Causes and Lessons of the Peacemaker Disaster

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In 1844, an explosion aboard the *USS Princeton* during a ceremonial demonstration for important heads of state and their families killed and injured dozens of people including two presidential cabinet members. The explosion resulted from the bursting of the Peacemaker, one of the vessel’s two pioneering canons, while it was being fired ceremoniously as a display for the distinguished guests. No particular mistake or act of negligence caused the explosion. However, the development of the Peacemaker by Commodore Robert Stockton and the inventor, John Ericsson, lacked the due caution that would normally be expected when implementing new technology. The method used to manufacture the Peacemaker deviated from that used for all previous guns, utilizing wrought-iron instead of cast-iron and reinforcing the barrel with welded bands rather than shrunken hoops. This pair of pioneering manufacturing changes was made with little consideration of the potential adverse effects. Furthermore, the testing of the canon prior to its demonstration onboard the *Princeton* was inadequate, especially considering the novel nature of its design. Had the effects of the manufacturing change been considered or had the canon had been thoroughly tested, the unsoundness of the gun would likely have been determined and the tragic disaster could have been avoided. The explosion taught a lesson of caution in the development of new naval technology in the United States that slowed efforts by the president to modernize the navy with new technologies such as steam engines and screw propellers. The navy learned that new technologies needed to be critically evaluated and tested prior to their implementation, as was not the case with the *USS Princeton*.

The *USS Princeton* featured two massive wrought-iron canons, the Oregon and the Peacemaker. The ship also included other innovations such as steam engines located below the waterline, and it “was the first ship of the Navy to be built with a screw propeller.”[[1]](#footnote-1) The ship was mainly the result of a collaboration between the inventor John Ericsson and U.S. Navy Commodore Robert Stockton. Both provided technological contributions and worked to advance the development of the vessel and demonstrate the advantages of its technologies to the navy. The vessel’s massive wrought-iron canons were considered to be “superior to those of any other vessel of the same size in the English or American Navy.”[[2]](#footnote-2) The enthusiasm to demonstrate the superiority of these powerful canons led to the Peacemaker disaster.

Prior to the *Princeton*, canons had been made from cast-iron. Ericsson sought to introduce a wrought-iron revolution, citing advantages such as “a larger gun could be constructed of wrought-iron . . . less erosion of the barrel, a more regular trajectory, and more destruction upon impact.”[[3]](#footnote-3) These advantages made the material appear attractive, but its use in a canon had never been tested.

The first wrought-iron gun was the Oregon, manufactured at an ironworks in Britain under the order of Stockton, before being shipped over to the United States. During Stockton’s testing of the Oregon, “a small crack developed near its breech” which Stockton addressed by installing “reinforcing bands or hoops.”[[4]](#footnote-4) The massive wrought-iron gun showed that it was prone to cracking, but the reinforcing hoops appeared adequate.

Stockton thoroughly tested the Oregon after installing the hoops. He fired over a hundred rounds through the canon at a Navy test facility after which the canon was examined and “no discernible change in either the crack or the bore” was found.[[5]](#footnote-5) The tests were compared to a similar cast-iron canon which broke after only 18 rounds. Thus, the canon appeared sufficiently strong to withstand service, and wrought-iron appeared to have demonstrated its superiority over cast-iron, the prior standard material. This thorough testing process used to prove the Oregon’s reliability was almost completely omitted for the Peacemaker.

A faulty assumption that the Peacemaker would hold up to testing as sturdily as the Oregon led to overconfidence on the part of Stockton who, while testing the canon, worked up to the gun’s full ordnance capacity in only 5 shots. The overconfidence in the gun was further demonstrated by the manner in which it was tested “on board a small vessel of some twenty feet beam and seventy feet in length . . . instead of being placed on the ground in some remote corner, as is usual in proving guns of not one-third of her caliber.”[[6]](#footnote-6) Inadequate testing made it impossible for the gun’s lack of structural integrity to be noticed prior to its utilization onboard to the *Princeton*.

Thorough testing of any newly manufactured weapon would be a normal expectation, but it was especially necessary in the case of the Peacemaker due to its unique design. It was thought that the integrity of wrought-iron canons had already been established with the Oregon. However, the Peacemaker differed from its counterpart in several crucial ways. It was “a foot more in diameter at the breech, and much heavier.”[[7]](#footnote-7) The Peacemaker was the largest canon yet constructed. In fact, it was remarked that it was forged from the “largest mass of iron ever brought under the hammer.”[[8]](#footnote-8) this fact alone should have been reason for very thorough testing before using the gun in service. However, the canon’s size was not the only difference from the Oregon.

Whereas shrunken hoops reinforced the Oregon’s breech, welded bands reinforced the Peacemaker’s breech. This untested and poorly considered design change turned out to be fatal because whereas “shrunk-on bands would have served as crack arrestors . . . welded bands permitted any cracks to enlarge.”[[9]](#footnote-9) Rather than assuming welded bands to behave the same as shrunken ones, this design change should have been thoroughly investigated. Then, the canon should have been rigorously tested as a new, unproven design, rather than as another canon with an already proven design.

The need for more thorough analysis of the changes in the canon’s manufacture is further exemplified by several dissenting opinions regarding the soundness of its construction. Ericsson “soured in part over Stockton's insistence on mounting the Peacemaker, which Ericsson considered unproven.”[[10]](#footnote-10) Ericsson was at least doubtful of this new canon and should have called for more consideration of the changes made to its design. Even more concerning was the objection raised by Lieutenant Colonel Talcott of Army Ordnance that welded guns would not be “homogeneous and actually welded throughout as they must of necessity be composed of many pieces, which may be welded on the exterior while many fissures exist in the interior of the mass.”[[11]](#footnote-11) According to Talcott, a welded canon could appear solid from the outside, but contain weaknesses on the inside that would encourage cracking.

These concerns turned out to be valid as it was later found under investigation that the metal used to fabricate the Peacemaker was considerably weaker than that used in the Oregon. The Naval Affairs Committee Board of Inquiry found the canon to have been “made of iron that was three fourths the strength of Ericsson’s British built gun and poorly welded.”[[12]](#footnote-12) The welding not only was a poor substitute for the shrunken bands of the Oregon, but the manufacturing also resulted in iron of a much lower strength. The manufacturer of the Oregon later commented that its tremendous size was so great that “[n]o hammer . . . could affect it much [and as a result] the iron had lost nearly half its strength.”[[13]](#footnote-13) The increased weight of the Peacemaker turned out to be an important design change that made it substantially more difficult to forge while maintaining the iron’s strength. The connection between the design changes and these severe effects were largely ignored until after the *Princeton* explosion.

The poor testing and analysis performed on the Peacemaker were in part a result of Stockton’s avoidance of oversight in his eagerness to complete the *Princeton*. While investigating the Princeton disaster, the Naval Affairs Committee remarked that the gun “had not been given the full U.S. Navy approval.”[[14]](#footnote-14) Stockton and Ericsson wanted to see the ship and its guns completed, so that the superiority of their innovations could be proven to the U.S. Navy. This led to what the American Institute of Technology referred to as “the moral daring of Captain Stockton, in the adoption of so many novelties at one time.”[[15]](#footnote-15) The institute’s remark criticizes the overconfidence that led to the inclusion of the unproven Peacemaker onboard the vessel in a public demonstration that turned fatal.

The *Princeton* disaster ensured a greater amount of caution was employed by the navy in determining the soundness of new technologies before implementing them in service. Although “a naval court of inquiry hastily absolved Captain Stockton of blame [and] no one was held responsible,”[[16]](#footnote-16) the U.S. navy did delay the adoption of wrought-iron guns, reinforced with shrunken hoops until long after they had become commonplace in European vessels of war. Ericsson later observed that European artillerists repeatedly asked why the “United States Government having been the first to introduce heavy wrought-iron guns [does] not continue to build guns of that material?”[[17]](#footnote-17) The U.S. Navy regarded the wrought-iron guns with due distrust until their manufacture could be better understood. This added caution also caused President Tyler and Commodore Stockton’s “dreams of a modernized and deadly navy” to be “stalled by the Peacemaker’s explosion.”[[18]](#footnote-18) The advancement of naval technology could not run ahead of the country’s ability to test new technologies and ensure that they were safe for use aboard ships.

The deadly explosion of the Peacemaker onboard the *USS Princeton* resulted from incorrect assumptions regarding the soundness of its construction. It demonstrated the need to thoroughly analyze and test any design changes, rather than assuming them to be unimportant. A thorough analysis of the quality of the Peacemaker’s manufacture could have shown the iron to be too weak. Instead, overconfidence allowed the weakness to go unnoticed and the unsound canon to be fitted to the *Princeton*. The disaster taught the U.S. Navy the need for adequate caution while developing new military technology.

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2. Ibid., 164. [↑](#footnote-ref-2)
3. Lee M. Pearson, “The ‘Princeton’ and the ‘Peacemaker’: A Study in Nineteenth-Century Naval Research and Development Procedures,” *Technology and Culture* 7, no. 2 (1966): 166, doi:10.2307/3102081. [↑](#footnote-ref-3)
4. Ibid., 170. [↑](#footnote-ref-4)
5. Pearson, “The ‘Princeton’ and the ‘Peacemaker,’” 171. [↑](#footnote-ref-5)
6. William Conant Church, *The Life of John Ericsson* (Scribner, 1911), 124. [↑](#footnote-ref-6)
7. Ibid. [↑](#footnote-ref-7)
8. Olav Thulesius, *The Man Who Made the Monitor: A Biography of John Ericsson, Naval Engineer* (McFarland, 2007), 61. [↑](#footnote-ref-8)
9. Pearson, “The ‘Princeton’ and the ‘Peacemaker,’” 179. [↑](#footnote-ref-9)
10. Ann Blackman, “Fatal Cruise OF THE PRINCETON,” *Naval History; Annapolis* 19, no. 5 (October 2005): 37. [↑](#footnote-ref-10)
11. Pearson, “The ‘Princeton’ and the ‘Peacemaker,’” 171. [↑](#footnote-ref-11)
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13. Pearson, “The ‘Princeton’ and the ‘Peacemaker,’” 180. [↑](#footnote-ref-13)
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