

# REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.  
**PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE (DD-MM-YYYY) 05/31/2023			2. REPORT TYPE Certificate Essay		3. DATES COVERED (From - To) August 2022 - May 2023	
4. TITLE AND SUBTITLE Naval Medicine from the Quarterdeck in the Age of Sail					5a. CONTRACT NUMBER	
					5b. GRANT NUMBER	
					5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) David Rothwell					5d. PROJECT NUMBER	
					5e. TASK NUMBER	
					5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) John B. Hattendorf Center for Maritime Historical Research U.S. Naval War College 688 Cushing Rd Newport, RI 02841					8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)					10. SPONSOR/MONITOR'S ACRONYM(S)	
					11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.						
13. SUPPLEMENTARY NOTES						
14. ABSTRACT To what extent did concern for men's health shape naval officers' decision-making in the West Indies in the age of sail? This essay draws on the papers and correspondence of Admiral Sir John Thomas Duckworth (1748-1817) to establish a hierarchy of decision-making priorities. The existing historiography suggests that an older generation of officers prioritized glory-seeking behavior over all else, while other historians have posited that men's health took priority. This essay shows that, in the case of Duckworth, mission always came first, even at the cost to men's health, and glory-seeking came third.						
15. SUBJECT TERMS						
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON	
a. REPORT	b. ABSTRACT	c. THIS PAGE			Evan Wilson	
UNCLASS	UNCLASS	UNCLASS	UU	28	19b. TELEPHONE NUMBER (Include area code) 401-856-5749	

NAVAL MEDICINE FROM THE QUARTERDECK IN THE AGE OF SAIL

---

An Essay  
Submitted to  
The Faculty of the  
United States Naval War College

---

In Partial Fulfillment  
of the Requirements for the  
Graduate Certificate in Maritime History

---

by  
LCDR David Rothwell

May 15, 2023

One of the greatest challenges in the age of sail for European navies was operating successfully in the West Indies. It was a region that tested every aspect of a navy, from its leadership to its logistics. Because it was far away (about six weeks' sail from Europe, on average), operating in the West Indies forced naval officers to make decisions with limited or imperfect information about the situation in Europe. Because it was subject to seasonal hurricanes, it forced naval officers to plan operations around nature's timeline rather than the war's. Because it was a region full of fabulous wealth, it provided countless temptations for officers to prioritize personal aggrandizement over the mission. Most of all, because of endemic tropical diseases, the West Indies exerted enormous pressure on a navy's ability to keep its men healthy.

Those characteristics mean that when we study naval operations in the West Indies in the age of sail, we need to understand the unique pressures that they put on officers' decision-making. This essay identifies three pressures that rose above the rest. First, naturally, was the mission. Officers had to consider their orders and their relationship to the strategic and operational situation. But that was not all that officers cared about. Officers also had to consider the health of their men. Sometimes, officers chose to prioritize their men's health over the mission; sometimes, they made the opposite choice. A third major pressure was the temptation of prize money. Because the West Indies formed the financial foundation of three major European empires, there was money to be seized, and there always seemed to be a target ripe for attack. Sometimes, officers chose to sacrifice their orders and their men's health on the altar of glory or the pursuit of wealth; sometimes, officers chose the opposite choice.

We need to deepen our understanding of these pressures because there currently exists some disagreement in the existing literature about how navies dealt with the challenges of operating in the face of endemic tropical diseases.

Wentworth's forces until they were hopeless and near annihilation, finally reembarking them on April 28. Over 8,000 men died between both army and navy. By the end of June 1741, 77% of the original 9,000 of General Cathcart's force were no longer fit for service. Vernon bullied Wentworth and his soldiers to do his will despite encountering unexpectedly strong defenses and a hopeless situation. After the catastrophe, Vernon spent his own money to augment hospital facilities in Jamaica to help deal with the casualties, but McNeill says that was nothing more than a result of self-serving practical interests, not compassion. In this, he was like many other admirals and generals, representative of a self-interested, uncaring social structure which was devoid of sympathy and thought only of honor, glory, and riches.<sup>2</sup>

George Rodney also typified this pattern of self-interest. On November 16, 1780, Rodney sailed for the West Indies without explicit orders and contrary to the will of the First Lord of the Admiralty, the Earl of Sandwich. He landed in Jamaica, even though sickly season had not yet come to an end. Rodney seized St. Eustatius on February 3, 1781, and then looted and pillaged whatever he could on the island, relaxing his defenses and leaving himself vulnerable to the French. Rodney's pillaging kept at least some of his force land-based through the onset of sickly season. Rodney finally exited St. Eustatius for England on August 1, 1781, having ignored both mission orders and his men's health in favor of maximizing his personal gain.<sup>3</sup>

Finally, Duffy describes the Grey-Jervis expedition of 1794 in similar terms. John Jervis, later Earl St. Vincent, with General Charles Grey took Martinique, St. Lucia, and Guadeloupe by April 22, 1794. Jervis continued in the region, acting beyond his orders, with Grey stretching the interpretation of an Order-of-Council. Pursuing sheer avarice, Jervis stayed on or close to land

---

<sup>2</sup> McNeill, *Mosquito Empires*, 159–64; N. A. M. Rodger. *The Command of the Ocean: a Naval History of Britain, 1649-1815*. First American edition. (New York: W.W. Norton, 2005), 237.

<sup>3</sup> Kenneth Breen, "Rodney, George Bridges, first Baron Rodney (bap. 1718, d. 1792), naval officer and politician," *Oxford Dictionary of National Biography*, September 23, 2004; Rodger, *Command of the Ocean*, 348.

naval and army officers made it a practice to send large numbers their men to their deaths in the Caribbean stemmed largely from alarmist accounts of rare expeditions that suffered significant casualties from disease.

One naval officer who can assist in this quest to illuminate the decision-making process is Sir John Thomas Duckworth, whose newly published papers form the heart of this project. Duckworth was a British naval officer who first entered the West Indies as a lieutenant in 1779. He served in the theater multiple times as a captain, in 1780, 1781, and then from May 1795 to February 1797. He was made a commodore at San Domingo in March 1796 when Rear Admiral William Parker got sick. After a brief respite from duty, Duckworth became commodore again in 1798, and then rear-admiral of the white in 1799. He became commander-in-chief of the Leeward Islands Station in 1801 and then the Jamaica Station in 1803. He was promoted to vice-admiral in 1804. The published papers cover the period 1793 to 1802, with a second volume not yet published but planned to cover the rest of his career. Examining how a veteran West Indies campaigner like Duckworth understood the threat of disease and tracing the steps he took to mitigate its effects will provide concrete evidence of the decision-making hierarchy—mission, health, glory—in action.

The results of this research suggest that Duckworth often prioritized his duty and mission first, which sometimes included obedience to an order to preserve his men's health. Next in the hierarchy, he prioritized his men's health, and finally he prioritized his own self-interest—glory or wealth—only when duty and mission and health aligned. Duckworth therefore exemplifies the shift in officer motivations identified by N.A.M. Rodger. An older generation of naval officers, exemplified by Vernon, Rodney, and Jervis, joined the navy "to make their fortunes." By the 1790s, however, a new generation came to see their service in different terms. Avarice and self-

# Young Generation Naval Officer's Hierarchy of Pressures

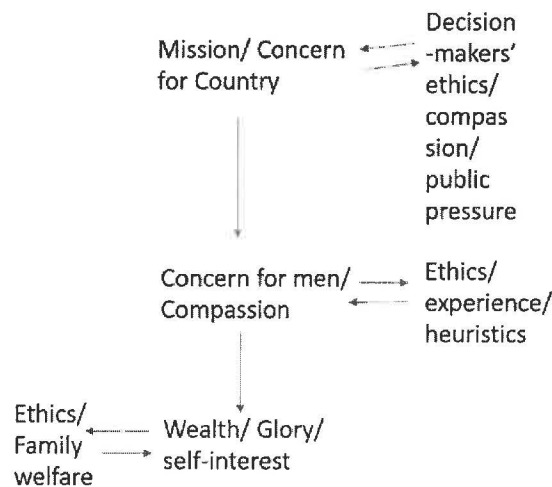


Figure 1. A younger generation naval officer's proposed hierarchy of pressures.

This essay illustrates Duckworth's decision-making by examining three episodes from his career. First, it describes the challenges of the summer of 1796 amid an outbreak of disease during operations around Jamaica and Haiti. Second, it examines Duckworth's return to the West Indies as he set up at Martinique and campaigned in the Leeward Islands in 1801. Third, it follows Duckworth to Jamaica as he protected British assets up until the ratification of the Peace of Amiens in 1802.

## **The Summer of 1796 Tropical Disease Outbreak: Jamaica and Haiti**

The French revolutionaries had overthrown the French monarchy and taken over France in 1792. The French were seeking to topple monarchies in favor of republics around the world, leading to declarations of war by Prussia and Austria. In February 1793 France declared war on Britain. Britain's main objective in the war was to keep France from entering or occupying the European Low Countries of modern-day Netherlands, Belgium, and Luxembourg. Although contributing

French. Factions of French loyalists and republicans further complicated matters. The civil war brought many French and naval forces to the area, threatening British holdings on St. Domingo and threatening Jamaica. Defensively, Duckworth's operational objective was to protect British colonies and commerce in the region, including assisting Jamaica to help suppress the maroon rebellion there. Offensively he was to wrest St. Domingo from the French and, if possible, deliver it unto the British.

As was often the case in the West Indies, though, Duckworth's real enemy was disease. Bad outbreaks of yellow fever and malaria in the summer of 1796 prevented him from being able to deploy enough ships to accomplish his mission. As a result, he requested the Admiralty to send more ships and men to the region, even though it was still the height of the sickly season, demonstrating the preeminence of mission in his mind. On August 19, 1796, Duckworth sought permission from Jamaica's governor Lord Balcarres to impress 1500 men to replace those he had lost.<sup>10</sup> Lord Balcarres declined to help him, as he had lost three-fourths of his white militia after just two years at Jamaica, while the army on station was already significantly reduced.<sup>11</sup> There simply were not enough healthy soldiers and sailors to go around.

That is not to say that Duckworth was indifferent to the risks of service in the region in the sickly season. In his June 1, 1796, letter to his patron and father of one of his midshipman, Edward Baker, Duckworth described his sorrow over the deaths of many men he knew well from his ship *Leviathan*. These men died because the *Leviathan* required an extended stay at the

---

<sup>10</sup> John Thomas Duckworth, *Papers and Correspondence of Admiral Sir John Thomas Duckworth, Vol. 1: The French Revolutionary War, 1793-1802*, ed. J.D. Grainger (London: Navy Records Society, 2022), 115.

<sup>11</sup> Duckworth, *Papers and Correspondence*, 118.

compassion. However, many men had relatives in the services, including such powerful men as Dundas, and later Duckworth's own son joined the army. While practical, a true concern for preservation of life may have also been present, as Charters argues.

For a few lucky weeks in September 1796, Duckworth's orders and his concern for his men's health aligned and provided him with an opportunity to put his fleet in a position to win a great and glorious battle. He was able to gather enough forces off the Mole to look with eager expectation of the arrival of a French fleet of fifteen ships of the line, which intelligence suggested would be arriving from Newfoundland. Usually, his ships were occupied with convoy duty or with repairs, so this was a rare example in the summer of 1796 of Duckworth having the chance to concentrate his force. The French fleet never did give him an opportunity to fight, but clearly Duckworth had that dream of glory in mind.<sup>15</sup>

Nevertheless, what emerges from a close reading of Duckworth's correspondence in 1796 is that he prioritized his mission above all else. Despite his squadron being degraded by disease, damage, and convoy duty, Duckworth vowed to the Admiralty to persevere. He reported the debilitated condition of his squadron to the Admiralty on July 25 upon assuming day-to-day command while Rear Admiral Parker awaited the return of the July convoy to England from the safety of the Jamaican mountains. He expressed his misgivings about his ability to accomplish his mission without additional ships. The French at St Domingo received three convoys of supplies and reinforcements protected by two ships of the line, and four frigates and corvettes. Shortly thereafter, Parker took *Swiftsure* with her crew on his return to England, further reducing his force. Duckworth explained to the Admiralty that his whole squadron is very weak because of "the ravages of the plague," which is "a destructive process that is beyond belief."<sup>16</sup> He had

---

<sup>15</sup> Duckworth, *Papers and Correspondence*, 138–41.

<sup>16</sup> Duckworth, *Papers and Correspondence*, 90–91.



Britain's remaining possessions at St. Domingo were by this time given to Toussaint L'Ouverture in exchange for promising not to attack Jamaica. British colonies remained in the area, however, with five other nations. Britain sought to control their own islands in the region, and to deter adversaries from attacking them. Britain also sought to deter uprisings and rebellions within their islands, and to suppress the influence of other nations, like France, helping to foment them. Many privateers infested the local seas, and Britain sought protection for its own and allied trade.<sup>19</sup>

By the time of his arrival to the Leeward Islands in 1800 Duckworth was a Rear-Admiral of the White, having been promoted in 1799 shortly after his capture of Minorca. His letters leave it uncertain as why he was ordered to the region, although his prior experience and "seasoning" perhaps had something to do with it, combined with his special relationship with Lord Spencer (who gave him special honors in promotion to Rear-Admiral) and his clear and continued desire for prize money and honors. He was placed loosely under Jamaican Commander-in-Chief Vice Admiral Lord Hugh Seymour. Aside from not having to contest for St Domingo any longer, Duckworth's duty remained privateer suppression, and convoy and colony protection. To protect the British colonies in the area, Duckworth's strategy included reconnaissance, surveillance, and intelligence gathering on Guadeloupe and Porto Rico, since these islands were the adversaries' regional hubs of power. To accomplish his objectives Duckworth had one line-of-battle ship, his own *Leviathan*, and frigates and smaller ships in varying quantities and qualities.<sup>20</sup>

Here again, we can see Duckworth prioritizing mission over health. On July 25, 1800, in a letter to Lord Spencer, Duckworth betrayed his worry over having adequate strength to

---

<sup>19</sup> Duckworth, *Papers and Correspondence*, 333.

<sup>20</sup> Duckworth, *Papers and Correspondence*, 208, 333–36.

Another source of sickness came from French prisoners, so Duckworth asked Lord Spencer's permission to establish *Frederick* as a receiving ship for them. Duckworth believed that the men were spreading sickness because they were received onto his own squadron's ships without purification. He also requested that the ship be permitted to receive his own convalescents because the low position of the Port Royal hospital had been producing a great deal of malarial fevers.<sup>24</sup>

Occasionally, there was nothing to be done but to send a weakened ship back to Britain. Duckworth initially hoped that that he could replace the losses in his marine regiment using men from the *Hydra*. However, he later learned that the weak *Hydra* crew was "diabolical," and so he could not use these men as replacements. Duckworth thus asked the Admiralty to send replacement marines instead and he sent the *Hydra* back to Britain on October 31.<sup>25</sup>

In 1796, Duckworth had been frustrated in his attempts to win glory. His weak squadron, overextended responsibilities, and concerns about his men's health had prevented him from following in the footsteps of Vernon, Rodney, and Jervis. But in 1801, Duckworth was luckier. Following the outbreak of war with the Armed Neutrality, Duckworth and Lieutenant-General Sir Thomas Trigge took advantage of the opportunity to attack vulnerable Danish and Swedish possessions. A new opportunity for prize money and glory had arisen, even available to Duckworth's weak, small force. Duckworth planned with Trigge to attack St Bartholomew, and then proceed to other islands "in pursuit of the Admiralty's intentions."<sup>26</sup> Note here the contrast especially with Rodney: Duckworth nestled his avarice under the Admiralty's mission.

---

<sup>24</sup> Duckworth, *Papers and Correspondence*, 338.

<sup>25</sup> Duckworth, *Papers and Correspondence*, 368, 371.

<sup>26</sup> Duckworth, *Papers and Correspondence*, 403.

Lord Hugh Seymour, Commander-in-Chief at Jamaica, died of disease in September 1801, and Duckworth, though wanting to return home to Britain, replaced him. The news of peace took nearly two months to reach Duckworth, so Duckworth continued to prosecute his duty fully until news of preliminary peace arrangements arrived November 16, 1801, and in reduced form until treaty ratification on March 27, 1802. Duckworth's duty was again privateer suppression, and convoy and colony protection, and he promised the Admiralty that he would prioritize his duty above all else. On December 11, 1801, Duckworth, still in Martinique though ordered to Jamaica, responded to the Admiralty and stated that he would do everything in his power to protect British and allied commerce and British colonial coasts; he would "strictly obey" their orders.<sup>29</sup>

One minor difference during this deployment was that St. Vincent was slightly less willing than Spencer to let Duckworth expose his ships to hurricane risks to avoid being near land. On February 14<sup>th</sup>, 1802 Duckworth, at last stationed at Port Royal, Jamaica (he was delayed due to a shortage of manpower and sickness among his men), asked St. Vincent for his preferences on how he should position his fleet of line-of-battle ships given that, by the time he will have received a reply, hurricane season would again be upon him. He received a response written April 4<sup>th</sup>, 1802 from the Admiralty to dispose his squadron in accord with his wishes such to expose his squadron as little as possible to hurricanes.<sup>30</sup> Nevertheless, St. Vincent's orders provided sufficient flexibility for Duckworth to respond to local conditions.

In turn, that provided Duckworth with the opportunity to take steps to protect his men's health, both for compassionate reasons as well as mission reasons. During every deployment to the West Indies as a flag officer, Duckworth made a point of shifting his living quarters onto land

---

<sup>29</sup> Duckworth, *Papers and Correspondence*, 453, 473.

<sup>30</sup> Duckworth, *Papers and Correspondence*, 485, 503.

mosquito-born diseases by relocating them to less sickly regions like Montego Bay.<sup>34</sup> Again and again in Duckworth's career, we can find little evidence of the callous indifference to men's health that McNeill and Duffy find with Vernon and Jervis.

Nor is there evidence of Rodney's self-interested aggressiveness in Duckworth's career. Duckworth did not take advantage of French weaknesses at St. Domingo when given the chance for potential riches and glory. Instead, he followed orders which coincided with health protection as rainy season was just starting. On April 26, 1802, Duckworth received intelligence from Captain James Macnamara informing him of the very weak, vulnerable state of the French, who had failed to retake St. Domingo and lost nearly 4,000 troops sick and wounded since their arrival. Their allies, the Spanish and Dutch, had departed, and just nine French sail of the line remained at St. Domingo. General LeClerc had assumed that he would retake St. Domingo within 3 months once he received reinforcements. The remaining line-of-battle ships were very lightly manned. At the same time, "Buonaparte is more feared than loved," while tensions between France and America had reached an apex due to French insults. Instead of crushing the weakened and demoralized French at St. Domingo, Duckworth mirrored the reduction in his own forces, sending eight sail-of-the-line and a frigate to England, the Admiralty's instructions. Meanwhile, in May, Duckworth at last received news of the ratification of the Peace of Amiens.<sup>35</sup>

### ***Conclusion***

For Duckworth, whenever mission conflicted with glory, riches, or health protection, the mission invariably won. Yet whenever possible Duckworth sought the protection of his own and his

---

<sup>34</sup> Duckworth, *Papers and Correspondence*, 453, 470, 510.

<sup>35</sup> Duckworth, *Papers and Correspondence*, 505–509.

men. Significant failure in paternalistic and compassionate behavior was unacceptable as it would place overseeing politicians in hot water. New health regulations were introduced after the Grey-Jervis disaster, regulating diet, hygiene, clothing, exercise, and location for sheltering. Failures in health protection could lead to the decreased status of an officer, disdain from other officers, insufficient troops for mission, blame, and low morale and capability. Thus, the degree to which compassion represented Duckworth's motivation to protect his men's health remains an open question. However, in his letter to Edward Baker, Duckworth certainly showed a well spring of emotion about the dead and dying of his own flagship. Given that Duckworth spent a considerable amount of time on administrative actions to acquire goods and resources to improve his men's health and that he obtained a reputation as an admiral that took care of his men, his interest in his men's health and well-being likely was genuine. Duckworth generally merged his desire for health protection into the higher priority for duty accomplishment and the Admiralty's approbation whenever possible. Thus, Duckworth epitomizes Charters' popular, paternalistic British military officer of the eighteenth century.<sup>38</sup>

To avoid risking his livelihood, his honor and status, and his ability to acquire significant amounts of treasure, Duckworth continued to seek the approval of the Admiralty and the success of the operational mission, even if he personally disagreed with it. Duckworth felt that fighting for St. Domingo in 1796 was foolish. Not only so, but it had already wasted "millions" in treasure and untold volumes in blood for a hopeless objective.<sup>39</sup> He considered British leadership "ignorant" regarding the real possibility of seizing and controlling St. Domingo.<sup>40</sup> Duckworth consistently separated his personal beliefs and aspirations from his duty as a military officer.

---

<sup>38</sup> Charters, *Disease, War, and the Imperial State*, 1–5, 62; Duffy, *Soldiers, Sugar, and Seapower*, 197; Duckworth, *Papers and Correspondence*, 71.

<sup>39</sup> Duckworth, *Papers and Correspondence*, 71.

<sup>40</sup> Duckworth, *Papers and Correspondence*, 71.

to avoid it. Duckworth could have gone to the mountains in Jamaica, but then he would have been unable to do his duty on the sea. Duckworth could have sailed north, but then he could not have accomplished his duty in the region. All Duckworth could do was follow his doctor's advice and that of the Sick and Hurt Board, who were shaping the Admiralty towards health practice uniformity. Duckworth simply had to follow procedures and standards for cleanliness, fumigating, taking Peruvian (cinchona) bark (quinine), and victualling sufficiently with fresh food and drink. Whenever the mission permitted it, he stayed out to sea during sickly season as much as possible. Unlike Rodney, who sailed north to protect his men's health during sickly season despite orders to protect Jamaica in 1781, Duckworth chose to obey his orders.<sup>42</sup> If Duckworth fully pursued gold and glory he would have also failed in his duty, immediately alienating himself from the Admiralty. The result would have most likely been court-martial and dismissal. Since he neither owned the mission nor the ship, Duckworth could not freely pursue glory or riches like a privateer or pirate. Although the hope for riches was the most common inspiration for seamen, including naval officers, it could not be freely pursued.<sup>43</sup>

According to one historian, in general, commanding officers generally esteemed and followed the advice of hospital physicians and surgeons. Duckworth's career supports this assertion; nowhere is there evidence of Duckworth not following the advice of his doctors. He censured one doctor, but he always took the reasoning and advice of his doctors. According to Convertito, admirals and captains often became more health-conscious and grew a closer relationship with doctors and surgeons after experiencing sickness and seeing it among their

---

<sup>42</sup> Christopher Lloyd and Jack L.S. Coulter, *Medicine and the Navy, 1200-1900*, volume 3 (Edinburgh and London: Livingstone, 1961), 131; Geoffrey L. Hudson, *British Military and Naval Medicine, 1600-1830* (Amsterdam: Rodopi, 2007), 16.

<sup>43</sup> James Alexander Miller, *Milestones in Medicine* (Freeport, N.Y: Books for Libraries Press, 1971), 84.

## Bibliography

### Primary Source Collections (Published Documents)

Grainger, John D, ed. 2022. *Papers and Correspondence of Admiral Sir John Thomas Duckworth: Volume 1: The French Revolutionary War, 1793-1802*. London: Navy Records Society.

### Secondary Sources

Breen, Kenneth. 2004. "Rodney, George Bridges, First Baron Rodney." Oxford Dictionary of National Biography. Oxford University Press. Doi: <https://doi.org/10.1093/ref:odnb/23936>.

Charters, Erica. *Disease, War, and the Imperial State : The Welfare of the British Armed Forces During the Seven Years' War*. Chicago: University of Chicago Press,, 2014.  
<https://doi.org/10.7208/9780226180144>

Convertito, Coriann. 2011. "The Health of British Seamen in the West Indies, 1770-1806." United Kingdom: University of Exeter Proquest Dissertations Publishing.

Duffy, Michael 1987. *Soldiers, Sugar, and Seapower: The British Expedition to the West Indies and the War against Revolutionary France*. Oxford: Oxford University Press.

Hudson, Geoffrey L. ed. 2007. *British Military and Naval Medicine, 1600-1830*. Amsterdam: Rodopi.

Lloyd, Christopher, and Jack L.S. Coulter. 1961. *Medicine and the Navy, 1200-1900*, volume 3. Edinburgh and London: Livingstone.

McNeill, J.R. 2010. *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914*. Cambridge: Cambridge University Press.

Miller, James Alexander. 1971. *Milestones in Medicine*. Freeport, N.Y: Books for Libraries Press.