



Steam Power and Sea Power: Coal, the Royal Navy, and the British Empire, c. 1870–1914 by Steven Gray.

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The use of steam power revolutionized naval warfare in the nineteenth century. While improved armaments and the use of steel armor changed the dynamics of naval combat, the coal-fueled steam engine represented the first new form of seaborne motive power since the invention of the sail millennia ago. It led to faster ships with greater displacements than had previously been feasible. Yet, as historian Steven Gray (Univ. of Portsmouth) demonstrates in his incisive new study, this was just the start of fundamental changes coal brought to sea power and the patterns of deployment of the world's largest navy.

Gray divides his examination of the effects of coal power into four parts. Though steam-powered warships had been built in Britain as early as the 1830s, he dates the rise of “coal consciousness” in considerations of naval and imperial defense to the 1870s, when the British began building vessels powered exclusively by steam and coal moved to the forefront of their strategic thinking. Gray credits the Carnarvon Commission of 1878–82 with recognizing the true importance of coal and the consequent need for a global infrastructure to supply it to Her Majesty's vessels. Though the commission's reports were meant to be secret, the leaking of them during the parsimonious government of William Gladstone concentrated public attention on the issue, thus ensuring that funds were provided to develop the supply networks needed to maintain Britain's global naval dominance.

The author elaborates on these networks in the second part of his book. To start with, he explains,

Naval steam engines required coal, and lots of it. Yet this could not just be any coal. The Admiralty insisted on fuel with particular characteristics: specifically, the required high-quality steam-coal that could provide the maximum amount of energy per ton, would not deteriorate badly when stored, and burnt cleanly to avoid clogging up warship engines. Furthermore, because naval steamships require a degree of stealth in battle, they needed a fuel that did not produce black smoke, thus making them visible for miles around. (67)

While government agents ceaselessly scoured the globe in search of the ideal coal, it was discovered that the best type came from South Wales. This gave the British the advantage of controlling the source of supply at home and its availability to other steam navies of the world. But stocking the bunkers in all of Britain's far-flung naval stations with South Wales coal was too costly. The consequent decision to pay private companies to provide coal to British ships from elsewhere in the empire as opposed to purchasing the mines themselves created a vulnerability in the supply chain, though Gray notes that the Admiralty successfully managed periods when labor unrest disrupted regular supplies.

Just getting the coal aboard the warships posed its own set of challenges, as Gray explains in part 3 of the book. Coal consumption required weekly resupply, a strenuous and filthy activity, typically performed by indigenous workers, whose labors often reinforced British sailors' racist

preconceptions, in terms of the workers' aptitude for hard labor or perceived laziness, and served to justify imperial control. Though the coal "heavers" were poorly paid, an even cheaper way of loading the fuel was to require the ships' crews to do it themselves. This sort of "all-hands" work required an entire day to complete; officers tried to make the activity as palatable as possible by maintaining a festive atmosphere and encouraging competitions to establish records in coal-loading rates, duly recorded in ships' logs. Another incentive, typically available to officers, was the promise of shore leave after the loading was completed.

The book's final part concerns another consequence of the navy's new dependence on coal. Prior to the introduction of steam power, sailing warships could remain on station for months at a time, being victualled by other vessels. Though colliers could provide coal to steam warships at sea, they more commonly resupplied their bunkers by visiting ports. These longer and more frequent visits led to the emergence of "station communities," where sailors fraternized with their counterparts from other vessels and with locals. Gray clarifies the key role of rank and class in shaping these interactions, which often took the form of sporting contests and other organized competitions between crews, though drinking sometimes led to what he terms "performative brawls." Longer visits also gave crews a chance to engage in tourism; their explorations of surrounding regions exposed them to indigenous people and enabled them to collect souvenirs such as exotic animals, both of which "helped to cement ideas of a homogenous otherness and backwardness in the colonial empire" (251).

Steven Gray's wide-ranging work elucidates the political, social, and technological aspects of coal's transformation of the Royal Navy. Its solid grounding in pertinent primary and secondary sources ensures that *Steam Power and Sea Power* will long remain a seminal work on its subject for everyone interested in the history of the Royal Navy and the British Empire.