with counter-sunk heads. The plates to overlap each other in such a manner as to break joints on the most approved plan.

The deck of the upper vessel to be made of pine planking 7 inches thick over the entire vessel excepting that part of the deck which extends over the 26 inch bulwark which is to be made of oak plank 8 inches thick. Beams for supporting the deck to be made of white oak 10 inches square placed at distances of 3 feet from centre or 26 inches apart from face to face. These deck beams will rest on a heavy 4 inch angle iron rivetted to the side of the vessel by 3/4 inch rivets.

In addition to this support each deck beam will be bolted to a plate iron bracket 2 feet wide 4 feet 6 inches deep rivetted to the side of the vessel. This bracket will be bolted to the face of the beam by 5 7/8 inch bolts and nuts.

Besides these brackets which thus support the deck beams and strengthens the side of the vessel and its bottom, a series of diagonal braces run from the base of each bracket to the under side of the deck beam near the centre line of the vessel - at this point the brace is bolted to the deck beam and also to a wrought iron stanchion 2 1/2 inches diameter which at that point connects the deck beam and the vessel bottom. This latter is moreover stiffened by 4 inch angle irons extending from side to side under each beam beside 3 inch angle iron

rivetted to the bottom at each intermediate space of 18 inches. The entire deck is covered with plate iron two thicknesses. The plates are bolted to the deck at close intervals with countersunk bolts in such manner that the joints overlap each other at regular distances. The two plates to be one inch in thickness. The deck will be pierced with six coal holes, 16 inches in diameter provided with faced frames and wrought iron covers 2 inches thick fitted water-tight. The deck will also have four openings of 30 inches in diameter with faced frames and similar covers for receiving ventilating pipes. Also three square hatches with faced iron frames and wrought iron covers moving on hinges or slides so arranged as to be flush with the deck when closed and fitting water-tight.

Near the bow of the vessel an anchor well of 5 feet diameter-composed of plate iron $5/8$ inch thick will pass from deck to bottom, open below and covered with plate iron 2 inches thick.

The upper deck will also be pierced with an opening 5 feet 2 inches by 5 feet placed 8 feet aft of the anchor well.

Over this opening the pilot house 5 feet high, 6 feet diameter, will be erected. It will be made of plate iron 6 inches in thickness firmly bolted to the deck and provided with a series of perforations near the top. At the stern a semi circular

projection will be formed in the bottom of the upper vessel to receive the upper portion of the propeller. A square well composed of plate iron will be formed above the propeller passing through the deck to admit of the lifting up of or repairing the propeller. A wrought iron cover 2 inches thick is placed over this well secured by flush bolts, the cover like the rest being let into the deck. Ten feet from the stern a broad flat post of wrought iron is secured under the bottom of the upper vessel for the purpose of protecting the rudder. Another similar post of wrought iron is placed 9 feet 6 inches forward of the one mentioned for the purpose of supporting the bearing of the aft end of the propeller shaft. The two posts are connected at the bottom by a shoe or broad plate of wrought iron which connects with the keel of the vessel. The shoe is 24 inches wide 1 inch thick and stiffened by a vertical rib 12 inches deep and $\frac{3}{4}$ inch thick.

The lower end of the axle of the equipois rudder (8 feet wide 6 inches high) is stepped into the said shoe and at the top the axle passes through a stuffing box secured to the bottom of the upper vessel.

The rudder is composed of two $\frac{1}{4}$ inch plates, the axle 4 inches diameter of wrought iron is inserted between the two plates. The rudder is operated by means of chains running

under the upper deck, to the steering apparatus in the iron pilot house at the bow.

The propeller shaft passes through a stuffing box secured to the stern of the lower vessel as usual. In addition to the apertures made in the upper deck, already mentioned, a circular opening 3 1/2 feet in diameter is formed 63 feet from the extreme stern to admit the smoke pipe of the boilers. This opening is surrounded with a conical projection, 8 feet at the base 4 1/2 feet at the top, 3 feet high formed of cast iron blocks, lined with plate iron 2 inches thick, all firmly bolted to the deck.

Lower vessel, to be made of best American plate iron 1/2 inch thick all over. The side and ends of this vessel which all incline at an angle of 36 degrees to the horizontal line, are secured to the bottom of the upper vessel by a double rivet joint with 3/4 inch rivets. The bottom is stiffened by transverse floor timbers 15 inches deep placed at intervals of 3 feet, composed of plate iron in one piece strengthened by 4 inch angle irons at the top and 3 inch angle irons at the bottom and rivetted to the bottom of the vessel. The bottom is further stiffened by 3 inch angle iron placed between each floor timber.

The sides and ends of the vessel are strengthened by angle irons 6 inches by 3 inches placed at distances of 3 feet

with intermediate ribs composed of 3 inch angle iron. Two rows of wrought iron stanchions 2 1/2 inches diameter are placed on the deep floor timbers to support the deck beams of the upper deck to which they are secured by cast iron caps bolted to the deck beams by 3/4 inch bolts and nuts. In order to give additional transverse stability to the entire structure, diagonal braces of wrought iron 2 1/4 inches square connect the said caps to the wrought iron beam brackets of the upper vessel.

A bulkhead of 3/8 inch plate iron is placed 8 inches forward of the ~~centre~~ line of the turret, divides the vessel in two equal spaces. This bulkhead is stiffened by 3 inch angle iron rivetted to it perpendicularly on opposite sides at spaces of 12 inches. A door 28 inches wide, 4 1/2 feet high through this bulkhead affords passage between the two compartments of the vessel. The aft part is wholly devoted to the engine, boilers, and coal bunkers ie, the forward part being intended for the accommodation of the officers and crew and for stores and ammunition.

A Wrought Iron Turret, 21 1/2 feet outside diameter, 9 feet high and 8 inches thick is placed at the deck of the upper vessel near the centre of buoyancy of the two. This turret which is intended to contain a battery of two 12 inch guns is composed of eight thicknesses of best American plate iron

each one inch thick, or it may be composed of $3/4$ inch plates to a thickness of $3\ 3/4$ inches rivetted together and covered with plates $4\ 1/4$ inches thick bolted to the former. The turret is made to revolve round a vertical wrought iron axle 9 inches in diameter, its weight being supported either by the said axle, or by a series of steel rollers under its circumference.

The circumference moreover forms a water-tight joint with the deck, so that in case the vessel is altogether immersed water cannot enter under the turret. A flat roof of wrought iron plate 2 inches thick is placed 6 inches below the top of the turret supported by a series of wrought iron beams 6 inches deep with flanges at top and bottom. These beams are secured to a wrought iron ring rivetted to the inside of the turret. Four square hatches 30 by 36 inches are introduced into the said flat roof all provided with wrought iron sliding doors operated from the inside. The whole of the flat roof and the said sliding doors are perforated at short intervals with holes $1\ 3/4$ inches diameter to afford light and ventilation within. Round each of these air holes small projections are made to prevent water lodged between the holes from running down. A small number of holes punched through the turret on a level with the roof permits the collected water to flow out. Four heavy cross beams made of wrought

iron are secured firmly to the inside of the turret near its base. These beams which are parallel and extend across the turret, support sliding carriages of cast and wrought iron combined to which the trunnions of the guns are attached - By mechanism similar to that applied to the United States Steam Ship Princeton - these carriages with the guns are moved in or out on the parallel beams or locked by the friction apparatus for the purpose of checking the recoil of the guns. The contractor will furnish both the wrought iron sliding carriages, and the said mechanism - the Government only furnishing the guns. The turret is kept in position and turned round by means of the vertical axle before mentioned - the upper end of which enters a substantial socket firmly secured to the under side of the beams on which the gun carriages slide and which beams are at the same time supported by the said upright axle. The floor of the turret consists of an open iron grating placed 4 inches above deck and secured partially to the beams and partially to the inside of the turret. Two grated hatches 30 by 36 inches are introduced into the said iron floor which correspond with four open hatches in the main deck in order to afford ready access to the interior of the vessel.

By means of a conical cog wheel, attached to the lower end of the turret axle and a small pinion worked by a double

cylinder donkey engine, the turret is turned round with perfect facility. A handle applied in the centre of the turret, regulates the action of the donkey engine and enables the gunners to stop or turn the turret at will.

The contractor will furnish and apply to the guns small chambers made of sheet brass containing lock and hammer. These chambers will be fitted air-tight to the gun and have flexible tubes of 4 inch bore attached which communicate with a hole of corresponding size in the roof of the turret. These flexible tubes are designed to carry off the smoke and are made of sufficient length to admit of the motion of the guns on the slides.

Twenty wrought iron stanchions 30 inches high with holes at the upper end, will be fitted to the upper circumference of the turret, with a suitable handrope to act as a temporary rail. The stanchions to admit of being removed at a moment's notice. Wrought iron ladders will also be attached for going in and out of the turret.

A Double Cylinder Condensing Steam Engine with 40 inch cylinders 22 inches stroke will be firmly secured near the stern of the lower vessel supported by wrought iron frames rivetted to the bottom. Two boilers of sufficient capacity to supply the engines with steam for the development of a dynamic power of 400 horse power will be furnished of sufficient strength

to carry a pressure of 40 pounds per square inch. The screw propeller will be 9 feet in diameter with 11 feet pitch.

The propeller shaft to be 9 inches in diameter and so arranged that the outer portion may be drawn in when it becomes necessary to lift the propeller on deck. The engines and boilers will be made of the best materials and the most perfect workmanship and all modern approved improvements will be applied. Powerful blowers with separate blower engines will be applied for keeping up the combustion in the boilers and for forcing fresh air into every part of the vessel will also be applied.

The smoke pipe will be made to raise or lower by suitable mechanism and the place where it passes through the deck will be made water-tight by an appropriate metallic packing. Coal bunkers will be erected of suitable form and materials. The fire rooms will be floored with cast iron plates and the most approved means will be resorted to for handling coal and ashes. All instruments and tools employed in well equipped Government war steamers will be supplied by the contractor, who also agrees to furnish all other parts for the engines that the Navy Department shall direct. All requisite spare articles and duplicate pieces of the engines will be also furnished by the contractor. A powerful windlass will be applied below deck worked by suitable gearing. Also a small

capstan for handling the vessel in port. Anchors, cables, ropes and hawsers to be supplied by the contractor.

Four ventilating tubes of wrought iron 28 inches diameter 8 feet high will be applied, so arranged that when raised they will form water-tight joints in the deck.

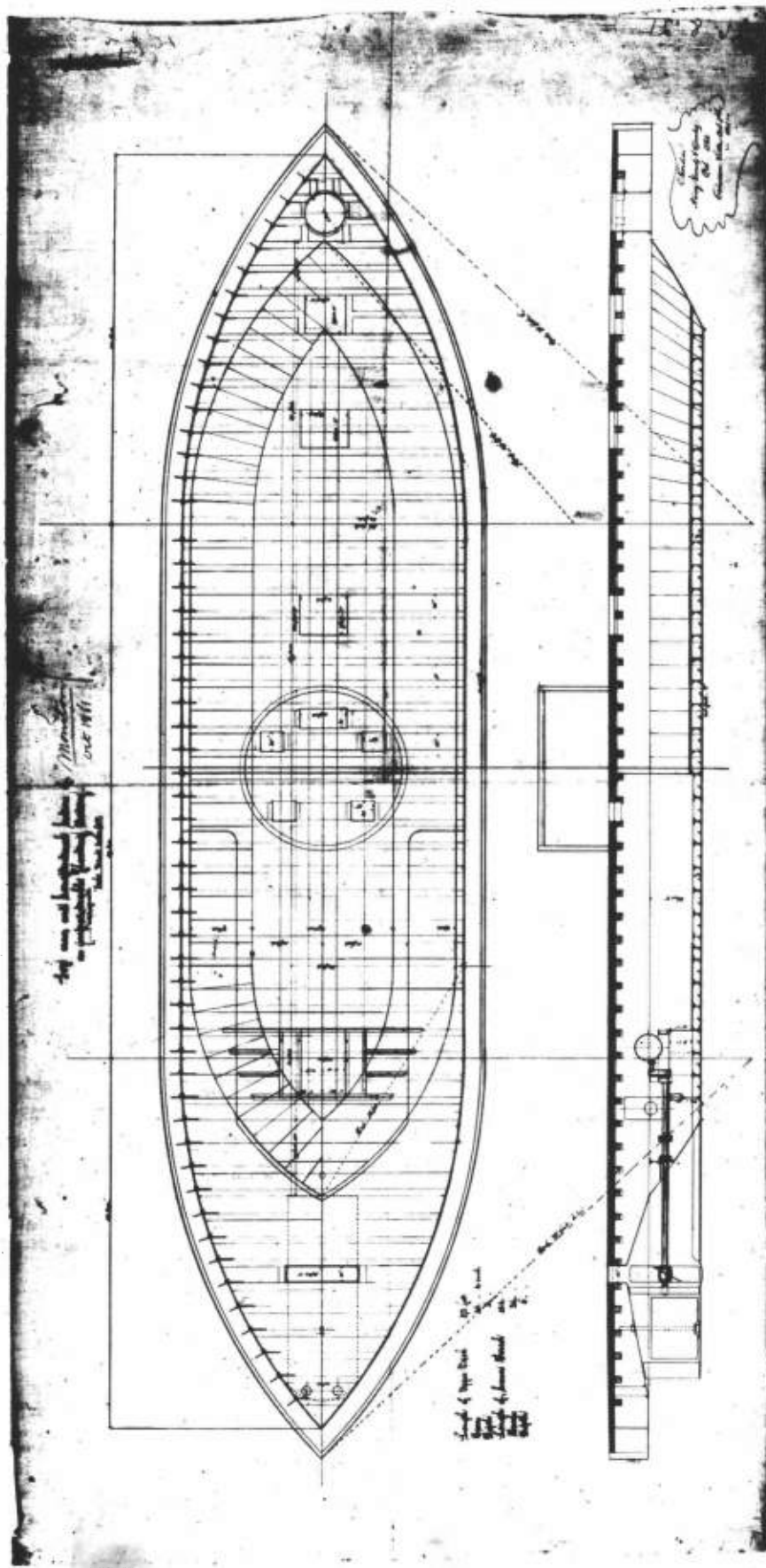
Stanchions of wrought iron for supporting a temporary rail will be fitted all round the vessel in such manner that they may be quickly removed and stored below.

As it is incompatible with the service for which the battery is designed to carry boats, none will be permanently carried.

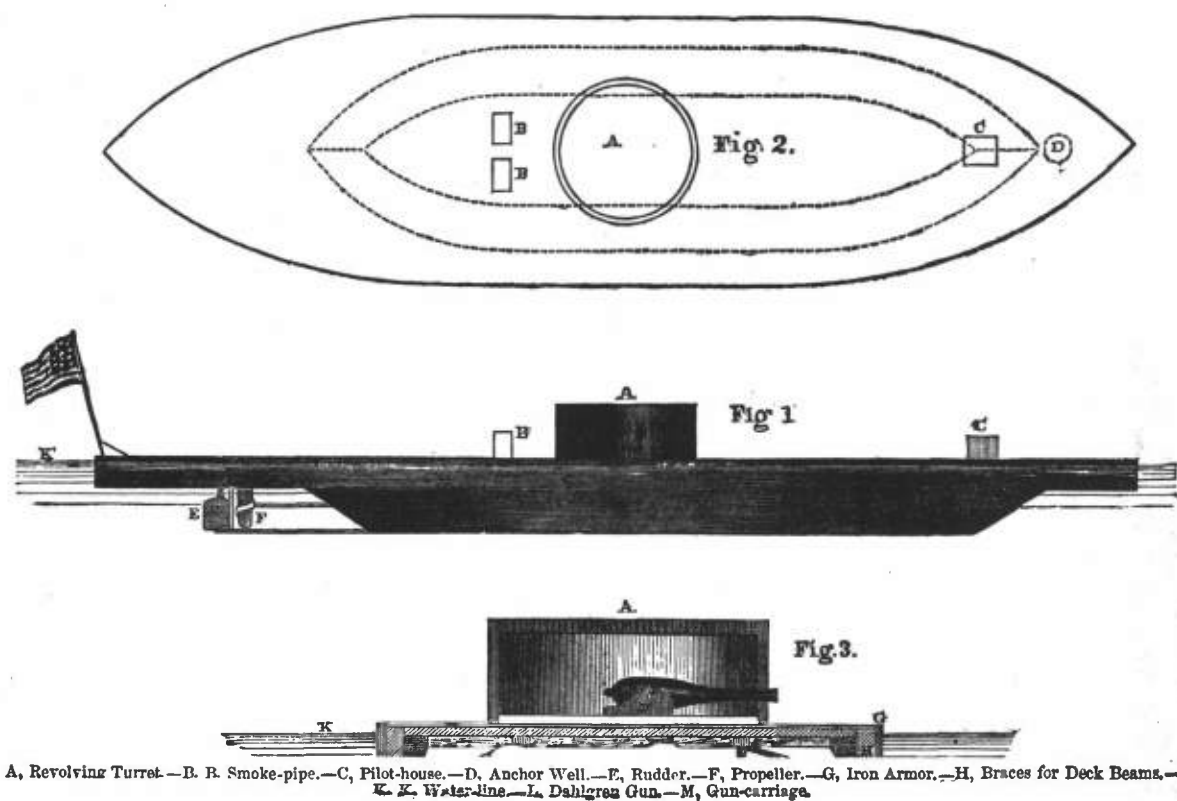
Light boats will however be lashed on the deck to be sent overboard when going into action. A skeleton frame of metal will be furnished by the contractor with an India rubber covering which may be put together in case of need, suitable light seats and oars to be furnished.

Cooking apparatus and utensils, water tanks, chain and shot lockers and internal fittings of every kind deemed necessary to accommodate officers and crew to be furnished by the contractor, it being distinctly understood and agreed that the contractor binds himself to deliver the vessel complete ready for service in all respects excepting guns, ammunition, coal and stores, which the Navy Department will supply, and it is further agreed that any defect whatever or any omission will be remedied at the cost of the contractor and that the

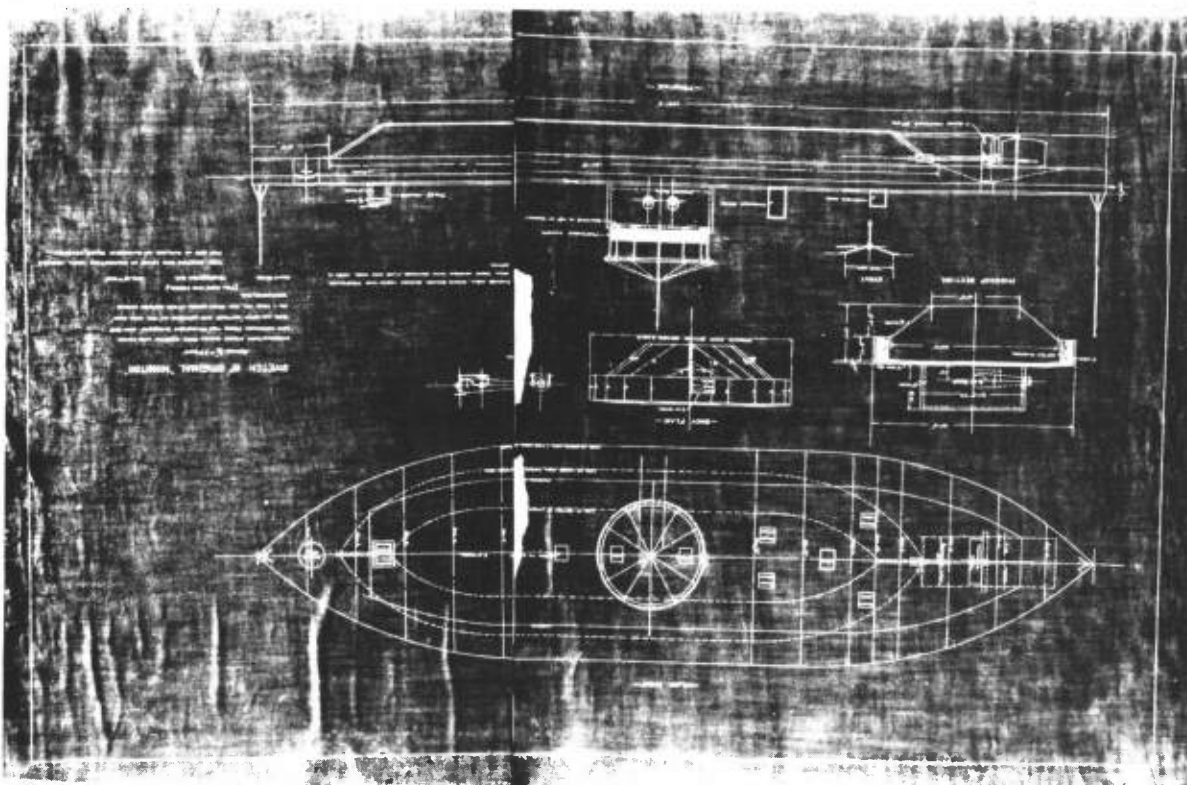
Secretary of the Navy is to decide what constitutes such defect or omission.



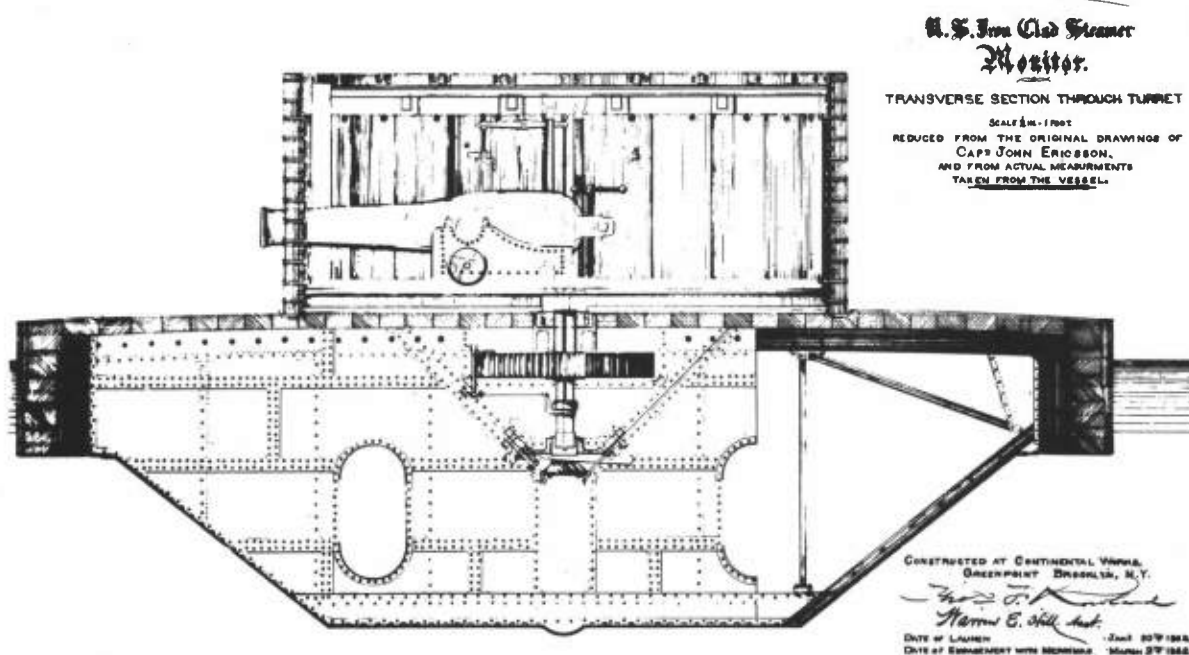
Plan of the Monitor U. S. National Archives



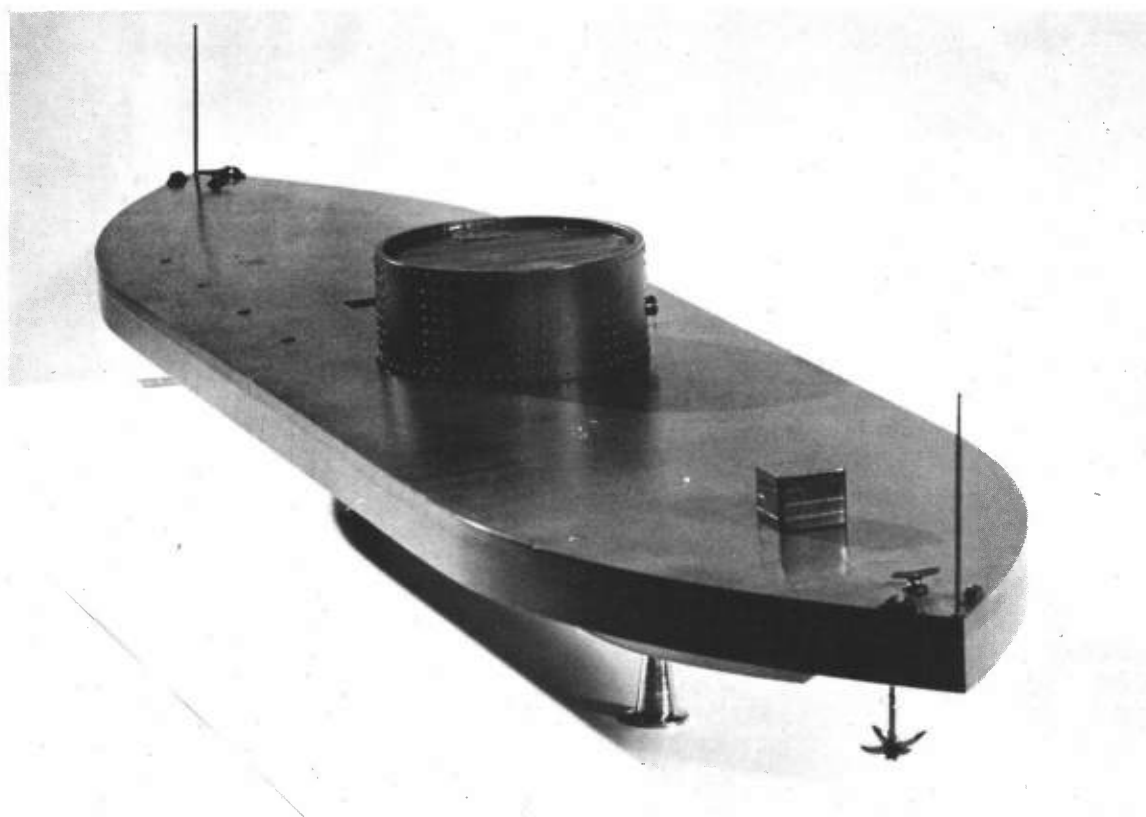
Harper's Engraving of the Monitor
 Jan-June 1862



Plan of the Monitor
 U. S. National Archives

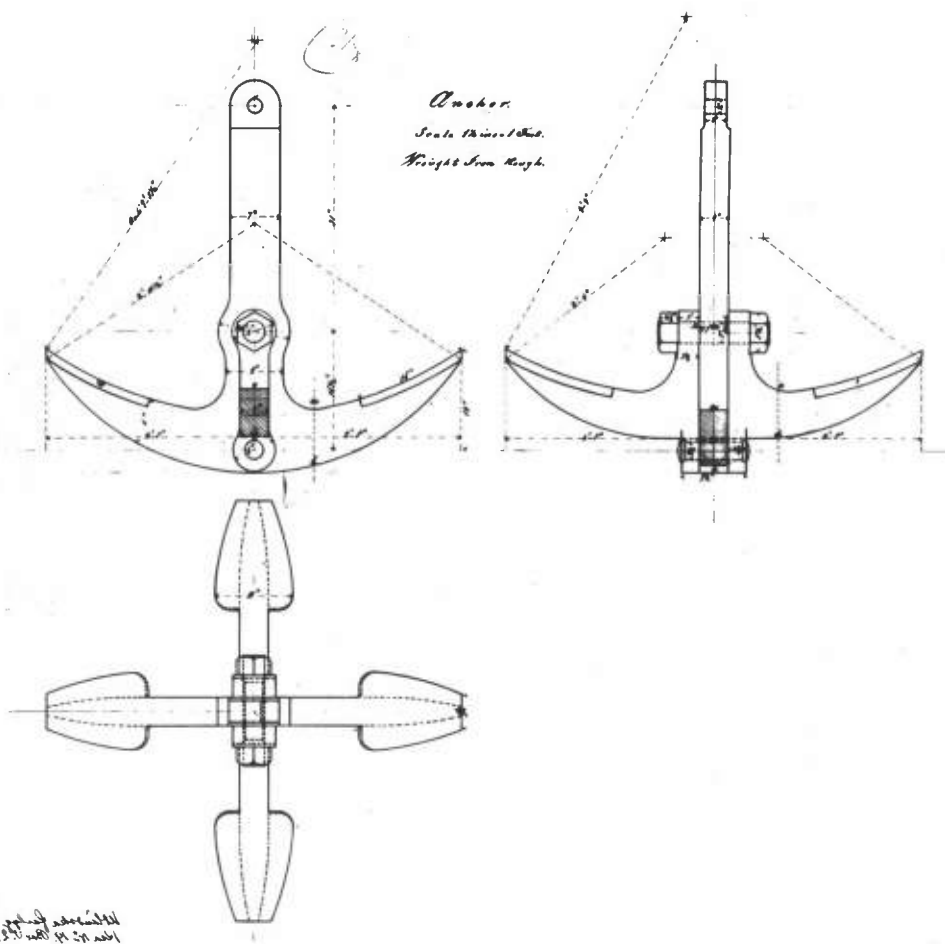


Transverse Section Through the Turret
Engraving from the original drawings
U. S. Navy Photo

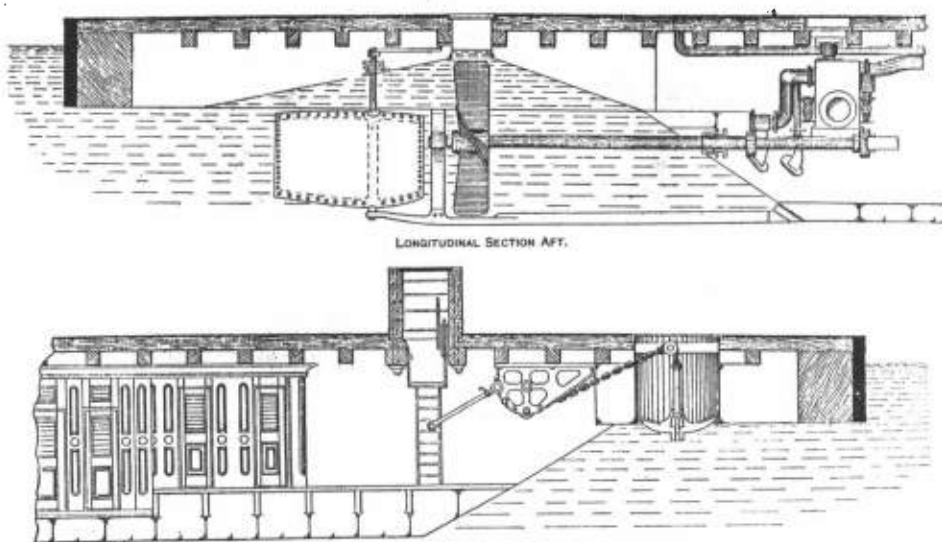


Model of Monitor

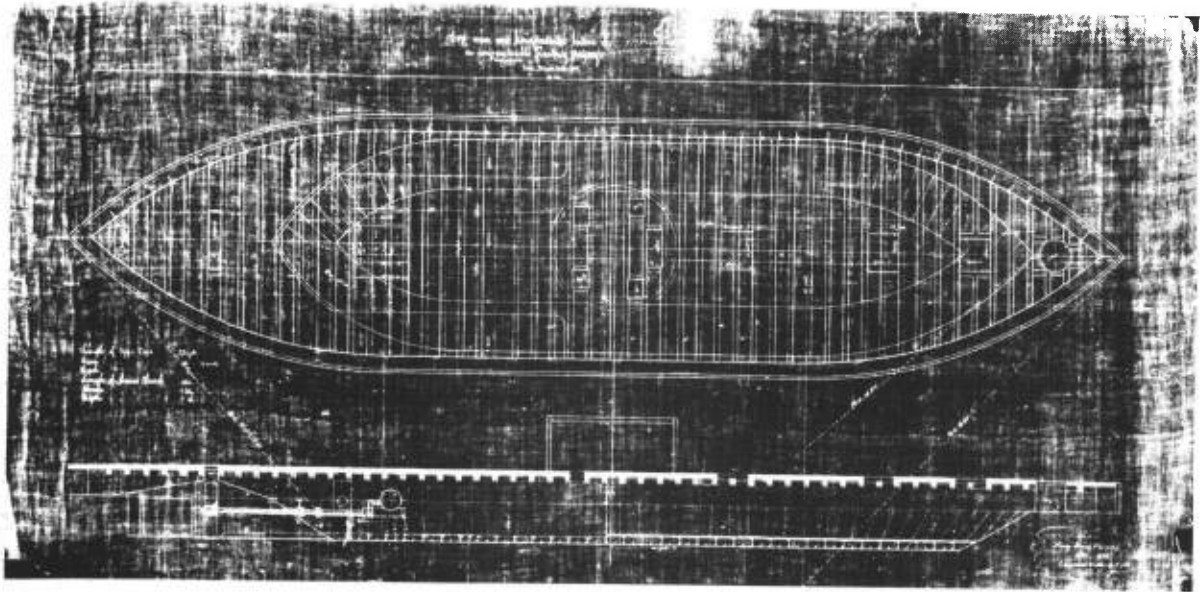
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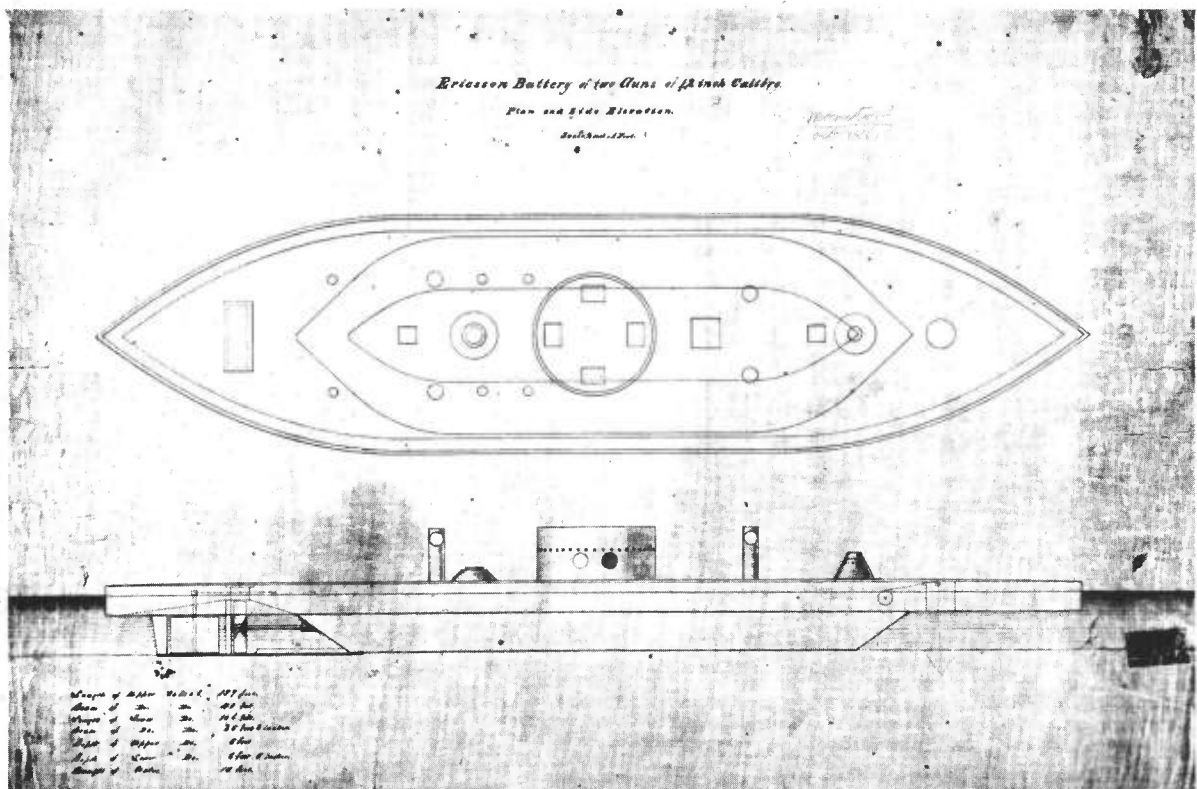
Unique Anchor of Monitor
Smithsonian Institution Photo
#62820



Plan of the Monitor
U. S. National Archives



Plan of the Monitor U. S. National Archives



Plan of the Monitor U. S. National Archives

EDITOR'S NOTE

The story of how Ericsson and company were able to construct the Monitor in such a short time simultaneously with dispelling the doubts of Commodore Smith and Secretary Welles is well documented in the correspondence in the record files of the Bureau of Construction and Repairs.

Building from working drawings and sending copies with explanations to Washington as the work was going on required a herculean effort on the part of Ericsson, both to keep ahead of the construction and to keep his patience with the inquiries from the Board.

In a letter questioning the stability of his ship and the weight of her armor, Ericsson replied:

Pardon me for saying in conclusion that there is no living man who has tripped me in calculation or proved my figures wrong in a single instance in matters relating to theoretical computation.

And to add a final note of disdain Ericsson reminded them

If the "expert naval architect" were right, myself and assistants merit commiseration as we have to pay for the iron that is to sink the battery.

Frequently the specifications were changed with Washington only being informed afterwards. In addition the Monitor was prefabricated with sub-contracts being let out to expedite the construction.

Little has been written concerning the actual construction of the ship other than stating that she was built in 100 days.

This, it must be said is inaccurate as from the date of contract to commissioning was actually 147 days. Secretary Welles later lamented about this delay in his diary as he had hoped to destroy the Virginia in her dry dock.

The article by MacCord who was a draftsman for Ericsson and later a professor at the Steven's Institute of Technology is included here as it hints at the personal relationship between Ericsson and those who worked for him. It seems that many of the details of implementation were left to the mechanics, indicating a sort of professional confidence. Also the two inserts together illuminate the fact that the Monitor was an engineer's ship, a prototype that required trial and error experience as evidenced by the right or left handed propeller question and the operation of the gun carriages during the gun trials. The operation of this mechanized warship was a source of pride for the young engineers who manned her, but the constant work of upkeep and frequent breakdown proved that the new breed of sailor could use profanity just as well as the old. Isaac Newton, Chief engineer on board the Monitor wrote to Ericsson on 23 April 1862.

As there are no sails and ropes on the Monitor, the spare time this deficiency gives the first Lieut. causes me very great annoyance.

The Monitor is a machine, the creation of an engineer.

The engines of the Princeton and Monitor are the only direct acting screw engines the U. S. Navy have ever possessed.

Very respectfully
Isaac Newton

I am sure that his annoyance was well expressed.

Many of the interior details of the ship are unknown because there was so little time to do complete drawings and many of the existent drawings were destroyed as per instructions in Ericsson's will. Fortunately, however, a collection of 97 drawings were found at the Stevens Institute of Technology, given to the library by Professor MacCord, formerly Ericsson's draftsman. This collection is the most extensive collection of Monitor drawings known to exist and has many sketches of the auxiliary equipment on board. The originals, many of which are in color, can be examined at Stevens and photographic copies can be obtained from the National Archives.

A complete study of the construction details will be under separate cover, when the cutaway model of the ship is completed.

COPIES OF LETTERS

from

JOHN ERICSSON

to

HON. GIDEON WELLES, Secretary of the Navy

and

COMMODORE JOSEPH SMITH, U.S.N.,

Chief of Bureau of Yards and Docks,

in 1861 - 62,

in relation to the building of

the original

M O N I T O R ,

and

similar vessels.

The National Archives

Record Group No. 19

COPY

New York, September 21, 1861

Sir:

In reply to your favor of the 19th instant, I beg respectfully to state, that the wording of the specification for the battery was intended to bind the contractor to furnish everything deemed requisite, in a fully equipped Government steam vessel. I submit that the following sentence which concludes the specification, establishes this point. It says: "It is further agreed that any defect whatever or any omission will be remedied at the cost of the contractor". As a matter of course, it is my intention to furnish a condenser for making fresh water. As to boats, the specification was intended not only to stipulate the furnishing light boats to be secured to the deck, but also 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. The construction of a temporary rigging to be put up in case of need, has engaged my particular attention, and I trust will be such as to merit your approbation.

I beg respectfully to add that my sureties in relation to the intended contract for building the battery are:

John A. Griswold, banker of Troy, New York.

J. W. Winslow, managing member of the great iron establishment of the same city.

One of these gentlemen is an intimate friend of the Secretary of State and the other as you may know, a leading

man in politics.

I am, Sir,

With great respect,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,

Bureau of Yards and Docks,

Washington.

COPY

New York, September 27, 1861

Sir:

The difficulty you apprehend in relation to vibration of the air within the turret of my intended battery, I have most effectually guarded against. I understand the subject perfectly. My long drilling in the Army has made me perfectly familiar with the effect produced by firing heavy ordnance in close chambers. The focal reverberation within an iron turret of a semi-globular form, are so great that the gunners, standing in its center, would be stunned as if struck by lightning. The top of my turret is perfectly flat and perforated all over with holes, the flooring is an open grating freely communicating by means of several hatches with the vessel below, and the turret is 9 feet high and so thick that it will not vibrate. By these means no pressure can be created within and no vibration can take place, both on account of the form of the perforated roof and the free circulation of air from above and below. It will be comparatively a luxury for gunners to stand on the open grating of my turret, to standing on the gun deck of a frigate during action. More air, less smoke and greatly diminished vibration over head.

Messrs. Winslow and Griswold from Troy, executed the contract for building the battery last Wednesday. It is now being certified as prescribed.

I have the work laid out for the vessel; the engine was started a week ago, as it will do for driving our propeller vessels should it not be wanted for war purposes.

A house will be built over the vessel to enable us to work in all weather and during night. It will be built while we are laying the keel and putting up the frames 60 feet wide, 20 feet high, 180 feet long.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON

Commodore J. Smith,
Washington.

The letter to Mr. Bushnell was intended for your eyes, in case that gentleman had left Washington on its arrival. There was a blunder in the heading only. I deem it proper under the circumstances to enclose the same.

COPY

New York, September 23, 1861

C. S. Bushnell, Esq.,

Dear sir:

You are hereby authorized to amend and complete my specification of an Impregnable floating battery, in accordance with any request of Commodore Smith. I wrote to the Commodore last Saturday, expressing my readiness to comply with any modification he may see fit to introduce in the said specification to render the same complete and binding. I should most reluctantly leave my drawing table at this moment engaged as I am in making out the working plans, and making out list of iron to be manufactured. I want to secure certain manufacturers in order to do the work in the short time stipulated and if I lose the next two days, I shall be thrown back full ten days.

Yours truly,

(Signed) J. ERICSSON.

Should any difficulty of a mechanical nature spring up, then telegraph and I will come on tomorrow, Tuesday.

J.E.

COPY

New York, September 28, 1861

Sir:

I have the honor to return the contract for building an iron-clad steam battery, duly executed by my sureties, Messrs. Winslow and Griswold of Troy, and certified by Judge Betts.

I am, Sir,

Respectfully,

(Signed) J. ERICSSON.

HON. GIDEON WELLES,
Secretary of the Navy.

COPY

Sir:

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. But for my desire to retain Mr. Winslow in the enterprise, on account of his relation with certain members of the Administration, I would never have accepted his amendment of the original contract. Not a moment will be lost in putting the matter straight; in the meantime, the work progresses.

I am, Sir, respectfully,

Your obedient servant,

(signed) J. ERICSSON.

Commodore J. Smith,
Washington.

COPY

Sir:

I am glad to inform you that Mr. Winslow, after mature reflection, now admits the propriety of your testing the battery under the enemy's fire; but we are going to solicit your abridging the time stipulated. As a mere engineering question, I would not advocate the request that will be laid before you. On other grounds, however, I earnestly ask your consent. The advantage to the country at this crisis, that will result from the enterprise of my sureties, I feel confident you will not overlook in deciding the matter. Mr. Winslow is now rolling the iron for the vessel itself, of a better quality, best scrap iron, than has yet been put into any vessel in this country.

The steam machinery for the battery is quite far advanced.

As an engineer of the highest intelligence will be required for the battery, the success mainly depending on that officer as the whole is machinery, permit me to suggest Chief Engineer A. C. Stimers of the Roanoke.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,
Washington.

COPY

Sir:

I have the honor to enclose an amended specification of the "Impregnable" battery.

I have to notice that the lower part of the vessel has been increased in length from 106 to 124 feet and made 18 feet instead of 16 feet wide at the bottom. The deck plank will be pine 7 inches thick in place of oak 6 inches; reason we can not obtain dry oak. Deck beams will be made of oak instead of pine, size 10 inches square as before. The plank shear will be made of oak 8 inches thick and 4 feet wide extending all round the vessel.

The turret will form a watertight joint with the deck, a smooth brass ring being let into the deck for that purpose. The beams for supporting gun carriages will be made of wrought iron in place of oak as first contemplated. I have also an expectation of obtaining rolled plate 4 inches thick to form the outer half of the turret, the inner half being composed of lighter plate riveted together. This will indeed make the structure shot-proof. The armor round the vessel I expect to be able to make in the same manner.

The deck over the deck beams will be absolutely shell proof by virtue of 17 inches solid wood. To render the intermediate spaces of 26 inches equally strong, I have an idea of running additional strips across the deck between each beam composed of 3/4" plate iron.

The turret will be turned by double gear, two pinions and two wheels of heavy pitch. The donkey engine will thus make 50 strokes for each turn of the turret. At 100 strokes per minute the latter will thus perform an entire revolution in half a minute which will bring the two guns in position alternately in 1/4 minute.

I am, Sir

Respectfully,
Your obedient servant,
(signed) J. ERICSSON.

Com. J. Smith,

Washington.

Copy

New York, October 4, 1861

Commodore J. Smith,

Dear Sir:

We have all come up to the mark, and concluded to execute Captain Ericsson's contract as you desire it, only asking one favor, which I have not the slightest doubt you will grant at once.

The amount to be reserved is so important in these times we wish you to change the three months to such time as she can be fairly tested under the enemy's fire.

We are aware of the fact we take upon ourselves an important responsibility in guaranteeing the success of this new means of National defence, and it is only the exigency of our present condition that would warrant such a step.

The whole vessel with her equipment will cost no more than to maintain one regiment in the field twelve months and each are experiments to be used to save the Government and Union. Should ours prove what we warrant it, will it not be of infinitely more service than one hundred regiments?

I will send you deck plans of my steamer at once, the frame of which we expect to have all up this week, and a splendid frame it is.

Allow me to thank you for the patience and consideration you have manifested, notwithstanding have put you so much trouble.

Yours truly,

(Signed) C. S. Bushnell & Co.

COPY

Sir:

To enable me to complete the plans of the turret of the battery, I require an accurate drawing of the XI in. Dahlgren gun which you have decided to employ. I have respectfully to request therefore that you cause such a drawing to be forwarded at once. The gun itself is all I want of Government, as the carriage as well as the slides, must be adapted to the turret. You will not doubt my ability to handle the gun if you call to mind the facility with which the 12 in. guns of the "Princeton" were worked with my carriages and friction gear.

I am gratified to learn that you intend to test the battery at short ranges and hope you will order its Commander to save his powder until he is as near the rebel batteries as he can get.

I am truly glad that you are in favor of the smooth bore.

Most respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,
Washington.

COPY

Sir:

I have the honor to enclose an accurate copy of the working plan from which the hull of the battery is now being built. Plans of the turret and other matter of detail I will forward as the work progresses, if you so desire.

The specification which I presented through Mr. Griswold is as correct as I can make it until after the conclusion of the entire planning. I therefore respectfully suggest that the document be accepted and attached to the contract as it now stands, giving me the authority to select either of the two modes specified of plating turret and the vessel's sides and also to adopt either of the two different modes of supporting the turret mentioned in the specification.

Mr. Abbott of Baltimore states he will require full two months preparations to roll 4 inch thick plates. Other establishments have not given a positive reply. The inch plate I can have at once, 5 feet square, at the rate of 140 tons per week.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON

Com. J. Smith,
Washington.

COPY

New York, October 13, 1861

Sir:

I have respectfully to state that I can not proceed with the work on the battery turret until the receipt of drawing of the Dahlgren gun. The bolts and rivets for holding together the plates of the turret also secure the slides. Until I know the size of the gun, the distance between the slides can not be determined nor distance between rivet holes, &c. It will be sufficient for my present purpose simply to know the extreme diameter of the gun, distance between shoulders of trunnions, their length and diameter. The length from centre line of trunnion to the ends of the gun would also be useful though not indispensable at present.

I am, Sir

Respectfully
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,
Washington.

COPY

New York, October 14, 1861

Sir:

I have the honor to acknowledge receipt of drawing of the XI in. Dahlgren gun with accompanying circular.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,
Washington.

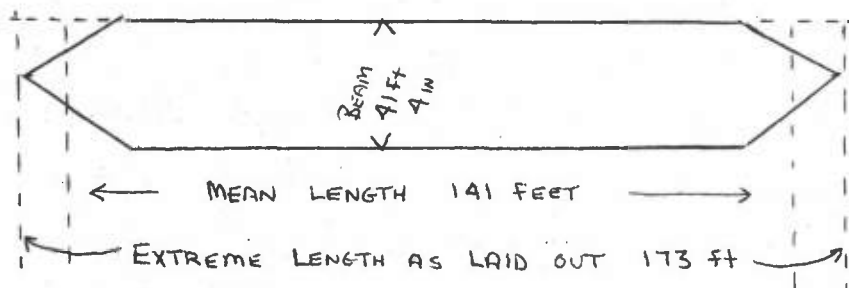
Original letter presented to Rear Admiral John L. Worden, U.S.N., April 30, 1886, by Commodore D. B. Harmony, Chief of the Bureau.

COPY

New York, October 14, 1861.

Sir:

Your private communication dated Oct. 11 has just reached me a few minutes before the closing of the mail. A pencil mark on the envelope indicates that the letter carrier has made a blunder. Please direct, 95 Franklin Street, my residence for eighteen years. I will reply more fully to your letter tomorrow. I now simply beg to assure you that there is not the slightest ground for the absurd statement made in relation to the battery, the displacement of which I know within 500 pounds. The mean length of the upper or flat portion of the vessel is 141 feet and the extreme beam is 41 feet, 4 inches.



Now by multiplying 141 by $41\frac{1}{3}$ we have 5827 square feet of area at water line. As the upper vessel is to draw $3\frac{1}{2}$ feet, we find by multiplying 5827 by $3\frac{1}{2}$ that the displacement of upper vessel is $582\frac{2}{3}$ tons. The area of the mid-ship section of lower vessel is 26' times $6\frac{1}{2}'$, or 169 square feet. Now the mean length of lower vessel is 94 feet, thus 169 times 94 gives 15886 cubic feet. This divided by 35

(which is the number of cubic feet of salt water per ton) gives 454 tons as the displacement of lower vessel. If we add 454 to 582 we have 1036 tons, total displacement at 3-1/2 feet draught of upper vessel. To sink the vessel requires $5827 \times 1-1/2 = 8740$ cubic additional feet displacement, which divided by 35 gives 249-1/2 tons so that 1036 added to 249-1/2 or, 1285-1/2 tons total displacement. Where the weight is to come from to make up this sum total, the expert naval architect probably can point out.

I omitted to state that 5827 feet area by 3-1/2 feet depth gives 20394 cubic feet displacement of upper vessel. That amount divided by 35 cubic feet to the ton establishes displacement of upper vessel to be, as stated, 582-2/3 tons.

As to stability I will only observe now, that there is no craft in this part as still as our battery will be, excepting the scow which carries Bishop's floating derrick. I will send you a diagram of stability tomorrow.

Pardon me for saying in conclusion that there is no living man who has tripped me in calculation or proved my figures wrong in a single instance in matters relating to theoretical computation.

Most respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,
Washington.

If the "expert naval architect" were right, myself and assistants merit commiseration as we have to pay for the iron that is to sink the battery.

COPY

Sir:

I have the honor of laying before you the enclosed transverse section of my battery, for the purpose of proving its stability. In order to do this in the simplest manner, the vessel is represented as being heeled over one foot, at the extreme beam. You will see by the plan that at this degree of heeling over, the center of gravity of the turret is 3 inches, out of perpendicular, while the center of gravity of the vessel and machinery deviates $1\frac{3}{4}$ inches from the perpendicular line on the opposite side, thus counterbalancing the turret in excess as the vessel and machinery weight three times more than the turret and its contents. Accordingly, the vessel will at all times stand upright unless operated upon by external causes. Let us now determine what force is requisite to heel the vessel over one foot in order to obtain an accurate measure of the stability. The area at the water line being 5827 square feet the quantity displaced on one side more than the other, will, at one foot of inclination be $\frac{5827}{2}$ or 2913 cubic feet. This divided by 35 cubic feet per ton, gives 83 tons of unbalanced displacement. But as the center of gravity of this is situated $11\frac{1}{2}$ feet from the center line of the vessel and as the vessel is $41\frac{1}{3}$ feet wide, it follows that 46 tons placed at the extreme plate would heel the vessel as represented. To form an accurate

idea of the extraordinary stability thus established, I respectfully call your attention to the fact that it takes 690 men of ordinary stature (15 to the ton) to make up the weight of 46 tons. In view then of the fact that such a large body of men, standing at the extreme of the vessel's side will only make her heel over a single foot, it may be safely asserted that there is not now in the service of the United States any vessel of equal tonnage that can compare in stability with the vessel under consideration.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. SMITH,

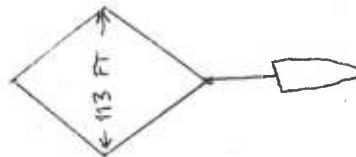
Bureau of Docks and Yards,

Washington.

COPY

Sir:

I yesterday forwarded a plan with calculations disproving the assertion of the "naval architect" that the battery will not stand up. I request as an act of justice that my demonstration be laid before the said party to convince him of the absurdity of his assertion. The prediction as to speed, viz., that 4 knots will be the maximum speed of the battery is too ridiculous to call for refutation. Bishop's derrick, measuring 113 feet across the corners, may be seen in our harbor moving at more than 4 miles an hour, towed by a 50 horse power steam tug, thus.



I have your sketch before me suggesting a change in the form of the lower part of the battery vessel. I am happy to say no increase is called for as it is now too late to change a single part of the entire structure, vessel, engine or turret.

I fear you did not notice that my statement of weight and displacement was given in gross tons of 2240 pounds.

The vessel as now laid down by the builder is 173 feet long and displaces, when the upper part draws 3 feet 6 inches 2,321,972 pounds, or 1161 tons net weight of 2,000 pounds. To sink or rather to bring the vessel down to the top of

outside armor, requires a further weight of 559,392 pounds. Total displacement, 2,881,364 pounds or 1440-2/3 net tons.

No man possesses the data for estimating the weight of hull but myself. I have now before me a list of every plate and part to go into the vessel.

I am just now in a position to state that the launching draught of the vessel with the entire steam machinery and turret gear on board and armor on, will be 6 feet 11 inches, that is, the upper vessel will be immersed 5 inches, which is within an inch of my original intention. The total displacement at this draught is 1,172,111 pounds or 586 net tons. We have thus 1,149,861 pounds for turret, guns, coal and stores, etc. Deduct turret (just 200,000 lb.) and we have 949,861 lb. left. Three inches additional draught would be preferable in action and that would bring the side of the vessel 15 inches out of the water and the deck nearly 20 inches up. This would add further 93,231 to our carrying capacity in all, 1,043,092 lb. or 521-1/2 tons.

I propose to be regulated by circumstances in regard to covering the deck. Over the bulwark I intend to put only a thin plate as there is five feet of solid wood below, lined on the outside with six inch armor. I have further an intention of proposing to dispense with two of the outside armor plates, but on this subject I will communicate in due season and of course be guided by your instructions. Professional friends advise the reduction of the "unnecessary" thickness

of 6 inches in view of the almost infinite resistance offered by the deck and deck beams in line of the shot, to say nothing of the 26 inch thick bulwark.

The excess of buoyancy over what we need will be my excuse for not now entering in the discussion of weight of stores, etc. As soon as the hull is ready for fitting up, I shall ask your advice and instructions on matters which I have not now time to discuss. The magnitude of the work, I have to do exceeds anything I have ever before undertaken because there is not sufficient time left for planning, everything must be put in hand at once - a condition truly difficult - I beg of you to rest tranquil as to the result. Success can not fail to crown the undertaking. Nothing is attempted not already well tried, or of so strictly mechanical a nature as to be susceptible of previous determination.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,

Washington.

One word as to speed - 30 years of practice has proved that with one horse power applied for every square foot of immersed midship section, 10 miles an hour is a rate attained by the worst models. The battery presents $313\frac{1}{2}$ square feet section with 400 horse power applied. Is it then reasonable of any well informed person to doubt that we shall attain 8 miles?

COPY

Sir:

I have received your favor of yesterday, and now return the document you sent for examination.

The calculation of displacement is in the main correct. It is based on 62.5 tons specific gravity of water in place of 64.12 tons which makes a difference against me of 60,281 pounds on the 37,211 cubic feet, supposed displacement. As a salt water craft there is no reason for using the fresh water standard in the computation. To have the vessel two inches less out of water when in still fresh water under the enemy's guns, I look upon as an advantage. 2 inches more or less in the draught of water is imperceptible. The computation of weight is erroneous from beginning to end. A builder of iron vessels alone can correctly estimate what his vessel will weigh. In the present instance the writer is the builder and knows all about the matter. There are several dimensions which have been changed in laying out the work. The substances particularly are varied. All these variations will be shown by the invoices of plate and other parts sent from the rolling mills, all of which will be submitted to the Department, as I am perfectly willing to deduct from the contract price any reduction of material from what the contract and specification specifies. For instance in order to make the turret just 8 inches thick I employ plate 15/16-inches thick, and so with regard to the armor plates.

The deck-plate-estimate exhibits the greatest error in the computation. The specification states two plates together 1 inch thick. It would be absurd to put 2 inches thickness on a deck strong enough to resist the blow of the shell, the object of the plating being simply to cause deflection or glancing off. Two half inch plates put on so as to break joint is more than sufficient for the purpose. Again over the heavy wood bulwark, there is only a thin plate through which the stanchions of the temporary rail pass. One half of the outer portion of bulwark is made of white pine forming a bed between the armor and the oak into which the blunt bolts are driven.

The assumed "laps" of deck plates and armor is an error, both deck plate and armor plate is all lap. And so with regard to turret plate, it is all a continued system of lapping. As soon as four inches of armor is up all round the vessel, I shall submit to you my reasons for not putting on any more. We are not going to fight the steel clad vessels of Europe at present and for home use the four inch plating sustained by 40 feet of deck and the end of 10 inch deck beams of oak will be more than sufficient. As before stated, if the plate is left out, the value will be deducted from the contract price. I may refer in detail to the computation of weight as soon as our material is on the ground. As you have thrown the entire responsibility - as to practical success - upon the contractor, you will, I respectfully submit, permit him to

exercise freely his own judgement in carrying out the mechanical part of the work. The moment the vessel is ready for guns and fitting up, your instructions will be solicited and your orders strictly obeyed.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,
Washington

Sir:

I have respectfully to report that the arrangement for ventilating my battery is now fully planned and under execution. It will consist of two centrifugal blowers attached under the deck near the stern of the lower vessel, each to be worked by a six horse power engine, and each to be capable of throwing 4,000 cubic feet of air in the minute. One of these blowers will take its supply from the outer atmosphere through a shell proof grating, the other will draw its supply through a trunk from the very bottom of the vessel and thus force it through the furnaces of the boilers out at the smoke opening in the deck. The first named blower on the other hand will force the fresh air, through a conductor, to the forward part of the vessel where it enters under the floor and circulates freely by means of perforations in the floor timbers, as shown on the annexed plan. A register will be applied in each of the officers' rooms and in other parts, for regulating the supply.

The capacity of each blower being as stated 4,000 cubic feet per minute or 240,000 cubic feet an hour and the contents of the vessel under deck being 36200 cubic feet, it follows that not only will the entire internal volume of air be withdrawn from the vessel more than six times every hour, but an equal quantity of fresh air will be blown into the interior in a perfectly pure state. It is evident that by this system of drawing the air for supplying the furnaces from the bottom of

the vessel, the carbonic acid gas generated by various engines will be most effectually carried off and that the internal ventilation will be as complete as that of any dwelling on land.

A blower of medium size, worked by a caloric engine of 2 horse power, will be applied for blowing the fires whilst raising steam at starting and for ventilating the vessel when the boilers are not in operation.

I will report at a future day respecting the plan I propose for disposing of the urine and excrements of the ships' company, within range of the enemys' guns.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,

Bureau of Yards and Docks,

Washington.

COPY

Sir:

The enclosed plan represents the manner of putting on the armor plate of the battery to which I have before adverted, and which I now respectfully submit for your approbation. The thickness above water and as far down as shot can strike with full effect, is 5 inches which, considering the almost incalculable amount of support offered by the deck, will prove more than ample. The support offered vertically to the inner plates by the notches in the bulwark, is of some importance.

We have now nearly all the plates rolled for the hull and must, to be in time, commence the armor plates at once. Only two mills in the United States will undertake to make this plate and each only engages to deliver a limited quantity per week.

The diminution of weight and cost of plate from that which the contract price was based upon, I offer to deduct at the final settlement with Government, should you permit the change proposed

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,

Bureau of Yards and Docks,
Washington.

COPY

Commodore J. Smith,

Dear sir:

Inclosed please find certificates. We have taken copy future guidance.

I am delighted with the progress we have made, of which I presume you have been informed by Mr. Pook.

My hope is to complete the vessel 30 days inside our limited time.

Captain Ericsson has had fine success in completing every arrangement for the most expeditious construction of his battery. The building which he has had erected for the purpose of working day and night is 185 x 60 feet, and the foreman thinks he can be ready to launch in 45 days. Captain Ericsson is at work day and night to drive the work along, and is confident that it is impossible to improve in any particular upon his plan, but I am much pleased to have you keep him supplied with suggestions for I know of two instances in which he has in my judgement greatly improved the vessel by adopting your suggestions. One by lining the inside of the turret with felt and the other by making the bottom of lower vessel wider.

I have more, and increasing confidence in the important results to be secured by Captain Ericsson's battery, and should not be surprised to have an order for several more of the same kind sent him very soon after this one has been

tested.

What say you to securing me a position as aid to Commodore Paulding when the battery is complete to go down and take Charleston. The Commodore says he will take the lead with the battery, and I am sure I can bring up the rear with the Mystic Steamer.

Yours respectfully

(Signed) C. S. Bushnell and Co.

COPY

Sir:

I have the honor to acknowledge the receipt of your letter of the 21st, by which you authorize the reduction of the side armor plate of the battery on certain conditions.

I enclose plan of the rudder of the battery, as it is now being made.

I would respectfully observe on this occasion, that all matters of detail are most carefully considered before the work is executed. Necessarily the specification, considering the novel character of the work, could not be accurate in matters of detail, as it is not until the actual working plans is made out that precision is attained.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,
Bureau of Yards and Docks,
Washington.

COPY

Sir:

In reply to your letter of yesterday, I have respectfully to inform you that the flooring of the iron pilot house of the battery is flush with the under side of the deck beams. The deck plank and plating being 8 inches, and the deck beam 10 inches deep, it follows that the height from the flooring to top of iron house will be 6 feet 6 inches, which will leave full 6 feet 2 inches in the clear within. Please refer to the deck plan and you will find a hatch forward, 5 feet 2 inches square. The pilot house is built over this hatch.

In relation to my specification, I respectfully claim the right to copy your mode of rendering it more clear by the introduction of italics. It will thus read "the two plates to be one inch in thickness". The plural was necessary on account of the preceding "two", a circumstance which renders your underscoring, I respectfully submit, less explanatory than otherwise, it might have been.

The plan to which you refer was never intended as a working drawing. It was originally intended merely as a diagrammatic and theoretical exposition of the principle of my battery before yourself, and the other members of the Committee appointed to decide on the iron clad vessels. It was however, my intention before I had looked closely into the subject, to make the deck plating two inches thick. On referring to my notes of the effect of the explosion of shells on level

wooden platforms and the necessity of solid wood work under, rather than thick plating at the surface. I at once increased the strength of the deck by employing oak beams, 10 inches square, placed only 26 inches apart and deck planks 7 inches thick, as more effective than thick plating. The great reduction of weight effected by the change. I need hardly say, powerfully influenced me in adopting the heavy wood work in preference to the thick plating.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,
Bureau of Yards and Docks,
Washington.

New York, October 25, 1861

Dear sir:

The turret is put together altogether by bolts and nuts and can be taken down at the works, and put on board in a few days. When on board, the two inside rings or courses will be riveted together, but the remaining 6 outside plates will be bolted only, so that injury can readily be repaired that may happen to any of the 6 outside courses. The rivets of the two inside courses can readily be cut out should it be necessary to place the turret on any other vessel. The top of the turret rests on a strong deep iron band firmly bolted to the inside. The weight alone keeps the top or roof down so that it may at any time be lifted up or removed. Under a crane this operation would not require more than a couple of hours. Guns therefore may be put in and exchanged with very little trouble.

I am aware that much is said of the battery, and can only express my surprise that persons should offer opinions on a subject of which positively nothing is as yet accurately known. I intended to have sent an elaborate reply to your remarks relative to the strength of the battery, but abstain because at present, I am hard pressed for time, and because it is an unpleasant task continually to contradict the opinions you express. The vessel is nevertheless the strongest one I have ever built. The overhang is so firmly braced, on the diagonal system, that a weight of 20 tons may be placed, for

every three feet, over the extreme point of the bulwark without injury to the vessel.

You must permit me to protest against the term "wooden vessel", which you employ in your communications. No part of the vessel, upper or lower, is made of wood. The entire structure is composed of iron, forming a complete and strong vessel without the wooden bulwarks, which are attached to the outside, resting on an iron shelf, which passes round the vessel. You probably have before you the plan which Mr. Bushnell presented, which, to explain the principle, clearly, exhibited a long flat pointed wooden scow with a hole cut in the bottom, to which an iron bag (the lower vessel) was attached, for the purpose of containing the motive power of the battery.

The side of the upper vessel is perfectly vertical with a very heavy angle iron riveted all around the vessel. This vertical side receives enormous strength from the broad iron shelf on which the bulwark rests. Altogether when the timber is bolted to this vertical side, and the armor secured in strips of 15 feet length, as it will be under the new arrangement, the side of this vessel will form a truss of enormous strength capable of resisting far more strain than it can possibly be subjected to. I earnestly request that you will not appoint any one to superintend the battery machinery who is not intended to run it. The United States will lose

nothing by the absence of the superintending engineer for three weeks to come. I pledge my word for this. After that period, it will assist me materially to have a good engineer to be present in putting up the work.

I am, Sir

Your most respectfully,
(Signed) J. ERICSSON.

Commodore J. Smith,
Washington.

COPY

New York, November 15, 1861

Sir:

I would very respectfully request that I be furnished with an intelligent assistant, that I may be enabled to secure drawings of everything connected with the Ericsson Battery, as well as to keep a close watch upon the multifarious constructions connected with it.

I am, very respectfully,

Your obedient servant,
(Signed) ALBAN C. STIMERS.
Chief Engineer and Superintendent.

Comm. Joseph Smith, U. S. Navy,

Chief of Bureau of Yards and Docks,

Navy Department, Washington, D. C.

COPY

New York, November 15, 1861

Sir:

I have the honor to enclose certificate of the Superintendent, showing that work to the amount of fifty thousand dollars has now been performed on the shot-proof battery. An order from the Navy Department for that amount is accordingly solicited.

The central part of the battery is so far advanced that the deck beams are being put in. Next week the main engine will be placed on board, also part of the turret machinery. The work at the extreme ends of the vessel has been somewhat delayed on account of the impossibility of obtaining the whole of the plate iron at once.

I enclose the "Scientific American" of this date containing an admirably clear description of the battery. In view of its bearing on the harbor defences of the country, I respectfully suggest to the promoter of the enterprise to present a copy to the Secretary of State. I am, Sir, respectfully,

Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,

Bureau of Yards & Docks,

Washington, D. C.

COPY

SUPERINTENDENT'S CERTIFICATE NO. 1

New York, Nov. 15, 1861

I hereby certify that in my estimation the work on the Iron Clad Shot Proof Steam Battery, building by J. Ericsson, has progressed to the amount of fifty thousand dollars, and that the work and materials are according to contract.

(Signed) ALBAN C. STIMERS,
Chief Engineer and Superintendent.

COPY

Sir:

I have respectfully to report that the slides that have been made and the gun carriages and guns that are making all admit of a recoil of six feet. Whatever be the length of the gun, this extent of recoil has been provided for. By the friction apparatus it may, however, be reduced to anything not less than two feet.

Everything connected with the turret has been constructed for a full-length Dahlgren XI-inch gun, and it matters not whether a reduction be allowed or not. I have respectfully to add on this subject, that I mentioned to Mr. Stimers that it would be better in practice if shorter guns were used and he at once expressed the opinion that he could, through yourself, effect a reduction of length. The guns will be run out by mechanical means without tackle, the weight during the process will rest on brass rollers. When the vessel is on even beam, a single man can run out the gun.

In furnishing correct information to the mechanical press, I discharged a duty to your Department and to the Government. It was my purpose to keep silent, but my refusal to furnish particulars gave great offence, and I had no alternative but to explain the structure or permit a most erroneous statement, damaging alike to the enterprise and the Navy, to go before the country. We are closely watched by hundreds and the work has now progressed so far that many imagined they saw enough to judge of the result. It is safe

to assert that withholding correct information for another week would have brought out an injurious attack on the enterprise. At all events, I have been guided in course by an earnest desire to serve the good cause. I am, Sir, respectfully,

Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith

Bureau Yards & Docks
Washington.

I have had the honor to receive the instructions for marking pivot XI-inch gun, and also your order for \$37,500.

COPY

New York, Dec. 3, 1861

Sir:

I have the honor to enclose certificate of the Superintending Engineer that work to the value of one hundred thousand dollars has been performed on the shot-proof battery, which I have contracted to build for the Navy Department.

I am, Sir, respectfully,

Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,

Bureau of Yards & Docks.

New York, Dec. 17, 1861

Sir:

I have the honor to enclose the Superintendent's certificate that work to the value of one hundred and fifty thousand dollars has now been performed on the shot-proof battery.

The whole of the machinery is now on board the vessel and probably within two weeks will all be in motion under steam. The armor and deck plate, I have much satisfaction in stating, has been delivered with greater dispatch than was anticipated.

In reply to a former communication, I have respectfully to state that the entire weight of turret and armament rests on the pivot of the turret shaft, which is supported by a bracket of great strength to the main bulkhead of the vessel, about 4 feet above the bottom. No strain whatever is put on the deck beams.

I avail myself of this opportunity to state that I made an elaborate drawing of a revolving turret thus supported on the point of the turret shaft, as early as 1854. This fact I can establish by the highest testimony, and accordingly claim to have perfected this invention more than seven years before Captain Cole brought out his abortive scheme in England. I respectfully solicit that you will bring this circumstance to the notice of the Secretary of the Navy.

I am, Sir, respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,
Bureau Yards & Docks,
Washington.

COPY

IMPREGNABLE BATTERY.

Explanation.

Speed. Immersed midship section of both vessels is 312 square feet; power of engine, 400 horse. A speed of 9 statute miles is, therefore, easily attained according to long practice in towing canal boats and similar bad models.

Displacement. Total displacement of the two vessels, 1255 tons of 2240 pounds. Displacement, when the armor is 18 inches out of water, is 992 tons.

Stability. (See sketch) In order to estimate the exact amount of stability, let us suppose that a force is applied that will bring one side down level with the waterline, the other side being in such case $18 \times 2 = 36$ inches out of water. The quantity displaced on one side more than on the other will be $20, 5 \times 1, 5 \times 138 = 4243$ cubic feet or 121 tons. The centre of gravity of the water then displaced is very nearly 15 feet from the vessel's center-line. This centre of gravity is marked "g" in the sketch. Now, in bringing the vessel over as supposed, the centre of gravity of the turret will only be 6 inches out of the perpendicular, showing the stability to be 30 times greater than the weight of the turret. The turret, however, is balanced from below, hence there is not even a tendency to disturb the enormous stability which we have established.

Will the turntable stand the recoil. There is no turntable. The wooden beams, or slides, supporting the gun carriages, are secured directly to the side of the turret. The recoil, therefore, is received by the entire mass of the turret. The friction rollers work on axles, the bearings of which are secured in the deck, and the turret itself rests on those rollers. The light grating on which the gunners stand is attached to the wooden beams and to the inside of the turret.

The turning of the turret only requires force enough to overcome the friction of the steel rollers on which it rests. The upright spindle of 9 inches diameter has more than tenfold the strength requisite for that purpose and for the purpose of preventing the turret from sliding sideways during the vessel's rolling at sea.

Whole weight of iron in vessel and turret is somewhat above 420 tons.

Washington, Sept. 15, 1861.

(Signed) J. ERICSSON.

Ventilation. The ventilation of the vessel is effected by four ventilating tubes 28" diameter, 8' high, as stated in the specifications. In action the ventilation is effected by powerful blowers worked by separate engines. The suction of the blower will draw in fresh air through the turret roof under the turret, through the holes in the pilot house, and holes in side of turret. The air thus taken in passes off through the chimney abaft the turret. Part of the air drawn in is passed through the fires, part goes directly to the chimney by side conductors.

COPY

Sir:

I have the honor to present the Superintendent's certificate that work to the value of two hundred thousand dollars has now been performed on the Impregnable Battery.

The turret has been completed at the Novelty Works and partially removed to Green Point. The turret ring is now being bolted to the deck, and next Monday the erection of the turret on board will commence.

I beg most respectfully to observe that while the principal outlay has now been incurred in building the battery, only \$37,500 have yet been paid by the Navy Agent, and that amount was not obtained until five weeks after the presentation of your order. In view of the large amount of funds thus called for from private source, my contemplated organization and operation by what is called night gangs has been to some extent frustrated. I am, Sir, respectfully,

Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,

Bureau Yards & Docks,

Washington.

COPY

UNITED STATES MILITARY TELEGRAPH,

Received January 24, 1862.
From New York
To Com. J. Smith.

I have arranged to put the guns into the turret at Green Point. The vessel is ready for launching. Only waiting for a few armor plates.

J. ERICSSON.

Memo. at bottom.

Lt. Worden says it will occupy 3 or 4 days to sight the guns after receipt.

The guns can be sighted on board, and Worden telegraphs me that the vessel won't be launched before the 29th inst.

Very obediently,

H. A. W.

COPY

Private

Dear Sir:

I have just returned from the battery and find your unofficial communication on my desk. By the end of next week, I expect to have the guns in their place and all else ready. A notice in the "Herald" today would lead to the belief that we are three weeks' distant from completion. Fortunately, such is not the case. Our men work night and day. When I left the battery half an hour ago the whole of the turret work was on board and the vessel still 42-1/2 inches out of the water amidships. I do not see how we ever can get down so deep as not to show 21 inches of vessel out of water.

Pray pardon my haste. Most respectfully,

Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,
Washington.

Sir:

I enclose the Superintendent's certificate that work to the amount of two hundred and fifty thousand dollars has now been performed on the battery. Most respectfully do I call your attention to the fact that we have as yet only received \$112,500, although we have now incurred all the expenses in building and equipping the battery within \$5,000. The bulk of the expenditure has been labor paid for in cash from week to week, and nearly all of the materials have been procured in exchange for cash. It will not be improper for me to admit to the fact that our expectations that credit would be given have not been realized. Our confident belief that, out of patriotic motives, accommodations would be given, has been doomed to utter disappointment. You will see from this, without my pointing out the consequences in a financial view, how necessary it is that the Government should liquidate our claim at once. My associates strongly urge that before we deliver up the battery, the Secretary of the Treasury would assure us that the amount will be paid as soon as possible. This request is presented in the most respectful spirit.

I am, sir, respectfully,

Your obedient servant,
(Signed) J. ERICSSON.

Com. J. Smith,

Bureau of Yards & Docks,

Washington.

COPY

Sir:

The battery being now completed, I have the honor to transmit the sixth and last certificate of the superintending engineer.

Commodore Paulding, I believe, has informed you that yesterday's trial of the steering qualities of the "MONITOR" resulted in a positive demonstration that the rudder has been properly constructed. In justice to myself, I have to state, that the artisan who was employed to put up the steering apparatus committed two serious blunders. In the first place he put the check against the tiller 10 degrees too far back, and secondly he placed the sheave in such a position as to bring the tiller rope nearly in a line with the tiller when hard up. The whole affair being hidden in the dark close chamber formed by the projection at the stern, the depth could not be readily observed.

I am, Sir

Respectfully,
Your obedient servant,
(Signed) J. ERICSSON.

Commodore J. Smith,
Bureau of Yards and Docks,
Washington.

Selections From

The United States Ironclad "Monitor"

By

F. M. Bennett, Passed Assistant Engineer, U. S. N.

Cassier's Magazine

Vol. XIII

April, 1898

No. 6.

On February 19, three weeks after launching, the Monitor had a trial trip that was such a failure that she had to be towed home. Almost everything went wrong. This is not to be wondered at, however, when we remember how rapidly the structure had been assembled and that it was composed of many pieces from many workshops, made from rough plans. The trouble with the propelling engines was charged to faulty valve setting and was easily remedied. Both gun mounts were disabled because the guns were fired without compressing the friction gear by which the recoil was to be taken up, but the damage was small considering the possibility for a general smash-up.

The greatest defect was the lack of control of the vessel by the steering gear. The rudder, of the balanced type, was over-balanced; that is, the area forward of the rudder post was too great in proportion to that abaft it. Consequently when the rudder was put over either way, the forward section offered so much resistance to being thrown back again that the mechanical connection between the steering wheel and the tiller

was unequal to the work. The naval authorities proposed docking the ship and replacing the rudder with one of better proportion, but Ericsson fiercely opposed this. It is well that his objection prevailed, for had the delay of fitting a new rudder been incurred the Monitor and Merrimac would not have met when they did; and they might never have met.

According to his biographers, Ericsson burst into a furious rage when this proposition was made known to him. With a mighty oath he is said to have shouted:—

The Monitor is MINE, and I say it shall not be done!

He added presently, in a tone of contempt:—

Put in a new rudder! They would waste a month doing that; I will make her steer as easily in three days.

He did remedy the trouble within three days, though he did not correct the original fault in the shape of his rudder. The change consisted simply in doubling the purchase between the tiller and the wheel ropes. This was a makeshift in an emergency that any seaman or mechanic should have thought of.

The first trial trip developed faults that were to be expected in such a hastily built craft. These were remedied within two weeks, and on March 4 a final, and successful, trial trip was run, the guns were satisfactorily tried, and a favourable report was made by a board of naval officers.

Chief Engineer A. C. Stimers, the superintendent of construction, went to sea in the vessel to observe her performance

and give the officers the benefit of his knowledge. He was, as stated by Colonel W. C. Church, in his "Life of John Ericsson,"

The only man on board who thoroughly understood the characteristics of the vessel.

The voyage to Hampton Roads was eventful and almost ended the career of the Monitor, and with it the fate of iron-clads for an indefinite time. Rough weather was encountered, and water broke over the smoke and blower trunks, nearly putting out the fires and stopping the pumps from lack of steam for four or five hours on one occasion. Loss by foundering was imminent at this time because of the great quantity of water that got into the vessel under the base of the turret and through the hawse pipes. The blowers stopped because the belts got wet and the engine and fire-rooms filled with noxious gas from the fires and had to be abandoned. In trying to remedy this trouble, the chief engineer, Mr. Newton, and his assistants were overcome by the gas and were carried to the top of the turret where they revived, though they were thought dead when dragged out of the engine-room. Trouble and danger also resulted from the wheel-ropes jumping off the steering wheel and becoming jammed.

After two days of toil and peril the Monitor escaped from the dangers of the sea into the presence of a new enemy. Late in the afternoon of March 8 she passed in at the Capes of

Chesapeake, and from the sound of shotted guns knew that her time for action had come thus early in her career. The Merri-mac was abroad that very afternoon, and wreck and destruction fouled her wake. A rude improvised iron-clad herself, she marked a new era in naval warfare, and before her a large fleet of supposedly formidable ships of war was as helpless as a flock of sheep assailed by a wolf.

Night fell before the Monitor came up to the seemingly doomed Union fleet in Hampton Roads. The Merrimac had glutted her thirst for blood for the day and was at anchor and at rest, but in her silence in presence of the ships that she meant to attack in the morning she stood for all that men understand by the dominion of the seas. Lighted by the burning wreck of the frigate Congress, the Monitor moved up toward Newport News and anchored near the stranded Minnesota, upon which vessel, it was certain, the first blow of the morrow would fall.

From either an historical or a theatrical point of view the stage settings were now complete. With the night the curtain had fallen upon the last of a long series of glorious deeds, performed under an order of seamanship, or sea tactics, that had already long passed its meridian, but which, for romance and chivalry, excelled any that had preceded it, and, it must be admitted, excelled that which was now to rudely supplant it. A new type of sea-warrior and a new type of war ship were about to appear upon the waters. The engineer's

machine of John Ericsson was to face the fabric that represented the engineering ingenuity of the American South, and the result of the encounter would inflict fright upon the romance of the sea and transform the masted navies of the world into useless relics in a day.

It is not within the scope of this article to tell the story of the famous sea-fight in detail. The Merrimac got under way on Sunday morning, March 9, with the intention of destroying the Union fleet lying at her mercy. When she advanced to attack the Minnesota, the Monitor came out from behind the big frigate and assumed the role of defender. In the furious duel between the iron-clads that followed, neither was vanquished. The Merrimac retired to Norfolk without having accomplished any part of her projected day's work, and the Monitor remained on guard, successful in the duty she had undertaken, and ready to fight the first comer.

In the fight the Monitor fired forty-one solid 11-inch round shot, twenty of which made marks that were afterward observed on the shield of the Merrimac; the iron plating of the latter was much disturbed and broken, but the casemate was nowhere pierced all the way through. Twenty-one of the Merrimac's shells (she fired no solid shot) struck the Monitor, the most damaging blow being one that cracked an iron "log" of the pilot house and disabled Lieutenant Worden. Two men in the turret were disabled by concussion. No one was killed on the Monitor.

As the first conflict between mastless steamers,—engineers' ships,—it will be interesting to remark briefly, the part taken by men of the engineering force. The crew of the Monitor, including Chief Engineer Stimers, numbered fifty-eight. Of these, thirteen were officers. Five officers were of the line, or seaman branch; five were engineers; the others were the surgeon, paymaster, and captain's clerk. Twenty-one enlisted men were petty officers, seamen, and landsmen of the seaman class; seventeen were firemen and others belonging to the engineer class. The remaining seven were yeomen, stewards and cooks. It appears that the fighting force,—the men at the guns, in the magazine, and at the engines and boilers supplying power to handle the ship and the guns, were almost equally divided between the seamen and engineering branches.

The familiarity of Chief Engineer Stimers with the various mechanisms in the ship enabled him to take a leading part in the battle. Indeed, it is not too much to say that without his knowledge the Monitor, in all probability, could not have gone into action at all, a point that is made by more than one historian. The exigencies of the trip from New York had prevented cleaning and oiling the turret-turning gear, resulting in its rusting, and it worked badly in the engagement. Colonel Church, Ericsson's biographer, says:

But for the energy and determination of Engineer Stimers it might not have worked at all.

The station of Mr. Stimers during the fight was in the turret, working the turning gear. This station was originally assigned to one of the line officers, but he could not manage it, as afterwards stated by the executive officer, Lieutenant Greene and was relieved by Stimers. When Worden was disabled and Greene took his place in the pilot house, Stimers relieved the latter in command of the turret and the last guns of the engagement, fired as the Merrimac withdrew, were fired by him. The New York Chamber of Commerce gave Ericsson a banquet in celebration of the battle, and in making his speech on that occasion Ericsson asserted that the success of the Monitor was

entirely owing to the presence of a master mind meaning Mr. Stimers.

Important as were the services of Chief Engineer Stimers in this stirring event, they were not greater than those of the officers and men of the engineer branch of the crew. In this, as in any engagement of a war steamer, power is the prime essential for manoeuvring the ship and working her turrets, and the men who furnish that power contribute quite as much to the result as do those who use it.

Selections From
Ericsson and His "Monitor"

By

Charles W. MacCord
SC.D., Professor of Mechanical Drawing, Stevens Institute of
Technology. (Formerly Chief Draughtsman for Captain
John Ericsson.)

From

North American Review

Vol. 149

July - Dec 1889

The story of the Monitor's building has been often told: the fertility of invention, facility in designing, speed and accuracy in drawing, promptness in execution, and unwearied industry which made the construction possible in so short a time—all these are familiar. But the minor mishaps, the special incidents which, apparently adverse, yet proved providential as contributing to that exact coincidence of time, place, and circumstance upon which so much depended—these have as yet been omitted in the telling, and without them the story is incomplete.

While the vessel was on the stocks, Captain Ericsson made frequent and for a part of the time daily visits to the yard of the Continental Works, watching operations with a keen and critical eye; but after the launch he considered this no longer necessary, and visited her but seldom. In this way it came about that, although the motive engines were put in before launching, he did not see them under steam, but contented

himself with the reports of their action made by the government engineers. These engines were of what has ever since been called the "Monitor type," and many have supposed that they were, like the vessel itself, of wholly novel and untried design. This, however, was not the case. In the Judith and the Daylight, and elsewhere, this form of engine had already demonstrated its practical working qualities: otherwise the captain would probably have given the first trials at the dock his personal supervision.

For obvious reasons, as little publicity as possible had been given to the work during its progress, but perfect secrecy was, of course, out of the question. The turret of a monitor can not be hidden under a bushel, nor could the launching of an iron-clad vessel be concealed from the public eye; and, indeed, it had been watched by some in expectation that this strange craft, built in defiance of everything considered ship-shape, apparently over-weighted with iron, and with no free-board worth mentioning, would slide off the ways straight to the bottom of the East River and never come up again. Disappointed of this sensation, the public had manifested no little curiosity to see how the "Ericsson Battery" would behave when she left the dock. This curiosity was soon gratified; the final preparations were pushed with unabated vigor, and, the engines having been reported in satisfactory working order, upon one gloomy winter's day a formal trial trip was made.

The result of this trial was anything but encouraging, as reported in the daily papers, one of which made it the text of a "crushing" article, wherein, under the heading of "ERICSSON'S FOLLY," the battery was pronounced an ignominious failure, which could neither be propelled nor steered; the captain was called an incapable schemer, and a stern reproof was given for the sin of thus wasting the country's resources;—no words too harsh, no denunciations too severe, for the zeal of this fiery crusader. The versatility of the modern journalist stood him in good stead on the 10th of March, when the novel fighting machine had proved invulnerable to heavier blows than his pen could deal; but in the meantime it must be admitted that the battery had not behaved as well as she might. The motive engines were not in proper adjustment, the steering-gear required excessive power, and between the two the vessel proved unmanageable; the trial was given up, and she had to be towed back—a rude disappointment indeed to expectations which no one conversant with all the facts can regard as unreasonable.

It is well known that John Ericsson was by nature sanguine and enthusiastic; impetuous, excitable, and impatient of contradiction, with him it was

sic volo, sic jubeo, stet pro ratione voluntas
nor did he always in the heat of the moment consider whether his wishes could be executed by those not endowed with his

own tireless energy. The events of that dismal day must have vexed his very soul, but the manner in which he bore them was strikingly characteristic. Had they been trifling things, he would have been exasperated, as his custom was, and exasperating, too, when small affairs went wrong; but under heavy burdens his broad shoulders never bent, and he looked always squarely in the face of grave misfortunes with calm and resolute eyes. It is true that on his return to Franklin Street, where he then resided, there was a somewhat portentous cloud upon his face, and no wonder; but it was not the forerunner of a storm.

At his request I brought the drawings of the valve gear, not without misgivings, for he had never examined them with a view to verification, and I alone was responsible for their accuracy. He wanted the plan showing the relative positions of the eccentrics and the main crank; and I was obliged to explain that I had no original, having made the working tracing, in order to save time, from detached drawings and a pencil diagram. He listened with patience and appeared satisfied with my detailed explanation, and then requested me to make a new drawing of the complete arrangement, trace it, and as soon as possible to call in the old plan, give out the new one, and give orders to have the eccentrics at once set according to it. I was then informed that during all the trials at the dock the engines had been running backward, of which

Chief-Engineer Stimers, who, it seems, had never inquired whether the propeller were right-handed or left-handed, was not aware. Simple reversal would not, at best, have fully met the difficulty; for each slide valve was driven by a loose eccentric, which was shifted part way round in order to reverse—an arrangement which, if adjusted to give the best results in one direction, will not in that type of engine do equally well in the other. Still this could not have been the whole secret, though it was never discovered just what was; for the subsequent difference between the forward and backward running was never great enough to have caused so much trouble; and, again, the same device was used in many engines of the same form afterward, about which no complaint was made.

Be that as it may, I did not feel like taking the responsibility of giving out the new plan without his scrutiny; but he would not look at it, only saying:

You are sure it is right now? Very well; then go ahead.

I did so, and, having captured the first tracing, lost no time in comparing it with the new drawing; to my great relief, they tallied exactly, so that both tracings might have been made from the same original plan.

Some time after, meeting the superintendent of the Delamater Works, I tried to ascertain the real cause of the difficulty, but without success. He asserted that the first drawings of the valve gear were all wrong, admitted that the new

ones were all right; and averred that the plans had been carefully followed in both cases. After a brief explanation, I invited him to accompany me to No. 95 Franklin Street and compare the old with the new; but he found that he had not time. Captain Ericsson had once described this superintendent as

too stupid to make a blunder which only proves that his own judgment was not infallible; but whatever the precise nature or cause of this annoying maladjustment, it is absolutely certain that it was due to no error or oversight at headquarters. And it was so quickly rectified that the trifling delay arising from this cause alone would not have prevented the Monitor from meeting her adversary before the eventful 9th of March.

She had become unmanageable, not only from the temporary failure of her engines, but from what of control over her steering-gear. The cause of this was that her rudder was somewhat overbalanced; the area forward of the rudder-post being too great in proportion to that aft of it. In these circumstances, the rudder, once thrown over to either side, does not readily return, but opposes considerable resistance to any effort to bring it back to its central position. Those who choose may attribute this to miscalculation; but it is for them to prove that under all the conditions, known and unknown, the exact proportion which shall require the least power can be

determined by any known means. At any rate, there was the hard, uncomfortable fact; it was not the hour, nor was Ericsson the man, to indulge in idle speculations as to how or why it came there, but had he adopted the remedy suggested to him, it is morally certain that the battle between the giant and the pygmy would not have occurred when and where it did.

This remedy was neither more nor less than the replacing of the balanced rudder by one of different form. I do not know where the idea originated, nor do I say that any formal proposal was made, but in some way the captain became aware of an intention of the naval authorities to have the vessel put in the dry-dock and fitted with a new rudder. The hot Scandinavian blood flushed his cheek, his eyes gleamed, his brow darkened; and this time the storm broke in all its fury. With the full volume of his tremendous voice, and with a mighty oath, he thundered:

The Monitor is MINE, and I say it shall not be done. Presently he added, in a tone of supreme contempt:

Put in a new rudder! They would waste a month in doing that; I will make her steer just as easily in three days.

My recollection is that it was done in less time. No change in the rudder was even thought of, and the change in the steering-gear was the simplest possible. Her tiller consisted of an arc of iron, with two angle-irons on the outer side; round each of these was wound a chain, which, running around a pulley below the deck, was attached to a wire

tiller-rope leading forward to the pilot-house, and coiled in the usual manner round the drum of the steering-wheel. By Captain Ericsson's direction, the wire ropes were now detached from the chains, to each of which a snatch-block was made fast; a short chain was connected at one end to each tiller-rope, run through one of these blocks, brought back parallel to itself, and secured at the other end to a deck-beam. The purchase being thus doubled, the trouble was over and the vessel steered with ease.

Considering how precious were the moments then, the suggestion of a new rudder might well excite his indignation and disgust. But the captain's wrath was chiefly roused by the idea of any official interference with the vessel as yet unpaid for and wholly in his own hands; which was perfectly natural in view of his treatment by the government in this and other matters. It will be always recorded in the history of this country that the building of the Monitor was sanctioned by the authorities at Washington only upon conditions the most arbitrary and, in the circumstances, the most contemptible, ever imposed by a great government upon a great designer. At a price barely sufficient to cover the cost of materials and labor, they would accept his battery, but not until it had proved impregnable under the guns of the enemy at the shortest range; in a most critical emergency, they would take all the profit if he would take all the risk. Twenty years

before, these United States had reaped the fruit of his genius and his labor, when the building of the Princeton had also marked a new era in naval construction. During all those years they had refused, as they have refused during all the longer years since, to pay him for his services, although in the meantime there had been days when the paltry sum would have been most acceptable; they are willing, it seems, that the memory of their meanness shall be everlasting, since they have allowed him to carry it with him to his eternal rest.

Nevertheless, as then in time of peace he had prepared them for war, so now in time of war he was ready to prepare them for peace, and that upon their own one-sided, almost humiliating, terms. To accept those terms was an act of magnanimity, and a proof, were any needed, that what he soon after said to me was true,—

I love this country. I love its people and its laws; and I would give my life for it just as soon as not.

Patriotic he was, but also he was proud; the sting of the earlier injustice still rankled, and it was only at the earnest solicitation of a friend that he consented to appear in Washington to demonstrate that he was conferring a boon, not soliciting a favor. But for which it might not have happened that in this country and for this country were built the two most conspicuous of the many monuments of his genius that mark his path all the way from the cottage in Vermland to the halls of Valhalla.

The trial of the armament also contributed its quota to the general result, in a manner which proved to be amusing, through the consequences narrowly escaped being disastrous. It must first be explained that the friction for taking up the recoil was produced by means of two levers, actuated by a screw, with a hand-wheel at the side of the gun-carriage. Since there were two guns, pointing in the same direction, with very little space between them, the hand-wheels were, of course, placed on the outer sides of the carriages; naturally suggesting the idea that the whole mechanism was right-handed for one and left-handed for the other. But this was not so; in order to save time it was made the same for each, and in serving either gun the compression was effected by turning the top of the wheel to the left. Now, screws are ordinarily turned the other way in order to produce pressure; and Chief-Engineer Stimers, by whom the trial was conducted, would seem not to have made himself acquainted with the construction here adopted. Grasping the hand-wheel of gun No. 1, he turned it to the right until the resistance in his judgment indicated a proper degree of compression, and gave the order to fire. It must next be stated that the first effect of his action was to relieve any pressure that might have existed; the second effect was that the levers, whose movement was quite limited, became jammed in the supporting brackets, thus causing the resistance which had completely deceived the chief

engineer. The great weapon gave a sullen roar, and, being entirely free, flew back until it was stopped by the cascabel striking against the interior of the turret.

One would imagine this experience sufficient to inspire caution; but, curiously enough, Engineer Stimers seems to have assumed that the carriages must be rights and lefts, and to have concluded that what was thus proved wrong for one was exactly the correct thing for the other. And so, without looking under the gun to see what was there and make sure of what he was really doing, he at once proceeded to experiment with gun No. 2 in the same manner, and with precisely similar results. Thus both guns were temporarily disabled, though, strange to say, neither was dismounted, nor were the carriages broken. The actual damage was surprisingly small, consisting chiefly in the shearing off of some bolts which secured the bearings of the guide-rollers to the carriages; these, however, were not easily accessible, and the repairs necessarily consumed some little time.

Now, it may be safely said that without the occurrence of these things, or of any one of them, the course of affairs at that critical period would have been materially changed. The minor as well as the major planets must be consulted in casting the horoscope, and trivial as such incidents might seem in ordinary times, each had its share in fixing the day and the hour of a mighty contest, and the fortunes of a nation

depended on the twist of a screw-thread. By far the most important one, as measured by its possible consequences, was the trouble with the steering-gear, though from the simplicity of the remedy it might appear the most insignificant; and it was this that brought into the boldest relief the prominent traits of the captain's character. His keen mechanical instinct, quick decision, firmness of resolve, his fiery spirit, his energy in action, were all conspicuous; but all these were dominated by self-reliance and his pride in originality.

He loved to do his own work in his own way, and his fertility of expedient was something marvellous; to quote his own words on another occasion

If I ever do get into a scrape, I know exactly
how to get out of it

and men unlike him, as most men are, were more likely than he to follow the lines laid down by others. He had said

The Monitor is mine

and his she was, in another and to him a far dearer sense; from turret to keel-plate, from rudder-shoe to anchor-well, every distinctive feature was the creation of his brain; every detail was stamped with the evidence of his handiwork. It was he who had planned the mechanism which had sulkily refused to obey his will, and he, or no man, should dictate the change which would reduce it to subjection. How much we owe to this one instance of determined resolution it is not easy to say. It prevented a fatal delay at a momentous crisis,

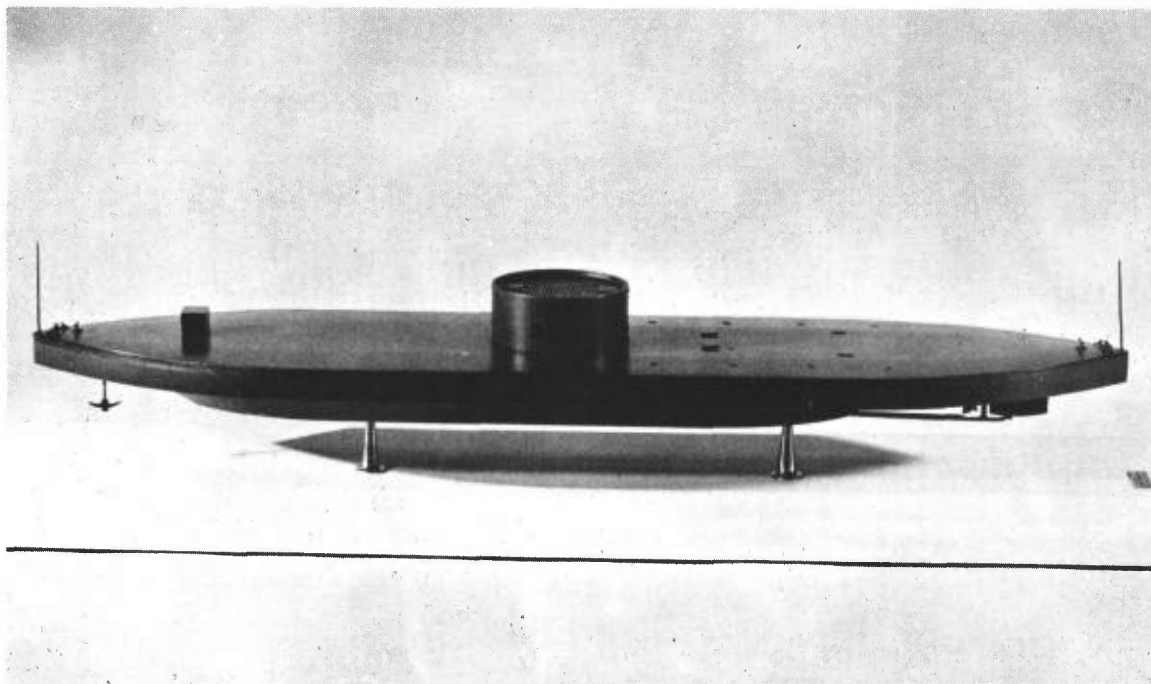
and was thus the cause of that unparalleled change in national feeling which followed, when in every hamlet it was told

The Ericsson Battery has saved the Union.

It seized the golden moment of opportunity; it changed defeat into victory—victory which revolutionized naval warfare, wrung from England the reluctant admission,

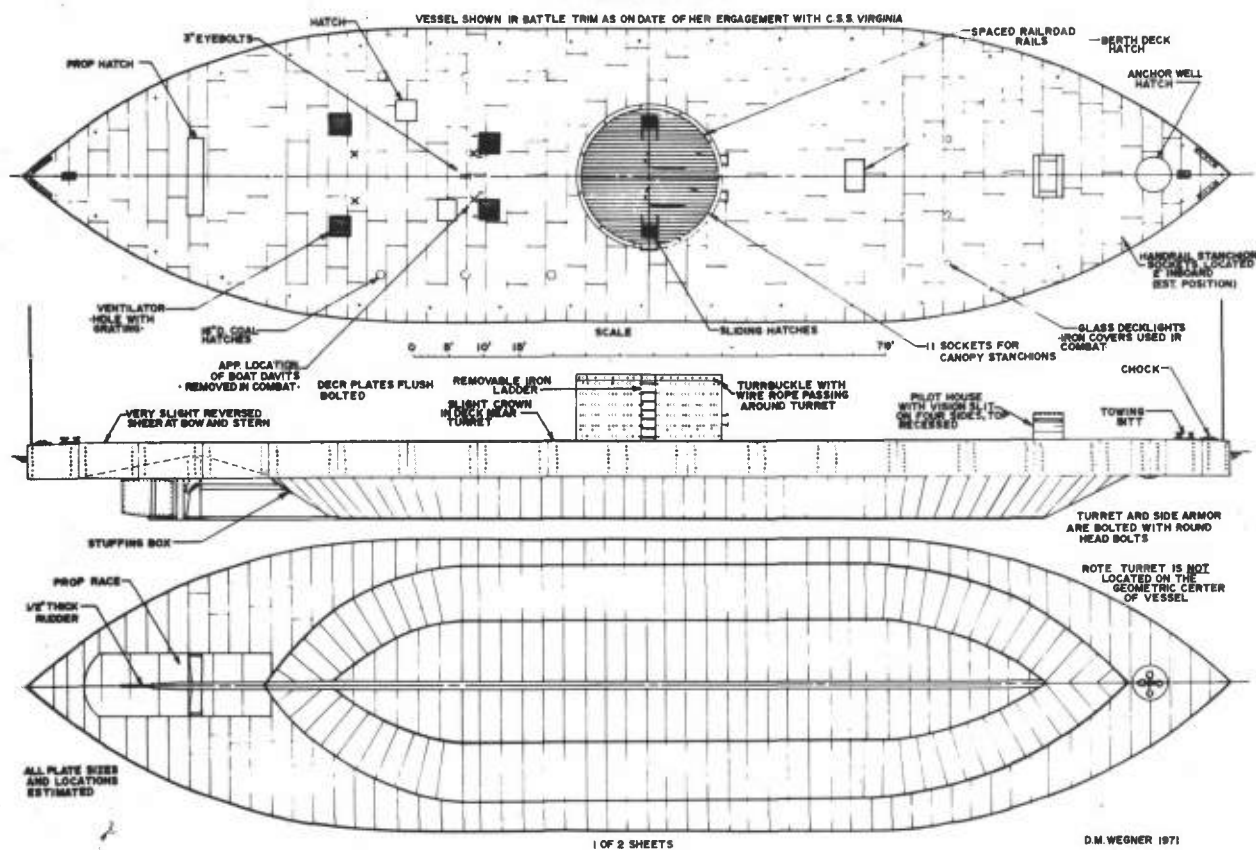
Yesterday we had a great navy; to-day we have but two war-ships worthy of the name,

and compelled our own government to exhibit a tardy confidence in the genius of the man whom it has persistently wronged.

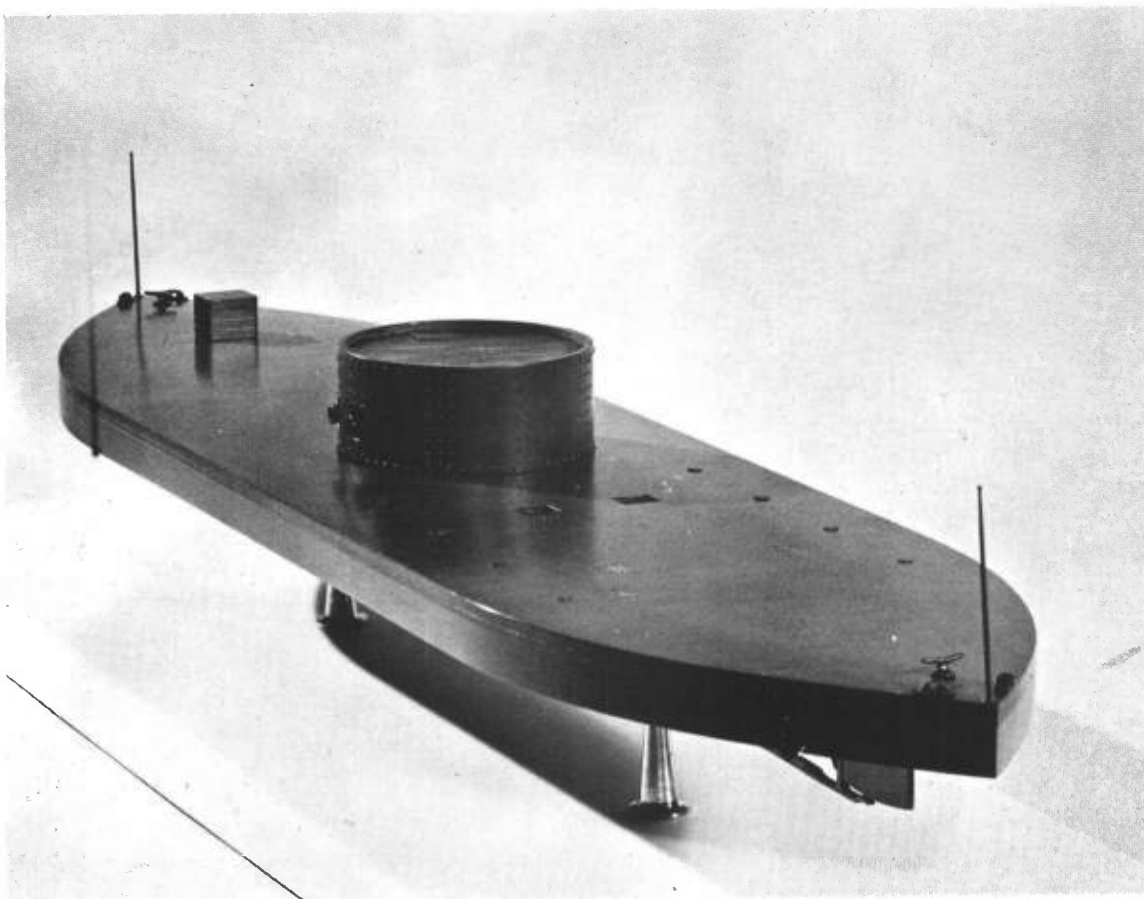


Model of Monitor in Battle Trim
 Smithsonian Institution Photo
 #47873

USS MONITOR 1862

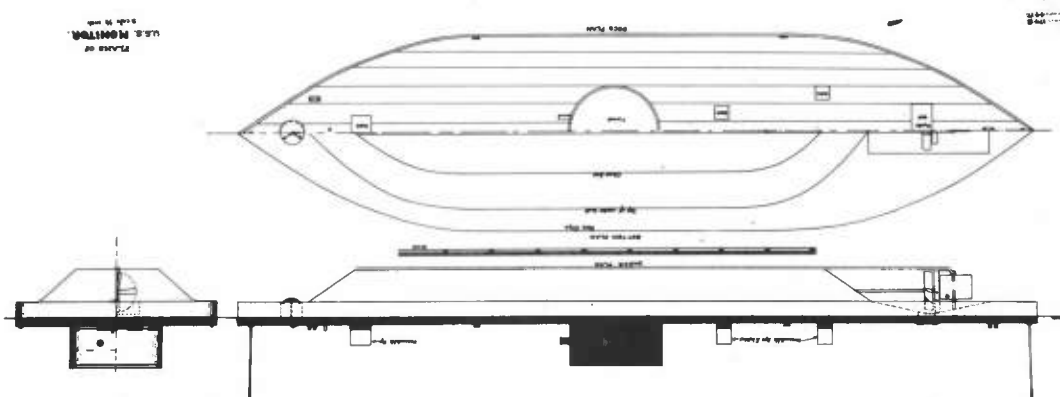


Modern Plan of Exterior Details by Dana M.
 Wegner



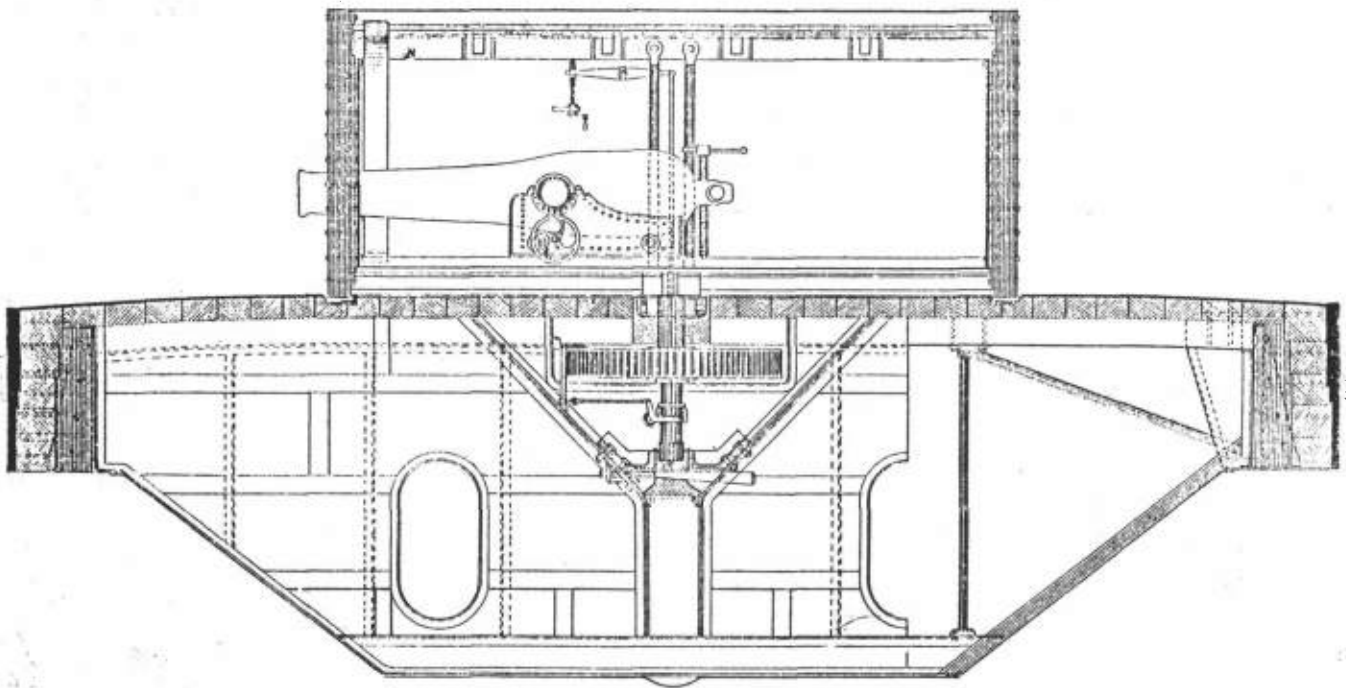
Model of Monitor

Smithsonian Institution Photo
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Plan of the Monitor

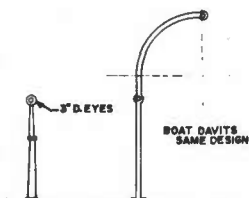
U. S. National Archives



Transverse Section Through Turret
U. S. National Archives

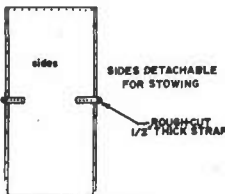
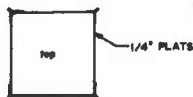
COLOR SCHEME: OVERALL GLOSS BLACK
RED LEAD BELOW WATERLINE

DETAIL PLANS
U.S. MONITOR 1862



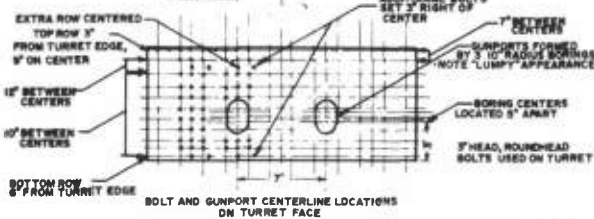
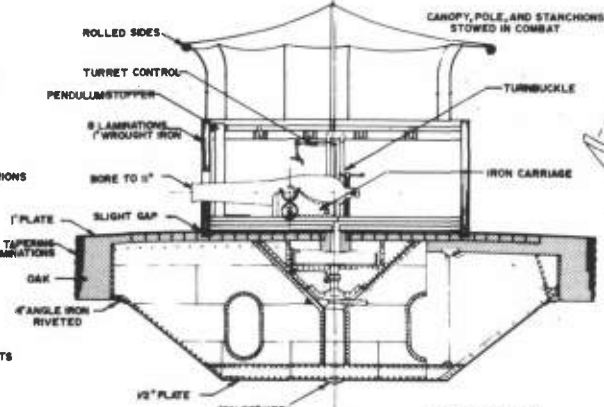
HANDRAIL AND CANOPY STANCHIONS
APP. 34 ROUND-FORGED HANDRAIL STANCHIONS
11 FLAT-FORGED CANOPY STANCHIONS

SCALE FOR STANCHIONS, ABOVE,
AND VENTILATORS, BELOW:



REMOVABLE VENTILATOR STACKS
FOUR NEEDED

SCALE FOR TURRET SECTION AND BOLT CENTERLINES



2 OF 2 SHEETS

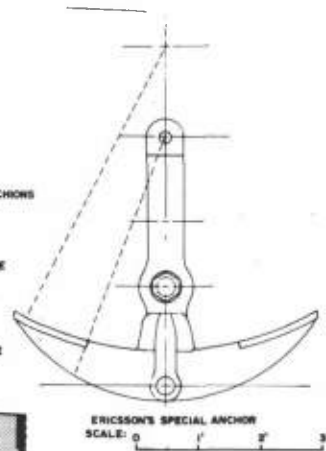
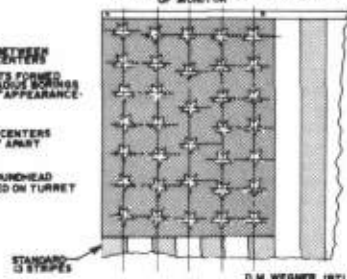
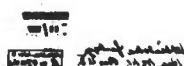
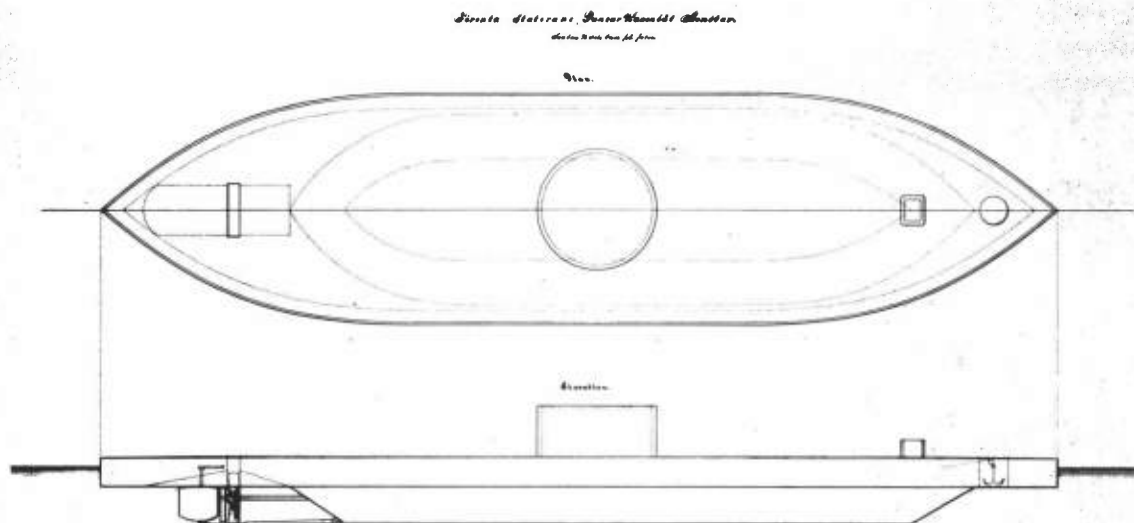


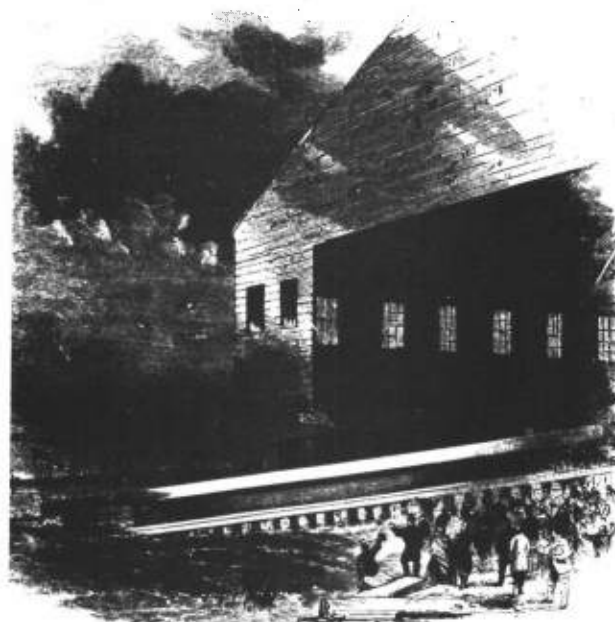
DIAGRAM OF 34 STAR UNION JACK SECTION
ON NATIONAL ENSIGN FLOWN ON STERN
OF MONITOR





Plan of the Monitor U. S. National Archives

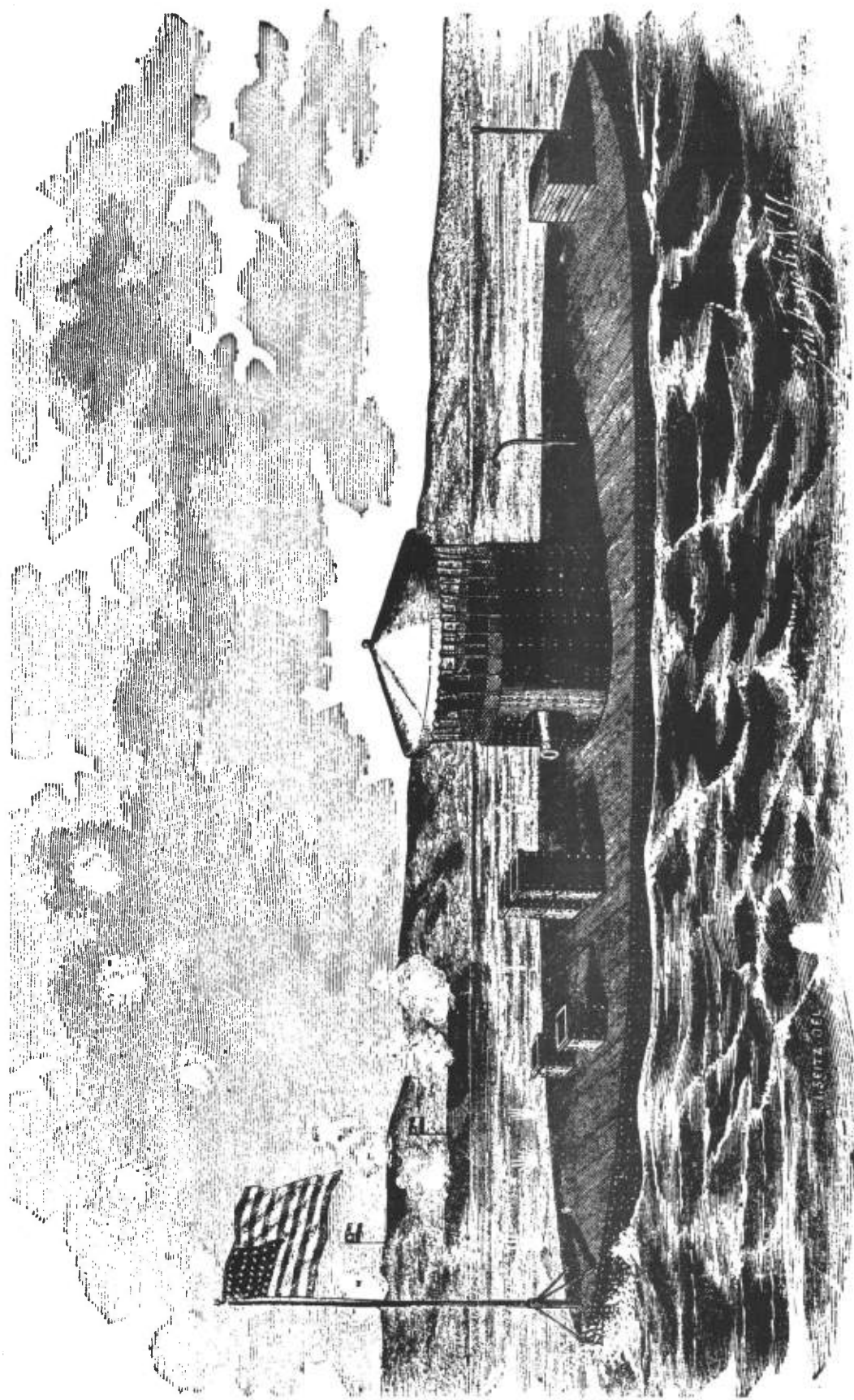
No. CXLVIII.—SEPTEMBER, 1862.—VOL. XXV.



LAUNCH OF THE "MONITOR."

IRON-CLAD VESSELS.

Contemporary Engraving of the Launching,
Harper's Magazine, Vol. 25, Sept. 1862.



Contemporary Harper's engraving of USS Monitor in action against Confederate batteries.

CHAPTER III

EDITOR'S NOTE

The Monitor was commissioned on February 25, 1861, and spent the first week of her career with mechanics on board making last minute adjustments. There was no time for any great familiarization with the new ship for the crew. They reported aboard and had time to stow their gear and then they found themselves heading out to sea in their strange looking "Cheesebox on a raft" to fight two of the biggest battles in her entire career. The first against the restless waves and the other against another ironclad. For one they would become national heroes, the other eventually spelled the doom of the now famous little warship.

The song, O give us a Navy of Iron, was found in John Ericsson's handwriting in the collection of his papers at the New York Historical Society. This section of the manuscript is framed around the deck log of the USS Monitor from 25 Feb. to 10 Sept. 1861, a copy of which is in the National Archives. Appropriate contemporary accounts are inserted for amplification of the major events in the short nine months of the Monitor's service life.

O give us a Navy of Iron

O give us a Navy of Iron,

And to man it our Yankee lads;

And we'll conquer the world's broad oceans,

With our Navy of Iron clads;

Then adieu to Britannia's power,

We'll crush her whenever we please,

The Lion shall yield to the Eagle,

And Columbia shall rule the seas.

Chorus

O give us a Navy of Iron,

And to man it our Yankee lads;

And we'll conquer the world's broad oceans,

With our Navy of Iron clads.

Old England the foe of our fathers,

The foe of their children to day,

Is gloating in hopes that our Union

In darkness is passing away.

But Treason shall die in its ashes,

And stronger than ever before;

We'll burn on the jealous old tyrant,

And punish John Bull at his door.

Chorus

O give us a Navy of Iron,

And to man it our Yankee lads;

And we'll conquer the world's broad oceans;
With our Navy of Iron clads.

And where in the wide world a nation,
That could cope with our Iron Jacks?
We would sweep all their seas and harbors,
Of their Warriors and Merrimacs.
Then give us a Navy of Iron,
And we'll fling our flag to the breeze,
And prove to the despots of Europe,
That freedom must reign on the seas.

Chorus

O give us a Navy of Iron,
And to man it our Yankee lads,
And we'll conquer the world's broad oceans,
With our Navy of Iron clads.

Obtained from the Ericsson Papers
New York Historical Society, New York City

Civil War Naval Chronology
of USS Monitor

by
David Clites

This report consists of daily passages from the log of the
Monitor from 25 February 1862 to 10 September 1862.

21 May 1974

LOG OF U.S.S. MONITOR
25 February to 10 September 1862

25 February--"Received crew from Receiving Ship North Carolina.

"Vessel put in commission by Capt. Almy.

"This day ends with clear, cold weather."

26 February--getting ready for sea; good weather.

27 February--Pilot came on board 7 a.m.

"Proceeded from Navy Yard accompanied by Steam Tug Freeboarn had not proceeded far before they found a defect in her Steaming gear. Returned and anchored offshore in five fathoms Water 20 fathoms cable out."

28 February--"Mechanics employed on board."

1 March--mechanics on board.

2 March--"light" weather.

3 March--weather thick. Sea trials--firing gun.

"With 30" steam making 30 revolutions turned with helm hard a starboard in 4 min. 15 sec. within a compass of 2 times her length. 4. Proceeded towards the yard against a strong ebb tide vessel going at the maximum speed of $6\frac{1}{4}$ Knots an hour. Greatest N^o of Rev'ls attained 64."

At 9 p.m. two men deserted, taking the ships cutter.

4 March--mechanics on board.

5 March--mechanics on board.

Thursday, 6 March--Left the Navy Yard at 10:30 a.m. in company of three other ships; crossed the bar; at 4 p.m.

"Sandy Hook light bore W.N.W. distance 6 miles, making 5 Knots an hour by log."

4 - 6 p.m. c/s S $\frac{1}{2}$ W $5\frac{1}{4}$ kt.

6 - 8 p.m. c/s S $\frac{1}{2}$ W $5\frac{1}{2}$ kt.

12 p.m. c/s SSW $5\frac{1}{4}$ kt.

7 March--Steaming.

8 March--Steaming. "At 7 P.M. took on a Pilot who reported an engagement between U.S. Steamers Cumberland and Congress and Rebel Steamer Merrimack.

"8 P.M. Anchored off Fort Monroe.

"9 P.M. Got underway for Newport News to render assistance to U.S. Steam Frigate Minnesota aground.

At 10 P.M. came to anchor alongside Ms^{ta}."

"Sunday March 9/62

"Comes in fine weather & calm

"at $\frac{1}{2}$ past one piped all to quarters, hove up anchor.

At 2 A.M. came to anchor again."

/s/ "Geo. Frederickson"

"4 to 8 P.M. (sic) fine weather and calm, at sunrise saw 3 steamers lying under Sewals (sic) Point. Made one out to be the Rebel Steamer Merrimac. At 7.20 got under weigh & stood towards her & piped all hands to quarters."

/s/ "J. Worden"

"From 8 to Median fine clear weather, the Rebel steamers advancing & opened fire on the Minnesota 8.20 opened fire on the Merrimac, From that time until 12, constantly engaged with the Merrimac."

/s/ "Louis Stodder"

"From Median to 4 P.M. clear weather at 12.30 rifled shell struck the pilothouse severely injuring Commander Worden. 1 P.M. the Merrimac hauled off in a disabled condition, stood towards the Minnesota & received on board Ast. Sec. Fox of the Navy. 2 P.M. Capt. Worden left for Fort Monroe, in charge of Surgeon Logal."

/s/ "Geo. Frederickson"

"4 to 6 P.M. fine weather. came to anchor alongside the Minnesota."

/s/ "J. Wilber"

"6 to 8 fine clear weather. sharp lookout kept."

/s/ "Louis Stodder"

"8 to 12 weather the same. fine clear weather. (SHARP LOOKOUT KEPT) 10 P.M. Leit. Edwin Flye joined the vessel as Extv. Officer."

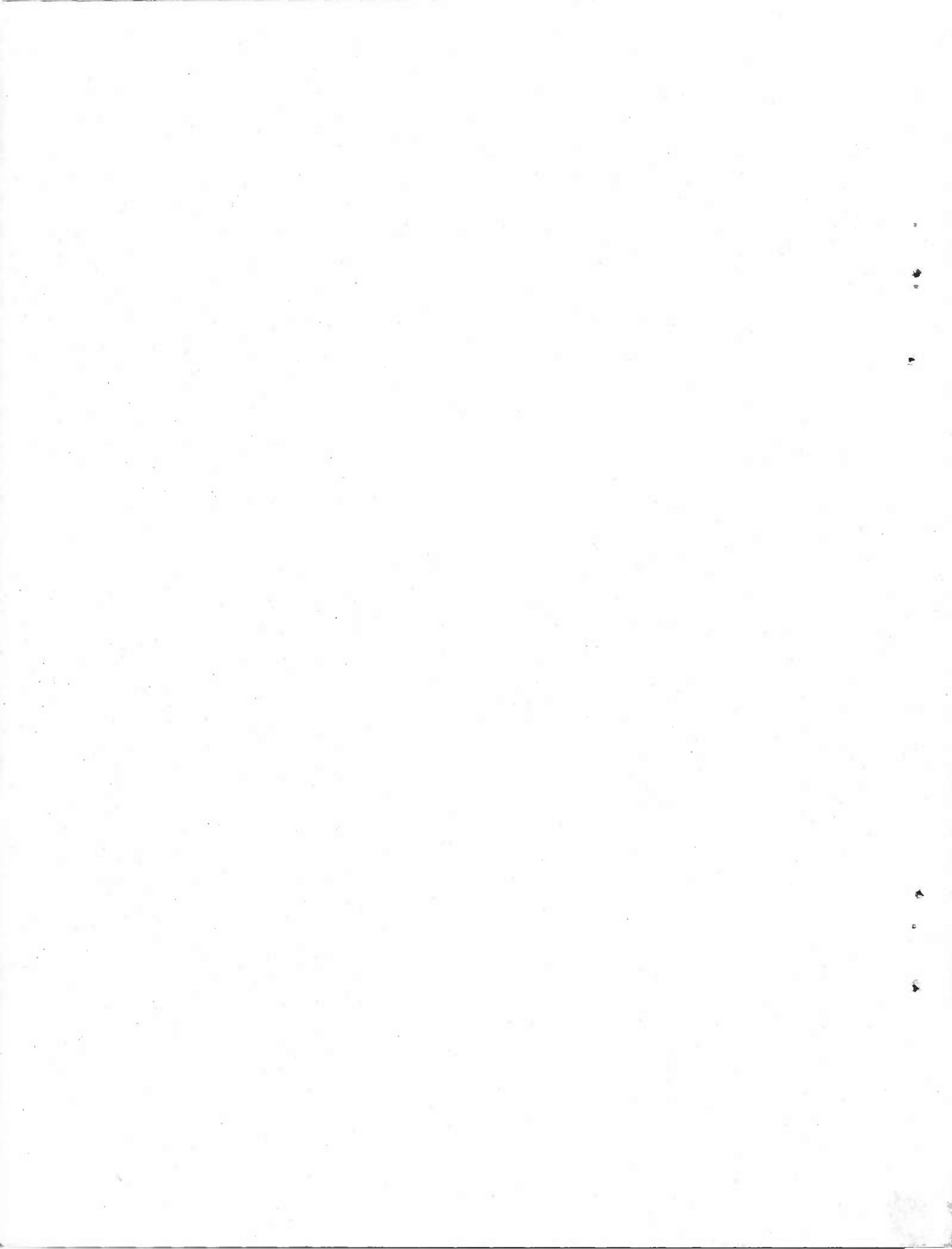
/s/ "Geo. Frederickson"

EDITOR'S NOTE

There are many accounts of the first engagement between ironclads, none however can surpass that of S. D. Greene's. He served on board the Monitor as executive officer for her entire career. He was typical of many of those on board, as he had virtually no sea experience having just been commissioned an officer.

During the battle, he was positioned in the turret to fire the guns along with A. C. Stimers who worked the turret mechanism. Their experiences of the rusted gearing in the mechanism and the awkward gun port pendulums bring out in high relief how experimental the Monitor actually was. Their ability to fight the ship surrounded with these circumstances after their eventful voyage from New York has left them a permanent position in Naval history.

An additional account has been inserted to balance Greene's, that of John T. Wood who was a Colonel in service to the Confederacy. Also, excerpts from a very scholarly article written by Albert L. Demaree which appeared in the Naval Institute Proceedings is included to point out the great effort the four-hour draw had on the public and the Navy Department, all of which testifies to the pivotal position which Ericsson's battery was placed. More than just mere hopes rested on the Monitor's performance in battle.



In the "Monitor" Turret.

By

S. Dana Greene, Commander, U.S.N., Executive Officer of the
"Monitor"

Taken from

From Sumter to Shiloh

Battles and Leaders of the Civil War

The keel of the most famous vessel of modern times, Captain Ericsson's first iron-clad, was laid in the shipyard of Thomas F. Rowland, at Greenpoint, Brooklyn, in October, 1861, and on the 30th of January, 1862, the novel craft was launched. On the 25th of February she was commissioned and turned over to the Government, and nine days later left New York for Hampton Roads, where, on the 9th of March, occurred the memorable contest with the Merrimac. On her next venture on the open sea she foundered off Cape Hatteras in a gale of wind (December 29th). During her career of less than a year she had no fewer than five different commanders; but it was the fortune of the writer to serve as her only executive officer, standing upon her deck when she was launched, and leaving it but a few minutes before she sank.

So hurried was the preparation of the Monitor that the mechanics worked upon her day and night up to the hour of her departure, and little opportunity was offered to drill the crew at the guns, to work the turret, and to become

familiar with the other unusual features of the vessel. The crew was, in fact, composed of volunteers, Lieutenant Worden, having been authorized by the Navy Department to select his men from any ship-of-war in New York harbor, addressed the crews of the North Carolina and Sabine, stating fully to them the probable dangers of the passage to Hampton Roads and the certainty of having important service to perform after arriving. The sailors responded enthusiastically, many more volunteering than were required. Of the crew Captain Worden said, in his official report of the battle,

A better one no naval commander ever had the honor to command.¹

We left New York in tow of the tug-boat Seth Low at 11 A.M. of Thursday, the 6th of March. On the following day a moderate breeze was encountered, and it was at once evident that the Monitor was unfit as a sea-going craft. Nothing but the subsidence of the wind prevented her from being shipwrecked before she reached Hampton Roads. The berth-deck hatch leaked in spite of all we could do, and the water came down under the turret like a waterfall. It would strike the pilot-house and go over the turret in beautiful curves, and it came through the narrow eye-holes in the pilot-house with such force as to knock the helmsman completely round from the wheel. The waves also broke over the blower-pipes, and the water came down through them in such quantities that the belts of the blower-engines slipped, and the engines consequently

stopped for lack of artificial draught, without which, in such a confined place, the fires could not get air for combustion. Newton and Stimers, followed by the engineer's force, gallantly rushed into the engine-room and fire-room to remedy the evil, but they were unable to check the inflowing water, and were nearly suffocated with escaping gas. They were dragged out more dead than alive, and carried to the top of the turret, where the fresh air gradually revived them. The water continued to pour through the hawse-hole, and over and down the smoke-stacks and blower-pipes, in such quantities that there was imminent danger that the ship would founder. The steam-pumps could not be operated because the fires had been nearly extinguished, and the engine-room was uninhabitable on account of the suffocating gas with which it was filled. The hand-pumps were then rigged and worked, but they had not enough force to throw the water out through the top of the turret,—the only opening,—and it was useless to bail, as we had to pass the buckets up through the turret, which made it a very long operation. Fortunately, toward evening the wind and the sea subsided, and, being again in smooth water, the engine was put in operation. But at midnight, in passing over a shoal, rough water was again encountered, and our troubles were renewed, complicated this time with the jamming of the wheel-ropes, so that the safety of the ship depended entirely on the strength of the hawser

which connected her with the tug-boat. The hawser, being new, held fast; but during the greater part of the night we were constantly engaged in fighting the leaks, until we reached smooth water again, just before daylight.

It was at the close of this dispiriting trial trip, in which all hands had been exhausted in their efforts to keep the novel craft afloat, that the Monitor passed Cape Henry at 4 P.M. on Saturday, March 8th. At this point was heard the distant booming of heavy guns, which our captain rightly judged to be an engagement with the Merrimac, twenty miles away. He at once ordered the vessel stripped of her sea-rig, the turret keyed up, and every preparation made for battle. As we approached Hampton Roads we could see the fine old Congress burning brightly, and soon a pilot came on board and told of the arrival of the Merrimac, the disaster to the Cumberland and the Congress, and the dismay of the Union forces. The Monitor was pushed with all haste, and reached the Roanoke (Captain Marston), anchored in the Roads, at 9 P.M. Worden immediately reported his arrival to Captain Marston, who suggested that he should go to the assistance of the Minnesota, then aground off Newport News.² As no pilot was available, Captain Worden accepted the volunteer services of Acting Master Samuel Howard, who earnestly sought the duty. 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. Skillfully piloted by Howard, we proceeded on our way, our path illumined by the blaze of the Congress. Reaching the Minnesota, hard and fast aground, near midnight, we anchored, and Worden reported to Captain Van Brunt. Between 1 and 2 A.M. the Congress blew up,—not instantaneously, but successively. Her powder-tanks seemed to explode, each shower of sparks rivaling the other in its height, until they appeared to reach the zenith,—a grand but mournful sight. Near us, too, at the bottom of the river, lay the Cumberland, with her silent crew of brave men, who died while fighting their guns to the water's edge, and whose colors were still flying at the peak.³

The dreary night dragged slowly on; the officers and crew were up and alert, to be ready for any emergency. At daylight on Sunday the Merrimac and her consorts were discovered at anchor near Sewell's Point. At about half-past 7 o'clock the enemy's vessels got under way and steered in the direction of the Minnesota. At the same time the Monitor got under way, and her officers and crew took their stations for battle. Captain Van Brunt, of the Minnesota, officially reports,

I made signal to the Monitor to attack the enemy, but the signal was not seen by us; other work was in hand, and Commander Worden required no signal.

The pilot-house of the Monitor was situated well forward, near the bow; it was wrought-iron structure, built of logs of

iron nine inches thick, bolted through the corners, and covered with an iron plate two inches thick, which was not fastened down, but was kept in place merely by its weight. The sight-holes or slits were made by inserting quarter-inch plates at the corners between the upper set of logs and the next below. The structure projected four feet above the deck, and was barely large enough inside to hold three men standing. It presented a flat surface on all sides and on top. The steering-wheel was secured to one of the logs on the front side. The position and shape of this structure should be carefully borne in mind.

Worden took his station in the pilot-house, and by his side were Howard, the pilot, and Peter Williams, quartermaster, who steered the vessel throughout the engagement. My place was in the turret, to work and fight the guns; with me were Stodder and Stimers and sixteen brawny men, eight to each gun. John Stocking, boatswain's mate, and Thomas Lochrane, seaman, were gun-captains. Newton and his assistants were in the engine and fire rooms, to manipulate the boilers and engines, and most admirably did they perform this important service from the beginning to the close of the action. Webber had charge of the powder division on the berth-deck, and Joseph Crown, gunner's mate, rendered valuable service in connection with this duty.

The physical condition of the officers and men of the

two ships at this time was in striking contrast. The Merrimac had passed the night quietly near Sewell's Point, her people enjoying rest and sleep, elated by thoughts of the victory they had achieved that day, and cheered by the prospects of another easy victory on the morrow. The Monitor had barely escaped shipwreck twice within the last thirty-six hours, and since Friday morning, forty-eight hours before, few if any of those on board had closed their eyes in sleep or had anything to eat but hard bread, as cooking was impossible. She was surrounded by wrecks and disaster, and her efficiency in action had yet to be proved.

Worden lost no time in bringing it to test. Getting his ship under way, he steered direct for the enemy's vessels, in order to meet and engage them as far as possible from the Minnesota. As he approached, the wooden vessels quickly turned and left. Our captain, to the "astonishment" of Captain Van Brunt (as he states in his official report), made straight for the Merrimac, which had already commenced firing; and when he came within short range, he changed his course so as to come alongside of her, stopped the engine, and gave the order,

Commence firing!

I triced up the port, ran out the gun, and, taking deliberate aim, pulled the lockstring. The Merrimac was quick to reply, returning a rattling broadside (for she had ten guns to our

two), and the battle fairly began. The turrets and other parts of the ship were heavily struck, but the shots did not penetrate; the tower was intact, and it continued to revolve. A look of confidence passed over the men's faces, and we believed the Merrimac would not repeat the work she had accomplished the day before.

The fight continued with the exchange of broadsides as fast as the guns could be served and at very short range, the distance between the vessels frequently being not more than a few yards. Worden skillfully manoeuvred his quick-turning vessel, trying to find some vulnerable point in his adversary. Once he made a dash at her stern, hoping to disable her screw, which he thinks he missed by not more than two feet. Our shots ripped the iron of the Merrimac, while the reverberation of her shots against the tower caused anything but a pleasant sensation. While Stodder, who was stationed at the machine which controlled the revolving motion of the turret, was incautiously leaning against the side of the tower, a large shot struck in the vicinity and disabled him. He left the turret and went below, and Stimers, who had assisted him, continued to do the work.

The drawbacks to the position of the pilot-house were soon realized. We could not fire ahead nor within several points of the bow, since the blast from our own guns would have injured the people in the pilot-house, only a few yards

off. Keeler and Toffey passed the captain's orders and messages to me, and my inquiries and answers to him, the speaking-tube from the pilot-house to the turret having been broken early in the action. They performed their work with zeal and alacrity, but, both being landsmen, our technical communications sometimes miscarried. The situation was novel: a vessel of war was engaged in desperate combat with a powerful foe; the captain, commanding and guiding, was inclosed in one place, and the executive officer, working and fighting the guns, was shut up in another, and communication between them was difficult and uncertain. It was this experience which caused Isaac Newton, immediately after the engagement, to suggest the clever plan of putting the pilot-house on top of the turret, and making it cylindrical instead of square; and his suggestions were subsequently adopted in this type of vessel.

As the engagement continued, the working of the turret was not altogether satisfactory. It was difficult to start it revolving, or, when once started, to stop it, on account of the imperfections of the novel machinery, which was now undergoing its first trial. Stimers was an active, muscular man, and did his utmost to control the motion of the turret; but, in spite of his efforts, it was difficult, if not impossible, to secure accurate firing. The conditions were very different from those of an ordinary broadside gun, under which we had been trained on wooden ships. My only view of

the world outside of the tower was over the muzzles of the guns, which cleared the ports by only a few inches. When the guns were run in, the portholes were covered by heavy iron pendulums, pierced with small holes to allow the iron rammer and sponge handles to protrude while they were in use. To hoist these pendulums required the entire gun's crew and vastly increased the work inside the turret.

The effect upon one shut up in a revolving drum is perplexing, and it is not a simple matter to keep the bearings. White marks had been placed upon the stationary deck immediately below the turret to indicate the direction of the starboard and port sides, and the bow and stern; but these marks were obliterated early in the action. I would continually ask the captain,

How does the Merrimac bear?

He replied,

On the starboard-beam,

or

On the port-quarter,

as the case might be. Then the difficulty was to determine the direction of the starboard-beam, or port-quarter, or any other bearing. It finally resulted, that when a gun was ready for firing, the turret would be started on its revolving journey in search of the target, and when found it was taken "on the fly," because the turret could not be accurately

controlled. Once the Merrimac tried to ram us; but Worden avoided the direct impact by the skillful use of the helm, and she struck a glancing blow, which did no damage. At the instant of collision I planted a solid 180-pound shot fair and square upon the forward part of her casemate. Had the gun been loaded with thirty pounds of powder, which was the charge subsequently used with similar guns, it is probable that this shot would have penetrated her armor; but the charge being limited to fifteen pounds, in accordance with peremptory orders to that effect from the Navy Department, the shot rebounded without doing any more damage than possibly to start some of the beams of her armor-backing.

It is stated by Colonel Wood, of the Merrimac, that when that vessel rammed the Cumberland her ram, or beak, was broken off and left in that vessel. In a letter to me, about two years since, he described this ram as

of castiron, wedge-shaped, about 1500 pounds in weight, 2 feet under water, and projecting $2\frac{1}{2}$ feet from the stem.

A ram of this description, had it been intact, would have struck the Monitor at that part of the upper hull where the armor and backing were thickest. It is very doubtful if, under any headway that the Merrimac could have acquired at such short range, this ram could have done any injury to this part of the vessel. That it could by no possibility have reached the thin lower hull is evident from a glance at the

drawing of the Monitor, the overhang or upper hull being constructed for the express purpose of protecting the vital part of the vessel.

The battle continued at close quarters without apparent damage to either side. After a time, the supply of shot in the turret being exhausted, Worden hauled off for about fifteen minutes to replenish. The serving of the cartridges, weighing but fifteen pounds, was a matter of no difficulty; but the hoisting of the heavy shot was a slow and tedious operation, it being necessary that the turret should remain stationary, in order that the two scuttles, one in the deck and the other in the floor of the turret, should be in line. Worden took advantage of the lull, and passed through the port-hole upon the deck outside to get a better view of the situation. He soon renewed the attack, and the contest continued as before.

Two important points were constantly kept in mind: first, to prevent the enemy's projectiles from entering the turret through the port-holes,—for the explosion of a shell inside, by disabling the men at the guns, would have ended the fight, as there was no relief gun's crew on board; second, not to fire into our own pilot-house. A careless or impatient hand, during the confusion arising from the whirligig motion of the tower, might let slip one of our big shot against the pilot-house. For this and other reasons I fired every gun while I

remained in the turret.

Soon after noon a shell from the enemy's gun, the muzzle not ten yards distant, struck the forward side of the pilot-house directly in the sight-hole, or slit, and exploded, cracking the second iron log and partly lifting the top, leaving an opening. Worden was standing immediately behind this spot, and received in his face the force of the blow, which partly stunned him, and, filling his eyes with powder, utterly blinded him. The injury was known only to those in the pilot-house and its immediate vicinity. The flood of light rushing through the top of the pilot-house, now partly open, caused Worden, blind as he was, to believe that the pilot-house was seriously injured, if not destroyed; he therefore gave orders to put the helm to starboard and "sheer off." Thus the Monitor retired temporarily from the action, in order to ascertain the extent of the injuries she had received. At the same time Worden sent for me, and leaving Stimers the only officer in the turret, I went forward at once, and found him standing at the foot of the ladder leading to the pilot-house.

He was a ghastly sight, with his eyes closed and the blood apparently rushing from every pore in the upper part of his face. He told me that he was seriously wounded, and directed me to take command. I assisted in leading him to a sofa in his cabin, where he was tenderly cared for by Doctor

Logue, and then I assumed command. Blind and suffering as he was, Worden's fortitude never forsook him; he 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.

When I reached my station in the pilot-house, I found that the iron log was fractured and the top partly open; but the steering gear was still intact, and the pilot-house was not totally destroyed, as had been feared. In the confusion of the moment resulting from so serious an injury to the commanding officer, the Monitor had been moving without direction. Exactly how much time elapsed from the moment that Worden was wounded until I had reached the pilot-house and completed the examination of the injury at that point, and determined what course to pursue in the damaged condition of the vessel, it is impossible to state; but it could hardly have exceeded twenty minutes at the utmost. During this time the Merrimac, which was leaking badly, had started in the direction of the Elizabeth River; and, on taking my station in the pilot-house and turning the vessel's head in the direction of the Merri-
mac, I saw that she was already in retreat. A few shots were fired at the retiring vessel, and she continued on to Norfolk. I returned with the Monitor to the side of the Minne-
sota, where preparations were being made to abandon the ship, which was still aground. Shortly afterward Worden was

transferred to a tug, and that night he was carried to Washington.

The fight was over. We of the Monitor thought, and still think, that we had gained a great victory. This the Confederates have denied. But it has never been denied that the object of the Merrimac on the 9th of March was to complete the destruction of the Union fleet in Hampton Roads, and that she was completely foiled and driven off by the Monitor; nor has it been denied that at the close of the engagement the Merrimac retreated to Norfolk, leaving the Monitor in possession of the field.⁴

In this engagement Captain Worden displayed the highest qualities as an officer and man. He was in his prime (forty-four years old), and carried with him the ripe experience of twenty-eight years in the naval service. He joined the ship a sick man, having but recently left a prison in the South. He was nominated for the command by the late Admiral Joseph Smith, and the result proved the wisdom of the choice. Having accepted his orders against the protests of his physicians and the entreaties of his family, nothing would deter him from the enterprise. He arrived on the battle-ground amidst the disaster and gloom, almost despair, of the Union people, who had little faith that he could beat back the powerful Merrimac, after her experience with the Cumberland and Congress. Without encouragement, single-handed, and without specific

orders from any source, he rose above the atmosphere of doubt and depression which surrounded him, and with unflinching nerve and undaunted courage he hurled his little untried vessel against his huge, well-proved antagonist, and won the battle. He was victor in the first iron-clad battle of the world's history.

The subsequent career of the Monitor needs but a few words.

On the day after the fight I received the following letter from Mr. Fox, Assistant Secretary of the Navy:

U.S. STEAMER Roanoke, OLD POINT, March 10th, 1862.

MY DEAR MR. GREENE: Under the extraordinary circumstances of the contest of yesterday, and the responsibilities devolving upon me, and your extreme youth, I have suggested to Captain Marston to send on board the Monitor, as temporary commanding, Lieutenant Selfridge, until the arrival of Commodore Goldsborough, which will be in a few days. I appreciate your position, and you must appreciate mine, and serve with the same zeal and fidelity. With the kindest wishes for you all, most truly,

G. V. FOX.

For the next two months we lay at Hampton Roads. Twice the Merrimac came out of the Elizabeth River, but did not attack. We, on our side, had received positive orders not to attack in the comparatively shoal waters above Hampton Roads, where the Union fleet could not manoeuvre. The Merrimac protected the James River, and the Monitor protected the Chesapeake. Neither side had an iron-clad in reserve, and neither wished to bring on an engagement which might disable

its only armored vessel in those waters.

With the evacuation of Norfolk and the destruction of the Merrimac, the Monitor moved up the James River with the squadron under the command of Commander John Rodgers, in connection with McClellan's advance upon Richmond by the Peninsula. We were engaged for four hours at Fort Darling, but were unable to silence the guns or destroy the earth-works.

Probably no ship was ever devised which was so uncomfortable for her crew, and certainly no sailor ever led a more disagreeable life than we did on the James River, suffocated with heat and bad air if we remained below, and a target for sharp-shooters if we came on deck.

With the withdrawal of McClellan's army, we returned to Hampton Roads, and in the autumn were ordered to Washington, where the vessel was repaired. We returned to Hampton Roads in November, and sailed thence (December 29th) in tow of the steamer Rhode Island, bound for Beaufort N. C. Between 11 P.M. and midnight on the following night the Monitor went down in a gale, a few miles south of Cape Hatteras. Four officers and twelve men were drowned, forty-nine people being saved by the boats of the steamer. It was impossible to keep the vessel free of water, and we presumed that the upper and lower hulls thumped themselves apart.

No ship in the world's history has a more imperishable place in naval annals than the Monitor. Not only by her

providential arrival at the right moment did she secure the safety of Hampton Roads and all that depended on it, but the idea which she embodied revolutionized the system of naval warfare which had existed from the earliest recorded history. The name of the Monitor became generic, representing a new type; and, crude and defective as was her construction in some of its details, she yet contained the idea of the turret, which is to-day the central idea of the most powerful armored vessels.⁶

FOOTNOTES

1. The Monitor's officers were: Lieut. J. L. Worden, commanding; Lieut. S. D. Greene, executive officer; Acting Master, L. N. Stodder; Acting Master J. N. Webber; Acting Master's Mate, G. Frederickson; Acting Assistant Surgeon, D. C. Logue; Acting Assistant Paymaster, W. F. Keeler; Chief Engineer, A. C. Stimers (inspector); First Assistant Engineer, Isaac Newton (in charge of steam machinery); Second Assist. Engineer, A. B. Campbell; Third Assist. Engineer, R. W. Hands; Fourth Assist. Engineer, M. T. Sunstrom; Captain's Clerk, D. Toffey; Quartermaster, P. Williams; Gunner's Mate, J. Crown; Boatswain's Mate, J. Stocking; and 42 others,—a total of 58.—S. D. G.
2. Captain John Marston, of the Roanoke, who was the senior officer present during Flag-Officer Goldsborough's absence on the sounds of North Carolina, had received peremptory orders to send the Monitor to Washington without delay. Similar orders had been received by Commodore Paulding in New York, but they only arrived after the Monitor's departure, and the tug by which Paulding endeavored to communicate with her failed to overtake her. When Worden went on board the Roanoke to report his arrival at Hampton Roads, Captain Marston took upon himself the responsibility of retaining the Monitor to protect the fleet. Under the circumstances, it is hard to see how he could have done otherwise, although his action involved him in a technical disobedience of orders. In view of the spirit of routine which pervaded the older branch of the service at this time, Captain Marston's action showed commendable spirit and good sense.—EDITORS.
3. The fortune of civil war was illustrated in the case of the Merrimac. Commodore Buchanan's brother was an officer of the Congress, and each knew of the other's presence. The first and fourth lieutenants of the Merrimac had each a brother in the United States army. The father of the fifth lieutenant was also in the United States army. The father of one of the midshipmen was in the United States navy, Lieutenant Butt, of the Merrimac, had been the room-mate of Lieutenant S. Dana Greene, of the Monitor, at the Naval Academy in Annapolis.—EDITORS.
4. "My men and myself were perfectly black with smoke and powder. All my underclothes were perfectly black, and my person was in the same condition. . . . I had been up so long, and been under such a state of excitement, that my nervous system was completely run down. . . . My nerves

and muscles twitched as though electric shocks were continually passing through them. . . . I lay down and tried to sleep — I might as well have tried to fly." From a private letter of Lieutenant Greene, written just after the fight.—EDITORS.

5. I was twenty-two years of age, and previous to joining the Monitor had seen less than three years of active service, with the rank of midshipman.—S. D. G.

6. On account of the death of the writer of this paper, which occurred December 11th, 1884, soon after its preparation, the proofs did not receive the benefit of his revision. The article appears substantially in the form in which it was written, without changes other than verbal ones and a slight rearrangement of paragraphs.

Of the services of Mr. Greene in connection with the Monitor, Captain Worden made the following official record in a letter to the Secretary of the Navy:

"I was ordered to her (the Monitor) on the 13th of January, 1862, when she was still on stocks. Prior to that date Lieutenant S. D. Greene had interested himself in her and thoroughly examined her construction and design and informed himself as to her qualities, and, notwithstanding the many gloomy predictions of naval officers and officers of the mercantile marine as to the great probability of her sinking at sea, volunteered to go in her, and, at my request, was ordered. From the date of his orders he applied himself unremittingly and intelligently to the study of her peculiar qualities and to her fitting and equipment. . . . Lieutenant Greene, after taking his place in the pilot-house and finding the injuries there less serious than I had supposed, had turned the vessel's head again in the direction of the enemy to continue the engagement; but before he could get at close quarters with her she retired. He therefore very properly returned to the Minnesota and lay by her until she floated. . . . Lieutenant Greene, the executive officer, had charge in the turret, and handled the guns with great courage, coolness, and skill; and throughout the engagement, as in the equipment of the vessel and on her passage to Hampton Roads, he exhibited an earnest devotion to duty unsurpassed in my experience."

EDITORS.

LIST OF THE OFFICERS AND CREW OF THE U.S.S. MONITOR
DURING THE ENGAGEMENT WITH THE C.S.S. VIRGINIA

Lieut. John L. Worden, U.S.N.,	Commanding
Lieut. Samuel D. Greene, U.S.N.,	Executive Officer
Louis M. Stodder,	Master
John J. N. Webber,	Master
Daniel C. Logue,	Assistant Surgeon
W. F. Keeler,	Paymaster
Isaac Newton,	First Assistant Engineer
Albert B. Campbell,	Second Assistant Engineer
R. W. Hands,	Third Assistant Engineer
M. T. Sunstrum,	Third Assistant Engineer
Daniel Toffey,	Captain's Clerk
Geo. Frederickson,	Acting Master's Mate
Jesse M. Jones	Hospital Steward
R. R. Hubbell,	Paymaster's Steward
Richard Anjier	Quarter-Master
Peter Williams,	Quarter-Master
Moses M. Stearns,	Quarter-Master
Derick Brinkman,	Carpenter's Mate
Robert Williams,	First Class Fireman
John Driscoll,	First Class Fireman
Abram Fester,	First Class Fireman
Wm. Richardson,	First Class Fireman
George S. Geer,	First Class Fireman
Patrick Hannan,	First Class Fireman
Mathew Leonard,	First Class Fireman
Thomas Joyce,	First Class Fireman
John Garrety,	First Class Fireman
Edmund Brown,	First Class Fireman
Joseph Crown,	Gunner's Mate
John Rooney,	Master at Arms
Thomas Carroll, 1st,	Captain of Hold
John P. Conkin,	Quarter Gunner
John Stocking,	Boatswain's Mate
Lawrence Murray,	Landsman
Wm. H. Nichols,	Landsman
William Bryan,	Yeoman
David Cuddebuck,	Officers' Steward
Edward Moore,	Officers' Cook
Thomas Longhran,	Ship's Cook
Thomas Carroll, 2nd,	First Class Boy
Charles F. Sylvester,	Seaman
Charles Peterson,	Seaman
Anton Basting,	Seaman
Hans Anderson,	Seaman
Peter Truskitt,	Seaman
Thomas B. Vial,	Seaman
William Marion,	Seaman
Anthony Connolly,	Seaman
James Fenwick,	Seaman (Quarter Gunner)

LIST OF THE OFFICERS AND CREW OF THE U.S.S. MONITOR
DURING THE ENGAGEMENT WITH THE C.S.S. VIRGINIA

Daniel Welch,	Seaman
Michael Mooney,	Coal Heaver
Ellis Roberts,	Coal Heaver
William Durst,	Coal Heaver
James Seery,	Coal Heaver
Robert Quinn,	Coal Heaver
John Mason,	Coal Heaver
Christy Price,	Coal Heaver
R. K. Hubbell,	Ship's Steward
A. C. Stimers,	Chief Engineer,
	passenger, and volunteer officer.

This list taken from "Naval Tracts" Vol. 17 - Nr P922 Navy Dept.
Library

The First Fight of Iron-Clads.

By

John Taylor Wood, Colonel, C. S. A.

Taken from

From Sumter to Shiloh

Battles and Leaders of the Civil War

The engagement in Hampton Roads on the 8th of March, 1862, between the Confederate iron-clad Virginia, or the Merrimac (as she is known at the North), and the United States wooden fleet, and that on the 9th between the Virginia and the Monitor, was, in its results, in some respects the most momentous naval conflict ever witnessed. No battle was ever more widely discussed or produced a greater sensation. It revolutionized the navies of the world. Line-of-battle ships, those huge, overgrown craft, carrying from eighty to one hundred and twenty guns and from five hundred to twelve hundred men, which, from the destruction of the Spanish Armada to our time, had done most of the fighting, deciding the fate of empires, were at once universally condemned as out of date. Rams and iron-clads were in future to decide all naval warfare. In this battle old things passed away, and the experience of a thousand years of battle and breeze was forgotten. The naval supremacy of England vanished in the smoke of this fight, it is true, only to reappear some years later more commanding than ever. The effect of the news was best

described by the London "Times," which said:

Whereas we had available for immediate purposes one hundred and forty-nine first-class war-ships, we have now two, these two being the Warrior and her sister Ironside. There is not now a ship in the English navy apart from these two that it would not be madness to trust to an engagement with that little Monitor.

The Admiralty at once proceeded to reconstruct the navy, cutting down a number of their largest ships and converting them into turret or broadside iron-clads.

The same results were produced in France, which had but one sea-going iron-clad, La Gloire, and this one, like the Warrior, was only protected amidships. The Emperor Napoleon promptly appointed a commission to devise plans for rebuilding his navy. And so with all the maritime powers. In this race the United States took the lead, and at the close of the war led all the others in the numbers and efficiency of its iron-clad fleet. It is true that all the great powers had already experimented with vessels partly armored, but very few were convinced of their utility, and none had been tried by the test of battle, if we except a few floating batteries, thinly clad, used in the Crimean War.

In the spring of 1861 Norfolk and its large naval establishment had been hurriedly abandoned by the Federals, why no one could tell. It is about twelve miles from Fort Monroe, which was then held by a large force of regulars. A few companies of these, with a single frigate, could have occupied and commanded the town and navy yard and kept the channel open.

However, a year later, it was as quickly evacuated by the Confederates, and almost with as little reason. But of this I will speak later.

The yard was abandoned to a few volunteers, after it was partly destroyed, and a large number of ships were burnt. Among the spoils were upward of twelve hundred heavy guns, which were scattered among Confederate fortifications from the Potomac to the Mississippi. Among the ships burnt and sunk was the frigate Merrimac of 3500 tons and 40 guns, afterward rechristened the Virginia, and so I will call her. During the summer of 1861 Lieutenant John M. Brooke, an accomplished officer of the old navy, who with many others had resigned, proposed to Secretary Mallory to raise and rebuild this ship as an iron-clad. His plans were approved, and orders were given to carry them out. She was raised and cut down to the old berth-deck. Both ends for seventy feet were covered over, and when the ship was in fighting trim were just awash. On the midship section, 170 feet in length, was built at an angle of 45 degrees a roof of pitch-pine and oak 24 inches thick, extending from the water-line to a height over the gun-deck of 7 feet. Both ends of the shield were rounded so that the pivot-guns could be used as bow and stern chasers or quartering. Over the gun-deck was a light grating, making a promenade about twenty feet wide. The wood backing was covered with iron plates, rolled at the Tredegar works, two inches thick and eight wide. The first tier was put on

horizontally, the second up and down,—in all to the thickness of four inches, bolted through the wood-work and clinched. The prow was of cast-iron, projecting four feet, and badly secured, as events proved. The rudder and propeller were entirely unprotected. The pilot-house was forward of the smoke-stack, and covered with the same thickness of iron as the sides. The motive power was the same that had always been in the ship. Both of the engines and boilers had been condemned on her return from her last cruise, and were radically defective. Of course, the fire and sinking had not improved them. We could not depend upon them for six hours at a time. A more ill-contrived or unreliable pair of engines could only have been found in some vessels of the United States navy.

Lieutenant Catesby ap R. Jones was ordered to superintend the armament, and no more thoroughly competent officer could have been selected. To his experience and skill as her ordnance and executive officer was due the character of her battery, which proved so efficient. It consisted of 2 7-inch rifles, heavily reenforced around the breech with 3-inch steel bands, shrunk on. These were the first heavy guns so made, and were the bow and stern pivots. There were also 2 6-inch rifles of the same make, and 6 9-inch smooth-bore broadside,—10 guns in all.

During the summer and fall of 1861 I had been stationed at the batteries on the Potomac at Evansport and Aquia Creek,

blockading the river as far as possible. In January, 1862, I was ordered to the Virginia as one of the lieutenants, reporting to Commodore French Forrest, who then commanded the navy yard at Norfolk, Commodore Franklin Buchanan was appointed to the command,—an energetic and high-toned officer, who combined with daring courage great professional ability, standing deservedly at the head of his profession. In 1845 he had been selected by Mr. Bancroft, Secretary of the Navy, to locate and organize the Naval Academy, and he launched that institution upon its successful career. Under him were as capable a set of officers as ever were brought together in one ship. But of man-of-war's men or sailors we had scarcely any. The South was almost without a maritime population. In the old service the majority of officers were from the South, and all the seamen from the North.¹

Every one had flocked to the army, and to it we had to look for a crew. Some few seamen were found in Norfolk, who had escaped from the gun-boat flotilla in the waters of North Carolina, on their occupation by Admiral Goldsborough and General Burnside. In hopes of securing some men from the army, I was sent to the headquarters of General Magruder at Yorktown, who was known to have under his command two battalions from New Orleans, among whom might be found a number of seamen. The general, though pressed for want of men, holding a long line with scarcely a brigade, gave me every facility to secure volunteers. With one of his staff I

visited every camp, and the commanding officers were ordered to parade their men, and I explained to them what I wanted. About 200 volunteered, and of this number I selected 80 who had had some experience as seamen or gunners. Other commands at Richmond and Petersburg were visited, and so our crew of three hundred was made up. They proved themselves to be as gallant and trusty a body of men as any one would wish to command, not only in battle, but in reverse and retreat.

Notwithstanding every exertion to hasten the fitting out of the ship, the work during the winter progressed but slowly, owing to delay in sending the iron sheathing from Richmond. At this time the only establishment in the South capable of rolling iron plates was the Tredegar foundry. Its resources were limited, and the demand for all kinds of war material most pressing. And when we reflect upon the scarcity and inexperience of the workmen, and the great changes necessary in transforming an ordinary iron workshop into an arsenal in which all the machinery and tools had to be improvised, it is astonishing that so much was accomplished. The unfinished state of the vessel interfered so with the drills and exercises that we had but little opportunity of getting things into shape. It should be remembered that the ship was an experiment in naval architecture, differing in every respect from any then afloat. The officers and the crew were strangers to the ship and to each other. Up to the hours of sailing she was crowded with workmen. Not a gun had

been fired, hardly a revolution of the engines had been made, when we cast off from the dock and started on what many thought was an ordinary trial trip, but which proved to be a trial such as no vessel that ever floated had undergone up to that time. From the start we saw that she was slow, not over five knots; she steered so badly that, with her great length, it took from thirty to forty minutes to turn. She drew twenty-two feet, which confined us to a comparatively narrow channel in the Roads; and, as I have before said, the engines were our weak point. She was as unmanageable as a water-logged vessel.

It was at noon on the 8th of March that we steamed down the Elizabeth River. Passing by our batteries, lined with troops, who cheered us as we passed, and through the obstructions at Craney Island, we took the south channel and headed for Newport News. At anchor at this time off Fort Monroe were the frigates Minnesota, Roanoke, and St. Lawrence, and several gun-boats. The first two were sister ships of the Virginia before the war; the last was a sailing frigate of fifty guns. Off Newport News, seven miles above, which was strongly fortified and held by a large Federal garrison, were anchored the frigate Congress, 50 guns, and the sloop Cumberland, 30. The day was calm, and the last two ships were swinging lazily by their anchors. (The tide was at its height about 1:40 P.M.) Boats were hanging to the lower booms, washed clothes in the rigging. Nothing indicated that

we were expected; but when we came within three-quarters of a mile, the boats were dropped astern, booms got alongside, and the Cumberland opened with her heavy pivots, followed by the Congress, the gun-boats, and the shore batteries.

We reserved our fire until within easy range, when the forward pivot was pointed and fired by Lieutenant Charles Simms, killing and wounding most of the crew of the after pivot-gun of the Cumberland. Passing close to the Congress, which received our starboard broadside, and returned it with spirit, we steered direct for the Cumberland, striking her almost at right angles, under the fore-rigging on the starboard side. The blow was hardly perceptible on board the Virginia. Backing clear of her, we went ahead again, heading up the river, helm hard-a-starboard, and turned slowly. As we did so, for the first time I had an opportunity of using the after-pivot, of which I had charge. As we swung, the Congress came in range, nearly stern on, and we got in three raking shells. She had slipped her anchor, loosed her foretop-sail, run up the jib, and tried to escape, but grounded. Turning, we headed for her and took a position within two hundred yards, where every shot told. In the meantime the Cumberland continued the fight, though our ram had opened her side wide enough to drive in a horse and cart. Soon she listed to port and filled rapidly. The crew were driven by the advancing water to the spardeck, and there worked her pivot-guns until she went down with a roar, the

colors still flying. No ship was ever fought more gallantly.² The Congress continued the unequal contest for more than an hour after the sinking of the Cumberland. Her losses were terrible, and finally she ran up the white flag.

As soon as we had hove in sight, coming down the harbor, the Roanoke, St. Lawrence, and Minnesota, assisted by tugs, had got under way, and started up from Old Point Comfort to join their consorts. They were under fire from the batteries at Sewell's Point, but the distance was too great to effect much. The first two, however, ran aground not far above Fort Monroe, and took but little part in the fight. The Minnesota, taking the middle or swash channel, steamed up half-way between Old Point Comfort and Newport News, when she grounded, but in a position to be actively engaged.

Previous to this we had been joined by the James River squadron, which had been at anchor a few miles above, and came into action most gallantly, passing the shore batteries at Newport News under a heavy fire, and with some loss. It consisted of the Yorktown (or Patrick Henry), 12 guns, Captain John R. Tucker; Jamestown, 2 guns, Lieut.-Commander J. N. Barney; and Teaser, 1 gun, Lieut.-Commander W. A. Webb.

As soon as the Congress surrendered, Commander Buchanan ordered the gun-boats Beaufort, Lieut.-Commander W. H. Parker, and Raleigh, Lieut.-Commander J. W. Alexander, to steam alongside, take off her crew, and set fire to the ship. Lieutenant Pendergrast, who had succeeded Lieutenant Smith, who had been

killed, surrendered to Lieutenant Parker, of the Beaufort. Delivering his sword and colors, he was directed by Lieutenant Parker to return to his ship and have the wounded transferred as rapidly as possible. All this time the shore batteries and small-arm men were keeping up an incessant fire on our vessels. Two of the officers of the Raleigh, Lieutenant Tayloe and Midshipman Hutter, were killed while assisting the Union wounded out of the Congress. A number of the enemy's men were killed by the same fire. Finally it became so hot that the gun-boats were obliged to haul off with only thirty prisoners, leaving Lieutenant Pendergrast and most of his crew on board, and they all afterward escaped to the shore by swimming or in small boats. While this was going on, the white flag was flying at her mainmasthead. Not being able to take possession of his prize, the commodore ordered hot shot to be used, and in a short time she was in flames fore and aft. While directing this, both himself and his flag-lieutenant, Minor, were severely wounded. The command then devolved upon Lieutenant Catesby Jones.

It was now 5 o'clock, nearly two hours of daylight, and the Minnesota only remained. She was aground and at our mercy. But the pilots would not attempt the middle channel with the ebb tide and approaching night. So we returned by the south channel to Sewell's Point and anchored, the Minnesota escaping, as we thought, only until morning.

Our loss in killed and wounded was twenty-one. The armor

was hardly damaged, though at one time our ship was the focus on which were directed at least one hundred heavy guns, afloat and ashore. But nothing outside escaped. Two guns were disabled by having their muzzles shot off. The ram was left in the side of the Cumberland. One anchor, the smoke-stack, and the steam-pipes were shot away. Railings, stanchions, boat-davits, everything was swept clean. The flag-staff was repeatedly knocked over, and finally a boarding-pike was used. Commodore Buchanan and the other wounded were sent to the Naval Hospital, and after making preparations for the next day's fight, we slept at our guns, dreaming of other victories in the morning.³

But at daybreak we discovered, lying between us and the Minnesota, a strange-looking craft, which we knew at once to be Ericsson's Monitor, which had long been expected in Hampton Roads, and of which, from different sources, we had a good idea. She could not possibly have made her appearance at a more inopportune time for us, changing our plans, which were to destroy the Minnesota, and then the remainder of the fleet below Fort Monroe. She appeared but a pigmy compared with the lofty frigate which she guarded. But in her size was one great element of her success. I will not attempt a description of the Monitor; her build and peculiarities are well known.

After an early breakfast, we got under way and steamed out toward the enemy, opening fire from our bow pivot, and closing in to deliver our starboard broadside at short range,

which was returned promptly from her 11-inch guns. Both vessels then turned and passed again still closer. The Monitor was firing every seven or eight minutes, and nearly every shot struck. Our ship was working worse and worse, and after the loss of the smoke-stack, Mr. Ramsey, chief engineer, reported that the draught was so poor that it was with great difficulty he could keep up steam. Once or twice the ship was on the bottom. Drawing 22 feet of water, we were confined to a narrow channel, while the Monitor, with only 12 feet immersion, could take any position, and always have us in range of her guns. Orders were given to concentrate our fire on the pilot-house, and with good result, as we afterward learned. More than two hours had passed, and we had made no impression on the enemy so far as we could discover, while our wounds were slight. Several times the Monitor ceased firing, and we were in hopes she was disabled, but the revolution again of her turret and the heavy blows of her 11-inch shot on our sides soon undeceived us.

Coming down from the spar-deck, and observing a division standing "at ease," Lieutenant Jones inquired:

Why are you not firing, Mr. Eggleston?

Why, our powder is very precious and after two hours' incessant firing I find that I can do her about as much damage by snapping my thumb at her every two minutes and a half,

replied the lieutenant.

Lieutenant Jones now determined to run her down or board

her. For nearly an hour we manoeuvred for a position. Now "Go ahead!" now "Stop!" now "Astern!" The ship was as unwieldy as Noah's ark. At last an opportunity offered.

Go ahead, full speed!

But before the ship gathered headway, the Monitor turned, and our disabled ram only gave a glancing blow, effecting nothing. Again she came up on our quarter, her bow against our side, and at this distance fired twice. Both shots struck about half-way up the shield, abreast of the after pivot, and the impact forced the side in bodily two or three inches. All the crews of the after guns were knocked over by the concussion, and bled from the nose or ears. Another shot at the same place would have penetrated. While alongside, boarders were called away; but she dropped astern before they could get on board. And so, for six or more hours, the struggle was kept up. At length, the Monitor withdrew over the middle ground where we could not follow, but always maintaining a position to protect the Minnesota.⁴ To have run our ship ashore on a falling tide would have been ruin. We awaited her return for an hour; and at 2 o'clock P.M. steamed to Sewell's Point, and thence to the dockyard at Norfolk, our crew thoroughly worn out from the two days' fight. Although there is no doubt that the Monitor first retired,—for Captain Van Brunt, commanding the Minnesota, so states in his official report,—the battle was a drawn one, so far as the two vessels engaged were concerned. But in its general results the

advantage was with the Monitor. Our casualties in the second day's fight were only a few wounded.

This action demonstrated for the first time the power and efficiency of the ram as a means of offense. The side of the Cumberland was crushed like an egg-shell. The Congress and Minnesota, even with our disabled bow, would have shared the same fate but that we could not reach them on account of our great draught.

It also showed the power of resistance of two iron-clads, widely differing in construction model, and armament, under a fire which in a short time would have sunk any other vessel then afloat.

The Monitor was well handled, and saved the Minnesota and the remainder of the fleet at Fort Monroe. But her gunnery was poor. Not a single shot struck us at the water-line, where one would have been fatal. Or had the fire been concentrated on any one spot, the shield would have been pierced; or had larger charges been used, the result would have been the same. Most of her shot struck us obliquely, breaking the iron of both courses, but not injuring the wood backing. When struck at right angles, the backing would be broken, but not penetrated. We had no solid projectiles, except a few of large windage, to be used as hot shot, and, of course, made no impression on the turret. But in all this it should be borne in mind that both vessels were on their trial trip, both were experimental, and both were receiving their baptism of fire.

On our arrival at Norfolk, Commodore Buchanan sent for me. I found him at the Naval Hospital, badly wounded and suffering greatly. He dictated a short dispatch to Mr. Mallory, Secretary of the Navy, stating the return of the ship and the result of the two days' fight, and directed me to proceed to Richmond with it and the flag of the Congress, and make a verbal report of the action, condition of the Virginia, etc.

I took the first train for Petersburg and the capital. The news had preceded me, and at every station I was warmly received, and to listening crowds was forced to repeat the story of the fight. Arriving at Richmond, I drove to Mr. Mallory's office and with him went to President Davis's, where we met Mr. Benjamin, who, a few days afterward, became Secretary of State, Mr. Seddon, afterward Secretary of War, General Cooper, Adjutant-General, and a number of others. I told at length what had occurred on the previous two days, and what changes and repairs were necessary to the Virginia. As to the future, I said that in the Monitor we had met our equal, and that the result of another engagement would be very doubtful. Mr. Davis made many inquiries as regarded the ship's draught, speed, and capabilities, and urged the completion of the repairs at as early a day as possible. The conversation lasted until near midnight. During the evening the flag of the Congress, which was a very large one, was brought in, and to our surprise, in unfolding it, we

found it in some places saturated with blood. On this discovery it was quickly rolled up and sent to the Navy Department, where it remained during the war; it doubtless burned with that building when Richmond was evacuated.

The news of our victory was received everywhere in the South with the most enthusiastic rejoicing. Coming, as it did, after a number of disasters in the south and west, it was particularly grateful. Then again, under the circumstances, so little was expected from the navy that this success was entirely unlooked for. So, from one extreme to the other, the most extravagant anticipations were formed of what the ship could do. For instance: the blockade could be raised, Washington leveled to the ground, New York laid under contribution, and so on. At the North, equally groundless alarm was felt. As an example of this, Secretary Welles relates what took place at a Cabinet meeting called by Mr. Lincoln on the receipt of the news.⁵ Stanton said,

'the Merrimac will change the whole character of the war; she will destroy, seriatim, every naval vessel; she will lay all the cities on the seaboard under contribution. I shall immediately recall Burnside; Port Royal must be abandoned. I will notify the governors and municipal authorities in the North to take instant measures to protect their harbors.' He had no doubt, he said, that the monster was at this moment on her way to Washington; and, looking out of the window, which commanded a view of the Potomac for many miles, 'Not unlikely, we shall have a shell or cannonball from one of her guns in the White House before we leave this room.' Mr. Seward, usually buoyant and self reliant, overwhelmed with the intelligence, listened in responsive sympathy to Stanton, and was greatly depressed, as, indeed, were all the members.

I returned the next day to Norfolk, and informed Commodore Buchanan that he would be promoted to be admiral, and that, owing to his wound, he would be retired from the command of the Virginia. Lieutenant Jones should have been promoted, and should have succeeded him. He had fitted out the ship and armed her, and had commanded during the second day's fight. However, the department thought otherwise, and selected Commodore Josiah Tattnall; except Lieutenant Jones he was the best man. He had distinguished himself in the wars of 1812 and with Mexico. No one stood higher as an accomplished and chivalrous officer. While in command of the United States squadron in the East Indies, he was present as a neutral at the desperate fight at the Peiho Forts, below Peking, between the English fleet and the Chinese, when the former lost nearly one-half of a force of twelve hundred engaged. Seeing his old friend Sir James Hope hard pressed and in need of assistance, having had four vessels sunk under him, he had his barge manned, and with his flag-lieutenant, S. D. Trenchard, pulled alongside the flag-ship, through the midst of a tremendous fire, in which his coxswain was killed and several of his boat's crew were wounded. He found the gallant admiral desperately wounded, and all his crew killed or disabled but six. When he offered his services, surprise was expressed at his action. His reply was,

Blood is thicker than water.

Tattnall took command on the 29th of March. In the

meantime the Virginia was in the dry dock under repairs. The hull four feet below the shield was covered with 2-inch iron. A new and heavier ram was strongly secured to the bow. The damage to the armor was repaired, wrought-iron port-shutters were fitted, and the rifle-guns were supplied with steel-pointed solid shot. These changes, with 100 tons more of ballast on her fan-tails, increased her draught to 23 feet, improving her resisting powers, but correspondingly decreasing her mobility and reducing her speed to 4 knots. The repairs were not completed until the 4th of April, owing to our want of resources and the difficulty of securing workmen. On the 11th we steamed down the harbor to the Roads with six gun-boats, fully expecting to meet the Monitor again and other vessels; for we knew their fleet had been largely reenforced, by the Vanderbilt, among other vessels, a powerful side-wheel steamer fitted as a ram. We were primed for a desperate tussle; but to our surprise we had the Roads to ourselves. We exchanged a few shots with the Rip-Raps batteries, but the Monitor with the other vessels of the fleet remained below Fort Monroe, in Chesapeake Bay, where we could not get at them except by passing between the forts.

The day before going down, Commodore Tattnall had written to Secretary Mallory,

I see no chance for me but to pass the forts and strike elsewhere, and I shall be gratified by your authority to do so.

This freedom of action was never granted, and probably wisely,

for the result of an action with the Monitor and fleet, even if we ran the gauntlet of the fire of the forts successfully, was more than doubtful, and any disaster would have exposed Norfolk and James River, and probably would have resulted in the loss of Richmond. For equally good reasons the Monitor acted on the defensive; for if she had been out of the way, General McClellan's base and fleet of transports in York River would have been endangered. Observing three merchant vessels at anchor close inshore and within the bar at Hampton, the commodore ordered Lieutenant Barney in the Jamestown to go in and bring them out. This was promptly and successfully accomplished under a fire from the forts. Two were brigs loaded with supplies for the army. The capture of these vessels, within gun-shot of their fleet, did not affect its movements. As the Jamestown towed her prizes under the stern of the English corvette Rinaldo, Captain Hewett (now — 1887 — Vice-Admiral Sir William Hewett, commanding the Channel Squadron), then at anchor in the Roads, she was enthusiastically cheered. We remained below all day, and at night returned and anchored off Sewell's Point.

A few days later we went down again to within gun-shot of the Rip-Raps, and exchanged a few rounds with the fort, hoping that the Monitor would come out from her lair into open water. Had she done so, a determined effort would have been made to carry her by boarding. Four small gun-boats were ready, each of which had its crew divided into parties

for the performance of certain duties after getting on board. Some were to try to wedge the turret, some to cover the pilot-house and all the openings with tarpaulins, others to scale with ladders the turret and smoke-stack, using shells, hand-grenades, etc. Even if but two of the gun-boats should succeed in grappling her, we were confident of success. Talking this over since with Captain S. D. Greene, who was the first lieutenant of the Monitor, and in command after Captain Worden was wounded in the pilot-house, he said they were prepared for anything of this kind and that it would have failed. Certain it is, if an opportunity had been given, the attempt would have been made.

A break-down of the engines forced us to return to Norfolk, Having completed our repairs on May 8th, and while returning to our old anchorage, we heard heavy firing, and, going down the harbor, found the Monitor, with the iron-clads Galena, Naugatuck, and a number of heavy ships, shelling our batteries at Sewell's Point. We stood directly for the Monitor, but as we approached they all ceased firing and retreated below the forts. We followed close down to the Rip-Raps, whose shot passed over us, striking a mile or more beyond the ship. We remained for some hours in the Roads, and finally the commodore, in a tone of deepest disgust, gave the order:

Mr. Jones, fire a gun to windward, and take the ship back to her buoy,

During the month of April, 1862, our forces, under General J. E. Johnston, had retired from the Peninsula to the

neighborhood of Richmond, to defend the city against McClellan's advance by way of the Peninsula, and from time to time rumors of the possible evacuation of Norfolk reached us. On the 9th of May, while at anchor off Sewell's Point, we noticed at sunrise that our flag was not flying over the batteries. A boat was sent ashore and found them abandoned. Lieutenant Pembroke Jones was then dispatched to Norfolk, some miles distant, to call upon General Huger, who was in command, and learn the condition of affairs. He returned during the afternoon, reporting, to our great surprise, the town deserted by our troops and the navy yard on fire. This precipitate retreat was entirely unnecessary, for while the Virginia remained afloat, Norfolk was safe, or, at all events, was not tenable by the enemy, and James River was partly guarded, for we could have retired behind the obstructions in the channel at Craney Island, and, with the batteries at that point, could have held the place, certainly until all the valuable stores and machinery had been removed from the navy yard. Moreover, had the Virginia been afloat at the time of the battles around Richmond, General McClellan would hardly have retreated to James River; for, had he done so, we could at any time have closed it and rendered any position on it untenable.

Norfolk evacuated, our occupation was gone, and the next thing to be decided upon was what should be done with the ship. Two courses of action were open to us: we might have

run the blockade of the forts and done some damage to the shipping there and at the mouth of the York River, provided they did not get out of our way,—for, with our great draught and low rate of speed, the enemy's transports would have gone where we could not have followed them; and the Monitor and other iron-clads would have engaged us with every advantage, playing around us as rabbits around a sloth, and the end would have been the certain loss of the vessel. On the other hand, the pilots said repeatedly, if the ship were lightened to eighteen feet, they could take her up James River to Harrison's Landing or City Point, where she could have been put in fighting trim again, and have been in a position to assist in the defense of Richmond. The commodore decided upon this course. Calling all hands on deck, he told them what he wished done. Sharp and quick work was necessary; for, to be successful, the ship must be lightened five feet, and we must pass the batteries at Newport News and the fleet below before daylight next morning. The crew gave three cheers, and went to work with a will, throwing overboard the ballast from the fan-tails, as well as that below,—all spare stores, water, indeed everything but our powder and shot. By midnight the ship had been lightened three feet, when, to our amazement, the pilots said it was useless to do more, that with the westerly wind blowing, the tide would be cut down so that the ship would not go up even to Jamestown Flats; indeed, they would not take the

responsibility of taking her up the river at all. This extraordinary conduct of the pilots rendered some other plan immediately necessary. Moral: All officers, as far as possible, should learn to do their own piloting.

The ship had been so lifted as to the unfit for action; two feet of her hull below the shield was exposed. She could not be sunk again by letting in water without putting out the furnace fires and flooding the magazines. Never was a commander forced by circumstances over which he had no control into a more painful position than was Commodore Tattnall. But coolly and calmly he decided, and gave orders to destroy the ship; determining if he could not save his vessel, at all events not to sacrifice three hundred brave and faithful men; and that he acted wisely, the fight at Drewry's Bluff, which was the salvation of Richmond, soon after proved. She was run ashore near Craney Island, and the crew landed with their small-arms and two days' provisions. Having only two boats, it took three hours to disembark. Lieutenant Catesby Jones and myself were the last to leave. Setting her on fire fore and aft, she was soon in a blaze, and by the light of our burning ship we pulled for the shore, landing at daybreak. We marched 22 miles to Suffolk and took the cars for Richmond.

The news of the destruction of the Virginia caused a most profound feeling of disappointment and indignation throughout the South, particularly as so much was expected

of the ship after our first success. On Commodore Tattnall the most unsparing and cruel aspersions were cast. He promptly demanded a court of inquiry, and, not satisfied with this, a court-martial, whose unanimous finding, after considering the facts and circumstances, was:

Being thus situated, the only alternative, in the opinion of the court, was to abandon and burn the ship then and there; which, in the judgment of the court, was deliberately and wisely done by order of the accused. Wherefore, the court do award the said Captain Josiah Tattnall an honorable acquittal.

It only remains now to speak of our last meeting with the Monitor. Arriving at Richmond, we heard that the enemy's fleet was ascending James River, and the result was great alarm; for, relying upon the Virginia, not a gun had been mounted to protect the city from a water attack. We were hurried to Drewry's Bluff, the first high ground below the city, seven miles distant. Here, for two days, exposed to constant rain, in bottomless mud and without shelter, on scant provisions, we worked unceasingly, mounting guns and obstructing the river. In this we were aided by the crews of small vessels which had escaped up the river before Norfolk was abandoned. The Jamestown and some small sailing-vessels were sunk in the channel, but, owing to the high water occasioned by a freshet, the obstructions were only partial. We had only succeeded in getting into position three thirty-twos and two sixty-fours (shell guns) and were without sufficient supply of ammunition, when on the 15th of May the

iron-clad Galena, Commander John Rodgers, followed by the Monitor and three others, hove in sight. We opened fire as soon as they came within range, directing most of it on the Galena. This vessel was handled very skillfully. Coming up within six hundred yards of the battery, she anchored, and, with a spring from her quarter, presented her broadside; this under a heavy fire, and in a narrow river with a strong current. The Monitor, and others anchored just below, answered our fire deliberately; but, owing to the great elevation of the battery, their fire was in a great measure ineffectual, though two guns were dismounted and several men were killed and wounded. While this was going on, our sharpshooters were at work on both banks. Lieutenant Catesby Jones, in his report, speaks of this service:

Lieutenant Woods, with a portion of the men, did good service as sharpshooters. The enemy were excessively annoyed by their fire. His position was well chosen and gallantly maintained in spite of the shell, shrapnel, grape, and canister fired at them.

Finding they could make no impression on our works, the Galena, after an action of four hours, returned down the river with her consorts. Her loss was about forty killed and wounded.⁶

This was one of the boldest and best-conducted operations of the war, and one of which very little notice has been taken. Had Commander Rodgers been supported by a few brigades, landed at City Point, or above on the south side, Richmond would have been evacuated. The Virginia's crew alone barred

his way to Richmond; otherwise the obstructions would not have prevented his steaming up to the city, which would have been as much at his mercy as was New Orleans before the fleet of Farragut.

FOOTNOTES

1. The officers of the Merrimac were: Flag-Officer, Franklin Buchanan; Lieutenants, Catesby ap R. Jones (executive and ordnance officer), Charles C. Simms, R. D. Minor (flag), Hunter Davidson, John Taylor Wood, J. R. Eggleston, Walter Butt; Midshipmen, Foute, Marmaduke, Littlepage, Craig, Long, and Rootes; Paymaster, James Semple; Surgeon, Dinwiddie B. Phillips; Assistant-Surgeon, Algernon S. Garnett; Captain of Marines, Reuben Thom; Engineers, H. A. Ramsey, acting chief; Assistants, Tynan, Campbell, Herring, Jack, and White; Boat-swain, Hasker; Gunner, Oliver; Carpenter, Lindsey; Clerk, Arthur Sinclair, Jr.; Volunteer Aides, Lieutenant Douglas Forrest, C.S.A., Captain Thomas Kevill, detachment of Norfolk United Artillery; Signal Corps, Sergeant Tabb.

2. According to the pilot of the Cumberland, A. B. Smith: "Near the middle of the fight, when the berth-deck of the Cumberland had sunk below water, one of the crew of the Merrimac came out of a port to the outside of her iron-plate roof, and a ball from one of our guns instantly cut him in two. . . . Finally, after about three-fourths of an hour of the most severe fighting, our vessel sank, the Stars and Stripes still waving. That flag was finally submerged, but after the hull grounded on the sands, fifty-four feet below, . . . our pennant was still flying from the top-mast above the waves."

3. Lieutenant Jones reported: "It was not easy to keep a flag flying. The flag-staffs were repeatedly shot away. The colors were hoisted to the smoke-stack and several times cut down from it."—EDITORS.

4. In his official report, Captain Van Brunt says of the fight, as viewed from the Minnesota:

"At 6 A.M. the enemy again appeared, . . . and I beat to quarters; but they ran past my ship and were heading for Fortress Monroe, and the retreat was beaten to enable my men to get something to eat. The Merrimac ran down near the Rip-Raps and then turned into the channel through which I had come. Again all hands were called to quarters, and opened upon her with my stern-guns, and made signal to the Monitor to attack the enemy. She immediately ran down in my wake, right within the range of the Merrimac, completely covering my ship, as far as was possible with her diminutive dimensions, and, much to my astonishment, laid herself right alongside of the Merrimac, and the contrast was that of a pigmy to a giant. Gun after gun was fired by the Monitor, which was returned with whole broadsides from the Rebels, with no more effect, apparently, than so many pebble-stones

thrown by a child. . . . The Merrimac, finding that she could make nothing of the Monitor, turned her attention once more to me. In the morning she had put one eleven-inch shot under my counter, near the water-line, and now, on her second approach, I opened upon her with all my broadside-guns and ten-inch pivot—a broadside which would have blown out of water any timber-built ship in the world. She returned my fire with her rifled bow-gun, with a shell which passed through the chief engineer's state-room, through the engineers' mess-room amid-ships, and burst in the boatswain's room, tearing four rooms all into one, in its passage exploding two charges of powder, which set the ship on fire, but it was promptly extinguished by a party headed by my first lieutenant."

5. The "news" was of the first day's battle before the Monitor had arrived.—EDITORS.

6. According to the official report, the loss on the Galena was 13 killed and 11 wounded; on the Port Royal, 1 wounded, and on the Naugatuck, 2 wounded. Total, 13 killed and 14 wounded.—EDITORS.

Officers of the Virginia

Taken from

From Sumter to Shiloh

Battles and Leaders of the Civil War

Flag-Officer Franklin Buchanan	Assistant-Surgeon Algernon S. Garnett
Lieutenant Catesby ap R. Jones (executive & ordnance officer)	Captain of Marines Reuben Thom
Lieutenant Charles C. Simms	Engineer H. A. Ramsey, acting chief
Lieutenant R. D. Minor (flag)	Assistant Tynan
Lieutenant Hunter Davidson	Assistant Campbell
Lieutenant John Taylor Wood	Assistant Herring
Lieutenant J. R. Eggleston	Assistant Jack
Lieutenant Walter Butt	Assistant White
Midshipman Foute	Boatswain Hasker
Midshipman Marmaduke	Gunner Oliver
Midshipman Littlepage	Carpenter Lindsey
Midshipman Craig	Clerk Arthur Sinclair, Jr.
Midshipman Long	Volunteer Aide, Lieutenant Douglas Forrest, C.S.A.
Midshipman Rootes	Volunteer Aide, Captain Thomas Kevill, detachment of Norfolk United Artillery
Paymaster James Semple	Special Corps, Sergeant Tabb
Surgeon Dinwiddie B. Phillips	

EDITOR'S NOTE

Nowhere else in history is the tragedy of civil war better illustrated than in the battle at Hampton Roads. Brother against brother, father against son, the fortune of civil war which split nation and families was cataclysmic.

Franklin Buchanan had helped found the U. S. Naval Academy in 1845 and with the event of civil war returned to his native state. On 8 March 1862, he was the flag officer in command of the CSS Virginia. His brother was an officer on board the Congress which the Virginia set ablaze, both knew of the other's presence. The first and fourth lieutenants of the Virginia each had a brother in the U. S. Army. The father of the fifth lieutenant was also in the U. S. Army. The father of one of the midshipmen on board the Virginia was in the U. S. Navy. Of particular note to the Midshipmen of today is that Lieutenant Butt, of the Virginia, had been the roommate of Lieutenant S. Dana Greene of the Monitor while at the Naval Academy.

Midshipman Littlepage's account of how he came to serve on board the Virginia is inserted here as a reminder of the grave consequences of civil war.

Selections From
A Midshipman Aboard the Virginia

By

Hardin Beverly Littlepage

Introduction by Jon Nielson

Taken from Civil War Times - April 1974

Hardin Beverly Littlepage was born March 18, 1841, at "Piping Tree," King William County, Virginia. The Littlepage family had lived in Virginia since 1650 and, as one of the first families, they had enjoyed a respectable social position in the upper county tidewater aristocracy. Hardin's great uncle had been General Lewis Littlepage, protégé of John Jay and Prime Minister to King Stanislaus of Poland. As a general in the Polish army, a friend of Lafayette, and a suitor of Catherine the Great of Russia, he had bequeathed a fascinating legacy of military achievement and political intrigue to the family tradition.

Hardin was educated at the Old Fields Common School in King William and then spent three years at the Rumford Military Academy. In 1858 he received an appointment to the United States Naval Academy at Annapolis. With war imminent in 1861, he resigned his commission and left for Richmond to offer his services to the Confederacy. His duties at first did not provide much excitement until, on November 24, he received orders from Secretary of the Navy Stephen R. Mallory

to report to Lieutenant Catsby ap R. Jones at Norfolk for duty on board the CSS Virginia. His experiences on the Virginia in her action with the Federal fleet and her duel with the USS Monitor in Hampton Roads left vivid memories, which found expression after the war in his memoir, "The Career of the Merrimac-Virginia: With Some Personal History."

When Captain Littlepage wrote of his recollections of Hampton Roads and of his service in the Confederate Navy, he did so as an agent of the Naval War Records Bureau at Washington, D. C. He was responsible for gathering Confederate naval records throughout the South and in Europe for publication as the Official Records of the Union and Confederate Navies in the War of the Rebellion, published 1894-1927.

It was during these years that he became widely known as an authority on Confederate naval operations and he enjoyed much popularity as Commander of the Confederate Naval Veterans Association. His knowledge of the Confederate Navy was responsible for his appointment by the Treasury Department to research and to report to Congress the amount and status of former Confederate property retained by European governments, to which the United States might still have a claim.

Quite predictably he rose to the challenge when in 1884, Commander John Worden and the survivors of the Monitor's crew petitioned Congress for prize money for the defeat and destruction of the Virginia. Regarding this as an outrageous

slander and affront to his former gallant comrades, he testified vigorously before a Senate Committee to "set the record straight." Because of his testimony and conviction the petition was denied.

Believing strongly that the events of March 8-9, 1862 were misrepresented by historians, he began his memoir, which he hoped would faithfully record history and once and for all demonstrate that the Virginia was indeed victorious at Hampton Roads.

I will begin this historical narrative with a short sketch of my life, that the reader may be made somewhat acquainted with the author and the sources of his information. Like all testimony, the weight of it depends upon the character of the testifier and his opportunities for obtaining the facts.

I was born in King William County, Virginia, on the 8th day of March, 1841, and I take occasion to mention here that one of the most interesting and important events of my life occurred upon the anniversary of my twenty-first birthday, March, 1862, in Hampton Roads, when the Confederate ironclad, Virginia, practically destroyed the wooden navies of the world.

* * * * *

In my boyhood I attended what was then known as "The Old Field Schools," and after some three or four years at the Old

Field Schools I was sent to the Rumford Military Academy. After a three years' course there, I received an appointment to the United States Naval Academy at Annapolis.

My father had quite a family; there were thirteen children, and it nearly broke my heart to leave home, knowing I would not return for two years. I made my first cruise in 1859, on the sloop of war, Plymouth, carrying 22 guns. She visited England, France, Spain, Portugal and the Madeira Islands. When I returned home at the end of the two years, my dear good mother told me that there never was a storm during my cruise that she did not sit at the window and watch it and pray that I might survive it. Possibly the storm did not extend beyond the limits of my own county, and yet I was impressed and I may truly say overwhelmed with the idea that I had the dearest, best mother in the world.

To return to my life at Annapolis, the usual routine passed smoothly until that unaccountable fanatic fired the first gun of the war at Harper's Ferry, October 16th, 1859. . . . The first note of alarm was John Brown's raid, and from then on, the ultra-abolitionists of the John Brown stripe, of whom there were less than a dozen, flocked to themselves, and the rest of us Middies, two hundred or more, talked over the situation in a friendly way, never saying anything to hurt the other fellow's feelings.

In the fall and winter of 1860, when secession became

rampant, the prevailing sentiment, the consensus of opinion, was for each and every one of us to abide the action of his own State; that their allegiance was first to their native State and through it to the general government. The situation gave rise to many amusing incidents, but to me a most amusing case was that of two brothers, Lieutenants in the Navy. I will mention them by their first names. Billy told me that he was coming down the Avenue in April of '61, and he met his brother Fox just in front of the White House. Fox said to him, "Billy, I suppose you have tendered your resignation and you're going to stand for our people." Billy said, "Fox, I don't know what I'd do if I'd get out of the Navy. I have been raised in it, and if I'd get out I'd be like a fish out of water. The South has no navy; what could I do?" Fox said, "I have tendered my resignation and I will stand by my own people. If you don't resign, I will never speak to you again." Billy said that after that he got on a spree and tendered his resignation and Fox got on a spree and withdrew his. "And now," said Billy, "Fox is an Admiral in the Navy and I am on my uppers."

After Lincoln's election the friction became more and more intense and we read all the papers eagerly. After the firing upon Fort Sumpter (sic), the rupture was plain and it was up to each fellow to assert himself and say where he stood. . . .

Well, after Lincoln's election and the secession, one after the other, of the Southern States, the officers of the various grades tendered their resignations in the order of the secession of their respective States, and were always spoken of afterwards as Secessionlists, and referred to as such. War was talked on every hand. The papers were filled with it and the feeling grew intense after Fort Sumpter was fired upon.

As for myself, as we say in the Navy, I was standing by for a jibe, and I was becoming more and more careless and indifferent as to routine, duty and studies. Every night I had what we called "Tappers"; that is, after "Taps," 10 P.M., all the Border State fellows and sympathizers would assemble in my room, which was almost hermetically sealed for the purpose, all the bed clothing being arranged in the windows after the shutters were closed so as to exclude the merest ray of light from within, as the Officer of the Day had to make his rounds at all hours.

Then we would assemble with all the daily papers—Herald, Times, Sun, Tribune and World—and with light turned down and a good reader up in one corner of the room with a dark lantern, which we called a "bull's eye." Each fellow would light his pipe or have his cigar going full blast and occasionally we would take a little recess for refreshments, which consisted generally of some of old Dowdy's good oyster

pies, sardines, Scotch herring, cheeses of various sorts, crackers and biscuits.

We would discuss and "cuss" the whole situation in a friendly undertone and agree to disagree if necessary in a friendly way. One could hardly see across the room for the smoke and as the nights went by we became more and more careless as to the amount of cheese, oysters and pies smeared on the floor and chairs. The official rounds the next morning concerned your narrator. Fortunately there was a spirit of liberal toleration all around and careful respect for the views of others, except by the narrow-gauged, hidebounds, who flocked by themselves and rarely spoke above a whisper.

Following my first "tapper," the officer of the day, upon his rounds about 9 A.M., as he stood in the door said, "Your room smells of tobacco smoke." I acknowledged the corn and took my two demerits without a word. The next morning he made the same charge and I asked him if he was sure it was not the same old smoke. He thought not and stuck me for two more. Two hundred demerits were the limit and as usual I was getting close to it.

The officers from the South were dropping out rapidly, so it was necessary for those left to do double duty. The officer referred to was from one of the Border States and he could not decide which way he would jump until his State acted. He was a fine fellow and appreciated the situation

and the predicament in which we were placed. When he came into the building for inspection he always tapped loudly on the doors and gave us a chance to straighten up our rooms.

The next morning I thought I would be on guard and as soon as I heard his tap at the outer door I threw up the windows. It was a blustering March morning and I grabbed a bottle of cologne off the bureau and poured it all along the steam-pipes. When he opened my door the window shades flapped out to the middle of the room. We had an immense "tapper" the night before with oysters, pie and cheese galore. He simply stood in the door unable to suppress his feeling and without waiting for me to explain, said, "Sir, your room smells of everything from a pound cake to a pole cat." He was a noble fellow and so far lost his official dignity as to be a little confiding. He advised me to gather up all the old pipes from the chairs and elsewhere and take them down to the woodhouse. My only request of him was that he would cover the various smells simply with tobacco smoke as my demerit number was getting very near the danger line.

I was at all times in intimate touch with my Member of Congress, Senators and Governor and the day that the State seceded April 17th, 1861, I tendered my resignation. . . .

When tendering my resignation from the United States Navy, the day after Virginia seceded, April 17, 1861, to the Commandant of Midshipmen, Commandant C. P. Rodgers, he advised

me to stand by the old flag, saying I would find it an easy matter to get out of the navy, but a hard one to get back; that the trouble would be all over in sixty or ninety days and that as the Government had educated me for the navy I owed my allegiance to it.

I told him plainly that my State, Virginia, had contributed as much to its support as any other of the States that formed the Federal government and as I had received appointment to the navy through her, I felt I owed my allegiance to her, at the same time handing him letters from Ex-Governor (Henry) Wise, Gov. (John) Letcher, my Member of Congress and my father, telling me to abide by the action of my State and to act promptly. I also told him that I had not a relative north of the Potomac; that my home was on the banks of the Mattaponi river and that if I remained in the service I might have to take part in shelling my own home and that my aged mother and father and my sisters would be its only occupants. He was exceedingly kind, insisting that it would be all over in sixty or ninety days, and that it would be hard to get back in the service.

Continuing to talk over the matter with me in a most kindly way, I asked him what he would do if he were in my place. He promptly replied: "That is not the question, sir. It is my duty to advise you to remain with the service and I want to know what you have decided to do." I told him

there had never been any doubt in my mind as to my duty, that when trouble confronted us, it was but natural to return to one's home and parents, that I could with a much better grace fire upon the "old flag" than upon them. With a great deal of feeling he then told me he would forward my resignation, remarking that he did not see how I could do otherwise and that he had only done his duty. He was a noble man and I shall always love his memory.

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The situation was becoming unendurable to those of us from the South, our ears being regaled every night by their favorite song, beginning, "We'll hang Jeff Davis on a sour apple tree" to the tune of "John Brown's Body." So just before the order to "rise" in mess hall, I arose and asked if there were any present who would like to walk South. O. A. Brown responded that he would go with me, so within an hour we were off. In Annapolis we learned that Judge Mason was going to Baltimore to address the people that night, so we hurried to his house and upon explaining our predicament he kindly offered to take us to Baltimore, if that would help us. We accompanied him and found upon reaching Baltimore that the last steamer for Richmond left that night. We took passage and reported to Governor Letcher for duty the next day.

After a pleasant interview in which he congratulated us

upon our loyalty to our Mother State, he ordered us to report to General Walter Gwyn(n) for duty at Fort Norfolk, Captain A(rthur). Sinclair, commandmant. My comrade, Orris Brown, he ordered to Pig Point, Captain R. B. Pegram, commanding. I was soon afterward ordered to Town Point Battery, at the mouth of the Nansemond river across the Roads from Newport News, and the following fall, about November 16th, to report for duty on board the Merrimack, which was being converted into an ironclad and was afterwards rechristened "Virginia."

I remained with the Virginia continuously from that time until the night she was destroyed and when leaving I saw her old, battle-scarred flags lying across the gun decks, I threw down my knapsack, drew out its contents of wearing apparel and carefully folding the old flags put them in my knapsack and marched away to unfurl them again at Drewry's Bluff a few days afterward.

* * * * *

That magnificent body of water formed by the confluence of three rivers, James, Nansemond and Elizabeth, met by the inflow from the Atlantic ocean through the passage between Cape Charles and Cape Henry, across the Chesapeake and through the narrow gateway between Fortress Monroe and the Rip-Raps called Hampton Roads, guarded by those immense fortresses, capable of floating comfortably the navies of the world, completely land-locked, was the arena of the first steam armored

vessel, the "Virginia," where she demonstrated that wooden ships were no longer war ships and where in fact, she destroyed the wooden navies of the world, and together with Ericsson's creation, the Monitor, inaugurated the new navies.

At Norfolk, about five miles from Hampton Roads, was the greatest naval station, ship and ordnance yard in the United States. This great harbor, about equally distant between the northern and southern parts of the Atlantic seaboard, made its possession of great importance to both sections of the country. While the clouds of war were gathering, the State of Virginia and the Federal Government kept the possession of this harbor and of Fortress Monroe constantly in view, and while the anxiety as to their possession was very great, neither the United States nor the State of Virginia was disposed to commit the first overt act, each hoping that events might yet be shaped to avoid collision.

Upon the hasty evacuation of Norfolk by the Federal navy on the night of the 20th day of April, 1861, possessed of a panic almost inexplicable and unaccountable, they fired the yard, spiked the hundreds of guns, undertook to blow up the dry dock, scuttled and burned the ships and left with whatever had motive power to assist them in their departure.

* * * * *

I do not impugn the motives or question the courage of the officers and men of the United States navy. I yield to

no man in my admiration of the American sailor. Norfolk was considered the naval officers' Paradise. Many of the older officers had their families ashore and the younger officers and sailors their sweethearts. There were no animosities between the people afloat and ashore. Neither side wanted to fire the first hostile shot, to draw the first blood, for either would be firing upon its own people. How could they do it? They preferred simply to withdraw, to avoid what appeared to be an inevitable and impending conflict, each side hoping for a peaceful adjustment.

The State of Virginia had passed an ordinance of secession, severing her relations with the Federal government on the 17th of April, and the destruction of the navy yard and evacuation of Norfolk by the Federal forces occurred on the 20th. Hurried preparations for war were being made on all sides and as soon as the Virginia forces got possession of the yard, they proceeded to extinguish the fires and repair the wreck and ruin.

The yard was soon filled with ship builders and artisans of all descriptions. Cannon and small arms were hurriedly overhauled, repaired and distributed; the former to all fortified ports along the coast from Norfolk to New Orleans, and up the rivers and the small arms to the armies. The ships that had been scuttled and burned were hurriedly raised and overhauled and their batteries hastily distributed to

exposed points. Amongst the vessels that had been so treated was the frigate Merrimack. She was immediately put into dry dock for repairs and when her condition was ascertained, it seems that one of the first questions presented to the mind of Secretary (of the Navy Stephen R.) Mallory was her conversion into an ironclad.

* * * * *

The work of her transformation into the iron clad war vessel Virginia immediately began by cutting her down to within five feet of her light water line. Both ends for seventy feet were covered over, first with a strong hardwood backing, and then iron plating one inch thick, and when the vessel was in fighting trim her ends were sufficiently submerged to be invisible. The midship section for a length of one hundred and seventy feet was roofed with heart-pine sills twenty-two inches in thickness inclined at an angle of thirty-four degrees, covered by a sheathing force fore and aft of white oak six inches in thickness. Upon this was closely laid the iron plating, the first layer longitudinally of plates two inches thick and eight inches wide, and upon this similar plates vertically or at the proper angle of inclination to fit closely upon the first layer and bolted through the wood work and clinched with plates and nuts on the inside. The armored casing extended from two feet below the water-line to a height of seven feet above the gun deck. The ends of this

shielded roof were rounded so that the pivot-guns could be used as bow or stern chasers or on either quarter. Above the gun deck was an iron grating of two inch bars, making a promenade about fifteen feet wide by one hundred and sixty feet long.

The Virginia's armament consisted of two seven-inch Brooke rifled guns; two 6.4 rifles and six nine inch Dahlgrens, making ten guns in all. She was further provided with a cast iron prow, but unfortunately it was put on hurriedly, and in a half-hearted way, as the constructor thought we would never have any use for it. I well remember when it was fastened by bolts to the ship's head in driving the bolts with heavy sledges, one of the flanges was cracked entirely across, but there was no time to cast another, as putting on the prow was a sort of finishing touch. Its loss in the Cumberland was greatly felt.

The transformation from the United States frigate Merri-mack to the Confederate States ironclad Virginia having been completed and the rechristening ceremonies having been duly performed, I shall call her "Virginia" hereafter and launch her into the turbid waters of her short, tempestuous, glorious career.

On February 17, 1862, Flag Officer Forrest sent the following communication to (Lieutenant) Catesby ap R. Jones, executive officer of the Virginia:

You will be pleased to receive on board the Virginia, immediately after dinner today, all the officers and men attached to the vessel, with their baggage, hammocks, etc., and have the ship put in order throughout. She will remain where she is to coal and receive her powder. You will report to me when your men and officers are on board, and use every effort to get the ship in order, as this day she is put in commission.

On the 24th of February, 1862, Flag Officer Franklin

Buchanan received the following communication from Secretary

S. R. Mallory:

You will hoist your flag on the Virginia, or any other vessel of your squadron, which will for the present embrace the Virginia, Patrick Henry, Jamestown, Teaser, Raleigh and Beaufort. The Virginia is a novelty in naval construction, is untried, and her powers unknown, and the Department will not give specific orders as to her attack upon the enemy. Her powers as a ram are regarded as very formidable, and it is hoped that you may be able to test them. Like the bayonet charge of infantry, this mode of attack, while the most distinctive, will commend itself to you in the present scarcity of ammunition. It is one also that may be rendered destructive at night against the enemy at anchor. Even without guns the ship would be formidable as a ram. Could you pass Old Point and make a dashing cruise on the Potomac as far as Washington, its effect upon the public mind would be important to the cause.

* * * * *

At last the fatal day arrived. We had intended going out a few days earlier, but were prevented by stormy weather. the 8th came in calm and peaceful as a May day. We hauled our fires early in the morning, cast off our fastenings, and drew out into the channel, and were soon under way, accompanied by the Raleigh and Beaufort, two little gun boats of one gun

each. As we passed along we found the wharves crowded with people, men and women, the women cheering us on our way, and many of the men with serious countenances. One man, I remember, called out to us, "Go on with your old metallic coffin! She will never amount to anything else!" As metallic coffins were becoming popular about that time, his remark was calculated to make one feel a little dubious.

We passed the several batteries along the river, beginning with Hospital Point, Ft. Norfolk; thence through the obstructions; then Pinner's Point, Lambert's Point, Crany Island and Sewell's Point, all of which cheered us lustily, and the soldiers filled the air with their hats. Soon after passing Sewell's Point we came in full view of Fortress Monroe and the frigates laying there. The alarm gun gave warning, and everything was immediately in motion, the mercantile craft getting below the fortress, and the frigates, Minnesota, St. Lawrence and Roanoke, of about 50 guns each, besides various and sundry gun boats carrying from one to six guns each, getting under way and "standing up."

In passing out of Elizabeth River into the Roads we necessarily headed in the direction of Fortress Monroe, and it was hard for them to tell what might be our point of attack. As soon as we reached fair channel way, however, we turned in the direction of Newport News where laid the frigate Congress, of 50 guns, the Cumberland of 24 guns, and some five or six

gun boats. Flag Officer Buchanan assembled his officers around him, pointed out to us the situation, and urged us to hurry with the work before us, that is, the destruction of the Cumberland and Congress, as the heaviest of the enemy's ships were following in our wake. He also told us that the Confederates had complained that they were not taken near enough to the enemy, and assured us that there should be no such complaint this time, for he intended to head directly for the Cumberland.

The action now began in earnest. The Virginia exchanged broadsides with the Congress at a distance of about 200 yards. She continued on with all speed, until she reached the Cumberland, and rounding, struck her under her starboard fore-chains with her prow, delivering fire from the bow gun, a 7-inch Brooke rifle with a percussion shell which exploded in her side at the very instant her prow reached her. The Virginia received, at the same time, a tremendous broadside from the Cumberland, cutting one of her guns off at the trunnions, sweeping away her guard howitzers and everything on the outside, and riddling her smokestack. Most of the men the Virginia lost were killed and wounded from this one broadside.

For awhile the Cumberland rested on the stem of the Virginia, and we felt great uneasiness lest she might carry us down with her, as she was filling rapidly. As soon, however, as there became a slight angle of inclination, the Cumberland glided off, and settled rapidly to her topsail yards.

The smoke from the Cumberland's and the Virginia's guns settled over the Virginia, completely hiding her from view. We heard them cheering on the Congress, and naturally supposed they were cheering some of the other frigates into action. We had great difficulty in getting around on account of the shoalness of the water; and, as we afterwards learned, the Congress was under the impression that the Cumberland had sunk us. So, of course, the Congress set up a lusty cheering.

As soon as the smoke cleared away and the Congress saw us heading for her, she tried to escape with the aid of a couple of tugs; but, finding us overtaking her rapidly, she ran under the guns of the Newport News battery. The Virginia then glided under her stern, about 200 yards distant, and in a few minutes knocked out her stern guns, leaving her perfectly helpless. Every shell fired from the Virginia raked her from one end to the other, and it was soon impossible for her men to stay on board of her. In a few moments her flag was hauled down, and immediately afterward a white flag was hoisted at her peak and another at her mainmast head. Buchanan immediately signaled his tenders, the Beaufort and Raleigh, to go alongside of her, take off her prisoners and set her on fire.

Soon after reaching the Congress and receiving the surrender of her officers (Brigadier) General (Joseph K. F.) Mansfield ordered Colonel (William L.) Brown, of the 20th

Indiana regiment, to send two rifle companies to the beach. The two rifle guns under Captain (Robert) Howard and a rifle, a Dahlgren howitzer, manned by sailors from the Cumberland, went into action from a raking position on the beach, well protected by sand-banks and trees, against these steamers. There they had them at about 800 yards to advantage, and immediately the gun boats let go their hold on the Congress and moved out of range, with a loss of several officers and men. This, to the Federals, was the most unfortunate thing that could have occurred. The tenders, having gone to Norfolk with the prisoners, some thirty odd, without reporting to the flag officer what they had accomplished, that officer, seeing no smoke coming from the Congress, was at first at a loss what to do. In this strait, his flag lieutenant, Bob (Robert D.) Minor, suggested that he go to her, the Congress, in a cutter. When he had gotten within about a hundred yards of her, fire was opened upon him and he returned to the ship badly wounded, as also were several of his men.

There was nothing left for the flag officer to do but to destroy the Congress with shell and hot shot, and she was soon on fire from one end to the other, her crew jumping overboard in every direction. It is sad to think that many of her wounded may have been burned up with her. But this unfortunate condition was brought about by an army undertaking to defend a ship which had already surrendered.

About this time we discovered that the Minnesota had run aground about one and a half miles from Newport News. The Virginia being in the south channel, and the Minnesota across the bar in the north channel, it was difficult for the Virginia to reach her with her guns as she was at their extreme range. The Minnesota, St. Lawrence and Roanoke all grounded going from Fortress Monroe to Newport News. It seems a strange coincidence. Ordinarily if one of them had grounded making that trip there would have been a court of inquiry.

It was true the outlook for the Federals was not very inviting. There before them lay the Cumberland settled to her topsail yards, and the Congress with her colors struck and white flags flying from her peak and mainmast head. Running aground at that time was about the best thing that they could have done, as it saved them from inevitable destruction. No single ship was ever exposed to a more destructive and terrific fire than was the Virginia about the time she rammed the Cumberland. She had not only the full broadsides of the Cumberland and Congress, but of the heavy battery at Newport News, and of various and sundry gun boats all around her.

Before leaving Norfolk the Virginia had been covered with slush or ships' grease, which was put on as thick as it would stick, under the hope that it might help the shot to glance. While under this terrible fire it seemed that she was literally frying from one end to the other. The smoke

from the burning grease on the outside blowing through the ports and mixing with the burning powder on the inside, made it so dense that we could hardly breathe. A man at my gun by the name of Hunt, during this pandemonium turned round to a man at (John R.) Eggleston's gun, named Jack Cronin. Hunt said to him: "Jack, don't this smell like hell? And Jack retorted, "It certainly does, and I think we'll all be there in a few minutes!"

By the time the Virginia had taken position under the stern of the Congress, the gallant (Commander John R.) Tucker, with the Patrick Henry, 6 guns followed by the equally gallant (Lieutenant J. N.) Barney with the Jamestown, 2 guns, and (Lieutenant William) Webb with the little Teaser, one gun, ran the batteries at Newport News and came gallantly into the fight and did valiant service. The Congress continued to burn and to illuminate the heavens. Her guns, as the fire reached them, one by one, sounded like a mournful dirge and her shrieking shells seemed to bear her message to eternity. A little after midnight the fire reached her magazine and a column of burning matter was thrown high in the air. Then there succeeded the stillness of death.

The Congress made all the fight that a ship could possibly have made under the circumstances. Her stern guns having been knocked out, she could not bring a single gun to bear on the Virginia, lying under her stern about 150 yards away, and

sweeping her decks from one end to the other. There was nothing left for her to do but strike her colors.

After seeing that the Congress was well on fire we proceeded to the Minnesota, but found her lying so far over the bar that it was with the greatest difficulty that the Virginia's guns could reach her with the small elevation that could be given them. Fire was continued on the Minnesota until it grew too dark to aim with accuracy, and the victorious Virginia returned to her moorings off Sewell's Point.

At daylight, on Sunday, March 9, 1862, the relative position of the vessels in Hampton Roads was as follows: off Sewell's Point the Confederate fleet, consisting of the Virginia, Patrick Henry, the Jamestown, the gunboats Raleigh and Teaser; off Newport News the remains of the Cumberland and the floating debris of the Congress told the story of the battle of the 8th. Hard and fast aground over in the north channel lay the Minnesota with her sides riddled, while near her we discovered what we then called "the Ericsson Battery." The officers made her out as soon as they put their glasses upon her. The men thought they were taking the Minnesota's boilers and machinery ashore on a raft.

At Fortress Monroe, the frigates Roanoke and St. Lawrence, and numerous gun boats of the Federal fleet, kept at their usual safe distance from the Virginia below the Fortress. In considering the fight about to commence with the Monitor we

realized that we would be fighting an iron-clad with an armor of almost twice the thickness of our own, and that we had not a solid shot on board, except some extra reinforce for heating and using as hot shot, and of course, they had but little penetrating force.

Between 7 and 8 a.m. on the 9th, the squadron got under way and the Virginia proceeded toward the Minnesota, closely followed by the Patrick Henry. After getting as near to the Minnesota as it was possible to go without grounding, we opened fire upon her. The Ericsson Battery, or "Monitor", as she was afterwards called and is known in history, came directly for us, stopping at a distance of some three or four hundred yards, opened fire on us. Knowing that we had nothing but shells to fight her with, we paid little attention to her as we did not care to develop the situation. When, however, she came nearer we concluded to test our shell upon her, and the action was continued, sometimes at very close quarters, until finally she undertook to run across our bows, and we ran ahead at full speed and struck her, not knowing until then that we had lost our prow the day before in the Cumberland. Her commander, Captain (John) Worden, seeing our object was to ram her, put his helm hard up, causing us to strike her obliquely, which possibly was a very fortunate thing for us, as we were ramming her with our naked stem. We were so close together at one time—in fact, rubbing together, that a man at my gun by the

name of Hunt jumped in the port and I ordered him to get back as it was useless to expose himself in that way. He said he wanted to get aboard of the bloody little iron tub, and that he would put his pea-jacket around the pilot-house so she could not tell which way she was going. It would not have been a bad idea, as we realised afterwards, provided he could have gotten back aboard of the Virginia.

The Virginia continued her efforts to get to the Minnesota, paying little attention to the Monitor because she felt satisfied that she could not materially damage an iron-clad with shell. The Monitor continued to maneuver around us, making an effort to run into our propeller, and missed it by only a few yards. If she had succeeded it might have proved a very serious injury. About this time a shell from the Virginia struck the pilot-house of the Monitor and blinded her commander, Captain Worden, who fell back with his face terribly lacerated. The pilot-house was seriously damaged.

I remember perfectly well that as soon as all hands were piped down and the fight considered over, I hurried on deck to get a little fresh air and take in the situation. There lay the Minnesota just as we had left her when we had gotten hard and fast aground trying to get a little near to her, about an hour before I came on deck, but as the tide was flood we succeeded in getting off. Should we have returned to her then and have touched bottom we should have remained there and

probably have been destroyed, as it was about high water. . . .

I immediately inquired for the Monitor and she was pointed out, a mere little speck to the naked eye under the guns of Fortress Monroe. Captain (Catesby ap R.) Jones stated in his official report, "I should have remained there if there had been any indication of the Monitor's returning."

I remained on the promenade deck where the officers assembled as fast as they could leave their respective stations. We saw nothing more of the Monitor until we returned to Hampton Roads on April 11th, and very little of her then, for upon seeing the Virginia coming she immediately made for Hampton Creek where she remained until the Virginia returned to her moorings at Sewell's Point that night, although the Virginia sent in her tenders and cut out two brigs and a schooner from almost under her guns and of those of the Nantucket, another iron-clad, and of (Flag-officer Louis M.) Goldsborough's whole squadron of frigates, iron-clads, gun boats and fast steamers, procured by the Government especially for running the Virginia down. Men who were at Old Point at the time have told me that the remark, "Oh, for a Farragut!" was frequently heard.

Admiral Worden, who was a frequent visitor at my house up to the time of his death, has often told me that he had much rather go into a fight with the Monitor than into a stiff, top-gallant breeze; that she was very near going to

the bottom off the Capes of Delaware on her way from New York to Hampton Roads and we all know she did go to the bottom the very next time she went out of the Capes of Virginia.

As soon as the Virginia reached the Gosport Navy Yard, on the afternoon of the 9th, she went immediately into dry-dock to be repaired and finished. I think I may truly say that she never was really finished, for she was always hurried out before everything had been quite done. She was, however, an infinitely better fighter than when she went out the first time, and kept her foes terribly uneasy. . . .

In fact, the Virginia, even at this time, was prepared to fight an iron-clad. We could have torn the Monitor to pieces with our chilled wrought-iron bolts, but we had made such extensive and sure plans for capturing her by boarding, that the feeling on the Virginia was not to injure the Monitor, but to carry her in that way by boarding and take her up to Norfolk.

On the Virginia we planned that as soon as we laid her alongside, the first boarders were to rush through our ports and hatches and cover her pilot-house and turret with blankets and tarpaulins; the second boarders were to take a suitable cable, which had been coiled forward, throw it around her turret and shackle her to us so that she could not get away; the third boarders had sledges and malleable wedges, and were to wedge her turret so that it would not revolve.

On board the Virginia the preparations for boarding the Monitor were elaborate and detailed, and included hand-grenades, inflammable oils and spirits, followed by inextinguishable matches. On April 11, a lovely spring day, everything being ready, we left for Hampton Roads, after promising our friends to bring the Monitor back with us or send her to the bottom. When we turned Crany Island and she spied us coming, imagine our surprise when we saw her making for Hampton Creek, her old refuge, with all speed!

The Virginia went back and forth at will from near Fortress Monroe to near Newport News, and stopped and had a parley with the commanders of the Rinaldo, Catinat and Gassendi, advising them to move up to Newport News as the lower Roads would probably be the fighting ground.

The Virginia continued to cruise back and forth all day, occasionally having a shot or two fired at her from Fortress Monroe or Rip Raps, an attention she promptly returned. There lay the iron-clads, Monitor and Naugatuck, on Hampton Flats, far out of range of our guns, and Goldsborough's immense squadron in Chesapeake Bay, and we could not tempt them to engage. Finally Tattnall ordered a gun to be fired to leeward, a gun which meant, in naval parlance, "The affair is over. They won't fight."

Illustration - Littlepage's cap insignia and Confederate uniform buttons, and a piece of the Virginia's flag.

The evacuation of Norfolk by the army occurred on the 10th of May, 1862. The Virginia was blown up by her own crew the next morning at 5 a.m. Thus ended the Virginia. . . .

She was manned by a crew of sailors collected from the regiments from the seaboard cities from New Orleans to Norfolk, and commanded by what were said to be the ablest, bravest and most skillful officers of the Confederate States Navy. She was a prodigy and a nondescript in naval construction. During her short career she not only inflicted immense loss on her enemy, defied the best production of unrestricted American genius, but she revolutionized naval construction throughout the world.

Her performance gave the first glimpse and impulse to the new system of naval warfare, and she taught the nations of the world that wooden ships were no longer war-ships. The echo that reverberated from her four-inch armament was heard and heeded in England and in all Europe, and the continental Powers learned that no weapon of offense or defense was left to them so efficient as an armor-clad swift ram.

The Federal gun-boats, Galena, Naugatuck and others, having already gone up James River, it is probable that the destruction of the Virginia at the time it occurred saved the city of Richmond. The people had trusted that the existence of the Virginia insured their protection from all harm by the way of the James River, and although the gallant and energetic

officers of the Patrick Henry and the Jamestown were working hard at Drewry's Bluff, yet the means at their command were insufficient to render the position impassable by the time the enemy's gun-boats could have reached that point.

Suddenly the news came, "The Virginia is destroyed". Then the hurry-orders came, and munitions of war, and barges loaded with stone, and in fact, all vessels that could be spared for the purpose, were sent down to Drewry's Bluff to be used as obstructions, to compel the gun-boats coming up the river to fight the guns at that point.

The officers and crew of the Virginia, traveling without rest, pushed through to Richmond, and went immediately to the Bluff, though worn out and broken down. There, ankle deep in mud, exposed to an unceasing rain for three days, without provisions of clothing and shelter, they assisted day and night in the mounting of heavy guns and the placing of obstructions in the river to prevent the enemy's passage.

The last gun mounted was not quite ready for action when the Monitor and Galena, accompanied by the Aroostook, Port Royal, Naugatuck and others, turned the bend at Chaffin's Battery and headed up the reach for Drewry's Bluff, 900 yards distant from Chaffin's.

It would have done any old sailor's heart good to see John Rogers (Captain John Rodgers), who commanded the flagship Galena, bring her into action. So beautiful and

determined she appeared, she seemed to command her adversaries to get out of the way. She anchored ahead and as she swung around and brought her broad-side squarely to bear upon our guns, she dropped her kedge. She immediately opened fire.

About this time wagon-loads of ammunition, sent down from Richmond, were backing up to our magazines. They were principally in charge of the negro drivers and their assistants. As those nine and eleven inch spherical cased shells began to burst over our heads, it was amusing to see the darkies shoulder the boxes of ammunition. One of them would get under a box that, under ordinary circumstances, it would require four of them to handle, and down in the magazine he would go. It probably was fortunate that there were no percussion shells in the lot, or else they would have blown up the magazine. Every time one of those immense shells would explode over their heads, you would hear them exclaim: "Good Lawd, dis aint no place fo' me."

I had noticed a beautiful little iron-gray mule, as round as a butter-ball, the lead mule of one of the wagons. One of the darkies, pretending to have something to do with her harness, to untangle it or something of that sort, availed himself of the opportunity to cut the leather traces, and the first thing we knew he was on her back and going down through the woods. He did not seem to realize that the farther he went the more he was getting into the fire; that his only safety was in hugging the banks of the river.

The action between the gun-boats and the batteries began at early light, and having a very limited amount of ammunition, our object was to prolong the fight, in order that it might not be exhausted. The elevation of our guns was such as to bring the line of our fire perpendicular to the inclination of the Galena's armor, compelling her to receive the full impact of our shot.

I have already spoken of my attachment for Captain C.R.P. Rogers, who was commandant of midshipmen at the United States Naval Academy when I resigned, and whose kindness so much impressed me at that time. Knowing that John Rogers, whom I thought at that time to be his brother (but afterwards learned that he was his first cousin), was in command of the Galena, I could not but feel, as I raised my ten-inch columbiad upon the Galena, what a cruel thing war was, and that the kindness of one Rogers was only exceeded by the bravery of another.

The action between the battery and the gun-boats continued until about 11 o'clock, when I saw a flash come out of the ports of the Galena, and immediately afterwards a signal was raised on her smoke-stack halliards. The fight had been so tame, in comparison with our experience for some weeks past, that Catesby Jones was sitting on a shell-box by my gun, and being completely exhausted and overcome by his constant exertions, had fallen asleep. I put my hand upon his knee and shook it, to tell him that the Galena had signaled. He asked me what I

supposed it meant, I told him that I thought they had enough of it; and I thought one of our shots had exploded some ammunition on her decks and that she was pulling out of the fight. We afterwards ascertained that of the 28 shots from our heavy columbiads, 18 of them had penetrated her, and she did not leave a minute too soon to prevent her sinking before getting around the bend out of range of our guns.

The Monitor amounted to little in this fight, for she could not get elevation for her guns. Probably if she had exposed herself a little more we might have burrowed up her decks or wedged her turret with some of our heavy shot.

The Aroostook, lying in the bend near Chaffin's Bluff, had burst one of her guns, disabling some of the men stationed at it.

Returning to where the darkey had cut out with the little iron gray mule and put through the woods, Midshipman (James C.) Long and myself proposed to take a stroll through the woods to see what havoc had been wrought, the fight being over. We were greatly impressed with the fact that if they had cut their fuses to explode 100 yards short, it would have been almost impossible for us to remain at the guns. As it was, they exploded immediately over our heads and we only received the effects of the balls whose flight had been neutralized by the exploding charge, causing them to fall almost harmlessly among us.

The woods immediately behind us had been literally torn to pieces. As we passed along through the woods a soldier arose from behind a large white oak tree, and asked us how things were getting along? He said he had just come from Petersburg and was trying to get to his command, but that the fire was so hot he thought he would sit down there until it was over. We told him that the gun-boats had been driven off and that there was nothing more to fear; that in a few days the place would be made so strong that there would not be room enough in the river to attack us again.

He then pointed out to us the same little iron-gray mule, with both of its hind legs shot off, and told us that he could not help laughing when the darkey came by with all speed, and when the cannon-ball cut off its legs, he went over her head like a flying squirrel. He said he didn't think that darkey touched the ground within 20 yards, and that he hardly touched it before he was up and gone.

After the arrival of the Virginia's crew at Drewry's Bluff we had neither tents nor rations, and the rain was incessant. Our gallant commander, Catesby ap R. Jones, seemed greatly worried or annoyed by the criticisms put upon the Virginia's officers, criticisms referring to the fact that they had destroyed her. We labored night and day, almost without rest or sleep, not having a dry thread upon us, nor anywhere to lie down except in the mud. I directed some of the

men to get some forks of trees and drive them in the ground, and go to the nearest fence for some broad rails, and what rest and sleep we found was in sitting upon them. We kept up a roaring fire and so kept dry—at least one side at a time!

We had nothing but a few barrels of hard-tack to eat, and the second morning after reaching there some of the sailors came and asked me if we could not let them have some of the guns and some ammunition and that they might go out in the woods and shoot some squirrels or something to eat? I immediately mentioned the matter to Captain Jones who was not in the most amiable frame of mind at the time, and he told me to give it to them if I thought proper. So I selected from our outfit of arms some smooth-bore muskets, and gave them some powder and some No. 2 shot which were the smallest we had. During the day we heard some one banging away in the woods, and after dark, when the sailors were congregated around a blazing fire, I touched Midshipman Long, who was the only other officer besides Jones and myself at this gun, and told him I thought I smelt something mighty good cooking, and suggested to him that we walk over to the fire where the men were and find out what it was.

I found the men had secured a fine sheep; in fact, the delicious odor of the mutton was almost irresistible. I asked them where they had got it, and they told me there was

a flock of sheep, about a hundred, in a field near by, and that they had shot one of them as the men were becoming quite desperate from hunger.

I could not blame them under the circumstances, so I suggested, after looking into the matter thoroughly, that they take a piece of the broader poplar bark which was as white as a dinner plate, put some of the hard-tack and mutton chops on it, and bring it where I was sitting. They did so, and I tendered it to Captain Jones, with the request that he would eat some of it. He asked me where the men got it? I told him that they had shot it in a near by field, and that possibly under the circumstances they were justified in doing so. He positively refused to touch it. I told him that in our exhausted condition it was absolutely necessary that we have food and that if we did not succeed in repelling those gunboats the owner of those sheep would lose his whole flock. He might, I said, at least sacrifice one sheep to fortify us for the fight, and possibly he would receive ample remuneration when he presented his bill for payment. I think the owner was so much rejoiced afterwards, at the result of the fight, that he was only too glad to have contributed a sheep as his donation.

The next morning after the fight General Lee and Secretary (of the Navy Stephen R.) Mallory rode up to where I was standing, at the upper ten-inch columbiad, and asked me about

the burning wrecks in the river; also as to where the Yankee gun-boats were, for they did not recognize them. I explained the situation as quickly as possible, as I had upon my mind a dozen things to attend to, for there was little ammunition left, no rations, no tents, and the crew were growing more and more dissatisfied and, sailor like, longing to get outside for a whiff of salt air. I referred them to Captain Jones, a few guns below.

After seeing to the careful storage of the goods brought by the steamer, I walked down to the lower guns (there were only four or five in all on the Bluff) to see what damage had been done and if any of my immediate friends had been killed. There were some fourteen or fifteen men laid out in a row, and as I walked around them I was struck with the expression on the face of one of them. It seemed impossible to look at him without laughing. I could hardly realize that he was a dead man, the laugh on his face was so contagious. I afterwards learned from one of the officers that something had occurred at one of the guns to arouse his laughter, and in the midst of it a shell had exploded and cut out his entire brain, leaving the face uninjured, with its expression of laughter.

The people of Richmond seemed to realize that we had saved the city from capture, and early in the after-noon wagon-loads of good things came down,—cakes and pies and

confections of all sorts accompanied by a delegation of Richmond ladies. They brought their tables with them, forks and pine boards, but when we looked upon the beautifully spread table, we saw that they did not realize our situation; that we wanted something more substantial, wanted meat and bread, not cakes and pies and sweets. We were soon supplied, however, with everything we needed, real food for soldiers.

The second day after the fight I went down to the landing to meet the boat from Richmond. We had not had time to dry off, and the morning was frosty and chilly, and I had nothing to keep me warm but a closely buttoned naval uniform, strapped closely, with belt for my sword and navy shooter. It lacked some time till sunrise, and I knew our hungry men would hear the steamer's whistle, for we knew she was coming down from Richmond with supplies, and they would reach the landing before me, if possible.

White standing on the beach, (Lieutenant Joseph W.) Alexander, commander of the Raleigh, lying off about 100 yards, hailed me and asked if he could not send a boat for me. I thought it would be a good idea to go aboard and get warm. Soon after getting on his deck he told me he had a bottle in his cabin, with a couple of good drinks of spirits in it, and proposed that, as the morning was so chilly and damp, we go below. Just before starting below, however, he happened to glance ashore; then he turned quickly to me and asked if that

was not the Secretary of the Navy on that old sorrel mare? I told him I thought it was, and he hailed the man on horseback and asked him if he would come aboard; that, if so, he would send a boat for him. He readily accepted the invitation, and upon getting aboard, after passing the usual courtesies of the morning, Alexander told the Secretary of the proposition he had made to me, that is, to go below and get warmed up. Having ridden all the way down from Richmond, some seven miles or more, he seemed to think it would be a good idea, so we retired to Alexander's cabin. The boy was called and the bottle produced, also three glasses and a pitcher of water. As Alexander had a warm stove in his cabin, the Secretary immediately removed his boots, complaining that his feet were very cold. He then remarked that the best thing to warm up one's feet was to put a drink of whiskey in one's boots. So he proceeded to put a drink in each boot, and, pouring out the remainder in a glass, he drank to our health. Alexander and I looked at each other in amazement. Probably that was all the whiskey there was in the squadron. I doubt whether the Secretary ever fully appreciated the joke,—if it were a joke!

I remained at Drewry's Bluff until about the middle of August, and in the meantime Captain Ferrand (Ebenezer Farrand), who was in command when the fight came off, had been removed by Captain S. S. Lee, brother of General Robert E. Lee, and

Drewry's Bluff soon became a second Gibraltar.

Besides some 30 or 40 heavy guns mounted in barbette, there was an iron-case battery constructed somewhat after the shield of the Merrimack, at an angle of about the same inclination, that is, 34 degrees, which, together with the elevation of about 200 feet from the river, reduced the angle of impact almost infinitesimally, and the pact of the heaviest shot upon its surface would hardly have been perceptible.

The distance between Drewry's Bluff and Chaffin's Battery, a straight reach of about a thousand yards, if filled with iron-clads, could hardly have made an impression upon Drewry's Bluff at that time. So the only means of attack was by land, and it was attempted by General B. F. Butler, who was handsomely "bottled" by Beauregard at Turkey Bend.

Our Navy's Worst Headache

The Merrimack . . .

By

Albert L. Demaree

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A Tense Cabinet Meeting

What was the reaction of official Washington to the world-stirring event of Saturday, 8 March? How did the Lincoln government receive the shocking news of the havoc Merrimack wrought on its wooden ships that day? Word of the Navy's worst defeat until that time had reached Washington on Sunday morning. A cabinet meeting was called immediately. It was during that session that the Monitor-Merrimack battle took place, but no word of it reached Washington until late Sunday afternoon, when Fox reported on the battle in the first message over the newly completed Hampton Roads-to-Washington telegraph line.

Alarm characterized the atmosphere during this grave and prolonged cabinet meeting. Gideon Welles, Secretary of the Navy, spent a troubled day. William H. Seward, Secretary of State, always buoyant and talkative, became quiet, obviously overwhelmed by the turn of events. The tall, handsome, and humorless Secretary of the Treasury, Salmon P. Chase, itemized in great detail, ship by ship, the cost of Saturday's battle.

Secretary of War Edwin M. Stanton (according to John Hay, the President's private secretary) acted "fearfully stampeded" and was full of dire predictions. He was certain that Merri-mack would destroy every vessel in the Union service, lay under contribution the great cities on the Atlantic coast, come up the Potomac River, disperse Congress, and knock the

dome off the Capitol. It was clear to him that the "whole character of the war" had been changed. So imminent seemed the danger that he expected a cannon ball to land in the White House before the end of the meeting. Repeatedly, he and the President went to the window to assure themselves that Merrimack, at that very moment, was not coming up the river.

After much discussion, President Lincoln, weary and troubled, anticipating the southern vessel's next move, called for his carriage. Leaving the room, his head down, he muttered, "Frightful news," and then drove to the Navy Yard to seek the advice of Captain Dahlgren, the Commandant. He received no encouragement.

The blame for Saturday's defeat rested squarely on Welles and his Navy. The blustering Secretary of War, while pacing the floor, eyed the Secretary of the Navy with distrust. In addition, he felt utter contempt for the two-gun, Monitor which had recently been completed and was, even then, at Hampton Roads facing the "ugly monster." Turning on Welles with unrestrained scorn, the Secretary of War demanded that he explain his plan for checking the southern ironclad and preventing her from reaching Washington.

Welles reiterated his confidence in Monitor and insisted that, in any event, he didn't believe the heavily armored Confederate vessel could survive a trip northward. This only

angered Stanton. "Grandfather" Welles—always conspicuous with his silvery whiskers and elaborate wig which was never quite securely anchored—suffered keenly under the railing inflicted upon him. He rarely offered a retort.

Stanton's disdainful attitude toward Welles was no doubt due to the fact that he knew that the man who really ran the Navy Department, and to whom Lincoln turned for advice on naval affairs, was G. V. Fox, who was still in Hampton Roads. Welles seldom if ever took action on purely naval affairs without Fox's knowledge.

Stanton Acts to Protect the North

Having no faith in Welles and the Navy, Stanton decided that, if the North were to be protected from the southern ironclad, the War Department would have to take over the Navy's responsibility. Not always sensitive to proprieties touching problems of other departments, he went into action and had a busy Sunday of it.

The battle between the two secretaries that day—which rivaled that of Monitor and Merrimack—was one of many conflicts. The newly-appointed Stanton not only entertained a great dislike for the Secretary of the Navy, but also felt (as Welles himself said) that the "Navy was secondary and subject to the control and direction" of the Secretary of War. President Lincoln, however, supported Welles's view on departmental equality and often acted as peacemaker. Since Welles was

under attack nationally during the following weeks, Stanton seized this opportunity. Their relationship did improve, but Stanton's arrogant attitude and his tendency to "run" other departments continued to cause friction.

As a first step in taking over the Navy's responsibilities, Stanton wired the Governors of New York, Massachusetts, and Maine advising them to take immediate steps to defend their harbors against the "southern monster" by building large timber rafts and other devices. Next he turned to the defense of the Capital. In this instance, he ordered Captain Dahlgren to obtain "some sixty" canal boats which were to be loaded with stone and sunk in the river below Washington. When the surprised Welles received word of Dahlgren's activities, he immediately cancelled the project. In a conference with Lincoln and Stanton the next day, however, the President stipulated that the work should go on, but that the boats were not to be sunk until it was known that the ironclad was approaching. Then the busy Stanton wired Henry B. Renwick, a prominent New York engineer, to call together leading naval engineering brains to discuss secretly the "best plan of speedily accomplishing the capture or destruction of the Merrimack." He was urged to "communicate hourly" with the War Department. The fear which gripped the Capital that Sunday began to spread rapidly through the North, especially to the coastal cities.

In fairness to Stanton, it should be remembered that the responsibility for shore defense fell to the War Department. Then, too, his great concern both for the security of Fortress Monroe and the safety of General McClellan's proposed peninsula campaign is understandable.

Toward the close of that endless, gruelling Sunday, the word came from Assistant Secretary of the Navy Fox, giving an eye-witness account of the famous Monitor-Merrimack duel fought that morning—while the cabinet was feverishly evaluating the impact of Saturday's catastrophe. How did the Lincoln government receive the news of Sunday's battle? The message, when first received, somewhat lifted the tension in the cabinet, but it came far from ending the alarm since the stark fact remained that the dreaded Merrimack had not been destroyed. She was not seriously injured according to observer Fox who was closest to the enemy—at his vantage point in the tug—save those stationed in Monitor. And she still lurked menacingly in Norfolk harbor. Nor had the skepticism of many naval officers concerning the capabilities of Monitor—sometimes dubbed "Ericsson's Folly"—been dispelled.

The government at Washington remained apprehensive because of the indecisive encounter. President Lincoln, always the realist, moved with caution. Fearing another test of strength, he at once ordered that Monitor "be not too much exposed" and that she not go "sky-larking" up to Norfolk

unattended. He was deeply disquieted to hear the wounded Lieutenant Worden say that Monitor could be "boarded and captured very easily." Flag Officer Goldsborough, commander of the Union forces in Hampton Roads, also agreed that it was unwise "to count too largely on her prowess" since she was "scarcely enough for the Merrimack!"

The Press and the People Receive the News

The story of the two battles "broke" in the Monday morning papers. Of course, the northern press widely proclaimed a complete victory for Monitor and the people's enthusiasm was unbounded. "The Monitor Victorious, The Merrimac towed off in a sinking condition," characteristically headlined the New York Daily Tribune. Many papers reported that Merrimack was "fatally wounded." The Philadelphia Bulletin observed that she was "now a much sadder and wiser Mac"; and the Boston Morning Journal categorically said that the "career of their iron monster was ended." Monitor was now a hero and publicly acclaimed the savior of the Union.

The press in unison "shuddered" to think that Monitor might have arrived too late or that it might have been defeated that Sunday. If either tragedy had occurred, it was generally agreed that the southern vessel would have hastened to bombard Washington, New York, and the other Union cities, leaving them in ashes while, at the same time, levying on

other coastal cities for money to continue the war.

Such a venture, said the New York Daily Tribune might have gone far toward winning the war for the Confederacy if Monitor had not arrived "just as she did and proved herself the miracle" that she was. The New York Times noted that the national cause had had both "an escape and a triumph" and declared that the arrival of the northern ironclad was a "Providential occurrence." Commonly used terms in the first reports of the Monitor-Merrimack battle were "interposing hand of Providence," the "hand of God," "Divine interference" and so on.

The southern press and people were likewise jubilant, hailing the battle as an "overwhelming victory" for their side, anticipating still greater conquests. Their early reports of the duel were also highly exaggerated. The Raleigh Standard, for instance, maintained that Merrimack was a "perfect success," boasting that after she had rammed Monitor, the latter (with all hands at the pumps and in a sinking condition), headed "instantly" homeward.

Public Clamor over Naval Unpreparedness

Even while the North was rejoicing over the "victory" of Monitor, there was arising a demand for an explanation of how it happened that Merrimack caught the Union Navy by surprise. Casualties for the North totaled possibly 400; for the South,

less than a dozen. It was known that the naval authorities at Hampton Roads had received ample warning of an impending attack. Indeed, the day before, word came that Merrimack's flags were flying, that she had taken on a crew and was ready for action.

But when the southern ironclad emerged the next day at noon, Commodore Goldsborough was many miles away in the Carolina Sounds, covering the Roanoke Island operations and aftermath. Captain William Radford of Cumberland was attending a court-martial in Roanoke and although he rode posthaste on horseback, he arrived just as his ship was sinking. The tugs which had been ordered for towing the sailing vessels out of danger were nowhere in sight.

Officers in the French sloop-of-war Gassendi, anchored in the Roads, noticed Merrimack's coming 15 minutes before a Union gunboat fired the warning signal. They were surprised to witness the confusion and lack of teamwork among the Union ships.

The Boston Evening Transcript called Saturday's performance "criminal stupidity" and "exceedingly mortifying" to the American people. "Why was the Congress placed in such a dangerous position with only half her complement of men?" it queried. "Why were our naval commanders entirely surprised by the attack, when they should have been fully apprised of every movement of so formidable a combatant as a mail-clad steam vessel

of war?" The Newark Daily Advertiser in disgust asked, "Are we of the North, awake or asleep? Are we alive, or are we dead?" The World (New York) came out denouncing the Navy Department, saying it deserved the severest censure since the "press had teemed with repeated warnings" for several months.

The northern ships were not stripped for action. Cumberland and Congress had boats hanging to lower booms, and unsuspecting tars were on deck washing clothes, some of which was drying on the rigging. The New York Daily Tribune wailed that it could not understand how our principal ships were caught "without steam up and without pilots," adding that the surprise seemed "to have been complete." Then it asked;

Who was responsible for the Roanoke's lying four months in Hampton Roads with a broken shaft? . . . Who ran the Minnesota aground in water that should have been as familiar to her pilot as the bottom of his wash basin? Who ought to have kept a lookout for the Merrimack, and known just how she was to be met in case she came out?

Not only was Roanoke without a functioning engine in this crisis, but her crew was 180 short of full complement. She was depending on two tugs to haul her into action if Merrimack should sally forth. When the latter did so on 8 March, Roanoke soon grounded and her commanding officer, Captain Marston, the senior officer in Hampton Roads, never reached the scene of action. The Philadelphia Daily News sarcastically inquired, "Who ever heard of a blockading squadron all aground."

"Why is the Country, at this terrible hour, cursed with such slackness of defense?" cried the Boston Post. The Boston Daily Advertiser, angered by the tragedy, exclaimed that the story read as though "everyone in the vicinity of Fortress Monroe was asleep on Saturday morning" and that the "Provi-dential" arrival of Monitor in no way removed the "deep stain" left by the disaster. In similar vein, The New York Herald demanded a good reason for the "absence of anything in the shape of an ironplated ship."

No one could assert that the northern vessels were on the alert that Saturday—notwithstanding the repeated warn-ings during a period of several months. Fox later wrote that some of the naval authorities at Hampton Roads had not taken the threat of the ironclad seriously and had even "laughed at the Merrimack's coming." That the northern forces were caught napping that afternoon seems clear. That the tragedy and defeat that day could have been prevented seems, even a hundred years later, equally clear.

As in all disasters, charges of skulduggery arose and accusations of disloyalty in high places occasionally ap-peared in the press.

The Bangor Daily Whig and Courier (Maine) referred to Saturday's fiasco as inexcusable carelessness or "something worse" and several days later presented "evidence" of gross incompetency, if not the "blackest treachery." In an angry

editorial, the Philadelphia Daily News spoke of the disaster as unwarranted stupidity or "unheard-of treason." Referring to Captain Marston of Roanoke, it asked, "Was he afraid to meet the enemy?" And again, "Did he desire that the secessionists should obtain a victory over the Government?" This attack was concluded with a demand that Captain Marston be "cashiered as an unfaithful officer." The Daily Missouri Democrat (St. Louis) called its readers' attention to the "mystery" of Minnesota's running aground by an experienced pilot "as if on purpose." It hinted that perhaps this was done to prevent her from lending aid to the distressed Cumberland and Congress. The Philadelphia Inquirer observed that these two ships were so stationed in the Roads, "as to invite their sad fate." The Sunday Dispatch (New York) felt strongly that President Lincoln should dismiss Welles from his cabinet and "cause Commodore Goldsborough and Captain Fox to be cashiered."

Stunned and distressed, the Congress in Washington demanded the facts. The U. S. Senate on 11 March, adopted a resolution offered by Senator Henry Wilson (Massachusetts) to investigate the circumstances of Saturday's "deplorable calamity" and to determine responsibility for the tragic disaster.

Welles Under Fire

The brunt of the criticism naturally fell upon the

sensitive Secretary of the Navy. At the moment, he was under attack principally on three counts; first, the naval forces at Hampton Roads on Saturday were neither prepared nor on the alert; second, Monitor had made a belated appearance; third, this was the only ironclad available to meet the national crisis.

Some said Welles's ideas were too conservative, that he was a man of the "old sailing wooden ship school," that he was "behind the age," that he was out of touch with the "spirit of the times," and that, at the age of 60, he was too old for the post.

The Boston Daily Evening Traveler claimed that eminent authorities had urged upon Welles the need for ironclads when he took office, but that his advisers "sneered at vessels of this class," pronouncing them "humbugs."

When bemoaning the tardy arrival of Monitor, the New York Herald asserted that Mr. Welles possessed the means of creating half-a-dozen ironclads months earlier, had he understood the problem and comprehended the immense advantage of these vessels.

What alarmed the Boston Evening Transcript at this critical time was the unwillingness of those in authority to adopt new methods or to investigate proposed improvements. The discouraged Boston Daily Evening Traveler lamented that the "misgivings" regarding the Navy's ability to meet the

emergency were increasing.

The northern press was also restive because of what was called the Navy's want of initiative. The New York Times wanted to know why the Confederates were permitted to refit and strengthen the disabled Merrimack at leisure. "Why," it said, "if our mailed champions are what they are represented to be, do they not seek the enemy, and at once terminate the general suspense?"

Some accused the Navy Department of laxness, saying that it had been "taken in" when the Confederate authorities several weeks earlier had "planted" a false report in the southern press to the effect that Merrimack was a complete failure. This ruse, it was said, caused the gullible Secretary to relax.

Several weeks after the "fateful Saturday," The New York Times thus summarized the country's lack of confidence in the Navy Department:

What the next naval disaster may be, we shall all know after it occurs. The Merrimack is about to run out of Norfolk again; and, though the Navy Department assures us, with a solemn nod, that everything is in readiness for her, it must be said that the previous utterances of that Department have not been so strictly verified as to afford any great confidence in its present assurances.

Finally, the Times pointed out that the "long series of National disgraces" which the country had experienced, were not due to our Navy, but to the "administration of our Navy Department."

And, late in March, the Boston Evening Transcript, having often alluded to the "incapacity of Secretary Welles," observed that the "press of all shades of political opinion" was now censuring the Secretary of the Navy.

Welles was under great pressure to resign. The New York Chamber of Commerce resolved that the chief cause of the disaster at Hampton Roads lay in the "culpable neglect" of naval authorities. In Boston, a petition was circulated requesting the Secretary's removal. Frank Leslie's Illustrated Newspaper summed up the hostility toward Welles as follows:

Retire, O Gideon, to an onion farm,
Ply any trade that's innocent and slow,
Do anything, where you can do no harm,
Go anywhere, you fancy—only go.

Stanton Attempts to Eliminate the Merrimack

The Secretary of War became increasingly convinced that the crisis precipitated by Merrimack was too big a job for Welles and the Navy. His distrust of Monitor was heightened when word arrived on 10 March from Engineer Renwick's committee in New York indicating that the northern ironclad was not, in their opinion, equal to her assignment. Having written off Monitor, Stanton decided that the War Department would have to destroy the "ugly monster" independently.

Following in the same vein, he felt that naval officers were not up to an emergency of this sort, being "circumscribed by their education" and handicapped by their training. It was

his opinion that Goldsborough was "too old and pompous to fight." Rather, Stanton reasoned, he would put his confidence in the ideas, initiative, and drive of big businessmen. It was logical, therefore, that he should turn to Cornelius Vanderbilt, the millionaire steamboat-king of New York City.

So it came about that six days after the Monitor-Merri-
mack duel, Stanton made a frantic appeal to Vanderbilt to save the U. S. fleet and prevent the ravaging of northern coastal cities, with this telegram from the War Department:

War Department
March 15, 1862

C. Vanderbilt, Esq., New York:

The Secretary of War directs me to ask you for what sum you will contract to destroy the Mer-
rimack or prevent her from coming out from Nor-
folk, you to sink or destroy her if she gets
out?

Answer by telegraph, as there is no time to be
lost.

John Tucker
Assistant Secretary of War

For the War Department to negotiate a contract with a private citizen for the destruction of an enemy warship was to introduce as revolutionary an idea into war-making as the ironclads themselves had heralded.

It is probable that Vanderbilt received the telegram from Washington with warm satisfaction. Never noted for his modesty or lack of confidence, he was not one to hesitate a moment in a situation like this. This telegram was sent immediately:

March 15, 1862
New York City

Hon. E. M. Stanton:

Mr. Vanderbilt desires me to say he can make no satisfactory reply to the inquiry made of him, but will be in Washington on Monday next to confer with the Department.

W. B. Dinsmore

Who was this Cornelius Vanderbilt who singlehandedly was to take over the Navy's task of destroying Merrimack and upon whose broad shoulders the fate of the nation now seemed to rest? He was a successful New York businessman of 68—loud, arrogant, profane, eccentric, vain, tobacco-chewing—internationally famous in merchant-shipping circles. He had become a millionaire of tremendous power and influence. Indeed, he had amassed the first of America's colossal fortunes.

Upon his arrival at the Secretary of War's office in Washington, Vanderbilt immediately informed Stanton that he had little time to waste and hoped that the worrisome problem could be handled expeditiously. He readily agreed to see the President, and the two hurried to the White House. Welles was not invited to the conference.

The President promptly put this question: How can you stop this rebel ram, and for how much money will you do it?" Vanderbilt replied that he felt confident he could protect the fleet and prevent Merrimack from leaving Hampton Roads; also, that he would charge nothing for his services and was happy to help the government in this emergency. The President,

relieved, inquired how he would do the job and Vanderbilt answered:

I will take my ship, the C. Vanderbilt, cover her machinery, etc., with 500 bales of cotton, raise the steam, and rush with overwhelming force on the iron-clad, sink her before she can escape, or cripple us.

Before undertaking this important mission, he wished it clearly understood that Monitor had to be out of the way when he was doing his work; neither did he want any interference from other naval vessels; he refused also to be subjected, in any way, to control from naval officers.

Five days after the White House conference, Stanton, at the direction of the President, confirmed by letter the agreement with Vanderbilt. He expressed Mr. Lincoln's thanks for the renowned Vanderbilt, specifying that she would be employed in the service of the War Department, but under the steamshipking's "supervision, direction, and command." He was assured that the Navy would not handicap him in any way.

On 23 March the War Department's newly acquired Vanderbilt arrived at Hampton Roads. She was equipped with a ram and her bow filled in solidly, guns mounted, and other changes made.

When Vanderbilt learned that his ship would be working "temporarily" with the Navy, he conferred with Commodore Goldsborough. They were in complete agreement relative to the proper handling of the vessel and the wealthy New Yorker,

having been agreeably impressed, rated the Commodore a "trump." Surprised at finding the Union's naval forces so strong, Vanderbilt concluded that Merrimack would not venture out again. So, after giving detailed instructions to Captain LeFevre, who commanded Vanderbilt, the steamboat-king returned to New York to more important duties.

The North Becomes Jittery Again

Almost simultaneous with the joy and satisfaction of the little Monitor's "victory" came realization that another test of strength was almost inevitable. It was generally known that the "defeated" Merrimack was in the process of being repaired and made more formidable, and the Union people therefore soon realized that they were still in jeopardy.

The press agreed that the "plucky little Monitor" had done well against the giant Merrimack. It agreed also that this small vessel alone stood between the defenseless North and the powerful ironclad. It was recognized, however, that Monitor might readily be disabled, thus rendering the Navy at Hampton Roads powerless. In turn, the coastal cities would be in danger.

The consensus of the press was summed up by the Providence Daily Post when it wrote that it could "almost worship" Monitor in gratitude for her service that Sunday, but it hastened to point out that Merrimack was larger and heavier

and, under favorable circumstances, might run down the northern vessel. It concluded that it would feel safer with a dozen ironclads on the coast.

Immediately after the famous battle, the press, conscious of the Union's narrow escape, came out almost unanimously for a big ironclad building program which the worried governors of the coastal states readily supported. Along with others, The New York Herald demanded that henceforth "not a single wooden vessel" should be built; The World (New York) agreed that every dollar put into wooden hulks "except for transports and tugboats" might as well be thrown into the sea. A little later it observed that Monitor cost \$275,000 but had proven herself "worth one hundred million." (By the end of the year, some 30 greatly improved ironclads were underway, each containing the most significant feature of the first Monitor—the revolving turret system of mounting guns.)

The Lincoln government from the first had understood the import of what happened on 9 March. On the other hand, a full realization of the facts came by degrees to the public, causing a gradual turning from over-confidence to grave apprehension concerning their safety. The old haunting fears returned.

Moreover, the public was learning that the Lincoln government was greatly disturbed because of the situation at Hampton

Roads and that the governors and mayors of the coastal states and cities were worried—demanding the protection of ironclads. One week after "Black Saturday," Welles wrote to Goldsborough: "There is a degree of apprehension in regard to the armored steamer Merrimack which is difficult to allay." The tragedy of 8 March, as many newspapers pointed out, was still a vivid memory. And the unwillingness of the Washington government to order Monitor to seek out and fight the southern vessel had a continuing disquieting effect.

Meanwhile, more and more people began to question Monitor's ability to defeat or even check the newly strengthened Merrimack were she to venture forth again. The general anxiety was evidenced by thousands of schemes and suggestions for destroying the southern menace, which poured into the Navy Department during these unhappy weeks. Fantastic and impractical as most of them were, they did indicate that the public was uneasy and lacked confidence in the Navy's ability to meet the crisis.

Newspaper editors, while assuming the role of Naval experts, advanced their suggestions for nullifying the danger of the southern ironclad. They advocated schemes such as the capture of Norfolk; the obstruction of the channel leading from Norfolk; the use of ocean rams; and, as already noted, the building of many ironclads. The Navy Department was pressured from many areas. On one occasion, Welles received

a delegation of "highly respectable gentlemen" from Boston, Philadelphia, and New York (headed by Mayor Opdyke of the latter city), who presented their pet scheme—a plan for sinking ships in the channel out of Norfolk—in order to thwart Merrimack.

The South appreciated fully the ironclad's worth as a weapon of torment. Judah P. Benjamin, the Confederate Secretary of War, commented upon the "vast advantages" gained from the "enemy's fright at the bare idea of the Virginia reappearing" in Hampton Roads. Their Secretary of the Navy, Stephen R. Mallory, gloated over the "wholesome fear" the North entertained for their vessel of war.

No Repeat Performance

Since neither Monitor nor Merrimack was clearly victorious on 9 March, it was logical that each would initiate new tactics, should they meet again—which each was willing to do, under respectively propitious circumstances. In both cases, the new tactics involved the use of additional vessels to insure victory.

In the case of Monitor, definite instructions from Washington had ordered her to fall back if Merrimack appeared and to engage her "seriously" only when found in a position that would permit Vanderbilt and similar ships to ram her. Before the end of March, there were seven steamships available to act

as rams under Goldsborough. Boarders were to be repelled with scalding water from especially designed hoses.

Merrimack, on the other hand, had orders to entice Monitor into deep water where she could be boarded readily and captured. This was to be accomplished with the aid of 150 volunteers who would accompany the southern vessel and her satellites. At the proper moment, they were to board the northern ironclad, throw combustibles down the ventilators, wedge the turret, and blind the steersman by throwing canvas over the pilot house, thus taking over the vessel.

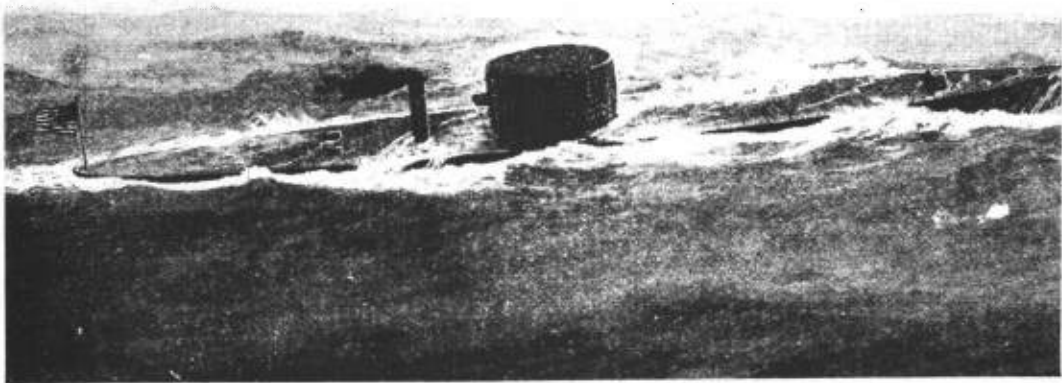
It was evident that a second encounter between the gladiators would not be a repeat performance. The coup de grace was, in each case, to be delivered by forces other than the ironclads themselves. Apparently each ironclad sensed her opponent's tactics and feared each other's consorts more than she feared her former antagonist.

Several times during the next two months, the Merrimack came out looking for trouble, but she did not engage Monitor. Nor did she tempt the latter's attendant ships to strike by placing herself where she could be rammed. Both sides practiced caution; especially Monitor. Each was willing to fight on her own terms. So each awaited an opening that never came. In the case of both governments, each held its chief hope (its ironclad) in leash, since the safety of certain respective, strategic areas depended on the survival of their protector. A disaster to Merrimack would have exposed Norfolk,

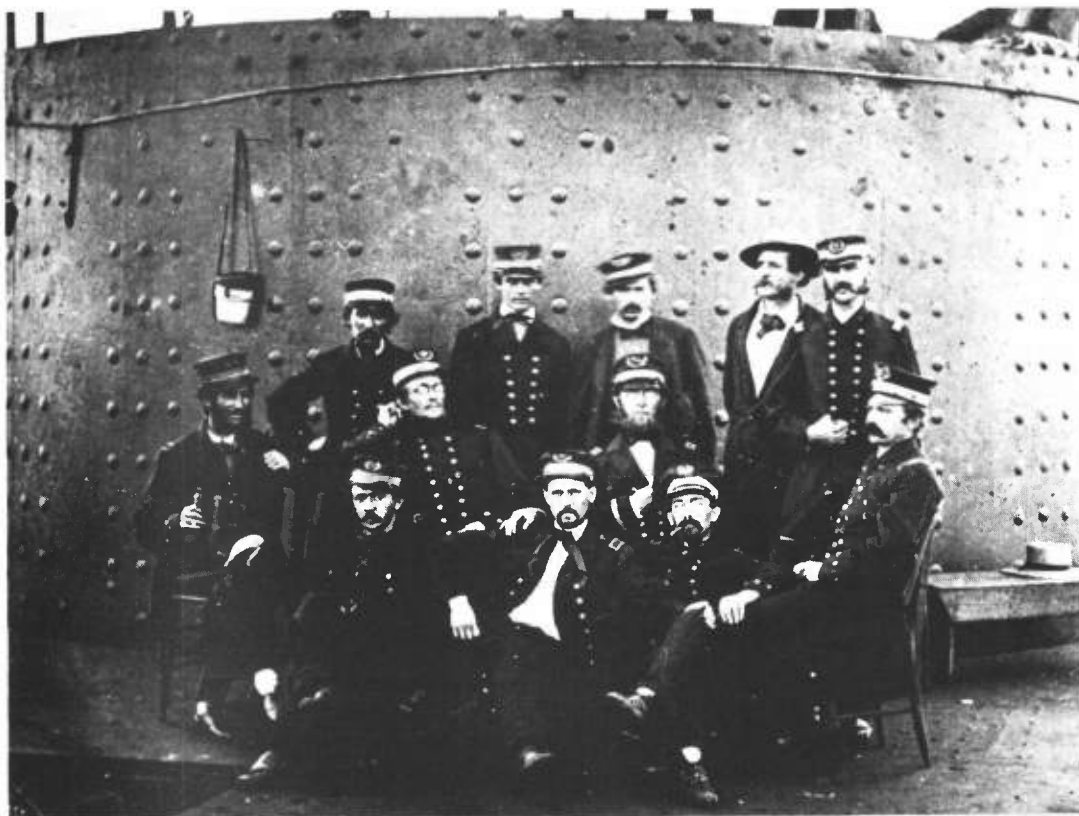
the James River, and perhaps Richmond. The loss of Monitor probably would have endangered General McClellan's operations.



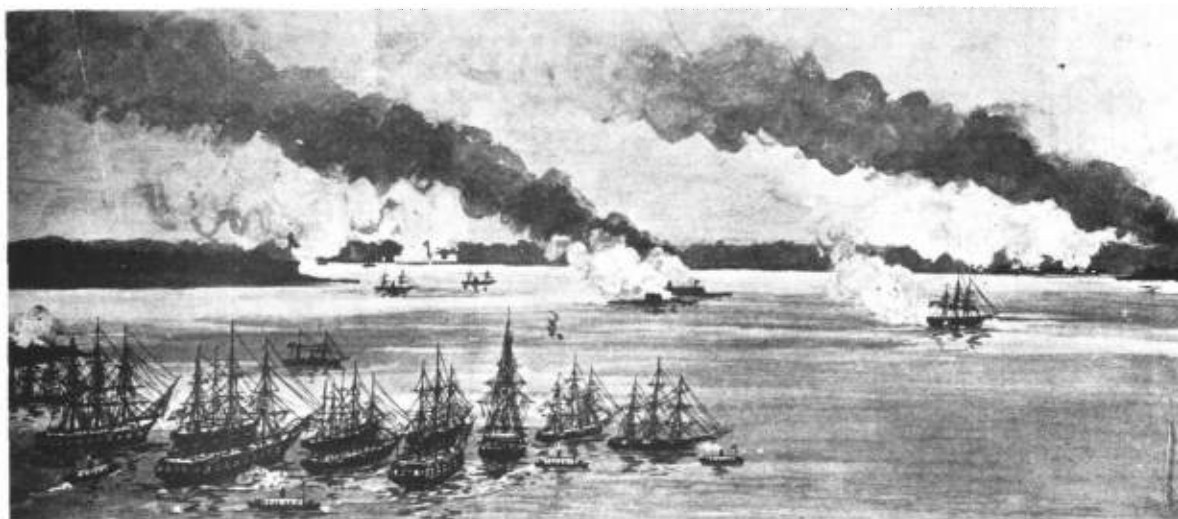
Ruins of Gosport Navy Yard
U. S. National Archives



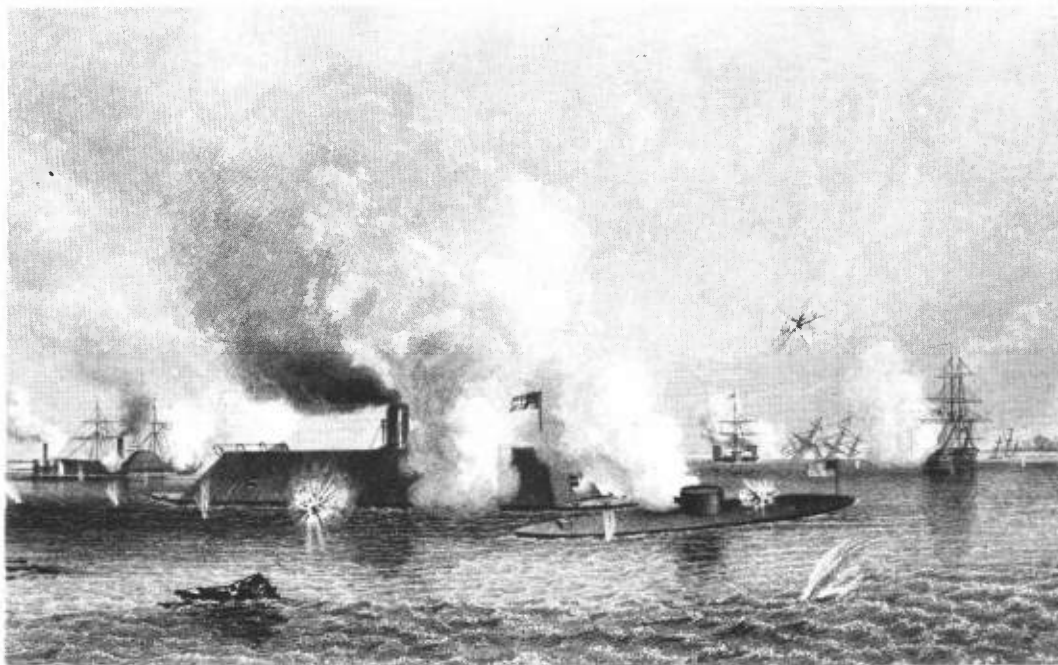
Contemporary Engraving of Monitor



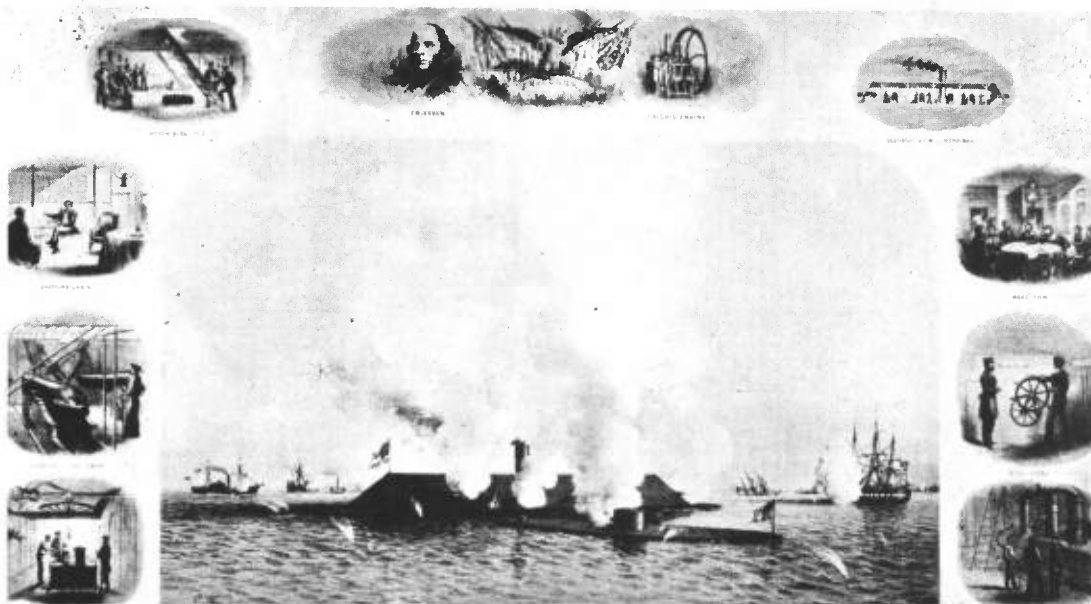
Officers of the USS Monitor in 1862.
 Top Row, (l-r) Master L. N. Stoddard, Seated
 in chair; Ensign George Frederickson; Ensign
 M. T. Sunstrom; Lt. S. D. Greene; Lt. L. R.
 Newman; Engr. J. Newton
 Second Row, (l-r) Paymaster Wm. F. Keeler
 and Lt. Wm. Flye.
 Front Row Seated on Deck, (l-r) Ensign R. W.
 Hands; Master A. B. Campbell; Master E. V.
 Gager; and Dr. D. C. Logue seated in chair.
 Lib. of Congress



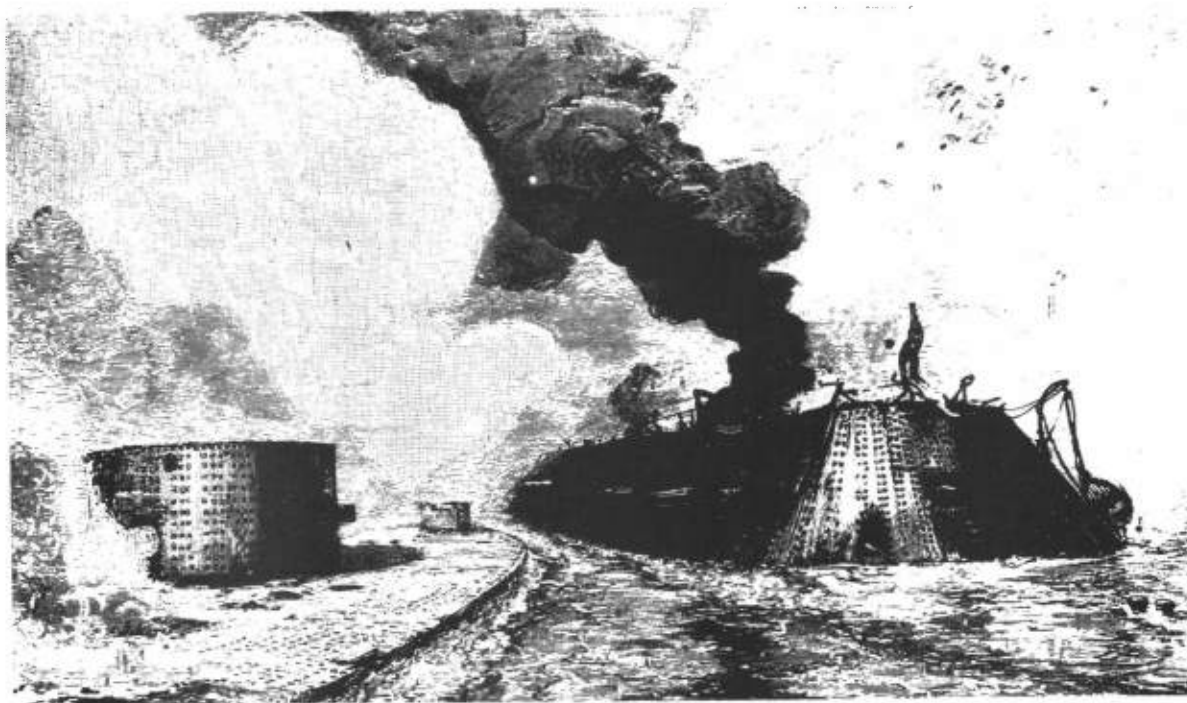
Battle Panorama of Hampton Roads
 U. S. National Archives



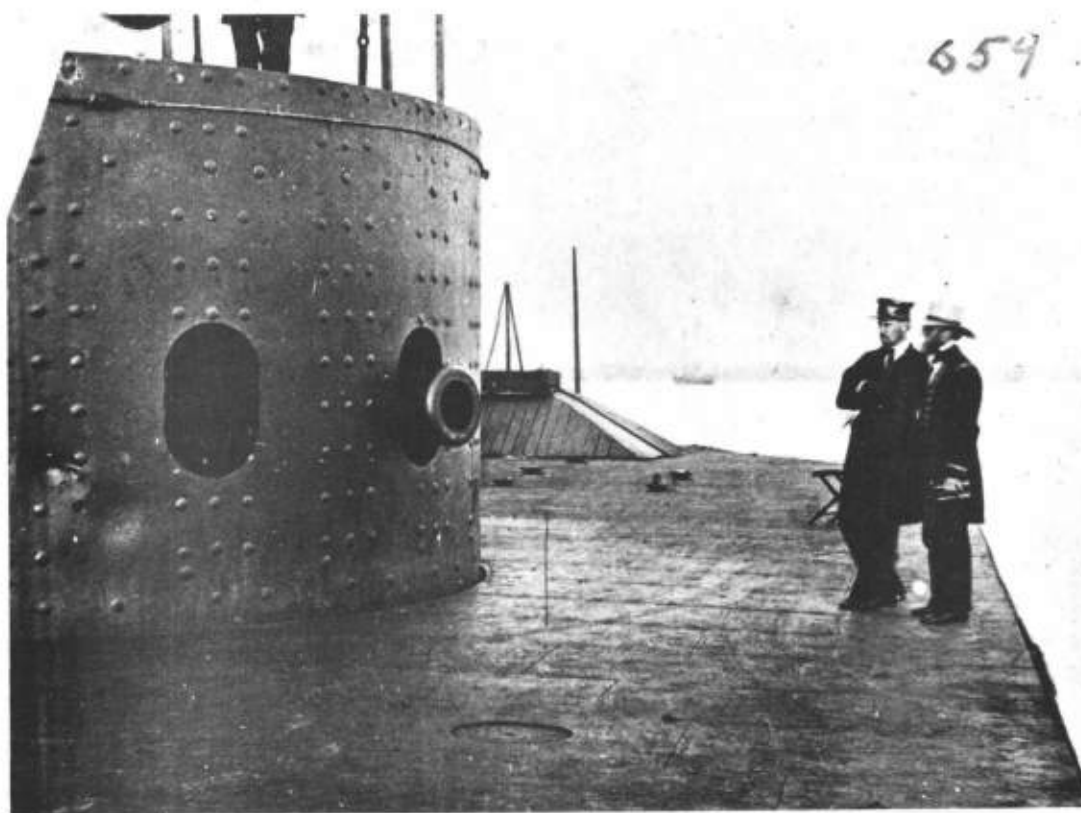
Contemporary Engraving of the Battle
U. S. National Archives



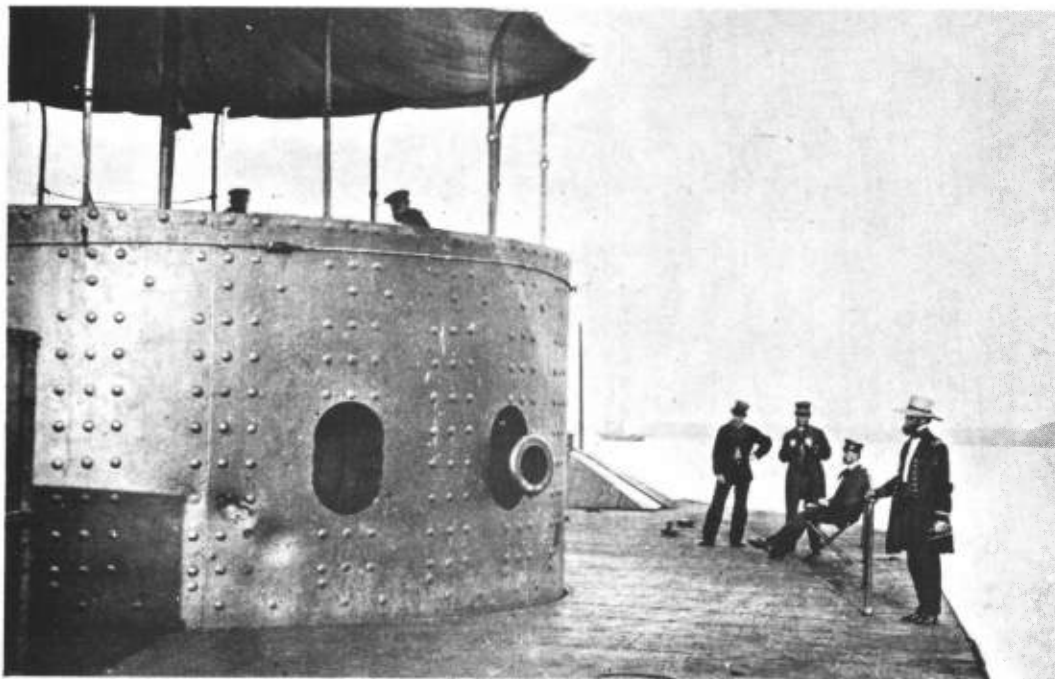
Contemporary Engraving of the Battle Showing
Interior Views of the Monitor
U. S. National Archives



Contemporary Engraving Showing Battle at
Close Quarters
U. S. National Archives



On the Deck of the Monitor Volunteer Officers
Lt. Wm. Flye with binoculars and Asst. Engi-
neer A. B. Campbell with folded arms.
Lib. of Congress

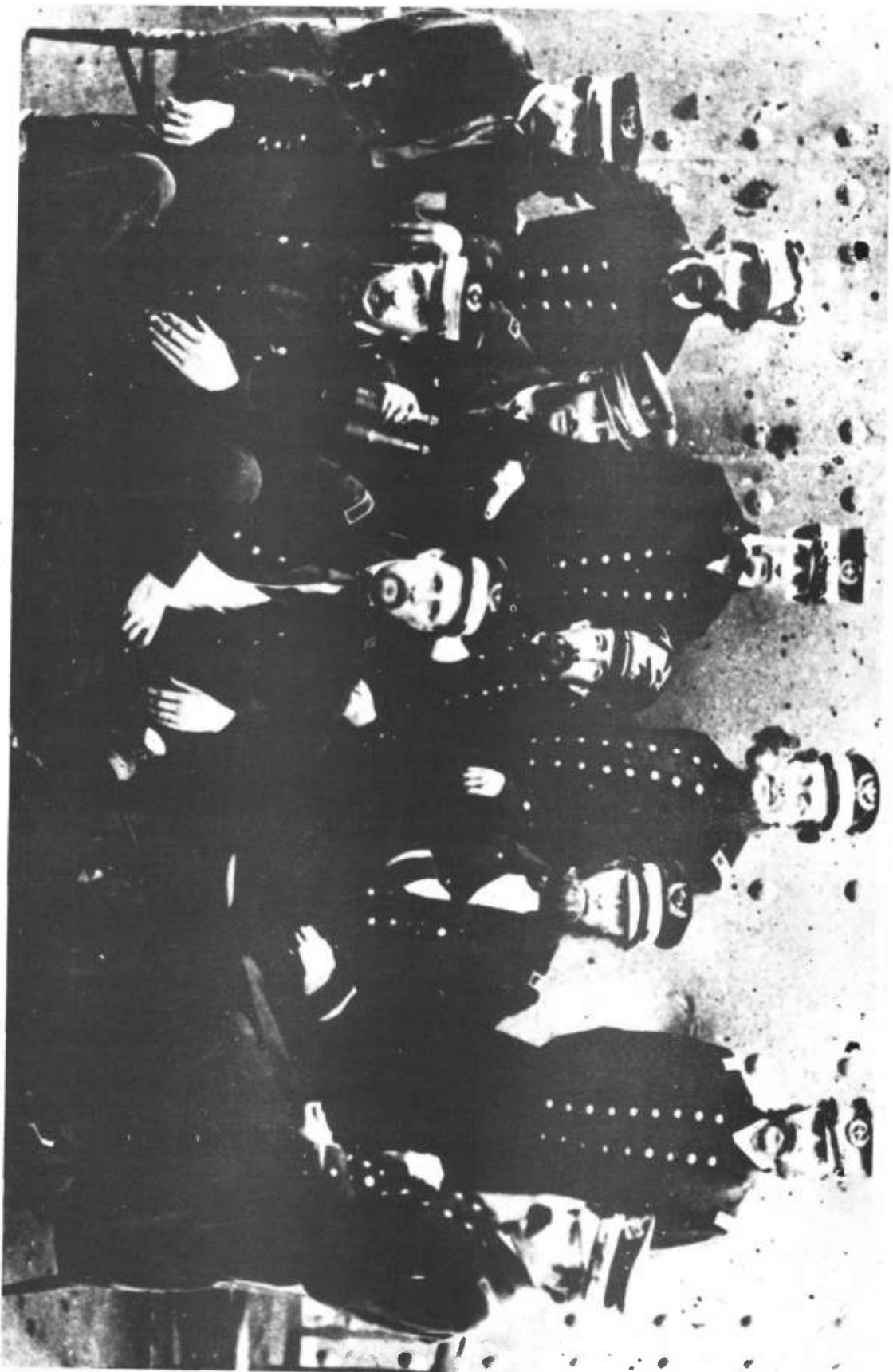


Deck Scene Photograph by James Gibson on the
James River 9 July 1862
The Officers are: (l-r) R. W. Hands, L. N.
Stodder, A. B. Campbell, Wm. Flye
Lib. of Congress



Crew on Deck of Monitor. Notice gun port
detail.

U. S. National Archives



Officers of the Monitor - Top Row, (l-r)
Ensign George Frederickson, Asst. Engr.
M. T. Sunstrom, Paymaster W. F. Keeler,
Asst. Engr. J. Newton. Middle Row, (l-r)
Lt. S. D. Greene, Master L. N. Stoddard,
Master E. V. Gager, Volunteer Lt. Wm. Flye,
Surgeon D. C. Logue.
Seated on the deck, (l-r) Ensign R. W. Hands
and Engr. A. B. Campbell.

Lib. of Congress

- 10 March--Minnesota freed and towed toward Fort Monroe.
Monitor proceeded toward fort, anchored at 8:00 a.m.
- 11 March--Took on coal and proceeded to Newport News.
Returned to Fort Monroe at 7:00p.m.
- 12 March--Received telegraph message via boat that the Merrimack was coming out, raised anchor and went to meet her but no sighting or action reported.
Mechanics employed on board, at anchor.
- 13 March--Lt. Jeffers came on board and assumed command.
- 14 March--received 9 tons coal, 1 barrel oil and 100 hand grenades.
- 15 March--fog and a rain squall. Received more supplies, including 9 tons of coal.
- 16 March--changed anchorage to nearer the fortress.
- 17 March--Mechanics on board. Took moorings of the Brandywine.
- 18 March--All hands to quarters; exercise for turret division.
Mechanics on board.
- 19 March--"Gunboat Cunituck came alongside to get up the end of our mooring chain. Shackled on 15 fms. of her chains, with which we made fast to 1st slip.
8 steamers arrived with troops and several schooners with horses."
- 20 March--rainy weather.
- 21 March--Weather improving. Anchor buoy placed in Hampton bar in 5 fathoms water by tug. Shield of turret taken on shore. Anchored near the Flagship.
- 22 March--Became cloudy.
- 23 March--Weather squally.
- 24 March--"At 3 a.m. a schooner swung around and carried away our flagstaff."
- 25 March--Mechanics on board.
- 26 March--Received 15 tons of coal. Squalls.

- 27 March--(difficult to read).
- 28 March--Received a visit from General Hunter and his staff.
Mechanics on board.
- 29 March--Work being done on pilot house. "Large fire in
direction of Norfolk."
- 30 March--Disagreeable weather. Lightning.
- 31 March--Received shot, Rope sponges and rams.
- 1 April--"commenced on the 3^d and last course of iron on the
pilothouse."
- 2 April--"received a package of belting"
- 3 April--English ship of war got under weigh and went to sea.
"Received a visit from part of Gen. McClenan's staff.
our tender broke down & our boat has been off during
the forenoon."
"Received a visit from Major Gen. McClenan."
- 4 April--working on pilot house "Swell washing over deck
hatch, caulked down. delivered 6 incendiary shell to
Gunboat Penobscot."
- 5 April--"Rebel Steamer fired a shot at a Union transport
off Newport News. Tug disabled."
- 6 April--Received 34 tons of coal.
- 7 April--"From 8 A.M. to Median
Wind east. fresh breeze. hatches caulked down, sea
washing over deck. Vessels arriving in the Harbour
very fast."
- 8 April--Heavy weather.
- 9 April--Workmen on board all night. Squalls & fog.
- 10 April--Mechanics came on board at 7 p.m.
- 11 April--"Rebel fleet sighted around Sewell's Point.
Prepared for action. Merrimack fired at two other
ships who returned fire as Rebel fleet went behind
Sewell's Pt."

Our Navy's Worst Headache

The Merrimack . . .

By

Albert L. Demaree

Taken from

U. S. Naval Institute Proceedings, March 1962

The Merrimack Reappears

On 11 April, the long awaited Merrimack defiantly advanced upon Hampton Roads—a direct challenge to Monitor. Union sloops, schooners, and brigs hurriedly sought the shelter of Fortress Monroe. The southern ironclad moved about leisurely, then ordered one of her gunboats to capture three northern merchant ships almost within gunshot of the Union forces. Monitor at her regular anchorage, and other northern ships (with steam up), watched the proceedings at a distance, but did not attempt to protect the ships which were taken as prizes. The southern challenge was not accepted—and no Union ships moved except those which retreated.

The refusal of Monitor to fight on 11 April shocked and angered the North. Again Welles seemed in bad repute. He was gaining a reputation for "paralyzing" the Navy. Deeply aroused, The New York Times registered the public conviction that the timid and dilatory policy at Hampton Roads was occasioned by the conservatism of the Navy Department. It held Welles responsible for the defensive attitude of Monitor, declaring, "We presume that there is no doubt of the Secretary's loyalty. Is he mad?" Furthermore, they continued, all hands "chafed at the disgraceful position in which they were placed, while the enemy insultingly dared them to conflict."

Monitor's crew was so distressed that they wrote a letter to their former Captain, John Worden, expressing the hope for

his early return to the ship, complaining that they were now being called "cowards." William Keeler, the ship's paymaster, in a letter home wrote: "We are very willing and anxious for another interview," but added "I believe the Department is going to build a big glass case to put us in for fear of harm coming to us."

The New York Herald taunted Mr. Welles for his "masterly inactivity." It was the "wretched imbecility" of the Navy Department, it said, which paralyzed the best sailors and the best Navy in the world. And, it added, "the criminality of the Navy Department" does not "end here," saying:

But space fails us to enumerate half the silly blunders and foolish mistakes of the head of the Navy Department in connection with the Merrimac business. . . . If, in the mean time, the rebels will only send a gunboat or two up the Potomac, and throw a large shell directly into the sleeping apartment of the venerable head of the Navy Department, we will forgive them all the other damage they may do us.

It seemed clear to the Herald that nothing had been done to prepare the Navy for victory during the month following the tragedy of 8 March and that the Navy Department was responsible to the country "for palpable neglect." This same newspaper deprecated the fact that ships from the French and English navies were present to witness the Union's "national disgrace" on 11 April.

Unfortunately for Mr. Welles, he was not free to disclose the fact that President Lincoln himself had ordered this

defensive role for Monitor. Since Merrimack did not attack Monitor nor accommodate Goldsborough's forces by placing herself as a good target for the rams, no second battle occurred. Doubtless, it was Lincoln's theory that containment of Merri-
mack was equivalent to victory.

- 12 April--Rebel fleet came from behind Sewell's Pt., then went to Turner's Creek, then to above Craney I.
- 13 April--Sunday. Good weather, no action.
- 14 April--Good weather, no action reported.
- 15 April--"Visited by M. S. Mercier, French minister. French Steamer Cabinet Steamed to Norfolk. Flag of truce came down." Sighted semaphore signals at Craney I.
- 16 April--working on pilothouse. "two men, Sylvester & Harwick, were bound together for fighting.
- 17 April--Received 32 tons of coal. Work on pilothouse. Three(2?) men, including Lt. Jeffers, left for home. Succeeded "in getting both guns run out at once"
- 18 April--Mechanics on board.
- 19 April--Work on pilothouse.
- 20 April--Work on board.
- 21 April--Work on board. Squall.
- 22 April--"deserter from Norfolk came on board and gave information". The French Steamer Cassendra came from Norfolk and anchored off the Fort.
- 23 April--Tug "brought off" with workmen, stores, and two pipes over air ports.
- 24 April--"heavy firing at Yorktown & Norfolk."
- 25 April--breezes from east, "water was washing over the deck fearfully."
- 26 April--"U. S. Steamer Connecticut arrived in the roads."
- 27 April--"From 8 A.M. to Median workmen came off in our tender at 9 A.M. bringing 4 pieces of iron for pilothouse. received a roll of packing for Eng. Dept., Frigate Sabine & Gunboat Mt. Vernon arrived, received a visit from Sec't. of Interior and friends." Received 8 kegs of white lead, 1 keg of red lead & 2 cans of oil.
- 28 April--Received iron pipes for the blowers.

EDITOR'S NOTE

After playing such a vital role in the success of the first Monitor, Chief Engineer Stimers continued to guide the ironclad construction program. Stimers was, perhaps, the most familiar with the operation of a monitor both at sea and in battle and his association with Ericsson proved very valuable for both.

In many cases, Stimers was the liaison between the Navy Department in Washington and Ericsson in the shipyard, operating the "Iron clad Office," and this brought him much criticism from senior officers and eventually from Ericsson. Excerpts from the Records of Bureau of Ships is included as they explain some of the hardships which the mass production of monitors thrust upon the designers, builders, and the "Iron clad Office."



Chief Engineer Alan C. Stimers

Report on the Harbor and River
Monitors Manhattan, Mahopac, and Tecumseh

Records of Bureau of Ships

Copy from

The National Archives

Record Group No. 19

"THE IRON CLAD OFFICE"

During the building of the Monitor, Chief Engineer Stimers had been detailed to assist Ericsson in inspecting the work being done on that vessel. He had made the trip in her to Hampton Roads and had helped in the flight against the Virginia. When, immediately afterward, the Navy Department made additional contracts for monitors, Stimers was put in charge of the inspection of these vessels, and it was this work that was put under Gregory's supervision. The details of the designs of the later classes of monitors were produced in Stimers' office, and a good deal of other work was assigned to him, so that his force of draftsmen, clerks, and inspectors increased until it was quite large. This increase in his duties brought him into a position of some prominence among ship and engine builders and the "Iron Clad Office" ultimately became the object of much criticism.

At the time of entering upon his duties as general inspector of iron clads he seems to have been a good engineer, very hard working, with some general knowledge of ship building, quick to decide, ingenious, and reasonable. These qualities appear to have won for him the confidence of the Hon. Gustavus V. Fox, Asst. Secretary of the Navy, and ex-naval officer, who particularly interested himself in the question of increasing our power at sea, and their relations at any rate at first, appear to have been quite close. But as the

importance of Stimers' position increased, he seems to have become less reasonable, more dictatorial, and intolerant of suggestions from others. Conscious of his great familiarity with the monitor type of vessel, he seems to have reached a state of mind in which he felt that others knew far less than he did about the vessels, and by assuming authority that was not properly his, he involved himself in several controversies with his senior officers.

He was greatly overworked and this undoubtedly added to his impatience, so that he was far from popular with the contractors. It has been alleged that in developing the details of the vessels under his charge, he permitted needless and expensive elaboration and complication, but this charge is hardly warranted. Without attempting to belittle Capt. Ericsson, the details of the monitors built from his plans, were in many important respects unsatisfactory as shown by the accidents to these vessels in action. He was therefore compelled to modify his plans in important particulars, the details of the changes being in many cases worked out in Stimers' office, and the revised plans and instructions being in all cases issued by Stimers. As these changes with the consequent delays involved tended to reduce the profits of the contractors, the latter held Stimers accountable for the condition of affairs, and it became the custom to decry his ability and methods.

During the early part of the war Stimers often expressed his admiration of Ericsson's ability, but as he grew more confident of the success of his own methods, he depended less upon Ericsson which seems to have annoyed the latter. Early in 1864 they became involved in a controversy over the failure of certain gun gear invented by Ericsson who could only with the greatest difficulty be brought to admit that any invention of his was not a success; he then came out strongly against Stimers, denouncing him as a "charlatan engineer." Very shortly after this it was found that the last class of monitors built, the light drafts, were defective owing to carelessness in connection with weights added to the original design. Ericsson utterly repudiated any responsibility for the mistake, and the entire blame was put upon Stimers who was relieved from his position as General Inspector and soon afterward ordered to sea. His removal was the signal for a general outcry of incompetence from the shipbuilders, who also urged that he had required much of them that was outside of their contracts. This tended to befog the issues when they later submitted claims for damages. His alleged mistakes were investigated by the Committee on the Conduct of the War and shortly afterward he resigned from the Navy. Later he appeared as consulting engineer for some of the contractors in connection with their claims for damages, and died within a few years after the close of the war.

Having outlined the organization developed by the Navy Department to supervise the building of its vessels, it will now be found desirable to describe briefly the various classes of monitors built during the Civil War, beginning with Ericsson's famous "Cheese-box."

THE ORIGINAL "MONITOR"

As is generally known, the first of the vessels of the type later known as monitors was a single turreted, low freeboard, iron vessel, built from designs submitted by Captain John Ericsson of New York City to a board of which Commo. Jos. Smith, Chief of the Bureau of Yards and Docks in the Navy Department, was senior member. This vessel was named the "Monitor" and is so well known that reference to it is only made for two purposes; first, to point out that the general design and all working plans were produced by Ericsson, and that the Government was in no way responsible for the design or successful completion of this vessel; second, that, while it is very generally stated that the monitor was built in one hundred days, an examination of Church's Life of Ericsson, a work entirely friendly to the inventor, shows that from the date of award of the contract until the vessel was delivered to the Navy Yard was a period of 157 days. (Sun. Record p. 795).

The Monitor was a very small vessel, being only about nine hundred tons displacement and subcontracts for the various parts were distributed among a number of manufacturing establishments who were urged to the utmost speed by Ericsson's energy. The details both of the hull and machinery were extremely simple; in fact, as experience later showed, they were in many respects positively crude.

Work was pushed in many cases at night as well as during the day, yet with all these advantages it took 157 days to complete this little vessel. The statement that the Monitor was built in 100 days probably grew out of the fact that it was about 100 days from the laying of the keel to the launching. Considerable time was needed after the contract was let before the keel could be laid, and still more was required to complete her after the launch.

These facts are pointed out, not to belittle the achievement of Capt. Ericsson and of such men as Quintard, Griswold and Rowland, who helped him to produce in haste what the country so urgently needed, but to show upon how false a foundation rests the assertion which will later be found repeated again and again that vessels of the Harbor and River Class could have been completed by their builders in less than five months.

THE PASSAIC CLASS

After the fight in Hampton Roads between the Monitor and the Virginia, and under an Act of Congress of February 13, 1862, authorizing the completion of twenty iron clad steam gun boats, contracts for six vessels were made with Captain Ericsson and later four more vessels were ordered from other parties. The name of vessel, date of contract, name of contractor, contract price, time allowed for and actual time of completion and time required for construction are shown in the following table.

<u>Name of Vessel</u>	<u>Date of Contract</u>	<u>Name of Contractor</u>	<u>Contract Price</u>	<u>Time allowed for Completion</u>	<u>Actually Completed</u>	<u>Time Required</u>
Passaic	Mar. 31, 1862	John Ericsson	\$400,000	Four to be completed on or before last day of July next, two on or before last day of August next.		
Montauk	do.	do.	400,000			
Catskill	do.	do.	400,000			
Patapsco	do.	do.	400,000			
Sangamon	do.	do.	400,000			
Lehigh	do.	do.	400,000			
Weehawken	May 1, 1862	Z. & F. Secor	400,000	Four months.		
Nantucket	do.	Atlantic Works	386,000	Five months.		
Nahant	do.	H. Loring.	393,000	4-1/2 months.		
Camanche	June 20, 1862.	Donohue, Ryan & Secor.	565,000	Ten months.		

Was to be erected in New York, shipped to San Francisco, put together and completed there.

(Canonicus record, p. 379)

Captain Ericsson designed the six vessels of this class built by him and furnished all the working drawings; the Government was in no way responsible for their design or their successful working. For the other four vessels of this class, he furnished the contractors with the necessary plans and acted more or less as the consulting engineer for both parties. For these services he received from the contractors, a percentage of the contract price.

Of great importance in the above table is the column showing the time actually required for building these vessels, especially those under direct control of Ericsson. While they were considerably more complicated and larger than the Monitor, Ericsson had all his experience in building that vessel to draw upon and the statement frequently found in petitions, briefs, and other papers files in these cases that these vessels were finished within their contract time is at once seen to be entirely incorrect. In Mr. Secor's testimony in a number of places he states that the Weehawken, one of this class of vessels, was built in 5-1/2 months; the above table shows that the Weehawken was contracted for May, 1, 1862, and was delivered January 5, 1863, a trifle over eight months. The time stated by Mr. Secor was, therefore, as a matter of fact, exceeded by about 45%.

PREPARATION OF THE DESIGN OF THE
HARBOR AND RIVER MONITORS

During the building of the Passaic class, their inspection on behalf of the Navy Department was as stated above under Chief Engineer Stimers, and, as he was closely connected with the design and construction of the following class of monitors, known as the Harbor and River, or "Tippecanoe" class, I quote below his description of the circumstances attending the preparation of their design. This description is found in his testimony before the Committee on the Conduct of the War, (Senate Report 142, 38th Congress, 2nd Session, page 92).

"While this was going on (referring to the construction of the vessels of the PASSAIC class) and these vessels were being built, the Government looked forward to building more. x x x
x x x But there was no one to design them, and that created a difficulty at once. Of course I was familiar with that to a certain extent, but I was busy as general inspector, and had no time to design vessels. x x x x x x Now, when we came to build some more than these ten monitors, we did not like some of their peculiarities. We wanted more speed and some other qualities which they did not possess. Captain Ericsson was himself too busy to design others; I was too busy to make them, and we had no one else to go to. I then suggested to Captain Fox, the Assistant Secretary of the Navy, that if he would permit me to establish an office in New York near Captain Ericsson's office, and hire some draughtsmen and put an assistant engineer there, an officer of the Government, to see that they performed their work properly, we could get Captain Ericsson to draw a general plan which would embody these changes, and then he could let me have the drawings which he had, and these draughtsmen could modify them. x x x x x x That was thought to be the best way of getting out of the difficulty, and it was done. About this time of getting up a new class, of which we built nine, of the river and harbor monitors, Captain Ericsson drew a general plan and submitted a general description of the river and harbor monitors

of the TIPPECANOE class. Those plans and descriptions were submitted here, advertised for, and contractors took contracts to build them. The specifications were made out in my office, constantly consulting with Captain Ericsson and Mr. Fox about the changes upon which we all agreed. The general plan was made by Captain Ericsson and transferred to me, and from that we made out the working plans."

(Canonicus record, p. 380).

