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U.S.S. New Ironsides: The Seagoing Ironclad in the Union Navy

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**U.S.S. NEW IRONSIDES:
THE SEAGOING IRONCLAD IN THE UNION NAVY**

by

William Howard Roberts
B.S. March 1973, Massachusetts Institute of Technology

A Thesis Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
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HISTORY

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ABSTRACT

**U.S.S. NEW IRONSIDES:
THE SEAGOING IRONCLAD IN THE UNION NAVY**

William Howard Roberts
Old Dominion University, 1992
Director: Dr. Harold L. Wilson

Of the ironclads completed by the Union during the Civil War, only the U.S.S. New Ironsides was a seagoing, high-freeboard design. Her seagoing qualities and heavy battery made her uniquely valuable to the Union in combat. Although New Ironsides was highly successful and her high-freeboard design squarely in the European mainstream, she represented the last of her direct line in the U.S. Navy. The lessons learned from her construction and wartime service, which should have provided invaluable instruction for U.S. designers, were not followed up. By failing to develop the seagoing ironclad the United States forfeited the advantages it might have gained over European navies from its extensive combat experience. The Navy was unable to convince Congress that money for ironclads would be well spent, and the U.S. Navy's best opportunity to build a seagoing ironclad fleet was lost for a generation.

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To Peg

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CHAPTER ONE

INTRODUCTION: THE NEGLECTED IRONCLAD

I have never yet seen a vessel that came up to my ideas of what is required for offensive operations as much as the Ironsides.¹

Admiral David Porter's words elicit little modern recognition. To most, "ironclad" is synonymous with "monitor," and scholars give New Ironsides but a few lines.² Yet this seagoing broadside ironclad presented one of the earliest instances in which the U.S. Navy's tacticians and strategists were forced to adapt to technological change. The new technology of iron and steam, pressed into service with neither precedent, wartime experience, nor sound theory to guide the designers, yielded both unanticipated strengths and unforeseen weaknesses.

New Ironsides participated in more engagements and fired more shots than any other Civil War ironclad. Her strategic importance to the blockade of Charleston and her

¹Rear Admiral David D. Porter to Secretary of the Navy Gideon Welles, January 15, 1865, Official Records of the Union and Confederate Navies in the War of the Rebellion 28 vols. (Washington: GPO, 1894-1922) (hereafter ORN), 11: 602. All references are to Series One unless otherwise noted.

²James Phinney Baxter III, The Introduction of the Ironclad Warship (Cambridge: Harvard University Press, 1933; reprinted Hamden, CT: Archon Books, 1968), 268-69. This, his most extensive discussion of the ship, is 23 lines.

contributions to the bombardments of Charleston and Fort Fisher were unmatched. New Ironsides was in the mainstream of ironclad development; while the low freeboard monitors were an evolutionary dead end, New Ironsides was of the high freeboard line that led to the dreadnought battleship.

Despite her highly successful career, New Ironsides herself had no direct descendant in the U.S. Navy. Her bright promise was neglected in the post-War reaction, and by the time the U.S. Navy again turned to seagoing iron-clads, she had been forgotten. This is her story.

CHAPTER TWO

GENESIS: IMPETUS AND DESIGN

By mid-1861, it was evident that the Union needed iron-clad warships.¹ The impetus was clear: a Confederate iron-clad program was already underway. The Confederate Navy could not hope to challenge the U.S. Navy with conventional wooden ships, so Confederate Secretary of the Navy Stephen R. Mallory placed his faith not in numbers but in technology. As he phrased the idea, "Inequality of numbers may be compensated by invulnerability."²

Although there were several Confederate projects underway, the Federals worried most about the conversion of the partially destroyed frigate U.S.S. Merrimack into the ironclad C.S.S. Virginia.³ Virginia, being rebuilt at the Navy Yard at Portsmouth, Virginia, might threaten the Union

¹For a discussion of the plans submitted before Welles reported to Congress, Baxter, Ironclad Warship, 238-45.

²Mallory to C. M. Conrad, Chairman of the House Committee on Naval Affairs, May 10, 1861, ORN ser. 2, 2: 69. A detailed discussion of the resulting policy can be found in William N. Still, Jr., Iron Afloat: The Story of the Confederate Armorclads (Columbia: University of South Carolina Press, 1985), 5-17.

³Mallory approved the conversion plan for the Merrimack on July 11, 1861. Baxter, Ironclad Warship, 229. Work was in progress by mid-July. Still, Iron Afloat, 19.

capital at Washington, D.C. Official Washington received frequent reports of Virginia's progress, as Union Secretary of the Navy Gideon Welles wrote in his diary.⁴

On July 4, 1861, Welles advised the U.S. Congress of the problem facing the Navy. There was little time to experiment, he wrote, and Congress should appoint a board to investigate the issue.⁵ Congress went beyond what Welles requested. On August 3, 1861, Congress authorized a board of Naval officers to inquire into armored ships and appropriated \$1,500,000 to build "one or more armored or iron or steel-clad steamships or floating steam batteries."⁶

The Navy lost no time. In an advertisement of August 7, 1861, the Navy requested proposals for "iron-clad steam vessels of war," of iron or wood and iron combined, to draw between ten and sixteen feet of water. The advertisement, which required that the vessel be rigged with two masts, stressed, "The smaller draught of water, compatible with other requisites, will be preferred."⁷

Welles appointed a board on August 8, 1861, to examine

⁴Gideon Welles, Diary of Gideon Welles Secretary of the Navy Under Lincoln and Johnson, Howard K. Beale, ed. (New York: W. W. Norton, 1960), 1: 65.

⁵U.S. Congress, House, House Executive Document 69, Report of the Secretary of the Navy in Relation to Armored Vessels, 38th Congress, 1st Session, 1864, 2 (hereafter Report . . . Armored Vessels).

⁶Ibid., 1-2.

⁷Ibid., 2.

the proposals he expected to receive. The "Ironclad Board" consisted of Commodore Joseph Smith, Chief of the Bureau of Yards and Docks, Commodore Hiram Paulding, and Commander Charles H. Davis.⁸ Davis, the youngest at fifty-four, was the only one of these seagoing officers who had no shipyard experience, but since he had just served as a member of the Navy's informal blockade strategy board, he had an excellent idea of how the ironclads would be employed. Paulding, sixty-three years old, commanded the Washington Navy Yard from 1851 to 1855, and Smith, the eldest at seventy-one, had been Chief of the Bureau of Yards and Docks since 1846.⁹ None of the three was a naval constructor, and no naval constructor was available to assist because they were all too busy elsewhere. The Board evaluated seventeen proposals and recommended the Secretary accept three of them.¹⁰

⁸Commander John A. Dahlgren, inventor of the Dahlgren gun, was originally assigned to the Board but was replaced at his own request by Davis. Baxter, Ironclad Warship, 247.

⁹Dumas Malone, ed., Dictionary of American Biography (New York: Charles Scribners' Sons, 1961-64), s.v. "Davis, Charles Henry," "Paulding, Hiram," "Smith, Joseph" (hereafter DAB). James Grant Wilson and John Fiske, eds., Appleton's Cyclopaedia of American Biography (New York: D. Appleton & Company, 1888), s.v. "Davis, Charles Henry," "Paulding, Hiram." National Archives, Record Group 24, Records of the Bureau of Personnel, Records of Officers, s.v. "Smith, Joseph." (National Archives Record Groups hereafter "NARG.")

¹⁰The board's report ("Report on Iron Clad Vessels") is reprinted in Report . . . Armored Vessels, 3-7, and in Frank Marion Bennett, The Steam Navy of the United States (Pittsburgh: W. T. Nicholson Press, 1896; reprinted Westport, CT: Greenwood Press, 1974), 264-72. The proposals, with comments, may be found in National Archives, Record

The three proposals recommended by the Board varied widely. The first design, which became U.S.S. Galena, was proposed by Bushnell & Co. of New Haven, Connecticut. The Bushnell ship had a conventionally shaped hull with a novel system of interlocking armor. Confederate guns easily penetrated this light armor in an engagement at Drewry's Bluff in the James River during May 1862, and Galena was not a success.¹¹ The design proposed by John Ericsson, a low freeboard vessel with a single turret, became the Monitor. The third, a fully rigged high freeboard ship with a broadside battery on the European model, proposed by the firm of Merrick & Sons of Philadelphia, became the New Ironsides.

There were four reasons the Ironclad Board accepted only these proposals. First, the Board could not evaluate some designs because the proposals lacked detail. Although some such proposals were apparently from cranks or self-anointed inventors, others were from respectable firms. The Board members apparently felt they did not have time to pursue the authors to get the details which should have been

Group 19, Records of the Bureau of Ships, Plan File, Plan 80-11-3.

¹¹Flag Officer Louis M. Goldsborough wrote to Assistant Secretary of the Navy Gustavus V. Fox, "The Galena has turned out precisely as I expected-beneath Naval criticism! . . . she is a poor stick for an iron clad." Goldsborough to Fox, May 21, 1862, in Robert Means Thompson and Richard Wainwright, eds., Confidential Correspondence of Gustavus Vasa Fox Assistant Secretary of the Navy 1861-1865 (Freeport, NY: Books for Libraries Press, 1972; reprint of 1918-19 edition), 1: 272. Bennett, Steam Navy, 272.

supplied with each proposal.¹²

Second, the Board had to pick designs with technical merit. While they were not naval constructors, they were men of long practical experience and could see that some designs were not sound. They rejected, for example, William Kingsley's theory that projectiles would bounce off the rubber-clad vessel he proposed.

Third, Congress appropriated only \$1,500,000 for building ironclads, and some proposals would have invested too much of it in a single ship. Shipbuilder Donald McKay offered to build an ironclad for \$1,000,000, and Henry R. Dunham's design was to cost \$1,200,000.¹³ While these ships were probably feasible and McKay at least had a good shipbuilding reputation, concentrating all the Union's resources on one ship would noticeably increase the risk to the nation. If the chosen design were a technical failure or if construction of an ambitious design took too long, the consequences would be grave.

Fourth, the Board had to choose builders who had the technical and financial ability actually to build the ships they proposed. While many proposals came from men with shipbuilding or iron-working backgrounds, others came from men who had no experience whatsoever to help them translate

¹²Examples are proposals of W. Perine, J. C. Le Ferre, Benjamin Rathburn, Henry Dunham, John Westwood, Neafie & Levy, and A. Beebe. Report . . . Armored Vessels, 5-7.

¹³Ibid., 6.

their drawing-board designs into wood and metal. Given the urgency of the situation, the Board could not afford to subsidize a new builder's errors of inexperience.

The Board fully grasped the important point that the immediate demands of the war required "vessels invulnerable to shot, of light draught of water, to penetrate our shoal harbors, rivers and bayous." They advocated the construction of such ships "before going into a more perfect system of large iron-clad sea-going vessels of war," but recommended the Navy construct seagoing ships later, building on the experience obtained from the smaller ships.¹⁴

In great part, the Southern coast shaped the Civil War at sea. The coast was long and low, penetrated by many rivers, bays and inlets. Because it was so shallow, few of the rivers and inlets were navigable. The irregularity of the coastline and the limitations of visual surveillance meant that many ships would be needed to enforce a blockade, and shallow water meant that those ships would require shallow draft to patrol close enough to shore to be effective.

The Northern blockade problem was not insurmountable since the Southern coastal regions were also economically behind the North. Materials brought in through the blockade would do only local good if they could not readily be moved to where they were needed. Only seven Southern seaports had

¹⁴Ibid., 5. New Ironsides, while at 3,500 tons the largest of the three, was much smaller than her European counterparts Gloire (5,600 tons) and Warrior (9,000 tons).

interstate rail connections. They were Norfolk, Virginia; Wilmington, North Carolina; Charleston, South Carolina; Savannah, Georgia; Pensacola, Florida; Mobile, Alabama; and New Orleans, Louisiana.¹⁵ These cities became prime targets for the Union since closing seven major ports would be easier and have more effect than blockading many lesser harbors.

After the fall of Fort Sumter in April 1861, General Winfield Scott proposed a plan, known to its detractors as the "Anaconda Plan," to blockade the Confederate coast and advance along the Mississippi River. This strategy aimed to cut the Confederacy in two and strangle the commerce upon which its economy depended. The Union Navy was to seize bases from which to operate, penetrate the interior on the rivers and choke off commerce by blockading or capturing seaports. The Confederate strategic challenges were to maintain commerce and protect the coastline and rivers.

The Confederacy set out to meet these strategic challenges by building fortifications to protect the coast, ironclads to break the blockade, and commerce raiders to

¹⁵Bern Anderson, By Sea and By River: The Naval History of the Civil War (New York: Alfred A. Knopf, 1962), 15. Anderson states six, Norfolk being the exception, but the Norfolk and Petersburg Railroad had interstate connections. "Mitchell's New Travellers Guide through the United States 1860," in National Geographic Society, Historical Atlas of the United States (Washington: National Geographic Society, 1988), 197; United States War Department, An Atlas to Accompany the Official Records of the Union and Confederate Armies 1861-1865 (Washington: GPO, 1891-95; reprinted New York: Fairfax Press, 1978), plate 137.

take the war to the Union. At first the Confederacy employed privateers, but when European powers closed their ports to Confederate prizes and the blockade kept them from being sent into Southern ports, Mallory began to commission Confederate States Navy vessels as commerce raiders.¹⁶ The Confederate Army and state troops were given charge of coastal defense and ironclad building began in earnest.

Underlying the U.S. Navy's choice of designs was the need for haste, which stemmed from the Confederate program of ironclad construction. By late 1861 there was "quite a panic" about the Confederate ironclads, with no Union vessels yet built to meet them.¹⁷ When submitting his proposal, each designer had to estimate how long it would take to build.¹⁸ John Ericsson's vessel was to be completed within one hundred days and the Bushnell vessel in four months, the shortest periods of the technically acceptable proposals, and short construction time was the key factor in Welles'

¹⁶Anderson argues that privateering attacks on Union shipping were the direct cause of the blockade. Anderson, By Sea and By River, 25-26. Privateers had to send captured ships to prize courts for adjudication; if they did not, in law they were pirates. Warships could destroy their prizes.

¹⁷Gustavus V. Fox to Mrs. Fox, October 8, 1861. Thompson, Correspondence of Fox, 1: 385. Even after Monitor fought Virginia the need for additional ironclads was acutely felt; in a letter to Fox dated March 14, 1862, Major General George B. McClellan asked, "How soon will the Mystic [Bushnell] iron clad ship be finished?" Ibid., 439.

¹⁸Report . . . Armored Vessels, 2.

decision to build the Monitor.¹⁹ The Merrick vessel, however, would take nine months. Despite the Board's evident bias in favor of speedy construction, it accepted Merrick & Sons' proposal as well as Ericsson's and Bushnell's.

Despite the claim that the selection of the Merrick design "showed that the old officers valued the sailing ship as far superior to the steam vessel," the primary reason for choosing Merrick & Sons' design was to reduce technological risk and ensure that the Union received a combat-effective ship.²⁰ The Bushnell proposal was novel, and the Board recommended it only if the contractor guaranteed she would "float her armor and load sufficiently high, and have stability enough for a sea vessel."²¹ The "Ericsson battery" was even more novel. The Board was not confident that the ship would be "shot and shell proof" as Ericsson stated and recommended a guarantee of this quality. Indeed, the Navy

¹⁹Two other proposals stipulated four months but could not carry their designed gun batteries. One would have required sixty to seventy-five days, but was for an unarmored iron boat, and A. Beebe's one hundred day ship was "defective." Ibid., 4-7. Stephen C. Thompson, "The Design and Construction of USS Monitor," Warship International 27, no. 3 (1990): 224. "As Mallory had felt he must gamble on ironclads, so Welles felt he must gamble on Ericsson." John Niven, Gideon Welles: Lincoln's Secretary of the Navy (New York: Oxford University Press, 1973), 368.

²⁰Stephen C. Thompson, "The Construction of the U.S.S. Monitor" (unpublished M.A. Thesis, Old Dominion University, 1987), 17. Thompson's statement that the Board "was reluctant to try anything new" is not supported by their choice of two novel designs, Bushnell's and Ericsson's.

²¹Report . . . Armored Vessels, 6.

required that the ship be brought "before an enemy's battery" as a test before finally accepting her.²²

The philosophy behind the Merrick design, however, was known to be sound, since the British and French had been building ironclads on the high freeboard principle for two years. The high freeboard design traded increased construction time and cost for low technological risk. The Merrick ship would take three times as long to build as Ericsson's vessel, but there was much greater assurance that the resulting ship would be effective in combat, and combat effectiveness was the most important criterion. Despite the compelling urgency Welles had to balance the risk of failure inherent in untried designs; according to a recent biography, "Above all, as he [Welles] and [Assistant Secretary Gustavus V.] Fox struggled to improvise a Navy, they needed the proven rather than the experimental."²³

This was especially true in light of the prevailing rumors about the Virginia. Many believed the Confederate ship could ascend the Potomac River and attack Washington, and others feared that she would instead put to sea to attack seaboard cities such as New York.²⁴ Although more

²²Ibid., 5; Baxter, Ironclad Warship, 259. Monitor still belonged to her builders when she fought the Virginia.

²³Niven, Gideon Welles, 350.

²⁴Welles, Diary, 1: 62-65, for Secretary of War Edwin M. Stanton's "almost frantic" reaction to the news of Hampton Roads. Welles later called men in New York "the most easily terrified and panic-stricken of any community."

sober minds assessed Virginia's draft and saw that she could not reach Washington without going aground, her seagoing qualities were untried. Little could be said other than that the steam frigate Merrimack, from which Virginia had been converted, was a seagoing vessel.²⁵ Since it was entirely plausible that she could be formidable on the open sea, a secondary tradeoff for Welles was therefore seagoing qualities and draft for risk.²⁶ In seagoing qualities the high freeboard but deeper draft broadside design was again the known quantity, while shallower draft favored the novel and untried Ericsson and Bushnell designs.

Merrick & Sons, who proposed the New Ironsides, was a Philadelphia firm well known for building marine steam engines. Samuel Merrick first became associated with the steam Navy in 1839, when he and his partner John Towne, doing business as Merrick & Towne, built the engines for the sidewheeler U.S.S. Mississippi. Merrick & Towne also built the Ericsson-designed engines for the U.S.S. Princeton, the U.S. Navy's first propeller-driven steamer, and later, engines for the screw steamer U.S.S. San Jacinto. The firm

Ibid., entry for September 11, 1862, 1: 123.

²⁵The Merrimack class frigates were well-regarded for seagoing qualities. John D. Alden, "Born Forty Years Too Soon," American Neptune 22, no. 4 (October 1962): 252-53.

²⁶Welles received reports that "she could not venture outside, and was to be used in Hampton Roads, and the river Chesapeake." This part of his Diary was written retrospectively and his low opinion of Virginia's seaworthiness may have been strengthened by hindsight. Welles, Diary, 1: 65.

built its first Navy machinery under the Merrick & Son name in 1854 for the U.S.S. Wabash. The Merricks continued with machinery for the U.S.S. Wyoming in 1858, and in 1861 built engines for U.S.S. Miami, Tuscarora, and Monongahela.²⁷

Since Merrick & Sons had no building ways, the firm planned to subcontract the hull to William Cramp and Sons, also of Philadelphia.²⁸ Merrick & Sons tendered their proposal to the Navy on September 3, 1861, offering to complete their vessel in nine months for \$780,000.²⁹

A prime mover of the Merrick proposal was Barnabas H. Bartol, Superintendent of the Southwark Foundry. Bartol was born in Freeport, Maine, on October 31, 1816. After an apprenticeship with the West Point Foundry and an attempt in 1837 to start his own business, Bartol returned to West Point in 1838 and became Superintendent there in 1839. He became Superintendent at Southwark in 1847. R. G. Dun

²⁷Bennett, Steam Navy, Appendix B.

²⁸[J. Vaughn Merrick], "Editorial. The U.S.S. Armored Frigate New Ironsides," Journal of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts (hereafter Journal of the Franklin Institute), 3d ser., 53, no. 2 (February 1867): 79; Augustus C. Buell, The Memoirs of Charles H. Cramp (Philadelphia: J. P. Lippincott Company, 1906), 68.

²⁹Merrick & Sons to Smith, September 3, 1861. National Archives, Record Group 71, Bureau of Yards and Docks, Entry 5, Miscellaneous Letters Received, Box 447, 1: 54½. September 3 was the deadline. Baxter, Ironclad Warship, 254.

called Bartol "a man of great practical skill."³⁰

Merrick & Sons later credited Bartol with originating the New Ironsides design, but it was quite similar to the French ironclad Gloire (Figures 1 and 2).³¹ The internal arrangements were also similar.³² Like Gloire, the Merrick design called for a high freeboard wooden hull armored with iron, carrying a broadside battery, and equipped with sail and steam power.

A comparison shows the close resemblance between New Ironsides and Gloire and their British contemporary, H.M.S. Warrior, but also shows some of the sacrifices made in the New Ironsides design in pursuit of the Navy's requirement for shallow draft. Although shallow draft was needed to operate in the coastal waters of the Confederacy, as with all warship designs the exaggeration of one characteristic required the compromise of others. A later analysis noted

³⁰In 1863 Bartol was elected to the Board of Managers of the Franklin Institute. He left Merrick & Sons in January 1867 and died February 10, 1888. W. P. Tatham, Wm. Sellers and Washington Jones, "Obituary. Barnabas H. Bartol," Journal of the Franklin Institute 125, no. 6 (June 1888): 499-503. For Dun comment of June 10, 1857, Harvard University, Baker Library, R. G. Dun Collection, Pennsylvania 135: 138.

³¹[Merrick], "U.S.S. New Ironsides," 79. It is doubtful that Bartol had the shipbuilding knowledge to do the hull design (for which Charles H. Cramp later claimed credit), but he was an excellent choice for arranging the armor.

³²Plans of Gloire are reprinted in Andrew Lambert, Warrior: The World's First Ironclad Then and Now (Annapolis: United States Naval Institute Press, 1987), 42-43, 68-71.

the disadvantages imposed on a shallow-draft vessel:

1st. Her lines must be more full (other things being equal), and hence more difficult of propulsion and of manageability. 2dly. Her screw must be smaller, and therefore less effective as an instrument of propulsion. 3dly. Her hull must be more strengthened owing to lack of depth, and must, therefore, be heavier. . . .³³

Table 1.--Comparison of New Ironsides, Gloire, and Warrior

	<u>New Ironsides</u>	<u>Gloire</u>	<u>Warrior</u>
Length	230'0"	255'6"	380'2"
Armored length	170'0"	255'6"	213'0"
Beam	56'0"	55'9"	58'4"
Draft	15'8"	27'10"	26'0"
Speed (knots)	7	12.5-13	14.08
Max armor	4.5"	4.7"	4.5"
Displacement	3500 tons	5630 tons	9137 tons
Coal	400 tons	665 tons	850 tons
Battery	14 XI" ML	36 6.4" MLR	10 110-pdr BL
	2 150-pdr MLR		26 68-pdr ML
			4 70-pdr BL

Sources: New Ironsides from "Statistical Data," ORN 2d ser. 1: 159 and manuscript sources. Gloire and Warrior from Robert Gardiner, ed. Conway's All the World's Fighting Ships 1860-1905. United States Naval Institute Press edition. (New York: Mayflower Press, 1979), 286, 7. Length is between perpendiculars; beam is overall; tons are long tons.

³³[Merrick], "U.S.S. New Ironsides," 76. See Oscar Parkes, British Battleships Warrior to Vanguard: A History of Design, Construction and Armament (Hamden, CT: Archon Books, 1970), 115-16, for the design compromises forced upon the British in a shallow-draft ironclad.

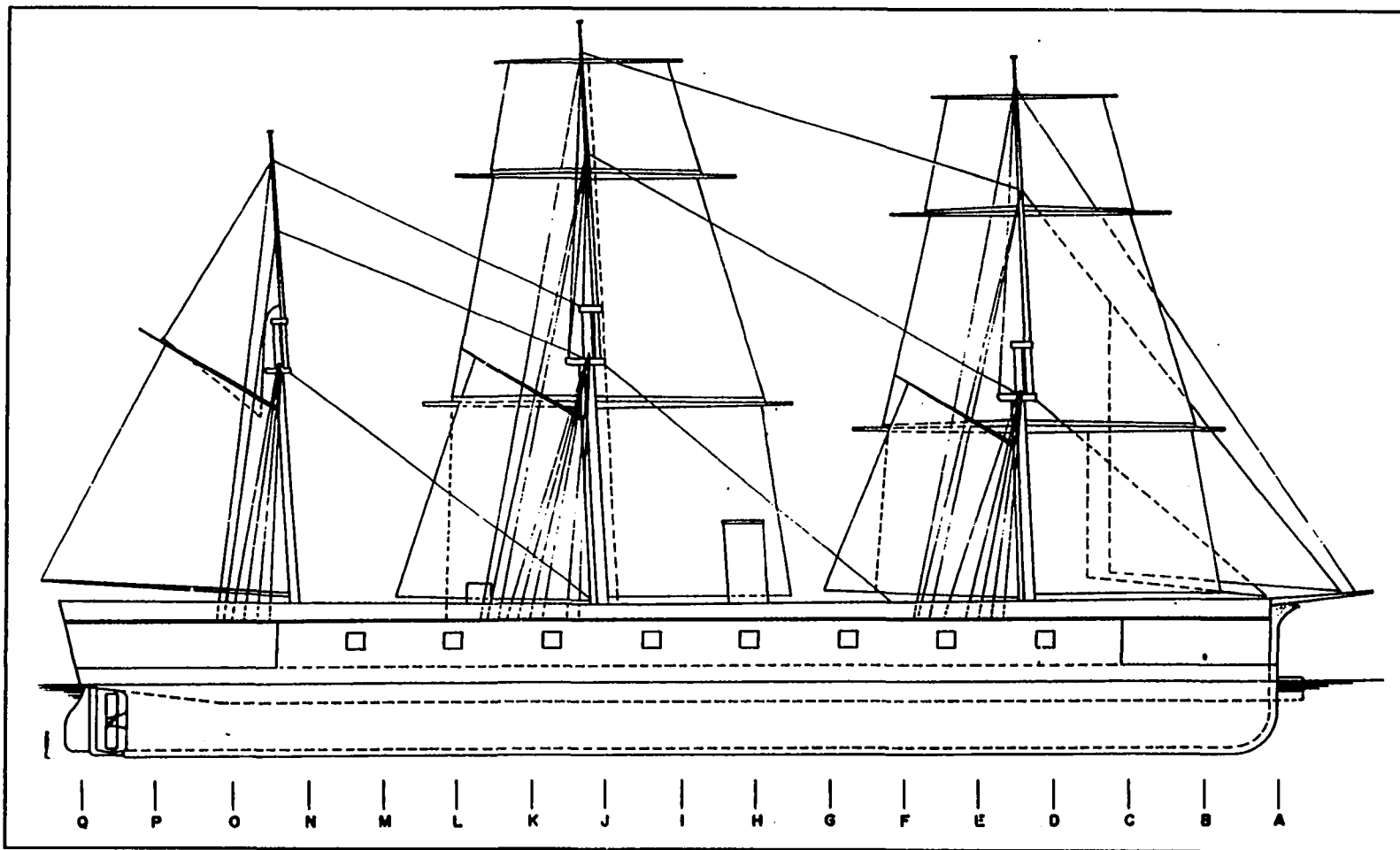


Figure 1. U.S.S. New Ironsides outboard profile. (From BuShips Plan 107-9-12L, redrawn by William J. Jurens.) The lettered stations correspond to the similarly lettered stations in the Body and Sheer Plan, Figure 16.

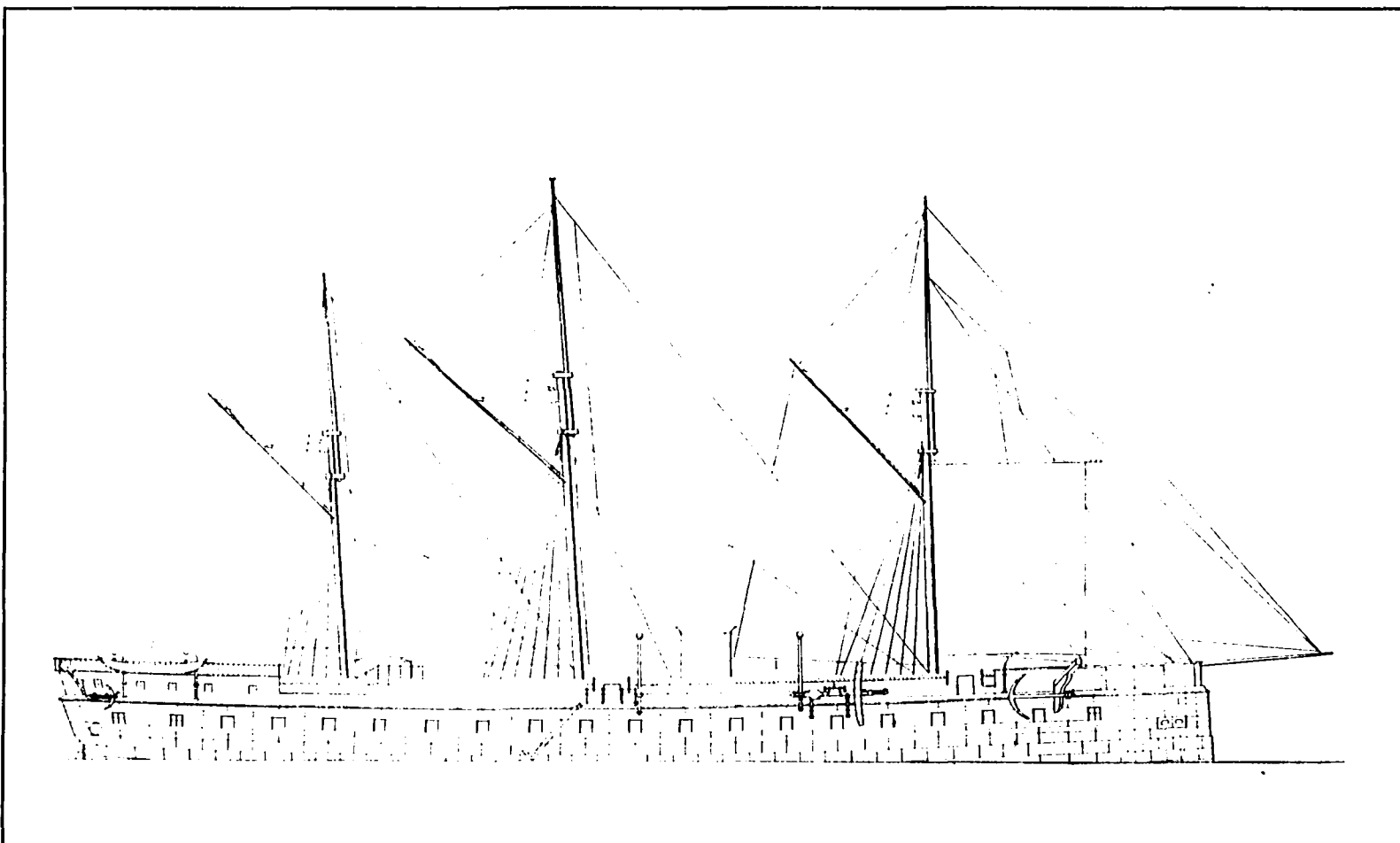


Figure 2. French Ironclad La Gloire outboard profile. (From Transactions of the Institution of Naval Architects 2, 1861)

The proposed vessel was wooden hulled, 230 feet long at the water line and 56 feet in extreme beam. Her depth of hold was 24 feet 9 inches and her draft exclusive of her keel beam was fourteen feet. She was a three-decked vessel, with a spar deck (the highest, and the only weather deck), a gun deck and a berth deck above her hold (Figures 3 through 5). She had six feet clear between decks.³⁴

The woodwork of the hull was of white oak, based on a keel eighteen inches wide and twelve inches deep. The massive framing timbers of the sides tapered from fourteen inches deep at the turn of the bilge to six inches at the edge of the spar deck. The spaces between the frames were filled in solidly with wood, and this "filling" was then caulked to make it watertight.³⁵ The wooden filling was intended to be white pine but was later changed to oak.³⁶

Hull planking was then installed over the outside of

³⁴The Merrick proposal is in NARG 19, Plan 107-9-12-H. The specifications "as proposed" are taken therefrom. The contract specifications are identical. National Archives, Record Group 71, Entry 42, Contracts and Bonds 1861, 269-95, is the contract for the New Ironsides.

³⁵For a description of wooden shipbuilding of the period, see John W. Watson, "The Building of the Ship," Harper's New Monthly Magazine 24 (April 1862): 608-20.

³⁶Charles H. Cramp designed the hull. He later stated, "With the exception of pine decking every stick of timber was of white oak." Buell, Cramp, 63. This address was apparently made on December 14, 1897, to the Contemporary Club of Philadelphia, where George E. Belknap also spoke. A typescript of Cramp's address is in the Belknap papers. Library of Congress, Manuscript Division, Naval Historical Foundation Collection, Papers of Rear Admiral George E. Belknap, Box 2; hereafter "Cramp, [Contemporary Club]."

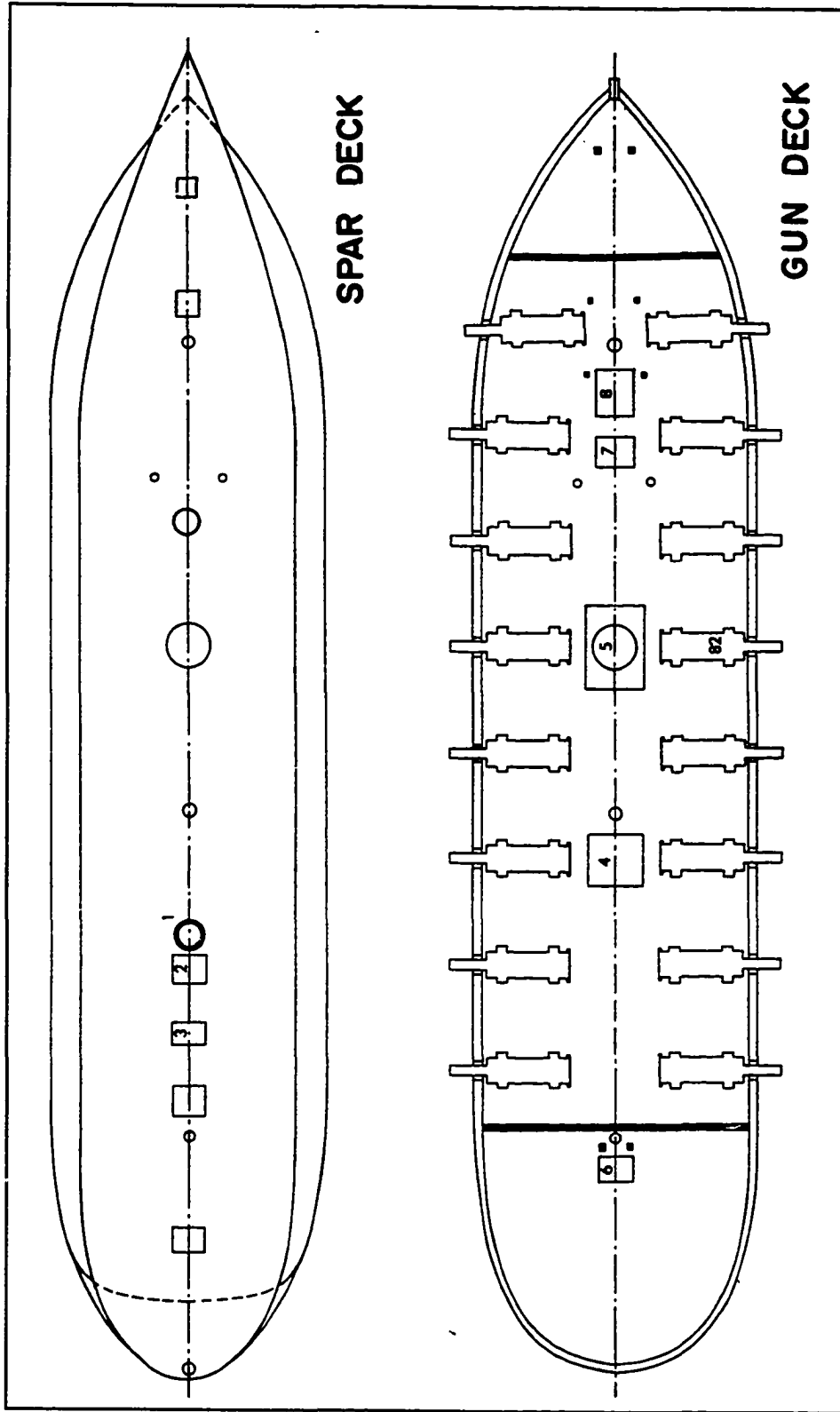


Figure 3. U.S.S. New Ironsides Spar and Gun Deck Plans. (From BuShips Plans 107-9-12A, -12E, redrawn by William J. Jurens.)

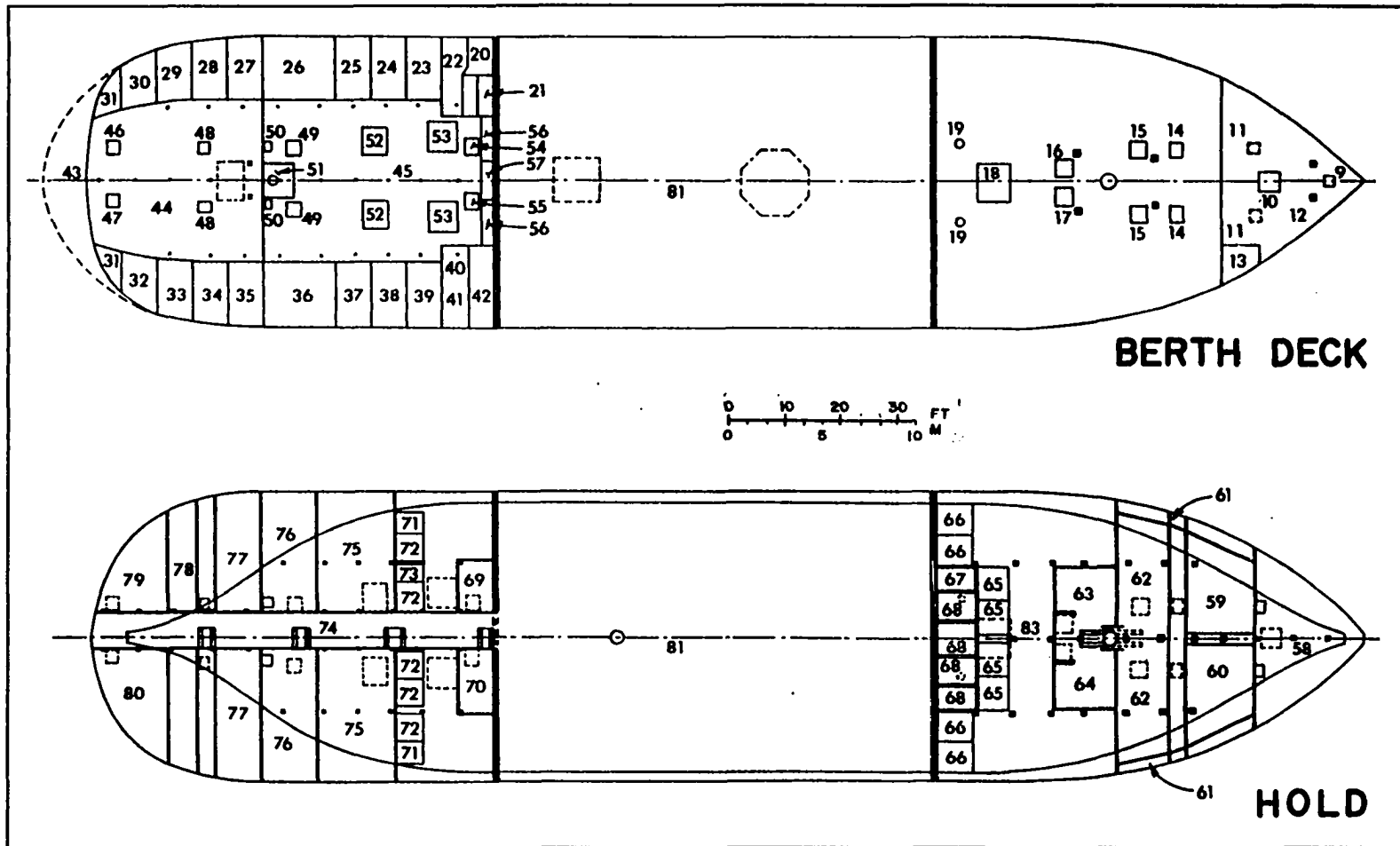


Figure 4. U.S.S. New Ironsides Berth Deck and Hold Plans. (From BuShips Plans 107-9-12B, -12C, redrawn by William J. Jurens.)

- | | |
|-----------------------------|--------------------------------|
| 1. Pilot house | 43. Wardroom Pantry |
| 2. Hold | 44. Wardroom |
| 3. Companion hatch | 45. Steerage |
| 4. Hatch to Engine Room | 46. Hatch to Wardroom Stores |
| 5. Smokestack | 47. Hatch to Captain's Stores |
| 6. Captain's Cabin | 48. Hatch to Magazine Passage |
| 7. Hold | 49. Hatch to Shell Room |
| 8. Galley stand | 50. Light |
| 9. Scuttle | 51. Steerage Pantry |
| 10. Hatch to Store Room | 52. Hatch to Spirit Room |
| 11. Light Box | 53. Hatch to Hold |
| 12. Sick Bay | 54. Hatch to Paymasters Stores |
| 13. Dispensary | 55. Hatch to Engineers Stores |
| 14. Hatch to Magazine Psg | 56. Armory |
| 15. Hatch to Shell Room | 57. Hospital Stores |
| 16. Hatch to Sail Room Psg | 58. General Stores |
| 17. Hatch to Bread Room Psg | 59. Magazine |
| 18. Hatch to Hold | 60. Magazine |
| 19. Chain Pipe | 61. Air Psg |
| 20. Engineers Mess Stores | 62. Shell Room |
| 21. Midshipmens Mess Stores | 63. Sail Room |
| 22. Paymaster Stores | 64. Bread Room |
| 23. Sailmaker SR | 65. 1200 gallon tank |
| 24. Carpenter SR | 66. 1253 gallon tank |
| 25. 1st Asst Eng SR | 67. Sand Locker |
| 26. Asst Eng SR | 68. Chain Locker |
| 27. Chief Eng SR | 69. Paymasters Stores |
| 28. Master SR | 70. Engineers Stores |
| 29. Paymaster SR | 71. 721 gallon tank |
| 30. Surgeon SR | 72. 890 gallon tank |
| 31. Stateroom | 73. 527 gallon tank |
| 32. 4th LT SR | 74. Shaft Psg |
| 33. 3rd LT SR | 75. Spirit Room |
| 34. 2nd LT SR | 76. Shell Room |
| 35. 1st LT SR | 77. Magazine |
| 36. Midshipmen Berth | 78. Boat Ammunition |
| 37. 1st Asst Eng SR | 79. Wardroom Stores |
| 38. Boatswain SR | 80. Captains Stores |
| 39. Gunner SR | 81. Machinery Room |
| 40. Pantry | 82. XI-inch gun carriage |
| 41. Warrant Officer SR | 83. Hold |
| 42. Marines' Stores | |

Figure 5. U.S.S. New Ironsides Deck Plans (Key). (William J. Jurens.)

the frames. This planking was also white oak, five inches thick. The first plank below the iron plating was nine inches thick at the top, tapering to five at the bottom, to fair the joint between the iron and the unarmored hull.³⁷ The total thickness of oak behind the armor, both hull planking and filling, varied from eleven inches just under the spar deck to about sixteen at the water line.

Inside the filling were two sets of iron braces, commonly used in wooden shipbuilding to strengthen the hull.³⁸ One set, at an angle of 45 degrees, was let flush into the frames; the other, at right angles to the first, lay on top of them. The braces were bolted to each frame and rivetted to each other where they crossed.

The armor arrangement was that later known as "belt and battery." It included a belt of iron extending entirely around the ship from four feet below to three feet above the designed load line, which was the fourteen foot waterline. The first plate below the waterline was 4½ inches thick, and the second, or lower, plate, three inches thick. Above the seventeen foot line, the armor extended 170 feet only, or 85

³⁷Cramp's paper stated twelve inches at the top, tapering to five at the turn of the bilge. Buell, Cramp, 65.

³⁸Watson, "Building of the Ship," 612, for description and diagram. See also NARG 19, BuShips Plan 80-11-3. The braces, made of iron bars 4½ inches wide and 3/4 inch thick, ran from six inches below the plank sheer to the turn of the bilge, with the ends on every third frame.

feet each way from the center of the ship.³⁹

All the armor above the load line was to be "plates forged of best American Scrap iron of $4\frac{1}{2}$ inches thickness, fifteen feet long and 28 inches wide." Each plate was grooved on all four edges, one inch deep and $1\frac{1}{2}$ inches wide; as the armor was installed, tongue pieces of iron (Figure 6) were placed in these grooves, "so as to connect the several plates as one in their resistance to shot."⁴⁰

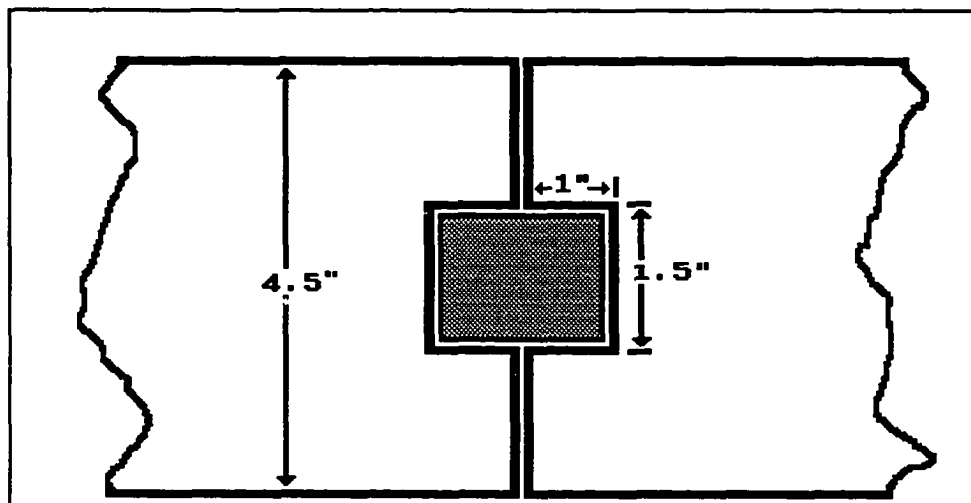


Figure 6. Tongued and Grooved Armor (Side View)

Although tonguing and grooving appeared to be a good idea, it actually weakened the armor. The interlocking

³⁹Admiral John A. Dahlgren erred when he said, "the iron plating is not carried around the stern." Dahlgren to Welles, November 5, 1863, ORN 15: 99. The waterline was completely armored. George E. Belknap, "Reminiscent of the 'New Ironsides' Off Charleston," United Service Magazine, o.s., 1 (January 1879): 63.

⁴⁰A sketch appears in a report of the Merrick proposal, NARG 19, BuShips Plan 80-11-3.

plates transmitted the effects of a blow and let a single shot damage more than one plate. It also made the replacement of damaged plates very difficult, since to replace a plate in a lower tier the plates above it had to be removed. J. D. A. Samuda, a prominent British builder of iron ships, argued cogently against tonguing and grooving as early as March 1861.⁴¹ Definitive British experiments were not conducted until October 1861 and the report of them not issued until March 1862, so the results were probably not known in the United States in time to affect the detailed armor design for the New Ironsides.⁴²

The armor was attached with screws (Figure 7) with countersunk heads, which did not extend through the wooden hull.⁴³ On the monitors the armor was attached with bolts that passed completely through the "sandwich" of laminated armor. British practice employed through bolts, while the

⁴¹Lambert, Warrior, 68-69; J. D. A. Samuda, in discussing J. Scott Russell's paper, March 1, 1861, "On the Professional Problem Presented to Naval Architects in the Construction of Iron-Cased Vessels of War," Transactions of the Institution of Naval Architects (hereafter Transactions INA) 2 (1861): 85-86.

⁴²See Edward W. Very, "The Development of Armor for Naval Use," Proceedings of the United States Naval Institute (hereafter Proceedings USNI) 9, no. 3 (July 1883): 424-26; Baxter, Ironclad Warship, 203. A brief item about the experiments ran in London Times, November 29, 1861: 7.

⁴³Belknap, "Reminiscent of the 'New Ironsides'," 63; [Merrick], "U.S.S. New Ironsides," 77.

French used screws.⁴⁴ The spar deck was made of iron plates one inch thick, joined with riveted butt pieces and

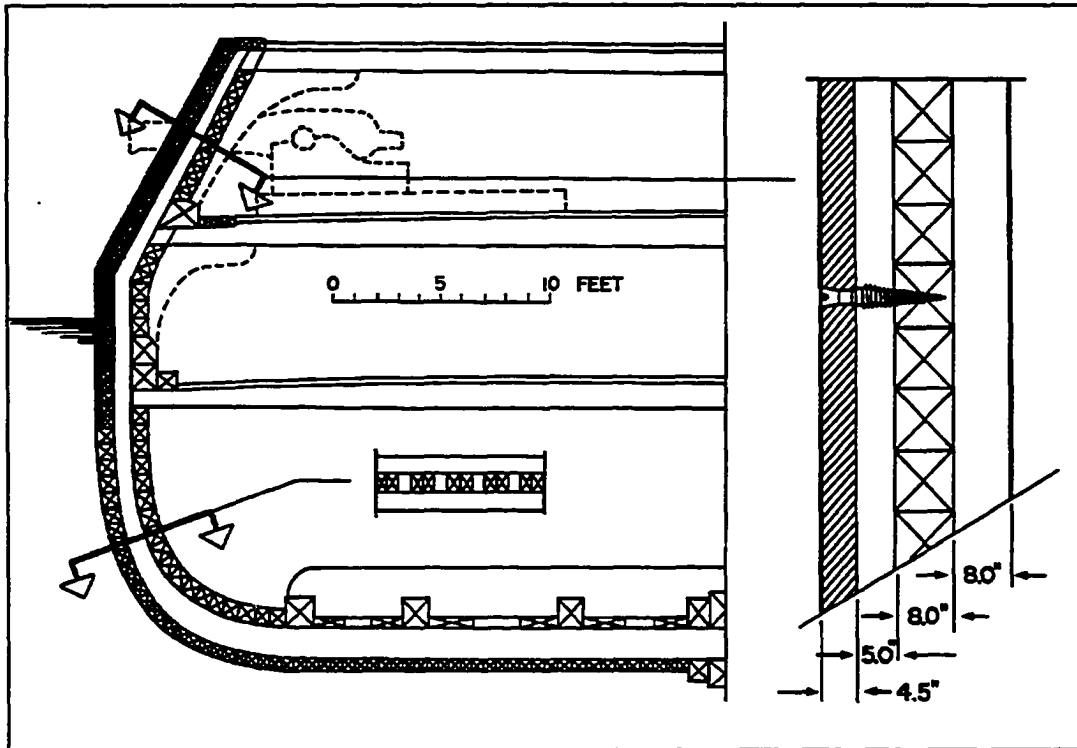


Figure 7. U.S.S. New Ironsides Midships Section and sectional drawing of armor arrangement. (Merrick & Sons drawing of January 1862; Edward Very drawing from "Development of Armor for Naval Use," Proceedings USNI 9 (1883): 390; redrawn by William J. Jurens.)

covered with three inches of yellow pine planking.

The battery was located on the gun deck, the middle

⁴⁴Baxter, Ironclad Warship, 97; Lambert, Warrior, 76; Very, "Development of Armor," 380-81, Alvah Folsom Hunter, A Year on a Monitor and the Destruction of Fort Sumter, Craig L. Symonds, ed. (Columbia: University of South Carolina Press, 1987), 51-53. The contract specified screws passing from within the hull out into the armor "where there is nothing to prevent," but an 1863 sketch confirms the heads were outside, and Very's article concurs. Carpenter Thomas H. Bishop to Turner, September 9, 1863, ORN 14: 555; Very, "Development of Armor," 390-91.

deck of the three. Charles Cramp later stated that when the ship was conceived, he specified that the battery was to consist of VIII-inch guns. The Model 1845 VIII-inch shell gun, a smoothbore muzzle-loader which was not a Dahlgren design, was apparently the gun he intended to use.

By the time Merrick & Sons submitted their proposal to the Navy, the VIII-inch guns had been superseded by the much more effective IX-inch Dahlgrens. Merrick & Sons proposed battery of sixteen IX-inch Dahlgrens weighed 76 tons, compared to 56 tons for an equal number of VIII-inch guns, and needed more men than the 165 intended for the VIII-inch battery. Since the size of the crew allowed for the ship was based upon the size and composition of the battery, the crew's accommodations were designed for 200 men.⁴⁵

In her single screw reciprocating engine propulsion plant the proposed vessel was little different in broad from the European ships. The machinery, duplicating what Merrick & Sons built for the 1858 sloop of war Wyoming, was to drive

⁴⁵[Merrick], "U.S.S. New Ironsides," 78. United States Navy Department, Bureau of Ordnance, Ordnance Instructions for the United States Navy (Washington: GPO, 1866), Appendix A, vi; Warren Ripley, Artillery and Ammunition of the Civil War (New York: Promontory Press, 1970), 102-103. In 19th Century convention, a Roman numeral designating caliber indicated a smoothbore gun, an Arabic numeral a rifled gun. For specification of 200 men, NARG 71, Entry 42, 280. Captain Thomas Turner mentioned "160 men, the complement of the ship originally intended." Turner to Welles, August 27, 1862, quoted in Report . . . Armored Vessels, 30.

the ship at 9½ knots.⁴⁶ New Ironsides had two horizontal reciprocating engines, each with a cylinder of fifty inches diameter and thirty inches stroke, driving a single shaft of ten inches diameter. One double surface condenser mounted between the engines served them both. Her brass screw was twelve feet in diameter, smaller than normal but all that could be accommodated on her limited draft.⁴⁷ New Ironsides had a clutch coupling to permit disconnecting the screw propeller from the engines. A disconnecting propeller was common since allowing the propeller to turn freely reduced its drag when the ship was under sail.⁴⁸

As was usual at the time, little auxiliary machinery was provided.⁴⁹ There were two boiler feed water pumps, two air pumps, two condenser seawater circulating pumps, and

⁴⁶The duplication of Wyoming's machinery, which Cramp found very useful, is explicit in Merrick & Sons' proposal. NARG 19, BuShips Plan 80-11-3; Cramp, [Contemporary Club], 9. Drawings of Wyoming's machinery are in NARG 19, BuShips Plans, Bureau of Steam Engineering alphabetical file, s.v. Wyoming (hereafter "Wyoming plans").

⁴⁷The screw fitted to H.M.S. Warrior was 24'6" in diameter. Lambert, Warrior, 110.

⁴⁸Some propellers could be hoisted, such as Wyoming's. NARG 19, Wyoming Plans. New Ironsides' clutch coupling was exercised at anchor but never disconnected at sea; with her bad sailing characteristics she would have made no headway under sail alone even with her full rig. See also Robert Murray, Rudimentary Treatise on Marine Engines and Steam Vessels, together with Practical Remarks on the Screw and Propelling Power, as used in the Royal and Merchant Navy, 3d. ed. (London: John Weale Architectural Library, 1858).

⁴⁹Warrior was fitted with steam pumps only. Parkes, British Battleships, 20.

two bilge pumps, one of each driven from each main engine. In addition, there were two auxiliary engines, each fitted to power a forced draft blower via a belt drive. A salt water auxiliary pump provided salt water to pump bilges, wash decks, extinguish fires, supply the distilling plant and furnish emergency feed to the boilers.⁵⁰

The four boilers (Figure 8) were of the horizontal fire-tube type, in which tubes slanting up at a slight angle to the horizontal carry the hot gases from the firebox to the smoke pipe, thus heating the water which surrounds them. They were placed facing each other forward of the main engines. The hydrostatic test pressure was 50 pounds per square inch, and the working pressure normally between 20 and 25 pounds per square inch.⁵¹

Each boiler, seventeen feet wide and eleven feet deep, had six coal furnaces, and all four boilers were connected

⁵⁰The contract specified two pumps but only one was provided. Commodore Stephen C. Rowan to Dahlgren, August 1, 1863, Library of Congress, Papers of Stephen Clegg Rowan, "Copies of Letters written by S. C. Rowan, U.S. Navy, from Feby 22, 1854 to Jan 21, 1880, and transferred, Jany 18/82, from various Letter Books," 138; NARG 71, Entry 42, 287. The pump was to be driven by one of the blower engines, but the ship's engineering log and the Wyoming Plans show it had its own engine. A second pump was installed in 1864.

⁵¹Each steamer in the U.S. Navy kept a "steam log," containing pressure and temperature readings for machinery and remarks about the Engineering Department. New Ironsides' logs show boiler pressures from 10 to 26 pounds. On August 31, 1862, 30 and 37 pounds are recorded, the only time pressures greater than 26 pounds were logged. National Archives, Record Group 19, Entry 1072, Steam Log of the U.S. Steamer New Ironsides.

to the same smoke pipe.⁵² A single auxiliary boiler could be used when the main boilers were secured. The main

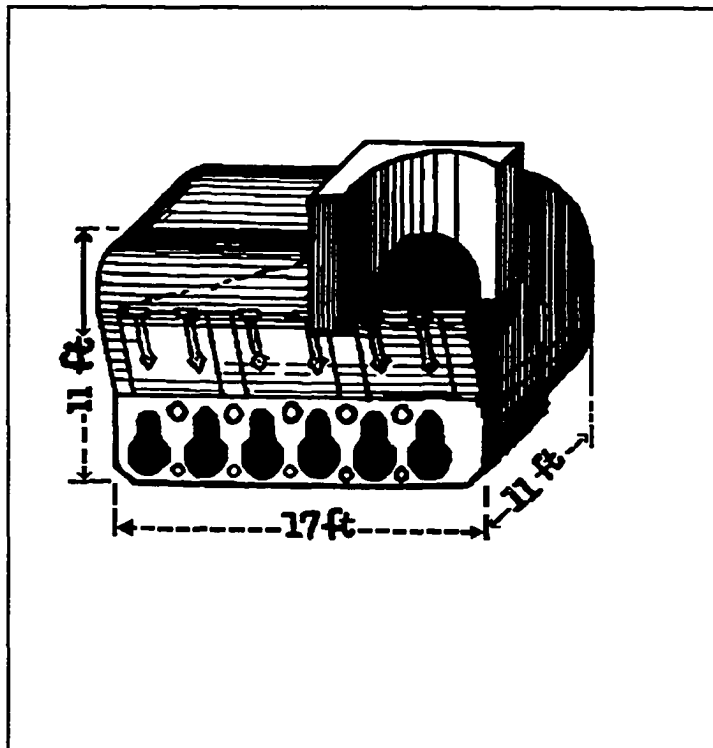


Figure 8. Main Boiler of U.S.S. New Ironsides. (Historical Society of Pennsylvania, Dr. A. C. Bining Collection.)

boilers could be fed with fresh water, which would dramatically reduce the amount of scale formed in them, decrease

⁵²The boilers are described in [Merrick], "U.S.S. New Ironsides," 77. These dimensions differ from the contract but agree with an advertisement of August 1869 (Figure 8) which shows a rectangular boiler with the uptake at one end of the firing front and six furnace doors; the Steam Log confirms six furnaces. The four uptakes together make a complete circle to form the base of the smoke pipe. "Advertisement for One or More (4 in all) Horizontal Tubular Boilers," Dr. A. C. Bining Collection, The Historical Society of Pennsylvania, Philadelphia; NARG 19, Wyoming Plans.

the maintenance required and increase their efficiency. In service, however, main and auxiliary boilers were fed with salt water. The reason appears to be that the distilling plant, large by contemporary standards, had a nominal capacity of 500 gallons per day. With the ship able to make 500 gallons per day for a crew of more than 400 men, there was little surplus fresh water for the boilers.⁵³

After the Ironclad Board made its report on September 16, 1861, the Navy began to negotiate with the three firms who were recommended. The Bureau of Construction, Equipment and Repair was normally responsible for building Navy ships, but Welles gave the responsibility for the first ironclads to Commodore Smith's Bureau of Yards and Docks, apparently due to Smith's connection with the Board.

Joseph Smith was born March 30, 1790, in Hanover, Massachusetts. He entered the Navy in 1809 and served in the Battle of Lake Champlain during the War of 1812. He later commanded U.S.S. Ohio, a sailing ship-of-the-line and, from 1843 to 1845, the Mediterranean Squadron. From 1846 until 1869 he was Chief of the Bureau of Yards and Docks.⁵⁴

Despite his age and long experience in sailing ships, Smith proved receptive to new ideas and made many well

⁵³The salinometer readings confirm that in service the main boilers were fed with sea water. NARG 19, Entry 1072, Steam Log of New Ironsides, various dates.

⁵⁴Smith retired in 1869 and died January 17, 1877. DAB, s.v. "Smith, Joseph."

considered suggestions during the construction not only of New Ironsides but of Monitor and Galena, the other two iron-clads built by the Bureau of Yards and Docks.⁵⁵ As Welles wrote later about the Monitor, but in terms applicable to all three ships, "Admiral Smith beyond any other person is deserving of credit, if credit be due any one connected with the Navy Department for this vessel."⁵⁶

Merrick & Sons chose William Cramp's shipbuilding firm to build their vessel. The two firms were of similar age but had markedly different financial reputations. Merrick & Sons' founder, Samuel V. Merrick, was born in Hallowell, Maine, on May 4, 1801. During the 1820s he built hand-operated fire engines with John Agnew under the name of S. V. Merrick & Company. By 1835 the firm was called the Franklin Works. Merrick and Agnew continued to make fire engines but in 1837 they built a foundry and added steam engines to their line.

Merrick established the Southwark Foundry in 1839 in partnership with John H. Towne, doing business as Merrick & Towne until Towne left in 1849. By 1854 Samuel Merrick had taken his son into the firm.⁵⁷ In 1857, the credit rating

⁵⁵For some of his correspondence with Ericsson, Thompson, "Design and Construction," 224-27.

⁵⁶Welles, Diary, entry for January 3, 1863, 1: 214.

⁵⁷DAB; Appleton's Cyclopaedia, s.v. "Merrick, Samuel V." Bruce Sinclair, Philadelphia's Philosopher Mechanics: A History of the Franklin Institute 1824-1865 (Baltimore and London: Johns Hopkins University Press, 1974), 290-91.

firm of R. G. Dun noted, "Each department has its efficient & reliable foreman, which renders the estate one of the best conducted in the country."⁵⁸

By 1859 Merrick & Son had become Merrick & Sons.⁵⁹ Even after Samuel Merrick retired, the business prospered. In May 1861, R. G. Dun called the company "one of the best in the line." Their wharf near the Navy Yard facilitated their "great deal of work for the Gov't."⁶⁰ Merrick & Sons' machinery was well known in the pre-Civil War Navy, and this cannot have hurt their efforts to secure Government contracts.⁶¹

Unlike the Merrick firm, Cramps' establishment had not always been sound. William Cramp, born September 22, 1807, in Philadelphia, founded his shipbuilding company at 23 and took his sons in they came of age.⁶² The business failed in

⁵⁸R. G. Dun Collection, Pennsylvania 135: 138.

⁵⁹According to DAB, Samuel Merrick retired from the firm in 1860. The Dun records indicate he withdrew on January 7, 1861. R. G. Dun Collection, Pennsylvania 135: 138. Samuel Merrick died August 18, 1870.

⁶⁰Ibid., Pennsylvania 135: 138; 131: 233. By January 1862, the partners were J. Vaughn Merrick, W. H. Merrick, John E. Cope and Hartley Merrick. For a letterhead, National Archives, Record Group 19, Entry 61, Letters Received by the Bureau of Construction and Repair, Box 1, 2: 54.

⁶¹During the Civil War, Merrick built engines for the sidewheeler Miami, the monitors Tonawanda and Yazoo, and six screw steamers, as well as New Ironsides. Bennett, Steam Navy, Appendix B.

⁶²William Cramp remained president of the firm until his death July 6, 1879. DAB, s.v. "Cramp, William."

1855. Cramp and his sons, Charles H. and William M. Cramp, continued it, successfully enough that by 1862 they could make a 50 percent settlement with William Cramp's old creditors. By 1863, they were doing business as William Cramp and Sons, with a capital of \$100,000 and, as the Dun firm noted, "as much work as they can get through." They made \$60,000 profit on New Ironsides, the first of their many ships for the Navy.⁶³

Charles H. Cramp designed New Ironsides. Born in Philadelphia on May 9, 1828, he was William Cramp's eldest son. He joined his father's shipyard in 1846 after an apprenticeship in the shipyard of his uncle John Byerly.⁶⁴ He stated after the war, "The design, plans and specifications of hull complete had been made by me in connection with Mr. B. H. Bartol. . . ." He wrote about his extremely conservative design philosophy when he said he provided against exceeding the required fifteen foot draft, "by allowing a foot for a margin. The draught was not to exceed fifteen feet; I allowed for fourteen feet. . . ."⁶⁵

⁶³For founding, The William Cramp & Sons Ship & Engine Building Company, Cramp's Shipyard founded by William Cramp 1830 (Philadelphia: The William Cramp and Sons Ship and Engine Building Company, 1910), 13. For bankruptcy, recovery and profit, R. G. Dun Collection, Pennsylvania 141: 70.

⁶⁴Charles H. Cramp became president of the firm in 1879 and remained as president or chairman until he died June 6, 1913. DAB, s.v. "Cramp, Charles Henry."

⁶⁵Cramp, [Contemporary Club], 6. Cramp said he received "much credit and congratulation from the Board and others for my foresight in allowing the margin as I did, and

After negotiations in September, Merrick & Sons signed the contract for their ship on October 15, and with that act took the first step towards the seagoing ironclad United States Navy.⁶⁶

for the correctness of my calculations."

⁶⁶Smith to Merrick & Sons, September 24, 1861, National Archives, Record Group 45, Entry 464, Office of Naval Records and Library (ONRL), Subject File, U.S. Navy 1775-1910, AD--Design and General Characteristics 1860-1910, Ironclads, Box 51, typescript marked Naval War Records (NWR), 2634: 28. For execution, Merrick & Sons to Smith, October 21, 1861, NARG 71, Entry 5, Box 447, 2: 7. The contract imposed a \$500 penalty on Merrick & Sons for each day the ship's completion was delayed beyond July 15, 1862.

CHAPTER THREE
CONSTRUCTION HISTORY AND DESIGN EVOLUTION

Once the contract was signed, construction of "the Merrick vessel" could begin. Though the idea of armor protection was old, its practical application was still so new there was no consensus on how to solve the myriad of detailed construction problems an armored vessel would encounter.¹ Compounding the difficulty of designing a successful ironclad was the then-primitive state of hydrodynamics.² Since ironclad ships had never engaged in combat, there was no way to winnow sound practices of armored construction from unsound ones, and seemingly insignificant details could have far-reaching impact. It was inevitable there would be delays, false starts and second thoughts.

Merrick & Sons subcontracted the hull to William Cramp

¹Compare the armor arrangements of Galena, New Ironsides, Monitor and the later Keokuk. Report . . . Armored Vessels, 4-7; Very, "Development of Armor," 389-90, 396-97.

²The design of ships' hulls and machinery was based on experience and rules of thumb. William Froude's pioneering work in model testing did not begin until 1870. New Encyclopedia Britannica, 1988 ed., s.v. "Froude, William."

within a week after signing the primary contract.³ The Navy participated in the design, since Naval Constructor Henry Hoover, the Chief Constructor at the Philadelphia Navy Yard, prepared the details of laying the ship down. His specifications included some timbers that were only available at the Navy Yard, and Bartol requested authority for Cramp to buy them from the Government.⁴

Cramps' first challenge was scarcity of timber for the hull. Charles Cramp stated that when he contracted for the ship, there was no white oak timber available outside of Pennsylvania. All the timber "was growing in the forests" when the contract was signed. The ship's frames were unusually heavy and the large trees needed to make them were hard to find. In October 1861 Cramps advertised for timber, offering a dollar per running foot for suitable trees. This brought in enough heavy timber to construct the ship's frame.⁵ Although haste and shortages dictated the use of unseasoned timber, the ship's long-term future was mortgaged since green timber decayed faster than seasoned wood.

³Bartol to Smith, no date, received October 19, 1861, and marked "Private." NARG 71, Entry 5, Box 5, 2: 78.

⁴Ibid. Hoover's participation is confirmed in Bartol to Smith, October 21, 1861, *ibid.*, 2: 79. This does not invalidate Cramp's claim to have designed the hull; Hoover probably took Cramp's design and worked out details of what piece of wood should go where.

⁵Curved pieces for the futtocks were also hard to locate, and they were made primarily from roots from Delaware. Cramp, [Contemporary Club], 4.

Smith chose two experienced officers to supervise the construction. On November 14, 1861, he appointed Hoover and Chief Engineer William W. Wood as inspectors. Wood was to oversee the engineering plant and the armor while Hoover dealt with the remainder. Hoover was already at the Philadelphia Navy Yard, and Wood reported for duty November 6.⁶

The Government made regular progress payments to Merrick & Sons. Despite their solvency, Merrick & Sons' could not finance the construction of the vessel from their own resources.⁷ Progress payments (best considered as advances against the final contract price) relieved the contractor of much of the financial burden of constructing the ship.

The Government paid the Merricks every two weeks beginning in December 1862, and one of the inspectors' duties was to certify that the contractor's bills were correct. The usual increment for payment was \$50,000, but the Government reserved 25 percent of each, or \$12,500, in case the

⁶Smith to Hoover, November 14, 1861, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 92. Smith to Wood, *ibid.*, 2634: 93. Smith requested Wood in October. Smith to Welles, October 9, 1861, National Archives, Record Group 45, Microfilm Entry M518, Letters Received by the Secretary of the Navy from Navy Department Bureaus, 1861, 3: 62; Wood to Smith, November 6, 1861, NARG 71, Entry 5, Box 445, 14.

⁷In April 1864 Merrick & Sons were worth \$700,000. R. G. Dun Collection, Pennsylvania 135: 320. The value of the New Ironsides contract was thus more than the firm's entire assets during roughly this period. Cramps' firm, with less capital, needed its share of the progress payments passed on from Merrick & Sons even more.

vessel did not meet the contract specifications.⁸ This 25 percent reservation was normal practice for Government ship and engine contracts and did not show unusual concern for the success of the ironclads.

Merrick & Sons undoubtedly needed the money from the progress payments. When the Navy Agent in Philadelphia refused on a technicality to pay one draft, W. H. Merrick wrote Smith, "Excuse me for thus troubling you but in thin times money is a desireable [sic] article."⁹ Merrick & Sons later claimed the Government's delay in making progress payments delayed the ship's completion.¹⁰ Their claim is believable considering the great increase in the price of labor and materials brought about by the War.

Shipbuilders, like all other businessmen, were dramatically affected by wartime inflation. Charles Cramp, commenting on its effects, said that when the contract was made, wages for shipwrights were \$1.75 per day, and in less

⁸For duties, Smith to Hoover, November 14, 1861, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, type-script, NWR, 2634: 92. Smith to Wood, *ibid.*, 2634: 93. For contract provisions, National Archives, Record Group 71, Entry 48, Contract Ledger for Iron Clads 1861-62, 11-12; NARG 71, Entry 42, 269.

⁹W. H. Merrick to Smith, January 6, 1862, NARG 71, Entry 5, Box 447, 3: 8.

¹⁰Smith's endorsement on Merrick & Sons to Welles, November 13, 1862: "The Contractors aver that the Govm't did not pay them as provided in the Contract and therefore they were delayed in the work." *Ibid.*, Box 448, 2: 159. Late payments by the Treasury retarded the Monitor. Baxter, Ironclad Warship, 267.

than two months they rose to \$3.00 per day. He ordered all the copper sheathing and bolts the day after signing the contract at 29 cents per pound; in four months copper was up to 60 cents per pound. Materials in general, he said, rose from 50 to 100 percent before the ship was finished.¹¹

Another of Cramp's problems was hiring enough skilled labor. As Charles Cramp later stated, "Nearly all the skilled workmen and ship-wrights here had gone into the Navy Yard. . . ." Many ship carpenters and other men came from Baltimore and Maine.¹²

The iron armor was forged by two Pennsylvania firms, half by Bailey, Brown & Co. of Pittsburgh and half by the Bristol Forge Co., of Bristol.¹³ Bailey, Brown had been doing business since at least 1846, and R. G. Dun rated them as a "safe good house" with very good credit.¹⁴

During this period, large iron plates could be

¹¹Charles H. Cramp, quoted in Buell, Cramp, 69.

¹²Cramp, [Contemporary Club], 5. Cramp asserts many men "left their home to avoid conscription and to secure the high rates of wages paid here." Since the draft had not yet begun, he apparently confused this with a later period.

¹³[Merrick], "New Ironsides," 79.

¹⁴R. G. Dun Collection, Pennsylvania 5: 90. John H. Brown of Bailey, Brown wrote to John Covode, a Pennsylvania Republican Congressman, that despite New Ironsides they were not invited to bid on plates for Roanoke. He complained, "Pennsy^a is nowhere, and New York gets the work at an extravagant figure." Brown to Covode, May 17, 1862, in National Archives, Record Group 19, Entry 71, Miscellaneous Letters Received by the Chief of the Bureau of Construction and Repair, 2: 183.

produced either by rolling or by forging (hammering). In each method, the starting point was a red hot stack of iron about twice the desired thickness. The stack was pressure-welded by rollers or a hammer into a single mass and simultaneously compressed to the finished thickness.¹⁵ The two processes produced a similar product but had different advantages. Forging was slow, manpower intensive and expensive, but at the time could produce a thicker and larger plate.¹⁶ Rolling was faster and cheaper and if properly done made a more uniform plate, though it required several trips through the rollers to reduce the thickness gradually.

Existing rolling machinery was limited. First, wide plates required long rollers, which had a tendency to "spring" or separate in the middle. The resulting plates were uneven, thicker in the middle than at the sides.¹⁷ Second, the wider and thicker the desired plate, the greater the total force required from the machine and the more

¹⁵Very, "Development of Armor," 560-66. For a description of forging and iron-clad construction, A. H. Guernsey, "Iron-Clad Vessels," Harper's New Monthly Magazine 25, no. 148 (September 1862): 433-46.

¹⁶Isherwood and Lenthall to Welles, March 17, 1862, discusses plates. National Archives, Record Group 19, Entry 49, Letters Sent by the Chief of the Bureau of Construction and Repair to the Secretary of the Navy, Book 0144, 377; reprinted in U.S. Congress, Joint Committee on the Conduct of the War, Report of the Joint Committee on the Conduct of the War, "Light Draught Monitors," 38th Cong., 2d Sess., 1865, 110-12.

¹⁷Testimony of Chief Engineer Eben Hoyt before the Joint Committee, *ibid.*, 34.

expensive and specialized it had to be. Since "such masses of rolled iron are not used in private business," machinery to roll solid four-inch plates was practically nonexistent in the United States.¹⁸ Charles Cramp stated that the plates for the New Ironsides, "which could now [1897] be rolled in many mills and be considered light work, were then looked upon as marvels of heavy forging."¹⁹ Accordingly, the plates for which Merrick contracted were forged. Once hammered to the correct thickness, the plates were straightened and their sides and ends planed and slotted.²⁰

New Ironsides' solid plates contrasted with the laminated armor used by Ericsson in his Monitor design. There were two reasons for Ericsson's choice of laminated armor. First, he could obtain thin (one inch) plates more rapidly than thick ones, and speed of construction was a

¹⁸Isherwood and Lenthall to Welles, March 17, 1862. NARG 19, Entry 49, Book 0144, 377. Several letters attest to interest in heavy rolled plating: Smith to A.S. Winslow, March 27, 1862, NARG 45, Entry 464, Subject File, AD--Iron-clads, Box 51, typescript, NWR, 2634: 239; Smith to C.W. Whitney, December 6, 1861, *ibid.*, 2634: 124; Brown & Co. to Welles, June 6, 1862, National Archives, Record Group 45, Microfilm Entry M124, Miscellaneous Letters Received by the Secretary of the Navy, Roll 409: 112.

¹⁹Cramp, [Contemporary Club], 9.

²⁰Very, "Development of Armor," 562. For tools used, James Fletcher, "On Improvements in Heavy Tools for General Engineering and Iron Ship-building Work," Journal of the Franklin Institute 3d ser. 51, no. 2 (January-July 1866): 100-110.

vital factor in the acceptance of his design.²¹ Second, the turret design called for plates bent in an arc, and no means for bending thick plates were then available.²²

At this date there was still some small doubt lingering about the relative effectiveness of laminated and solid plating. The minority held that laminated plates would be more resistant to shot than solid ones. Chief Engineer Alban C. Stimers wrote in his 1863 report of the first attack on Charleston, South Carolina, that although the laminated plates of the monitors "impressed the nonprofessional observer with the idea of great injury," their "power to resist shot has not been greatly reduced." Notwithstanding that the solid plates of the New Ironsides appeared less damaged, "the unprejudiced engineer" would perceive that laminated plates were more effective.²³

Stimers, as the engineer in charge of monitor construction, was hardly unprejudiced. War experience and further experimentation proved repeatedly that thick solid

²¹Ericsson wrote Smith on October 8, 1861, saying the only contractor who replied positively to his request for four inch thick plates required two months preparations. "The 1 inch plate I can have at once . . . at the rate of 140 tons per week." NARG 71, Entry 5, Box 447, 2: 50.

²²Isherwood and Lenthall to Welles, March 17, 1862. NARG 19, Entry 49, Book 0144, 377. Similarly, Roanoke's turrets were laminated even though the hull armor was solid. Guernsey, "Iron-Clad Vessels," 440. New Ironsides' round pilot house was also laminated.

²³Report of Chief Engineer Stimers, April 14, 1863, ORN 14: 42.

plates were indeed more resistant and that Stimers was engaging in political engineering.²⁴

Experimental confirmation of the superiority of solid plates may not have been known in the U.S. when Monitor and New Ironsides were designed in 1861, although it was widely available by February 1862. In an article reprinted then in the Journal of the Franklin Institute, John Brown, a noted iron maker from Sheffield, stated that English experience and trials favored solid plates.²⁵ In March 1861, in discussion at the Royal Institution of Naval Architects, J. D. A. Samuda, a prominent builder of iron ships, stated, "You could resist more effectually with a solid plate than you could do with the same weight placed in layers."²⁶

²⁴Very said Stimers showed "absolute blindness to any and all imperfections of the monitor . . . as early as 1854 it had been definitely established that laminated armor only possessed two thirds the resisting power of solid plates of the same thickness." Very, "Development of Armor," 399.

²⁵John Brown, "On the Manufacture of Steel Rails and Armor Plates" from Newton's London Journal, February 1862, reprinted in Journal of the Franklin Institute 3d ser. 43, no. 2 (January-June 1862): 255.

²⁶ J. D. A. Samuda, discussing Russell's "Iron-Cased Vessels," Transactions INA 2 (1861): 87. In his example, comparing two three-inch plates with one six-inch plate, the resistance of the two would be $(3^2 + 3^2) = 9 + 9 = 18$ and of the one $6^2 = 36$, making the two half as effective as the one. For wrought iron the correct equation for effective thickness can be simplified to $T = (t_1^2 + t_2^2 \dots + t_n^2)^{1/2}$, where T is the effective thickness and t_1 through t_n are the actual thicknesses of the component plates. The ratio of the resistance of two three-inch plates to the six-inch plate would actually be $18^{1/2}$ to $36^{1/2}$, or 4.24 to 6.0, making the two plates 70% as effective as the one. Nathan Okun, "Armor and its Application to Warships," Warship International 15, no. 4 (1978): 284-85.

In an 1862 discussion at the Institution, Sir John C. Dalrymple Hay, Chairman of the Iron Plate Committee of Parliament, stated,

The resisting power shewn by the iron will be very nearly measured by the square of the thickness in inches; that is to say, assuming a 2-inch plate has a resisting power of 4, a 4-inch plate is equal to 16. . . .²⁷

Later, in an 1863 discussion at the Royal United Service Institution, it was noted that,

When a mass of iron is produced by overlaying plates one upon the other, you lose in the mass the cohesive strength which iron has when it is in one thickness.²⁸

While the question of hammered or rolled plates was still open, Hay said the Iron Plate Committee found almost no difference between them, and rolled plates "if equally well done" were equal to hammered plates.²⁹

As might be expected with so novel a ship, New Iron-sides' design continued to change during her construction. The rigging was at issue in December 1861, but a three

²⁷John C. Dalrymple Hay, March 27, 1862, discussing John Ford's paper, "On the Manufacture of Armour Plates," March 27, 1862, Transactions INA 3 (1862): 153. (The paper was reprinted in the Mechanics' Magazine in April 1862 and again in the Journal of the Franklin Institute 3d. ser. 44 (July-December 1862): 39.)

²⁸A Mr. Clarke, discussing Jasper H. Selwyn's "On the Future of Naval Attack and Defence," February 16, 1863, Journal of the Royal United Service Institute (hereafter Journal RUSI) 7, no. 26 (1863): 49.

²⁹John C. D. Hay, March 27, 1862, discussing Ford's "Armour Plates," Transactions INA 3 (1862): 153.

masted bark rig was chosen.³⁰ The battery was in flux as late as April 15, 1862, when Smith wrote to Commander John A. Dahlgren, then Commandant of the Washington Navy Yard, "I have deck plans of 'Ironsides,' also plans of shutting ports. Come up & see them & see how many XI inch guns she can fight."³¹ As a result, fourteen XI-inch Dahlgren smoothbores and two 150-pounder Parrot rifles replaced the sixteen IX-inch Dahlgrens then planned for the ship.³²

The battery was again changed in July 1862, when the two 150-pounder Parrott rifles were moved from the spar deck to the gun deck.³³ In addition to the guns, the ship's weapons included an iron ram on the prow.

The increased battery caused a large increase in the size of the crew, which grew to almost 400. Cramp's conceptual design for the ship included a battery of VIII-inch

³⁰Smith to B. H. Bartol, December 3, 1861, NARG 45, Entry 464, Subject File, AD--Ironclads, typescript, NWR, 2634: 114. For rigging plan, NARG 19, Plan 107-9-12L (Figure 1).

³¹Smith to Dahlgren, April 15, 1862, NARG 45, Entry 464, Subject File, AD --Design, Box 48. Dahlgren became Chief of the Bureau of Ordnance on July 18, 1862, and was promoted Captain on August 5, 1862. David K. Allison, "John A. Dahlgren: Innovator in Uniform," in Captains of the Old Steam Navy: Makers of the American Naval Tradition 1840-1880, ed. James C. Bradford (Annapolis: United States Naval Institute Press, 1986), 36-37.

³²For armament listing, National Archives, National Archives, Record Group 74, Records of the Bureau of Ordnance, Entry 121, Reports of Armaments on Vessels, 1: 80.

³³Dahlgren to Turner, July 24, 1862. National Archives, Record Group 74, Entry 2, Letters and Telegrams Sent to Naval Officers, Box 2, 3: 116.

shell guns. The VIII-inch was allowed 7½ men per gun, resulting in a total crew of 120 for the guns and 41 more for the powder division (to carry powder and shell and help the surgeon by carrying wounded), for a total crew of 161 exclusive of engineers. The revised design, carrying IX-inch Dahlgrens, required gun crews totaling 136 men and 46 men for the powder division, for a crew of 182 not counting engineers. The XI-inch battery required 200 men for gun crews, plus 22 to handle the fifty-pounder Dahlgren rifles added on the spar deck and 75 more in the powder division, totalling 297 exclusive of engineers.³⁴

Other major additions to the original design included armored shutters to cover the gun ports, armored bulkheads to protect the ends of the battery, and an armored pilot house.³⁵ The port shutters, four inches thick, pivoted at their tops on axles penetrating the ship's sides. Ten men worked each shutter, but since the shutters were operated from within the battery the crews were well-protected.³⁶

³⁴The allowance for the XI-inch Dahlgren and 150-pounder Parrott used on the broadside was 12.5 men per gun. The IX-inch was allowed 8.5 men per gun. Ordnance Instructions, Appendix A, iii, vi.

³⁵Merrick & Sons to Smith, August 7, 1862: "The following work additional to contract is now progressing rapidly, viz., Gun carriages, Port shutters, Iron bulkheads. . . ." NARG 71, Entry 5, Box 448: 105. Edward Shippen, "Fort Fisher - December, 1864, and January, 1865," United Service Magazine, n.s., 2 (July 1889): 11; also Belknap, "Reminiscent of the 'New Ironsides'," 63-64.

³⁶Captain Thomas Turner to Smith, April 2, 1863, NARG 71, Entry 5, Box 449, 2: 7.

The original design provided no defense against shot that might enter the unarmored wooden bow or stern and pass lengthwise through the ship, an effect known as "raking." To prevent it, Merrick & Sons designed armored bulkheads to protect the battery, which Bartol proposed to Smith on January 9, 1862. The bulkheads would run across each end of the battery, on the gun deck and the berth deck below. Each was of twelve inch oak covered with 2½ inches of iron.³⁷

On January 16, Smith wrote back that he had considered the proposal, but expressed concern about the effect of the bulkhead on the working of the anchor cables and a bow gun.³⁸ His letter crossed one from Bartol that gave an estimate of the added weight and enclosed a drawing. This letter was sent to the Bureau of Construction, Equipment and Repair for comment and was returned with the note, "The disadvantages viz. weight above water and obstruction on deck are greater than any advantage we can perceive." On the strength of this, Smith noted on January 18, "Concluded not to put in the bulkhead."³⁹

Fortunately for the Navy, Merrick & Sons did not drop

³⁷Merrick & Sons to Smith, January 8, 1862, *ibid.*, Box 447, 3: 17.

³⁸Smith to Merrick & Sons, January 16, 1862, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 157. No bow gun was ever installed.

³⁹Bartol to Smith, January 16, 1862, with annotations, NARG 71, Entry 5, Box 447, 3: 32. Smith notified Merrick & Sons on January 18, 1862.

the matter. On February 13, 1862, Smith wrote to Merrick and Sons that he would accept the bulkheads as long as they did not affect the other characteristics of the ship. He was especially worried about her speed, saying, "I do not mean to let up a hair on the speed of the vessel. . . ." ⁴⁰

Bartol replied on February 14 that

we think the bulkheads absolutely essential between the spar and gun deck because a raking shot might disable several guns . . . an ironclad steamer is expected to be proof against an accident of this kind. ⁴¹

Smith, still concerned about increased weight and draft, approved bulkheads between the spar and gun decks only. ⁴²

The armored pilot house was added late in the construction period. The small circular structure extended through the spar deck and was entered from the gun deck level by a spiral staircase. ⁴³ It was placed on the centerline of the spar deck directly aft of the smokestack and mainmast, probably because unarmored ships were normally

⁴⁰Smith to Bartol, February 13, 1862, NARG 45, Entry 464, Subject File, AD--Design, typescript, NWR, 2634: 184.

⁴¹Bartol to Smith, February 14, 1862, NARG 71, Entry 5, Box 447, 3: 81.

⁴²Smith to Merrick & Sons, February 15, 1862, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 185.

⁴³The placement was not determined as late as April. On April 4, 1862, Smith telegraphed Merrick & Sons, requesting their proposal. Ibid., 2634: 257. For placement, NARG 19, Plan 107-9-12A. The "Look Out" had an inside diameter of four feet and an outside diameter of five feet. Merrick & Son to Lenthall, NARG 19, Entry 71, 4: 198.

directed from that area. In this decision the lack of either precedent or sound ideas to guide the designer led to a serious operational problem, since the smokestack drastically reduced the conning officer's forward vision.

New Ironsides was usually steered from a wheel on the spar deck but in action was steered from a wheel behind armor on the berth deck. A speaking tube apparently connected the conning officer in the pilot house with the helmsman below. Engine orders were passed by voice until late August 1863 when the engine room bell pull was extended to the spar deck level.

While design details were being resolved, construction continued at Cramps' shipyard. There was little security during the early stages. Charles Cramp wrote, "The war on land . . . occupied the entire attention of the people, so that the yard was left open; no fence around it and no visitors." After the battle between Monitor and Virginia, interest in ironclads rose and the number of visitors soared. "We had to build a high fence around the yard and only admitted those who secured tickets issued by us."⁴⁴

Under pressure of war New Ironsides' construction was remarkably rapid for such a novel design, although she, like Monitor, took longer to build than the contracted time. New

⁴⁴Cramp, [Contemporary Club], 7.

Ironsides was launched on May 10, 1862.⁴⁵ By June the engines were on board and the armor was being installed. The ship was drydocked on June 6 at the Philadelphia Navy Yard to install her copper and propeller, and the urgency of completing her was so great that the coppering was worked day and night.⁴⁶ By June 14, the propeller shafting was installed, and Wood was optimistic enough of prompt completion to request permission to enlist firemen for the ship. The boilers and engines were tested under steam in July.⁴⁷

By this time, New Ironsides' prospective Commanding Officer had reported to the Navy Yard. He was Captain Thomas Turner, a naval officer of 37 years experience. Born December 23, 1808, in Washington, D.C., he entered the Navy in 1825. A veteran of combat against Malay pirates, he had commanded several other ships, both sailing vessels and

⁴⁵U.S. Navy Department, Naval History Division, Civil War Naval Chronology (Washington: GPO, 1971), II-62. Smith was unable to attend. NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 282. The ship's sponsor, Commodore Charles Stewart, launched her at 10:27 A.M. "Launch of the 'New Ironsides.'" Philadelphia Daily Evening Bulletin, May 10, 1862: 1; Edith Wallace Benham and Anne Martin Hall, Ships of the United States Navy and their Sponsors (Norwood, MA: Privately printed [Plimpton Press], 1913), 121.

⁴⁶Wood to Smith, June 7, 1862, NARG 71, Entry 5, Box 448, 1: 15. For coppering, Turner to Smith, April 2, 1863, *ibid.*, Box 449, 2: 7.

⁴⁷For firemen, Wood to Smith, June 14, 1862, *ibid.*, Box 448, 1: 25. Permission was granted. For testing, Wood to Smith, July 12, 1862, *ibid.*, 1: 68.

steamers, before assuming command of New Ironsides.⁴⁸

On August 2, 1862, Welles directed Dahlgren, by this time Chief of the Bureau of Ordnance, to rush production of the ordnance equipment.⁴⁹ In reply, Dahlgren told Welles that the ship's iron gun carriages would be done by August 11. Of the sixteen carriages, eight were made by Merrick & Sons and eight by Cooper & Company of Trenton, New Jersey.⁵⁰ Dahlgren visited New Ironsides in Philadelphia on July 29, and on July 31 visited Cooper in Trenton.⁵¹

The ship's guns were probably received on board in early August. Most were prewar pieces; eight of the fourteen XI-inch Dahlgrens were cast in 1856, two in 1860, and four in 1862. All except one were made at West Point Foundry. The two 150-pounder Parrotts were cast in 1862 by the Parrott firm.⁵²

⁴⁸Turner commanded the South Pacific squadron from 1868 to 1870. He died on March 24, 1883. Appleton's Cyclopaedia, s.v. "Turner, Thomas."

⁴⁹Welles to Dahlgren, August 2, 1862, National Archives, Record Group 74, Entry 16, Letters Received from the Secretary of the Navy and Navy Department Bureaus, Box 4, 62.

⁵⁰To meet the delivery date, Dahlgren had to send men from the Washington Navy Yard to help Cooper. Dahlgren to Welles, August 4, 1862. National Archives, Record Group 74, Entry 1, Letters Sent to the Secretary of the Navy and Navy Department Bureaus, Box 1, Book 3: 9.

⁵¹Madeleine Vinton Dahlgren, Memoir of John A. Dahlgren Rear Admiral United States Navy (Boston: James R. Osgood and Company, 1882), 377.

⁵²NARG 74, Entry 121, 1: 80. May 4, 1863, U.S.S. New Ironsides.

During the ship's construction, the Philadelphia Navy Yard supplied some skilled labor to the contractors.⁵³ The Yard also furnished hemp and manila line and various iron parts. This labor and material, and the cost of drydocking the ship in June, were deducted from the contract price.

Despite the urgency accompanying her construction, the nine months specified in the contract stretched to ten by the time New Ironsides was completed. On August 7, 1862, Merrick & Sons notified the Navy Department that construction was complete. There was still work to do on gun carriages, port shutters and iron bulkheads, but these items, Merrick & Sons' averred, were additional to the contract. Smith disagreed: "The contract is not complete til the Bulkheads are in. . . ." ⁵⁴

The originally calculated weights had by this time increased considerably. The heavier battery added 301 tons, the armored bulkheads 110 tons, and the pilot house 16.5 tons. Additional men and their "appendages" added 29 tons, and increased fresh water storage another 51 tons. Against this there was a deduction of 40 tons for masts and rigging, as the full sail rigging was discarded for pole masts. The

⁵³Among other tasks, Navy Yard carpenters installed the ship's capstan. Merrick & Sons to Smith, January 13[14?], 1863, NARG 71, Entry 5, Box 449, 1: 36. It includes a letter from Hoover to Merrick dated January 14.

⁵⁴Merrick & Sons to Smith, August 7, 1862, with pencil note in Smith's hand, *ibid.*, Box 448, 1: 105.

total was 495 tons beyond that initially estimated.⁵⁵

Even with the additional weight, the ship drew between fourteen and fifteen feet. Bartol wrote Smith on August 14, "To day she draws 14 ft.9 aft & 14 ft forward & as she has immense capacity and they will not stop until she is full they will get her to the 15 feet [emphasis added]."⁵⁶ The shallower draft was a mixed blessing, despite the original Navy advertisement that called for the least possible draft.

In an unarmored seagoing ship, draft mattered for two reasons. First, shallower draft permitted the ship to navigate in shallower water. Second, given a specific ship's design, draft determined the height of the gun ports above the water. A ship with higher ports, all else being equal, could work her guns better in rough weather. For an iron-clad, draft was more significant, since the armor had to be laid out around a nominal design draft.

The armor of the New Ironsides provided protection below as well as above the design waterline. This was because the actual position of the water relative to the armor was variable. It depended not only upon the ship's draft, but upon her heel, roll and pitch, and upon the action of the seas. Given the established dimensions of the

⁵⁵The full rigging was returned after the initial trials. Turner to Merrick & Sons, September 22, 1862, *ibid.*, 2: 79.

⁵⁶Bartol to Smith, August 14, 1862, marked "Private." *Ibid.*, 2: 118.

protection, too shallow a draft could have exposed the unarmored hull below the armor to enemy fire when the ship heeled before a wind or rolled in the seas.

The contract required New Ironsides' gun port sills to be at least seven feet above water when the ship was ready for sea. This was within reason for a seagoing ship; the port sills of the French Gloire were six feet six inches, although those of the much larger British Warrior were nine feet.⁵⁷ Cramp designed the ship such that the port sills were eight rather than seven feet above his nominal fourteen foot waterline. He later said,

Having in view the fact that all war-ships heretofore built--particularly steamships--exceeded their calculated draught, I determined to avoid a similar error . . . by allowing a foot for a margin.⁵⁸

Yet he oriented the armor around the fourteen foot water line.

When New Ironsides floated at her designed fourteen foot draft, she exposed her rudder head to shot.⁵⁹ This shows that Cramp's original protective scheme, oriented around the fourteen foot water line, was defective. To

⁵⁷Russell, "Iron-Cased Vessels," 24.

⁵⁸NARG 71, Entry 42, 269; Cramp, [Contemporary Club], 6. Increasing the height of the gun ports by a foot increased the range of the guns by no more than 20 yards.

⁵⁹When coal was removed to compensate for the weight added during construction, the rudder head was out of the water. See below, 71-72. C.S.S. Virginia also suffered from inadequate immersion, the edges of her armor being only six inches below the waterline when she fought the Monitor. Still, Iron Afloat, 23.

protect the rudder, the ship had to sit deeper in the water than fourteen feet. It made no difference whether the weight added to achieve this was guns, men, armor, coal or ballast; weight, not its composition, was the key. The increased weight of battery, bulkheads, and pilot house saved Cramp the embarrassment of having to ballast the ship to protect the rudder.

Cramp's margin did maintain the seven-foot height of the port sills above the waterline after the "normal" load draft was increased to fifteen feet to protect the rudder. Fortunately, the ship still met the requirement for a fifteen foot maximum draft after the rudder protection was resolved.

Merricks officially delivered the ship to the Navy on August 10, 1862, though shipyard work continued.⁶⁰ The pressure for departure was great and the situation confused, and 53 crewmen deserted during the next week due to poor living conditions on board. Turner told Commodore Garrett J. Pendergrast, Commandant of the Philadelphia Navy Yard, that the crew should have remained in the receiving ship, since they had no cooking facilities--the men had been put on board "without the ordinary conveniences." In a lament familiar to naval officers, he complained, "I do not command and cannot control the mechanics." Although "the Gov't is

⁶⁰Merrick & Sons to Welles, November 13, 1862, endorsed by Smith and Welles, NARG 71, Entry 5, Box 448, 2: 159.

exceedingly anxious to despatch this ship," he observed, "so far from the departure of the ship being accelerated, it has been retarded by the crew being on board."⁶¹

Turner wrote to Assistant Secretary Fox on August 16, 1862, saying,

I beg you to be assured that every effort is being made in every Dept. to get the 'New Ironsides' off as soon as possible. The utmost energy & activity is employed by the Contractors--and every one concerned to despatch her--as many men are employed as can be worked to advantage.⁶²

Turner expressed misgivings in the same letter, writing,

My only fear is that the extraordinary haste, may cause things to be not so complete as I could wish. The Commodore [Pendergrast] acting under the spur of telegraphs & letters from the Dept is disposed to push us off--before the finishing stroke can be given to make her a complete success.⁶³

The main armament was completed August 15, and New Ironsides was commissioned on August 21, 1862.⁶⁴ The seagoing iron-clad U.S. Navy had become a reality.

⁶¹New York Public Library, Captain Thomas Turner Letter Book (hereafter "NYPL, Turner Letter Book"), August 19, 1862.

⁶²August 16, 1862, Thompson, Correspondence of Fox, 1: 356-57.

⁶³Ibid., 1: 356-57.

⁶⁴For armament, Dahlgren to Welles, August 18, 1862, NARG 74, Entry 1, Box 1: 9; Turner to Fox, August 16, 1862, Thompson, Correspondence of Fox, 1: 356-57. For commissioning, National Archives, Record Group 24, Records of the Bureau of Personnel, Log of the U.S.S. New Ironsides, August 21, 1862.

CHAPTER FOUR

TEETHING TROUBLES: A "HOT-HOUSE" SHIP

Every new ship displays her share of defects when she leaves her builders' hands, and New Ironsides was no exception. In normal times, she would have a trial period for her crew to become familiar with their ship and their duties. Following this "shakedown" period, the ship would return to the shipyard to correct the flaws the crew identified. A workup and trial period would be especially important to an ironclad ship, unorthodox and unfamiliar to her officers and crew.

The summer of 1862 was not a normal time. The New Ironsides, like the Monitor, had no formal trial period or shakedown cruise. Unlike the Monitor, which had at least been tested in New York Harbor, New Ironsides' very first trip underway took her down the Delaware River enroute to possible action.

New Ironsides was urgently wanted at Hampton Roads, where Rear Admiral Louis M. Goldsborough began asking for her in July 1862. Her duty there was to counter the threat

posed by Confederate ironclads up the James River.¹ After her commissioning on August 21, she started down the Delaware River to Hampton Roads on August 22, 1862, in what her Commanding Officer called "unprecedented haste."² On August 26 she anchored off Newport News. On August 31, 1862, after the flurry caused by the Richmond-based Confederate ironclads had subsided, New Ironsides steamed back to Philadelphia for post-trial repairs. Although Goldsborough wanted to keep the ship, Welles decided that the needed work could better be done at Philadelphia than at Hampton Roads and directed the ship's return there on August 29, 1862.³

During this first active service, New Ironsides displayed several failings, some best described as the "teething troubles" expected in any new ship, and some less easily corrected. Most of the "teething troubles" were corrected during her refit. They included enlarging the galley and hammock nettings, both too small for the enlarged crew, and replacing the catheads, too drooping and not long enough to

¹"I would urgently suggest that the Ironsides be sent here as early as practicable. I have but little faith in the Galena, and regard the Monitor as exceedingly overrated. . . ." Goldsborough to Welles, July 8, 1862, ORN 7: 549; Goldsborough to Welles, July 13, 1862, ibid., 7: 569.

²Turner to Welles, August 27, 1862, in Report . . . Armored Vessels, 30.

³NARG 24, Log of New Ironsides, August 22-31, 1862. ORN 7: 688-89. Goldsborough continued to request New Ironsides. Goldsborough to Welles, September 12, 1862, ibid., 8: 14. Welles wrote, "two or three times a week we are assured they are in sight. . . ." Welles, Diary, entry for August 10, 1862, 1: 72.

handle the anchors properly.⁴ The galley was the most significant of these difficulties. As Turner wrote,

The galley was made for 160 men, the complement of the ship originally intended. There are now four hundred on board--none too many; consequently, my crew are suffering in their meals, and are absolutely living on raw beef and pork. . . .⁵

The surgeon blamed the galley for sickness in the crew.⁶

The major deficiencies revealed were in her speed, steering and gun carriages. In speed, the ship failed by a considerable margin to make her contract speed of 9½ knots. During the open ocean passage from Cape Henlopen, Delaware, to Hampton Roads, she steamed an average of 5.7 knots for ten hours. The engines were not tested at maximum power because of steering problems, which became worse at speeds above 5.7 knots.⁷

⁴Turner to Welles, August 30 and October 5, 1862, NYPL, Turner Letter Book. The full list is in Lenthall to Pendergrast, September 4, 1862, National Archives, Record Group 19, Entry 54, Letters Sent by the Bureau of Construction and Repair to the Commandant of the Philadelphia Navy Yard, 2: 196. Catheads were used to stow an old-fashioned stocked anchor.

⁵Turner to Welles, August 27, 1862, quoted in Report . . . Armored Vessels, 30.

⁶He also wrote, "Eating too much with abundant drinking of wine and ice water may account for the officers being affected." National Archives, Record Group 52, Bureau of Medicine and Surgery, Entry 22, Medical Records of Ships, Medical Journal of the U.S.S. New Ironsides, August 26, 1862.

⁷Wood to Welles, August 27, 1862, published in Report . . . Armored Vessels, 31. The steering is mentioned in the report of trial made by Turner to Welles, August 27, 1862, *ibid.*, 30, and in Wood's report, *ibid.*, 31.

On her return up the Delaware River, Turner claimed a speed of ten knots for her. He based this upon the ship having covered an adjusted distance (allowing for the current) in an adjusted time (allowing for maneuvering).⁸ As will be discussed later, his adjustments were incorrect; her speed was much lower than ten knots.

The steering problem was that the ship could not be controlled at high speed. She required constant attention and would veer off unexpectedly to starboard, at times so badly that she had to slow or stop to regain her course.⁹ This was probably due to poor hydrodynamic design of the hull, but at the time it was supposed to be the fault of the rudder.¹⁰ The ship had a novel articulated rudder, consisting of a rudder hung with pintles and gudgeons to the stern post with another rudder attached to the aft end of the first and fitted with gearing to connect the two (Figure

⁸Turner to Merrick & Sons, September 22, 1862, NARG 71, Entry 5, Box 448, 2: 79. The highly complimentary letter was apparently forwarded to the Bureau by the firm.

⁹Turner to Smith, October 20, 1862, *ibid.*, 2: 110.

¹⁰The hull was very blunt aft, giving a poor flow of water into the screw and rudder. NARG 19, Plan 107-9-12M. The rudder was directly aft of the centerline of the screw. In modern practice, single screw ships of comparable displacement have finer lines, their screws and rudders are below the plane of the ship's bottom rather than above it and their rudders are offset for improved steering. R. S. Crenshaw, Jr., Naval Shiphandling, 4th ed. (Annapolis: United States Naval Institute Press, 1975), 20-25.

9).¹¹ The outer rudder was moved by pendants.¹²

Smith and Turner initially thought the problem was due to insufficient force on the tiller. During the post-trial repair period in Philadelphia, from September 3 to September 26, 1862, blocks were rigged to give a three to one mechanical advantage to the tiller ropes. This did not correct the problem. Turner wrote,

The trouble is not that it [the tiller] is moved with difficulty, but when moved under certain circumstances, she will not answer it, but on the contrary persists in going her own way.¹³

Smith proposed an "equipoised," or balanced, rudder to correct the problem. Figure 8 shows the articulated rudder with a one-piece balanced rudder overlaid, but no change was made to the ship during her commissioned service.¹⁴

There was a lesser steering problem with the lower (secondary) wheel. This wheel was placed on the berth deck

¹¹Turner to Rear Admiral Samuel F. DuPont, February 6, 1863, ORN 13: 646-47. The rudder was a proprietary design, sold by S. & G. Yerkes. NARG 19, Entry 71, Box 3, 1: 18.

¹²Based on Figure 9 and a letter, the inner rudder was actuated by the tiller and the outer by pendants. Commodore William Radford to Porter, January 1, 1865, National Archives, Record Group 45, Entry 395, Subentry 87, Correspondence of Commodore William Radford. A description of a similar "fish rudder" is in Henry Lumley, "On the Steering of Ships," Transactions INA 5 (1864): 128-34 and plate.

¹³Turner to Smith, October 20, 1862, NARG 71, Entry 5, Box 448, 2: 130.

¹⁴NARG 19, Plan 107-9-12F. On March 31, 1865, Lenthall told Commodore Isaac B. Hull, Commandant of the Philadelphia Navy Yard that the rudder would be replaced with a "balanced rudder of metal." NARG 19, Entry 54, 2: 302.

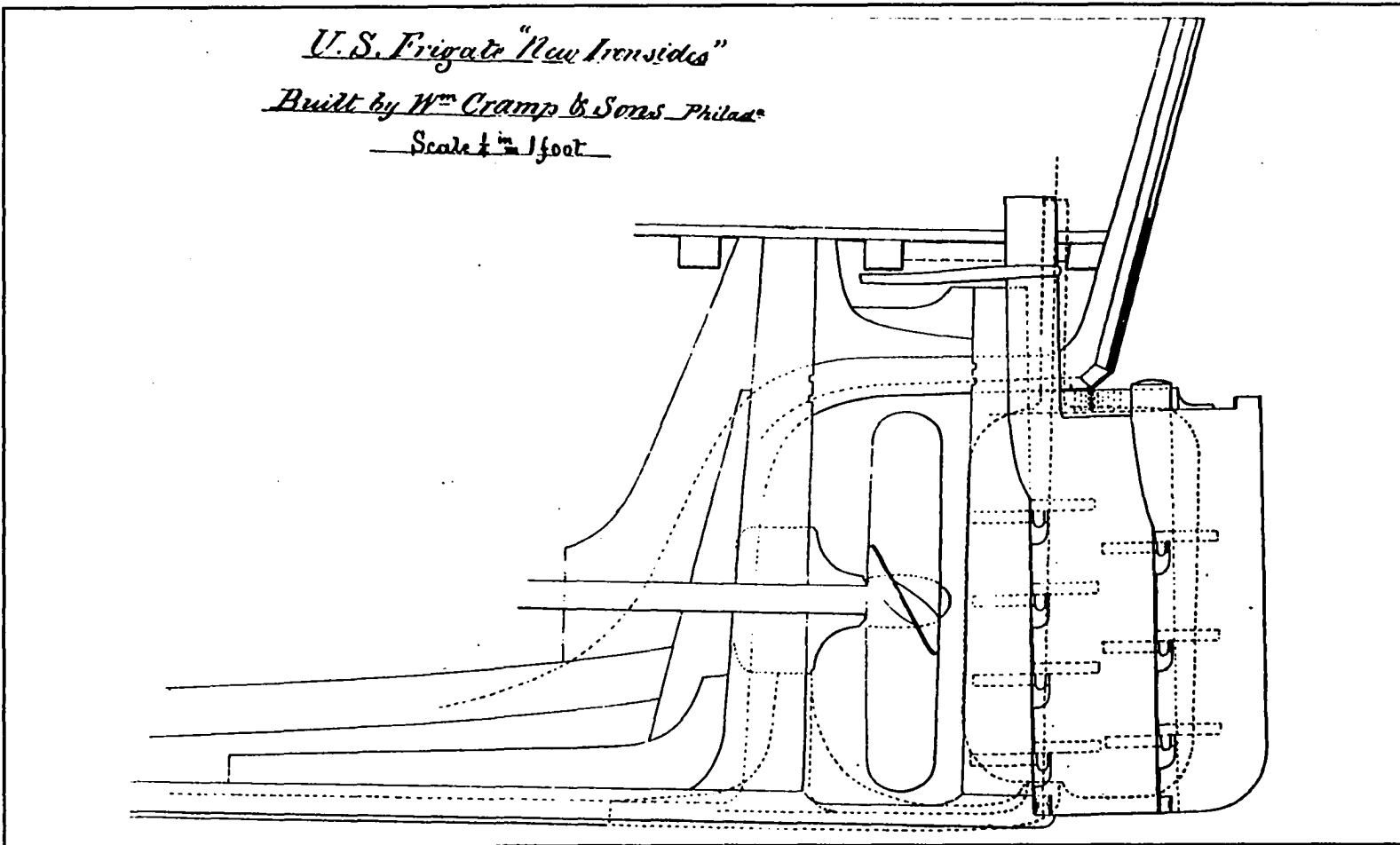


Figure 9. U.S.S. New Ironsides Screw and Rudder Plan (BuShips Plan 107-9-12F.)

so the ship could be steered from a protected place in action. Turner called it "radically defective," but rerigging the tiller ropes improved it.¹⁵

The gun carriage problem, potentially the most serious of the three, was that the guns showed excessive recoil when fired. This risked injuring personnel and putting the battery out of action by breaking the carriages or dismounting the guns. The carriages for New Ironsides' guns were of a new design (Figure 10), made of iron instead of wood.¹⁶ The gun itself rode in an upper cradle which slid on iron rails. The upper cradle had eccentric axles with small wheels that lifted the cradle clear of the rails when engaged. They were engaged to run out the gun easily and released for firing, to increase the friction working against the recoil. The carriage, attached to a pintle in the ship's side, pivoted at the outboard end.

Recognizing that the recoil of the XI-inch gun would be greater than the friction of the cradle on the slide could dissipate, the designers included a compressor, or friction clamp, on each side of the sliding cradle. When tightened, the compressors squeezed the iron rails of the

¹⁵Turner to Smith, October 20, 1862, NARG 71, Entry 5, Box 448, 2: 110.

¹⁶A plan (Figure 10) shows detail and dimensions. NARG 19, Plan 10-3-19. Monitor's XI-inch Dahlgrens, also on iron rails, had different mountings with more elaborate compressors. Ernest W. Peterkin, Drawings of the U.S.S. Monitor (Raleigh: North Carolina Department of Cultural Resources, 1985), 525-27, 532-39, 543-53.

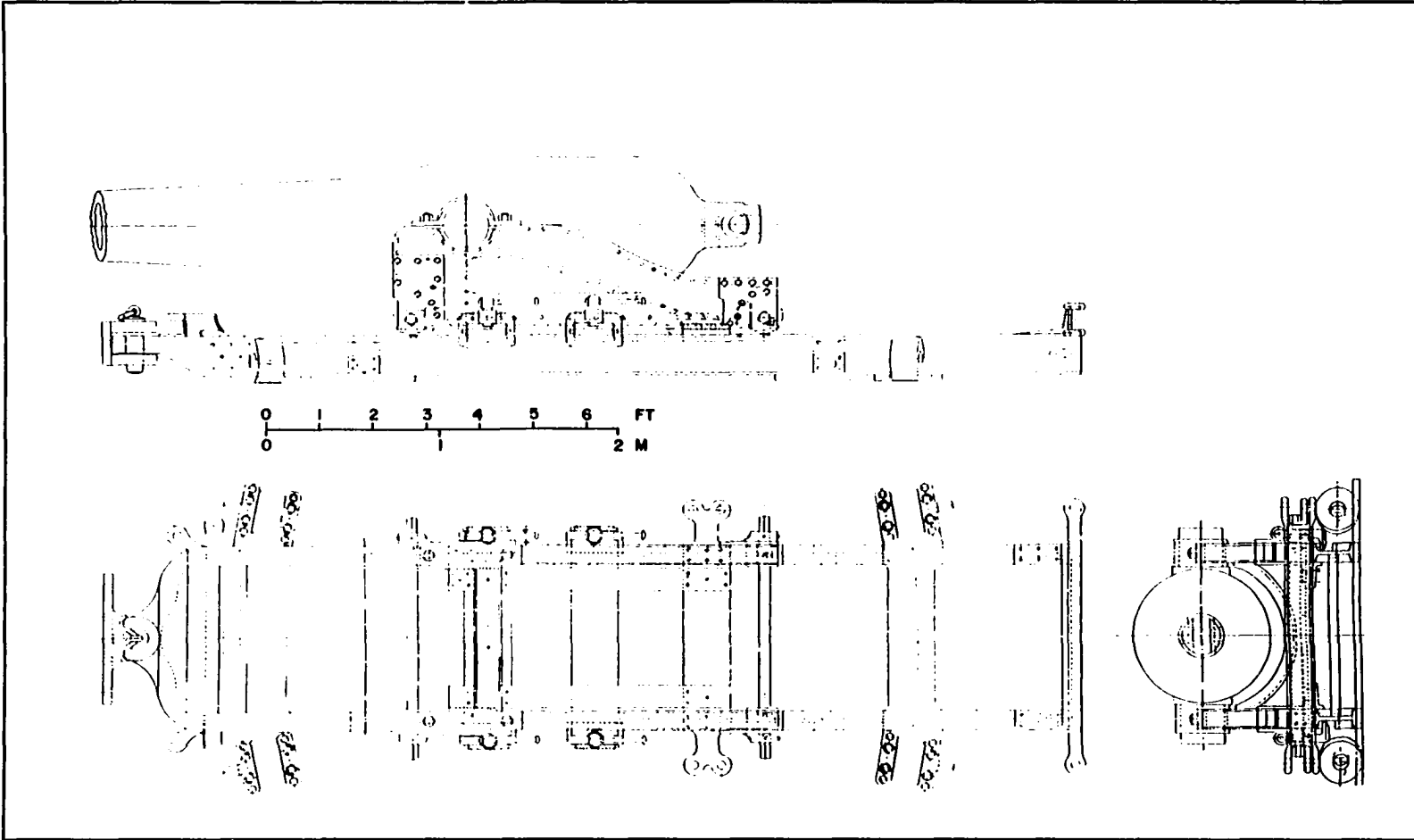


Figure 10. Iron Carriage and Slide for New Ironsides' XI-inch Dahlgren guns. This drawing, with two compressors on each side, shows the carriage as modified in September 1862. (BuShips Plan 10-3-19, redrawn by William J. Jurens.)

carriage to increase friction and dissipate recoil energy. The compressors were the only means provided to control the recoil.

Dahlgren advised Turner on August 19, 1862, that it was "desirable to be assured of the proper working of the armament of the 'Ironsides,' particularly because the guns are mounted on Iron Carriages."¹⁷ Turner tested the guns during the ship's first trip and observed excessive recoil. In a telegram he called the results "quite unfavorable."¹⁸

Turner was extremely concerned about the gun carriages. He wrote Dahlgren that he hoped the Bureau would correct the recoil but, "my only anxiety now is my battery." He believed he had "escaped by the skin of my teeth--Had I gone into action . . . I would have disgraced myself and the noblest specimen of Naval Architecture--This Ship. . . ."

Turner blamed the "hot house system--forcing things into existence before they could mature" and complained, "Those iron clad steamers Warrior-Couonne & had 18 months to try and test things--two weeks is begrudged me . . . We are again hurrying the ship off from here."¹⁹

¹⁷August 19, 1862, NARG 74, Entry 2, Box 1, 4: 26.

¹⁸Turner to Fox, telegram, August 23, 1862, NYPL, Turner Letter Book.

¹⁹"It ought not to be tested here at this wharf--I should know as the Captain of this ship before then that my guns will stand the charges intended for them--and then I should be held responsible for my management of them." In this letter, he addressed Dahlgren as "my dear friend." Turner to Dahlgren, September 10 [1862], Library of

After the excessive recoil was observed on the trial trip, the Bureau of Ordnance sought a remedy. The first proposal was to increase the friction of the compressors. Tubes, three feet long, were provided to increase the leverage and permit the gun crews to tighten the compressors more than they could by hand. This was unsatisfactory because it slowed the rate of fire without sufficiently restraining the recoil.²⁰ Another solution, implemented simultaneously, was to add a second compressor to each side of the carriage.

Along with the extra compressors, installed in Philadelphia during the September 1862 refit, breechings were specified. New Ironsides left for Hampton Roads on September 23, 1862, with the installation of breechings just beginning.²¹ Dahlgren, still concerned, directed Turner to retest the guns with four compressors each.²² The recoil was still not subdued, even with the extra force provided by the extension tubes, and the compressors themselves could

Congress, Manuscript Division, Papers of John A. B. Dahlgren [hereafter "Dahlgren papers"], General Correspondence September 1861-July 1863.

²⁰Lieutenant Henry B. Robeson, Ordnance Officer, to Turner, November 13, 1862. National Archives, Record Group 74, Entry 21, Letters Received from Inspectors of Ordnance, Ironclads, Box 1, 1: 34. Turner to Dahlgren, November 14, 1862, *ibid*.

²¹Dahlgren to Welles, November 11, 1862, NARG 74, Entry 1, Box 1, 41.

²²Dahlgren to Turner, October 10, 1862, calling a test "of the utmost importance." NARG 74, Entry 2, Box 1, 4: 63.

not stand the stresses imposed by increased leverage.²³

These trials in early October resulted in two complaints from Captain Turner. On October 17, Turner wrote from Hampton Roads to the Bureau of Ordnance that the apparatus for controlling recoil was "utterly worthless" and the ship could not go into action without a remedy.²⁴

Turner also wrote to Rear Admiral Samuel P. Lee, Commander of the North Atlantic Blockading Squadron, requesting that Lee appoint a board of officers to examine the guns. Turner claimed, "It would be impossible to carry this ship through an action of more than three or four rounds without tearing everything to pieces and disabling the guns." He blamed the Bureau: "My apprehensions as to the means adopted by the Bureau to correct the excessive recoil of the gun, that they would prove insufficient, are realized."²⁵

Lee appointed the board of examination that Turner requested, and it convened on October seventeenth. The next day, Turner wrote again to the Bureau, qualifying his remarks to say the carriages, though not as bad as he asserted the day before, were "sufficiently unsatisfactory as to

²³Dahlgren to Fox, October 19, 1862, reported that the recoil was still not sufficiently controlled. NARG 74, Entry 1, Box 1, 3: 30; Turner to Dahlgren, November 14, 1862, NARG 74, Entry 21, Box 1, 1: 34.

²⁴Turner to Dahlgren, October 17, 1862, NYPL, Turner Letter Book.

²⁵Turner to Lee, October 17, 1862, ORN 8: 136.

raise grave doubts" about protracted action.²⁶

Commenting on the board's report, Dahlgren noted that after firing seven rounds from two guns, the board found the recoil "only inconvenient, not dangerous." He opined that the breechings the board had suggested would fix the problem and took exception to Turner's letter to Lee, noting that it might "impose upon me a responsibility that is not due--I allude to that where you express your 'apprehension as to the means adopted by the Bureau. . . .'"²⁷

Dahlgren reminded Turner that he (Dahlgren) had entered the Bureau of Ordnance when the iron carriages were nearly completed and had authorized the ordnance officer in Philadelphia to do anything that Turner desired to correct the problem. Furthermore, the board appointed by Lee had come to the same conclusions as the Bureau. Dahlgren felt the trouble began when iron carriages were adopted "without that full experimental knowledge of their operation which should have been required."²⁸

In addition to the installation of breechings Dahlgren recommended a change in the XI-inch guns, from the "tulip"

²⁶Turner to Dahlgren, October 18, 1862, NYPL, Turner Letter Book.

²⁷Dahlgren to Turner, October 21, 1862, NARG 74, Entry 2, Box 1, 4: 86.

²⁸Ibid. Dahlgren to Welles, November 11, 1862: The difficulty "has arisen from the use of Iron carriages before it was fully known what the effect might be." NARG 74, Entry 1, Box 1, 41.

(flared) muzzle variant to the straight muzzle variety. He arranged for New Ironsides to come to the Washington Navy Yard for the exchange, but when circumstances changed to prevent this, he visited the ship on October 28, 1862.²⁹ After watching the guns fire ten rounds, he concluded that the guns should be exchanged even if New Ironsides could not come to Washington. He sent the guns downriver by ship, and the first vessel with replacement guns arrived in Hampton Roads on November 5, 1862.³⁰

In a telegram on November 6, Dahlgren left the decision to Turner. Because of the threat of Confederate iron-clads, Turner decided not to replace the guns, saying, "Galena I think is not enough to help me if I am in any way hampered . . . I don't wish to be caught napping."³¹

In the meantime, another carriage problem arose. On October 31, Turner wrote to Dahlgren that one gun had been disabled because the rollers on the forward eccentrics

²⁹Dahlgren recalled visiting on October 26 but the ship's log shows the twenty-eighth. NARG 24, Log of New Ironsides; Dahlgren, Memoir, 381; Telegram, Dahlgren to Turner, October 26, 1862, NARG 74, Entry 2, Box 1, 4: 96.

³⁰Dahlgren to Turner, October 30, 1862, *ibid.*, 4: 97; NARG 24, Log of New Ironsides, November 5, 1862. Turner estimated the exchange would take two or three weeks. Turner to Dahlgren, November 6, 1862, NYPL, Turner Letter Book.

³¹Telegram, Dahlgren to Turner, November 6, 1862, NARG 74, Entry 2, Box 1, 4: 112; Dahlgren to Welles, November 11, 1862, NARG 74, Entry 1, Box 1, 41. NARG 24, Log of New Ironsides, November 8, 1862. For his reasoning, Turner to Fox, November 6, 1862, in Thompson, Correspondence of Fox, 2: 427-28. The guns were never changed.

broke. Dahlgren attributed the casualty to bad material in the rollers and told Turner he would send new parts. Turner blamed recoil stress, but Dahlgren appears to have been correct since the problem did not recur.³²

New breeching bolts and stouter breechings were installed in November 1862 as New Ironsides lay in Hampton Roads. Mechanics from the Washington Navy Yard worked seven days a week to complete the job, and the guns were again test fired on November 14 and 18. On November 18, 1862, Turner wrote to Dahlgren from Hampton Roads that a Mr. Wilson, the ordnance supervisor from the Washington Navy Yard, had developed a solution. Wilson installed strips of ash wood so the compressors bore upon the wood rather than upon the iron carriage directly. The effect was to increase the friction markedly.³³ On December 8 and 12, 1862, the battery was fired successfully.³⁴

³²Robeson to Turner, October 31, 1862, as enclosure to Turner to Dahlgren, October 31, 1862, NARG 74, Entry 21, Box 1, 1: 10, 11. Telegram, Dahlgren to Turner, November 2, 1862, NARG 74, Entry 2, Box 1, 4: 103. Turner to Dahlgren, November 5, 1862, NYPL, Turner Letter Book.

³³Turner to Dahlgren, November 18, 1862, NARG 74, Entry 21, Box 1, 1: 35. Coefficients of friction for cast iron on cast iron vary from 0.11 (lubricated) to 0.4 (chemically clean); for wood on iron from 0.2 to 0.6. Larger numbers mean more friction. Robert C. Weast, ed., CRC Handbook of Chemistry and Physics, 51st ed. (Cleveland, Ohio: Chemical Rubber Company, 1970), F15-F16. The carriages must have had some grease on them, so friction was at least doubled by the wooden strips.

³⁴Telegram, Turner to Dahlgren, November 20, 1862, NARG 74, Entry 21, Box 1, 1: 36; NARG 24, Log of New Ironsides, December 8 and 12, 1862.

While the ship was correcting her problems and training in Hampton Roads, the Navy Department and Merrick & Sons were clearing up contractual loose ends. The government made the last progress payment on August 13, 1862, but \$195,000, or 25 percent of the contract price, was reserved as surety for the ship's performance.³⁵

The Government had ninety days from the date of delivery to test the ship's ability to meet the contract requirements. If she did not meet the specifications, the Government could recover the money advanced to the contractor, holding the ship as collateral until it was repaid. The government would then return the ship to the contractor.³⁶

On September 27, 1862, the Government paid Merrick & Sons \$34,322.06 "by bill of extras allowed by agreement." This apparently covered the addition of the armored bulkheads but probably not the port shutters and pilot house. On October 4, though the ninety-day period had not expired, the Government paid Merrick & Sons \$100,000 of the reservation.³⁷ There were, however, disagreements to resolve.

Chief among them were the "extras." Smith wrote, since "omissions in regard to fitments" were to be supplied at the demand of the Navy Department, "the pilot house was one omission, and the port shutters another, which should

³⁵NARG 71, Entry 48, 1: 11-12.

³⁶NARG 71, Entry 42, 270.

³⁷NARG 71, Entry 48, 1: 11-12.

not be charged as extras." It was, he said, "doing you a favor to pay the \$100,000 before the expiration of the time specified." Merrick & Sons replied that they were awaiting the results of "further experiments with the vessel."³⁸

On October 1, 1862, Smith directed Turner to report on the ship's performance. Smith reiterated his direction on October 16.³⁹ Turner replied that he would conduct a trial if possible, but Lee was apprehensive of New Ironsides leaving her Newport News station.⁴⁰

In the event, the speed trial could not be run as Smith desired. Since her builders blamed the ship's failure to meet the contract speed requirement (9½ knots) on the weight added during construction, he had directed that the coal on board New Ironsides, normally about 400 tons, be reduced to under 100 tons to compensate for the added weight. Lightening the ship so much exposed the rudder to shot.⁴¹ Combat readiness demanded that Turner keep enough coal on board to maintain fighting draft, and this requirement combined with Lee's prohibition on leaving station to

³⁸Smith to Merrick & Sons, October 4, 1862, NARG 45, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 443. Merrick & Sons to Smith, October 7, 1862, NARG 71, Entry 5, Box 448, 2: 110.

³⁹Smith to Turner, October 1, 1862, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 431; Smith to Turner, October 16, 1862, *ibid.*, 458.

⁴⁰Turner to Smith, October 20, 1862, enclosing Lee to Turner, October 18, 1862, NARG 71, Entry 5, Box 448, 2: 130.

⁴¹Turner to Smith, November 11, 1862, *ibid.*, 2: 157.

keep Turner from running the trial.⁴²

The results of lightening the ship confirm that Cramp's original protective scheme was defective. Had the original IX-inch battery not been increased to XI-inch, some 300 tons of non-productive ballast would have been needed to submerge the rudder head.

On November 13, Merrick & Sons wrote to Welles, requesting the remaining reservation of \$95,000. In his endorsement, Smith noted that the ship was "highly spoken of except in speed in which she has failed to comply."⁴³

Merrick & Sons had received \$585,000 in progress payments, \$34,322.06 on September 27, 1862, for agreed upon extras, and \$100,000 on October 1, 1862, as an advance on the reservation. Without deducting the contractual penalty of \$500 per day for delayed delivery, the Navy thus owed Merrick & Sons \$95,000, the reservation remaining, minus \$1,280.73 to cover the work done for them by the

⁴²The results of a light-ship trial would probably not have differed much from the full-load trial enroute to Hampton Roads in August. A ship's top speed is achieved when resistance equals propulsive power. A major factor is wave-making resistance, which varies with hull form, and a minor one is frictional resistance, which varies with area of wetted surface. Removing weight would change the effective hull form and decrease the wetted surface slightly, but with her bluff lines it would certainly not have given the additional three knots to fulfill the contract. Thomas C. Gillmer, Modern Ship Design, 2d ed. (Annapolis: United States Naval Institute Press, 1975), 97-98, 100-110. Also Smith to Merrick & Sons, October 4, 1862, NARG 45, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 443.

⁴³Merrick & Sons to Welles, November 13, 1862, with endorsements, NARG 71, Entry 5, Box 448, 2: 159.

Philadelphia Navy Yard, making the total due \$93,719.27.⁴⁴

The Government could hardly give up a powerful and perfectly serviceable ironclad just because she was three knots too slow. Welles implicitly acknowledged this when, on November 24, he favorably endorsed Merrick & Sons' request: "Admiral Smith will make a requisition on the Department to pay the balance [on] the 'Ironsides.'"⁴⁵

⁴⁴Merrick & Sons claimed the Navy Yard had double-billed them and asked for \$544.77 more. Smith declined, noting that Merricks' still owed the Yard for drydocking. "The Secy was very liberal to the Contractors with settlement." Endorsement on Merrick & Sons' letter of January 13[14], 1863, *ibid.*, Box 449, 1: 36. The ledger shows only the one correct charge from the yard, for \$1280.73 on October 21, 1862. NARG 71, Entry 48, 1: 11-12. Given that the \$500 per day penalty was not enforced and the ship did not make her contract speed, settlement was very liberal indeed.

⁴⁵Merrick & Sons to Welles, November 13, 1862, with endorsements by Smith and Welles, NARG 71, Entry 5, Box 448, 2: 159. From the Contract Ledger, the price was \$813,041.33 (exclusive of armament). ORN gives a total of \$865,514.66, which probably includes work done on the Bureau of Ordnance account. ORN, ser. 2, 1: 159.

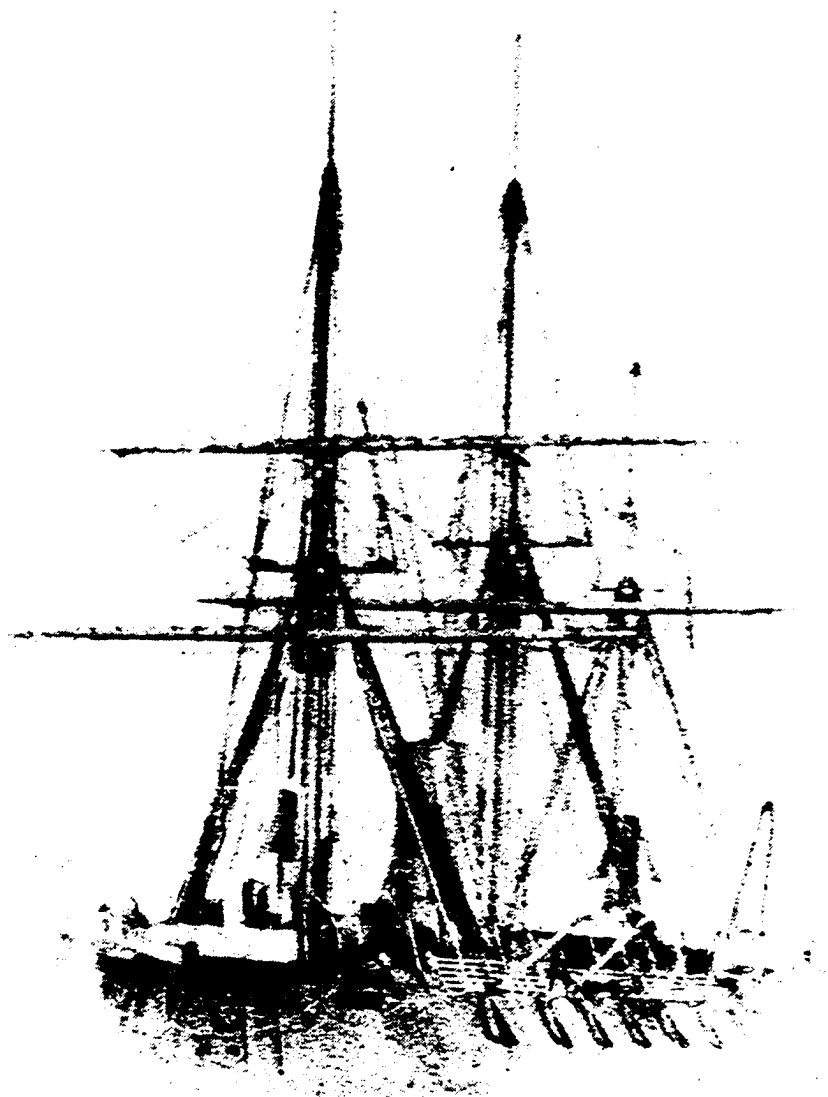


Figure 11. New Ironsides with her masts and rigging.
(Carte de Visite photograph by B. F. Cooper, Philadelphia.
Courtesy of the U.S. Marine Corps Historical Center, Personal
Papers Section, Collection of Henry Clay Cochrane. U.S.
Naval Historical Center Photograph.)

CHAPTER FIVE

EARLY EXPERIENCE: CLEARING FOR ACTION

Her initial refit period behind her, New Ironsides joined the fleet in Hampton Roads in September 1862. From then until she left for Port Royal, South Carolina, in January 1863, her crew of 461 officers and men gained experience while they guarded Hampton Roads.¹

Her arrival in Hampton Roads was not unremarked by naval officers. Captain John Rodgers, a respected officer then commanding the ironclad Galena, wrote that New Ironsides was a "magnificent vessel--with the appearance of great strength--indeed of invulnerability to any ordinary artillery while her battery is most formidable--I know of no vessel which can pretend to cope with her."² About Turner

¹The first available muster roll for New Ironsides is dated September 23, 1862. The crew included 50 petty officers, 51 seamen, 43 ordinary seamen, 187 landsmen and boys, 25 firemen, 24 coal heavers and 49 Marines, for a total of 429. There were 32 officers. National Archives, Record Group 24, Entry 138, Civil War Muster Rolls of USS New Ironsides.

²John Rodgers to his wife Ann, September 28, 1862, quoted in Robert Erwin Johnson, Rear Admiral John Rodgers 1812-1882 (Annapolis: United States Naval Institute Press, 1967), 220. Rodgers left Galena in November 1862 for the monitor Weehawken, then under construction.

he was less complimentary: "Turner will fight his vessel gallantly. I do not think he has thought much about fighting her at all. . . ."³

While in Hampton Roads, New Ironsides lay at anchor with steam up and fires banked. At first the engineers maintained steam in all four boilers for maximum readiness, but in mid-November 1862 they were permitted to secure one boiler at a time for maintenance. The ship remained on three boilers until January 11, 1863, when she departed for Port Royal, the U.S. Navy's base near Hilton Head, about sixty miles south of Charleston.⁴ Arriving there on January 18, she prepared to join the ironclad fleet in an attack on Charleston under the commander of the South Atlantic Blockading Squadron, Rear Admiral Samuel F. DuPont.

Samuel Francis DuPont was born at Bergen Point, New Jersey, on September 27, 1803. He was appointed a midshipman in the Navy in 1815 and his service included combat in the Mexican War. Appointed Flag Officer in September 1861, in his first Civil War service he seized Port Royal from the Confederates. He was promoted to Rear Admiral in July 1862.⁵ From a patrician family, DuPont thought much of his

³John Rodgers to Ann, September 29, 1862, quoted in *ibid.*, 220.

⁴NARG 19, Entry 1072, Steam Log of New Ironsides, various dates.

⁵DuPont died in retirement on June 23, 1865. DAB, s.v. "DuPont, Samuel Francis."

reputation. At first he looked at the attack on Charleston as a chance to gain more laurels, but he gradually concluded that the risks of failure outweighed the possible gains.

New Ironsides had two major jobs to do at Port Royal. The first was to remove her masts and replace them with thin poles suitable for signalling but not for carrying sail (Figure 12). This was done between January 29 and 31, 1863.⁶ The second was to cut down the stack so it did not block the view from the pilot house.

The pilot house was located directly abaft the stack. Since the stack was eight feet in diameter and the pilot house only four, it was impossible to see straight ahead from the pilot house.⁷ DuPont called attention to the lack of "sufficient scope of vision to steer the ship in a devious channel" when he inspected the ship in October 1862.⁸ He wanted the pilot house moved forward, but instead the stack was cut down. On November 7, Fox informed DuPont,

The smoke pipe is fitted to take entirely off even with the rail, and the eyelet holes of the pilot house are enlarged, which will give more sweep

⁶NARG 24, Log of New Ironsides, 29-31 January, 1863.

⁷NARG 19, Plan 107-9-12A, 107-9-12E; Figure 3.

⁸DuPont to Mrs. Sophie M. DuPont, October 20, 1862, John D. Hayes, ed., Samuel Francis DuPont: A Selection from his Civil War Letters (Ithaca, NY: Columbia University Press for The Eleutherian Mills Historical Library, 1969), vol. 2, The Blockade: 1861-1862, 250. He wrote that Turner told Bartol about the problem but nothing was done. DuPont to Benjamin Gerhard, January 30, 1863, *ibid.*, 2: 395.



Figure 12. U.S.S. New Ironsides under bare poles. (From the collection of Dr. Charles Peery, used by permission.)

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especially with everything off even with the deck.⁹

The job was to be done in Hampton Roads, but under the circumstances there the ship could not shut down her boilers to permit it.¹⁰ It was deferred until she reached Port Royal.

On January 26, 1863, the stack was cut down to four feet, and New Ironsides took a trial trip around the harbor the next day.¹¹ The experiment was unsuccessful. Stack gas nearly suffocated men in the pilot house and on the gun deck, and the lack of draft to carry away smoke and hot gases made it almost impossible to open the furnace doors to feed the boiler fires.¹² The stack was reinstalled and moving the pilot house (called the "turret," though it did not revolve) was investigated. Since it weighed eighteen tons, it could not be moved with the means available.¹³

DuPont wrote,

One would suppose that where you could not feel your way, by using a lead and line to ascertain the soundings, that at least an opportunity to see to

⁹Fox to DuPont, November 7, 1862, *ibid.*, 2: 279.

¹⁰Turner to Welles, November 30, 1862, NYPL, Turner Letter Book.

¹¹For trial, NARG 24, Log of New Ironsides, January 26-27, 1863.

¹²Turner to Dupont, January 29, 1863, ORN 13: 550-51.

¹³DuPont to Welles, January 28[?], 1863, *ibid.*, 13: 543-44.

advantage would have been provided.¹⁴

He said, "We will have to 'go it blind.' . . . If we don't run ashore going in, it will be because God is with us."¹⁵

While New Ironsides was at Port Royal, the Confederate ironclads Chicora and Palmetto State attacked the Federal blockading ships off Charleston. The two Confederate vessels were very similar, each being about 150 feet long, thirty-five feet in beam and twelve feet in draft. Palmetto State carried two seven-inch rifles and two IX-inch smoothbores while Chicora carried four 32-pounder rifles and two IX-inch smoothbores. Each carried two two-inch layers of iron plate on her casemate sides, with a single layer of two-inch iron at bow and stern.¹⁶ The Confederates knew that New Ironsides was in Port Royal, so the timing of their raid may have been connected with her imminent arrival at Charleston. William H. Parker, Executive Officer of the Palmetto State, mentioned only that plans were afoot throughout January to attack the blockaders.¹⁷

¹⁴DuPont to Mrs. DuPont, January 28, 1863, Hayes, DuPont Letters 2: 389. The ram and the extreme tumble-home precluded the use of a lead from the eyes of the ship; it had to be heaved from a gun port farther aft. Turner to DuPont, April 10, 1863, ORN 14: 25.

¹⁵DuPont to Gerhard, January 30, 1863, Hayes, DuPont Letters 2: 395.

¹⁶Still, Iron Afloat, 81-82, 97; Civil War Naval Chronology, VI-211-12, VI-279.

¹⁷William Harwar Parker, Recollections of a Naval Officer 1841-1865 (New York: Scribner, 1883; reprinted Annapolis: United States Naval Institute Press, 1985), 314; J.

The Confederate ships got underway the night of January 30, 1863, and crossed Charleston Bar soon after 4:00 A.M. on January 31. In the ensuing action, Palmetto State rammed the Federal steamer Mercedita, which surrendered, and Chicora engaged Keystone State, which also yielded. The other Federal ships withdrew but both Mercedita and Keystone State escaped from the Confederates.¹⁸ General Pierre G. T. Beauregard, in charge of the defenses of Charleston, immediately proclaimed that the blockade had been broken.¹⁹

Beauregard was trying to use the law of blockade to the Confederacy's advantage. Specifically,

To make a blockade legal, the primary requirement is that it be effective. . . . ships had to hover close enough to the blockaded port or coast to be able to sight and capture blockade-runners day or night--the traditional 'close-in' blockade.²⁰

If the blockade were broken by being made ineffective, the Union would have to issue new notices of blockade to

Thomas Scharf, History of the Confederate States Navy from Its Organization to the Surrender of Its Last Vessel (New York: Fairfax Press, 1977; reprint of 1887 edition), 674-75.

¹⁸There was some dispute over the incident, which the Confederates considered a "faithless act." Commander J. R. Tucker, commanding C.S.S. Chicora, to Flag Officer Duncan L. Ingraham, January 31, 1863, ORN 13: 619-20.

¹⁹Letters from Beauregard and from the Confederate Secretary of State to foreign consuls are in ibid., 620-21. Parker considered the proclamation ill-advised: "I looked upon it as all bosh." Parker, Recollections, 320, 323. Also Scharf, Confederate States Navy, 683-85.

²⁰Burdick H. Brittin, International Law for Seagoing Officers, 5th ed. (Annapolis: United States Naval Institute Press, 1986), 272.

reimpose it. The waiting period of legal ineffectiveness would be a godsend to blockade runners.

Beauregard had foreign consuls taken on a tour of the lower harbor to show them that the blockading forces were nowhere to be seen. The British consul and others stated the next day that they saw none of the blockading fleet; the Federals denied their claim. Beauregard's efforts were unavailing; the Federals resumed their stations the afternoon of the raid and the blockade continued as before.²¹

New Ironsides hastily departed Port Royal on February 1, 1863, as a result of the Confederate raid.²² DuPont ordered Turner to "prevent the rebel ironclads from again attacking the blockading fleet."²³ In a conference on January 31, Turner objected strenuously to lying outside the Charleston bar. He claimed New Ironsides was unwieldy and would be blown ashore in a gale, that she needed her masts

²¹Certificate of commanding officers of United States vessels regarding the condition of the blockade, January 31, ORN 13: 605-607; Anderson, By Sea and By River, 160-61. Welles said the reports were "made up for the European market by the foreign consuls who are Rebel agents." Welles, Diary, entry for February 4, 1863, 1: 232-33.

²²George E. Belknap recalled New Ironsides arrived at Port Royal after the raid. His recollection was incorrect. George E. Belknap, "Address Before the Contemporary Club of Philadelphia, Dec. 14, 1897," Papers of Rear Admiral George E. Belknap, Box 2, 9 (hereafter "Belknap, [Contemporary Club]").

²³DuPont to Turner, January 31, 1863, Hayes, DuPont Letters 2: 399.

and sails, and that her anchor chains were untrustworthy.²⁴ DuPont told him to go anyway, saying he understood the great distinction between New Ironsides and the monitors lay in New Ironsides "being able to keep the sea."²⁵

The next morning, February 1, DuPont received a letter from Turner officially stating his objections to outside blockade service. When DuPont said he could defer going, thereby implying Turner was unequal to the task, Turner reconsidered, withdrew his letter and departed.²⁶

The Charlestonians quickly noted New Ironsides' presence. They reported first "a very large, formidable looking propeller, without masts," and then correctly identified the ship as New Ironsides. The Daily Courier reported,

She is not at all so formidable as described by the Yankee Abolition newspapers. . . . Those who ought to know say she is no match for our impenetrable little iron-clads, excepting perhaps in speed and sailing qualities.²⁷

²⁴Turner wrote to Andrew H. Foote, Chief of the Bureau of Equipment and Recruiting, that New Ironsides' anchor chains were unsatisfactory. Government chain had a swivel every thirty fathoms, the contractor's only one in its whole length. This made for kinks, risk of breakage and difficulty getting in the anchor. Turner to Foote, December 24, 1862, NYPL, Turner Letter Book. New Ironsides broke a chain and lost an anchor while preparing to enter Port Royal. NARG 24, Log of New Ironsides, January 18, 1863.

²⁵DuPont to Mrs. DuPont, February 1, 1863, Hayes, DuPont Letters 2: 405.

²⁶DuPont to Mrs. DuPont, February 1, 1863, *ibid.*, 2: 405-406; Turner to DuPont, January 31, 1863, ORN 13: 623-24.

²⁷"From the Bar," Charleston Daily Courier, February 3, 1863, 2. See also "Situation of Affairs Off the Bar," Charleston Mercury, February 3, 1863, 2.

Turner was not so sure about her sailing qualities, or at least her seaworthiness at anchor. He soon wrote from Charleston, again expressing his anxieties. Rough weather had caused problems with the rudder and anchor chains. The rudder broke loose and had to be secured by men let down over the side. The anchor chains became fouled and because of the bow design they were difficult to unsnarl. The ram interfered with the ship's motion by catching the chains on its surface.²⁸ The "fearful" yawing and sheering caused such problems that Turner left Charleston on February 6 and returned to Port Royal on February 7, 1863.²⁹

Showing the importance he attached to New Ironsides' presence off Charleston, DuPont noted his astonishment and wrote, "He should never have come back. . . . If those rams come out tonight he may be broke."³⁰ A survey directed by DuPont reported that New Ironsides was uninjured but recommended strengthening the rudder, soon accomplished by dint of the machine shop working all night.³¹ Leaving Port

²⁸Turner to DuPont, February 6, 1863, ORN 13: 646-47. Turner to Smith, February 16, 1863, NARG 71, Entry 5, Box 449, 1: 79.

²⁹NARG 24, Log of New Ironsides, February 5-7, 1863.

³⁰DuPont to Mrs. DuPont, February 7, 1863, Hayes, DuPont Letters 2: 416. DuPont could not know that the Confederate rams did not even dare to anchor outside the bar overnight, since "in case of a blow the vessels would have foundered." Parker, Recollections, 323.

³¹DuPont to Mrs. DuPont, February 7, 1863, Hayes, DuPont Letters 2: 416-17. Turner had earlier written in "flattering terms" about the rudder. Silas Yerkes, Jr., to

Royal on February 9, New Ironsides was back on station at Charleston on February 10, 1863.³²

Although some of her early deficiencies were corrected, New Ironsides' slow speed was a long term handicap. As experience mounted, it became clear that the ten knot figure Turner obtained during the return from her maiden voyage was wrong. The ship made a full power trial on February 11, 1863, under favorable wind and sea conditions. Harman Newell, New Ironsides' chief engineer, reported her best speed ever under steam was 6½ knots, but the best shown during this trial was six knots. Turner wrote,

Six (6) knots is her maximum speed per hour. When passing up the Delaware the last time . . . I gave her a higher rate of speed, but there was evidently a mistake . . . she can never have exceeded the rate I have given her here.³³

In May 1863, Turner reported to DuPont, "This ship is so unwieldy and moves so slowly . . . if they only knew that on shore they would not give themselves much trouble about

Lenthall, January 8, 1863. NARG 19, Entry 71, Box 3, 1: 18.

³²NARG 24, Log of New Ironsides, February 9 and 10, 1863. The Confederates did not miss her until February 9, thinking she laid off in the morning and returned after dark, "hoping to catch our ironclads should they make another night attack on the Yankee fleet." "News from the Yankee Fleet," Charleston Daily Courier, February 9, 1863, 2; February 10, 1863, 2; for a similar opinion, "News From The Blockading Fleet," Charleston Mercury, February 9, 1863, 2.

³³Turner to Smith, February 16, 1863, and Chief Engineer Harman Newell to Turner, February 11, 1863, enclosure to Turner's letter to Smith of February 16, 1863, NARG 71, Entry 5, Box 449, 1: 79.

her."³⁴ George E. Belknap, Executive Officer of New Ironsides from the autumn of 1862 until her decommissioning in June 1864, wrote that pursuit of a swift blockade runner would have been "as absurd and useless as the efforts of an elephant in pursuit of a camelopard [giraffe]."³⁵

In the Navy Department's technical bureaus, opinion of her speed was similarly negative. John Lenthall, Chief of the Bureau of Construction and Repair, and Benjamin Franklin Isherwood, Chief of the Bureau of Steam Engineering, told Welles that New Ironsides had

just two-thirds of the speed guaranteed [sic], and as the speed is in the ratio of the cube of the power, it follows that the contractor provided just one-third enough machinery, while the Government paid for the three-thirds, and, in addition, paid very large extra bills.³⁶

The best speed the ship ever logged under both steam and

³⁴Turner to DuPont, May 6, 1863, ORN 14: 178.

³⁵Belknap, "Reminiscent of the 'New Ironsides'," 70. Belknap, born on January 22, 1832, in Newport, New Hampshire, began his Navy career in 1847. After leaving New Ironsides for further wartime service as Commanding Officer of the monitor Canonicus, he rose to the rank of Rear Admiral before retiring in 1894. He died at Key West, Florida, on April 7, 1903. DAB, s.v. "Belknap, George Eugene," NARG 24, Records of Officers.

³⁶C. H. Davis, Lenthall, Isherwood, Cullum[?] to Welles, August 15, 1863, NARG 45, Entry 464, Subject File, AD--Design, Box 48. Isherwood was right. Effective horsepower = ([Total resistance coefficient x density x (velocity)³ x wetted surface]/2)/550. The ratio of power required for 9.5 knots to power required for 6.5 knots is thus $(9.5)^3/(6.5)^3$, or approximately 3.12. Gillmer, Modern Ship Design, 136.

sail was seven knots.³⁷

New Ironsides remained on guard at Charleston even as the monitors assembled for DuPont's assault. In March 1863 DuPont had to discourage Turner's request to return to Port Royal. DuPont called New Ironsides "the only iron vessel which can lay outside" and noted that if a second Confederate raid were attempted in her absence, "the accountability would not be light."³⁸ The Confederates were well aware of New Ironsides' presence, considering that she was, "permanently stationed off the Bar, to protect the wooden sides of the Yankee gunboats from our 'iron clads.'"³⁹

As one Confederate officer wrote, "It was not considered advisable to send our vessels [Chicora and Palmetto State] out to attack her."⁴⁰ Unseaworthy, lightly armed and carrying only two two-inch layers of armor, neither would have stood a chance against New Ironsides. Instead, according to Belknap the time on board the frigate was spent "in perfecting the drills at the guns and in watching the

³⁷NARG 24, Log of New Ironsides, January 12, 1863. There was a strong wind from dead astern.

³⁸DuPont to Turner, March 3, 1863, ORN 13: 714-15.

³⁹Charleston Daily Courier, February 14, 1863, 2; Charleston Mercury, February 14, 1863, 2.

⁴⁰Parker, Recollections, 327. Richmond was full of rumors about an impending Union assault. For examples, John Beauchamp Jones, A Rebel War Clerk's Diary at the Confederate States Capital 2 vols. (Philadelphia: J. P. Lippincott, 1866; reprinted Alexandria, VA: Time-Life Books, 1982), entries for January 27 and 31, February 5, 6 and 10, 1863.

enemy strengthening his defenses."⁴¹ During the first week in April 1863, the monitors arrived and the Federals made final preparations for their attack.

The most significant preparation aboard New Ironsides was strengthening the spar deck. Civil War-era sea battles were conducted at ranges less than 2,000 yards. Projectile trajectories were flat, and it was unusual to receive a hit on the deck in a ship-to-ship action. Since New Ironsides was designed to fight other ships, her deck protection was thin, and that made her vulnerable to plunging fire from shore guns and mortars.⁴² Plunging fire was considered very dangerous. Turner wrote, "One inch of iron and three of wood upon her spar deck form a very feeble barrier to resist plunging shot, and bombs."⁴³

To increase resistance to plunging fire, Turner increased the spar deck protection with sandbags over a layer of green (untanned) hides.⁴⁴ A thick coating of grease on

⁴¹Belknap, [Contemporary Club], 11.

⁴²In the low Charleston country "plunging" fire was misnamed. At 1000 yards, the angle of impact of an XI-inch shell fired from sea level was 2.7 degrees; fired from an elevation of fifty feet, it would strike at 3.5 degrees. Trajectory extrapolation from BALLISTA, a program to calculate exterior ballistics; the original version, by William J. Jurens, appeared as "Exterior Ballistics with Microcomputers," Warship International 21, no. 1 (1984): 49-72.

⁴³Turner to Smith, April 2, 1863, NARG 71, Entry 5, Box 449, 2: 7. "Bombs" were mortar shells.

⁴⁴This was the only engagement in which hides were used. Belknap wrote years later that the hides were placed on top of the sandbags, but Turner in his report and in

her armored sides, to increase the tendency of shot and shell to glance off, completed New Ironsides' battle outfit.

sworn testimony in 1863 stated specifically that the hides were under the sandbags. Belknap, "Reminiscent of the 'New Ironsides'," 66, 70; ORN 14: 26; Turner's testimony at the Stimers Court of Inquiry, Report . . . Armored Vessels, 149.

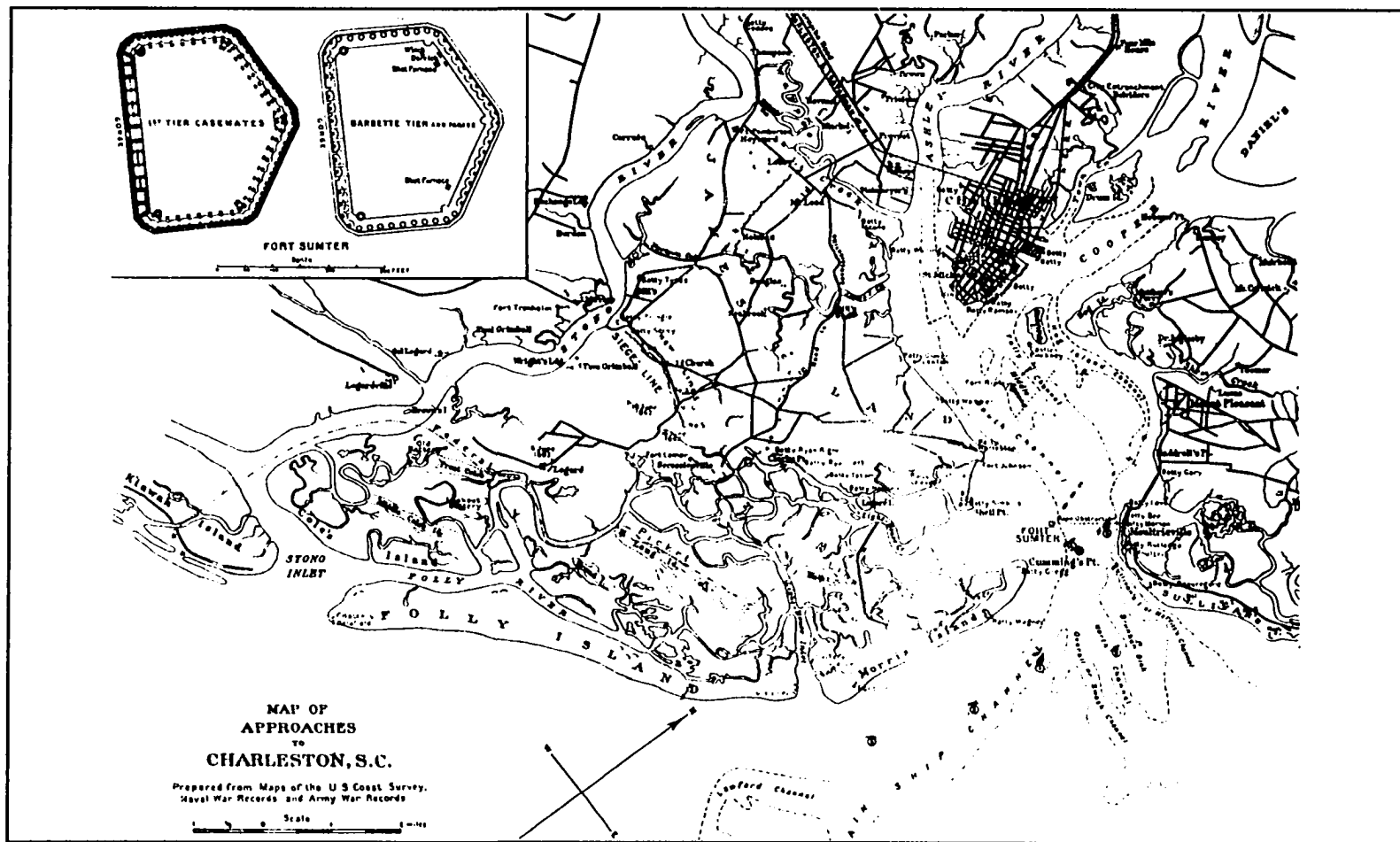


Figure 13. Outline chart of Charleston Harbor. (Official Records . . . Navies, Vol. 14, facing page 1.)

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CHAPTER SIX

BATTLE EXPERIENCE: "A CAPITAL SCARECROW"?

New Ironsides' first combat experience was the April 7, 1863, assault on Charleston, in which her unique design affected the outcome of the battle. Serving Rear Admiral DuPont as fleet flagship, New Ironsides engaged the Charleston fortifications at a range of more than 1,000 yards.

Charleston Harbor was well defended. The major works of the outer defenses were Fort Moultrie on Sullivan's Island and Fort Sumter. They were supported by Batteries Wagner and Gregg on Morris Island and Batteries Bee and Beauregard on Sullivan's Island. All except Fort Sumter were earthworks. The inner layer included Fort Johnson and Battery Glover on James Island, Fort Ripley and Castle Pinckney in the harbor, and the White Point Battery on Battery Point in Charleston itself (Figure 13).

Charleston had little strategic importance, but it was the "original seat of the great wickedness that has befallen our country," and accordingly "there is not another place

[our anxious countrymen] would so rejoice to see taken."¹

As Welles wrote before he received news of the assault,

A desperate stand will be made at Charleston, and their defenses are formidable. Delay has given them time and warning, and they have improved them. They know also that there is no city so culpable, or against which there is such intense animosity.²

The Confederates knew a Federal assault was probable. Writing, "Charleston is bitterly hated. . . ." the Charleston Mercury told Charlestonians in mid-February 1863 to expect "some eight or ten iron-clad gunboats to try the harbor" in the near future.³

DuPont had been planning his assault on Charleston for months, and as his planning continued his requirements grew. He insisted on more ships and wrote, "the limit of my wants in the way of ironclads is the capacity of the Department to supply them."⁴ Secretary Welles sent the ironclads, but as DuPont's delays mounted, Welles began to worry. When they met in October 1862, Welles called DuPont "skillful and

¹Welles, Diary, entry for May 26, 1863, 1: 314. A Philadelphia paper called South Carolina "the insolent, conceited, unreasonable and arbitrary author of all our national troubles. . . ." "Port Royal." Philadelphia Daily Evening Bulletin, November 15, 1861: 1.

²Welles, Diary, entry for April 9, 1863, 1: 264.

³"The Yankee Preparations," Charleston Mercury, February 12, 1863: 1.

⁴DuPont to Fox, March 2, 1863, Hayes, DuPont Letters, 2: 463. Fox replied that Welles had sent DuPont "every vessel except the Sangamon," guarding Hampton Roads. Other commanders had called for ironclads, "but we have not given them any." Fox to DuPont, March 11, 1863, *ibid.*, 2: 487.

sagacious," noting that although he was "given to the formation of cliques," Welles would make no controversy "while he continues to do his duty so well."⁵

By February 1863, Welles was writing that

DuPont shrinks from responsibility, dreads, [sic] the conflict he has sought yet is unwilling that any other should undertake it, is afraid the reputation of DuPont will suffer. . . . I deplore the signs of misgiving and doubt which have recently come over him . . . It is not what we have talked of. . . .⁶

By March 1863, Welles was convinced, "DuPont is getting as prudent as McClellan . . . He has a reputation to preserve instead of one to make."⁷

Welles' concept of the attack was that the Navy could

move independent of the Army, and pass Sumter, not stop to batter it. Once in the rear, and having the town under the guns of the ironclads, the military in the forts and on James Island would be compelled to leave.⁸

DuPont appears to have based his plan on the same idea of passing the outer defenses, Forts Moultrie and Sumter, but he intended then to destroy Sumter from behind. He planned to proceed up the channel between Sumter and Moultrie, pass into the harbor, and reduce Sumter from Rebellion Roads,

⁵Welles, Diary, entry for October 2, 1862, 1: 160. He later noted, "When here last fall, expressly to consult and concert measures for the capture of Charleston, he was as earnest and determined as any of us, did not waver a moment, and would not listen to a suggestion of Dahlgren as an assistant." Ibid., entry for April 15, 1863, 1: 273.

⁶Ibid., entry for February 16, 1863, 1: 236.

⁷Ibid., entry for March 12, 1863, 1: 247.

⁸Ibid., entry for February 16, 1863, 1: 236.

that is, from the north and northwest.

Fort Sumter, a pentagonal brick fort constructed between 1829 and 1860, was shaped as four sides of a regular hexagon with the gorge opening closed by a straight wall. It joined Moultrie to cover the ship channel with a cross-fire. Sumter was oriented so its lightly armed gorge faced southwest, protected by Morris Island, and the four heavily armed sides covered the channel.⁹

DuPont knew that attacking Sumter from inside the harbor would have two serious disadvantages. First, his ships would have to navigate a channel full of obstructions including, he believed, torpedoes (Figure 14).¹⁰ These would have "entangled the vessels and held them" under heavy fire. Second was the risk to New Ironsides. Attacking from the northwest,

We are further inside and if we meet disaster will lose this ship, which from her size and unwieldiness cannot be got out like the monitors. . . . If I leave her out altogether, or down here, I divest myself of half my force. . . .¹¹

Despite these disadvantages, DuPont chose to enter the

⁹Willard B. Robinson, American Forts: Architectural Form and Function (Urbana, IL: University of Illinois Press for the Amon Carter Museum of Western Art, Fort Worth, 1977), 107-109.

¹⁰DuPont to Welles, April 15, 1863, ORN 14: 7. The Civil War "torpedo" was what is now called a mine, a water-tight container of explosive with a detonator. Various detonators, including contact and electrical fuzes, were used.

¹¹DuPont to Mrs. DuPont, April 6, 1863, Hayes, DuPont Letters, 2: 552.

harbor for two major reasons. First, it would remove his ships farther from Fort Moultrie and place them in a position where, he believed, some of the forts and batteries would be unable to fire upon them. Second, once inside, the ships would have deeper water and more maneuvering room.¹²

DuPont's plan appears to owe something to advice he received from Captain John Rodgers on attacking Charleston. Rodgers' plan, set forth in a letter to DuPont, called for taking a position close enough to Fort Sumter to breach its

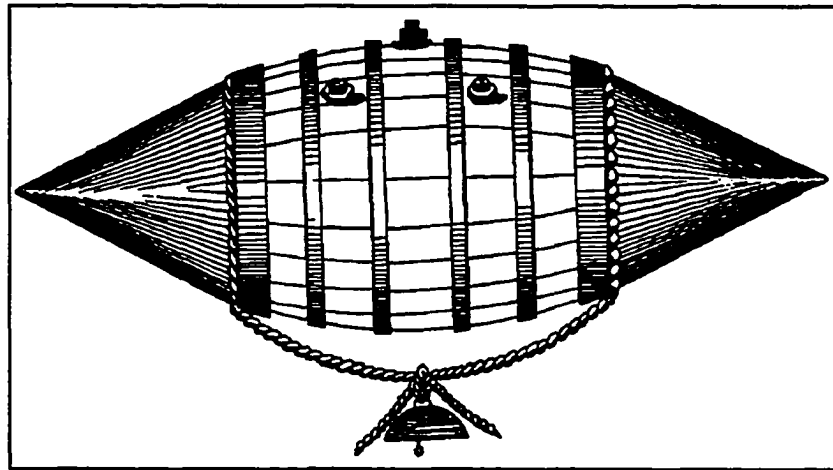


Figure 14. Typical Confederate barrel torpedo. (From Scharf, Confederate Navy, 757.)

walls but far enough away to render its cannon ineffective against the ironclads. Rodgers estimated, based upon a "very incomplete" account of British experiments he had read, that the ironclads would be secure at ranges of 1200 to 1300 yards. Since "Beauregard breached the walls of Fort

¹²DuPont to Mrs. DuPont, April 6, 1863, *ibid.*, 2: 552.

Sumter" at a distance greater than this, he recommended positioning the ironclads near the center of Charleston Harbor, along the arc of a circle of 1250 yards radius centered on Sumter. "I should be inclined to anchor," he wrote, for "better aim, [and] less danger from torpedoes." Rodgers' chosen position was over a mile from Forts Moultrie and Johnson, permitting the ironclads to "take the forts successively in quiet."¹³

Beauregard, on the contrary, expected the Federals to run past the forts. If they did not, he expected that they would silence Battery Wagner on Morris Island first and then attack Sumter "where it is weakest,--i.e., the gorge, south-east angle, and east face." The Federals might also

send one or more monitors during the night to take position in the small channel north of Cummings Point, within close range. . . . That mode of attack being the one most to be apprehended should be guarded against, as well as our limited means will permit. . . .¹⁴

Beauregard underestimated the draft of the monitors and the difficulty they would have in coping with Charleston's tricky tidal currents, and overestimated DuPont's daring.

DuPont's tactics were straightforward. He planned to cross the bar with New Ironsides, seven monitors and the

¹³John Rodgers to DuPont, October 29, 1862, ORN 13: 421-22. Johnson, John Rodgers, 239-40.

¹⁴Beauregard to Ripley, February 8, 1863, United States, War Department, The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies 128 vols. (Washington: GPO, 1880-1901), ser. 1, 14: 769. Hereafter OR.

hybrid Keokuk.¹⁵ The ships would form in line astern at two hundred yards interval, with the monitor Weehawken leading, New Ironsides fifth in line, and Keokuk last. The ships would pass up the main ship channel without returning the fire of the Morris Island batteries and open fire on Sumter "when within easy range." DuPont planned to remain underway and his preferred firing position was 600 to 800 yards from the northwest face of the fort.¹⁶ After reducing Sumter, the ships would return outside to destroy the batteries on Morris Island.

DuPont's choice of close action rather than Rodgers' plan of prolonged distant firing may have been influenced by the reported short life and unreliability of the monitors' XV inch guns.¹⁷ By moving closer, he gained greater effect for his ships' guns in exchange for increasing their vulnerability to Confederate projectiles. Because of the primitive state of gun fire control technology and the monitors' slow speed, keeping the monitors moving reduced slightly both their chances of hitting vital portions of the forts and the Confederates' chances of hitting them.

In choosing New Ironsides as his flagship and placing her in the center of the line, DuPont had his ability to

¹⁵Keokuk had a monitor's low freeboard but her two stationary "turrets" did not revolve.

¹⁶DuPont's plan of attack, April 4, 1863, ORN 14: 8-9.

¹⁷Johnson, John Rodgers, 240.

direct his fleet foremost in his mind. The only reliable means of signalling from ship to ship in daylight was by hoisting signal flags. The ability of subordinates to see their commander's flag hoists depended upon the prevailing visibility, their distance from the flagship and the position of the flagship's halyards upon which the signals were hoisted. DuPont could not change the visibility nor prevent it from being reduced by powder smoke in battle. He could control the other two factors by judicious selection of the flagship and the formation.

To this end, he chose New Ironsides as his flagship. In addition to better accommodations for an admiral and his staff, with her high freeboard and tall masts New Ironsides provided a better signalling platform than any monitor. To minimize the distance over which signals would have to be seen, he placed the flagship in the center of the line of ships.¹⁸ Another benefit of having a monitor lead the line was that the shallower-draft monitors could act as pathfinders for New Ironsides among the harbor shoals.

The battle did not go as DuPont planned. As Welles foresaw, the defenses had been "strengthened much faster than the assailants."¹⁹ The ironclads were to cross Charleston Bar on April 5, but the crossing took longer than

¹⁸"The New Ironsides being in the center, from which signals could be better made to both ends of the line." DuPont to Welles, April 15, 1863, ORN 14: 5.

¹⁹Welles, Diary, entry for March 17, 1863, 1: 249.

expected. DuPont and his staff boarded New Ironsides at 7:30 A.M. on April 6 and she finally crossed the bar at 9:00 A.M. That afternoon the ships anchored in the planned line of battle.²⁰ Due to this delay and to bad visibility, the attack, originally planned for April 6, was delayed until April 7. The Confederates had noted the unusual activity and were ready for "important movements."²¹

At 12:10 P.M. on April 7, 1863, DuPont signalled his ships to get underway (see Figure 15). Further delay was caused when a special torpedo-clearing raft, equipped with grapnels for catching and removing torpedoes, fouled the anchor chain of the Weehawken, the monitor that was to push it ahead of the formation. The force finally started up the channel at 1:15 P.M., and at 2:10 P.M. Weehawken, the leading ship, met the first obstructions.²²

Weehawken's Commanding Officer, John Rodgers, believed he saw a torpedo explode near his ship. Upon reaching the rope obstruction the Confederates had placed across the channel, he turned aside to avoid it, writing, "upon deliberate judgment I thought it right not to entangle the

²⁰NARG 24, Log of New Ironsides, April 6, 1863.

²¹"From the Bar," Charleston Daily Courier, April 6 and 7, 1863; also, "Highly Important From the Bar," Charleston Mercury, April 6, 1863: 2 and "The Hour at Hand," ibid., April 7, 1863: 2.

²²Times are from DuPont's report. The times recorded in New Ironsides' Log are consistently ten to fifteen minutes earlier. NARG 24, Log of New Ironsides, April 7, 1863.

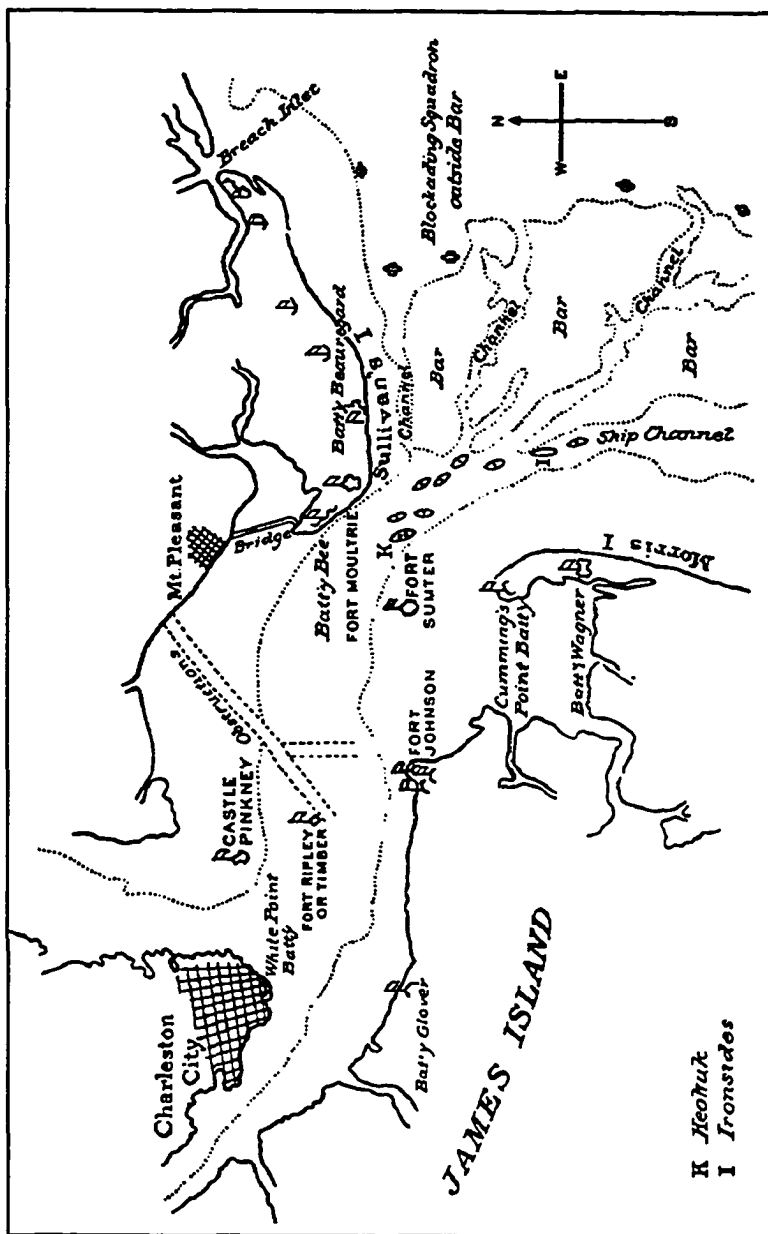


Figure 15. DuPont's Attack on Charleston. (From Official Records . . . Navies, 14:81.)

vessel in obstructions which I did not think we could have passed through and in which we should have been caught."²³ Rodgers' action threw the formation of ships into confusion.²⁴ Although DuPont later reported Weehawken had 250 feet of rope wrapped around her propeller shaft and inferred that it came from the obstructions, the Confederates said she had not come within 600 yards of them.²⁵

The Confederate batteries commenced firing about 3:00 P.M. and at 3:15 P.M. DuPont signalled to Weehawken to begin the action. The monitors and Keokuk engaged the east and northeast faces of Fort Sumter, but no further attempt was made to pass or clear the rope obstruction. Beauregard claimed the ships "were baffled and driven back before reaching our lines of torpedoes and obstructions. . . ."²⁶

A strong flood tide was making, pushing the ships into the obstructions. By 3:25 P.M. New Ironsides became unmanageable and DuPont signalled to disregard the motions of the

²³John Rodgers to DuPont, April 8, 1863, ORN 14: 12.

²⁴DuPont to Welles, April 15, 1863, ibid., 14: 6.

²⁵DuPont to Welles, April 22, 1863, ibid., 14: 54. DuPont wrote two weeks after the attack, and Weehawken probably fouled the rope after the assault. For Confederate views, General Ripley to General Thomas Jordan, October 12, 1863, ibid., 14: 107-108; Colonel William Butler to W. F. Nance, October 9, 1863, with endorsement by General T. L. Clingman of October 10, ibid., 14: 108-109; Colonel Alfred Rhett to Jordan, October 12, 1863, ibid., 14: 109-110. Jones, Rebel War Clerk's Diary, entry for April 25, 1863, provides more contemporary evidence of Confederate opinion.

²⁶Beauregard to General S. Cooper, May 24, 1863, ORN 14: 76.

flagship. At 3:30 P.M. New Ironsides anchored to avoid going aground but almost immediately hove up her anchor.²⁷ At 4:05 P.M. she was once again in difficulty, as shown by DuPont's signal to give the flagship more room. The monitors Catskill and Nantucket, next astern of her, struck her at about that time.²⁸ Keokuk, originally last in line, ran past her to within 500 yards of the fort. Confederate guns penetrated Keokuk's armor ninety times in thirty minutes of close action and she withdrew mortally wounded.

New Ironsides' officers believed their ship came within 800 yards of Sumter, but Turner's report credited her with 1000.²⁹ The smoke was so thick that Sumter could not be seen, and at times Turner could not see fifty yards from the ship.³⁰ At 4:15 P.M. New Ironsides fired her port broadside at Fort Moultrie, her only shots during the action.

In the midst of this, at 4:30 P.M. DuPont signalled his force to withdraw.³¹ Soon after, New Ironsides again

²⁷The incident of the "boiler torpedo" probably occurred at this time.

²⁸New Ironsides' Log records a brief anchorage at 3:30 P.M., the signal for more room at 3:40 P.M., and the collision at 3:45 P.M.

²⁹Western Reserve Historical Society, Cleveland, Ohio, John M. Butler Diary, 1862-1864, MSS 3947 (microfilm) (hereafter Butler Diary), entry for April 7, 1863; ORN 14: 26. Butler was a volunteer officer in New Ironsides.

³⁰Butler Diary, entry for April 7, 1863; ORN 14: 26.

³¹DuPont to Welles, April 15, 1863, *ibid.*, 14: 5-6.

sheered badly and anchored for the second time. She hove up again at 4:45 and steamed down the channel.³² After ninety minutes of fighting and with evening approaching, the ironclads departed.³³ The ships had fired 139 shot and shell; the fortifications fifteen times that number.³⁴

The attack was no surprise to the Confederates, either tactically or strategically.³⁵ The forts and batteries had been instructed in detail on how to attack ironclads. Distance buoys were installed to permit close estimates of range, and there were obstructions liberally scattered through the channel.³⁶ Torpedoes were also installed to block the channel, although there may not have actually been any in place in the obstructions when DuPont attacked.³⁷

For New Ironsides, this first combat action showed

³²NARG 24, Log of New Ironsides, April 7, 1863.

³³Sunset in Charleston during the first week in April was between 6:20 and 6:30 P.M.

³⁴Abstract of ammunition expenditure, dated April 14, 1863, and signed by Lieutenant A. S. Mackenzie, ORN 14: 27.

³⁵Jones, Rebel War Clerk's Diary, entries for February 5, 6, and 21; March 23 and 28; April 4, 6 and 7, 1863.

³⁶Circular of Instructions from the Commanding General at Charleston, S.C., dated December 26, 1862, and signed by Brigadier General Roswell S. Ripley, ORN 14: 102-103.

³⁷Weehawken supposedly saw explosions, and Beauregard wrote that installation of torpedoes began soon after he took command in September 1862. Pierre G. T. Beauregard, "Torpedo Service in the Harbor and Water Defences of Charleston," Southern Historical Society Papers (hereafter SHS Papers) 5, no. 4 (April 1878): 147-48. Other Confederates stated the only torpedo in place at the time was the large one which failed. Hayes, DuPont Letters, 3: 13, note 1.

more of her deficiencies than of her strengths, although the small amount of damage she suffered was encouraging. Her chief deficiency was her inability to support Admiral DuPont as his fleet flagship, caused by her unique pilot house and touchy maneuvering qualities. DuPont, writing two months after the failure of his assault, was caustic. Calling the ship's defects "glaring," he particularly disliked "the contracted size of her pilot house and its improper location behind the enormous smokestack," which shut out all view ahead and "most materially interfer[ed] with the management of the vessel in battle. . . ." ³⁸

Turner's report cited three major deficiencies, all of which adversely affected shiphandling. First, the ship was unmanageable in the current. Second, the pilot house was too small, holding only three people. Third, the ship's draft placed her within a foot of the bottom during the action.³⁹ Turner implied New Ironsides could not be navigated effectively in combat.

The design of the pilot house contributed to DuPont's problems both directly and indirectly. The design of its small viewing ports and its placement on deck abaft the

³⁸DuPont to Welles, June 3, 1863, ORN 14: 69.

³⁹Turner to DuPont, April 10, 1863, *ibid.*, 14: 25. A contemporary Union chart shows the channel depths to be approximately three fathoms, or 18 feet. "Charleston Harbor and Its Approaches, 1863," National Archives, Record Group 23, Records of the Coast and Geodetic Survey, Special Civil War Maps.

smoke stack directly reduced the Admiral's ability to see the battle and control the ship. The indirect impact of its small size was more serious. Merely four feet in inside diameter, it had room only for DuPont, his pilot Acting Master John W. Godfrey, and his fleet captain, Commander C. Raymond P. Rodgers.⁴⁰

DuPont had considered the problem before the attack, calling the pilot house "miserably small." He told Turner that if Rodgers could not be in the pilot house with him, he would have to shift his flag to a monitor.⁴¹ Since DuPont insisted on Rodgers' presence, lack of room in the pilot house forced Turner to station himself on the gun deck.⁴² This meant that Turner, the senior officer most familiar with the ship and most knowledgeable of her characteristics, could not contribute to maneuvering her in action.

Ship control, difficult enough under fire, was made even more difficult by being within a foot of grounding. The full lines of the ship (Figure 16) combined with the shallow water to make steering difficult, and the novel

⁴⁰Belknap opined it had only room for two. Belknap, [Contemporary Club], 15.

⁴¹DuPont to Mrs. DuPont, April 5, 1863, Hayes, DuPont Letters, 2: 546. If nothing else, the monitor pilot houses, being atop the turrets, had excellent all-around vision.

⁴²Turner to DuPont, April 10, 1863, ORN 14: 25.

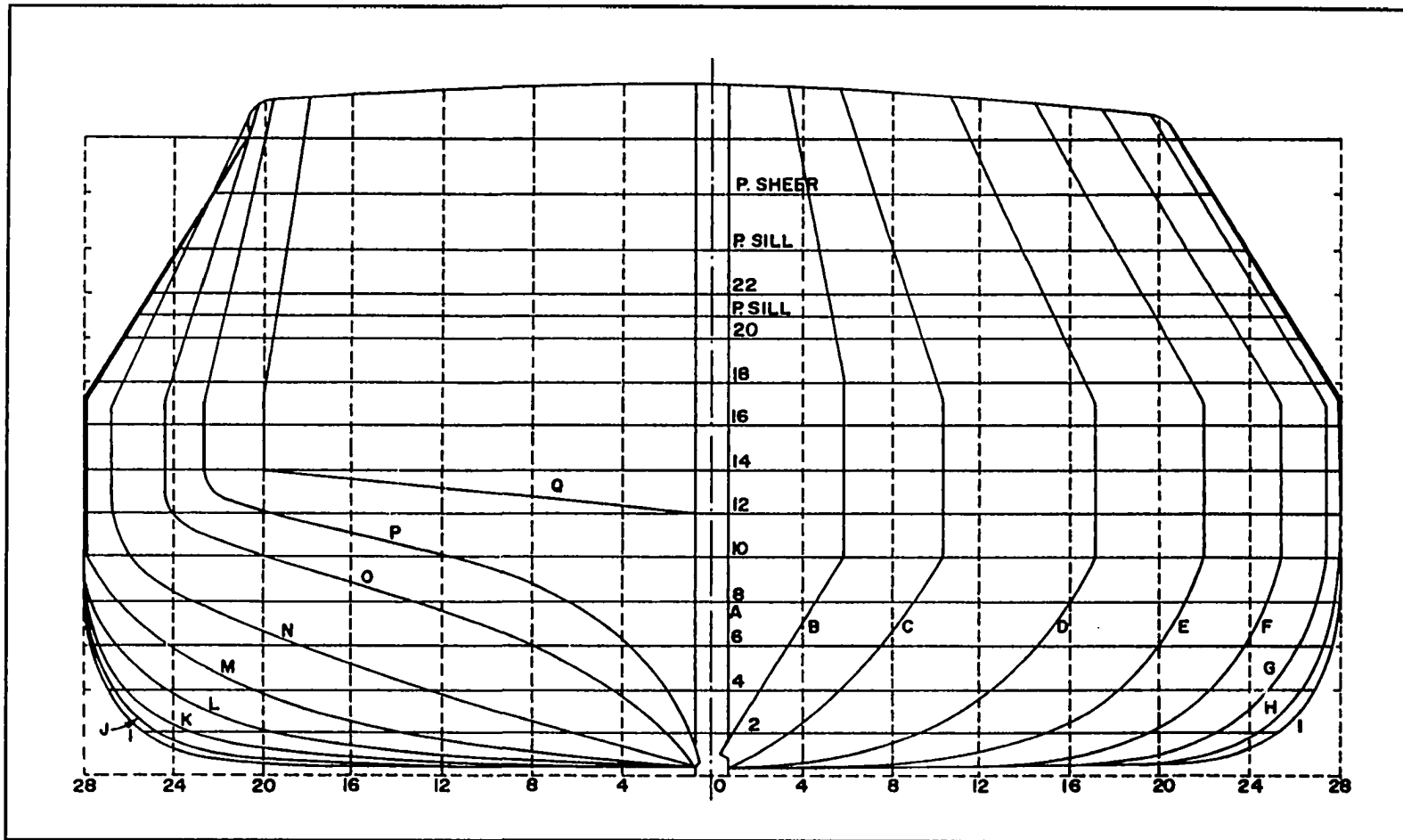


Figure 16. Body and Sheer Plan of U.S.S. New Ironsides. (BuShips Plan 107-9-12M, redrawn by William J. Jurens.) The lettered stations correspond to the similarly lettered stations in Figure 1.

articulated rudder probably aggravated the situation.⁴³ The need for precise control, and the frustration of being unable to get it, must have been a factor in DuPont's management of the battle. DuPont undoubtedly found that maneuvering his flagship took much attention, which detracted from his ability to control the fleet.⁴⁴ Turner's report to DuPont noted the skill with which Godfrey kept the ship clear of the bottom, but the pilot's performance was decidedly mixed: he kept the ship off the ground but did not maneuver her to be effective in combat.⁴⁵

Much of the difficulty with ship control came only because the Admiral and his pilot were unfamiliar with the ship and what her Executive Officer, George Belknap, called "wrinkles in the management of the helm." DuPont and Godfrey did not board the ship until April 6.⁴⁶ As shown by

⁴³NARG 19, Plan 107-9-12M. The lines did not permit smooth flow to the rudder. With the ship's hull only a foot from the bottom, rudder effectiveness would be reduced by 25 percent. Crenshaw, Naval Shiphandling, 20-25, for forces affecting a single-screw ship. Stephen B. Luce, Text-Book of Seamanship, rev. ed. (New York: D. Van Nostrand, 1884), 538-48, is understandably less sophisticated.

⁴⁴Notes from Papers of Rear-Admiral DuPont, U.S. Navy, on the attack on Fort Sumter, April 6, 1863, ORN 14: 28. The old saying about a collision at sea ruining your whole day is apropos. DuPont wrote, "This ship would not steer . . . and had to be anchored twice." DuPont to Mrs. DuPont, April 8, 1863, John D. Hayes, ed., DuPont Letters, vol. 3, The Repulse: 1863-1865, 3.

⁴⁵ORN 14: 25.

⁴⁶Belknap, "Reminiscent of the 'New Ironsides'," 68. Belknap later said Godfrey was "utterly ignorant" of the ship and handled her badly. Belknap, [Contemporary Club],

her later movements in the same channel, at night and under fire, New Ironsides would have given a better account of herself had her own Commanding Officer and pilot been permitted to maneuver her instead of DuPont and Godfrey.⁴⁷

DuPont's tactical leadership is also open to critical discussion. Foremost is the question of whether DuPont should have led the formation as he did at Port Royal. The advantage of leading the line was that he could draw his ships on by example. A resolute commander could execute the simple and direct "follow the leader" by force of will, without relying on a subordinate, as when Admiral David G. Farragut took the lead at Mobile Bay and saved the day for the Union. Civil War gun fire control, even from shore batteries, was poor enough that the leading ship ran little increased risk of being hit by concentrated fire. Against this, "follow me" leadership put the leader in the most hazardous position because leading the line increased the commander's exposure to torpedoes.⁴⁸ It also reduced his

16. Belknap incorrectly wrote the attack was the first time Godfrey handled the ship; she crossed the bar "in charge of Pilot (Mr. Godfrey)." George E. Belknap, "Reminiscent of the Siege of Charleston," in Naval Actions and History 1799-1898 (Boston: Military Historical Society of Massachusetts, 1902), 170; NARG 24, Log of New Ironsides, April 6, 1863.

⁴⁷Pilot Benjamin Dorey worked New Ironsides up to Moultrie "in the night without lights, bearings or compass." Captain S. C. Rowan to Rear Admiral John A. Dahlgren, September 10, 1863, Report . . . Armored Vessels, 240.

⁴⁸At New Orleans and Mobile, Farragut was dissuaded by his captains from leading the line due to the perceived torpedo risk. Clarence Edward Macartney, Mr. Lincoln's

ability to control all of his ships at once.

DuPont knew New Ironsides could not operate outside the narrow channel. By choosing a position in the middle of the line to increase his ability to communicate, DuPont foreclosed his option to haul out of line and take the lead if necessary. At the decisive moment of his attack he had to rely completely upon John Rodgers's judgment that the obstructions could not be passed.

Although Rodgers had an excellent reputation, his conduct shows a keen appreciation of risk but not of possible gain.⁴⁹ Without trying to pass the obstructions or use the grapnel-equipped torpedo clearing raft, he turned away from the obstructions and disrupted the formation.

From his position in the middle of the line, DuPont could do little to rectify the situation. A British critique opined that the Federals were repulsed

because their vessels were delayed under the enemy's guns. . . . It will have been seen how little, after all, the Confederate obstructions were required to do. Only one vessel, the Weehawken, . . . was directly affected by them. The others . . . thus thrown into partial confusion . . . half an hour's firing then completed their discomfiture.⁵⁰

DuPont's disposition of New Ironsides was, on balance, adequate. Disregarding her steering qualities, which could

Admirals (New York: Funk & Wagnalls, 1956), 43, 64-65.

⁴⁹G. F. Eliot considered him to be "probably the best captain of the war." *Ibid.*, viii.

⁵⁰H. W. Tyler, "Spithead and Harbour Defence," Journal RUSI 8, no. 31 (1864): 145.

have been overcome by skilled handling, New Ironsides' significant tactical characteristics were her relatively deep draft, soft ends, and great offensive power on the broadside. Her draft and her restricted forward visibility made it unwise to place her at the head of the line, especially since she could not cast the lead from the bows. Her soft ends could not be helped, but her powerful battery was best placed near the head of the line to aid in suppressing Confederate defensive fire. DuPont might have improved his formation by stationing New Ironsides second in line, to give "encouragement" to the leader, or by leaving New Ironsides in the middle of the line and transferring himself to the leading or the second monitor.

During her first trial by fire, New Ironsides was hit by more than fifty Confederate shot and shell.⁵¹ The damage she received, which set the pattern for her later engagements with the Charleston fortifications, was of four types: Projectiles which struck the side armor, the port shutters, the armored spar deck, and the unarmored areas.

Projectiles that struck the side armor were of little concern. Those that struck obliquely glanced off. Shot that struck squarely might indent the armor, perhaps cracking it or crushing the wood backing behind it, without

⁵¹Abstract log of the U.S.S. New Ironsides, April 7, 1863, ORN 14: 26.

doing significant damage (Figure 17).⁵²

Projectiles that struck the port shutters frequently broke them; if they broke in two, the detached part fell overboard. Replacement port shutters were shipped from the North to be installed on station.⁵³

Captain Turner had written to Admiral Smith a week

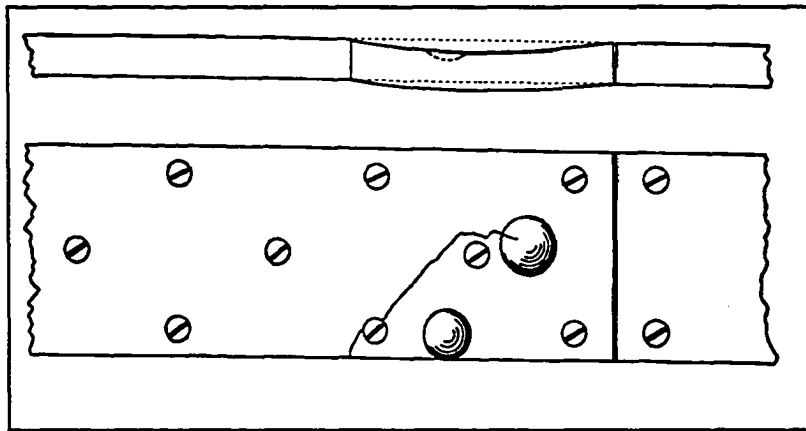


Figure 17. Damage to New Ironsides' armor from Confederate fire at Charleston. (Official Records . . . Navies, 15: 555)

before the attack, discussing the port shutters at length. He worried, "should a shot strike the bolts upon which they pivot, and vibrate--doubtless they would be disabled and perhaps the free action of them obstructed." He wanted to

⁵²Abstract Log of the U.S.S. New Ironsides, April 7, 1863, *ibid.*, 14: 26; Turner to Smith, April 25, 1863, NARG 71, Entry 5, Box 449, 2: 33.

⁵³On April 23, 1863, Lenthall directed Commodore Charles K. Stribling, Commandant of the Philadelphia Navy Yard, to send replacements. NARG 19, Entry 54, 2: 223. Several orders were eventually made.

reshape them to work "longitudinally on the ship's sides-- instead of on the arc of a circle as now--moving in grooves fitted on the outside of the [armor] cladding." They were to be held to the ship's side with bolts "through the entire wood of the ship's side and the cladding" and operated by tackles attached to the inside of each shutter.⁵⁴

During the battle on April 7, one shutter was carried away by a shot, but Turner did not mention it or press the case for his modification, when he wrote to Smith shortly after the battle. Despite the number of times shutters were damaged, they did not jam, and the proposed alteration, which would have been very expensive, was never made.⁵⁵ This was for the better as it would have weakened the armor and complicated the working of the guns.

Projectiles that struck the deck were a greater threat. In addition to penetration of the deck, Turner saw another problem "fraught with danger" to the gun crews. The spar deck planking was secured to the iron deck plating by screws, about three inches long, projecting up through the iron into the wood. These screws were knocked loose from the overhead in the battery when shot struck the spar deck.

⁵⁴Turner to Smith, April 2, 1863, NARG 71, Entry 5, Box 449, 2: 7.

⁵⁵Turner to Smith, April 25, 1863, *ibid.*, 2: 33. No report of damage mentions inability to serve a gun. ORN 14: 26, 460, 534, 555. The change, clearly shipyard work, could have been made only in the 1864 refit, but Shippen describes the ship after that refit as having shutters "much indented by shot." Shippen, "Fort Fisher," 11.

Turner wrote, ". . . a shot striking anywhere over them, drives them out--when corroded by the iron-rust--They fly out bodily--like bullets and would kill men standing underneath."⁵⁶ His fears were groundless; although the deck was hit repeatedly in various engagements and received shots that completely broke the deck plating, no serious injuries from this cause were recorded.⁵⁷

The fourth category, projectiles that struck the unarmored areas of the ship, generally caused no significant damage.⁵⁸ They were always a concern since the lack of protective bulkheads between the gun and berth decks, and the lack of a protective deck other than the spar deck, made the machinery and steering gear vulnerable.

The armored bulkheads between the spar deck and gun deck protected the battery itself, but a shot could pass through the spar deck and diagonally down through the wooden gun deck outside the battery to reach the engines or rudder. Similarly, a shot could pass through the stern above the armor and reach the rudder head and tiller. Turner was well aware of this. As he wrote before the April 7 attack,

⁵⁶Turner to Smith, April 25, 1863, NARG 71, Entry 5, Box 449, 2: 33.

⁵⁷For instances of deck damage, July 24, 1863, ORN 14: 392; August 17, 1863, Bishop to Rowan, August 16[17], 1863, ibid., 14: 460; Rowan to Dahlgren, November 29, 1863, ibid., 15: 142.

⁵⁸On various occasions, railings, boats and cabin furnishings were damaged. Ibid., 14: 392, 408, 409, 460, 509.

If her iron bulkheads had been dropped to the berth deck and she had been given twenty inches more vertically of iron-plating around her bows, and quarters--there would have been no necessity for these additional safe-guards of sand-bags.⁵⁹

Without the armored bulkheads upon which Bartol had insisted, the ship would have been tactically useless against fortifications. As it was, the ship control problems noted above were aggravated by the need to minimize the unarmored areas presented to enemy fire. DuPont recognized this before the attack, stating, "she is not so strong as the monitors, or has many more vulnerable places."⁶⁰ Concern became acute after the Charleston attack. Turner deemed it "most important" to give the rudder "an iron-clad protection--in any way it can possibly done."⁶¹ No additions to the bow and stern protection were made, however, and she remained vulnerable there throughout her career.

Had the Confederates' defensive torpedo system worked as planned, improving the ship's protection would not have been an issue--New Ironsides would have been sunk in the April 7 attack. During that attack, New Ironsides spent about ten minutes anchored in the main ship channel directly

⁵⁹Turner to Smith, April 2, 1863, NARG 71, Entry 5, Box 449, 2: 7.

⁶⁰DuPont to Mrs. DuPont, April 6, 1863, Hayes, DuPont Letters, 2: 552. C. Raymond P. Rodgers told New Ironsides' Executive Officer, "If the first fire of the enemy does not strip the armor off this vessel, I will be agreeably surprised." Belknap, [Contemporary Club], 13.

⁶¹Turner to Smith, April 25, 1863, NARG 71, Entry 5, Box 449, 2: 33.

over a Confederate torpedo made from an old boiler filled with 3,000 pounds of powder.⁶² The torpedo had an electric detonator, and Captain Langdon Cheves, C.S.A., tried repeatedly to set it off.

Cheves' efforts failed and New Ironsides escaped. He was reported to have said

that for ten minutes he could not have placed the Ironsides more directly over it if he had been allowed to, but the confounded thing, as is usual, would not go off . . . The insulation of the wire, I suppose, defective.⁶³

Scharf states one of the wires had been severed by a wagon passing over it, but the man who built the torpedo, Assistant Engineer Ch. G. de Lisle, noted three possible causes for the failure: a leak in the boiler, a rupture of the cable, or a defect in the fuze. He reported that the cable to the torpedo was twice the intended one mile length, and surmised, "the distance of the poles in the fuse was too great for the length of the cable." De Lisle was probably

⁶²From location and time, this was during her second anchorage. Map of Approaches to Charleston, S.C., ORN 14, facing page 1 (Figure 13 above). This chart includes the torpedo's position. A deserter claimed it contained 12,000 pounds of powder, but its builders said 3,000. Statement of Seaman John B. Patrick, June 27, 1864, ORN 9: 770; report by Assistant Engineer Ch. G. de Lisle to Beauregard, May 25, 1863, OR, ser. 1, 14: 949-50.

⁶³Captain Francis H. Harleston, C.S.A., to Lieutenant James Thurston, C.S.M.C., April 26, 1863, ORN 14: 111. For a flowery narrative, A. W. Taft, "The Signal Service Corps. A Tribute to Their Arduous and Invaluable Services During the War." SHS Papers 25 (1897): 132-3. Surveyors' transits were used to determine when the ship was over the torpedo.

correct.⁶⁴ Considering the damage later inflicted by a much smaller charge (Chapter 7 below), New Ironsides could not have survived the explosion of 3,000 pounds of gunpowder under her keel.

Although her protection proved sound, New Ironsides did not make the offensive contribution expected of her by both Federals and Confederates. Due to her maneuvering difficulties she fired only eight rounds, although the Confederates credited her with considerably more, believing she was to "perform the lion's share" of the reduction of the defenses.⁶⁵ As a result of her disappointing performance, the opinions formed of her by her Commanding Officer and Admiral were unfavorable and she became an issue in the controversy surrounding DuPont's failure to resume the attack after his first effort was repulsed.⁶⁶

Convinced of the fleet's inability to take the city, DuPont asserted he could not renew the attack due to the

⁶⁴Scharf, Confederate Navy, 750. Seaman Patrick averred that the wires had been "cut by the man who invented the torpedo. . . ." ORN 9: 770. For De Lisle's opinion, De Lisle to Beauregard, May 25, 1863, OR, ser. 1, 14: 951-52.

⁶⁵Lieutenant A. S. Mackenzie, Ordnance Officer, to DuPont, April 14, 1863, ORN 14: 27. "The Attack on Charleston," Charleston Daily Courier, April 8, 1863, 2; "The Siege of Charleston," *ibid.*, April 11, 1863, 2; also "The Attack on Charleston Opens," Charleston Mercury, April 8, 1863, 1.

⁶⁶DuPont originally contemplated a much longer action. He wrote that the monitors' XV-inch guns needed repairs after each day's fight, while "we may be a week before a result is gained at Charleston." DuPont to James Stokes Biddle, March 25, 1863, Hayes, DuPont Letters, 2: 509.

heavy damage to the monitors.⁶⁷ He claimed he had never advised the attack on Charleston, but as Welles wrote,

He certainly never discouraged it . . . DuPont claimed the right to perform this great work . . . His third dispatch since the battle, brings me the first intelligence he has thought proper to communicate of an adverse character.⁶⁸

Others disagreed with DuPont's assessment, blaming him for the failure and for exaggerating the monitors' injuries, and he was roughly handled in the press.

The Baltimore American published the severest criticism, written by Charles C. Fulton, a reporter whom DuPont believed had the sanction of the Navy Department.⁶⁹ Fulton wrote of the "dreadful fear that overshadowed the fleet authorities" of torpedoes and stated his belief: "The great work has been entrusted to incompetent hands."⁷⁰

Aboard New Ironsides, initial acceptance of failure turned to resentment of DuPont and of the ship's meager participation. On April 8, Lieutenant John M. Butler wrote

⁶⁷DuPont to Welles, April 8, 1863, ORN 14: 3, and April 15, 1863, ibid., 14: 6-7. DuPont feared Confederate salvage of a sunken monitor, writing, "What most oppresses me is the possible losing of the ironclads, more or less--in which case we lose the whole coast. . . ." DuPont to Henry Winter Davis, April 1, 1863, Hayes, DuPont Letters, 2: 533.

⁶⁸Welles, Diary, entry for April 21, 1863, 1: 277.

⁶⁹DuPont to Welles, April 22, 1863, ORN 14: 51-56. DuPont wrote, "Fulton came especially down to represent the monitor interest in full sympathy with Fox." DuPont to H. W. Davis, Hayes, DuPont Letters, 3: 78. Fox denied it. For political implications, Niven, Gideon Welles, 435.

⁷⁰"Newspaper clipping from the Baltimore American of April 15, 1863," signed C. C. F[ulton], in ORN 14: 57-59.

the repulse was "not much after all--we may grow again," but on April 9 he noted, "Sumter is still looking us in the face . . . we have been too slow." On April 13 he wrote, "We feel more and more the effects of not fighting this ship. All are blue."⁷¹ In his more restrained fashion, Belknap said,

The officers and men had unbounded faith in the prowess of the ship, and sore was their disappointment at this day's failure. Sorer still was the feeling when it was given out on the next morning that the attack would not be renewed. . . .⁷²

Belknap was not alone in his opinion, but others gave more vigorous vent to their feelings. Edward Kershner, New Ironsides' Assistant Surgeon, wrote a letter to the American attacking DuPont. He stated, "the strongest ships and heaviest battery that ever floated" would "wait until the Government sends--not more iron-clads--but a MAN to take Charleston."⁷³ When DuPont departed New Ironsides after the Charleston attack, Turner ordered his crew to cheer the

⁷¹Butler Diary, entries for April 8, 9, 13, 1863.

⁷²Belknap, "Siege of Charleston," 171. A Philadelphia newspaper stated, based on a letter from the ship, "All on board have great confidence in the ship and in Captain Turner, and think that the New Ironsides can take Charleston alone." "Particulars of the Attack on Charleston," Philadelphia Daily Evening Bulletin, Monday, April 13, 1863, 1.

⁷³DuPont preferred charges, Kershner admitted guilt, and a Court Martial sentenced him to dismissal, but Welles retained him in the Navy. General Court Martial of Edward Kershner, June 5, 1863, Case No. 3253, National Archives, Record Group 125, Records of the Judge Advocate General (Navy), Microfilm Entry M273, Records of General Courts-Martial and Courts of Inquiry of the Navy Department, 1799-1867, Roll 108.

Admiral; they refused.⁷⁴

Captain Turner's own statements show an ambivalence which appears to be the result of pride in his ship warring with his innate pessimism and his desire to support DuPont, his friend and superior. Turner's opinion of New Ironsides varied with time. In August 1862, he took command with confidence, calling New Ironsides "the noblest specimen of naval architecture." He sent word to friends in Charleston that he hoped they had good wine since he expected to come to drink it, but there were still questions in some minds about his attitude. In October 1862 Rear Admiral Lee wrote to Assistant Secretary Fox, "As to Turner I knew nothing of his 'temper' in regard to the Government and the War. . . . I shall now have an opportunity to sound him about the War as you seem to desire."⁷⁵

Turner's initial report to Welles in 1862 was followed by a highly complimentary letter to Merrick & Sons, written soon after the trial trip to Newport News. After that,

⁷⁴For the cheering incident, Journal of Surgeon Marius DuVall, quoted in Report . . . Armored Vessels, 276; DuPont to Turner, May 14, 1864, Hayes, DuPont Letters, 3: 342; Belknap, "Siege of Charleston," 171. Butler wrote, "The Admiral leaves on the James A[dger] . . . no one cheers the Admiral." Butler Diary, entry for April 12, 1863.

⁷⁵"Noblest specimen" from Turner to Dahlgren, September 10 [1862], Dahlgren Papers. For Charleston friends, Mrs. DuPont to DuPont, August 28, 1862, Hayes, DuPont Letters, 2: 229n. For Lee's comment, Thompson, Correspondence of Fox, 2: 220. DuPont wrote, "He [Turner] has the same way of speaking discouragingly as formerly--trims his political views. Very sound, however, and very anti-South on the war." Hayes, DuPont Letters, 2: 372.

Turner's letters became more pessimistic and critical.⁷⁶ His anxiety at being off a lee shore at Charleston increased until even DuPont became exasperated.⁷⁷ After finding in Port Royal that he "never could get him along with his work," DuPont was surprised at Turner's return on February 7, 1863, and wrote, "Turner came on board with a long report of complaints and dangers."⁷⁸

Yet after the April 7, 1863, attack, Turner became less, or at least no more, pessimistic. He stated in his report that the ship's damage, except the loss of a port shutter, was not material, although he opined that had she been in closer action, "not one port shutter could have been left."⁷⁹ In a letter to Smith, he complained, "In a sea

⁷⁶Turner to Welles, August 27, 1862, in Report . . . Armored Vessels, 30. Turner to Merrick & Sons, September 22, 1862, NARG 71, Entry 5, Box 448, 2: 79. Also Turner's report of the trip to Port Royal, stressing the risk of a lee shore to a ship with such low power: "Nothing could save her but her anchors." Turner to DuPont, January 19, 1863, ORN 13: 518-19.

⁷⁷"I desire that the Navy Department may be undeceived if they supposed that this ship was equal to any such service [at anchor off Charleston]. . . this vessel is not calculated for any outside work, and should avail herself of the most favorable opportunities to get from port to port as soon as she can." Turner to DuPont, February 6, 1863, *ibid.*, 13: 646-48. Events proved her equal to the task.

⁷⁸DuPont to Mrs. DuPont, February 1, 1863, Hayes, DuPont Letters, 2: 405. DuPont to Mrs. DuPont, February 7, 1863, *ibid.*, 2: 416. DuPont later wrote, "He [Turner] is a queer man; I believe (indeed I know) he is a devoted friend of mine, but he has disturbed my equanimity more since he has joined my squadron than any other officer in it." DuPont to Mrs. DuPont, March 18, 1863, *ibid.*, 2: 494 and note.

⁷⁹Turner to DuPont, April 10, 1863, ORN 14: 26.

fight at close quarters--she would be terrible," but, "She is not adapted to this kind of [blockade] service--and is deteriorating every day under the wear and tear of it."⁸⁰

At a later Court of Inquiry, Turner testified that New Ironsides had received damage in the April 7 attack, but there was nothing to impair her efficiency in the slightest degree. He stated, "She was as ready to go into the fight ten minutes afterwards as she ever was. . . . No shot or shell entered the iron-clad part of the Ironsides."⁸¹

After the attack, DuPont quickly was convinced that the monitors were worthless. As early as April 8 he told Major General David Hunter, "These monitors are miserable failures where forts are concerned. . . ."⁸² For the New Ironsides, however, he initially had kinder words. Far from worthless, on April 11 DuPont wrote Welles to say it was "absolutely necessary" that New Ironsides should remain at Charleston as "the great protective force of the blockading vessels" against Confederate raids.⁸³ On April 16, DuPont wrote, "But for the Ironsides the raid of the 31st January

⁸⁰Turner to Smith, April 25, 1863, NARG 71, Entry 5, Box 449, 2: 33.

⁸¹Turner's testimony at the Stimers Court of Inquiry, Report . . . Armored Vessels, 148-49. The Charleston press claimed "the plating could be distinctly seen to peel off," but this was wishful thinking. "The Siege of Charleston," Charleston Daily Courier, April 11, 1863, 1.

⁸²DuPont to Hunter, April 8, 1863, ORN 14: 30-31.

⁸³DuPont to Welles, April 11, 1863, in Report . . . Armored Vessels, 85-86.

would have been repeated with more serious effect."⁸⁴

DuPont's attitude toward the ship became more critical as time passed and he received more press abuse about the attack. In May, a month after the battle, he told Congressman Henry Winter Davis that he was most attacked in the Philadelphia press "just in the proportion that the Iron-
sides is more worthless than the monitors . . . she is the greatest sham of all. . . ."⁸⁵ He wrote another friend of

. . . the greater worthlessness of the Ironsides as compared with the monitors, for defective as the latter are they have some merits. The Ironsides has none except of accommodation for men and officers-- and is a capital scarecrow, for the rebels have not found her out yet, and she keeps in the rams from pouncing again on the blockaders.⁸⁶

DuPont's deteriorating opinion of New Ironsides was thus motivated by his desire to assign the blame for failure at Charleston to someone or something other than himself. As the controversy grew more heated, his opinion of all ironclads become less favorable.

Eventually, to vindicate himself, DuPont requested a court martial for Chief Engineer Alban C. Stimers, the

⁸⁴DuPont to Welles, ORN 14: 139.

⁸⁵DuPont to Davis, May 3, 1863, Hayes, DuPont Letters, 3: 78. The emphasis is DuPont's. The Philadelphia Evening Bulletin noted that Farragut took the forts below New Orleans with a wooden fleet. "It is absurd, then, to suppose that forts cannot be taken by iron-clad vessels whose impregnability has been thoroughly proved." "The Iron-Clads," Philadelphia Daily Evening Bulletin, April 17, 1863, 4.

⁸⁶DuPont to Biddle, May 4, 1863, Hayes, DuPont Letters, 3: 86.

General Inspector of Ironclads. DuPont believed that Stimers encouraged Fulton, the Baltimore American reporter, with false and unfounded statements. According to DuPont, Stimers said the monitors received less damage than DuPont claimed and DuPont was "too much prejudiced against the monitors to be willing to give them a fair trial."⁸⁷

Stimers was competent but overly ambitious. He supervised construction of the original Monitor and was favorably mentioned in the accounts of her stormy passage to Hampton Roads and her battle with the Virginia. After that action, he returned to New York as General Inspector of Ironclads, the principal assistant to Rear Admiral Francis Gregory, the General Superintendent of Ironclads. As such, he directly supervised the construction of the many monitors being built along the eastern seaboard.

Self-centered and overconfident, Stimers was no friend of Engineer-in-Chief Isherwood because he wanted that post for himself.⁸⁸ His report of the battle of Charleston, which defended the monitors (and denigrated New Ironsides),

⁸⁷DuPont to Welles, May 12, 1863, ORN 14: 59-60.

⁸⁸Edward William Sloan, III, Benjamin Franklin Isherwood Naval Engineer: The Years as Engineer in Chief, 1861-1869 (Annapolis: United States Naval Institute Press, 1965), 71, 74-76. Stimers later designed the notoriously defective "light-draft monitors." Sloan recounts that Stimers was ordered to the light-draft Tunxis in 1864. "He discovered a plaque . . . [stating the vessel was built] 'from designs prepared by Alban C. Stimers . . .' Reflecting on the reputation of this class of vessel, Stimers for once became modest of publicity and proceeded to cut his name out of the plate with a cold chisel." *Ibid.*, 77.

was a masterpiece of "political" engineering in support of the Department's monitor construction program.

Secretary Welles confided that DuPont wanted "to lay his failure [at Charleston] on the ironclads, and with such a court as he would organize, and such witnesses as he has already trained, he would procure Stimers and vessels to be condemned." Saying he would not put anyone whom DuPont "wished to make a victim, in his power," Welles appointed a court of inquiry (vice a court martial) to investigate. "Nothing less will satisfy DuPont, who wants a victim."⁸⁹

DuPont's failure first to press home and then to renew his attack on Charleston was due to his own mental state. Belknap reported,

John Irwin, then executive officer of the Wabash [DuPont's flagship] reportedly said: 'DuPont was beaten before we left Hilton Head. The reason was that he had contemplated defeat with more earnestness down there than he had counted upon success.'⁹⁰

His attitude, which Welles assessed as "imparting his doubts to his subordinates, until all are impressed with his apprehensions," made it impossible for him to succeed. Yet his pride, and perhaps fear of being relieved, kept him from

⁸⁹Welles, Diary, entry for May 20, 1863, 1: 307. After testimony from most of the officers commanding ironclads in the attack, the court, under Rear Admiral Gregory (Stimers' immediate superior), recommended no further action on the charges. Report . . . Armored Vessels, 114-69.

⁹⁰Belknap, "Siege of Charleston," 166.

resigning or making clear his objection to the attack.⁹¹

DuPont, for his part, believed most of the attacks upon him in the press came "from the mechanics in the squadron and the representatives in the machine shop," and wrote that Harman Newell, Chief Engineer of New Ironsides, was "Mr. Merrick's agent, as Stimers was for Ericsson. . . ." He stated the idea of the "clever men": "Charleston could have been readily taken if naval officers had believed in the irresistible machines in their hands."⁹²

Whatever the beliefs of the "clever men," DuPont clearly had no faith in the ironclads. New Ironsides engaged in no more combat operations while DuPont commanded the South Atlantic Blockading Squadron.⁹³

⁹¹K. Jack Bauer, "Samuel Francis DuPont: Aristocratic Professional," in Captains of the Old Steam Navy: Makers of the American Naval Tradition 1840-1880, ed. James C. Bradford (Annapolis: United States Naval Institute Press, 1986), 154, 158-59. In October 1862 DuPont refused Dahlgren as his second-in-command, and Welles did not force the issue. DuPont knew Dahlgren earnestly desired the command and stood high in President Lincoln's favor. For Dahlgren's attitude, Dahlgren to Welles, October 11, 1862, ORN 13: 377-78.

⁹²DuPont to Mrs. DuPont, May 2, 1863, Hayes, DuPont Letters, 3: 74. DuPont to H.W. Davis, May 3, 1863, *ibid.*, 3: 78-79.

⁹³After the April 7 attack, New Ironsides settled into a "blockade service" routine. Prior to the attack, she turned her engines (for testing) once or twice a week only. Commencing April 19, 1863, she steamed to her anchor from about 8:00 P.M. until dawn each day, maintaining propeller revolutions for about one knot. This increased readiness but consumed more coal and increased wear on the machinery. NARG 19, Entry 1072, Steam Log of New Ironsides, April 19-July 8, 1863.

CHAPTER SEVEN

COMBAT VETERAN: MATURE REFLECTION

On July 6, 1863, Rear Admiral John A. B. Dahlgren relieved Rear Admiral DuPont as Commander of the South Atlantic Blockading Squadron.¹ Dahlgren's plans for the Squadron took full advantage of New Ironsides' unique capabilities, and under his command she made a contribution to the Siege of Charleston unmatched by any other ship.

Dahlgren's arrival had an immediate if inadvertent effect on New Ironsides. As a result of DuPont's departure, the ship lost her first Commanding Officer, Commodore Thomas Turner, who was relieved at his own request.

There were several reasons for Turner's departure. First, before Dahlgren was promoted to rear admiral, Turner was considerably senior to him, in a service where seniority was jealously guarded.² Second, Dahlgren had not commanded at sea as a commander or captain, and had not seen action in

¹Civil War Naval Chronology, III-110.

²"Relative rank defined one's shipboard quarters, one's seat at the mess table, one's duties, one's social habits, indeed, often one's very friends." Peter Karsten, The Naval Aristocracy (New York: The Free Press, 1972), 63. Dahlgren was promoted Captain on August 5, 1862, and Rear Admiral on February 27, 1863. Allison, "Dahlgren," 26.

the Civil War. Third, Turner had earlier been at odds with Dahlgren over the gun carriage problem.

As Welles confided to his diary, there was discontent because of Dahlgren's promotion. DuPont spoke for many when he wrote about Dahlgren: "He chose one line in the walks of his profession while [Rear Admiral Andrew H.] Foote and I chose another; he was licking cream while we were eating dirt. . . ." Welles told Dahlgren that if officers who had been senior to him wanted to be transferred, the Department would permit it.³

Turner was one such officer. Anticipating that DuPont would be relieved, Turner wrote to Foote, expressing his willingness to serve under Foote but not under Dahlgren. Although he understood Turner's "natural and proper" views on Dahlgren, Welles was on the whole displeased with this letter, in which Turner wrote of the "miserable monitors," built to fill the pockets of speculators.⁴ When Foote died enroute to the command and Dahlgren replaced him, Turner chose not to remain. His departure probably distressed neither Welles nor Dahlgren. On July 6, 1863, Captain

³Welles, Diary, entry for June 21, 1863, 1: 337. DuPont to Fox, October 8, 1862, Hayes, DuPont Letters, 2: 243.

⁴In Welles' words, "Tom Turner is a simple dupe, and merely echoes the insinuations of another [DuPont], who moulds him at pleasure and is demoralizing that entire command." Ibid., entry for May 27, 1863, 1: 314. Turner's change in feeling from the "my dear friend" of his letter of September 10, 1862, probably came more from Dahlgren's rapid promotion than from the carriage problem.

Stephen C. Rowan relieved Turner as Commanding Officer of New Ironsides.⁵

Stephen Clegg Rowan was born in Ireland on Christmas Day, 1808, emigrating at the age of ten to join his parents in Piqua, Ohio. He entered the Navy in 1826, served in the Seminole and Mexican Wars, and distinguished himself in the North Carolina sounds early in the Civil War. Fox proposed him as Commanding Officer of New Ironsides as early as September 1862: "If he [Turner] wishes to give up the command, S. C. Rowan would be an admirable man. . . ." ⁶

Although not as cautious as Turner, Rowan still laid stress on the navigational dangers besetting his ship. In July 1863 he wrote to Dahlgren that his position inside the bar was unsafe; Dahlgren's comment was, "Curious! The 'Iron-sides' has been at her anchor in all weather outside in the open sea for a year, and yet here within the bar she is unsafe. . . ." In August, Dahlgren wrote, "Rowan is terribly careful about that vessel."⁷ In battle, however,

⁵Welles wrote in May, "There would be bitter opposition to Dahlgren from some good officers as well as Tom Turner [emphasis added], were he given the squadron." Ibid., entry for May 27, 1863, 1: 315. Turner was relieved July 6 and left the ship July 7, 1863.

⁶For Fox's proposal, Fox to S. P. Lee, September 11, 1862, Thompson, Correspondence of Fox, 2: 212. After leaving New Ironsides in 1864, Rowan commanded in the North Carolina sounds. He was promoted to Rear Admiral in 1866 and retired as a Vice Admiral in 1889. He died March 31, 1890. Appleton's Cyclopaedia, s.v. "Rowan, Stephen C." DAB, s.v. "Rowan, Stephen C." NARG 24, Records of Officers.

⁷Dahlgren, Memoir, 404, 410.

Rowan handled his ship boldly and resolutely.

Upon taking command of the South Atlantic Blockading Squadron, Dahlgren lost no time in resuming active operations against Charleston. On July 10, 1863, Brigadier General Quincy A. Gillmore attacked Fort Wagner on Morris Island. The Confederates repulsed the Army's coup de main and Gillmore began a siege, with Dahlgren's ships providing heavy naval gunfire support for the Army troops.

Between February and July, New Ironsides' mission had changed. She was designed and built to fight other ships, specifically ironclad ships, and her first employment was to counter a Confederate ironclad threat to Hampton Roads. When she first went to Charleston it was to protect the blockading fleet from the Confederate ironclads Chicora and Palmetto State. As the number of Union ironclads available increased and more than one could be kept on station at Charleston, the threat from Confederate ironclads became proportionately less severe. DuPont's April 7, 1863, assault marked the change in the ship's primary mission, from ship-versus-ship action to shore bombardment.⁸

The April 7 attack was the first time New Ironsides was used for shore bombardment. Although she made a poor showing then, her large battery made her a unique asset to

⁸New Ironsides' secondary mission remained the protection of the blockading fleet for one overriding reason: she was the only Union ironclad which could remain on station and fight her guns in any weather.

any attack on fortifications. As a result, once Dahlgren arrived New Ironsides was soon back in action. On July 18, 1863, she attacked Fort Wagner, an action which set the pattern for her participation in the "Siege of Charleston."

This attack, coordinated with the Army, was Dahlgren's first opportunity to engage the enemy. His correspondence with General Gillmore shows his high estimate of New Ironsides. The ship was scheduled to cross Charleston Bar on July 14, but due to low tides and heavy seas she was delayed. Dahlgren so informed Gillmore and suggested postponing the attack to wait for New Ironsides, which "will double the number of guns in action from Ironclads."⁹

At 12:15 P.M. on July 18 the ship got underway and stood up the channel, second in line behind the monitor Montauk. At 12:57 she opened fire on Fort Wagner with a 150-pounder Parrott rifle and at 1:12 commenced fire with the port broadside. She anchored 1400 yards from Fort Wagner at 1:20 P.M. She stayed there, firing broadsides and working the engines and rudder to keep the guns bearing, until she swung to the flood tide at 4:37 P.M.

After a pause to let the ship complete her swing, at 4:55 P.M. she commenced firing the starboard broadside. The fleet's fire was effective, as New Ironsides' Log records, "Fort Wagner silenced about 4.45, the enemy driven into

⁹Dahlgren to Gillmore, July 14, 1863, Dahlgren Papers, Letterbook June-July 1863, 49.

their bomb proofs." The action continued until 7:49 P.M., when she ceased firing and soon withdrew out of range. During the action she fired 665 XI-inch shell, 15 XI-inch shrapnel and 125 150-pounder rifle shell.¹⁰ Federal sailors were impressed; a seaman aboard the Powhatan wrote, ". . . 'Ironsides' comes nobly up . . . taking a commdg position . . . and opened upon [Fort Wagner] with shell and judging from appearances she did terrible execution."¹¹

New Ironsides engaged Fort Wagner again on July 20, firing 147 XI-inch and 21 150-pounder shell and receiving thirteen hits.¹² In this and later actions, the guns were normally fired in rotation, one at a time, instead of rapidly and continuously. Firing in rotation, an option not available to the monitors, reduced ammunition consumption and kept the garrison in their bombproofs. New Ironsides again employed the tactic when she attacked Fort Wagner early on July 24. During this action, the ship fired 464 rounds and took only five hits. One of these, a X-inch solid shot, passed through the spar deck armor.¹³ The Confederates had already established New Ironsides as their

¹⁰NARG 24, Log of New Ironsides, July 18, 1863.

¹¹Charles K. Mervine, "Jottings By the Way: A Sailor's Log 1862 to 1864," Kent Packard, ed. Pennsylvania Magazine of History and Biography 71, no. 2 (April 1947): 134.

¹²Rowan to Dahlgren, May 13, 1864, ORN 14: 605; NARG 24, Log of New Ironsides, July 20, 1863.

¹³Rowan to Dahlgren, May 13, 1864, ORN 14: 605; Rowan to Dahlgren, July 25, 1863, *ibid.*, 14: 391-92.

most serious threat; in late July, Beauregard's Chief of Staff wrote, "Our great enemy now is the Ironsides."¹⁴

On July 29, New Ironsides stood up the channel to anchor some 1400 yards away from Fort Wagner. At first her battery would not bear because a southerly breeze kept her from swinging to the ebb tide. At 12:20 P.M. she commenced firing at Wagner and at Battery Gregg, on the north end of Morris Island, receiving two hits in return. She also sent twenty-five rounds from the spar deck fifty-pounder rifles at Fort Sumter, some 2500 yards distant.¹⁵ Having learned that his ship was hard to maneuver but also hard for the Confederates to hurt, Rowan fought her from anchor in these engagements.

On July 30, New Ironsides anchored to shell Battery Gregg, receiving two hits. Before retiring she threw one fifty-pounder at Sumter.¹⁶ The Confederates, recognizing New Ironsides as the most effective of the attackers,

¹⁴Brigadier General Roswell Ripley's endorsement on Brigadier General Johnson Hagood's report of July 25, 1863, OR ser. 1, 28, part 1: 433.

¹⁵Rowan to Dahlgren, May 13, 1864, ORN, 14: 605; Rowan to Dahlgren, July 29, 1863, *ibid.*, 14: 408; Abstract Log of New Ironsides, *ibid.*, 14: 405.

¹⁶Rowan to Dahlgren, May 13, 1864, *ibid.*, 14: 605; Rowan to Dahlgren, July 30, 1863, *ibid.*, 14: 408-409; Abstract Log of New Ironsides, *ibid.*, 14: 405. One hit cracked the armor but did not penetrate. Rowan's May letter gives a total of 329 main battery shell vice 329 XI-inch and 37 150-pounders; the Log agrees with the higher figures.

concentrated their fire on her.¹⁷

On August 17, the ship again anchored to bombard Wagner and Gregg and again fired at Sumter, this time at a range of 2700 yards. In return, she received thirty-one hits, mostly from X-inch guns in Wagner and Gregg. Four of the nineteen hits on the armor caused cracking but little other damage; a port shutter was shot away and the spar deck armor was partially broken in one place. Other projectiles hit woodwork or the smokestack, which was holed eight times.¹⁸ In this action, characterized by a Federal sailor as "truly terrific, on both sides," Fleet Captain Commander George W. Rodgers was killed.¹⁹

On August 18, 1863, New Ironsides remained underway to bombard Fort Wagner, but on August 19 she again anchored to attack the same target, when the "very fresh" wind "kept the rest of the fleet quiet."²⁰ On August 20 she fired at Wagner from anchorage and tried two fifty-pounders at a

¹⁷"Fort Sumter and Battery Gregg replied deliberately, their shots being made with great accuracy; nearly every one striking and taking effect on the Ironsides." "News from the Islands," Charleston Daily Courier, July 31, 1863, 1.

¹⁸Rowan to Dahlgren, May 13, 1864, ORN 14: 605; Rowan to Dahlgren, August 21, 1863, ibid., 14: 459-60.

¹⁹Mervine, "Jottings By the Way," 140.

²⁰"News from the Islands." Charleston Daily Courier, August 20, 1863, 1.

"Rebel steamer" at the extreme range of 3,400 yards.²¹ The ship also anchored for an August 21 bombardment of Wagner, during which she received one XI-inch hit from Sumter.²²

On August 22 and 23, New Ironsides stayed underway for her attacks on Fort Wagner. The ship received no injuries on August 22, but on August 23 she was hit four times.²³ After twelve engagements in five weeks, her primary mission was clearly shore bombardment in support of the Army; her prowess against other ironclads remained untested. Her battery did considerable damage.²⁴

During this period, changes were made to improve the ship's handling characteristics. The earlier difficulties in ship control were partially remedied by moving the

²¹Rowan to Dahlgren, May 13, 1864, ORN 14: 605. Fort Wagner's Chief of Artillery wrote, "In less than thirty minutes after I opened fire, the Ironsides came into position, and opened an enfilade fire upon the guns engaged. My guns being now subjected to a very severe fire and in great danger of being dismounted, I deemed it prudent to cease firing and to close my embrasures. . . ." Captain Robert Pringle to Assistant Adjutant General Major Henry Bryan, August 20, 1863, OR ser. 1, 28, part 1: 547.

²²The summary states she anchored, but Rowan's initial report said she was underway. Rowan to Dahlgren, May 13, 1864, ORN, 14: 605; Rowan to Dahlgren, September 3, 1863, ibid., 14: 533.

²³Rowan to Dahlgren, May 13, 1864, ibid., 14: 605; Rowan to Dahlgren, September 3, 1863, ibid., 14: 533; Abstract Log of New Ironsides, ibid., 14: 509.

²⁴Report of Captain of Engineers J. W. Gregorie to Capt. Molony, Assistant Adjutant General, August 22, 1863: "I repaired sea face [of Wagner], which was sadly torn up by the Ironsides, also traverse over southeast magazine, which was nearly cut through . . ." OR ser. 1, 28, part 1: 503.

secondary steering wheel, or "fighting wheel," from the berth deck to the gun deck under the pilot house.²⁵ By shortening the reaction time between the conning officer's order and the helmsman's response, the Captain's ability to direct the ship in action was greatly improved.

Although her handling difficulties were ameliorated, the ship still suffered from the tactical handicap of soft ends. Dahlgren wrote, "Then her ends are not armored, and between Wagner, Sumter and Moultrie she is always enfiladed by one or more of them."²⁶ The armored bulkheads provided enough protection to enable her to make her approach, after which she fought the enemy on her broadside.

As New Ironsides gained battle experience, her battery came to be considered the most effective in the ironclad fleet, especially by the Confederates.²⁷ Beauregard opined, "she was the most effective vessel employed in the reduction of Battery Wagner," and Confederate historian J. Thomas Scharf called New Ironsides "more troublesome to Fort Wagner than all the monitors combined." The Confederates

²⁵Belknap, "Reminiscent of the 'New Ironsides'," 68. Similarly, it was not until August 31, 1863, that the engine room bell pull, used to give orders to the engines, was extended to the spar deck level. NARG 19, Entry 1072, Steam Log of New Ironsides, August 31, 1863.

²⁶Dahlgren to Gillmore, August 22, 1863, ORN 14: 466.

²⁷A Union view: "The Ironsides is capable of a more rapid and concentrated fire, which, under the circumstances, made her guns more effective than the XV-inch of the monitors." Dahlgren to Welles, January 28, 1864, *ibid.*, 14: 598-600.

publicly affirmed this opinion when they offered a reward for destroying a Union ironclad--they set the amount at \$50,000 for a monitor and twice that for New Ironsides.²⁸

One Confederate officer, a veteran of the fighting on James Island, thought her "one of the most powerful vessels ever built."²⁹ Another Confederate officer in Charleston called her

the most formidable ship of the fleet . . . Her broadsides were not fired in volley, but gun after gun, in rapid succession, the effect upon those who were at the wrong end of the guns being exceedingly demoralizing. Whenever she commenced there was a painful uncertainty as to what might happen before she got through.³⁰

An English officer serving with the Confederates at Fort Wagner observed, "As for the Ironsides, she gives three rounds for every single shot any of our batteries think proper to send her."³¹ The Charleston press also

²⁸Beauregard, "Water Defences," 151. Scharf, Confederate Navy, 695. For reward, Theodore D. Wagner to Beauregard, August 13, 1863, OR ser. 1, 28, Part 2, 280; E. Milby Burton, The Siege of Charleston 1861-1865 (Columbia: University of South Carolina Press, 1970), 216. The offer included \$100,000 for sinking the flagship, U.S.S. Wabash. Thomas Jordan, Beauregard's Chief of Staff, informed B. A. Whitney, "in charge of Submarine Torpedo-Boat," on August 15, 1863. OR ser. 1, 28, Part 2, 285.

²⁹Major John G. Pressley, C.S.A., "The Wee Nee Volunteers of Williamsburg District, South Carolina, in the First (Hagood's) Regiment," SHS Papers 26 (1888): 153.

³⁰Charles H. Olmstead, "Reminiscences of Services in Charleston Harbor in 1863," SHS Papers 11 (1883): 159. Olmstead was Colonel of the First Georgia Volunteers.

³¹S. A. Ashe, "After the Evacuation of Battery Wagner," Confederate Veteran 35, no. 12 (December 1927): 451. In this article he quotes a letter from a Captain DuHaume

considered her the most dangerous of the Federal fleet.³²

Her offensive prowess was due to her large battery and to the ease of working the guns provided by her broadside mountings, compared with the turret mountings of the monitors.³³ In discussing an earlier action between three monitors and an earthwork fortification in which Passaic fired only 100 shots in eight hours, DuPont noted the monitors' ineffectiveness. He wrote, "Continuity of fire is the thing; twenty-five minutes of the Wabash, broadside, would take that fort about three times a day. . . ."³⁴ New Ironsides, with her iron protection, brought "continuity of fire" to areas where a wooden ship like Wabash could not possibly survive.

After the initial troubles with her gun carriages were solved, the sole defect noted in New Ironsides' battery was that the maximum gun elevation was only 4½ degrees.³⁵ This

dated September 10, 1863.

³²"The formidable vessel in whose capacity for injuring us the invaders of our harbor place their chief reliance." Charleston Daily Courier, October 10, 1863, 1.

³³The monitor Montauk's rate of fire was one round per gun in 2.40 minutes and New Ironsides' one in 1.33 minutes. With her larger battery, in an hour New Ironsides could fire 360 rounds; Montauk only 25. Dahlgren to Welles, January 28, 1864, ORN 14: 598.

³⁴DuPont to Mrs. DuPont, March 4, 1863, Hayes, DuPont Letters, 2: 467.

³⁵Rowan answered an inquiry about the battery, saying the guns had been fired 334 times before he took command and 4439 times since. "The recoil is easily controlled-The carriages show no signs of weakness." Rowan to Commander

constraint, imposed by the size of the gun ports, limited the maximum range to under 2,000 yards.³⁶

Short range was a handicap at Charleston, where shallow water kept the ship at a distance from the Confederate forts. In one action Rowan used the ship's roll to increase the effective elevation of the guns, but New Ironsides did most of her work at ranges of 1200 to 1300 yards.³⁷ On August 17, 1863, she was able to close to within 900 yards of Fort Wagner and on September 2, to 1000 yards. She engaged Battery Gregg at about 1800 yards and, after the fall of Morris Island, engaged Moultrie at 1200 yards.³⁸ Recalling DuPont's intent to engage Fort Sumter at 600 to 800 yards, these ranges were greater than optimum.

The size of the gun ports was restricted to reduce the chance of projectiles entering them, but this meant the

H[enry] A. Wise, Chief of the Bureau of Ordnance, October 2, 1863, Rowan Letter Book, 151.

³⁶In a letter of August 22, 1863 to Gillmore, Dahlgren wrote, "her ports only allow of elevations of 4 to 4½ degrees." ORN 14: 466. Turner said under 4°; Turner to Smith, April 25, 1863, NARG 71, Entry 5, Box 449, 2: 33. Tabulated ranges for the XI-inch were:

Elevation	Range (15# charge)	Range (20# charge)
4°	1,524 yards	1,660 yards
5°	1,757 yards	1,975 yards

Ordnance Instructions, Appendix B, No. V, xv.

³⁷"Firing at Battery Gregg at extreme elevation on weather roll. . . ." NARG 24, Log of New Ironsides, July 30, 1863.

³⁸Dahlgren to Welles, ORN 14: 590, 602; Rowan to Dahlgren, *ibid.*, 14: 605. The ranges depended upon the tides--with a higher tide, the ship could approach more closely.

range of the guns was limited by the angle to which they could elevate without striking the top of the port. Since New Ironsides was designed to fight other ships and such battles rarely took place at long range, reducing the range of the guns in exchange for reducing their vulnerability must have appeared to the designers as a good trade.

New Ironsides' great combat effectiveness made her a prime target for the Confederates, and Beauregard promoted a torpedo expedition against her as early as April 1863. He told Captain John R. Tucker, the naval officer in charge at Charleston, it was of the utmost importance that "some effort should be made to sink either the Ironsides or one of the monitors," emphasizing the "great moral effect" of such an act.³⁹ The first torpedo attack on New Ironsides followed on the night of August 20, 1863.

This attack was made by a torpedo craft built from a gunboat hull left on the stocks at Charleston.⁴⁰ Captain James Carlin, commanding the blockade runner Ella and Annie, took charge of the vessel, equipped with a spar carrying

³⁹Beauregard to Tucker, July 18, 1863, *ibid.*, 14: 728. Scharf describes Confederate boat expeditions in Charleston harbor, saying most had been sent out "with a view to discovering the possibilities of a torpedo attack upon the New Ironsides. . . ." Scharf, Confederate Navy, 690-91, 695.

⁴⁰Captain Francis D. Lee, C.S.A., was in charge of this effort. Lee to Beauregard, July 25, 1863, OR ser. 1, 28, part 1: 229-30. A discussion is in Milton F. Perry, Infernal Machines (Baton Rouge and London: Louisiana State University Press, 1965), 77-78.

three torpedoes each with 100 pounds of powder.⁴¹ The night chosen for the attack was very dark and Carlin could not see the New Ironsides until he was nearby. Upon sighting her, he lowered the spar and turned to the attack.

Either Carlin misjudged the torpedo boat's motion or New Ironsides swung to her anchor at precisely the correct moment, because the boat passed up the starboard side of the ironclad rather than striking her. Carlin's misjudgment, at night and under stress, is most likely. Carlin's attention was also distracted by the boat's engine, which stopped and would not restart. As the boat passed, about 1:00 A.M., New Ironsides' Officer of the Deck hailed her. Carlin, whose crew was working frantically on the engine, identified his vessel as the U.S. steamer Live Yankee from Port Royal.

As New Ironsides beat to quarters and fired a rocket to alert the fleet, the torpedo boat grazed the ironclad's bow, and Beauregard's account stated the torpedo spar became entangled in New Ironsides' anchor chain.⁴² Carlin's engineers restarted the engine and the torpedo boat escaped into

⁴¹Burton, Siege of Charleston, 217; Lee to Beauregard, July 25, 1863, OR ser. 1, 28, part 1: 229-30. Beauregard, "Water Defences," 150. The spar is shown in Lee to Jordan, August 2, 1863, OR ser. 1, 28, part 2: 251-52. Carlin was well-regarded by the Charleston press: "Captain Carlin certainly understands how to run the blockade." Charleston Daily Courier, April 29, 1863, 2.

⁴²Beauregard, "Water Defences," 150. A more detailed account is in Perry, Infernal Machines, 78-80.

the night, under XI-inch fire from New Ironsides.⁴³ Carlin "most unhesitatingly" condemned the torpedo vessel and her engine.⁴⁴ No further torpedo attack was made on New Ironsides until October 1863.⁴⁵

Meanwhile, the ship continued her support of the Army. On September 2, the ship stood in and dropped anchor at 1:40 A.M. to shell Gregg and Sumter. She demolished "nearly the whole of the eastern scarp" of Sumter, in return receiving seven hits from Gregg and Moultrie which broke the port sheet anchor hawse pipe and cracked the floor plate of the pilot house and a port shutter.⁴⁶

She engaged Wagner and Gregg on September 5. The Commanding Officer of Fort Wagner noted her fire "proved

⁴³"At 1. Saw a strange looking vessel coming up astern very fast, and upon being hailed she answered 'Live Yankee' from Port Royal. Beat to quarters fired a Rocket, slipped the chain and fired several Guns at stranger but as he passed he grazed our bows and then kept directly ahead so that we could not get our battery to bear on him. At 1.20 he disappeared under the land." NARG 24, Log of New Ironsides, August 21, 1863.

⁴⁴Beauregard, "Water Defences," 150; Captain J. Carlin to Beauregard, ORN 14: 498-99; Rowan to Dahlgren and Ensign Benjamin H. Porter to Rowan, *ibid.*, 14: 497-98.

⁴⁵Rowan did not resume Turner's over-anxious practice of steaming to anchor. The ship had by then been out of port for seven months and repairs were already frequent; extra wear was not desirable. NARG 19, Entry 1072, Steam Log of New Ironsides, August 20-December 31, 1863.

⁴⁶Rowan to Dahlgren, May 13, 1864, ORN 14: 605; Rowan to Dahlgren, September 3, 1863, *ibid.*, 14: 533-34; Abstract Log of New Ironsides, *ibid.*, 14: 558. For damage, Brigadier General Ripley's report of September 22, 1863, OR ser. 1, 28, part 1: 87.

very destructive and had a rather depressing effect on many of the garrison, to whom it was a novelty."⁴⁷ After firing all day in exchange for one hit from Gregg, she remained anchored off Wagner overnight, and on September 6 fought another all-day action with the same fortifications.⁴⁸

The Confederates evacuated Fort Wagner that night. The next day, September 7, New Ironsides anchored to engage Fort Moultrie from 5:45 P.M. to 7:15 P.M. During this bombardment she received 24 hits that did little damage.⁴⁹

On September 8, New Ironsides was loading shell from the store ship Memphis when she was called up to cover the monitor Weehawken, aground off the pass between Sumter and Cummings Point. Anchoring some 1,200 yards from Moultrie, New Ironsides engaged the fort and soon drove the Confederate gunners to cover. She eventually withdrew due to lack of ammunition, having expended every XI-inch shell she had.

During the successful action, which involved five monitors besides the grounded and refloated Weehawken, New Ironsides fired 483 shell and was struck at least seventy

⁴⁷Colonel Lawrence M. Keitt, Commanding Battery Wagner, to Captain W. F. Nance, Assistant Adjutant General, September 18, 1863, describing the action of September 5. OR ser. 1, 28, part 1: 489.

⁴⁸Rowan to Dahlgren, May 13, 1864, ORN, 14: 605; Abstract Log of New Ironsides, *ibid.*, 558-59.

⁴⁹At least on this occasion, anchor chains were placed under the sandbags to give more protection to the engine room. Rowan to Dahlgren, May 13, 1864, *ibid.*, 14: 605; Rowan to Dahlgren, September 10, 1863, *ibid.*, 14: 553-56.

times.⁵⁰ The Confederates concentrated on her, one Charleston newspaper noting, "our guns were served with admirable precision--six out of every seven shots on an average, striking the Ironsides."⁵¹ Even in so heavy an engagement, she proved her powers of resistance, emerging with minor damage.⁵² The Confederates again recorded their high opinion of New Ironsides when Beauregard's Chief of Staff directed the shore batteries to concentrate their fire on the nearest ironclad but specified, "Should the Ironsides at any time come within effective range, it will be well to concentrate fire on her."⁵³

During the night of September 8, officers and men from New Ironsides participated in Dahlgren's attempt to capture Fort Sumter by assault.⁵⁴ Commander Thomas H. Stevens of

⁵⁰Rowan to Dahlgren, May 13, 1864, *ibid.*, 14: 605; Rowan to Dahlgren, September 10, 1863, *ibid.*, 14: 553-56; Dahlgren to Welles, January 28, 1864, *ibid.*, 14: 594-95; Abstract Log of New Ironsides, *ibid.*, 14: 559-60. The latter says 488 shell.

⁵¹"The Siege of Charleston," Charleston Daily Courier, September 9, 1863, 1.

⁵²Bishop to Rowan, September 9, 1863, ORN 14: 555-56. Rowan requisitioned six more pairs of shutters, writing in a cover letter, "These are not times for red tape." Rowan to Merrick & Sons, September 9, 1863, Rowan Letter Book, 146; Rowan to Stribling, September 9, 1863, *ibid.*, 146.

⁵³Jordan to Ripley, September 9, 1863, OR ser. 1, 28, part 2: 351.

⁵⁴Thomas H. Stevens, "The Boat Attack on Sumter," in The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, Robert Underwood Johnson and Clarence C. Buel, eds. (New York: Castle Books, 1956; reprint), 49-50.

the monitor Patapsco led the force of 400 sailors and Marines in which Ensign Benjamin H. Porter commanded New Ironsides' gig. Without being aware of Dahlgren's plan, General Gillmore planned a similar attack for the same night. Neither would yield leadership of a joint expedition to the other and their telegrams betray a total lack of cooperation.⁵⁵ Stevens, who learned he was to lead the attack just before it occurred, tried to decline the command but in the end proceeded as Dahlgren ordered.⁵⁶

The hastily-prepared attack was poorly planned and executed. The boats started up the channel towed by the tug U.S.S. Daffodil about 10:00 P.M. on September 8, 1863. They were to attack in two groups, with a diversionary group assaulting the northwest face before the main force stormed the southeast. The main force became confused and rushed the fort at the same time as the diversionary group.⁵⁷

The lack of a diversion made little difference, because the Confederates were awaiting an attack. They had seen the Union boats assembling and knew of Dahlgren's plans from intercepted messages.⁵⁸ Beauregard alerted the

⁵⁵The correspondence is in ORN 14: 606-610.

⁵⁶Stevens to Welles, September 28, 1865, *ibid.*, 14: 633.

⁵⁷Union reports of the action are in *ibid.*, 14: 610-36.

⁵⁸Alfred Roman, The Military Operations of General Beauregard in the War Between the States 1861 to 1865 (New York: Harper & Brothers, 1884), 2: 153-54.

garrison and the surrounding batteries and moved the iron-clad Chicora so she could cover the outside of the fort with gunfire. When the Union boats were sighted, at about 1:00 A.M. on September 9, the Confederates held their fire until the boats were within a few yards. They then opened fire with small arms and hand grenades and made the pre-arranged signal to the batteries and the Chicora to commence firing.

The few Federals who got ashore were pinned down and captured or killed. The total Union loss was four killed, nineteen wounded and 102 more captured, the latter including Ensign Porter; the Confederates suffered no casualties.⁵⁹ The Army detachment, seeing the lack of surprise and the Navy's failure, withdrew without attacking.⁶⁰ Belknap, who admired Dahlgren for his physical bravery and scientific accomplishments, wrote that this failure "seemed to paralyze the Admiral" and prevented further offensive action.⁶¹

During the "siege of Charleston," New Ironsides suffered many minor injuries, but her solid armor proved its worth as she had no serious damage or battle casualties. One novel feature of her design showed its value when a shot from Moultrie passed through the foundation of the smoke-stack. The grating that protected the boiler uptakes was

⁵⁹Confederate accounts are in ORN 14: 636-40; OR ser. 1, 28, part 1: 125-26, 403, 724-28.

⁶⁰Stevens to Welles, September 28, 1865, ORN 14: 633.

⁶¹Belknap, "Siege of Charleston," 190.

bent, but it kept the shot from injuring the machinery.

Despite being punished by over 150 heavy projectiles, her fighting efficiency was never impaired. This was in contrast to the monitors, which frequently suffered jammed turrets from Confederate shot.⁶²

When Fort Wagner was abandoned by the Confederates on September 7, 1863, with it fell Battery Gregg.⁶³ After the fall of Wagner and the boat assault on Sumter, New Ironsides returned to her blockade routine. She remained at anchor off Charleston with fires banked and steam up in all boilers. The crew stood alternating watches during the night, with half awake at their stations and half sleeping near their guns. Sentinels and lookouts were posted around the ship and, after evening quarters, the officers would gather informally on deck aft for amusement. Alarms during the night were frequent, as ships tried to run the blockade and blockaders saw nonexistent torpedo boats.⁶⁴

⁶²Dahlgren to Welles, September 8, 1863, Letterbook July-August 1863, 182.

⁶³Quincy A. Gillmore, "The Army Before Charleston in 1863," in The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, Robert Underwood Johnson and Clarence C. Buel, eds. (New York: Castle Books, 1956; reprint), 64.

⁶⁴Belknap, "Reminiscent of the 'New Ironsides'," 70, 80. One officer wrote that before the October attack, "I do not recall having heard there was such a thing as a torpedo boat and the attack upon us was a complete surprise." William S. Wells to James H. Tomb, January 19, 1915, from the Tomb Papers #723, Southern Historical Collection, University of North Carolina, Chapel Hill, North Carolina. Wells must have confused this with the earlier incident, since he himself was the engineer on watch during the August attack.

The Confederates had not given up the idea of sinking New Ironsides with a torpedo, and their second try nearly succeeded. Unlike Carlin's converted boat, the Confederates built the "torpedo steamer" David expressly for torpedo attack (Figure 18). Low in the water, she presented a small target. Her steam engine drove her at six knots and she was armed with a single spar torpedo mounted on the bow. This torpedo, attached to a fourteen foot tube of iron, contained

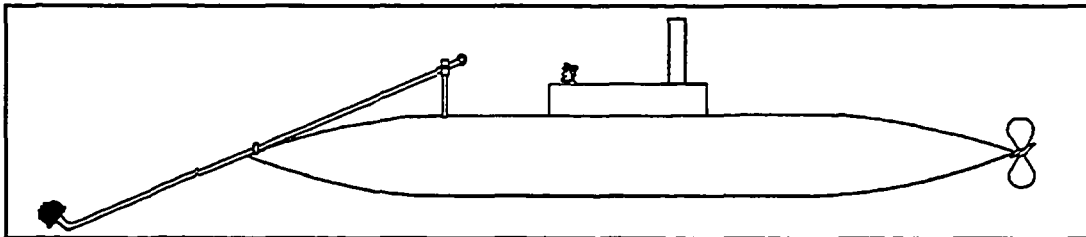


Figure 18. Confederate spar torpedo boat C.S.S. David. (Official Records . . . Navies 15: 15)

about 100 pounds of gunpowder with four percussion detonators. Her Commanding Officer, Lieutenant William T. Glassel, C.S.N., had been Executive Officer of the C.S.S. North Carolina and had already made one unsuccessful attempt at torpedo warfare in the waters around Charleston.⁶⁵

There was some debate among the Confederates on the propriety of attacking New Ironsides with a torpedo. One

⁶⁵William T. Glassel, "Reminiscences of Torpedo Service in Charleston Harbor by W. T. Glassell [sic], Commander Confederate States Navy," SHS Papers 4, no. 5 (November 1877): 227-30.

school feared that destroying the ship would work against the Confederacy by causing public revulsion at this method of warfare. Another held that the torpedo was "correct warfare," and the latter prevailed.⁶⁶

On the evening of October 5, 1863, New Ironsides lay at anchor off Morris Island. The Captain and Executive Officer had gone below shortly after 9:00 P.M. About 9:15 P.M., the Officer of the Deck, Acting Ensign Charles W. Howard, saw an object 300 yards away. He hailed it, received no answer, and hailed again. Again receiving no answer, he hailed a third time, saying, "Keep off or I will fire into you." The reply was a shotgun blast which wounded him mortally. A minute after the first hail, the torpedo exploded on the starboard side, under number six starboard gun and even with the after end of the engine room.⁶⁷

The shock was considerable. On board New Ironsides, General Quarters was sounded. The Marines and lookouts took the torpedo boat under small arms fire and two main battery rounds were fired, but as the David drifted away she vanished in the darkness and no hits were made. The engineers

⁶⁶Wells to Tomb, September 28, 1914, and December 18, 1914, Tomb Papers. Tomb told Wells years later that Glassel had "an excess of wine" at supper before the attack. Wells to Tomb, March 12, 1915, *ibid*.

⁶⁷Belknap, "Reminiscent of the 'New Ironsides'," 80-81; Glassel, "Torpedo Service," 231-32; Rowan to Dahlgren, October 6, 1863, ORN 15: 12-13; NARG 24, Log of New Ironsides, October 5, 1863; Confederate reports in OR ser. 1, 28, part 1: 731-35.

spread fires under the boilers and started the engine, and a boat was launched to pursue the David.⁶⁸ William S. Wells, then an Assistant Engineer aboard New Ironsides, was playing chess with another officer when the torpedo exploded. He remembered a "tremendous concussion," with water coming through the hatches and the smoke pipe. Some joints in the steam piping were dislocated, and, he wrote, "I can assure you that there was considerable excitement on board to ascertain whether the ship was sinking."⁶⁹

There was excitement aboard the David as well, and for the same reason. The plume of water raised by the explosion went down her stack and put out her fires, and the shock threw some of her iron ballast into the engine and jammed it. Glassel then ordered abandon ship. The crew went overboard, but the pilot, Walker Cannon, could not swim and held on to the boat. After drifting away from New Ironsides, Cannon got back aboard and rescued Acting First Assistant Engineer James H. Tomb. They rebuilt the boiler fires, restarted the engine and proceeded back to Charleston.

⁶⁸Belknap, "Reminiscent of the 'New Ironsides'," 80; NARG 19, Entry 1072, Steam Log of New Ironsides, October 5, 1863. Fires were banked, showing the alarm was over, at 9:30 P.M.

⁶⁹Wells to Tomb, December 1, 1913, Tomb Papers. Wells, who joined the ship in December 1862, was the only officer who served in her throughout her fighting career, from 1863 to 1865. He struck up a correspondence with Tomb long after the War and the two became friends. By 1913 they were the only surviving officers of their ships.

Glassel and Fireman James Sullivan were captured.⁷⁰

The New Ironsides was inspected the next day, both by her crew and by Dahlgren, but little damage was found. The engineers suffered broken floor plates and displaced bulkheads in the engine room and "store rooms and stores thrown into confusion." Divers inspected the hull and told Dahlgren, "no impression of any consequence is to be seen, except, perhaps, the removal of some copper. . . ."⁷¹ Ensign Howard, who was meritoriously promoted to Acting Master before he died October 10, was the only serious casualty New Ironsides sustained in the action.⁷²

In recounting the action, Beauregard stated that New Ironsides "never fired another shot after this attack," and remained off Morris Island "undergoing repairs" until she was "towed" to Port Royal.⁷³ He was totally incorrect.

⁷⁰Glassel, "Torpedo Service," 232-33; Tomb to Flag Officer J. R. Tucker, October 6, 1863, ORN 15: 20-21. A report said, "[Glassel and Sullivan] state that the people of Charleston have very little faith in the capacity of [monitors] to reduce the fortifications leading to the harbor, but hold in great fear the terrible batteries of the New Ironsides." "Yankee History of the Attempt to Blow up the Ironsides." Charleston Daily Courier, October 13, 1863, 2.

⁷¹NARG 19, Entry 1072, Steam Log of New Ironsides, October 5, 1863; Dahlgren to Welles, October 7, 1863, ORN 15: 11; NARG 24, Log of New Ironsides, October 6, 1863.

⁷²Ordinary Seaman W. L. Knox had his left leg broken and Master at Arms Thomas Little was bruised all over. Howard died of the shotgun wound to his abdomen. NARG 52, Entry 22, Medical Journal of New Ironsides, October 5, 1863.

⁷³Beauregard, "Water Defences," 152. Beauregard also said the ship then went to Philadelphia, "where she remained until destroyed by fire after the war." Roman repeats

The damage was not significant, and on November 16, 1863, the ship got underway to aid the U.S.S. Lehigh. Although the grounded monitor floated free before New Ironsides could assist, it is clear that the Federals did not consider New Ironsides to be out of action. The fact that she remained on station instead of retiring to Port Royal for repairs should have told Beauregard she was not badly damaged.⁷⁴

Assistant Engineer Wells wrote after the War,

Our ship was not hurt very much, for fortunately the torpedo struck on the starboard side amidships, and just where we had a coal bunker, and the ship did not make any water; and after the coal was taken out, (which was not until the following March) we found she was crushed in a little, but nothing very serious.⁷⁵

He opined, however,

If the torpedo had struck the ship on the port side we would certainly have gone down, for the outboard delivery [the sea water discharge pipe from the main condenser] was just on a line with the point where the torpedo struck on the starboard side.⁷⁶

More damage was discovered when the coal bunkers near the explosion were emptied. As Dahlgren told Welles, "upon

Beauregard's error. Roman, Beauregard, 2: 181-82.

⁷⁴The non-nautical Beauregard also believed New Ironsides' hull was five feet thick and did not correct Lee's estimate that it was twenty feet thick. F. D. Lee to Beauregard, October 7, 1863, OR ser. 1, 28, part 1: 733. Perry's partisan account credits New Ironsides with an iron hull and also magnifies the damage. Perry, Infernal Machines, 82-85.

⁷⁵Wells to Tomb, December 1, 1913, Tomb Papers. Writing fifty years after the incident, Wells overlooked an inspection made in November 1863 (see below).

⁷⁶Ibid.

removing coal in the bunkers of the Ironsides, it is discovered that the damage done by the torpedo was much more serious than first appeared."⁷⁷ Even so, the damage was minor: some of the beams and knees of the framing were broken, the wooden side of the ship was sprung in, some copper was missing and the planking abreast the engine room was "shattered" 1½ inches deep over an area six feet high and ten to twelve feet long.⁷⁸ Despite the damage, the ship could still steam and fight without impairment.

Although damaged, since New Ironsides did not leak "excessively" there was no compelling reason to send her North for repairs. Welles offered to send her to Philadelphia for repairs and for installation of a new pilot house and steam steering gear, but Dahlgren, rightly distrusting the Secretary's estimate of twenty days absence from station to perform the repairs, preferred to keep her: "After the work has been accomplished, which will not be long after the new monitors arrive, the Ironsides can probably be spared

⁷⁷Dahlgren to Welles, November 19, 1863, ORN 15: 16-17.

⁷⁸Carpenter T. H. Bishop to Rowan, November 24, 1863, ibid., 15: 17-18. Underwater damage depends in part on brisance, the ability to shatter hard structures. The torpedo contained black powder, a low explosive with brisance only 1.5 percent of that of TNT. Melvin A. Cook, The Science of High Explosives (New York: Reinhold Publishing, 1958), 8, 17, 308; Arthur Marshall, A Short Account of Explosives (Philadelphia: P. Blakiston's Son, 1917), 69, 71. With the warhead so close to the surface, much of its energy was vented to atmosphere instead of transferred to the target.

without disadvantage."⁷⁹ Since the ship could not be sent back to Philadelphia, plates made for the new pilot house were sent to the ship to improve the protection (but unfortunately not the size or location) of the old one.⁸⁰

After the attack, Dahlgren directed additional protective measures, active and passive, for the entire squadron. Among the active measures were heavily-armed ships' boats and tugboats patrolling the anchorage, extra guards and loaded boat howitzers topside, and, on New Ironsides' pilot house, a "calcium light" to illuminate the water around the ship.⁸¹ The primary passive measures were barriers of logs or rope netting placed around the ships to impede the approach of torpedo boats.⁸²

New Ironsides settled again into a blockade routine,

⁷⁹For leakage, Dahlgren to Welles, November 30, 1863, ORN 15: 17. For repairs, Welles to Dahlgren, November 24, 1863, *ibid.*, 15: 135. Dahlgren remarked that the ship would probably consume ten days each way to and from Philadelphia. Dahlgren to Welles, December 6, 1863, *ibid.*, 15: 170-71.

⁸⁰Merrick & Sons built a new pilot house, to be installed forward of the stack. It was five feet inside diameter and eight inches thick. Merrick & Sons to Lenthall, April 17, 1863, NARG 19, Entry 71, Vol 4: 198; Merrick & Sons to Lenthall, *ibid.*, 4: 203. Dahlgren to Welles, December 6, 1863, notes receipt of plates. ORN 15: 135, 170-71.

⁸¹For Dahlgren's measures, *ibid.*, 15: 148, 15: 226. The "calcium light," probably an acetylene lamp fueled by calcium carbide, was provided by the Army. Gillmore to Dahlgren, October 17, 1863, *ibid.*, 15: 50.

⁸²The barriers also impeded the protected ships; New Ironsides once took five hours to remove the netting and get underway. NARG 24, Log of New Ironsides, November 16, 1863. See also Belknap, "Siege of Charleston," 194; NARG 52, Entry 22, Medical Journal of New Ironsides, November 16, 1863.

but Rowan's unease was evident. He wrote, "Since the night we were struck by the torpedo, we have found it necessary, for the safety of the ship, to go to general quarters at 8 o'clock at night and permit the men to sleep on the deck at their guns." The gun deck was too low and too cluttered by the gun slides to permit the ship to be ready for action quickly if the hammocks were slung.⁸³

New Ironsides saw no further combat at Charleston. To Dahlgren, as to DuPont, the consequences of failure loomed larger than the rewards of success. It did not help that the Confederates had ceaselessly improved their defenses. In a letter to Welles on October 18, 1863, Dahlgren stated that his preference was to "enter the harbor with adequate force [emphasis added] and make my way to Charleston." Yet a defeat might involve "our forces on the islands, the blockade, and other material advantages," he wrote, and "I confess I am not prepared to risk these unless relieved of the responsibility of such a result. . . ."⁸⁴

On October 22, 1863, Dahlgren held a council of war to discuss the options available. The assembled captains agreed there would be "extreme risk incurred without adequate results" by entering the harbor. It would be unjustified to enter the harbor with the force they had, so the preferable course of action was cooperation with the Army to

⁸³Rowan to Dahlgren, November 22, 1863, ORN 15: 134.

⁸⁴Dahlgren to Welles, October 18, 1863, ibid., 15: 53.

reduce Sullivan's Island and Fort Moultrie.⁸⁵

Another conference, with similar results, was convened on May 10 and 12, 1864. Rowan's caution showed again when he at first endorsed an attack on Sumter "with much qualification." When the question was discussed the next day, however, he was strongly against an attack.⁸⁶ Dahlgren, ever sensitive about his reputation, later came to believe that Rowan was part of "that 'Ironsides' and Gillmore coalition . . . Gillmore, undermining [me] in the papers, and then preparing his book; while Rowan was ready to take the vacancy!"⁸⁷ In the event, the Army could not spare the men to continue joint operations. No further offensive moves were made at Charleston until the end of the War.

Thus the blockade routine continued uninterrupted for New Ironsides. There were few things to occupy the crew's attention, but a favorite was smuggling liquor aboard. On one occasion, a batch of hams, "neatly covered with cotton

⁸⁵Ibid., 15: 67-68. Dahlgren's need to diffuse responsibility reflects Welles' opinion: "As a bureau officer he is capable and intelligent, but he shuns and evades responsibility. This may be his infirmity in his new position." Welles, Diary, entry for May 27, 1863, 1: 341.

⁸⁶Dahlgren, Memoir, 453-4; ORN, 15: 430-33.

⁸⁷Recorded as March 31, 1865, in conversation with Fox. Dahlgren, Memoir, 507. There is no sign of intrigue, but the "general sentiment" in the squadron was that if Dahlgren left, Rowan should succeed him. J. A. DeCamp, commanding U.S.S. Wabash, to Admiral David D. Porter, January 1, 1864, National Archives, Record Group 45, Microfilm Entry M625, Squadron Letters: South Atlantic Blockading Squadron, Roll 208: 74.

cloth, painted yellow and branded true grocer fashion," came aboard from the supply steamer that regularly visited the ship. Upon noticing liquid oozing from one of the "hams," the Executive Officer had the Master-at-Arms attack it with a battle axe, whereupon a spurt of liquid "showed that the tinsmith and the rumseller had put their heads together." On another occasion, when half of the crew became more or less drunk, a search turned up a five gallon keg of whiskey packed in a barrel of potatoes. Fishing over the side was popular as well, and once provided a sea turtle which furnished sixteen gallons of soup for the crew.⁸⁸

Dahlgren's increasingly obvious anxiety about torpedo boats enlivened the blockade. The information he received from deserters and prisoners certainly showed a growing threat. By January 1864, the Federals had accurate information about the existence and unsuccessful trials of the "American Diver" (the submersible torpedo boat Hunley), and an informant had seen eight more torpedo boats like the David under construction.⁸⁹

⁸⁸For liquor, George E. Belknap, "The Old Navy, Historical and Reminiscent, With Side Glances at the British Navy," typescript annotated in pencil, "Read January 5th, 1897." George E. Belknap papers, Box 2. The surgeon provided whiskey to flavor the soup. NARG 52, Entry 22, Medical Journal of New Ironsides, April 17 and June 16, 1863.

⁸⁹"Information obtained from the examination of deserters from the enemy," January 7, 1864, ORN 15: 227-31; also Dahlgren to Welles, January 13, 1864, Dahlgren Papers, Letterbook January-February 1864, 166. It is corroborated in Beauregard, "Water Defences," 152-54, although in March 1864, Beauregard wrote that there were but three torpedo

Commenting on the precautions he had earlier directed, Dahlgren required that ships be anchored out of each other's lines of fire and not in the deepest part of the channel, since with minimum clearance between the ship and the bottom, the "diving torpedo" (Hunley) could not operate effectively.⁹⁰ He emphasized, "The blockade is important, but the safety of the ironclads much more so."⁹¹

The next successful torpedo attack was made not by a David but by the Hunley. On February 17, 1864, Hunley passed the ironclads inside the bar, apparently deterred from attacking them by their vigilance, to reach the wooden steam sloop U.S.S. Housatonic. At about 8:45 P.M. Housatonic saw the submersible at a range of 100 yards. She slipped her anchor chain and backed engines to get clear, but three minutes later a torpedo exploded on her starboard side. She sank immediately, though her rigging remained above water and all but five of her crew were saved. Hunley also sank, but Dahlgren could not know of this lessening of the threat; his concern was again increased.

In a letter to Welles, Dahlgren noted, "the whole line of blockade will be infested with these cheap, convenient,

boats ready. Beauregard to Major General W. H. C. Whiting, March 31, 1864, OR ser. 1, 35, part 2: 396.

⁹⁰Also, he noted, raising a sunken ship would be easier in shallow water. Dahlgren to the South Atlantic Blockading Squadron, January 7, 1864, ORN 15: 226-27.

⁹¹Dahlgren to Rowan, February 5, 1864, ibid., 15: 273.

and formidable devices, and we must guard every point."⁹² Torpedo warfare was certainly in his mind when in May 1864 he wrote Welles that, with the forces at his disposal, "there will be no opportunity for active operations against the enemy at this place for some time." New Ironsides would probably have to be withdrawn for repairs, no more monitors were coming to him, and most of the Army troops had departed. He asked to be relieved, "having effected all that I believed to be in my power to punish the atrocious rebels who harbor here. . . ."⁹³ Welles did not agree to the relief, and Dahlgren remained in command of the South Atlantic Blockading Squadron until June 1865.⁹⁴

The damage from the October 1863 David torpedo attack eventually caused New Ironsides to go North for repairs, though she did not travel under tow as Beauregard asserted. Dahlgren would not send the ship back to Philadelphia in 1863, but by the spring of 1864 she clearly needed a refit. On May 5 and 6, 1864, divers again examined New Ironsides' hull. Their report to Rowan stated,

In our opinion from the appearance of the ships bottom, so much copper being off and loose, we consider

⁹²F. J. Higginson, Executive Officer of U.S.S. Housatonic, to Dahlgren, February 18, 1864; Dahlgren to Welles, February 19, 1864; *ibid.*, 15: 329.

⁹³Dahlgren to Welles, May 14, 1864, ORN 15: 430-33, including the report of the council of war mentioned above.

⁹⁴Dahlgren, Memoir, 612. Dahlgren, unrelieved, did go North in the spring of 1864 and Rowan was "Commanding S.A.B. Squadron Pro Tem" from March through May of that year.

it an imperative necessity that the ship be sent North and docked at once, for in the next two months the worms will pierce in so many places as to seriously injure the planking and keels.⁹⁵

By that spring of 1864, New Ironsides had been on her blockade station for fifteen straight months and the strain was beginning to tell on the crew as well as the ship. Upon Dahlgren's return to Charleston in May, he received a letter from Marius DuVall, surgeon of the New Ironsides, who alleged that Rowan, Belknap, and other officers had made disparaging remarks about Dahlgren which had demoralized the entire fleet. Rowan endorsed that the allegations concerning him were false and pressed charges against DuVall.

Since Rowan neglected to mention the other officers in his endorsement, on May 9 Dahlgren "decided to begin with [Belknap] as the senior officer."⁹⁶ A Court of Inquiry cleared Belknap; DuVall was found guilty by a General Court Martial but was saved from dismissal "by the extreme favor of Secretary Welles and Assistant Secretary Fox."⁹⁷

⁹⁵Messrs Smith and Phelps to Rowan, May 6, 1864, Rowan Letter Book, 193. NARG 24, Log of New Ironsides, May 5-6, 1864. The shipworm or teredo, an elongated clam, feeds on wood particles.

⁹⁶Dahlgren expressed astonishment to Rowan at this alleged state of things. "He said he was astonished too, and that Belknap was as clear of it as he was. . . ." Dahlgren, Memoir, 453.

⁹⁷Belknap, "Siege of Charleston," 196-97. For Belknap's Court of Inquiry, NARG 125, Entry M273, Courts-Martial, Roll 167, Case 4305. For DuVall's preliminary Court of Inquiry, *ibid.*, Roll 167, Case 4306; for his General Court-Martial, *ibid.*, Roll 128, Case 3606. Dahlgren wrote, "It seems that nobody ever spoke disrespectfully of me in

On May 3, 1864, Rowan wrote to Dahlgren asking to be relieved, stating that his health was "breaking down from a long confinement of ten months to this ship."⁹⁸ Many of his crew had been confined much longer. Because of her superior seakeeping and coppered bottom, New Ironsides stayed at Charleston while the monitors were rotated to Port Royal for repairs and cleaning. Belknap wrote that New Ironsides "was the only vessel never permitted the recreation and refreshment of leaving behind for a few days the wearing and unceasing strain of the blockade."⁹⁹

The divers' report and the growing backlog of repairs finally impelled the ship's return North in June 1864. On June 6, New Ironsides left Charleston for Port Royal. On June 7, Rowan wrote to Dahlgren, protesting an order to transfer all of New Ironsides' crew with over six months of service remaining to the receiving ship U.S.S. Vermont. This would take over forty petty officers and disorganize the ship, Rowan said. Also, his men had been twenty-three months onboard ship without liberty.¹⁰⁰

Dahlgren's answer showed the Union manpower shortage: the squadron was 1300 men short, the shortage was getting

the 'Ironsides.' Fortunate man!" Dahlgren, Memoir, 454.

⁹⁸Rowan to Dahlgren, May 3, 1864, ORN 15: 418.

⁹⁹Belknap, "Reminiscent of the 'New Ironsides'," 70.

¹⁰⁰Rowan to Dahlgren, June 7, 1864, Rowan Letter Book, 216.

worse and he was already keeping every man the allowed thirty days over the term of his enlistment. It would be unfair, he wrote, to send back men who had months left to serve. "Would not this disorganize the whole squadron instead of one ship. . . .?"¹⁰¹ Despite two more protests from Rowan, on June 12 and 14 New Ironsides transferred 135 crewmen and 33 Marines to the Vermont. In return, she received 121 men for passage north.¹⁰²

On June 8, 1864, New Ironsides received her masts and full sail rigging. On June 16, 1864, she offloaded much of her ammunition and set off for Philadelphia. After discharging her remaining ammunition at Fort Mifflin, she arrived at the Philadelphia Navy Yard on June 24, where she was decommissioned on June 30, 1864.¹⁰³

New Ironsides made two vital contributions to Federal efforts in the South Atlantic Squadron area. First, her ability to keep the sea saved the blockade of Charleston during the early months of 1863. No low-freeboard monitor

¹⁰¹Dahlgren to Rowan, June 9, 1864, Rowan Letter Book, 229-31 and Dahlgren Papers, Letterbook May-June 1864, 435. On February 15, Dahlgren had offered a month's furlough to any man who would reenlist for one year. ORN 15: 324.

¹⁰²NARG 24, Log of New Ironsides, June 12-15, 1864. Dahlgren to Rowan, June 10, 1864, Dahlgren Papers, Letterbook May-June 1864, 474, restated Dahlgren's position and assured Rowan that the Petty Officers who left New Ironsides would not be disgraced because of their transfer.

¹⁰³NARG 24, Log of New Ironsides, June 30, 1864. Belknap noted that after nearly 18 months without seeing any, "there were more pretty girls in Philadelphia than any other city could boast of." Belknap, "Siege of Charleston," 199.

could have remained on station in all weathers as she did; had it not been for New Ironsides, the Confederates could have repeated their ironclad raid on the blockaders. Second, without her great offensive capability the Navy's part in the "Siege of Charleston" would have been minimal. The monitors could not have supported the Army as New Ironsides did. While their slow firing helped eventually to batter down Fort Sumter's walls (without, however, driving the Confederates from the fort), they could not provide the volume of fire needed to silence defending artillery, drive troops into their bombproofs or disrupt earthworks.

CHAPTER EIGHT

FINAL CAMPAIGNS: FORT FISHER AND JAMES RIVER

Only sketchy information is available about New Ironsides' refit at the Philadelphia Navy Yard. Much of the work was undoubtedly the result of the ship's strenuous extended operations. Drydocking would have been required, and the work must have included hull and machinery repairs as well as recoppering.¹ Some work involved alterations based on experience; for example, a second auxiliary pump was installed, relieving the ship's engineers of the anxiety of depending so heavily on only one. Although both the steam steering gear and the new pilot house were ready, neither was installed, probably due to time constraints.² Some of

¹Several letters from Lenthall to Stribling are germane, including one of August 3, 1864 (NARG 19, Entry 54, 2: 280) which directs a survey of the "metal sheathing on the bottom of the 'New Ironsides'" and one of August 11 which directs "no delay" in repairing it (ibid., 2: 281).

²For pump, NARG 19, Entry 1072, Steam Log of New Ironsides, September 2, 1864. For pilot house and steering gear completion, Merrick & Sons to Lenthall, October 3, 1863, NARG 19, Entry 71, 5: 184; for installation, Lenthall to Stribling, September 7, 1864, and Lenthall to Isaac B. Hull, April 21, 1865, NARG 19, Entry 54. In April 1865 both were still on hand; Merrick & Sons wanted either to install them or be paid for them. Merrick & Sons to Lenthall, National Archives, Record Group 19, Entry 70, Letters Received from Contractors, 1: 107.

the work was apparently done by Merrick & Sons; in June the Bureau of Steam Engineering disapproved Merrick & Sons' proposal to remove the forced draft blowers.³

Upon completion of her refit, New Ironsides was recommissioned at 6:00 P.M. on August 22, 1864, under the command of Commodore William Radford. Radford, born in Fincastle, Virginia, on September 9, 1809, had joined the Navy in 1825. His career included extensive West Coast operations during the Mexican War. He was introduced to ironclad warfare in Hampton Roads: his first Civil War service was as Commanding Officer of the frigate U.S.S. Cumberland, although he was absent on court-martial duty when his ship was sunk by the Virginia. Between 1862 and 1864 he served as Executive Officer of the New York Navy Yard.⁴

After her re-commissioning, New Ironsides remained at the Navy Yard until August 29. She then moved out to anchor off Fort Mifflin, where she loaded powder and shell. The straining urgency which marked her previous departure from Philadelphia was missing. During the next month the ship remained at Fort Mifflin while her crew exercised at General

³Isherwood stressed that no means of increasing New Ironsides' speed should be omitted. Isherwood to Merrick & Sons, June 25, 1864, National Archives, Record Group 19, Entry 968, Letters Sent to Contractors, 413.

⁴After promotion to Rear Admiral in 1866, Radford commanded the European Squadron from 1869 to 1870, when he retired. He died January 8, 1890. DAB, s.v. "Radford, William;" Appleton's Cyclopaedia, s.v. "Radford, William;" NARG 24, Records of Officers.

Quarters and gunnery and sail drills.

Most of the men were kept aboard, although officers had shore leave and some men went ashore on liberty. As at Charleston, the men did their best to sneak alcohol on board.⁵ Visits from dignitaries and petty infractions of the ship's regulations broke the monotony.⁶ There were more serious incidents, too. Marine private Terrence Devlin died of illness on September 14; seaman Hugh Looney drowned on October 2 when he tried to desert and swim ashore.⁷

On October 6, 1864, New Ironsides stood down river to join the North Atlantic Blockading Squadron at Fortress Monroe, Virginia, where she arrived October 8. Target practice was held October 10, "to get the men accustomed to the smell of powder and working in the smoke."⁸ On October 12, the ship moored at the Norfolk Navy Yard, where her rigging and upper masts were removed.⁹ After coaling and taking in

⁵James Rowbottom, a second class fireman, was confined for "endeavouring to smuggle liquor." NARG 24, Log of New Ironsides, September 26, 1864.

⁶Commodore John L. Worden of Monitor fame visited the ship (ibid., September 15, 1864) and Edward Bennett received five hours extra watch for "committing a nuisance" out a gun port (ibid., September 20, 1864).

⁷Ibid., September 14 and October 2, 1864.

⁸Surgeon Edward Shippen to "My dear Wife" Kate, October 10, 1864. Edward Shippen Collection, Historical Society of Pennsylvania, Philadelphia, Pennsylvania.

⁹The original intent was to replace her masts with signalling masts, as had been done at Port Royal, but during the job she was ordered to keep the lower masts. NARG 24, Log of New Ironsides, October 12 and 13, 1864.

shell, men went ashore to fill sandbags to protect the deck. New Ironsides moved back across Hampton Roads to Fortress Monroe on October 19, 1864.¹⁰

New Ironsides spent the next seven weeks near Fortress Monroe. It must have been evident something big was in the wind. The crew conducted gunnery exercises and sent men ashore to exercise as landing parties. Boat drills were frequent.¹¹ Rear Admiral David D. Porter visited the ship on November 25, and on December 1 the crew practiced shifting steering from the open spar deck wheel to the fighting wheel, "to see that everything was in order." On December 6, 1864, three of the ship's boats were painted black, indicating the possibility of night action.¹²

The objective was officially secret. Although Porter wrote, "We don't often surprise the rebels; there are too many leaky people who participate in our secret movements," there was only one remaining Confederate objective important enough to merit a full-scale joint expedition.¹³ It was Fort Fisher, which guarded the mouth of the Cape Fear River

¹⁰Ibid., October 14-19, 1864.

¹¹For example, armed boat drills are logged on October 21, 22, 26, 31, November 2 and 8. Ibid., dates indicated.

¹²Ibid., November 25-December 8, 1864.

¹³Porter to Welles, January 11, 1865, ORN 11: 228. Major General William H. C. Whiting, Commander of the Third Military District, Department of North Carolina, referred to "my spy from Norfolk." Whiting to Major General J. F. Gilmer, December 23, 1864, OR ser. 1, 42, part 3: 1297.

and the city of Wilmington, North Carolina (Figure 19).

By the autumn of 1864, the Confederacy was visibly failing, but Wilmington was its busiest remaining seaport. Most of the blockade-runners came to Wilmington, and most of the imports which kept the Confederate Army in the field moved through there. Closing the port had been a Federal objective since 1862, when Rear Admiral Lee proposed a joint expedition to capture it, but troops could not then be spared.¹⁴ In late 1864, Secretary Welles argued that the loss of Wilmington would be a serious blow to the Confederate Army's supplies, and this argument persuaded General Ulysses S. Grant to provide the needed troops.¹⁵

General Robert E. Lee apparently agreed with Welles. He wrote to Colonel William Lamb, commander of Fort Fisher, that Fort Fisher must be held or he could not subsist his army.¹⁶ Lamb used his two years tenure as commander to make Fort Fisher as secure as possible.

¹⁴Anderson, By Sea and By River, 277.

¹⁵Grant considered the port of "immense importance" to the Confederacy. Ulysses S. Grant, Personal Memoirs of U.S. Grant (New York: Charles L. Webster & Co., 1885), 2: 385. Welles wrote, "I have been urging a conjoint attack on Wilmington for months." Welles, Diary, entry for August 30, 1864, 2: 127.

¹⁶William Lamb, "The Defense of Fort Fisher," in The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel (New York: Castle Books, 1956; reprint), 642. For a book-length treatment of the Fort Fisher campaign, Rod Gragg, Confederate Goliath: The Battle of Fort Fisher (New York: HarperCollins, 1991).

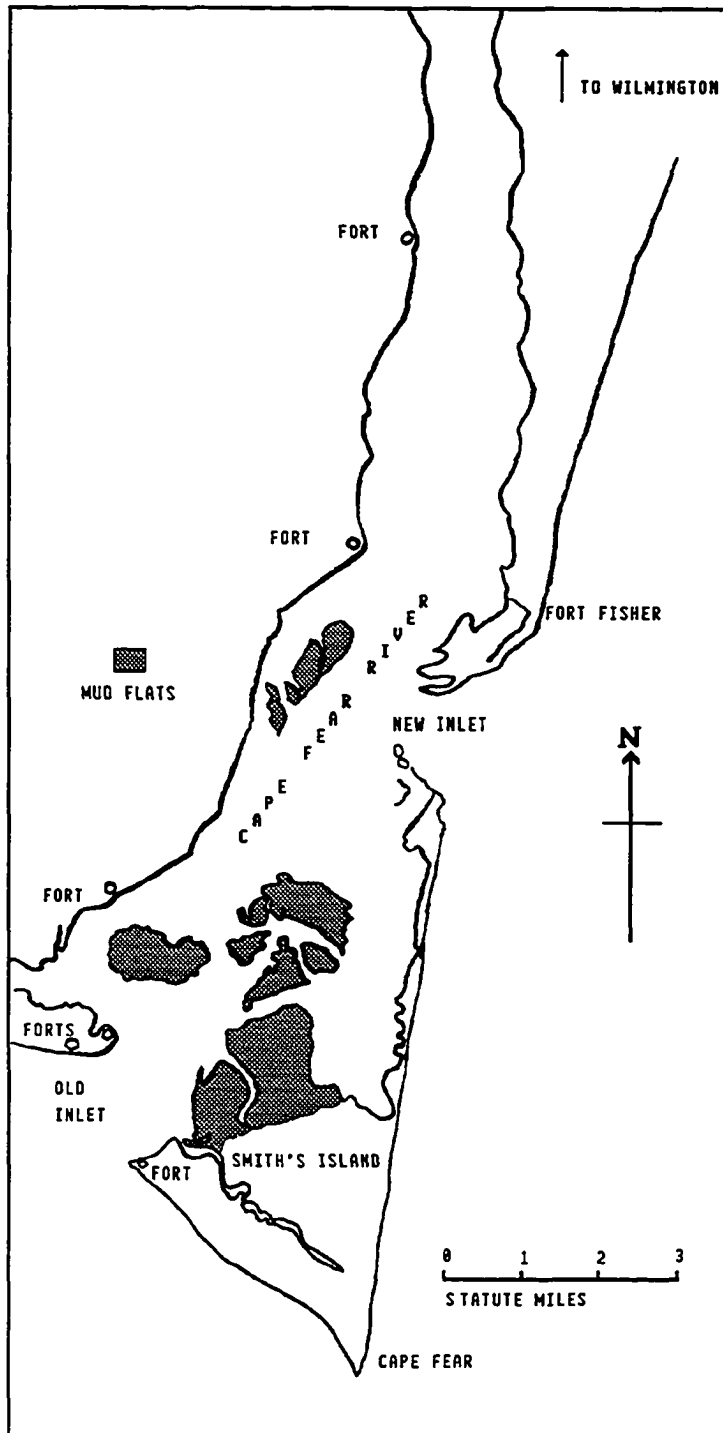


Figure 19. Fort Fisher and vicinity. (From An Atlas to Accompany the Official Records of the Union and Confederate Armies 1861-1865; Plate 132 Section 1.)

There were two entrances to the Cape Fear River. Old Inlet was just west of Cape Fear itself, between Smith's Island and the mainland. It was only some six miles south and west of New Inlet, but because deep draft vessels had to skirt Frying Pan Shoals, which extended east from Cape Fear, they faced a voyage of thirty or forty miles between the two entrances. Fort Fisher occupied the tip of the peninsula which formed the eastern bank of the Cape Fear River and the northern side of New Inlet.

Fisher was an earthwork, its "sea face" stretching three quarters of a mile from the semi-detached Mound Battery in the south to the northeast bastion, whence the works turned west (the "land face") to cross the spit. Battery Buchanan, a detached battery, covered the fort's rear and the Cape Fear River, and other detached batteries and torpedoes protected the landward side.¹⁷

The Fort Fisher expedition was subject to many delays, among them those caused by lack of coordination between the Army and the Navy. Porter commanded the warships, and Grant chose Major General Godfrey Weitzel to command the Army troops. Fort Fisher, however, lay within the military department commanded by Major General Benjamin F. Butler, who

¹⁷Lamb, "Defense of Fort Fisher," 642-43; Gragg, Confederate Goliath, 20. In December 1864, the fort mounted twenty-four guns on the sea face and twenty on the land face. Ibid., 19.

insisted upon taking charge of the expedition himself.¹⁸

Butler conceived the idea that the fort could be demolished by exploding a ship filled with powder near it, and preparing this ship further delayed the expedition. Butler's force, with its transports and supply ships, was finally ready to sail on December 9 but storms delayed it until December 14.¹⁹ Meanwhile, the Navy portion of the expedition rendezvoused off Beaufort, North Carolina.

New Ironsides left Hampton Roads on December 13, 1864, and anchored off Beaufort December 15.²⁰ The fleet left Beaufort on December 18, arriving at their rendezvous (twenty miles off New Inlet) on December 20. Meanwhile, Butler's troops were again delayed, this time by running out of food, water and coal. After weathering a gale which began December 20, the fleet awaited the transports.²¹ Not until December 24 did the entire expedition join off New Inlet.

By this time, the defending Confederates were

¹⁸Anderson, By Sea and By River, 278; Grant, Personal Memoirs, 2: 388-90; Thomas O. Selfridge, "The Navy at Fort Fisher," in The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel (New York: Castle Books, 1956; reprint), 655.

¹⁹Shippen, "Fort Fisher," 13; Grant, Personal Memoirs, 388-90. Shippen, writing after a lapse of years, is sometimes careless of chronological detail.

²⁰NARG 24, Log of New Ironsides, December 13-17, 1864.

²¹Grant, Personal Memoirs, 2: 390-91; NARG 24, Log of New Ironsides, 19-23 December, 1864; Porter to Welles, December 26, 1864, ORN 11: 254-55; NARG 24, Log of New Ironsides, December 21, 1864.

thoroughly alarmed. Reinforcements were sent, though they were few because there were few to send.²² Federal volunteers exploded the powder boat on the night of December 23, 1864, with no effect on Fort Fisher whatsoever, and on December 24 the fleet commenced its bombardment.²³ The fleet carried 293 guns of IX-inch or larger caliber and included five ironclads: four monitors and New Ironsides.²⁴

Porter planned for New Ironsides to lead the ironclads to a position 1,500 yards from Fort Fisher, about 500 yards from the beach, where she would anchor and "open fire without delay." The larger wooden ships would then anchor forward of the ironclads about 2,000 yards from the fort, with a third line of wooden ships still farther out (Figure 20).²⁵ The fleet stood in toward Fort Fisher at daylight on December 24. New Ironsides set General Quarters at 9:06 A.M., and at 11:30 A.M. Porter signalled to engage.

New Ironsides headed inshore and anchored some 2,000 yards from the fort at 12:53 P.M. A ranging shot burst

²²Report of Major General Whiting, December 30, 1864, OR ser. 1, 42, part 1: 994, 996.

²³Selfridge, "Navy at Fort Fisher," 657; Grant, Personal Memoirs, 392-93; Anderson, By Sea and By River, 279-80; Porter to Welles, December 26, 1864, ORN 11: 254-60. The Wilmington (NC) Daily Journal reported that the explosion, which "shook the houses," was the Federals blowing up a ship which had run aground and could not get off. "Blowed Up." Wilmington Daily Journal, December 24, 1864, 2.

²⁴Selfridge, "Navy at Fort Fisher," 662. A list of participating ships is in Porter's report, ORN 11: 254.

²⁵General Order No. 70, *ibid.*, 11: 245-47.

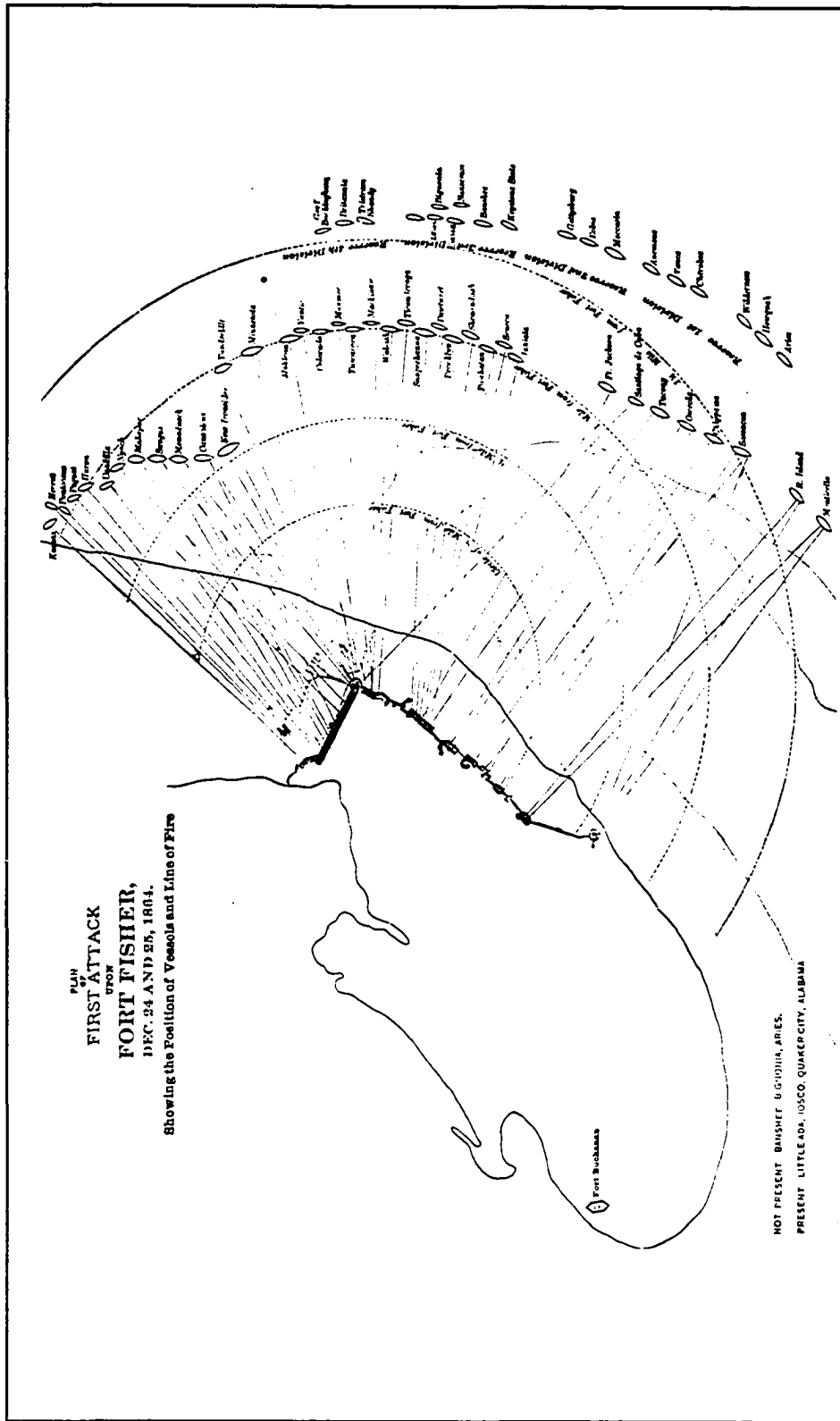


Figure 20. Plan of first attack on Fort Fisher. (Official Records . . . Navies 11:245.)

short, so at 1:10 the ship steamed closer. A range between 1,500 and 2,000 yards was better and she immediately commenced firing.²⁶ Porter complimented New Ironsides for taking position "in the most beautiful and seamanlike manner." The ship engaged the Confederate guns which fired on the fleet and they "were silenced almost as soon as the Ironsides opened her terrific battery."²⁷ New Ironsides fired 646 rounds with such enthusiasm that Porter signalled repeatedly for the ships to "fire more deliberately."²⁸ The fleet shelled the forts for five hours but could do no more since the transports had not arrived. A few arrived at sunset, too late to land troops that day.

On Christmas Day the rest of the transports arrived, and Porter sent twenty-six ships and gunboats to help land troops. For this unopposed amphibious assault the Navy provided about 100 small boats to add to the 20 the Army brought. At 9:30 A.M., New Ironsides again steamed in to bombard the fort. On this day Porter reported the ships fired slowly, "only sufficient to amuse the enemy while the

²⁶NARG 24, Log of New Ironsides, December 24, 1864.

²⁷Porter to Welles, December 26, 1864, ORN 11: 255. Lamb averred, "The guns of Fort Fisher were not silenced." Due to limited ammunition, he had given orders to fire each not more than once every thirty minutes. Selfridge, "Navy at Fort Fisher," 657; Lamb. "Defense of Fort Fisher," 647-48. See also reports of Colonel Lamb, December 24, 1864, OR ser. 1, 42, part 1: 1003; December 27, 1864, ibid., 1004.

²⁸NARG 24, Log of New Ironsides, December 24, 1864.

army landed," but New Ironsides still fired 416 rounds.²⁹ At sunset Porter directed her to remain in position during the night.

Meanwhile, Butler landed his men some four miles up the spit from Fort Fisher. After closing the fort, Butler decided it could not be taken.³⁰ He reembarked most of his troops and sailed for Hampton Roads. The remaining troops, some 700, were reembarked by the fleet on December 27 and the Navy returned to Beaufort.³¹ New Ironsides left for Beaufort on December 28, arriving on December 29.³²

During the bombardments, New Ironsides fired over a thousand heavy shell.³³ The Navy was optimistic about its effect; New Ironsides' Log records, "Judging from the many fires & explosions in the fort and the severe fire of the fleet, it was evident that the fort was greatly injured or damaged inside."³⁴ Despite the heavy expenditure of ordnance, however, little significant damage was done. The

²⁹Porter to Welles, December 26, 1864, ORN 11: 256-57; NARG 24, Log of New Ironsides, December 25, 1864.

³⁰Butler to Porter, December 25, 1864, ORN 11: 251.

³¹Selfridge, "Navy at Fort Fisher," 657; Grant, Personal Memoirs, 393-94; Anderson, By Sea and By River, 279-80; Porter to Welles, December 27, 1864, ORN 11: 261. Shippen's chronology is wrong. Shippen, "Fort Fisher," 16-17.

³²NARG 24, Log of New Ironsides, December 28-29, 1864.

³³Ibid., December 24, 1864; Radford to Porter, December 31, 1864, ORN 11: 275.

³⁴NARG 24, Log of New Ironsides, December 25, 1864.

defenders suffered only three men killed and sixty-one wounded.³⁵ Shells tore up the earthworks but did not penetrate any bomb-proofs or magazines, and only four guns were permanently disabled.³⁶ Confederate repairs began as soon as the fleet left, and by mid-January at least three replacement heavy guns had been mounted.³⁷

In return for her contribution, New Ironsides received no significant damage or casualties from the Confederate fire, although several shot cut up her topsides.³⁸ Part of her immunity must be laid to the inadequate Confederate ammunition supply, which caused the fort's commander to restrict his firing.³⁹ Although Confederate fire did some damage, most of the fleet's eighty-three casualties were caused by the bursting of 100-pounder Parrott guns.⁴⁰

³⁵Report of Surgeon Spyers Singleton, December 30, 1864, OR ser. 1, 42, part 1: 1008-1009.

³⁶Report of Colonel Lamb, December 27, 1864, *ibid.*, ser. 1, 42, part 1: 1004; Report of Captain John C. Little, December 30, 1864, *ibid.*, 1007-1008; Gragg, Confederate Goliath, 99.

³⁷Extract from the official diary of Colonel Lamb, ORN 11: 746-47.

³⁸Shippen, "Fort Fisher," 15; Radford to Porter, December 31, 1864, ORN 11: 275. Shippen said the dispensary was damaged, but that was in January 1865. NARG 24, Log of New Ironsides, December 24-26, 1864, and January 13, 1865.

³⁹Lamb, "Defense of Fort Fisher," 647-48. The fort fired only 1390 rounds from forty-four heavy guns during the December 24-25 bombardment. OR ser. 1, 42, part 1: 1007.

⁴⁰Porter to Welles, December 26, 1864, ORN 11: 256; Selfridge, "Navy at Fort Fisher," 662. An inquiry determined five guns burst and forty-five men were killed or

The enemy had not hurt New Ironsides, but nature dealt her a heavy blow. Her rudder, partially disabled December 30, received injuries on December 31 which put it completely out of commission. The outer rudder broke loose first and soon both outer and inner rudders were adrift. The rudder head was twisted off just above the blade. Although Radford rigged improvised steering gear consisting of a chain around the rudder, the ship's steering was impaired.⁴¹

Porter was irate at the failure to take Fort Fisher and Grant was distressed, not least because Butler had ignored Grant's explicit instructions not to relinquish a foothold if he obtained one.⁴² Grant informed Porter he would send the same troops back with a different leader and selected Major General Alfred H. Terry to command the Army portion of the expedition. The troops reembarked on January 6, 1865, and arrived off Beaufort on January 8.⁴³ Delayed

wounded. Resolution of the House of Representatives, January 5, 1865, with endorsements, *ibid.*, 11: 359-60.

⁴¹Radford to Welles, January 20, 1865, *ibid.*, 11: 616. New Ironsides participated in the second attack on Fort Fisher with temporary steering gear. Radford to Porter, January 7, 1865, *ibid.*, 11: 414. NARG 45, Entry 395, Sub-entry 87, Radford to Porter, December 30, 1864, and January 1 and 2, 1865; NARG 24, Log of New Ironsides, December 30-31, 1864.

⁴²Porter to Welles, December 27, 1864, ORN 11: 261-62.

⁴³Grant, Personal Memoirs, 2: 394-96. "Porter told Grant the fort could be had any time they sent a competent general to take it. The presidential election was over and the war was on the downhill slope, and it was suddenly realized that Butler no longer need be handled with tongs. So Grant relieved him. . . ." Bruce Catton, A Stillness at

again by a heavy gale, the fleet got underway from Beaufort on January 12 and the first landings at Fort Fisher took place January 13.⁴⁴ This time the Army had come to stay.

The Confederates saw the fleet's approach on January 12 and sent again for reinforcements.⁴⁵ Even with the 700 men who arrived on the 13th, Colonel Lamb had only 1,800 to defend Fort Fisher and its outlying works.⁴⁶ Porter's plan was similar to that used in December, but all the ships were closer to the fort, with the monitors engaging at a range of 1,200 yards (Figure 21).⁴⁷ In addition, Porter formed a force of seamen to assist the Army troops.⁴⁸

The ironclads steamed inshore to their anchorages early in the morning of January 13. At about 8:30 A.M. New Ironsides anchored and at 8:36 Fort Fisher "fired the first gun . . . which was immediately answered."⁴⁹ The ships

Appomattox (Garden City: Doubleday & Co., 1954), 329.

⁴⁴Porter to Welles, January 14, 1864, ORN 11: 432-33; Grant, Personal Memoirs, 2: 396; Selfridge, "Navy at Fort Fisher," 657-58.

⁴⁵Report of General Braxton Bragg, January 20, 1865, OR ser. 1, 46, part 1: 431-32.

⁴⁶Lamb, "Defense of Fort Fisher," 647; Selfridge, "Navy at Fort Fisher," 658, 661.

⁴⁷General Orders 78, January 2, 1864, ORN 11: 425-27.

⁴⁸General Orders 81, January 4, 1864, ibid., 11: 427. Selfridge said volunteers were called for, but this General Order required commanders to detail as many men as they could spare. Selfridge, "Navy at Fort Fisher," 658.

⁴⁹NARG 24, Log of New Ironsides, January 13, 1865.

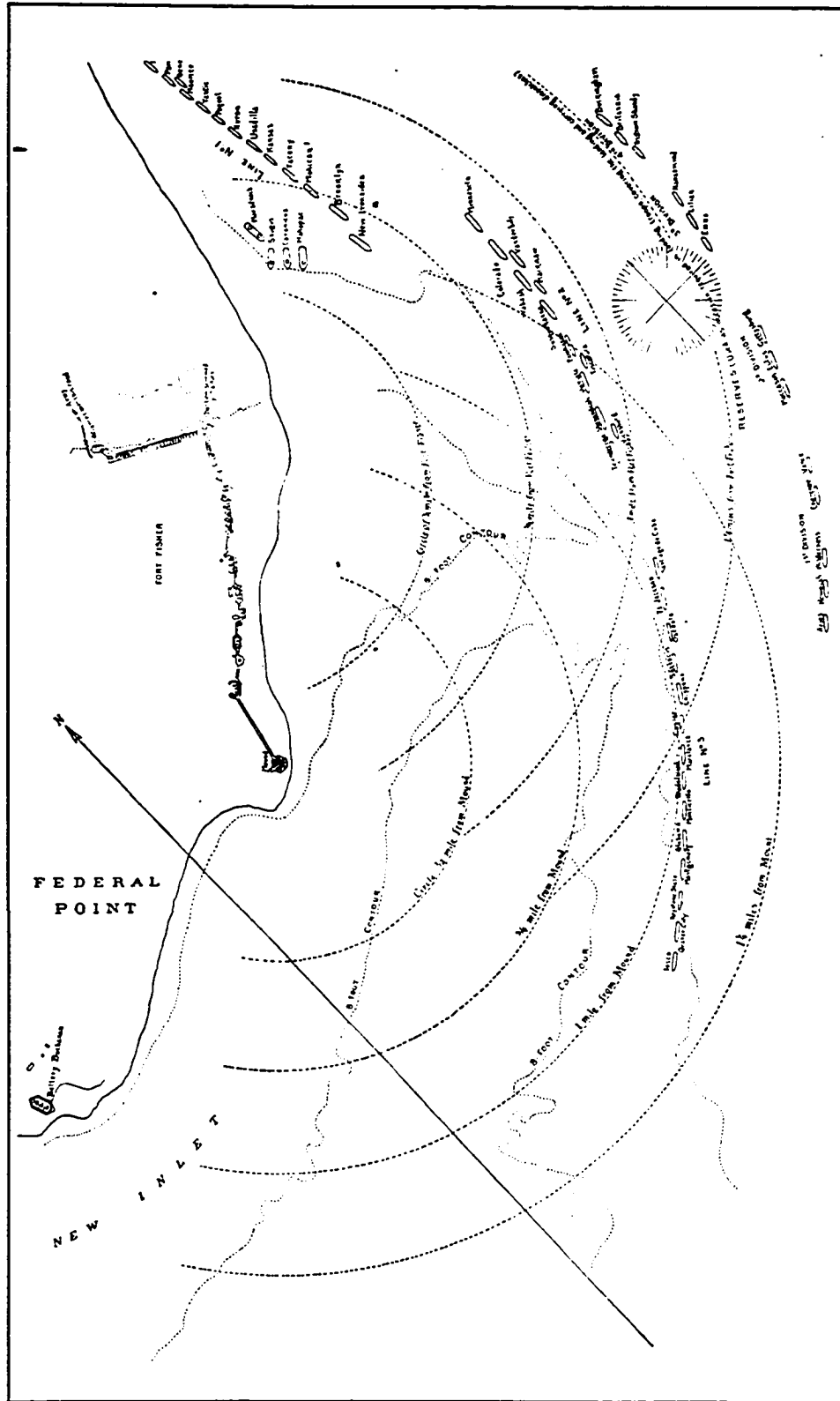


Figure 21. Plan of second attack on Fort Fisher. (Official Records . . . Navies 11:425.)

opened fire in a "spirited engagement" which soon made the fort "look very dilapidated."⁵⁰ Lamb judged the fire of the ships was concentrated with the intent of destroying the landward defenses, and the fort suffered much more heavily than during the December bombardment.⁵¹

The Confederates were still short of ammunition, having received none between assaults, so Lamb imposed the same restrictions on firing as before.⁵² New Ironsides was again a target. "Our fire was returned very briskly, and we were struck more frequently" than in December, but the only significant damage was an X-inch shot which entered sick bay and smashed the dispensary.⁵³ Meanwhile, Terry's troops landed five miles up the spit from the fort. They moved south to a point three miles from the fort, then closed to two miles by 2:00 A.M. on January 14.⁵⁴

After dark on January 13 the wooden ships withdrew to anchorage, but the ironclads remained to harass the enemy with sporadic fire. New Ironsides shifted anchorage at 9:30 P.M., "The enemy having found the exact range of this ship

⁵⁰Porter to Welles, January 14, 1865, ORN 11: 433. Porter timed the first shots from Fort Fisher at 7:30.

⁵¹Report of Major General Whiting, January 18, 1865, OR ser. 1, 46, part 1: 439-40.

⁵²Lamb, "Defense of Fort Fisher," 647-48.

⁵³Shippen, "Fort Fisher," 17; NARG 24, Log of New Ironsides, January 13, 1865.

⁵⁴Report of Major General Terry, January 25, 1865, OR ser. 1, 46, part 1: 396-97.

during the day."⁵⁵ Lamb noted that the defenders "could scarcely gather up and bury our dead without fresh casualties," and it was impossible to repair the damage done to the land face of the fort.⁵⁶

On January 14 the bombardment resumed, with the wooden ships returning to their positions during daylight. New Ironsides resumed firing at 11:00 A.M. when directed by Admiral Porter. Her target was Fort Fisher, but "at 1.30 A rebel gunboat in Cape Fear River attempted to shell our camp, when the fire of this ship's battery was directed to her with effect and she withdrew." New Ironsides also disabled a "very troublesome" X-inch which had damaged her the day before.⁵⁷ The Army landed artillery and moved down the river, or inland, side of the peninsula. By evening they were within a mile of the fort.⁵⁸

The Confederates tried to stop the Federal troops with artillery but could not; "to fire from that [land] face was to draw upon the gunners the fury of the fleet." Only three

⁵⁵NARG 24, Log of New Ironsides, January 13, 1865. This corroborates Shippen's anecdote. Shippen, "Fort Fisher," 18.

⁵⁶Lamb, "Defense of Fort Fisher," 648; Whiting to General Robert E. Lee, February 19, 1865, OR ser. 1, 46, part 1: 441.

⁵⁷NARG 24, Log of New Ironsides, January 14, 1865.

⁵⁸Report of Major General Terry, OR ser. 1, 46, part 1: 397.

or four guns remained on the land face.⁵⁹ Lamb repeatedly telegraphed General Braxton Bragg, in charge of defending Wilmington, to organize a counter-attack using the 6,000 troops of General Robert Hoke's division. Bragg, believing the garrison could hold the fort and that committing Hoke risked losing the whole state, did not attack.⁶⁰

New Ironsides remained in position without having to shift anchorage the evening of the 14th. Since she had fired over 2,300 rounds in two days, she loaded 518 XI-inch shell from the U.S.S. Wilderness.⁶¹ New Ironsides resumed her bombardment at 7:16 A.M. on January 15, firing slowly and bursting her shells precisely, and continued all day.

Late in the morning, Porter landed his 1,600 sailors and 400 Marines north of the fort, in view from New Ironsides. He planned to have them assault the seaward side of the fort while the Army attacked the landward side.⁶² After some delay, both attacks commenced at 3:00 P.M. New Ironsides ceased firing at 3:10 P.M. and at 3:27 saw that

⁵⁹Lamb, "Defense of Fort Fisher," 648; Whiting to Lee, February 19, 1865, OR ser. 1, 46, part 1: 441.

⁶⁰Lamb, "Defense of Fort Fisher," 648-49, 654; Report of Major General Bragg, January 20, 1865, OR ser. 1, 46, part 1: 433-34. Gragg, Confederate Goliath, 26-29, 59-60, 99-101, 110-11, 117-20 for Lamb's difficulties with Bragg.

⁶¹NARG 24, Log of New Ironsides, January 14-15, 1865.

⁶²Porter to Welles, January 17, 1865, ORN 11: 439; Report of Major General Terry, OR ser. 1, 46, part 1: 398.

the sailors had been repulsed.⁶³

The Navy assault failed when the defenders pinned the sailors down within 100 yards of the fort, but it occupied many Confederates and permitted the Army to gain a foothold on the northwest corner.⁶⁴ In addition, three days of naval bombardment had disabled all but one heavy gun on the landward face of the fort.⁶⁵

Once inside, the troops cleared each traverse in turn, the Confederates fighting stubbornly and making frequent counter-charges. About 350 reinforcements, comprising two South Carolina regiments of Hagood's brigade, arrived by steamer during the fighting but Navy gunfire drove the vessel off before the rest of the brigade could land.⁶⁶

Naval gunfire was decisive. In addition to destroying the fort's landward artillery and preventing reinforcement, the ships, especially the ironclads, supported the Army directly, firing on the traverses with "deadly precision"

⁶³NARG 24, Log of New Ironsides, January 15, 1865.

⁶⁴Porter to Welles, January 17, 1865, ORN 11: 439-41; Lamb, "Defense of Fort Fisher," 650-51; Selfridge, "Navy at Fort Fisher," 659-60; Report of Major General Terry, OR ser. 1, 46, part 1: 398-99. Porter blamed the Marines for the failure, but the sailors were poorly organized and armed for land combat. Lamb wrote, "Had the fleet helped their own column as they did afterward that of the army, theirs would have been the glory of victory."

⁶⁵Lamb, "Defense of Fort Fisher," 648; Whiting to Lee, February 19, 1865, OR ser. 1, 46, part 1: 441.

⁶⁶Lamb, "Defense of Fort Fisher," 649; Report of General Bragg, OR ser. 1, 46, part 1: 433.

and breaking up defensive concentrations.⁶⁷ Again New Ironsides took the lead. Porter wrote,

His [Radford's] vessel did more execution than any vessel in the fleet, and even when our troops were on the parapet I had so much confidence in the accuracy of his fire that he was directed to fire on the traverses in advance of our troops and clear them out. This he did most effectually, and but for this the victory might not have been ours.⁶⁸

In the evening, the fort's remaining defenders withdrew south toward Battery Buchanan, expecting to cover their further retreat from there. They found the battery's Confederate Navy garrison already gone, the guns spiked and all the boats taken. New Ironsides' part in the battle ended when she ceased fire about 7:00 P.M., having supported the Army with a total of 2,783 main battery rounds and 113 fifty-pounders.⁶⁹ Battery Buchanan, the last remaining outpost of Fort Fisher, surrendered at about 10:00 P.M.⁷⁰

In return for her vital contribution, New Ironsides received little damage. Radford reported that though the

⁶⁷Lamb, "Defense of Fort Fisher," 652. The traverses are spaced so closely that the precision firing New Ironsides did would not be easy for modern fire control systems.

⁶⁸Porter to Welles, January 28, 1865, ORN 11: 453. Lamb agreed: "Just as the tide of battle seemed to have turned in our favor the remorseless fleet came to the rescue of the faltering Federals." Lamb, "Defense of Fort Fisher," 652.

⁶⁹NARG 24, Log of New Ironsides, January 15, 1865.

⁷⁰Lamb, "Defense of Fort Fisher," 653-54; Porter to Welles, January 15, 1865, ORN 11: 434-35; Reports of Major General Whiting, January 18, 1865, and February 19, 1865, OR ser. 1, 46, part 1: 440, 442.

ship was often struck, "she has not been much hurt." Once again, no one aboard was injured.⁷¹ The fleet suffered 82 killed, 269 wounded and 35 missing in the second attack, mostly in the ground assault on the fort.⁷²

Upon departing Fort Fisher on January 17, 1865, New Ironsides returned to Hampton Roads, arriving off Fortress Monroe on January 18. The reason for her return was to repair her rudder at the Norfolk Navy Yard, but there was soon other work for her to do in the Hampton Roads area.

The Confederates had built three ironclads on the James River at Richmond, the Richmond, Fredericksburg, and Virginia II.⁷³ They were both protected and restricted by obstructions in the James. In 1862, the Confederates blocked the James at Drewry's Bluff, six miles below Richmond, to prevent the Union Navy from passing upriver and attacking the Confederate capital (Figure 22). Though the obstructions kept the Union ironclads from going upriver,

⁷¹A X-inch solid shot "badly smashed" one armor plate, and another came through the side forward of the armor. Radford to Porter, January 20, 1865, ORN 11: 616. NARG 52, Entry 22, Medical Journal of New Ironsides.

⁷²Selfridge, "Navy at Fort Fisher," 662; Porter to Welles, January 17, 1865, ORN 11: 442-44. New Ironsides lost a former shipmate when Lieutenant Benjamin Porter was killed ashore. Selfridge, "Navy at Fort Fisher," 662; Porter to Welles, January 15, 1865, ORN, 435.

⁷³The Richmond was the first completed, in mid-1862. Scharf states July 1862; Still states the incomplete ship was towed up from Norfolk in May 1862 and completed six months later. Scharf, Confederate States Navy, 727; Still, Iron Afloat, 168-71. The others were commissioned in March 1864, *ibid.*, 170.

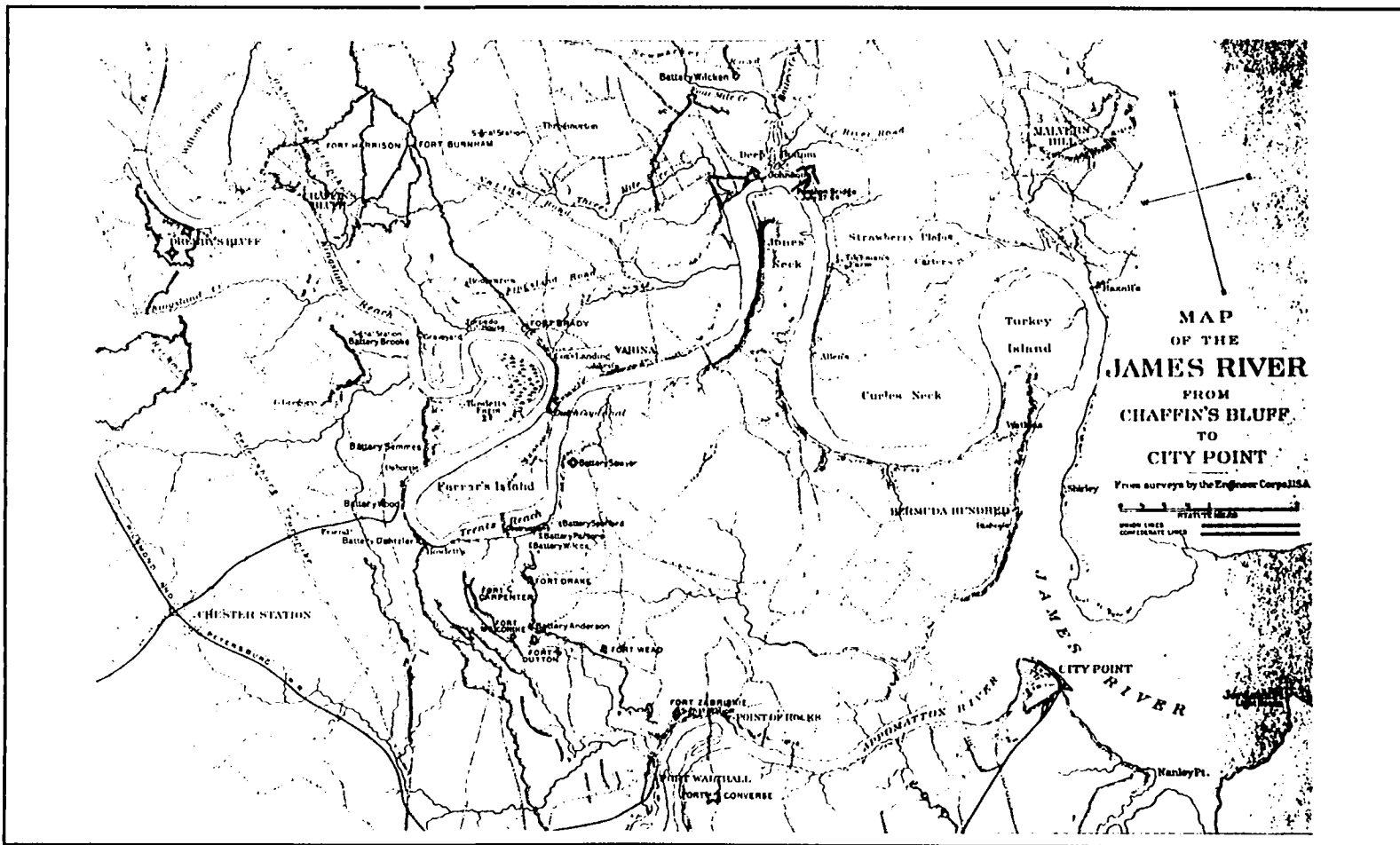


Figure 22. Map of the James River from Chaffin's Bluff to City Point. (Official Records . . . Navies, 11, facing page 633.)

they also prevented Confederate ironclads from attacking Union troops or shipping below Drewry's Bluff.

Despite the completion of the Richmond in 1862 to protect the city, President Jefferson Davis refused until May 1864 to permit a channel through the obstructions.⁷⁴ The Confederate ironclads finally passed the obstructions in late May 1864. By then there were several monitors in the James and it was too late for the Confederates to accomplish anything against the Union base at City Point.

Grant was still worried about his supplies. Not confident of the Navy's ability to prevent a raid, he directed Butler to block the James at Trent's Reach, the northwestern anchor of Butler's defensive line across the Bermuda Hundred peninsula.⁷⁵ Butler blocked the river on June 13, 1864, by sinking hulks filled with stones.⁷⁶ Conditions in the James remained stalemated, with Confederate ironclads above Trent's Reach and Union ironclads below, until January 1865.

In mid-January 1865 the Confederates determined that a successful raid on City Point would relieve Union pressure

⁷⁴Ibid., 169-71, 173; Parker, Recollections, 356-57.

⁷⁵Trent's Reach was six statute miles west northwest of City Point as the crow flies but some seventeen miles up the James, and ten miles downstream from Drewry's Bluff. "Map of the James River from Chaffin's Bluff to City Point," ORN facing 11: 663; Still, Iron Afloat, 176-77.

⁷⁶Scharf, Confederate States Navy, 734-35; Still, Iron Afloat, 176-78, 180. In August, Butler began digging a canal across the Dutch Gap peninsula to bypass the Trent's Reach obstructions and give the Union a clear route to attack Drewry's Bluff. Although completed, it was never used.

on Richmond. On January 23, heavy rain washed away some of the Trent's Reach obstructions, at a time when there was only one Union ironclad in the James, the monitor Onondaga. Taking advantage of the opening, a Confederate force comprised of the three ironclads, a gunboat, and four torpedo craft arrived at Trent's Reach that evening. The Fredericksburg, with the shallowest draft, could pass the obstructions but the other two ironclads grounded above them on a falling tide. Fredericksburg returned above the obstructions and the expedition was effectively over. Onondaga engaged the Confederates from a distance on the morning of January 24, causing some damage, but the Confederates refloated their ships on the rising tide and retired.⁷⁷

The abortive attack caused consternation in the Union command. New Ironsides, which had steamed from Fortress Monroe to Norfolk on January 21, 1865, started up the James on January 25, her mission once again countering Confederate ironclads. After anchoring for the night, she continued on upriver, grounded briefly on Harrison's Bar, and anchored off Bermuda Hundred at 11:10 A.M. on January 26.⁷⁸

Upon his arrival, Radford relieved Commander William

⁷⁷Ibid., 183-86; Scharf, Confederate States Navy, 740-42; Parker, Recollections, 365-66. Commander William A. Parker (no relation to William H. Parker), the commander of the James River Division, was relieved at Grant's request for lack of aggressiveness. OR ser. 1, 46, part 2: 218.

⁷⁸NARG 24, Log of New Ironsides, January 21, 25, 26, 1865. The river was so shallow that she later grounded while at anchor. Ibid., February 9, 1865.

A. Parker as commander of the James River Division of the North Atlantic Blockading Squadron.⁷⁹ There were frequent alarms and considerable small boat activity, but New Ironsides remained at Bermuda Hundred without major incident until February 17, 1865.⁸⁰ Radford departed the ship on that date, hoisting his pennant as commander of the James River Division in U.S.S. Dumbarton. He left his Executive Officer, Lieutenant Commander Robert L. Phythian, in charge of New Ironsides as acting Commanding Officer.⁸¹

Phythian's first duty was to return New Ironsides to Norfolk for the repairs interrupted by the Confederate sortie. She left Bermuda Hundred at 7:30 A.M. on February 18, grounded again on Harrison's Bar, and later anchored for the night. She arrived at Norfolk at 4:30 P.M. on February 19. After offloading shot and shell on February 23 and 24, she proceeded on February 27 to the Navy Yard. She spent until March 3, 1865, offloading guns and carriages, and then

⁷⁹Radford was ordered to report to Grant when he took command of the Division. By February 23, 1865, the command had been retitled the James River Flotilla. Radford to Porter, February 23, 1865, ORN 12: 48.

⁸⁰For example, Radford telegraphed Welles on January 29, 1865: "Deserters report rebel ironclads to come down again; all ready for them." Ibid., 11: 710. On February 6, New Ironsides' Log noted the rams were moving downriver. On February 22, "It is thought an attack will be made in a few days, or at any time." Radford to Captain E. T. Nichols, February 22, 1865, ibid., 12: 46.

⁸¹Radford to Porter, February 23, 1865, ORN 12: 48; NARG 24, Log of New Ironsides, February 17-18, 1865. Phythian styled himself as "Commanding pro tem." NARG 19, Entry 1072, Steam Log of New Ironsides, February 21, 1865.

on March 6 offloaded powder. Finally, on March 9, her draft was reduced enough to remove the rudder for repairs.⁸²

The Navy Yard completed the repairs and rehung the rudder on March 20, 1865. On March 20, 21 and 22, New Ironsides took in her guns and carriages and the spars she landed in October 1864. On March 23, Radford was officially detached, making Phythian the ship's Commanding Officer.⁸³

By this time the war, as far as the Navy was concerned, was over. The Navy Department was already trying to reduce expenses and there were no enemies left against whom New Ironsides could fight.⁸⁴ On March 24, the ship took in powder and on March 25, she completed loading powder and shot. On March 27, the ship moved into Hampton Roads, and on March 28, she left Norfolk for the last time, bound for Philadelphia with the steamer U.S.S. Fahkee.⁸⁵

New Ironsides arrived in Philadelphia on March 30,

⁸²NARG 24, Log of New Ironsides, February 18-March 9, 1865. Report of Vessels at the Naval Station Norfolk for the week of March 11, 1865, NARG 45, Subject File, AR--Miscellaneous Material Relative to Repairs, U.S. Ships, Box 106; also weeks of March 18 and March 25, 1865.

⁸³NARG 24, Log of New Ironsides, March 23, 1865. On April 28, 1865, Radford relieved Porter as Commander of the North Atlantic Blockading Squadron. ORN 12: 129.

⁸⁴The Secretary's letter was dated February 24, 1865. Report of the Secretary of the Navy, 1865 (Washington: GPO, 1865) (hereafter SecNav [year]), ix. "With the war coming to an end, however, Welles' ingrained sense of thriftiness reasserted itself." Niven, Gideon Welles, 506.

⁸⁵NARG 24, Log of New Ironsides, March 21-27, 1865; Captain E. T. Nichols, Senior Officer at Hampton Roads, to Porter, March 28, 1865, ORN 12: 86.

1865, and anchored off the Philadelphia Navy Yard. The pace of operations was "normal peacetime:" the ship started to offload ammunition on Saturday, April 1, and completed the effort on Monday, April 3, rather than working on Sunday to finish the job. On April 5, she moored at the Navy Yard and sent her remaining stores ashore. At 9:45 A.M. on April 6, 1865, New Ironsides' commissioning pennant was hauled down for the last time.⁸⁶

⁸⁶NARG 24, Log of New Ironsides, March 31-April 6, 1865.

CHAPTER NINE
CONTEMPORARIES AND COMPETITORS

New Ironsides was a successful ship, both in the eyes of Union and Confederate contemporaries and in the light of history. She proved herself in combat under severe conditions and amply justified the pride of her builders by spending fifteen uninterrupted months off Charleston without the refit or repair periods granted to the monitors. Her gunnery was more effective than the monitors, and she could, as DuPont phrased it, keep the sea. She compared very favorably with her contemporaries, both monitors and foreign ironclads.

The monitor type was characterized by low freeboard, complete absence of sail power, and an armament consisting of a few heavy guns placed in closed, revolving turrets, whereas New Ironsides had high freeboard and a broadside armament.¹ The most important difference between the two types was in freeboard, the vertical distance between the

¹Definition from William Hovgaard, Modern History of Warships (Annapolis: United States Naval Institute Press, 1971; reprint of 1920 edition), 27.

water and the edge of the weather deck.²

John Rodgers, who commanded the monitors Weehawken and Dictator, wrote in 1864 an exposition of the virtues of the monitors. He noted that, while the monitors and the New Ironsides type each had "peculiar advantages" and both were needed,

When the Monitor class measures its strength against the Ironsides class, then, with vessels of equal size, the Monitor class will overpower the Ironsides class; and, indeed, a single Monitor will capture many casemated vessels of no greater individual size or speed. . . .³

Rodgers' analysis, based upon equal displacement, begs the question of effectiveness. Compared to the monitors, New Ironsides makes an excellent showing.

In resistance to damage, New Ironsides was the equal of any monitor, despite her unarmored ends. She never had a man seriously hurt in action.⁴ This was at least in part due to the protection given by her solid plating, which gave more resistance for the same total thickness of iron than did laminated plate.⁵ Although the later monitors gained

²Gillmer, Modern Ship Design, 26, for a discussion of freeboard and its significance.

³John Rodgers to Welles, April 7, 1864, quoted in Johnson, John Rodgers, 220.

⁴Ensign Howard, mortally wounded by a shotgun blast from the David, was the only man killed by the enemy. Belknap, "Reminiscent of the 'New Ironsides'," 64; NARG 52, Entry 22, Medical Journal of the New Ironsides. The ship did lose men to accidents and disease.

⁵Chapter 2, 42n above for modern results. Lenthall and Isherwood to Welles, June 10, 1862, found laminated armor "very inferior for equal aggregate thicknesses." NARG

some advantage in protection from their eleven inch turret armor, their major protective advantage was their small target area. At Fort Fisher, for example, the monitors were "fired at a great deal" but seldom hit.⁶

When they were hit, the monitors sustained considerable damage. Their laminated armor required complex bolting and riveting to hold it together. Shot hitting the outside frequently sheared the bolts and caused the nuts to fly around inside like projectiles. In an engagement between the monitor Montauk and Fort McAllister on the Ogeechee River, Montauk suffered considerable damage of this kind.⁷

Of the seven monitors engaged in DuPont's attack on Charleston, at least four suffered severely from broken bolts.⁸ Passaic had the roof of her pilot house knocked loose and several bolts broken. Weehawken had thirty-six broken in the turret and "a good many" in the pilot house. Nantucket lost many bolts and Nahant had seventy-seven

19, Entry 49, 387. Lieutenant Commander E. Simpson, Commanding U.S.S. Passaic, to Welles, October 14, 1863: "Solid plates . . . only 4 [sic] inches thick, resist the impact of shot much better than the 5 inches of laminated iron. . . ." ORN 15: 38. See also Baxter, Ironclad Warship, 202-203.

⁶Porter to Welles, ORN 11: 602.

⁷Commander John L. Worden to DuPont, February 2, 1863, enclosing Second Assistant Engineer Thomas A. Stephens to Worden, February 2, 1863, *ibid.*, 13: 630-32.

⁸Very, "Development of Armor," 396. Testimony at the Stimers Court of Inquiry is presented in Report . . . Armored Vessels, 61-73. Hunter, A Year on a Monitor, 51, describes injuries to the Nahant.

broken in the turret and pilot house, one of which killed the quartermaster.⁹ Fabric or light iron screens had to be installed inside the turrets and pilot houses to protect the occupants. Even with the screens, casualties occurred; in August 1863 Dahlgren's fleet captain, Commander George W. Rodgers, was killed in U.S.S. Catskill by pieces of broken bolts.¹⁰

In speed, New Ironsides was at a slight disadvantage to most of the monitors. Dahlgren, who was favorably impressed with the monitors, credited them with seven knots and New Ironsides with six to seven.¹¹

The broadside battery was far more effective than the turret batteries of the monitors in providing a high volume of fire.¹² The monitors had more flexibility, since New

⁹For Passaic, Captain Percival Drayton to DuPont, April 8, 1863, ORN 14: 10; for Weehawken, John Rodgers to DuPont, April 8, 1863, *ibid.*, 14: 12; for Nantucket, Commander D. M. Fairfax to DuPont, April 8, 1863, with enclosures, *ibid.*, 14: 18-20; for Nahant, Commander John Downes to DuPont, April 8, 1863, *ibid.*, 14: 22, and Hunter, A Year on a Monitor, 51-53.

¹⁰Report of Lieutenant Commander Charles C. Carpenter, August 17, 1863, ORN 14: 458.

¹¹Dahlgren to Welles, ORN 14: 598. The Charleston monitors were rotated to Port Royal for maintenance and cleaning; New Ironsides was not. New Ironsides was coppered to prevent fouling, but during her first commission she suffered from copper falling off in sheets. Turner to Smith, April 2, 1863, NARG 71, Entry 5, Box 449, 2: 7.

¹²"If the depth of water would only permit her to approach, I would sweep the ground clean with her powerful broadside." Dahlgren to Welles, July 30, 1863, ORN 14: 410.

Ironsides could not fire except on the broadside.¹³ The monitors had essentially unlimited firing arcs. The XI-inch guns of the New Ironsides were the largest which could practicably be handled and trained without the mechanical assistance provided by the turret.

Due to their powerful XV-inch guns, the Passaic and Canonicus classes of monitors would have been more effective than the New Ironsides in ship to ship combat in protected waters. Against such antagonists, the best tactic for New Ironsides would have been to close as rapidly as possible, accepting the chance of a disabling hit from the monitors' slow-firing XV-inch to come to a range where the smaller but far more numerous shot from her rapid-firing XI-inch could tell. Once at close range she would have had an excellent chance of disabling the monitor turrets.¹⁴

The most significant difference between New Ironsides and the monitors was in freeboard. The early monitors had one to two feet of freeboard, and the trunnion axes of their guns were within five feet of the water. Even "seagoing" monitors such as the Miantonomoh class had a freeboard of

¹³New Ironsides could fire twenty degrees forward and abaft the beam. Chief Constructor Henry Hoover to Smith, March 31, 1863, NARG 71, Entry 5, Box 449, 1: 160.

¹⁴The monitor captains reported "much solicitude" for their turrets' "liability . . . to cease to revolve" when struck. Joint Report of Officers Commanding Ironclads, May 25, 1863, ORN 14: 214.

only two feet seven inches.¹⁵

New Ironsides' freeboard was about thirteen feet and her gun port sills at least seven feet above the water. Depending on her loading, the trunnion axes of her guns were at least nine feet above water. The result was increased command for the guns and less interference from waves. In anything but protected waters, the low freeboard of the monitors left them unable to work their guns, placing them at a serious disadvantage.¹⁶

In addition, the Ericsson turrets of the monitors were in theory kept watertight by having the bottom of the turret plates bear against a brass ring set into the deck. The turret revolved around and was supported by a central spindle, which was wedged up to permit the turret to turn. When the turret was so raised, there was a gap between the turret and the ring which permitted much water to enter. After the action at Charleston Captain Percival Drayton, commanding the Passaic, called this "a most serious evil" and said it required correction "if the turret is to be kept up [ready

¹⁵Hovgaard, History of Warships, 33; Gardiner, Fighting Ships, 121.

¹⁶"At times the sea would go over the turrets. . . ." Porter to Welles, on the transit to Fort Fisher, ORN 11: 601. Similarly, Radford to Porter, January 16, 1865: The monitors had "not only proved that they could ride out heavy gales at sea, but fight their guns in moderately smooth [emphasis added] weather, which has been doubted by many intelligent officers." Ibid., 11: 462.

for action] in any but the smoothest weather."¹⁷

High freeboard also helps a ship maintain her speed, especially against a head sea, since with a low freeboard the bow is often buried in the waves and this increases the ship's resistance. The monitors suffered severely from this; although their motion was generally easy, they shipped dangerous quantities of water and could not make much headway.¹⁸ Due to her higher freeboard and better seakeeping New Ironsides could have maintained her speed better at sea. Being coppered, she could expect a longer useful time before bottom fouling would markedly reduce her speed.¹⁹

It was only in their shallow draft that the monitors, under the conditions of the Civil War, had a decisive advantage. The monitors drew less than twelve feet of water; the New Ironsides about fifteen. Dahlgren's opinion was that ten to eleven feet was the "most convenient" draft and that

¹⁷Drayton to DuPont, April 8, 1863, ibid., 14: 11.

¹⁸Drayton, referring to John Rodgers' riding out a gale in Weehawken: "If he can get her along against a head sea comfortably and safely, she is a different concern from the Passaic." Drayton to DuPont, February 7, 1863, Hayes, DuPont Letters, 2: 425. Rodgers himself co-signed a report to Welles stating that the monitors "have been exaggerated into vessels capable of keeping the seas, and making long voyages alone." Joint Report of Officers Commanding Iron-clads, May 25, 1863, ORN 14: 214.

¹⁹When foul, the monitors' speed was 3.5 or 4 knots. After cleaning, Montauk's speed improved from 3.5 to 6 knots. Dahlgren to Welles, November 4, 1863, ORN 15: 79.

anything more was too restrictive.²⁰ During the Charleston campaign the light draft of the monitors made them the choice for inshore work, whereas New Ironsides was the only vessel suited for outside work.²¹ The psychological impact of the original Monitor aside, one reason the U.S. Navy built so many monitors and so few seagoing ironclads was that only ships of relatively light draft could reach the fighting.²²

Dahlgren, who served both in New Ironsides and in monitors while in action and was known as a "monitor man," summed up the discussion. He wrote,

Keeping in view the peculiar exigencies of the case, which required light draft and great ordnance power, it appears that the selection of the Department could not have been more judicious in preferring a number of monitors to operate from a heavy frigate as a base.²³

Together, they provided both the inshore punch and the off-shore security required.

²⁰Dahlgren to Welles, January 28, 1864, *ibid.*, 14: 598. In a letter of August 22, 1863, to Gillmore, Dahlgren called her "powerful but most impractical . . . Her great draft prevents approach to the main object. . . ." *Ibid.*, 14: 466.

²¹"I have only one [ironclad] vessel which can do outside blockading duty. . . ." DuPont to Welles, June 3, 1863, *ibid.*, 14: 231.

²²"So great was the need of light-draft ironclads suited for the immediate task . . . and so popular was the Monitor, cheap, novel, and fresh from her dramatic struggle, that the opportunity for building a high seas ironclad fleet was largely overlooked." Baxter, Ironclad Warship, 302.

²³Dahlgren to Welles, January 28, 1864, ORN 14: 599-600. Dahlgren, who owed his admiral's stars and his command to Lincoln, firmly supported the Administration's position.

In comparison with those European ships which were her contemporaries, New Ironsides also makes a favorable impression. All three were of the high freeboard type. Although the smallest of the three, New Ironsides' armament and protection were the equal of either Gloire or Warrior.²⁴

In protection, New Ironsides's chief defects were that her armor did not cover her bow and stern and that her deck armor was only one inch thick.²⁵ As noted above, deck protection was not then particularly important in ship to ship combat. To avoid the weight of heavy deck armor, minimal deck protection was common to all early ironclads.²⁶ Against New Ironsides' one inch, Warrior carried 3/4 inch of iron deck plating and Gloire carried only 4/10 inch.²⁷

New Ironsides had no armor above a single waterline strake for thirty feet forward and aft of the battery. Her soft ends were vulnerable but so were Warrior's. Warrior, with no waterline belt, had only the 3/4 inch plating of her

²⁴The rapid progress of naval architecture in the 1860s and 1870s makes it necessary to compare ships of roughly similar date. Warrior, laid down in 1859, was completed in late 1861; Gloire, laid down in 1858, was completed in 1860. By the end of 1862, Great Britain had four ironclad ships completed and France had six.

²⁵Dahlgren's report to Welles, November 5, 1863, discusses these flaws, ORN 15: 99.

²⁶Due to its large area, the one inch deck of New Ironsides weighed 170 tons, compared to 650 tons for her entire 4½ inch side protection. NARG 19, Plan 107-9-12H, is a listing of weights (reproduced as Appendix A).

²⁷For Warrior, Lambert, Warrior, 72. For Gloire, Gardiner, Fighting Ships, 286.

hull to protect her forward and aft of the 213 feet amidships covered by her 4½ inch armor.²⁸ Gloire was the only one of the three to have her sides completely covered with armor.²⁹ Because of the unarmored areas of her wooden hull, New Ironsides would have been more likely to catch fire in action than Warrior or Gloire.

As a result of poor protection at the stern, rudder damage was another danger. Neither New Ironsides nor Warrior had protection for their steering gear.³⁰

A vulnerability common to all masted ironclads was dismasting. New Ironsides had her masts removed for most of her Civil War service, which eliminated the problem.³¹ Her masts might have been helpful for operations in the open ocean, however, and both Gloire and Warrior remained fully

²⁸Parkes, British Battleships, 19; Lambert, Warrior, 181. New Ironsides was armored over 74 percent of her length, Warrior over only 56 percent.

²⁹Baxter, Ironclad Warship, 61; Parkes, British Battleships, 3. See also plates of Gloire and Warrior which accompany Russell, "Iron-Cased Vessels," Plates IV and V.

³⁰Parkes, British Battleships, 18; Dahlgren to Welles, November 5, 1863, ORN 15: 99.

³¹New Ironsides made her first voyage with signalling masts which carried no sail. The full rig was reinstalled in September 1862 and again replaced by signalling masts in January 1863. The full rig was reinstalled in June 1864. In October 1864, the topmasts and yards were removed, leaving only lower masts, and the full rig was restored in March 1865. NARG 24, Log of New Ironsides, 5-7 September, 1862; 29-31 January, 1863; 8 June and 12-13 October, 1864; and 21-22 March, 1865; Dahlgren to Rowan, June 1, 1864, Dahlgren Papers, Letterbook May-June 1864, 290.

rigged throughout their careers.³² All three would have been liable to severe embarrassment in action by damage to a mast, because of the chance of fouling their propellers.³³

In armament, New Ironsides was distinctly superior to the Europeans. Warrior's main battery gun was the smooth-bore 68-pounder, a muzzle-loading weapon incapable of penetrating good 4½ inch iron plate even at the muzzle.³⁴ Gloire's 16-centimeter rifled muzzle-loaders could barely pierce 4.7 inch plate at their muzzles.³⁵ The XI-inch Dahlgren firing 166-pound shot could penetrate 4½ inches of iron at over 950 yards.³⁶

³²There were two reasons for re-masting New Ironsides for prolonged ocean service. First was seaworthiness; for Turner's pessimistic opinion, Turner to Welles, August 27, 1862, Report . . . Armored Vessels, 30. Although the ship rode out gales without them, masts would have steadied her. Second, sails might have slightly increased her endurance.

³³No masted ironclad sailed well. Unarmored ships carried from 6.15 to 13.9 square feet of sail per ton of displacement, whereas British ironclads carried about 3.25 square feet per ton. Horsepower per ton was thus against armored ships. Parkes, British Battleships, 690.

³⁴Very, "Development of Armor," 383. Theoretically, the 68-pounder with wrought iron shot could pierce 4½ inch armor to 650 yards; in practice it could not. Theoretical penetration using PENETRA, a program to calculate armor piercing effect, using data from Lambert, Warrior, 86-87.

³⁵Baxter, Ironclad Warship, 207-209, for armor tests; Gardiner, Fighting Ships, 286, for battery composition.

³⁶Firing tests showed 4.5 inch armor with twenty inch wood backing was near the limit of penetration for the XI-inch gun. Very, "Development of Armor," 402-404. Theoretical penetration from PENETRA with velocity from BALLISTA. Initial velocity extrapolated from Ordnance Instructions, Appendix B, xv. The Instructions permitted a thirty pound charge; *ibid.*, Part III, 39, 53.

Shell would, of course, be preferable to solid shot for inflicting damage to ships. In theory the 68-pounder shell could penetrate 4½ inch armor at 250 yards, which the XI-inch Dahlgren could penetrate at 600 yards.³⁷ It is extremely doubtful that any spherical shell could remain intact after penetrating armor. In practical terms, none of the weapons could penetrate 4½ inch plate with shell.

One problem attributed to the XI-inch was that its bulk would make it too heavy to handle at sea.³⁸ Had the XI-inch been mounted on an old-fashioned wooden carriage this might have been true, but with the positive control afforded by iron carriages this objection was overcome.

The only characteristic in which New Ironsides would have been at a disadvantage was speed. Her service speed of 6 knots was well below the 12.5 knots claimed for Gloire and the 14-knot trial speed of Warrior.³⁹ Either European ship could have caught or evaded New Ironsides at will. With a superior battery and equal protection, New Ironsides could discount any advantage the European ships would gain from their ability to control the range of a battle, but she

³⁷Penetration for 68-pounder from PENETRA program; ordnance figures from Lambert, Warrior, 86-87. Penetration for XI-inch from PENETRA; gun data from Ordnance Instructions, Appendix B, xv.

³⁸A British author called the XI-inch an example of American folly. Andrew Lambert, Battleships in Transition: The Creation of the Steam Battlefleet 1815-1860 (Annapolis: United States Naval Institute Press, 1984), 92-93.

³⁹Gardiner, Fighting Ships, 7, 286.

could not pursue an enemy who desired to break off action.

Since New Ironsides was originally built to counter Confederate ironclads, specifically the Virginia, a direct comparison is in order. New Ironsides was clearly superior in all areas. First, New Ironsides was a seagoing ship, Virginia strictly a smooth water vessel.⁴⁰ Although their speeds were similar, New Ironsides' engines were reliable; Virginia's were decidedly not.⁴¹

Virginia's four inch armor, in two layers of two inches each, was only 63% as effective as New Ironsides' solid 4½ inch plating. New Ironsides' armor would have been proof against the Confederate ship's battery.⁴² Each ship had a ram and neither was very handy, but New Ironsides' protection below the waterline was of iron three inches

⁴⁰William H. Parker, a Confederate who commanded a wooden ship in the Monitor-Virginia battle, observed, "[Virginia] would have foundered as soon as she got outside Cape Henry. She could not have lived in Hampton Roads in a moderate sea." Parker, Recollections, 288.

⁴¹New Ironsides' maximum speed was 6½ knots; Virginia's six to eight. Still, Iron Afloat, 25. A lieutenant in Virginia stated, "We could not depend upon [the engines] for six hours at a time." John Taylor Wood, "The First Fight of Iron Clads," in The Opening Battles, vol. 1 of Battles and Leaders of the Civil War, Robert Underwood Johnson and Clarence C. Buel, eds., (New York: Castle Books, 1956; reprint), 694.

⁴²For Virginia, Still, Iron Afloat, 20. Monitor's eight inch laminated armor [$(1^2 \times 8)^{1/2} = 2.83$], which Virginia could not pierce, was equal to Virginia's four inch armor [$(2^2 + 2^2)^{1/2} = 2.83$]. Either was only 63 percent as effective as New Ironsides' solid armor ($2.83/4.5 = 0.629$).

thick and Virginia's only one inch.⁴³ In addition, New Ironsides drew only fifteen feet of water against Virginia's twenty-two feet, and could have employed the same tactic of withdrawing to shallow water as did Monitor.⁴⁴

Withdrawal would not have been required, since New Ironsides' decisive superiority was her armament. Her battery of fourteen XI-inch Dahlgren guns and two 150-pounder Parrott rifles was much more powerful than the mixed bag of six IX-inch Dahlgrens, two 6.4-inch and two 7-inch Brooke rifles mounted by the Virginia.⁴⁵ The XI-inch Dahlgren guns carried by New Ironsides were the same as those mounted in Monitor, which did not seriously damage Virginia. By the time New Ironsides was commissioned, however, the Bureau of Ordnance had approved the use of larger powder charges in them, which would have improved penetration.⁴⁶

Monitor's two slow-firing XI-inch guns, using fifteen

⁴³Virginia's Executive Officer, Lieutenant Catesby ap R. Jones, noted, "We are least protected where we most need it. The constructor should have put on six inches where we now have one." Quoted in *ibid.*, 23.

⁴⁴*Ibid.*, 26, for Virginia's draft.

⁴⁵*Ibid.*, 22, for Virginia's battery.

⁴⁶The thirty pound charge doubled muzzle energy. Had Monitor used wrought iron shot instead of standard cast iron, she could have penetrated Virginia's armor with a fifteen pound charge. Monitor did not use her wrought iron shot because they were out of round, making the risk of jamming while loading too great. Very, "Development of Armor," 388.

pound powder charges, did some damage to Virginia.⁴⁷ New Ironsides' far more rapid gunnery, employing the thirty pound powder charge, would have been decisive.⁴⁸ The report of the October 17, 1862, examining board on the gun carriage problem shows that New Ironsides' unmodified battery, although not as effective as it later became, could easily have carried her through an action with the Virginia.

⁴⁷Still, Iron Afloat, 34.

⁴⁸New Ironsides could fire 360 rounds per hour; Monitor 2 rounds every seven to eight minutes or about 16 per hour. For New Ironsides, Dahlgren to Welles, January 28, 1864, ORN 14: 598; for Monitor, Wood, "First Fight," 701. The Executive Officer of the Monitor noted the labor of working the guns. Samuel D. Greene, "In the 'Monitor' Turret," in The Opening Battles, vol. 1 of Battles and Leaders of the Civil War, Robert Underwood Johnson and Clarence C. Buel, eds., (New York: Castle Books, 1956; reprint), 723-25.

CHAPTER TEN

SEAGOING IRONCLADS: FAILURE OF WILL

Large seagoing vessels were planned from the beginning of the U.S. Navy's ironclad construction program, when the original Ironclad Board recommended that the smaller experimental vessels it approved be followed by "a more perfect system of large iron-clad sea-going vessels of war."¹ Numerous seagoing ironclads were proposed and several projects actually commenced, but only three "seagoing" ironclads were finished during the Civil War. Of the three, only two saw action and of those two, only New Ironsides could actually have fought another ship at sea.

As a seagoing ironclad in a coastal and riverine war, New Ironsides did yeoman service but gained few headlines. In the absence of a seagoing enemy her seakeeping ability, the major advantage she had over the monitors, was discounted and her disadvantages emphasized. There was, however, a considerable body of wartime opinion in the Navy Department that realized that monitors were deficient in any but protected waters.

More seagoing ironclads were proposed in March 1862,

¹Report . . . Armored Vessels, 5.

when John Lenthall, Chief of the Bureau of Construction and Repair, and Benjamin Isherwood, Chief of the Bureau of Steam Engineering, broached a project to Secretary Welles. Their design was for "frigate built, iron steamships . . . of a size larger than any vessel we now possess."² That same month they also proposed to convert the wooden screw frigate Roanoke to a seagoing ironclad with four turrets, each containing two guns. The Navy specified solid 4½ inch plates instead of less effective but readily available laminated armor. This delayed the project and Roanoke was not finished until June 1863.³

In the spring of 1862, what was to become the "Monitor craze" was not fairly begun, and the design of the ironclad fleet was not yet firmly set. In March 1862, an editorial in the New York Times argued strongly for large ironclad ships, saying, "No small vessel can be fast, and carry her armor and armament . . . to be fast, they must be large."⁴ In addition to the Lenthall-Isherwood proposal, in April 1862 William H. Webb of New York sent a model of a "Steam

²Joint Committee, "Light Draught Monitors," 111. For a discussion, Sloan, Isherwood, 53.

³Ibid., 55-56. The ship was badly overweight and was completed with only three turrets. Gardiner, Fighting Ships, 120; Alden, "Forty Years Too Soon," 252-63.

⁴"Large and Small Iron-Clad Ships," New York Times, March 22, 1862, 4. The comparison was between Monitor and the Stevens Battery, an ironclad of 5,000 tons begun by Robert L. Stevens in 1842 but never completed. Baxter, Iron-clad Warship, 48-52, 211-19.

Battery" to the Department, and discussions about his vessel continued into the summer of 1862.⁵ This ambitious design, which resulted in the Dunderberg, was for a wooden-hull casemated ironclad of about 7,000 tons.

The contract for the Dunderberg was signed on July 3, 1862, seven weeks before the commissioning of the New Ironsides.⁶ The detailed specifications were approved on August 27, 1862, too soon to incorporate any lessons learned from the Merrick ship.⁷ Dunderberg was to have a broadside armament of eight XI-inch Dahlgren guns, plus two turrets each equipped with two XV-inch guns. Her armor above the main deck was to be solid 4½ inch iron, and from the main deck to five feet below the load waterline was to be 3½ inches, tapering to 2½ inches. The machinery would propel her at fifteen knots on a draft of not more than twenty feet six inches. Webb was to complete the ship in fifteen months

⁵This may be the model shown in Edwin L. Dunbaugh and William duBarry Thomas, William H. Webb Shipbuilder (Glen Cove, NY: Webb Institute of Naval Architecture, 1989), 95.

⁶Smith to Webb, August 8, 1862, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51, typescript, NWR, 2634: 367; Gregory to Lenthall, October 31, 1862, National Archives, Record Group 19, Entry 64, Letters Received from Superintendents Outside of Navy Yards, Box 1, 1: 171.

⁷Experience with New Ironsides was later incorporated into some facets of the design. Webb to Smith, March 11, 1863, NARG 71, Entry 5, Box 449, 1: 128; Henry Hoover to Smith, March 31, 1863, *ibid.*, 1: 160.

for \$1,250,000.⁸

Dunderberg, the only seagoing broadside ironclad other than New Ironsides, was never completed for the U.S. Navy. The ship proved to be too ambitious a project, beset with delays and major design changes, and the Civil War ended before she was launched. In 1867, Webb bought her back from the Navy and sold her to France.⁹

In October 1862, Lenthall and Isherwood advertised for bids on a seagoing ironclad of 7,300 tons, to have an iron hull and a broadside battery. The project received considerable criticism, much of it due to partisan attacks on Isherwood. They issued a revised proposal for a casemated vessel of 8,000 tons in March 1863.¹⁰ Merrick & Sons submitted a design which would have mounted ten XV-inch guns.¹¹

⁸Details from an "Historical Statement" prepared in 1900. Lieutenant L. H. Chandler, "Memorandum for the Chief of the Bureau of Ordnance," March 26, 1900, NARG 45, Entry 464, Subject File, AD--Ironclads, Box 51.

⁹The turrets were eliminated but her final armament of two XV-inch and four XI-inch made her undergunned. Ibid. Webb's partisans blamed the delay on the Government, but the problem was the continual addition of "improvements." Dunbaugh, William H. Webb, 92, 110-13; Gardiner, Fighting Ships, 119, 287.

¹⁰Sloan, Isherwood, 61. Sloan states, "It was not until the end of the year [1862] that private builders began tentative negotiations with the department concerning a large, sea-going ironclad." The March 1862 proposal apparently does not meet his definition of "large." For a copy of the March 12 advertisement, G. W. Tatham to Lenthall, March 30, 1863, NARG 19, Entry 71, Box 3, 1: 165.

¹¹Drawings and specifications of this vessel, which would have displaced over 11,000 tons, are in NARG 19, Bu-Ships Plan 80-9-2.

Merrick & Sons proposed a 3,500 ton follow-on design similar to New Ironsides on June 13, 1863. This ship, an iron hull, ironclad steamer equipped with four masts for sail power, appears to be a smaller version of the earlier 8,000 ton design. With its higher length to beam ratio and twin screws, it would have corrected some of the propulsion and maneuvering faults of the New Ironsides. This 3,500 ton ship would have carried four XV-inch Dahlgren guns in a casemate, with a pilot house atop each end.¹²

The ship was never built because Merrick & Sons' price was too high for the Navy. The original proposed price was \$1,950,000, but with the Government's additions it went up to \$2,400,000. When the Bureau objected and asked Merrick & Sons to recalculate, it increased again to \$2,404,000.¹³

Although this figure seems exceptionally high compared to the original prices for New Ironsides (\$780,000) or Monitor (\$275,000), it reflects not only the increased size of the vessel but the advance of prices due to inflation and the scarcity of materials for shipbuilding in general.¹⁴

¹²This ship would have been 325 feet long and 54 in beam, with a draft of seventeen feet. Lenthall to Welles, July 23, 1863, NARG 19, Entry 49. Drawings are in NARG 19, BuShips Plan 80-9-1. Although her measurement tonnage was 3,500, her displacement would have been over 5,300 tons.

¹³A detailed description and rationale for the price is in Merrick & Sons to Lenthall, September 7, 1863, NARG 19, Entry 71, 5: 131.

¹⁴For materials, see Cramp's comments (Chapter 2); testimony by Chief Engineers Hoyt and Wood, Joint Committee, "Light Draught Monitors," 35, 64-65; Erastus W. Smith to

By comparison, the pre-Civil War frigate Roanoke cost \$820,000 to build in 1856.¹⁵ During the War, the cost of building commercial ships rose 60 percent.¹⁶

As an example of the increased cost of armored ships, the Navy Department between March and June 1863 contracted for twenty "light draft" monitors. Designed by Chief Engineer Stimers, each was to carry two XI-inch Dahlgren guns in a single turret. The contract price was \$386,000 apiece. During construction the ships were modified repeatedly and the modifications aggregated some \$100,000 per vessel. When the first were launched they were seriously overweight, and most were modified or rebuilt for another \$80,000 each.¹⁷ Thus, vessels little superior to the original Monitor cost

William H. Webb, November 7, 1864, National Archives, Record Group 19, Entry 186, Records Relating to Claims, Subentry 137, s.v. Dunderberg. Smith said materials prices had advanced 76 percent and mechanics' wages 83 percent.

¹⁵Alden, "Forty Years Too Soon," 252.

¹⁶K. Jack Bauer, A Maritime History of the United States (Columbia: University of South Carolina Press, 1988), 288.

¹⁷Testimony of Donald McKay, builder of the Nanset, Joint Committee, "Light Draught Monitors," 43. McKay would charge \$586,000 to duplicate Nanset, *ibid.*, 42. Testimony of Nathaniel McKay, builder of Squando, *ibid.*, 29. Tunxis was to be altered for \$115,000. Testimony of Rear Admiral Gregory, *ibid.*, 76. Raising Nanset's sides would cost \$86,000; for other ships Wood gave the cost of "raising up" as \$55,000 to \$80,000, and Gregory estimated \$55,000 to "more than \$90,000," *ibid.*, 45, 64, 76.

twice as much to build.¹⁸

Part of the increase in asking price for armored ships was due to the growing sophistication of shipbuilders as they learned more about the material with which they had to work. Thomas F. Rowland of the Continental Works contracted to install the port lids of the Galena for ten cents per pound. He found the amidships ports cost almost fifty cents per pound for labor to install, and those at the stern cost nearly \$1.00 per pound for labor alone. He wrote, "Until we have had more experience in this country in forming and applying these heavy plates, I, for one, don't care to tackle it at any price that I dare at present name."¹⁹

In late 1863 the Navy Department advertised for more seagoing ironclads but none was built, apparently because of the extremely high cost. In December 1863, Merrick & Sons proposed a seagoing broadside design of 7,100 tons costing \$4,300,000.²⁰ In January 1864, Otis Tufts of Boston proposed a ship 380 feet long and 61 feet in beam, to carry

¹⁸The "light drafts" were to carry two XI-inch Dahlgren guns in one turret, the same as Monitor, on a displacement of 1,175 tons, close to Monitor's 987 tons. Figures from Gardiner, Fighting Ships, 119, 123.

¹⁹T. F. Rowland to Wm. E. Everett, May 15, 1862, NARG 19, Entry 71, 2: 172.

²⁰Sloan, Isherwood, 61-62. Even Merrick & Sons tired of unrequited proposals. On January 23, 1864, they wrote Lenthall they did not plan to answer his advertisement for proposals for a large ironclad. NARG 19, Entry 70, 1: 24.

four XV-inch Dahlgrens in casemate and cost \$3,160,000.²¹ Others proposed ships costing as much as \$6,948,000 and requiring up to three years to complete.²²

Still another follow-on design was that of Charles H. Cramp, who said in 1897 that he proposed building two more ironclads of "similar type" to the New Ironsides, presumably with wooden hulls.²³ He planned to improve the ships by using twin screws and "increasing the efficiency of the armor." He asserted, "At that time [1863], what was known as the 'MONITOR craze' was in full blast and, notwithstanding the excellent all-around performance of the 'IRONSIDES' she remained the only seagoing broadside iron-clad in the Navy."²⁴ By 1864 ultimate Union success was becoming clear but war weariness was growing in the North. The investment of time and money required to build a large seagoing iron-clad was no longer politically or militarily practical.

The "Monitor craze" was a drawback to those in the Navy Department, particularly Lenthall and Isherwood, who

²¹This started as a 3,500 ton proposal but grew to 5,400 tons. Tufts to Lenthall, January 4, 1864, NARG 19, Entry 71, 4: 4. For a larger Tufts design, Smith to Welles, December 26, 1862. NARG 45, Entry M518, Roll 18: 91.

²²Sloan, Isherwood, 61-62.

²³Cramp, [Contemporary Club], 3-4; Joint Committee, "Light Draught Monitors," 39, 42-43, 76, 96-97.

²⁴Cramp, [Contemporary Club], 9. For a discussion of the psychological roots of the "Monitor craze," Earl J. Hess, "Northern Response to the Ironclad: A Prospect for the Study of Military Technology," Civil War History 31 (1985): 126-43.

supported the building of seagoing high freeboard iron-clads.²⁵ After the Monitor-Virginia engagement, Fox became an ardent supporter of Ericsson and Welles capitalized politically upon the Monitor's success.²⁶ Other influential officers such as Admirals Dahlgren and Porter were strong monitor supporters as well. Grudgingly admitting that New Ironsides was "better suited for attacking fortifications under certain conditions," Porter believed she would have stood no chance in a ship-to-ship engagement with a monitor. After the Monitor-Virginia battle, he wrote, ". . . there was no longer, as regarded the Monitor system, a pin to hang a doubt on."²⁷

To the unbiased, that lack of doubt did not survive the rough handling the monitors received in DuPont's Charleston attack. The Department's enthusiastic espousal of

²⁵Cramp and Merrick climbed on the monitor bandwagon. Gardiner states Cramp contracted for the light-draft Yazoo on March 2, 1863, (Gardiner, Fighting Ships, 123), but Bennett assigns Yazoo to a Merrick contract and states Cramp built Tunxis for Reamy, Son & Archbold. Bennett, Steam Navy, Appendix B. Cramps' history says the firm built Yazoo and does not mention Tunxis. Cramp's Shipyard, 16. Merrick & Sons was the contractor for Yazoo. Merrick & Sons to Lenthall, NARG 19, Entry 71, 4: 337.

²⁶Sloan, Isherwood, 66. Belknap wrote that Welles and Fox "pinned their faith to the Monitor class of iron-clad." Belknap, "Siege of Charleston," 187. "Welles, though more objective about the monitors than Fox, steadfastly supported his Assistant Secretary." Niven, Gideon Welles, 437.

²⁷David D. Porter, The Naval History of the Civil War (Seacaucus, NJ: Castle, 1984; reprint of 1886 edition), 362. Dahlgren expressed his preference in Dahlgren to Welles, January 28, 1864, ORN 14: 598-600.

the Monitor type undoubtedly contributed to the acrimony when that attack failed. In the emotionally charged atmosphere of the war, the blame for failure had to be placed either upon the ships themselves or their employment. The Department had thrown in its lot with the "monitor men" and DuPont was the commander. It is thus understandable that DuPont officially bore sole blame for the failure, although clearly both ships and leader were flawed.

Pro-monitor prejudice was evident outside the Department as well. By December 1862, the same New York Times which had so strongly supported large ironclad ships in March 1862 was calling the proposed seagoing ironclads "Another Job." The New York Times wrote, "We are threatened with two 7,000-ton ships, iron-clad in a manner which the whole practice of Europe and America has proved defective, at four million two hundred thousand dollars a-piece."²⁸

Writing in 1883, Lieutenant Edward Very was critical of the monitor proponents. He stated,

. . . so great was the glamor cast over the monitor type of ships by the defeat of the Merrimac [sic] and the name of Ericsson, that although steering-gear was deranged and turrets were jammed in every general action, the spindle-turret with its pilot house mounted on top was retained unaltered even in

²⁸"Another Job," New York Times, December 25, 1862, 4. The editorial continued, "If that is not bad enough, we may add that the designs of hull and machinery were made by the Bureaux of Construction and Steam-engineering."

the monitors rebuilt in 1874.²⁹

Instead of regarding DuPont's attack on Charleston as a test of the ships so that their weak points could be remedied, "there was a demand--not only implied, but expressed, in official language and the most positive terms--that the shortcomings of the monitors should not be made known, in order not to give encouragement to the rebels." Because these serious faults were not corrected, the monitor type "never passed the age of swaddling-clothes" in the United States.³⁰

Besides Dunderberg and New Ironsides, the other "sea-going" ironclads built by the U.S. Navy during the Civil War were of the low freeboard monitor type.³¹ The Miantonomoh class included four 3,400-ton, wooden-hulled monitors, designed by the Bureau of Construction and Repair and built in

²⁹Very, "Development of Armor," 399. DuPont, commenting that the government sent "untried machines . . . all received on Mr. Ericsson's dictum," noted that these "novelties" were tested "against the most thoroughly and scientifically defended place in America. . . ." DuPont to H. W. Davis, May 3, 1863, Hayes, DuPont Letters, 3: 77.

³⁰Very, "Development of Armor," 400. Welles wrote DuPont that since many of the official reports detailed the "imperfections, or supposed imperfections, of a class of formidable vessels of our service," their publication would "discourage our friends" and encourage the rebels. ORN 14: 62. Accordingly, Welles refused to publish them.

³¹Roanoke was to be a high-freeboard seagoing vessel but was overweight when completed and capable only of harbor service. Sloan, Isherwood, 56-57; Gardiner, Fighting Ships, 120; Alden, "Forty Years Too Soon," 257-59, 261-63.

Navy Yards.³² Their armament was four XV-inch guns in two turrets. U.S.S. Monadnock of this class saw some action but the other three were not completed until after the War's end. Although they were reasonably effective in combat, they were not particularly successful in the open sea.³³

U.S.S. Dictator was an iron-hulled Ericsson design, of 4,400 tons displacement and carrying two XV-inch guns in a single turret. After her completion in November 1864, she set out to join the assault on Fort Fisher but had to return to port because of engineering difficulties.³⁴

Puritan, another iron-hulled Ericsson design, was to carry one turret with two XX-inch guns on her 4,900 tons. She was never finished, nor were the four wooden-hulled ships of the 5,660-ton Kalamazoo class, a Bureau design.³⁵

The seagoing monitors were contracted for in 1862 and 1863, some very soon after the original Monitor's action

³²Gardiner, Fighting Ships, 121; Bennett, Steam Navy, Appendix B.

³³Monadnock rounded Cape Horn and Miantonomoh crossed the Atlantic, but neither was particularly habitable at sea and their performances were "achieved at great price of human labor and suffering . . . Full confidence in the seaworthiness of monitors does not exist yet. . . ." Frank M. Bennett, "Reconstructed American Monitors," Journal of the American Society of Naval Engineers, August 1897, 529. Bennett served in Amphitrite (ex-Tonawanda), which had been completely rebuilt under the guise of repairs. Conditions aboard the original ship must have been even worse.

³⁴Gardiner, Fighting Ships, 121; Johnson, John Rodgers, 268-73, 275-78. Dictator's propeller shaft bearings were too short to support the shaft without overheating.

³⁵Gardiner, Fighting Ships, 122.

with the Virginia. Even taking into account the difficulties of obtaining material and skilled labor in the wartime United States, they, like the other seagoing ironclad projects, were not pushed with the vigor which attended the construction of the coastal and "light-draft" monitors. A major reason lay in the changing international situation.

In 1861, there was considerable European approval of the Confederate cause, especially in England. English sympathy for the Confederacy was partly due to a romantic feeling for the South as the underdog and partly due to England's need for Southern cotton for her textile mills. The Union blockade was a constant irritant and incidents such as the "Trent Affair" exacerbated the situation.³⁶ The Trent episode ended in an American apology, and the feeling in the U.S. that war with England must be avoided for the time "for the plain reason that now we are unable to meet it."³⁷

This did not mean that war with England must be avoided for all time. Welles wrote in 1862, "We shall however have a day of reckoning with Great Britain for these wrongs [the Alabama's depredations], and I sometimes think I

³⁶On November 8, 1861, James M. Mason and John Sli-dell, Confederate commissioners to Great Britain and France, were forcibly removed from the British mail packet Trent. The affair inflamed British public opinion. Shelby Foote, The Civil War: A Narrative, Fort Sumter to Perryville (New York: Random House, 1958), 139-40, 156-63.

³⁷Attorney General Edward Bates, quoted in Bruce Cat-ton, Terrible Swift Sword (Garden City: Doubleday & Co., 1963), 116.

care now how soon that reckoning comes."³⁸ Yet if the reckoning had come in 1862, the Union would have been poorly prepared to meet it. The U.S. Navy was in no condition to compete with the Royal Navy. Maintaining and tightening the blockade of the South was difficult enough; if each blockading squadron had to be protected against the British fleet it would have been impossible. Welles rightly concluded that ironclads that could fight at sea were needed.

The Confederacy had no seagoing ironclads, nor the means to build or buy more than a few, and the failure of DuPont's attack on Charleston showed the Confederates could have done only minor damage to Northern ports defended by forts and coastal monitors. After it became clear Confederate ironclads could not venture to sea, the only remaining opponents for U.S. seagoing ironclads were European.

Welles obviously thought the European threat was significant. In December 1863 he wrote,

If I go forward and build large and expensive vessels, I shall be blamed for extravagance, particularly if peace takes place. On the other hand if I should not build, and we have war with England or France, I shall be denounced for being unprepared. . . . A strong navy will deter commercial nations from troubling us, and if not troubled, we need no strong and expensive navy.³⁹

The seagoing ironclad projects which were approved, including both low and high freeboard types, show that Welles

³⁸Welles, Diary, entry for December 29, 1862, 1: 207.

³⁹Ibid., entry for December 26, 1863, 1: 496.

fully supported a seagoing Navy able to protect the country from foreign intervention. As the threat from Europe diminished, so did his support for these expensive ships.

Writing in his diary after the War, Welles noted that when Dunderberg was laid down, "We had a large defensive force, but not as many and formidable vessels as we should need in the event of a war with a maritime power." Dictator and Puritan could break up any attempted blockade, "but we could not cruise with them." Dunderberg was intended for that purpose. Welles wrote, "In view of what was being done by England and France . . . I felt that we might need such a vessel." He felt that three vessels were sufficient; although "I have rejoiced that I did not yield to the appeals [by Fox and others] for more. . . . I feel assured I did right in ordering [Dunderberg] to be built."⁴⁰

Thus, the seagoing ironclads of the U.S. Navy failed of their wartime promise. The main reason was a change of heart by the British and to a lesser extent the French. This reversal of British sympathy was based upon a growing realization of Confederate failure as manifested by Antietam, Gettysburg and Vicksburg, upon a recovering textile industry, and upon the Emancipation Proclamation. One effect of improving U.S. relations with Great Britain was that on September 3, 1863, the British government issued orders

⁴⁰Ibid., entry for July 24, 1865, 2: 340-41. See also Niven, Gideon Welles, 506.

to prevent the sailing of two seagoing ironclad rams which Laird and Company were building for the Confederacy.⁴¹

The "Laird Rams" might have caused the U.S. Navy a serious, although not overwhelming, problem. The British decision to prevent their delivery removed both the immediate threat to the blockade and the long-range threat of war with England. As the prospects of war at sea declined, so did the urgency with which seagoing ships were constructed.

The vessels the Navy needed immediately to defeat the Confederacy took precedence: shallow draft armored ships which could operate in large numbers in the shallow harbors and rivers of the Confederacy, instead of a few, expensive oceangoing ships which could meet European ironclads on equal terms at sea. As Welles wrote, "I was accused of not having a navy of formidable vessels. I had vessels for the purposes then wanted."⁴²

Matters might have changed had New Ironsides, rather than Monitor, met Virginia in combat. Much of the enthusiasm for the monitors was generated by the original Monitor's

⁴¹ Ephraim D. Adams, Great Britain and the American Civil War (Gloucester: Peter Smith, 1957), 2: 116-51; Allan Nevins, The War for the Union, The Organized War, 1863-1864 (New York: Charles Scribner's Sons, 1971), 480, 483-87, 494-503. For Confederate projects in France, Lynn M. Case and Warren F. Spencer, The United States and France: Civil War Diplomacy (Philadelphia: University of Pennsylvania Press, 1970), 427-80.

⁴²Welles, Diary, entry for July 24, 1865, 2: 341.

battle with the Virginia; what might have happened had New Ironsides, rather than Monitor, reaped "the glamor cast over the monitor type" from that engagement? Given the urgent need for many shot proof, shallow draft ships which could be constructed quickly, small armored ships would still have been built, but they might have been the Isherwood-Lenthall "Bureau" design rather than the Ericsson "monitor" design.⁴³ The publicity from a successful single ship action would have dramatically improved the Navy's chances of building more seagoing, high freeboard ironclads like those later proposed by Merrick, Cramp and others.⁴⁴

⁴³The "Bureau" design, by Lenthall and Isherwood, would have had solid plate armor, twin screws and two turrets, compared to the "monitor" design which had laminated armor, a single screw and one turret. Sloan, Isherwood, 58.

⁴⁴Robert Albion concurred: "In many ways, it was unfortunate that the New Ironsides was not completed in time to acquire the prestige of 'stopping' the Merrimack. Like her European counterparts, she would have been a useful nucleus for a general-purpose seagoing fleet. . . ." Robert Greenhalgh Albion, Makers of Naval Policy 1798-1947 (Annapolis: United States Naval Institute Press, 1980), 198.

CHAPTER ELEVEN

CONCLUSION

New Ironsides was the United States Navy's first essay at building a seagoing, high freeboard ironclad. Imperfect in some ways like any prototype, overall she was highly successful. Her high freeboard design was squarely in the European mainstream. She should have been followed up, both during the war and more deliberately afterward; the lessons learned from her construction and wartime service should have provided invaluable instruction for U.S. designers. She was not followed up, for reasons discussed below. By the time twenty years later that the U.S. again built seagoing armored ships, the lessons she could have taught were obsolescent.

During the Civil War, the "Monitor craze" was taken for granted. The decision to build an entire fleet on a single basic design, inconclusively tested in a single action--to place most of the country's naval eggs in a single basket--was accepted as a foregone conclusion. The "Monitor men," led by Gustavus Fox, effectively denied the United States Navy the strategic and tactical benefits of more

ironclads like New Ironsides.¹

The New Ironsides type offered significant tactical advantages, both in offensive power and in seakeeping ability. Before quick-firing guns were developed, the only way to increase volume of fire was by multiplying the number of guns engaged, so the broadside ship's large battery and the rapidity of her fire made her superior. New Ironsides could put over twenty times as much weight of metal on target in an hour as the original Monitor and at least ten times as much as the later classes of monitors with their mixed XI- and XV-inch guns. Off Charleston, New Ironsides fired more shots than all Dahlgren's monitors put together, and despite her lack of XV-inch guns threw over forty-four percent of the total weight of Union Navy metal.² While a single ship was tactically less flexible than multiple ships (and more would be sacrificed if she were lost), a broadside ship could concentrate fire to achieve an effect that monitors acting jointly could not.

While the large battery and high volume of fire of the New Ironsides type was a great tactical advantage in projecting power ashore, the ship's high freeboard and ability to fight at sea could have been even more vital to the Union

¹As Belknap stated, regarding the New Ironsides and monitor types, "Both classes of iron-clads were incomparable for their special purpose, but unfortunately for the country, the Monitor class had the most potent countenance of the Navy Department." Belknap, "Siege of Charleston," 188.

²Based on figures from Dahlgren's report, ORN 14: 596.

strategically. The ironclads the Confederacy was building overseas, such as the "Laird rams," could fight in the open ocean while the monitors could not. Cramp's two follow-on high-freeboard ships of the New Ironsides type would have greatly improved the Union's strategic position at relatively small cost.

The demonstrated superiority of the New Ironsides against shore fortifications offers tantalizing "what-ifs." There were other ports, such as Wilmington, Mobile, and New Orleans, where the Union might profitably have employed New Ironsides good seakeeping qualities, invulnerability and firepower. Her draft, although greater than that of the monitors, was up to two feet less than that of unarmored ships which mounted batteries less capable than her own.³ The two additional ironclads which Charles Cramp proposed to build to the New Ironsides design could have permitted earlier neutralization of Fort Fisher, potentially shortening the war by choking off supplies to the Army of Northern Virginia.

Economy was another consideration in favor of more ships of the New Ironsides design. In relative terms, each of the two guns of the original Monitor cost \$137,500 to put afloat; the sixteen guns of the New Ironsides only \$50,815 each. If the price of the original New Ironsides doubled to

³New Ironsides drew fifteen feet, Hartford drew seventeen feet two inches, Brooklyn drew sixteen feet three inches.

account for inflation and modest improvements, a follow-on New Ironsides would still have cost only \$102,000 per gun. By contrast, the monitor Passaic cost \$211,585 per gun. The light-draft monitors, contracted at \$193,000 per gun, finally cost from \$265,000 to \$324,000 per gun; the "seagoing" double-turreted monitors Miantonomoh and Monadnock, \$245,000 and \$327,700 per gun.⁴ In absolute terms, for each three useless light-draft monitors, the Navy could have had at least one more follow-on New Ironsides.

While the situation in 1863 was not as desperate as during the first year of the War, speed of construction was still a consideration. Of the twelve seagoing ironclads built for the Union, only three (including New Ironsides) were completed during the war. The New Ironsides design, a proven one, could have been repeated more easily and built more quickly than new ships designed from the keel up.

Despite her advantages, New Ironsides received little attention in Europe, and British discussion of the naval aspects of "the American war" was predominantly monitor-oriented.⁵ This is not surprising for several reasons.

First, monitors were novel. Second, their low freeboard and revolving turrets fit in with ideas already

⁴Figures based on Bennett, Steam Navy, Appendix B.

⁵Some examples are John Bourne, "On the American System of Turret Ships," Transactions INA 7 (1866), 131-43; Jasper Selwyn, "On Armoured or Iron-clad Ships--Their Advantages and Defects," Journal RUSI 8, no. 30 (1864), 81-104; Tyler, "Spithead and Harbour Defence," 139-47.

advanced in the Royal Navy by Captain Cowper Coles. Third and most important, in high freeboard seagoing ironclads the Europeans were already ahead of New Ironsides. Although she compared well with the first British and French ironclads (the Warrior and Defence classes in England and the French Gloire and Couronne and the Magenta class), by the end of the Civil War New Ironsides was obsolescent, eclipsed by newer European designs.

Despite the general lack of attention to New Ironsides herself, Europe recognized the value of high freeboard. Ironclad development was far from homogenous among the European powers but the tendency toward high freeboard designs is unmistakable. By the end of the 1860s, few low freeboard designs were being built, and most of those were unsuccessful at sea. British attempts to combine low freeboard with masts and sails came to an abrupt end when H.M.S. Captain foundered in 1870. In France, the mastless monitor Tonnerre nearly capsized as a result of a sharp turn to port. Even the British "breastwork monitors," nominally "low freeboard" ships but with a raised superstructure, had almost twice the freeboard of American monitors and carried their guns fourteen feet above the water.⁶

By 1870, high freeboard for good gunnery and sea-keeping was recognized as an important element of ironclad

⁶For Captain, Parkes, British Battleships, 137-43; for Devastation and her four feet six inch freeboard, *ibid.*, 195-202; for Tonnerre, Hovgaard, History of Warships, 37.

design. In this vital respect, New Ironsides was well ahead of the monitors. Despite this head start, the seagoing ironclad was poorly followed up in the U.S. Navy. During the Civil War, the Navy's advantages of wartime urgency and free-spending Congresses notwithstanding, the service was unable to build more ships like the New Ironsides, the only seagoing ironclad design proven to be successful. After the war the situation deteriorated.

Sailing ships and smoothbore ordnance changed little in two centuries, but iron ships, steam machinery and rifled ordnance changed from year to year.⁷ In this environment, an evolutionary construction program was mandatory for any navy that wanted to maintain its relative power. Yet with the end of the Civil War the U.S. Navy's immediate need for armored warships also ended, and politically popular retrenchment struck hard at the Navy's shipbuilding programs.

Retrenchment began even before the end of the war, when it was clear the Confederacy was close to defeat. In February 1865 Welles directed squadron commanders to reduce expenses.⁸ By July 1865, the blockade was reduced to about 30 ships, from 471 in January 1865, and by December 1865, the improvised wartime Navy was gone.

The Navy's budget was almost \$117 million for fiscal

⁷Peter Padfield, Guns at Sea (New York: St. Martin's Press, 1974), 57-69, 111-16, 137-43.

⁸Navy Department circular letter dated February 24, 1865, SecNav 1865, ix; Niven, Gideon Welles, 506-507.

year 1865 and its expenditure during the War about \$72.5 million annually. The United States budget deficit was \$974 million in 1865 and its total national debt was over \$3 billion, not to mention the damage inflicted upon both North and South by the War.⁹ There was no surplus of funds which could conveniently be used to continue the evolution of the ironclad, and Congress was unwilling to take money from elsewhere for the purpose.

Several things compounded Congressional parsimony. Even before the War ended, antipathy to the Administration was expressed in politically motivated investigations of the Navy Department. Welles and Fox came under heavy fire from legislators intent on settling old scores. Among them was Radical Republican Congressman Henry Winter Davis of Maryland, a close friend of Rear Admiral DuPont and deadly political enemy of the Francis Blair family, whose "violent assaults" Welles noted in his diary.¹⁰ Congressman Elihu Washburne of Illinois considered even Welles' much-reduced

⁹For budget, SecNav 1865, xxxi-xxxii. For deficit and debt, Andrew McLaughlin and A. B. Hart, eds. Cyclopedia of American Government (New York: D. Appleton & Co., 1914), 2: 16.

¹⁰Welles, Diary, entry for July 24, 1865, 2: 341; William E. Smith, The Francis Preston Blair Family in Politics (New York: Da Capo Press, 1969), 2: 255, 263. For Davis' relations with other Republicans, Niven, Gideon Welles, 435, 438-39. Davis died in December 1865.

budget to be excessive.¹¹

Congress's attitude was that the Navy was good enough. In Congressional debate in 1865, Senator James W. Grimes of Iowa said of the monitors, "For harbor defense, the purpose for which they were originally devised, they are unapproached by anything yet invented by the ingenuity of man," and in 1865 his attitude was still justified.¹² At the end of the Civil War, the United States possessed the world's largest ironclad fleet. Within a strictly limited sphere, the coastal waters of the United States, the United States Navy was superior to any possible invader.

Given the economic climate of retrenchment and Congressional satisfaction with the country's naval power, the multitude of leftover monitors eliminated any political or financial support in the Congress for evolutionary development of naval architecture of the sort accomplished in Europe. The armored ships needed to extend U.S. naval power

¹¹Sloan, Isherwood, 133-41. A discussion of the "Politics of Decline" is in William Scott Peterson, "The Navy in the Doldrums: The Influence of Politics and Technology on the Decline and Rejuvenation of the American Fleet, 1866-1886" (unpublished Ph.D. dissertation, University of Illinois at Urbana-Champaign, 1986), 10-43. Albion avers, "There was money enough, if intelligently spent, to have secured an adequate Navy." Albion, Naval Policy, 199.

¹²Congressional Globe, 38th Cong., 2d Sess., February 17, 1865, 866. Grimes, generally a friend of the Navy, also said, "The trouble about the monitors has arisen from the fact that their friends have claimed too much for them while their enemies have too greatly undervalued them." Senator Benjamin F. Wade of Ohio called vessels like New Ironsides a failure.

beyond the coastal area never joined the fleet.¹³ As a result, the local superiority of 1865 had completely evaporated ten years later.¹⁴

Congressional economic arguments against seagoing ships were bolstered, not opposed, by the strategic theory of the day. In this pre-Mahan era, U.S. Navy strategy may be simplistically described as coastal defense and commerce raiding. It rested on two premises: first, commerce raiding would wreck an enemy's commerce and tie down his navy in attempts to protect what little shipping remained to him, and second, fortifications supplemented by coastal (or even harbor) defense ironclads could protect the coastline and ports from invasion and bombardment.¹⁵ Seagoing ironclads were not vital to the Navy's strategic vision.

When the range of guns was only a few hundred yards, the strategy of harbor defense had validity. To damage a

¹³The Navy built ten seagoing monitors and two broadside ironclads. New Ironsides and the five monitors of the Miantonomoh and Dictator classes were eventually completed. The broadside Dunderberg was sold to France in 1867 and five monitors of the Puritan and Kalamazoo classes were broken up on the stocks. Gardiner, Fighting Ships, 119, 122.

¹⁴In 1874, Commodore Foxhall Parker wrote, "What could be more lamentable . . . than to see a fleet armed with smooth-bore guns, requiring close quarters for their development, moving at the rate of four and a half knots an hour? What inferior force could it overtake, or what superior one escape[?] . . ." Foxhall A. Parker, "Our Fleet Maneuvers in the Bay of Florida," Proceedings USNI 1, no. 8 (1874): 168-69.

¹⁵Harold Sprout and Margaret Sprout, The Rise of American Naval Power (Princeton: Princeton University Press, 1946), 80-82.

seaport city, an enemy ship had to enter its harbor, passing or destroying its fortifications. Once past the shore batteries, the enemy ship would be at a qualitative disadvantage against a harbor defense vessel, which in theory could concentrate thick armor and heavy guns on a small, shallow draft hull. The harbor defense vessel had no need for speed or endurance to seek the enemy, since the enemy had to enter the harbor to achieve his objective, and its shallow draft permitted it to move freely where the seagoing enemy could not. In fact, many American harbors could not be entered at all by deep draft European ironclads.

With improvements in gunnery came a divergence between theory and practice. As gun ranges increased, ships could inflict damage at dramatically greater distances. The ocean area from which the enemy could damage a seaport, and thus the area which the defender had to deny to the enemy, increased geometrically.¹⁶ The harbor defense vessel could no longer rely upon meeting a seagoing opponent in protected waters. With its tactical advantage of shallow draft thus nullified, its slow speed prevented it from reacting fast enough to cover the enlarged area and its poor seakeeping prevented it from meeting the enemy at sea.

Lenthall and Isherwood foresaw this. In their March

¹⁶A graphic depiction of this growth, from the coast artillery view, may be found in Emmanuel R. Lewis, Seacoast Fortifications of the United States: An Introductory History (Washington: Smithsonian Institution Press, 1970), 13.

1862 letter on seagoing ironclads, they argued that it was "cheaper, more effective, and more sustaining of the national honor" to protect the nation's coasts "by keeping command of the open sea." Although harbor defenses could keep an enemy from entering a port, "they could not drive him from its gates." They concluded it was better to fight at the threshold than on the hearthstone.¹⁷

Surprisingly, the strategy of coastal defense and commerce raiding remained in vogue despite the experience of the Civil War. In that conflict the South used that strategy, partly by intention and partly because Southern resources were inadequate to do much else. The Confederacy built forts and ironclads for coastal defense and raided Union commerce using fast wooden cruisers. The dominant Union Navy enjoyed freedom of action and hampered its enemies' warmaking by blockade. Union armies which maintained contact with the coast could be supplied or evacuated. The weaker power tried to protect its coastline and to force the stronger to capitulate by commerce raiding.

As in the War of 1812, the weaker power failed. Coastal defense and commerce raiding were strategic failures. The Union won command of the sea and denied its use to the Confederacy.¹⁸ This lesson of strategic failure, dearly

¹⁷Lenthall and Isherwood to Welles, March 17, 1862, reprinted in Joint Committee, "Light Draught Monitors," 111-12.

¹⁸Sprout, American Naval Power, 160-64.

bought, was not applied to post-War naval construction.

The "line-engineer controversy" involved Lenthall and Isherwood and provided another reason for failure to develop the seagoing ironclad. Although the evolution for which the Bureau chiefs agitated was necessary to maintain the U.S. Navy's relative position, development was disturbing to older naval officers. When peace came, parsimony joined conservatism to impel a return to the "conventional" Navy--the sailing Navy.

Although a detailed discussion is beyond the scope of this work, the conflict was between the "line" officers (who navigated, fought and commanded ships) and the naval engineers.¹⁹ With steam propulsion, a split developed between the men who fought and those who operated the ship. The result was greater status for engineers and a relative decline for line officers. Predictably, the line reacted. Since the influence of the engineers came from their engines, the line officers set out to reduce the importance of steam. Ironclads, full of machinery and dependent on steam, were prime targets. Since Isherwood was anathema to senior line officers, it is not surprising that his seagoing

¹⁹For a fuller discussion, see Sloan, Isherwood, 189-212; Karsten, Naval Aristocracy, 65-69, and Elting E. Morison, Men, Machines and Modern Times (Cambridge, MA, and London: The MIT Press, 1966), 114-18.

ironclad projects did not meet with their favor.²⁰

The superiority of high freeboard ships for seagoing action and New Ironsides' demonstrated effectiveness in action against shore fortifications were insufficient to tip the postwar balance in favor of seagoing ironclads. Sea-going armored ships needed powerful sponsorship and unanimity within the Navy, to overcome objections to their cost and prod Congress into action. In the absence of sponsorship, the Navy was unable to persuade Congress that money for ironclads would be well spent.

By failing to develop the seagoing ironclad the United States forfeited the advantages it might have gained over the European navies from its extensive combat experience. The lessons learned from the Civil War were largely lost and deficiencies in industrial base, ship design, personnel experience, and tactics inevitably followed. The gap between American and foreign practice widened year by year until when naval building recommenced in the 1880s it was extremely difficult to cross.

Thus New Ironsides, the precursor of the seagoing, high freeboard battleship, had no direct descendant in the United States Navy. No other Union ironclad could have done what she did, whether it was protecting the blockaders off

²⁰All the most senior Navy officers were line officers. There were factions in the Engineer Corps, pro- and anti-Isherwood, and the latter short-sightedly allied with the line. Sloan, Isherwood, 210-11; also 133-41, 189 ff.

Charleston during the stormy early months of 1863 or supporting the Army at Fort Wagner and Fort Fisher. Her bright promise and brilliant career were neglected in the post-War reaction, and the U.S. Navy's best opportunity to build a seagoing ironclad fleet was lost for a generation.

EPILOGUE

The night of Saturday, December 15, 1866, was windy in Philadelphia, and the cold rain borne on the northeast wind made a stove a welcome fixture. Shortly after eight o'clock, Frederick Frederickson, a shipkeeper at the League Island Navy Yard, made his evening rounds. He attended to the coal stove in the engine room of the New Ironsides, and then to the stoves on the other four ships in his charge.

On his return to New Ironsides at 10:25 P.M., he reached the gun deck on his way below when he smelled smoke. He saw smoke coming from the lower deck hatches, but could not find the fire and returned ashore to give the alarm. The watchmen tried to fight the fire while the duty officer, Acting Ensign William A. Stannard, was called. He, with Second Assistant Engineer Absalom Kirby, roused the watch and sent messengers to his superiors.

Stannard and Kirby located the fire on the berth deck and hold, aft of the engine room, but the bucket brigade they formed was handicapped by choking smoke, too few men and too few buckets. By the time the steam fire engines from the Shiffler, Franklin and Southwark fire companies arrived, it was too late--the fire was out of control. The

ship was towed to shoal water, where she burned to the water's edge and sank.¹

The Philadelphia papers on the seventeenth were full of the news. "DESTROYED!! Sad End of an Invincible War Ship." said the Philadelphia Inquirer. The Philadelphia Public Ledger noted that the ship, "considered the best iron-clad in the American Navy," was "an especial favorite with Philadelphians." All the papers agreed with the witnesses who testified at the Navy's preliminary inquiry--the fire must have been the work of an incendiary. The quarter-inch iron of the engine room bulkhead made it impossible that the pine wood behind it could catch fire from the stove.

The investigating board, headed by Captain James Madison Frailey, reached the same conclusion. In their report, forwarded to Secretary Welles on December 27, 1866, they stated the fire "did not originate from any fire or light authorized or known to be on board," and the Commandant of the Navy Yard, Rear Admiral Thomas Selfridge, agreed.²

The endorsers at the Navy Department were not so

¹Rear Admiral Thomas O. Selfridge, Sr., to Welles, December 17, 1866, Library of Congress, Manuscript Division, Naval Historical Foundation Collection, Papers of Thomas O. Selfridge, Sr., "Copies of Letters to Hon. Secretary of the Navy, Bureau of Yards and Docks, and Bureau of Construction &c., 1866-'68, from U.S. Navy Yard Philadelphia," no. 419, addresses the tow.

²Frailey was the officer responsible for the inactive ironclads and Selfridge was his immediate superior.

charitable. One Bureau chief noted that the suppositions of the witnesses concerning incendiarism were "not sustained by a single fact," and that the fire organization and apparatus were very defective. The gun deck ports and hatches were standing open as well. Another Bureau chief noted that the testimony showed there were only four or five persons on board forty minutes after the fire had started, and that the General Orders governing fire fighting and the proper conduct of the watch had all been issued two days after the fire. The Department's consensus was that the stove had set the wooden backing of the engine room bulkhead on fire, and that the ship could have been saved had the Navy Yard's fire organization been adequate.³

Whatever the cause, New Ironsides was gone. During the Civil War, New Ironsides was in action more days than any other vessel of the Navy. Admiral Porter once wrote that she had a reputation for having been hammered more thoroughly than any vessel that ever floated.⁴ That comment can stand as her epitaph. The Navy received its money's worth in the New Ironsides.

³The investigations, both preliminary and formal, are in NARG 45, Subject File, HF--Fires and Explosions, Box 178. The Philadelphia Inquirer story occupies the front page of Monday, December 17, 1866; the Philadelphia Public Ledger's story is on page one of the same day. The Philadelphia Daily Evening Bulletin ran its story on page 12 of the December 17, 1866 edition.

⁴Porter, quoted in Bennett, Steam Navy, 273.

BIBLIOGRAPHICAL ESSAY

Despite her seagoing superiority and successful wartime service, there has been little written about New Ironsides. The primary reason has been overwhelming concentration on the monitors. Historians tend to dismiss New Ironsides, if they mention her at all, as an old fashioned design completely outclassed by the revolutionary monitor type. Nothing succeeds like success; after the Union won the war, the defects of the monitors and the wartime controversies about them paled alongside their glorious victories. As the monitors quickly passed into obsolescence, the legend of the brave little "cheesebox on a raft" remained.

The small amount of historical literature associated with the New Ironsides is operationally oriented, of the "untarnished gold on the sleeves of our heroes" school. The major secondary sources for the New Ironsides comprise four articles. George E. Belknap's 1879 "Reminiscent of the 'New Ironsides' Off Charleston" and Edward Shippen's 1889 "Fort Fisher--December, 1864, and January, 1865" were published by

United Service Magazine.¹ They are first-person reminiscences, the former by the Executive Officer and the latter by the assistant surgeon. The third is a chapter in a 1903 book by Frederic S. Hill, and the fourth, which probably had the widest circulation of any, was a section in Robert W. Neeser's 1926 series on "Historic Ships of the Navy," published in the United States Naval Institute Proceedings.²

Belknap's "Reminiscent of the 'New Ironsides'" is not simply a personal narrative. His recounting of the events of DuPont's Charleston assault includes a critique of the battle as well as a description of conditions in the New Ironsides. He briefly discusses ironclad policy and concludes the Navy should have built fewer monitors and more armored frigates:

The same energy, expended early in the war in building a fleet like the 'Ironsides' class, that was put forth in constructing the monitors, would have led to the capture of Charleston, Mobile and Wilmington early in '63, and the Confederates would have been cut off entirely from the supplies carried in by the blockade-runners, and the enormous expense of blockading those ports would have been saved.³

Belknap saw combat both in New Ironsides and in

¹George E. Belknap, "Reminiscent of the 'New Ironsides' Off Charleston," United Service Magazine, o.s., 1 (January 1879): 63-82; Edward Shippen, "Fort Fisher--December, 1864, and January, 1865," United Service Magazine, n.s., 2 (July 1889): 11-25.

²Frederic S. Hill, Twenty-six Historic Ships (New York: G.P. Putnam, 1903); Robert W. Neeser, "Historic Ships of the Navy--New Ironsides," Proceedings USNI 52 (1926): 2443-51.

³Belknap, "Reminiscent of the 'New Ironsides'," 79.

monitors; after leaving New Ironsides, he commanded the monitor Canonicus. His article is the best available source from which to gain an appreciation of New Ironsides' contribution to the Civil War, at least through 1864, but it is still generally limited to shipboard events and observations and does not extensively discuss any larger issues.

Shippen's work on Fort Fisher is more personal and anecdotal than Belknap's article and includes a bare minimum of information descriptive of the ship. About half of the article deals with the fighting on land and the author's subsequent tour of the captured fort. The article draws no conclusions in any area. It shows the lapse of years between action and recollection in errors of date and detail.

Both Hill's and Neeser's articles are essentially operational histories. Each commences with a description of the ship and continues, in more or less detail, with a chronological narrative of the ship's career.

Hill's 1903 effort is the longer and more detailed of the two, but includes much information about the operations off Charleston, the siege of Charleston and the attack on Fort Fisher which does not relate directly to the New Ironsides.⁴ The work draws heavily upon Belknap's articles. Hill errs in several constructional and operational details, including the ship's dimensions, the design of her pilot

⁴It is easy to believe this matter is padding to fill up Hill's chapter on New Ironsides to respectable length.

house, and the dates of her decommissioning and destruction. He does not evaluate her performance and draws no conclusions about her impact upon ironclad development.

Neeser's 1926 article is also devoid of evaluation. More accurate in his description of the ship than Hill, he depends less overtly upon Belknap. The dates he assigns for Captain Turner's relief from command and the ship's destruction by fire are incorrect.

There are two less-well-known secondary sources, one an article and one a section of a book, which deal primarily with the ship's construction. The article, which would have had only limited circulation, is an 1867 editorial entitled "The U.S.S. Armored Frigate New Ironsides," which appeared in the Journal of the Franklin Institute.⁵ This anonymous editorial, a good source of design and construction detail, appears to have been written by someone closely connected with Merrick & Sons. In his book, A Year on a Monitor, Alvah F. Hunter states that the author was J. Vaughn Merrick. Because of the Merrick family's close connection with the Franklin Institute, the statement is credible.⁶ In keeping with the nature of the Journal, the article is

⁵[J. Vaughn Merrick], "Editorial. The U.S.S. Armored Frigate New Ironsides," Journal of the Franklin Institute, 3d ser., 53, no. 2 (February 1867): 73-81.

⁶Samuel Vaughn Merrick, J. Vaughn Merrick's father, helped to found the Franklin Institute and served as its President from 1841 to 1853. J. Vaughn Merrick was elected to the Institute's Board of Managers in 1863 and served as President from 1868 to 1869.

technical, focused upon the design and construction of the ship. It has just sufficient discussion of New Ironsides' operations to support the author's contention that the ship was successful.

The book passage is Charles H. Cramp's address to the Contemporary Club of Philadelphia, which appears in Augustus C. Buell's 1906 book, The Memoirs of Charles H. Cramp.⁷ This address, apparently given in 1897, contains valuable material on the ship's design and construction. The printed version is longer than the typescript, a copy of which is in the Belknap Papers. Cramp makes observations on the course of the Navy's ironclad program, but only to discuss in passing the "Monitor craze." He makes some errors of chronology in his discussion, but this can be attributed to a lapse of thirty-five years between the events and the recollections.

The Dictionary of American Naval Fighting Ships is a widely distributed tertiary source, apparently compiled from secondary sources including Neeser. The brief historical sketch given is purely narrative but contains numerous

⁷Augustus C. Buell, The Memoirs of Charles H. Cramp (Philadelphia and London: J. P. Lippincott Co., 1906), 63-71. I have used the typescript where possible since Buell's reputation for scholarly accuracy is not without spot. Allan Nevins wrote, referring to another Buell book, "When his sources ran thin, Mr. Buell calmly manufactured new ones." Allan Nevins, from The Gateway to History, quoted in The Historian as Detective: Essays on Evidence, ed. Robin Winks, (New York: Harper Colophon Books, 1969), 201-202.

errors, especially of chronology.⁸

Among primary sources, the most valuable for New Ironsides' design and construction is National Archives Record Group 71, Records of the Bureau of Yards and Docks. Little of Merrick & Sons' correspondence has survived. Accordingly, the several series of Yards and Docks letters provide almost all of the primary information available about the original proposal and the evolution of the design during the construction period. Other entries contain the contract for the ship and the record of the Government's financial dealings with the contractor.

There is little about the ship in Record Group 19, Records of the Bureau of Ships, since the Bureau of Ships' predecessor bureaux (Steam Engineering; Construction, Equipment and Repair; and Construction and Repair) were not directly involved in her construction. The Plan File, also part of Record Group 19 but housed at the National Archives Cartographic Branch, contains plans of the ship and of her novel gun carriages but not of her machinery. This lack is made up by a very complete set of plans for U.S.S. Wyoming's

⁸United States Navy Department, Naval History Division. Dictionary of American Naval Fighting Ships 8 vols. (Washington: GPO, 1959-81), 5: 58-59. Hereafter DANFS. For example, DANFS states the ship joined the squadron off Charleston on January 17, 1863, but that was actually when she reached Port Royal. She served as DuPont's flagship only for the April attack. The dates given for her departure from station and her recommissioning in 1864 and her destruction by fire in 1866 are incorrect. Since these errors match those Neeser makes, the editors of DANFS probably used Neeser's material without checking it.

machinery, of which New Ironsides' was a duplicate. Record Group 19 also contains New Ironsides' Steam Logs.

Record Group 24, Records of the Bureau of Personnel, includes the Deck Log for the ship's entire commissioned service, an incomplete series of Muster Rolls, and individual Records of Officers. Record Group 45, Office of Naval Records and Library, contains much material in the "Old Navy" Subject File. It also contains Captain Radford's letter books and the Squadron Letters for the ship's service in the North and South Atlantic Blockading Squadrons.

Considerable information, generally scattered, about New Ironsides is found in other groups. Record Group 52, Records of the Bureau of Medicine and Surgery, contains the ship's medical journals. Record Group 125, Records of the Judge Advocate General (Navy), includes several Courts Martial and Courts of Inquiry which involve officers of the New Ironsides. Record Group 74, Records of the Bureau of Ordnance, has valuable but well-scattered information about the ship's ordnance difficulties.

Two noteworthy sources for information on the ship's early active service are the Thomas Turner papers in the New York Public Library and the diary of Acting Master John M. Butler in the Western Reserve Historical Society. The Turner papers applicable to New Ironsides comprise his letter book for the period of his captaincy. John Butler was a junior officer aboard the ship. His diary, from January 1,

1863, until his detachment in May 1863, gives a revealing although biased view of life aboard New Ironsides during the period of DuPont's attack on Charleston.

SELECTED BIBLIOGRAPHY

ARCHIVAL SOURCES

Baker Library, Harvard University, Boston, Massachusetts.
R. G. Dun Collection.

Historical Society of Pennsylvania, Philadelphia, Pennsylvania. Dr. A. C. Bining Collection.

_____. Edward Shippen Collection.

Library of Congress, Washington, D.C. Manuscript Division.
Papers of John A. B. Dahlgren.

_____. Manuscript Division, Naval Historical Foundation
Collection. Papers of George E. Belknap.

_____. Manuscript Division, Naval Historical Foundation
Collection. Papers of Stephen Clegg Rowan, "Copies of
Letters written by S. C. Rowan, U.S. Navy, from Feby
22, 1854 to Jan 21, 1880, and transferred, Jany 18/82,
from various Letter Books."

_____. Manuscript Division, Naval Historical Foundation
Collection. Papers of Thomas O. Selfridge, Sr.,
"Copies of Letters to Hon. Secretary of the Navy, Bur-
eau of Yards and Docks, and Bureau of Construction &c.,
1866-'68, from U.S. Navy Yard Philadelphia."

National Archives, Washington, D.C. Record Group 19, Re-
cords of the Bureau of Ships. Entry 49. Letters Sent
by the Chief of the Bureau of Construction and Repair
to the Secretary of the Navy.

The Bureau of Yards and Docks had cognizance of
the building of the first three ironclads, Monitor,
Galena, and New Ironsides, instead of the Bureau of
Construction and Repair. There is little correspon-
dence relating to these ships in the files of the Bur-
eau of Construction and Repair, or the Bureau of Steam
Engineering, through mid-1863.

_____. Record Group 19, Records of the Bureau of Ships.

Entry 54. Letters Sent by the Chief of the Bureau of Construction and Repair to the Commandant of the Philadelphia Navy Yard.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 61. Letters Received by the Chief of the Bureau of Construction and Repair.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 64. Letters Received from Superintendents Outside of Navy Yards.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 70. Letters Received from Contractors 1864-1865.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 71. Miscellaneous Letters Received by the Chief of the Bureau of Construction and Repair.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 186. Records relating to Claims. Subentry 137, s.v. Dunderberg.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 405. Proposals and Advertisements of Sales.

_____. Record Group 19, Records of the Bureau of Ships.
Entry 968. Letters Sent to Contractors. (At National Military Records Center, Suitland, MD.)

_____. Record Group 19, Records of the Bureau of Ships.
Entry 1072. Steam Logs of the U.S. Steamer New Ironsides. (At National Military Records Center, Suitland, MD.)

_____. Record Group 19, Records of the Bureau of Ships.
Plan File. (At Cartographic and Architectural Branch, Alexandria, VA.)

_____. Record Group 23, Records of the Coast and Geodetic Survey. Special Civil War Maps. (At Cartographic and Architectural Branch, Alexandria, VA.)

_____. Record Group 24, Records of the Bureau of Personnel. Log of the U.S.S. New Ironsides.

_____. Record Group 24, Records of the Bureau of Personnel. Records of Officers.

_____. Record Group 24, Records of the Bureau of Personnel. Entry 138. Civil War Muster Roll of U.S.S. New Ironsides.

- _____. Record Group 45, Office of Naval Records and Library. Entry 395, Subentry 87. Correspondence of Commodore William Radford.
- _____. Record Group 45, Office of Naval Records and Library. Entry 464. Subject File, U.S. Navy 1775-1910, AD--Design and General Characteristics 1860-1910, Ironclads, Boxes 48 and 51.
 Around the turn of the century, many items were removed from their original locations and incorporated in the Subject File. The Subject File also contains typescripts of material otherwise unavailable which were made for the aborted second series of the Official Records of the Union and Confederate Navies in the War of the Rebellion.
- _____. Record Group 45, Office of Naval Records and Library. Entry 464. Subject File, U.S. Navy 1775-1910, AR--Miscellaneous Material Relative to Repairs, U.S. Ships, Box 106.
- _____. Record Group 45, Office of Naval Records and Library. Entry 464. Subject File, U.S. Navy 1775-1910, HF--Fires and Explosions, Box 178.
- _____. Record Group 45, Office of Naval Records and Library. Microfilm Entry M124, Miscellaneous Letters Received by the Secretary of the Navy.
- _____. Record Group 45, Office of Naval Records and Library. Microfilm Entry M518, Letters Received by the Secretary of the Navy from Navy Department Bureaus.
- _____. Record Group 45, Office of Naval Records and Library. Microfilm Entry M625, Squadron Letters: South Atlantic Blockading Squadron.
- _____. Record Group 52, Records of the Bureau of Medicine and Surgery. Entry 22. Medical Records of Ships. Box 303. Medical Journals of the U.S.S. New Ironsides.
- _____. Record Group 71, Records of the Bureau of Yards and Docks. Entry 5. Miscellaneous Letters Received.
 The volume of Letters Received for March through June 1862 is missing. Since New Ironsides was built under the aegis of the Bureau of Yards and Docks, Record Group 71 is considerably more useful for correspondence about the ship's construction than is Record Group 19.
- _____. Record Group 71, Records of the Bureau of Yards and Docks. Entry 42. Contracts and Bonds 1861.

Contains the contract for the New Ironsides.

- _____. Record Group 71, Records of the Bureau of Yards and Docks. Entry 48. Contract Ledger for Iron Clads 1861-1862.
- _____. Record Group 74, Records of the Bureau of Ordnance. Entry 1. Letters Sent to the Secretary of the Navy and Navy Department Bureaus.
- _____. Record Group 74, Records of the Bureau of Ordnance. Entry 2. Letters and Telegrams Sent to Naval Officers.
- _____. Record Group 74, Records of the Bureau of Ordnance. Entry 16. Letters Received from the Secretary of the Navy and Navy Department Bureaus.
- _____. Record Group 74, Records of the Bureau of Ordnance. Entry 21. Letters Received from Inspectors of Ordnance 1861-1884, Ironclads.
- _____. Record Group 74, Records of the Bureau of Ordnance. Entry 121. Reports of Armaments on Vessels.
- _____. Record Group 125, Judge Advocate General (Navy). Microfilm Entry M273, Courts Martial and Courts of Inquiry.

New York Public Library. Manuscript Division. Captain Thomas Turner Letter Book (microfilm).

University of North Carolina, Chapel Hill. Southern Historical Collection. Tomb Papers #723.

Includes a collection of letters written to James H. Tomb, who as engineer aboard C.S.S. David helped to torpedo New Ironsides, by William S. Wells, who was an engineer aboard the frigate at the time.

Western Reserve Historical Society, Cleveland, Ohio. John M. Butler Diary, 1862-1864, MSS 3947 (microfilm).

Butler was a volunteer officer in New Ironsides. This 1863 diary covers his service in the ship from January 1 through May 4, 1863, when he was transferred to U.S.S. Stettin. It is sprinkled with expressions of disgust for slavery and South Carolina, for the inactivity and weariness of the blockade, and for Regular Navy officers, especially senior officers. While offering valuable insights, Butler's personal groaning and self-pity must be taken with a grain of salt; not only the sentiments but even some of the words were regularly heard in the Navy of the 1970s and 1980s.

PUBLISHED GOVERNMENT DOCUMENTS

- United States. Official Records of the Union and Confederate Navies in the War of the Rebellion. 28 vols. Washington: Government Printing Office, 1894-1922.
- _____. Congress. Congressional Globe. 38th Congress, 2d Session, February 17, 1865.
- _____. Congress. House. House Executive Document 69. Report of the Secretary of the Navy in Relation to Armored Vessels. 38th Congress, 1st Session, 1864.
- _____. Congress. Joint Committee on the Conduct of the War. Report of the Joint Committee on the Conduct of the War, "Light Draught Monitors." 38th Congress, 2d Session, 1865.
- _____. Navy Department. Annual Report of the Secretary of the Navy. Washington: Government Printing Office, 1865.
- _____. Navy Department. Bureau of Ordnance. Ordnance Instructions for the United States Navy. Washington: Government Printing Office, 1866.
Extremely valuable for technical details of armament.
- _____. Navy Department. Naval History Division. Civil War Naval Chronology. Washington: Government Printing Office, 1971.
- _____. Navy Department. Dictionary of American Naval Fighting Ships. 8 vols. Washington: Government Printing Office, 1959-81.
- _____. War Department. An Atlas to Accompany the Official Records of the Union and Confederate Armies 1861-1865. Washington: Government Printing Office, 1891-95; reprinted New York: Fairfax Press, 1978.
- _____. War Department. The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies. 128 vols. Washington: Government Printing Office, 1880-1901.

SECONDARY SOURCES

- Adams, Ephraim D. Great Britain and the American Civil War. Gloucester: Peter Smith, 1957.
- Albion, Robert Greenhalgh. Makers of Naval Policy 1798-1947. Annapolis: United States Naval Institute Press, 1980.
- Anderson, Bern. By Sea and By River: The Naval History of the Civil War. New York: Alfred A. Knopf, 1962.
- Bauer, K. Jack. A Maritime History of the United States. Columbia: University of South Carolina Press, 1988.
- Baxter, James Phinney III. The Introduction of the Ironclad Warship. Cambridge: Harvard University Press, 1933; reprinted Hamden, CT: Archon Books, 1968.
The "standard" on the subject. Much information on British and French practice, and on Monitor; little information on New Ironsides.
- Benham, Edith Wallace, and Anne Martin Hall. Ships of the United States Navy and their Sponsors. Norwood, MA: Privately printed [Plimpton Press], 1913.
- Bennett, Frank Marion. The Steam Navy of the United States. Pittsburgh: W. T. Nicholson Press, 1896; reprinted Westport, CT: Greenwood Press, 1974.
A detailed history of steam in the U.S. Navy, written from the viewpoint of a somewhat partisan engineer.
- Bradford, James C., ed. Captains of the Old Steam Navy: Makers of the American Naval Tradition 1840-1880. Annapolis: United States Naval Institute Press, 1986.
- Brittin, Burdick H. International Law for Seagoing Officers, 5th ed. Annapolis: United States Naval Institute Press, 1986.
- Buell, Augustus C. The Memoirs of Charles H. Cramp. Philadelphia and London: J. P. Lippincott Co., 1906.
Charles Cramp was a partner in William Cramp and Sons and designed the hull of the New Ironsides. Pages

63-71 quote a paper given before the Contemporary Club of Philadelphia [typescript in the George E. Belknap Papers, Library of Congress] which contains valuable information on the design and construction of the ship. I have used the typescript of Cramp's speech where possible, since Buell's reputation for veracity has been impugned. Allan Nevins wrote, in reference to another Buell book, "When his sources ran thin, Mr. Buell calmly manufactured new ones." (Allan Nevins, from The Gateway to History, in The Historian as Detective: Essays on Evidence, ed. Robin Winks, [New York: Harper Colophon Books, 1969], 201-202).

- Burton, E. Milby. The Siege of Charleston 1861-1865. Columbia: University of South Carolina Press, 1970.
- Case, Lynn M., and Warren F. Spencer. The United States and France: Civil War Diplomacy. Philadelphia: University of Pennsylvania Press, 1970.
- Catton, Bruce. A Stillness at Appomattox. Garden City: Doubleday & Co., 1954.
- _____. Terrible Swift Sword. Garden City: Doubleday & Co., 1963.
- Cook, Melvin A. The Science of High Explosives. New York: Reinhold Publishing, 1958.
- Crenshaw, R. S., Jr. Naval Shiphandling, 4th ed. Annapolis: United States Naval Institute Press, 1975.
The current (unofficial) "U.S. Navy standard" textbook on shiphandling and the forces affecting a ship. The principles of shiphandling have not changed, and their applicability to the New Ironsides is quickly evident.
- Dahlgren, Madeleine Vinton. Memoir of John A. Dahlgren Rear Admiral United States Navy. Boston: James R. Osgood and Company, 1882.
Written by Admiral Dahlgren's widow, this unabashedly partisan volume includes many excerpts from his journal.
- Dunbaugh, Edwin L., and William duBarry Thomas. William H. Webb Shipbuilder. Glen Cove, NY: Webb Institute of Naval Architecture, 1989.
A sympathetic biography of the New York shipbuilder.
- Foote, Shelby. The Civil War: A Narrative, Fort Sumter to Perryville. New York: Random House, 1958.

- Gardiner, Robert, ed. Conway's All the World's Fighting Ships 1860-1905, United States Naval Institute Press ed. New York: Mayflower Books, 1979.
- Gillmer, Thomas C. Modern Ship Design, 2d ed. Annapolis: United States Naval Institute Press, 1975.
- Gragg, Rod. Confederate Goliath: The Battle of Fort Fisher. New York: HarperCollins, 1991.
A book-length treatment of the Fort Fisher campaign, told primarily from the Confederate viewpoint.
- Grant, Ulysses S. Personal Memoirs of U.S. Grant. 2 vols. New York: Charles L. Webster & Co., 1885.
- Hayes, John D., ed. Samuel Francis DuPont: A Selection from his Civil War Letters, vol. 2, The Blockade: 1862-1863, vol. 3, The Repulse: 1863-1865. Ithaca, NY: Columbia University Press for The Eleutherian Mills Historical Library, 1969.
- Hill, Frederic S. Twenty-six Historic Ships. New York: G. P. Putnam, 1903.
An operational history, which appears to draw heavily upon Belknap's article in United Service.
- Hovgaard, William. Modern History of Warships. Annapolis: United States Naval Institute Press, 1971; originally published 1922.
An excellent general work which traces design trends but gives little detail about the earlier iron-clads.
- Hunter, Alvah Folsom. A Year on a Monitor and the Destruction of Fort Sumter, Craig L. Symonds, ed. Columbia: University of South Carolina Press, 1987.
A reminiscence, based on a diary kept by an enlisted man aboard the monitor U.S.S. Nahant, which includes the period of DuPont's assault on Charleston.
- Johnson, Robert Erwin. Rear Admiral John Rodgers 1812-1882. Annapolis: United States Naval Institute Press, 1967.
- Johnson, Robert Underwood, and Clarence C. Buel, eds. Battles and Leaders of the Civil War, vol. 1, The Opening Battles, vol. 4, The Way to Appomattox. New York: Castle Books, 1956; reprint of 1887 edition.
- Jones, John Beauchamp. A Rebel War Clerk's Diary at the Confederate States Capital. 2 vols. Philadelphia: J. P. Lippincott, 1866; reprinted Alexandria, VA: Time-Life Books, 1982.

Relatively little on naval subjects but valuable for its record of the discussion topics and attitudes prevalent in Richmond.

Karsten, Peter. The Naval Aristocracy. New York: The Free Press, 1972.

An analysis of the officer corps of the United States Navy during the middle and late 1800s.

Lambert, Andrew. Battleships in Transition: The Creation of the Steam Battlefleet 1815-1860. Annapolis: United States Naval Institute Press, 1984.

Warrior: The World's First Ironclad Then and Now. Annapolis: United States Naval Institute Press, 1987.

A history of the ship and her reconstruction. Excellent for constructional details of an early iron-clad.

Lewis, Emmanuel R. Seacoast Fortifications of the United States. Washington: Smithsonian Institution Press, 1970.

Luce, Stephen B. Text-Book of Seamanship, rev. ed. New York: D. Van Nostrand, 1884.

Luce suffers, understandably, from a hydrodynamic analysis less sophisticated than the modern Crenshaw text. Interestingly, as late as this 1884 edition, Luce devoted only one of his thirty-seven chapters to the handling of vessels under steam.

Macartney, Clarence Edward. Mr. Lincoln's Admirals. New York: Funk & Wagnalls, 1956.

Biographical sketches of several Union naval leaders, including DuPont and Dahlgren.

Malone, Dumas, ed. Dictionary of American Biography. New York: Charles Scribner's Sons, 1961-63.

Marshall, Arthur. A Short Account of Explosives. Philadelphia: P. Blakiston's Son, 1917.

McLaughlin, Andrew, and A. B. Hart, eds. Cyclopedia of American Government. New York: D. Appleton & Co., 1914.

Morison, Elting E. Men, Machines and Modern Times. Cambridge, MA, and London: The MIT Press, 1966.

Murray, Robert. Rudimentary Treatise on Marine Engines and Steam Vessels, together with Practical Remarks on the Screw and Propelling Power, as used in the Royal and

Merchant Navy, 3d ed. London: John Weale Architectural Library, 1858.

Contemporary engineering practice of the late 1850s and early 1860s.

National Geographic Society. Historical Atlas of the United States. Washington: National Geographic Society, 1988.

Nevins, Allan. The War for the Union, The Organized War, 1863-1864. New York: Charles Scribner's Sons, 1971.

New Encyclopedia Britannica. Chicago: Encyclopedia Britannica, 1988. S.v. "Froude, William."

Niven, John. Gideon Welles: Lincoln's Secretary of the Navy. New York: Oxford University Press, 1973.

Padfield, Peter. Guns at Sea. New York: St. Martin's Press, 1974.

A survey, with some technical detail, of the history of guns on ships. It is British oriented, but nonetheless good on trends and solutions to problems.

Parker, William Harwar. Recollections of a Naval Officer 1841-1865. New York: Scribner, 1883; reprinted Annapolis: United States Naval Institute Press, 1985.

Parker, a Lieutenant in the United States Navy, joined the Confederacy in 1861. He commanded the wooden gunboat Beaufort during the Virginia's battle with the Monitor, and served as Executive Officer of the ram Palmetto State at Charleston. He later served with the James River Squadron.

Parkes, Oscar. British Battleships: Warrior to Vanguard: A History of Design, Construction and Armament. Hamden, CT: Archon Books, 1970; first published 1956.

An exhaustive and reasonably detailed survey of all British armored battleships.

Perry, Milton F. Infernal Machines: The Story of Confederate Submarine and Mine Warfare. Baton Rouge and London: Louisiana State University Press, 1965.

A partisan and somewhat romantic study, with several errors of fact and interpretation in its handling of the Confederate attacks on the New Ironsides.

Peterkin, Ernest W. Drawings of the U.S.S. Monitor. Raleigh: North Carolina Department of Cultural Resources, 1985.

Peterson, William Scott. "The Navy in the Doldrums: The

Influence of Politics and Technology on the Decline and Rejuvenation of the American Fleet, 1866-1886." Unpublished Ph.D. dissertation, University of Illinois at Urbana-Champaign, 1986.

- Porter, David Dixon. The Naval History of the Civil War. Seacaucus, NJ: Castle Books, 1984; reprint of 1886 edition.
 In his "Reminiscent of the Siege of Charleston," Belknap calls Admiral Porter's book "full of inaccuracies."
- Ripley, Warren. Artillery and Ammunition of the Civil War. New York: Promontory Press, 1970.
 Background information on guns, ammunition and gunnery practices.
- Robinson, Willard B. American Forts: Architectural Form and Function. Urbana, IL: University of Illinois Press for the Amon Carter Museum of Western Art, Fort Worth, 1977.
- Roman, Alfred. The Military Operations of General Beauregard in the War Between the States 1861 to 1865. 2 vols. New York: Harper & Brothers, 1884.
- Scharf, J. Thomas. History of the Confederate States Navy from its Organization to the Surrender of Its Last Vessel. New York: Fairfax Press, 1977; reprint of 1887 edition.
- Sinclair, Bruce. Philadelphia's Philosopher Mechanics: A History of the Franklin Institute 1824-1865. Baltimore and London: Johns Hopkins University Press, 1974.
- Sloan, Edward William III. Benjamin Franklin Isherwood Naval Engineer: The Years as Engineer in Chief, 1861-1869. Annapolis: United States Naval Institute Press, 1965.
 An excellent portrait of the controversial Isherwood and, by extension, of the first widespread wartime use of steam propulsion.
- Smith, William E. The Francis Preston Blair Family in Politics. New York: Da Capo Press, 1969.
- Sprout, Harold, and Margaret Sprout. The Rise of American Naval Power. Princeton: Princeton University Press, 1946.
- Still, William N., Jr. Iron Afloat: The Story of the Confederate Armorclads. Columbia: University of South

Carolina Press, 1985.

Thompson, Robert Means and Richard Wainwright, eds. Confidential Correspondence of Gustavus Vasa Fox Assistant Secretary of the Navy 1861-1865. 2 vols. Freeport, NY: Books for Libraries Press, 1972; reprint of 1918-19 edition.

Regrettably limited and incomplete.

Thompson, Stephen C. "The Construction of the U.S.S. MONITOR." Unpublished M.A. Thesis, Old Dominion University, 1987.

Excellent for its description of the financial and organizational background of the Monitor, but sometimes inaccurate in technical details, especially those dealing with marine engineering.

Weast, Robert C., ed. CRC Handbook of Chemistry and Physics, 51st ed. Cleveland, Ohio: Chemical Rubber Company, 1970.

Welles, Gideon. Diary of Gideon Welles Secretary of the Navy under Lincoln and Johnson, Howard K. Beale, ed. 3 vols. New York: W. W. Norton, 1960.

A revised and more accurate version of the Welles diaries. This edition maintains the same pagination as the 1911 edition which was heavily edited by Edgar T. Welles.

William Cramp and Sons Ship and Engine Building Company. Cramp's Shipyard founded by William Cramp 1830. Philadelphia: The William Cramp and Sons Ship and Engine Building Company, 1910.

A corporate promotional book, given to sweeping generalities and containing a number of errors of fact. Several editions, with varying dates of publication, are available.

Wilson, James Grant, and John Fiske, eds. Appleton's Cyclopaedia of American Biography. New York: D. Appleton & Company, 1888.

Winks, Robin, ed. The Historian as Detective: Essays on Evidence. New York: Harper Colophon Books, 1969.

ARTICLES

Alden, John D. "Born Forty Years Too Soon." The American Neptune 22, no. 4 (October 1962): 252-63.

A description and history of the frigate U.S.S. Roanoke, converted to a turreted ironclad during the Civil War.

Allison, David K. "John A. Dahlgren: Innovator in Uniform." In Captains of the Old Steam Navy: Makers of the American Naval Tradition 1840-1880, ed. James C. Bradford, 26-45. Annapolis: United States Naval Institute Press, 1986.

Ashe, S. A. "After the Evacuation of Battery Wagner." Confederate Veteran 35, no. 12 (December 1927): 451.

Ashe quotes a letter from a Captain DuHaume, dated September 10, 1863, regarding the siege and evacuation of Fort Wagner.

Bauer, K. Jack. "Samuel Francis DuPont: Aristocratic Professional." In Captains of the Old Steam Navy: Makers of the American Naval Tradition 1840-1880, ed. James C. Bradford, 142-65. Annapolis: United States Naval Institute Press, 1986.

Beauregard, Pierre G. T. "Torpedo Service in the Harbor and Water Defences of Charleston." Southern Historical Society Papers 5, no. 4 (April 1878): 145-61.

General Beauregard's reminiscences on the defense of Charleston in general and on torpedo warfare in particular, with some detail on the vessels which attacked the New Ironsides.

Belknap, George E. "Reminiscent of the 'New Ironsides' Off Charleston." United Service Magazine, o.s., 1 (January 1879): 63-82.

Written by the ship's Executive Officer. Primarily operational and anecdotal, this article includes some valuable eyewitness technical detail.

_____. "Reminiscent of the Siege of Charleston." in Naval Actions and History 1799-1898. Boston: Military Historical Society of Massachusetts, 1902: 155-207.

A paper read in April 1896, containing a broader view of the Charleston campaign than in the author's "Reminiscent of the 'New Ironsides'," but including other anecdotal and technical details.

Bennett, Frank Marion. "Reconstructed American Monitors." Journal of the American Society of Naval Engineers, August 1897: 525-48.

A description of an engineer's life aboard the reconstructed monitor U.S.S. Amphitrite, of the Miantonomoh class, with emphasis on the lack of seaworthiness and habitability of the class.

Bourne, John. "On the American System of Turret Ships." Transactions of the Institution of Naval Architects 7 (1866): 131-43.

An argument for British adoption of monitors, calling them "the most effective ships of war yet constructed."

Brown, John. "On the Manufacture of Steel Rails and Armor Plates." Journal of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, 3d ser., 43, no. 2 (January-June 1862): 249-55.

British practice in armor manufacture, reprinted from Newton's London Journal of Arts, February 1862.

Fletcher, James. "On Improvements in Heavy Tools for General Engineering and Iron Ship-building Work." Journal of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, 3d ser., 51, no. 2 (January-June 1866): 100-110.

A reasonably detailed survey of the early to mid-1860s "state of the art" of making heavy ironworking machinery, reprinted from Newton's London Journal of Arts, August 1865.

Ford, John. "On the Manufacture of Armour Plates." Transactions of the Institution of Naval Architects 3 (1862): 144-47, 151-59.

A paper read March 27, 1862, contrasting hammered plates to rolled plates. In the discussion following, both the hammered-versus-rolled issue and that of laminated vice solid armor are addressed. The paper was popularly published in the Mechanics' Magazine in April 1862 and reprinted in the Journal of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, 3d ser., 44 (1862): 39.

Gillmore, Quincy A. "The Army Before Charleston in 1863." In The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and

- Clarence C. Buel, 52-71. New York: Castle Books, 1956; reprint.
- Glassel, William T. "Reminiscences of Torpedo Service in Charleston Harbor by W. T. Glassell [sic], Commander Confederate States Navy." Southern Historical Society Papers 4, no. 5 (November 1877): 225-35.
- Greene, Samuel D. "In the 'Monitor' Turret." In The Opening Battles, vol. 1 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel, 719-29. New York: Castle Books, 1956; reprint.
- Guernsey, A. H. "Iron-Clad Vessels." Harper's New Monthly Magazine 25, no. 148 (September 1862): 433-46.
Emphasis on the conversion of the U.S.S. Roanoke into a low freeboard turret ship, but some information on monitors and on the Stevens Battery.
- Hess, Earl J. "Northern Response to the Ironclad: A Prospect for the Study of Military Technology." Civil War History 31 (1985): 126-43.
- Jurens, William J. "Exterior Ballistics with Microcomputers." Warship International 21, no. 1 (1984): 49-72.
- Lamb, William. "The Defense of Fort Fisher." In The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel, 642-54. New York: Castle Books, 1956; reprint.
- Lumley, Henry. "On the Steering of Ships." Transactions of the Institution of Naval Architects 5 (1864): 128-34 and plate.
- [Merrick, J. Vaughn.] "Editorial. The U.S.S. Armored Frigate New Ironsides." Journal of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, 3d ser., 53, no. 2 (February 1867): 73-81.
A good source of technical detail, obviously written by someone closely connected with Merrick & Sons. Alvah Hunter (see above) states that the author was J. Vaughn Merrick.
- Mervine, Charles K. "Jottings By the Way: A Sailor's Log 1862-1864." Kent Packard, ed. Pennsylvania Magazine of History and Biography 71, no. 2 (April 1947): 121-51; no. 3 (July 1947): 242-82.
Charles K. Mervine served as a Boy aboard U.S.S. Powhatan from August 9, 1862, until his death in action on January 16, 1865. His diary favorably mentions New

Ironsides and probably reflects the fleet's opinion of her.

Neeser, Robert W. "Historic Ships of the Navy: 'New Ironsides'." United States Naval Institute Proceedings 52 (1926): 2443-51.

Primarily an operational narrative. Contains some errors of fact, especially regarding dates.

Okun, Nathan. "Armor and its Application to Warships." Warship International 15 (1978): 284-93.

Olmstead, Charles H. "Reminiscences of Services in Charleston Harbor in 1863." Southern Historical Society Papers 11 (1883): 158-68.

Olmstead was Colonel of the First Georgia Volunteers.

Parker, Foxhall A. "Our Fleet Maneuvers in the Bay of Florida." United States Naval Institute Proceedings 1, no. 8 (1874): 163-78.

A discussion of the deteriorated state of the U.S. fleet, primarily of the monitors, in the naval maneuvers engendered by the "Virginus affair" with Spain in 1874.

Pressley, John G. "The Wee Nee Volunteers of Williamsburg District, South Carolina, in the First (Hagood's) Regiment." Southern Historical Society Papers 26 (1888): 153.

Russell, John Scott. "On the Professional Problem Presented to Naval Architects in the Construction of Iron-Cased Vessels of War." Transactions of the Institution of Naval Architects 2 (1861): 17-91.

Includes discussion of this and related papers. A perceptive analysis of the need for both the naval architect and the "naval man" to examine design compromises for the new ironclad ships.

Selfridge, Thomas O. "The Navy at Fort Fisher." In The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel, 655-61. New York: Castle Books, 1956; reprint.

Selwyn, Jasper H. "On Armoured or Iron-clad Ships-Their Advantages and Defects." Journal of the Royal United Service Institute 8, no. 30 (1864): 81-104.

_____. "On the Future of Naval Attack and Defence." Journal of the Royal United Service Institute 7, no. 26

(1863): 48-54.

Shippen, Edward. "Fort Fisher--December, 1864, and January, 1865." United Service Magazine, n.s., 2 (July 1889): 11-25.

An operational history, with fewer technical details than Belknap's piece, written by the ship's Surgeon.

Stevens, Thomas H. "The Boat Attack on Sumter." In The Way to Appomattox, vol. 4 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel, 47-51. New York: Castle Books, 1956; reprint.

Taft, A. W. "The Signal Service Corps. A Tribute to Their Arduous and Invaluable Services During the War." Southern Historical Society Papers 25 (1897): 130-33.

Tatham, W. P., Wm. Sellers, and Washington Jones. "Obituary. Barnabas H. Bartol." Journal of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts 125, no. 6 (June 1888): 499-503.

Thompson, Stephen C. "The Design and Construction of USS Monitor." Warship International 27, no. 3 (1990): 222-42.

Tyler, H. W. "Spithead and Harbour Defence." Journal of the Royal United Service Institute 8, no. 31 (1864): 139-47.

Contains a British analysis of DuPont's attack on Charleston in April 1863.

Very, Edward W. "The Development of Armor for Naval Use." Proceedings of the United States Naval Institute 9, no. 3 (1883): 349-583.

Watson, John W. "The Building of the Ship." Harper's New Monthly Magazine 24, no. 143 (April 1862): 608-20.

Wood, John Taylor. "The First Fight of Iron Clads." In The Opening Battles, vol. 1 of Battles and Leaders of the Civil War, eds. Robert Underwood Johnson and Clarence C. Buel, 692-711. New York: Castle Books, 1956; reprint.

NEWSPAPERS/ARTICLES

- "The Attack on Charleston." Charleston Daily Courier, April 8, 1863, 2.
- "From the Bar." Charleston Daily Courier, February 3, 1863, 2.
- "News from the Islands." Charleston Daily Courier, July 31, 1863, 1; August 20, 1863, 1.
- "News from the Yankee Fleet." Charleston Daily Courier, February 9, 1863, 2; February 10, 1863, 2; April 6, 1863, 2; April 7, 1863, 2.
- "The Siege of Charleston." Charleston Daily Courier, April 11, 1863, 2; September 9, 1863, 1.
- "Yankee History of the Attempt to Blow up the Ironsides." Charleston Daily Courier, October 13, 1863, 2.
- "The Attack on Charleston Opens." Charleston Mercury, April 8, 1863, 1.
- "Highly Important From the Bar." Charleston Mercury, April 6, 1863, 2
- "The Hour at Hand." Charleston Mercury, April 7, 1863, 2.
- "News From The Blockading Fleet." Charleston Mercury, February 9, 1863, 2.
- "Situation of Affairs Off the Bar." Charleston Mercury, February 3, 1863, 2.
- "The Yankee Preparations." Charleston Mercury, February 12, 1863, 1.
- "Another Job." New York Times, December 25, 1862, 4.
- "Large and Small Iron-Clad Ships." New York Times, March 22, 1862, 4.
- "The New Ironsides Again Afloat." New York Times, December 5, 1868, 2.

- "The Iron-Clads." Philadelphia Daily Evening Bulletin, April 17, 1863, 4.
- "Launch of the 'New Ironsides.'" Philadelphia Daily Evening Bulletin, May 10, 1862, 1.
- "A National Loss: The New Ironsides Destroyed by Fire." Philadelphia Daily Evening Bulletin, December 17, 1866, 12.
- "Particulars of the Attack on Charleston." Philadelphia Daily Evening Bulletin, April 13, 1863, 1.
- "Port Royal." Philadelphia Daily Evening Bulletin, November 15, 1861, 1.
- "DESTROYED!! Sad End of an Invincible War Ship." Philadelphia Inquirer, December 17, 1866, 1.
- "Burning of the New Ironsides--Total Destruction of the Vessel." Philadelphia Public Ledger, December 17, 1866, 1.
- "Blowed Up." Wilmington Daily Journal, December 24, 1864, 2.

APPENDIX A

SPECIFICATION OF WEIGHTS AND DISPLACEMENT

From National Archives, Record Group 19, Plan 107-9-12H.
 "Specification of Iron Plated Steamer proposed to the Navy
 Department by Merrick & Sons of Philadelphia. 1861."

	Tons
Weight of Hull, 230 feet long	1965
" " 4 1/2 inch iron plating	650
" " 1 " deck "	170
Armament & Ordnance Stores	100
Engines, Boilers, Machinery and Water in Boilers	300
Coal	300
Chains. Same as "Lancaster"	60
Anchors " " "	13
Water and Tanks, Same as "Wyoming"	20
Boats	4
Masts, Spars and Sails. Bark rig.	40
Rigging and Blocks	15
Clothing	8
Provisions	100
Small Stores	10
165 Men and appendages	15
Wood for Cooking	5
Boatswain, Gunner, Carpenter and Sailmaker's Stores	33
Engineers Stores	20
Total Weight	3828

Displacement

At 14 feet load line, exclusive of Keel	4015
Surplus Displacement	187

To these "as designed" weights, the increased battery
 added 301 tons, the armored bulkheads 110 tons, and the

pilot house 16.5 tons. The additional men and their "appendages" added 29 tons, and the increased storage for fresh water another 51 tons. The total with other additions and deletions, was 495 tons beyond that initially estimated. This included a deduction of 40 tons for masts and rigging.¹ The full sail rigging was discarded for pole masts, but was returned after the ship's initial trials.

¹Turner to Merrick & Sons, September 22, 1862, NARG 71, Entry 5, Box 448, 2: 79.

APPENDIX B
SALVAGE AND FINAL DISPOSITION

New Ironsides was sold for "removing or wrecking and recovering" the property in her. On March 22, 1867, advertisements were placed requesting bids to purchase her "as she lies."¹ All of the original bids were rejected, but a late bid from the Atlantic Submarine Company of New York was accepted in May 1867.²

The company soon started work. Loose plating and fittings were removed and sold, and Atlantic Submarine made at least one progress payment to the Government.³ Her boilers were salvaged between 1867 and late 1868 and were offered for sale separately by Merrick and Sons, apparently after being

¹National Archives, Record Group 19, Entry 405, Proposals and Advertisements of Sales, 48.

²The Government was to receive one-third of the value of the salvaged material. NARG 19, Entry 71, 7: 40, 43, 118. The correspondence with the Atlantic Submarine Company is with George D. Norton and F. W. Beers. They later sold their interest; in late 1867 David Boyd, Jr., purchased what was left of the ship. "The New Ironsides Again Afloat," New York Times, December 5, 1868, 2.

³A payment of \$5,000 was received on June 28, 1867. NARG 19, Entry 71, 7: 119.

reconditioned.⁴ Finally, the hull was raised using pontoons. Chains were run under the ship and connected to the pontoons at low tide. When the tide rose, so did New Ironsides. After she was refloated, tugs towed her upriver by stages, and she was eventually beached and broken up.⁵

⁴In an advertisement of August 1869, Merricks' offered the boilers of the New Ironsides "taken from her wreck." "Advertisement for One or More (4 in all) Horizontal Tubular Boilers" (Figure 8).

⁵"Again Afloat," 2.