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David A. Mindell. *Iron Coffin: War, Technology, and Experience Aboard the USS Monitor.* Johns Hopkins Introductory Studies in the History of Technology Series. Baltimore: Johns Hopkins University Press, 2012. 208 pp. $23.00 (paper), ISBN 978-1-4214-0520-9.

Reviewed by Gregory Stern (Florida State University)
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David A. Mindell's *Iron Coffin* is an update of the 2000 version of the book. The Dibner Professor of the History of Engineering and Manufacturing at the Massachusetts Institute of Technology, Mindell adds a new preface and epilogue in light of the raising of the USS *Monitor*'s steam engine and gun turret in 2001 and 2002 respectively–and in respect to technology's role in warfare since the terrorist attacks of September 11, 2001. In *Iron Coffin*, Mindell continues to impress on readers the complications of putting men in the midst of revolutionary new technology and suddenly thrusting man and machine into the throes of combat. From the *Monitor*'s creation by inventor John Ericsson, to its famous duel with the CSS *Virginia* during the American Civil War at Hampton Roads, to its foundering in a storm on December 31, 1862, the remarkable ship was a nexus of technological marvels and human controversies.

The argument in *Iron Coffin* remains unchanged from the 2000 version, a persistence that only enhances its power. More than telling a story of inventor and invention, Mindell contends that the *Monitor* frames issues of technology and society, thereby inviting us to reconsider the relationship between soldier and weapon, as well as expectation and experience. The human element, as Mindell highlights throughout the book, was essential to the ship's success or failure. Competing inventors, sailors living onboard, political figures, and the public's image of the *Monitor* through experience or literature were as much a part of the ship's legacy as its engines, guns, and rivets.

Mindell's book walks us through the steps that nineteenth-century nautical engineering took in bringing ironclad technology to fruition. He reiterates how transitioning from sail to steam and from wood to iron resulted from decades of gradual developments and uncertainty among shipbuilders and governments. Although aware of European innovations that led to France's ironclad *Gloire* and Britain's HMS *Warrior* in 1859 and 1860, U.S. naval officers only tinkered with steam engines and ironclad batteries (army or navy cannons set in a series). Except for the increasing use of steam vessels, Congress did not support any line of revolutionary ships before the Civil War. Mindell mentions how competition can change a situation rapidly. As Britain's *Warrior* was a response to France's *Gloire*, the Confederacy's pursuit of ironclad technology to thwart the Union's naval blockade forced the hand of Union Secretary of the Navy Gideon Welles.

Mindell continues the story of how the *Monitor* was built through his discussion of Welles forming the "Ironclad Board" and coming to settle on the ship design of Swedish engineer Ericsson. The middle part of the book takes the reader inside the *Monitor*, often through the eyes of its crew–especially paymaster William F. Keeler. Mindell uses Keeler's reminiscences (mostly Keeler's letters to his wife) as observations of life onboard the ship over the few months of its service. The book highlights the mixed feelings crew members had about the *Monitor*. The crew was simultaneously grateful for the *Monitor*'s iron hull protecting them from ordnance, but loathing of the hot interior, stagnant air, and leaky joints of the vessel. Of note is Mindell's showcasing the crew as being fully aware of how experimental their ship was–recognizing the novelty of their being onboard, sometimes regretting their courage in serving on such an untried design.

For Mindell, the Battle of Hampton Roads (March 8-9, 1862) serves as much as a separation of image and reality as it does a trial by fire for the *Monitor*. Questions of which ship, *Monitor* or *Virginia*, was victorious linger, as both vessels survived to fight another day. But the outpouring of praise in contemporary media, declarations of an end to the wooden ship navy, and the showcasing of the vessel to the public (including women and children)

is juxtaposed with the ship's subsequent difficulties. The *Monitor* was ill-suited for support of the Peninsular Campaign against Richmond at the Battle of Drewry's Bluff, and its poor seaworthiness led to its demise in a storm off Cape Hatteras, North Carolina.

Mindell successfully blends the history of science and technology with military history. The meshing of the personal stories of servicemen to operational history, like Keeler's account or that of fireman George Geer, put a face to the *Monitor*'s record, providing readers with the crew's sense of ambivalence in the face of mechanized warfare. The work's display of the drama that occurred between Ericsson and the Union's naval administration also shows how the *Monitor*'s invention and use affected all levels of society–political, martial, and industrial. The invocation of Herman Melville's poetry in *White Jacket* (1850) and *Battle Pieces* (1866) remind us of the the nineteenth century's continued mistrust of technology that replaced human skill.

Mindell's new preface and epilogue carry his man-versus-machine argument into the twenty-first century. He observes how warfare at a distance with remote-controlled drones and computer-guided ordnance has made using robots in warfare acceptable in all theaters of combat. But Mindell emphasizes, through such contemporary authors as Melville and Nathaniel Hawthorne, that warfare is no less bloody or violent with new technologies at the forefront. The prose and themes of the book are accessible to academic and general readers alike. Mindell's research is impeccable and supports his argument with considerable authority from contemporary sources as well as his own experiences after the partial recovery of the *Monitor*'s components. The book, as with its earlier incarnation, is an important bridge between operational military history and the human side to science and technology.

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