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Close on the Wind: An Environmental Military History Examining Wind's Influence on
the Early United States Navy

by

Scott J. Beehler

A Thesis

Presented to the Faculty of
The Graduate College at the University of Nebraska
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Close on the Wind: An Environmental Military History Examining Wind's Influence on
the Early United States Navy

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University of Nebraska, 2014

Adviser: Lloyd Ambrosius

Utilizing General Carl von Clausewitz's theory of friction in combat, *Close on the Wind* examines wind's historical influence on early United States naval warfare, specifically small scale engagements fought during the Quasi War, First Barbary War, and the War of 1812. To accomplish this, the thesis first engages in a scientific discussion of wind, concentrating on how it occurs and what forces dictate its velocity and direction. The examination goes on to also present the types of wind that period sailing vessels encountered, including global, regional, and local patterns, as well as how wind influenced the practice of sailing and what period naval captains understood about its origins. Employing this scientific understanding, *Close on a Wind* next investigates wind's impact on a collection of American naval engagements, applying von Clausewitz's concept of friction as a guide. The first examples focus on wind as a force of friction that through changes in direction and intensity altered battle dynamics leading to delays, hindering movement, allowing escapes, and even inflicting damage upon vessels. The second group of examples center on the tactics that American naval captains utilized to combat wind friction in battle, concentrating particularly on the weather gage and how captains attempted to exploit or negate its advantage. Together, these clashes all testify to the power and unpredictability that wind brought to naval engagements revealing its importance in shaping the early United States Navy's battle tactics.

For my parents, Kevin and Susan, and Gramdpa R. who always believed in me and pushed me to be the best, Thank you.

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Introduction

For millennia sailing has represented a key role in civilization's development, providing infinitely greater mobility, speed, and carrying capacity in comparison to land travel, as well as allowing the projection of military power over vast areas. As a result, nations throughout history, including the United States, have sought to control the seas and oceans to protect their national interests. In order to utilize this power, one must understand one of the natural forces that dominate it, wind. For the early United States Navy, wind played a decisive role in its battles, greatly influencing the emerging navy's aggressive fighting style.

Over the years numerous books have been published about the Navy and its early wars.¹ These works cover a vast array of themes from traditional military histories and

¹ For works on the Quasi and First Barbary Wars see: Michael A. Palmer, *Stoddert's War: Naval Operations During the Quasi-War with France, 1798-1801* (Columbia, SC: University of South Carolina Press, 1987), Alexander DeConde, *The Quasi-War: The Politics and Diplomacy of the Undeclared War With France, 1797-1801* (New York: Scribner, 1966), Howard P. Nash, *The Forgotten Wars: The Role of the U.S. Navy in the Quasi War with France and the Barbary Wars* (New York: A. S. Barnes, 1968), Donald B. Chidsey, *The Wars in Barbary: Arab Piracy and the Birth of the United States Navy* (New York: Crown, 1971), Frank Lambert, *The Barbary Wars: American Independence in the Atlantic World* (New York: Hill and Wang, 2005), Glenn Tucker, *Dawn Like Thunder: The Barbary Wars and the Birth of the U.S. Navy* (Indianapolis: Bobbs Merrill, 1963), and Gregory Fremont-Barnes, *The Wars of the Barbary Pirates: To the Shores of Tripoli the Rise of the US Navy and Marines* (Long Island City, NY: Osprey Publishing, 2006). For works on the War of 1812 see: Donald R. Hickey, *The War of 1812: A Forgotten Conflict* (Urbana, IL: University of Illinois Press, 2012), Cecil S. *The Age of Fighting Sail: The Story of the Naval War of 1812* (Garden City, NY: Doubleday, 1956), Mackay J. Hitsman, *The Incredible War of 1812: A Military History* (Toronto: University of Toronto Press, 1965), Reginald Horsemann, *The War of 1812*

biographies to economically and politically oriented studies. Nevertheless, an analysis focusing specifically on wind and its influences on the American navy does not exist.

While wind and its affects are not examined at the micro level, several books do recognize wind and its contribution to warfare and naval history. These include John Collin's *Military Geography*, Harold A. Winters's collaborative effort *Battling the Elements*, and Alfred W. Crosby's environmental history *Ecological Imperialism*.

(New York: Knopf, 1969), John K. Mahon, *The War of 1812* (Gainesville, FL: University of Florida Press, 1972), Theodore Roosevelt, *The Naval War of 1812; or, The History of the United States Navy During the Last War with Great Britain: To Which is Appended an Account of the Battle of New Orleans* (New York: Haskell House, 1968), James Barnes, *Naval Actions of the War of 1812* (London: Cornmarket Press, 1969), and Jon Latimer, *1812: War with America* (Cambridge, MA: Harvard University Press, 2007). For biographies of important U.S. naval commanders consult: Eugene S. Ferguson, *Truxtun of the Constellation: The Life of Commodore Thomas Truxtun, U.S. Navy, 1775-1822* (Baltimore: John Hopkins University Press, 1956), Linda M. Maloney, *The Captain from Connecticut: The Life and Naval Times of Isaac Hull* (Boston: Northeastern University Press, 1986), Claude G. Berube and John Rodgaar, *A Call to the Sea: Captain Charles Stewart of the USS Constitution* (Dulles, VA: Potomac Books, 2005), A.J. Langguth, *Union 1812: The Americans Who Fought the Second War of Independence* (New York: Simon & Schuster, 2006), and David F. Long's biographies: *Nothing Too Daring: A Biography of Commodore David Porter, 1780-1843* (Annapolis, MD: U.S. Naval Institute, 1970), *Ready to Hazard: A Biography of Commodore William Bainbridge, 1774-1833* (Hanover, NH: University Press of New England, 1981), and *Sailor-Diplomat: A Biography of Commodore James Biddle, 1783-1848* (Boston: Northeastern University Press, 1983). Finally, for works providing a overarching view of the U.S. Navy's creation see: Allan R. Millett and Peter Maslowski, *For the Common Defense: A Military History of the United States of America from 1607 to 2012* (New York: Free Press, 2012) and Ian W. Toll, *Six Frigates: The Epic History of the Founding of the U.S. Navy* (New York: W.W. Norton & Company, 2006).

Military Geography describes the effect that a wide variety of geographic features, both physical and cultural, have on warfare. As for wind, Collin's work focuses mostly on the macro scale, discussing wind's influence on surface water (waves), types of winds, and storms. When he does bring attention to the micro level he has few examples and they portray wind as a negative force that impedes movement and can endanger ships.² In contrast, the work done by Harold A. Winters and his compatriots undertakes a much greater micro level examination of the environment's impact on warfare. In its chapter discussing wind and weather, *Battling the Elements* centers its research on three examples: thirteenth-century Japan and the Kamikaze, the Allied evacuation of Dunkirk in 1940, and the Normandy invasion in 1944. In doing so Winters displayed instances in history in which wind and weather played a critical role in a battle's outcome, acting both negatively (the Kamikaze) and positively (Dunkirk and Normandy). However, even in examining wind's part in these historical events, *Battling the Elements* still does not dig deep enough, lacking an analysis of wind tactics in battle.³

Perhaps the best written works characterizing wind and applying its influence to a specific time period comes from the environmental history *Ecological Imperialism*. Alfred W. Crosby explains how Europe's environment allowed its people during the age of exploration to conquer and colonize regions around the world and turn them into what

² John M. Collins, *Military Geography: For Professionals and the Public* (Washington, D.C.: Brassey's Inc., 1998).

³ Harold A. Winters, Gerald E. Galloway Jr., William J. Reynolds, and David W. Rhyne. *Battling the Elements: Weather and Terrain in the Conduct of War* (Baltimore: John Hopkins University Press, 2001).

he called “Neo-Europes.”⁴ In his chapter on wind, Crosby explains how Europeans exploited specific global wind patterns through new sailing technologies and techniques, opening up the world to European domination. Yet, because Crosby does not investigate wind’s influence over naval engagements, he leaves out a significant share of wind’s influencing capability.

In addition to the secondary sources, primary sources played a significant part in providing information, helping to uncover the significance that wind played in the American Navy’s early battles. Sources such as ship’s logs, captain’s letters, and journals offered key information detailing wind conditions like strength and direction, as well as giving a timeline for each naval encounter. By far the most helpful primary source material came from Abel Bowen’s *The Naval Monument*.⁵ Published in 1830 as a collection of letters, ship’s log entries, journals, and other firsthand accounts covering the American naval engagements fought during the War of 1812, Bowen’s work furnished accounts for many of the battles examined in this thesis.

To detail the relationship between wind and the American navy, this thesis defined two parameters to narrow its focus. First, the time frame concentrates on the Quasi War, First Barbary War, and the War of 1812. Together, these three wars characterized the United States Navy’s birth (Quasi War), growth (First Barbary War), and maturation (War of 1812), as well as provided numerous examples detailing

⁴ Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge: Cambridge University Press, 1986), 2.

⁵ Abel Bowen, ed., *The Naval Monument, Containing Official and Other Accounts of All the Battles Fought Between the Navies of the United States and Great Britain During the Late War; and an Account of the War with Algiers* (Boston: George Clark, 1830).

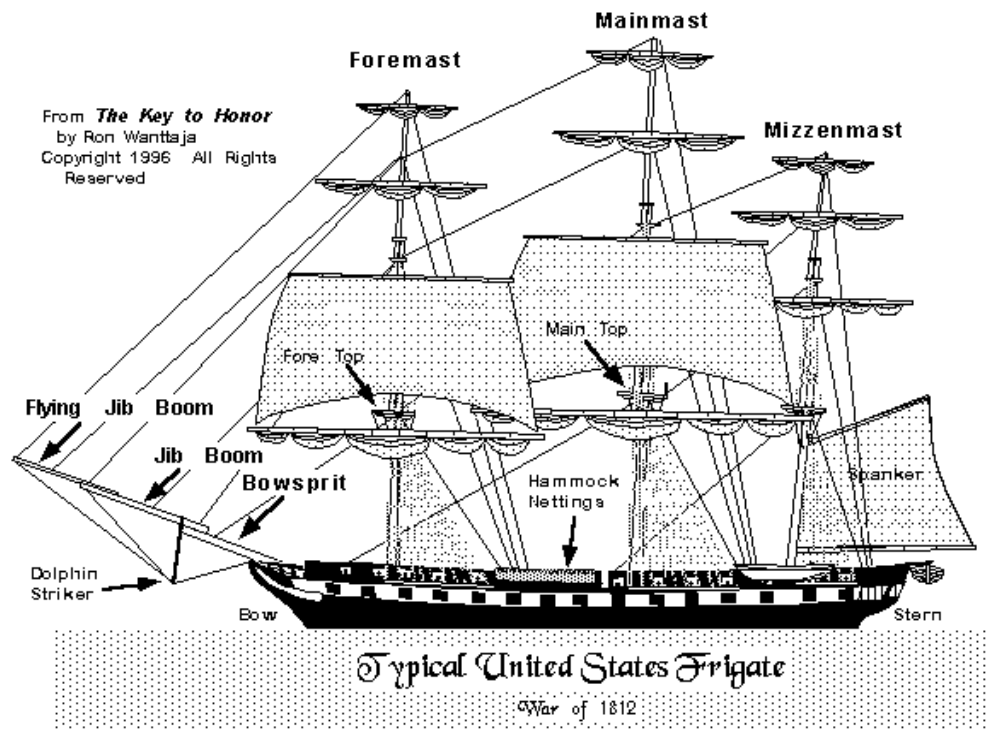
American naval battles and tactics from which to examine wind's influence. While each war contributed conflicts for the study, the majority come from the War of 1812, not because it was more important, but because the war was simply more expansive than the others.

Second, to best explain wind's influence on specific battles and American naval tactics, this paper also limits the engagement types examined to individual, ship on ship encounters, and other small engagements. This is done for two reasons. First, due to its limited size, the United States Navy lacked the ability to form large fleets or taskforces, instead sending its frigates out individually or on patrol with a smaller sloop or brig. Consequently, almost every battle fought by the American navy was either single combat or a small engagement featuring four or fewer total vessels. Second, determining the conditions under which a battle occurred and understanding the actions taken by each side is far easier in a small engagement making an examination of wind clearer.

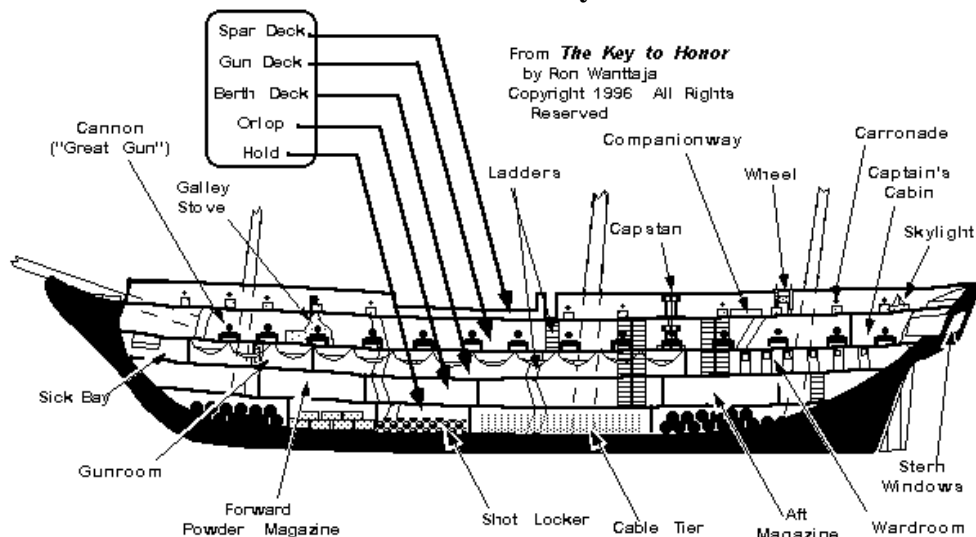
Following these constraints, the analysis that arises breaks down wind's impact on the early United States Navy into four chapters. Chapter one presents background for the Quasi War, First Barbary War, and War of 1812 briefly describing how the war began, what occurred during the war, and how it ended. Chapter two concentrates on wind itself, expounding on how wind forms, which forces determine its strength and direction, what types of wind exist, how it affects sailing, and what knowledge period captains possessed on how wind occurred, specifically if this knowledge was based on scientific understanding, collective knowledge accumulated over their careers, or a combination of both. The final two chapters illustrate specific examples spelling out wind's influence on the country's early naval battles. Utilizing General Carl von Clausewitz's concept of

friction, chapter three demonstrates the direct role that wind played in deciding several naval engagements. Lastly, chapter four continues along these lines, expanding wind's influence to tactics, particularly focusing on exploiting or countering the weather gage.

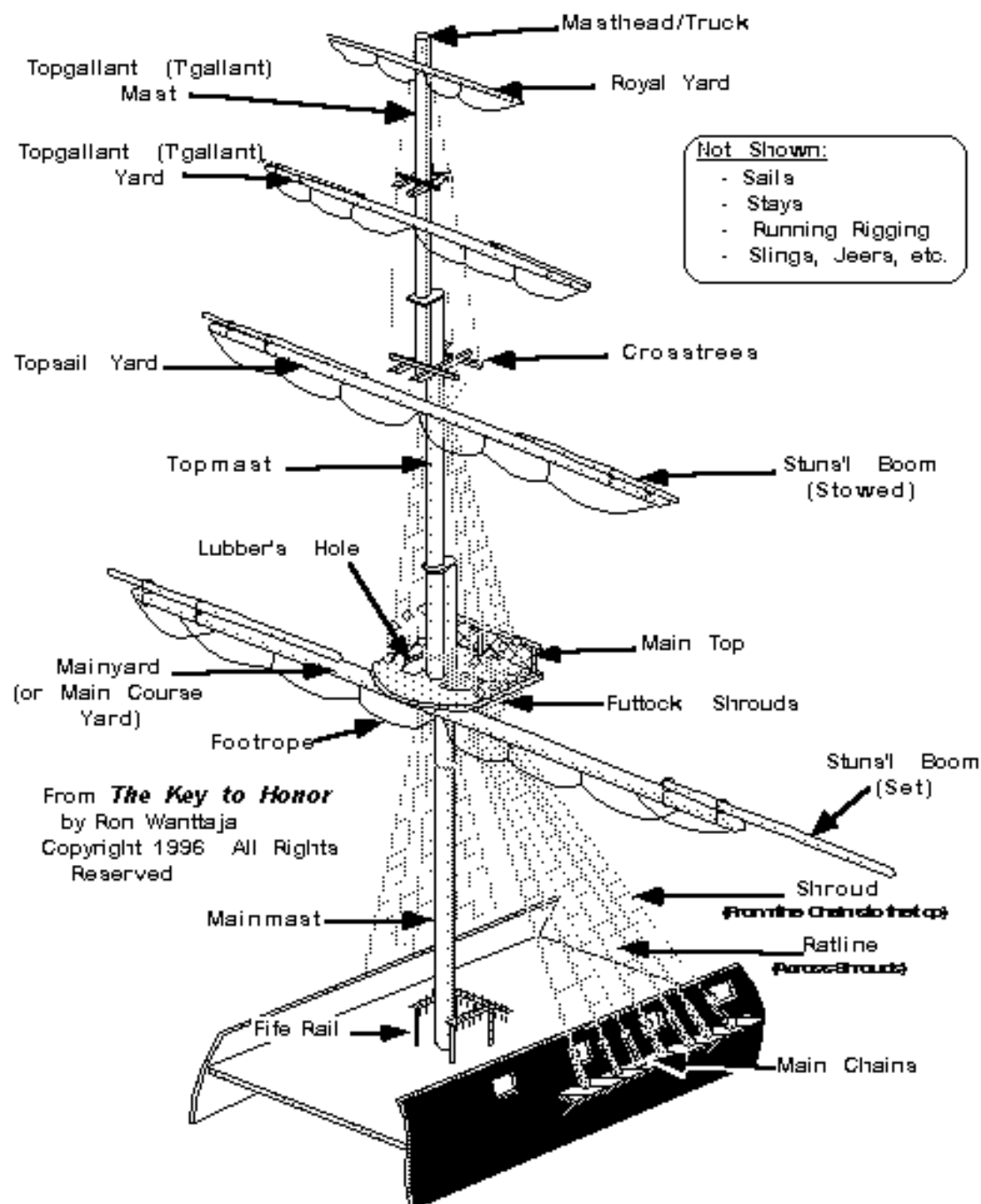
Overall View of Typical U.S. Frigate during War of 1812



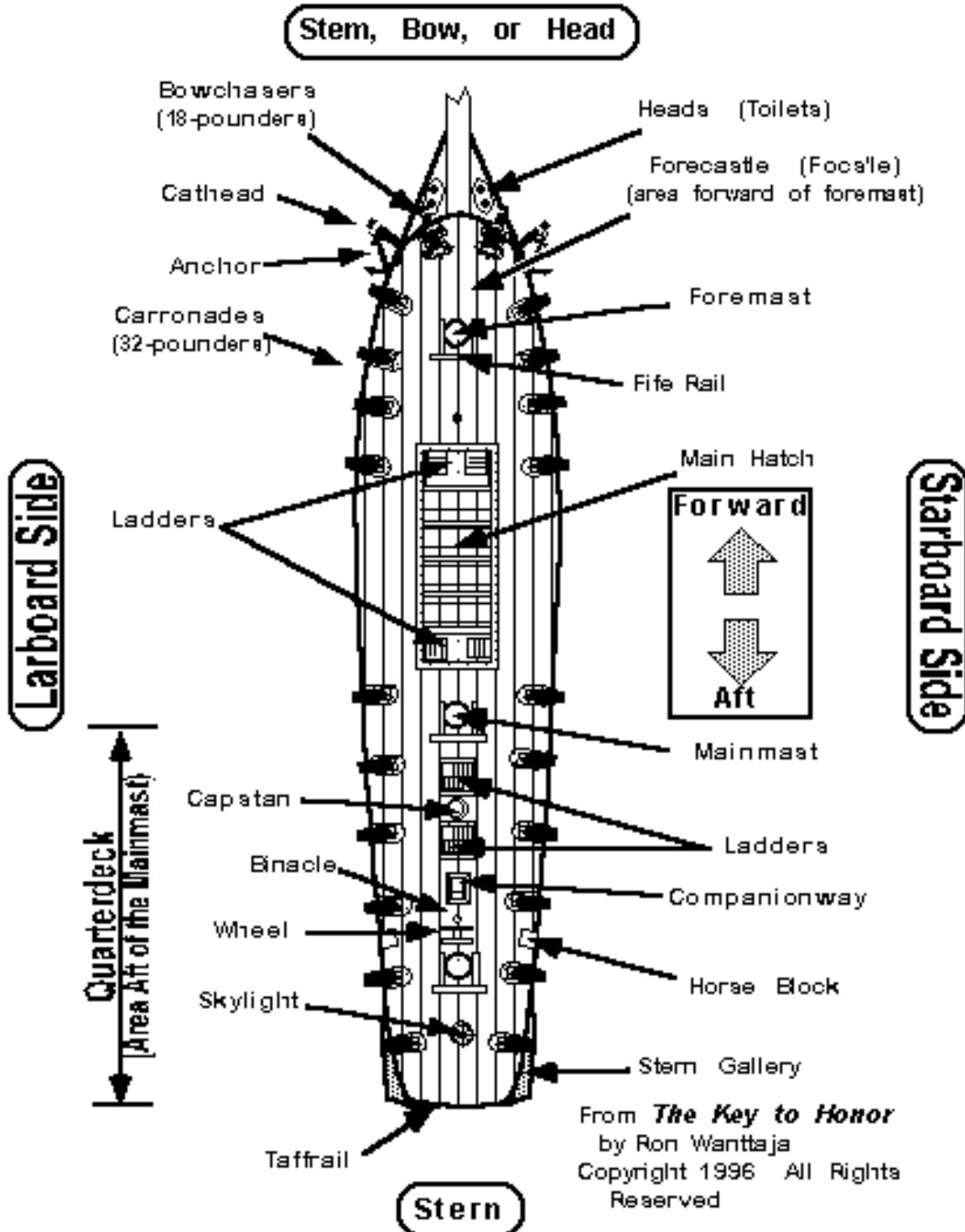
Deck Cutaway



Typical Mainmast



Overhead View of the Spar Deck



(Graphics above obtained from <http://www.wanttaja.com/navlinks/shipview.htm>)

Chapter 1: War Backgrounds

With America's war for independence over, the young country now faced the growing challenge of defending not only its thousands of miles of coastline, but also its economic and political interests on the world stage. At the eighteenth century's close, this meant navigating through the complex world of international politics, negotiating alliances and treaties, as well as possessing a navy to protect the nation's trade and transmit its political and military influence to any belligerent's doorstep. In the United States' case though, such a navy did not exist to give teeth to any negotiated agreement. By 1785, the Confederation government had sold the Continental Navy's remaining vessels and greeted any talk of resurrecting the institution with political infighting over the cost and danger of provoking a European power to war.⁶ Necessity soon changed such opinions though, as a series of wars, the Quasi War, the First Barbary War, and the War of 1812, made it clear that the country badly needed a navy.

Quasi War

The Quasi War's roots trace back to 1793 when the French Revolution's violence boiled over into a worldwide conflict between France and Britain. Politically split over whom to support, Congress and the Washington administration ushered in a policy of neutrality.⁷ While the policy's primary aim sought to prevent the country from becoming a pawn for the world's great powers, many opportunistic American merchants saw the

⁶ Allan R. Millett and Peter Maslowski, *For the Common Defense: A Military History of the United States of America* (New York: The Free Press, 1994), 99-100.

⁷ Millett and Maslowski, *For the Common Defense*, 100-101.

policy as an irresistible money-making opportunity. As the war escalated and prolonged, Britain and France's shipping proved unable to handle the war's increasing demands, in addition to each country's normal trade. As a result, Britain and France turned heavily to neutral countries, particularly the United States, to carry their goods and provide supplies.⁸

With the war raging, the nation's merchants stepped in to fill the void, greatly increasing the United States imports, exports, and ship tonnage engaged in foreign trade. However, the new-found commercial power did not come without danger. As America's commercial importance grew, both Britain and France attempted to curtail the nation's neutrality in order to cut off their enemy's trade and possibly draw the country into the war. To walk the fine line between the two belligerents, American diplomats needed to demonstrate their astuteness and lessen the tension that surrounded the United States.⁹

America's first peace overture went toward its traditional enemy. In 1794 President George Washington sent a diplomatic mission to Great Britain, headed by statesman John Jay. One year later, Jay's Treaty achieved its goal, greatly lessening tension between the two countries.¹⁰ While Jay's Treaty effectively ended the threat of war with Britain for the time, it did the opposite with France. A key ally during the Revolutionary War, France viewed Jay's Treaty as a stab in the back, making an already strained relationship even more tenuous. The French responded to what they saw as a

⁸ Michael A. Palmer, *Stoddert's War: Naval Operations During the Quasi-War with France, 1798-1801* (Columbia, SC: University of South Carolina Press, 1987), 4.

⁹ Palmer, *Stoddert's War*, 3-4.

¹⁰ Palmer, *Stoddert's War*, 4.

new Anglo-American alliance by increasing their attacks on American merchant ships and refusing to accept a new American minister.¹¹

By September 1800, French privateers and corsairs had seized, captured, detained, and confiscated the cargos and crews of 2,309 American merchant ships costing millions of dollars. In a final effort to prevent war, President John Adams sent American statesmen Elbridge Gerry, John Marshall, and Charles Cotesworth Pinckney to France to negotiate a settlement between the two nations. However, before agreeing to a meeting, French agents, code named X, Y, and Z by the American diplomats, demanded a two hundred and twenty thousand dollar bribe. Gerry, Marshall, and Pinckney refused and, when an official letter describing the encounter reached the United States, anti-French sentiments over what came to be known as the X Y Z Affair swept through American society.¹² With diplomacy failing to stop France from harassing American commerce, a military response became President Adams' only reasonable option. The United States sent out its new naval force consisting of fifty-four warships, including the six frigates authorized by Congress in 1794 that came on line during the conflict. Additionally, over one thousand armed merchantmen also joined in the hunt for French privateers and escorted American merchant vessels, inaugurating a nearly three-year limited and undeclared naval war with France.¹³

¹¹ Millett and Maslowski, *For the Common Defense*, 101.

¹² Palmer, *Stoddert's War*, 6.

¹³ Frigate names and completion dates: *United States* (10 May 1797), *Constellation* (7 September 1797), *Constitution* (21 October 1797), *Congress* (15 August 1799), *Chesapeake* (2 December 1799), and *President* (10 April 1800), obtained from: "The Reestablishment of the Navy, 1787-1801 Historical Overview and Select Bibliography," Naval Historical Center,

The United States Navy's first conflict came to an end in late 1800 with the Treaty of Mortefontaine's signing. In less than a year though, the nation's navy faced another challenger on the high seas. Like the Quasi War, the new conflict revolved around protecting America's right to conduct international trade. However, the threat did not come from the traditionally powerful European naval states, such as France or Britain, but instead came from the Barbary pirates.

First Barbary War

Located on North Africa's coast, the Barbary States occupied a nearly two-thousand mile long corridor, extending from the Eastern Mediterranean to the Atlantic Ocean and consisting of four principal states: Tripoli in the east, and Tunis, Algiers, and Morocco in the west. As far back as historical records go, piracy was a highly lucrative business for peoples living around the Mediterranean Sea. In the classical era, many of Greece's greatest heroes and leaders, from Achilles and Odysseus to Alexander the Great's father Philip of Macedon either engaged in or utilized piracy to achieve their goals. However, after Rome's fall and the resulting collapse in sea trade, piracy in the Mediterranean stagnated. Not until the Renaissance did a trade revival re-open the door for pirating, allowing North Africa's Muslim inhabitants to gain a foothold in the business. During the centuries that followed, the Barbary States increased their power,

using piracy to blackmail European nations into making large tribute payments to protect their nation's commerce.¹⁴

Prior to independence, the American colonies' foreign commerce rested securely under a protective umbrella provided by Britain's commercial treaties and powerful Royal Navy. One such treaty, the 1682 treaty of Peace and Commerce negotiated by King Charles II with the Algerian Dey, provided protection for all English subjects and their ships. This ensured their rights to freely enter and leave Algerian ports, buy and sell goods, travel the seas without searches, and protection from enslavement. With American independence though, this protection disappeared, making the United States just another country for the Barbary States to extort.¹⁵

Efforts to rectify the nation's commercial vulnerability began at the same time as the end of the Revolutionary War. In addition to the treaty recognizing independence, the United States also submitted a commercial treaty to the British hoping to extend the commercial protections that America experienced as British colonies, thus protecting the new nation's commerce from the Barbary States. However, because Great Britain still practiced a closed mercantilist economic system, Parliament refused to ratify the proposed commercial treaty. From the mid 1780s to the early 1790s, America's problem with the Barbary pirates grew as its merchant ships and their crews began to fall to Algerian pirate vessels.¹⁶ With tensions rising, the United States government undertook a

¹⁴ Donald Barr Chidsey, *The Wars in Barbary: Arab Piracy and the Birth of the United States Navy* (New York: Crown Publishers, 1971), 1, 10-12.

¹⁵ Frank Lambert, *The Barbary Wars: American Independence in the Atlantic World* (New York: Hill and Wang, 2005), 4-5.

¹⁶ Lambert, *The Barbary Wars*, 5-7.

two-pronged strategy to address the Algerian problem, one military and the other diplomatic. The strategy's military aspect came into existence in 1794 when Congress passed the Naval Act, mandating the construction of six frigate class warships to protect American merchant vessels. The diplomatic aspect came to fruition two years later with a successfully negotiated Algerian peace treaty. President Washington and Congress agreed though to continue construction on three frigates to protect against future aggression against American maritime commerce.¹⁷

The 1796 Algerian treaty and other previous negotiated treaties ended Barbary pirate attacks against United States merchant ships, but it cost the country significantly. Nearly one million dollars in currency along with an additional twenty-one thousand dollars in naval stores went annually to the Algerians alone, this at a time when it cost less than six million dollars to run the country for a year.¹⁸ Nevertheless, even with such payments, the Barbary States' greed still posed a threat. In 1801 the threat materialized when the Pasha of Tripoli violated his 1796 treaty with the United States, threatening to unleash his pirates if payments did not increase. Refusing to give in to such intimidation, President Thomas Jefferson sent a small squadron under Commodore Richard Dale to the Mediterranean to defend American merchant vessels and to punish the Pasha for threatening war. Over the next four years, United States naval squadrons conducted operations against Tripoli, blockading and bombarding the city until June 1805 when a peace treaty ended America's second naval war.¹⁹

¹⁷ Millett and Maslowski, *For the Common Defense*, 99.

¹⁸ Chidsey, *The Wars in Barbary*, 30-31.

¹⁹ Millett and Maslowski, *For the Common Defense*, 104-105.

With the peace treaty signed and the First Barbary War concluded, the United States hoped for an extended period of peace and economic prosperity, during which America's merchantmen could freely ply the seas carrying the world's goods. However, the peace and prosperity created after the war's end proved short lived. Less than ten years later, the United States became involved in its most destructive war since the Revolution with its traditional and most powerful rival, Great Britain.

War of 1812

The United States' next confrontation with the British Empire traces its source back to 1803 and the failed Peace of Amiens, which rekindled the Napoleonic War. Much as they had done during the Quasi War, Britain and France began targeting neutral American merchant ships with the intent to destroy one another's economies. By this point in the war though, the French navy embodied a mere shadow of its former self, having lost many ships and command of the sea to the Royal Navy at the Battle of Trafalgar. As a result, the economic damage inflicted upon the United States by the British far outstripped that caused by the weakened French. From 1803 to 1807, the Royal Navy lingered off America's coast imposing a near blockade, detaining more than five hundred American ships and impressing (forcibly taking) American sailors suspected to be British deserters and putting them into service aboard British warships.²⁰

With more and more sailors being taken from American ships, impressment soon became an increasingly critical issue between the two countries. The worst of these offenses occurred on June 22, 1807, when the fifty-two gun frigate *HMS Leopard*

²⁰ Millett and Maslowski, *For the Common Defense*, 105.

intercepted the American frigate *Chesapeake* off the Virginia Capes with orders to search the ship for British deserters. In the melee that followed, the *Leopard* fired three broadsides into the unprepared *Chesapeake*, killing four and wounding seventeen crewmembers. After the American ship struck colors the British boarded it and took four deserters back to the *Leopard*. The disgraced *Chesapeake* limped back to its anchorage at Hampton Roads, Virginia. Word of the incident spread quickly causing waves of public outrage to sweep across the nation leading to anti-British sentiment not seen since the Revolution.²¹

The open sea was not the only area where differences between the two countries caused increased animosity. In the western states and territories, many American settlers pointed to British interference as the reason behind the rising tensions with Native Americans in the region. Since signing Jay's Treaty British officials walked a tight rope, seeking to restrain Native American reactions to the increasing numbers of whites moving into their territory while maintaining their loyalty through economically subsidizing each tribe. However, when hostilities broke out, Americans saw the economic and diplomatic connection between the British and the Indians, translating it into blame for the uprisings. In 1805 tensions began boiling over when the Shawnee spiritual leader Tenskwatawa, known as the Prophet, pioneered a new religious movement that rejected the "white man's ways." After three disastrous land cession treaties in 1809, the Prophet's brother, Tecumseh, added a militant tone to the movement in order to protect against further white encroachment on native lands.

²¹ Ian W. Toll, *Six Frigates: The Epic History of the Founding of the U.S. Navy* (New York: W.W. Norton & Company, 2006), 294, 297-99.

As Tecumseh's movement spread across the West, Americans began to see it as a growing threat. Responding to the danger, the governor of the Indiana Territory, William Henry Harrison, assembled a 1,000 strong army to attack and destroy the tribal headquarters at Prophetstown. Early on November 7, 1811, Harrison's forces attacked the camp, eventually driving the Indians from Prophetstown. Rather than resolve the conflict though, the American victory at the Battle of Tippecanoe forced many more natives toward the British, which stoked American hatred and led many to advocate invading British Canada.²²

The War of 1812 formally began on June 18th when President James Madison signed into law the most hotly debated declaration of war in American history. To this day, scholars continue to debate why the United States ventured down the path to war. Some point to maritime issues such as impressment, the Orders in Council, which imposed broad trade regulations over the European continent and hindered American free trade, and British violations of American territorial waters as the war's primary flash points. Others key upon America's western interests, such as conquering Canada to expand the country's farm land and end British influence in North America, particularly over native tribes that opposed American encroachment onto their lands. Still, an additional group directs their attention toward political motives, such as building Republican Party unity, and ideological dynamics centered on preserving national honor. Because so many differing regional and national motives defined the conflict, no single

²² Donald R. Hickey, *The War of 1812: A Forgotten Conflict* (Urbana, IL: University of Illinois Press, 2012), 22-25.

issue pinpoints the reason America declared war on Great Britain.²³ Instead, the war's most likely cause seems a combination of these issues.

Throughout the war the United States faced repeated setbacks, failing to accomplish many of its war aims, and achieved victories only under the most desperate circumstances. On land, American forces proved not only unable to capture British Canada, but also to protect their own borders, losing parts of New York, northern Maine, and large regions west of Lake Michigan, as well as allowing the British to sack and burn the nation's capital.²⁴ Only a small number of victories, such as those at Lake Erie, Fort McHenry, and Plattsburg, prevented the British from retaking much of the country. On the sea, Britain's superior naval forces imposed a blockade that devastated the American economy. The United States did achieve several stunning victories in frigate-on-frigate engagements early in the war. However, the Royal Navy soon countered, ordering its warships to avoid one-on-one engagements, increasing the blockade force, and confining America's frigates to port for extended periods. For the war's remainder, the United States Navy depended on its smaller warships that could slip through the blockade and attack enemy merchant traffic and small warships, achieving some success.²⁵ Though significant to the country's morale, in the end America's naval victories had little strategic importance, failing to dislodge the British blockade. Even with all their successes, the British were content to maintain the pre-war status quo in the treaty that ended the war. Signed on Christmas Eve 1814, the Treaty of Ghent officially ended the

²³ Hickey, *The War of 1812: A Forgotten Conflict*, 1-2, 46.

²⁴ Jon Latimer, *1812 War with America* (Cambridge MA: Harvard University Press, 2007), 4.

²⁵ Millett and Maslowski, *For the Common Defense*, 111-12.

War of 1812 and returned “all territory, places, and possessions whatsoever taken by either party from the other during the war, or which may be taken after the signing of this Treaty” to its status quo antebellum.²⁶

Together, these wars not only supplied the conflicts responsible for creating the United States Navy, but also provided the navy with valuable experience from which to establish a tactical doctrine. This furnished the basis from which the world’s future foremost maritime power developed.

²⁶ Hunter Miller, Editor, *Treaties and Other International Acts of the United States of America: Treaty of Ghent* Vol. 2 Documents 1-40: 1776-1818 (Washington: United States Government Printing Office, 1931), Article 1.

Chapter 2: Wind, a Scientific Explanation

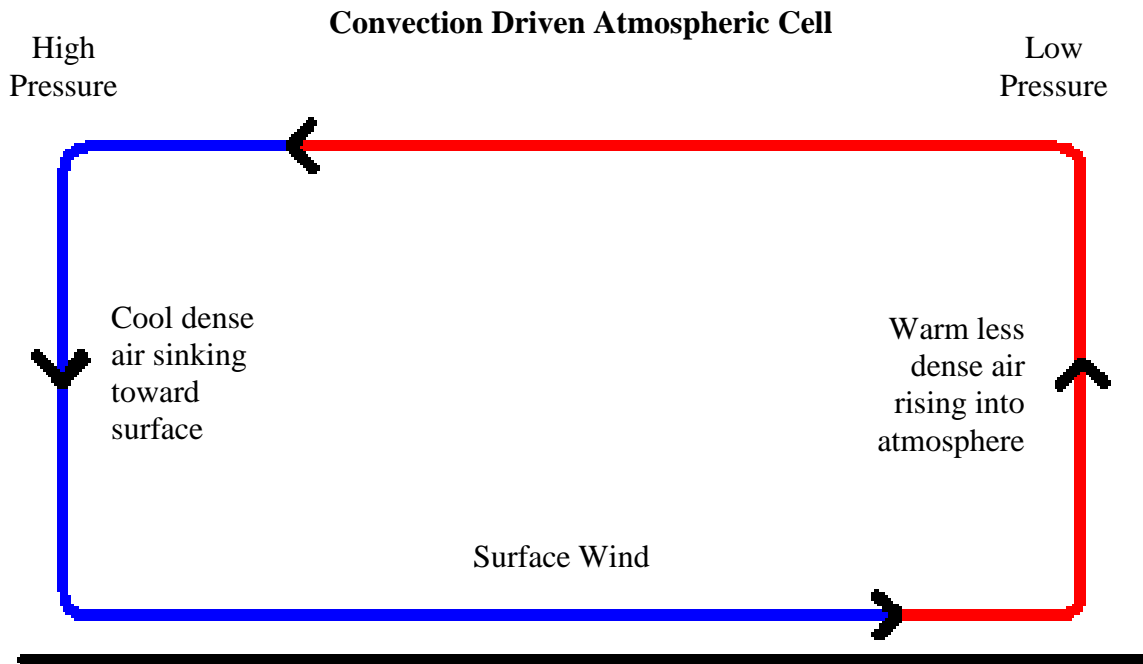
How Wind Occurs

Before delving into the examples that detail the role wind played in influencing the United States Navy's development, a basic understanding of how wind occurs, what forces influence it, the types of wind that impact sailing, and how wind affects not only the practice of sailing but the environment in which sailing ships operate will illustrate the complexities that early nineteenth-century mariners faced. In its simplest definition, wind represents the convection driven movement of air from high pressure areas to low pressure areas, which originate from the sun's unequal distribution of heat energy over the earth's surface. Due to the earth's tilt, some areas receive more heat energy than other locations. As the air in areas that receive large amounts of heat energy warms, such as in the equatorial region, it becomes less dense and rises, creating a low-pressure zone. Conversely, the air in locations that receive smaller amounts of the sun's energy cools, such as in the polar regions, becoming denser and sinking toward the earth's surface, forming a high-pressure zone.¹

Due to the pressure difference, the high pressure zone's cooler, denser air flows along the earth's surface toward the low pressure zone, seeking to fill the partial vacuum caused by the rising warm air and producing a surface wind. Along the way and upon reaching the low pressure zone, the cooler, denser air warms and rises into the atmosphere. Similarly, higher up in the atmosphere the low pressure zone's warmer, less dense air flows toward the partial vacuum left by the high pressure zone's sinking dense air, cooling along

¹ W.G. Ernst, ed. *Earth Systems: Processes and Issues* (Cambridge: Cambridge University Press, 2000), 160.

the way and then sinking towards the surface. These moving air masses create a convection driven atmospheric cell, which will continue to produce winds on the surface and in the upper atmosphere as long as the two differing pressure zones exist.²



Forces that Influence Wind

While pressure differences caused by the sun's unequal distribution of solar heat energy represent the driving force that produces wind, other factors influence the wind's direction and speed. These include the pressure gradient force, friction with the earth's surface, the Coriolis Effect, and the centrifugal effect.³ In reality, wind's speed and

² Ernst, *Earth Systems*, 160-62.

³ John F. Lounsbury and Lawrence Ogden, *Earth Science* (New York: Harper and Row, 1979), 81. Because physicists have proven that the Coriolis force and the centrifugal force are the result of observations made from a rotating frame of reference and not actual physical "forces" that influence motion, this paper, in order

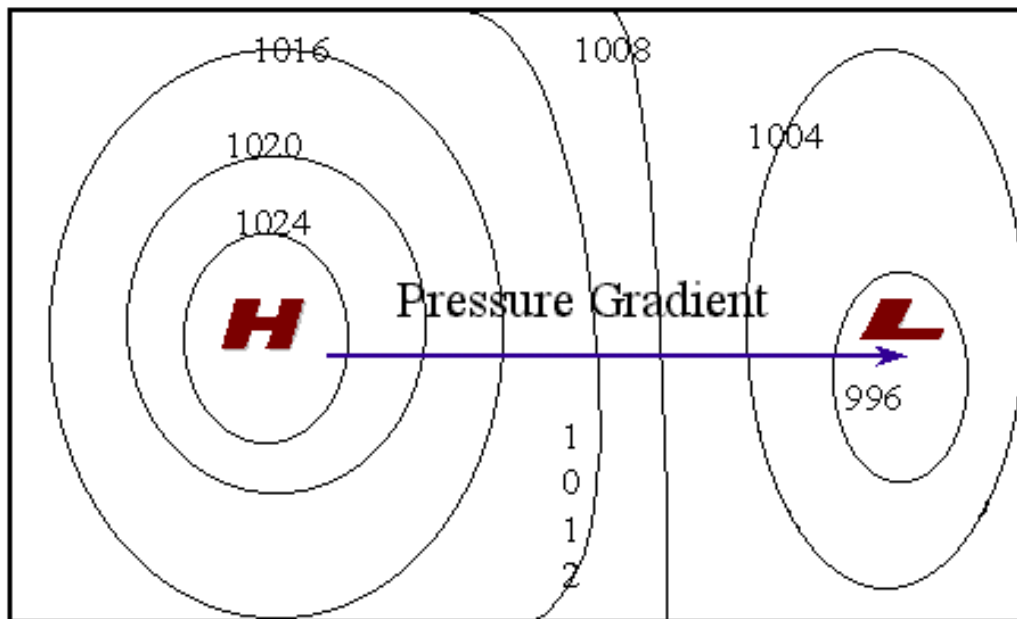
direction are determined by the simultaneous interaction of all these forces. However, in order to explain what causes each force and how it interacts with wind, the paragraphs that follow examine each force separately before combining them all into an example.

The pressure gradient force initiates air movement from high to low pressure zones. As a result, the pressure gradient force is important in determining the initial speed and direction in which wind travels. Though the force is always present in creating wind, the velocity with which the force pushes the air from high to low pressure depends upon the difference between the pressure systems: the greater the difference in pressure, the greater the wind's speed, while the lower the pressure difference the lower the wind's speed. In addition to influencing speed, the pressure gradient also provides wind with its initial direction by forcing the air flow on the shortest path between pressure areas, a straight line.⁴

to avoid confusion, will refer to them as “effects” rather than “forces;” also the word friction has similar but dual meanings. In Chapter 2 its scientific meaning is used referring to the resistance that a surface or object encounters when moving over another (wind moving over land or water), while in Chapters 3 and 4 friction describes Carl von Clausewitz's theory, which states that in war, even the easiest things are made difficult.

⁴ Lounsbury and Ogden, *Earth Science*, 81.

Pressure Gradient Force



(Graphic obtained from <http://home.comcast.net/~rhaberlin/pwpptnts.htm>)

As soon as the pressure gradient starts pushing air from high to low pressure, another force, friction with the earth's surface, begins to affect wind speed and direction. As the wind blows across the earth, air molecules come in contact with surface features such as mountains, plains, seas, oceans, and other such features and materials, causing the moving air to transfer some of its momentum energy. This leads to a decrease in wind speed. The greater the distance for wind to travel between high and low pressure zones, the greater is the momentum energy lost to friction.⁵ Besides decreasing wind velocity, friction also possesses the ability to change wind direction locally. Local landscapes, particularly

⁵ Jack Williams, *The AMS Weather Book: The Ultimate Guide to America's Weather* (Chicago: University of Chicago Press, 2009), 54.

mountains, valleys, and hills, can force wind to shift direction in order to move around or through them.⁶

Unlike the pressure gradient force or friction with the earth's surface, the Coriolis Effect only minimally affects wind speed. Instead the effect focuses on manipulating wind direction, helping to create the global wind belts that circle the earth. French mathematician Gustave Gaspard Coriolis first described the effect in an 1835 scientific paper. In it he sought to explain why objects that moves across, but is not attached to the earth's surface, such as long-range artillery shells, follow a curved path rather than a straight line, landing to the right of their intended target in the Northern Hemisphere and the left in the Southern Hemisphere.⁷ Coriolis explained the apparent deflection as a problem of perception due to the earth's rotation. According to Isaac Newton's second law of motion, in a non-rotating, non-accelerating system, objects moving in a straight line will continue to move in a straight line. However, because the earth does not follow these rules, it creates issues, specifically with wind direction.

To understand how the earth's rotation causes the Coriolis Effect, consider the example of a long-range artillery shell observed from the earth's surface. On a non-rotating Earth, an artillery shell fired at a distant target would travel along a straight path and hit the target. Similarly an artillery shell fired at the same target on our rotating earth will begin traveling through the air along a straight path. However, while the shell travels toward the target, the earth rotates underneath it, causing the shell's path to appear curved to the observer and miss the target. In reality the shell's path did not curve, nor did it miss its

⁶ Lounsbury and Ogden, *Earth Science*, 81.

⁷ Williams, *The AMS Weather Book*, 54.

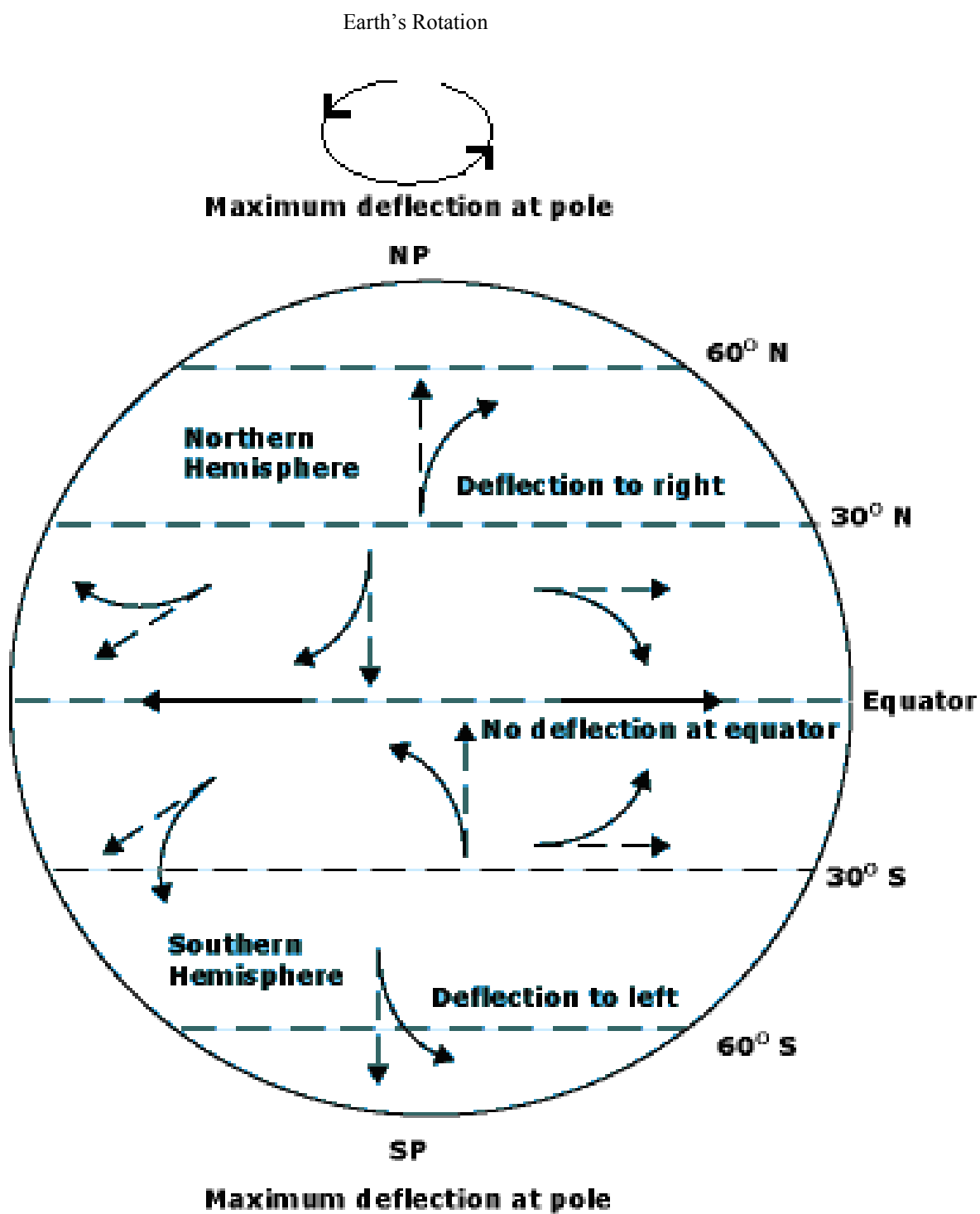
aiming point, instead the observer and the target moved as the earth rotated counterclockwise under the shell, deflecting the observed path.⁸

In the same way, the Coriolis Effect also influences wind direction. Like the artillery shell traveling through the air, the atmosphere is not attached to the earth's surface, which rotates underneath the atmosphere. As soon as a pressure gradient force creates wind, the Coriolis Effect begins to deflect that wind no matter which direction it blows, either to the right (Northern Hemisphere) or left (Southern Hemisphere). Two factors ultimately determine the extent that the Coriolis Effect influences wind direction, latitude and wind speed. First, the farther from the equator a wind is generated, the greater the amount of deflection that occurs and second, as wind velocity increases, so too does the degree that the wind's direction is changed. Combined, these two factors determine the extent that the Coriolis Effect shapes wind at any given moment.⁹

⁸ Ernst, *Earth Systems*, 216-17.

⁹ Williams, *The AMS Weather Book*, 54-56.

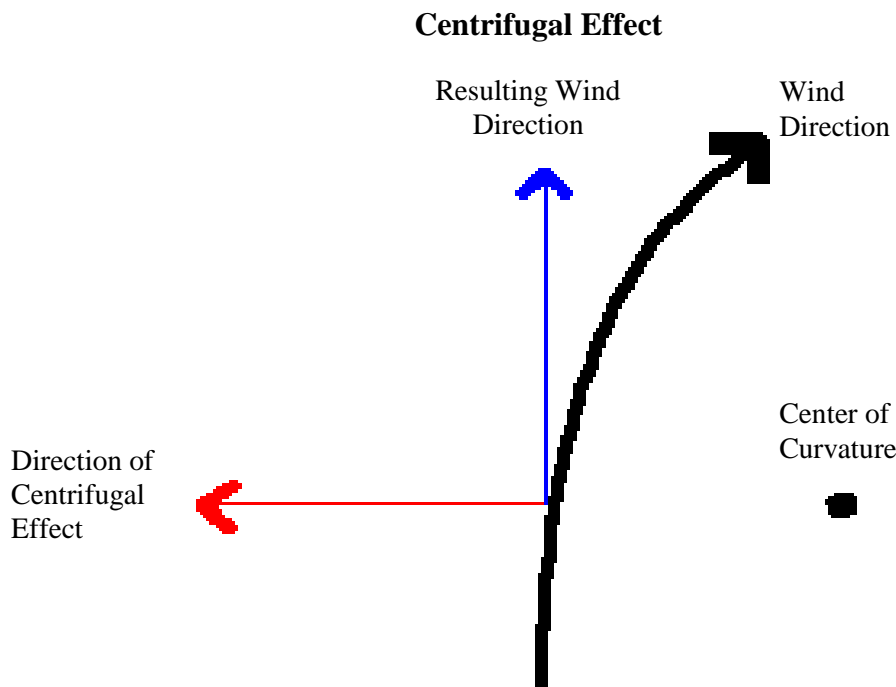
Coriolis Effect



(Graphic obtained from http://www.scioly.org/wiki/Everyday_Weather)

The fourth and final player that manipulates wind is the centrifugal effect.

Comparable to the Coriolis Effect, the centrifugal effect also predominately concerns wind direction, relying on wind speed to determine its strength, and results from being viewed from a rotating frame of reference. Rather than causing wind to curve, the centrifugal effect acts in the opposite manner, attempting to straighten the wind's direction by drawing air outward from its center of curvature. As a result, while the direction that the centrifugal effect attempts to pull wind may differ, it will always be away from the center of curvature.¹⁰



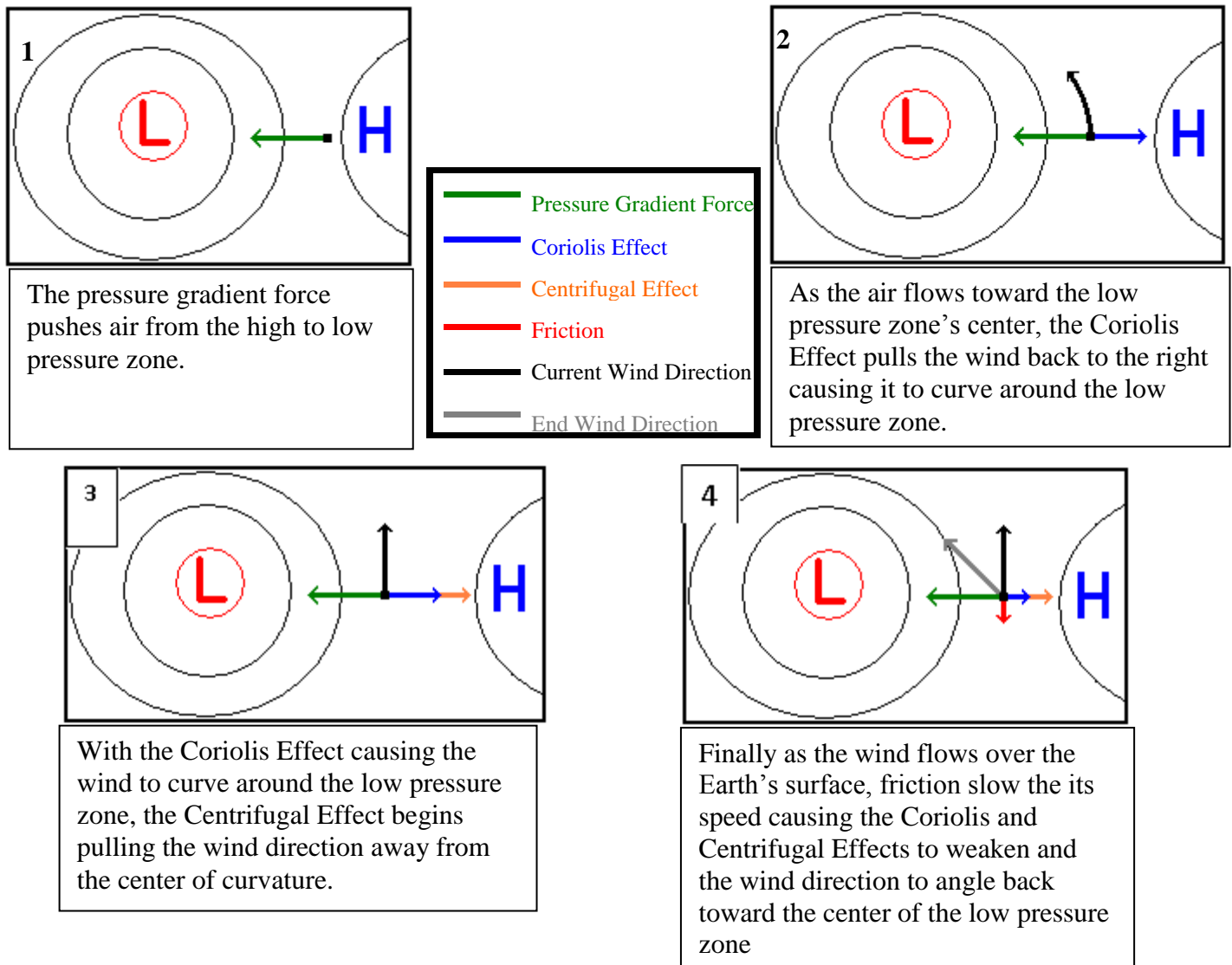
Separately, the pressure gradient force, friction with the earth surface, the Coriolis Effect, and the centrifugal effect each represents important influences over wind velocity and direction. Nevertheless, to understand how wind occurs in the real world and what the

¹⁰ Lounsbury and Ogden, *Earth Science*, 81.

early United States Navy's sailors and captains faced every day, one must combine these individual forces and effects to observe how they interact and influence each other, ultimately determining wind's speed and direction. The example that follows will demonstrate the interconnectivity among these sometimes complementary and sometimes opposing forces and effects. However, because the forces and effects involved constantly change, the example will focus on a single wind's movement over a short time period.

Imagine a northern hemisphere high pressure zone, with a low pressure zone located to the west. With the pressure gradient difference large enough to induce a steady wind, the pressure gradient force begins pushing air westward toward the low pressure area (figure 1). Soon after the wind begins flowing toward the low pressure zone's center, the Coriolis Effect starts deflecting the wind to the right, causing it to begin curving around the low pressure zone (figure 2). The curvature causes the centrifugal effect to act outward from the low pressure system's center, straightening the wind's direction (figure 3). However, as the wind blows across the earth's surface, friction slows its velocity. As wind speed decreases, so too does the Coriolis and centrifugal effect's influence over the wind's direction. This allows the pressure gradient force to pull the wind's direction back toward the low pressure area, increasing the wind's speed and restarting the process (figure 4).

Forces of Wind Example (in Northern Hemisphere)



Global, Regional, and Local Wind Patterns

Over the past few hundred years, scientists have identified the forces and effects that drive wind and manipulate its speed and direction. Nevertheless, mankind has observed wind patterns for centuries, wondered why certain regions saw winds blowing predominantly from one direction all year, while others saw seasonal or daily changes in direction. Originating from these observations and the worldwide distribution of high and

low pressure zones, three wind patterns that affect sailing emerge. These include global prevailing winds, regional monsoonal winds and cyclonic storm systems, and localized land and sea breezes.¹¹

Global prevailing winds bear responsibility for creating earth's basic surface wind patterns: the northeastern and southeastern trade winds, the northern and southern westerlies, and the northern and southern polar easterlies.¹² Like all winds, the prevailing winds depend upon the sun's unequal distribution of solar radiation over the earth's surface. This creates two global low pressure bands and two global high pressure bands. The low pressure zones are located at the intertropical convergence zone in the equatorial region, while the other is found between 50 and 60 degrees north and south latitude. The first of the two global high pressure bands is located at approximately 30 degrees north and south latitude with the other zone at the poles. The air's movement between these global high to low pressure bands generates the world's primary winds.

Global wind circulation begins near the equator at the intertropical convergence zone, an area where solar radiation is at its maximum. Here the air warmed by the sun rises into the atmosphere creating a sustained low pressure band that dominates the region. In addition, because the majority of the intertropical convergence zone's atmospheric movement is vertical, the region experiences very weak surface winds, called the doldrums. Simultaneously, as the warm equatorial air continues rising and moves away from the equator it cools and becomes denser. Near 30 degrees north and south latitude the air sinks

¹¹ Lounsbury and Ogden, *Earth Science*, 81.

¹² Winds are referred to by the direction from which they flow. For example the northeastern trade winds blow from the northeast to the southwest.

toward the surface creating a high pressure band. Once the descending air reaches the surface the air flow divides with part blowing back towards the equator and the other blowing towards the low pressure band found between 50 and 60 degrees north and south latitude, warming along the way as the wind picks up the heat that the warmer earth's surface was radiating back into the atmosphere. The air that flows back towards the intertropical convergence zone, deflecting to the right in the northern hemisphere and to the left in the southern hemisphere by the Coriolis Effect and the other forces that influence wind, creates the northeast and southeast trade winds.¹³

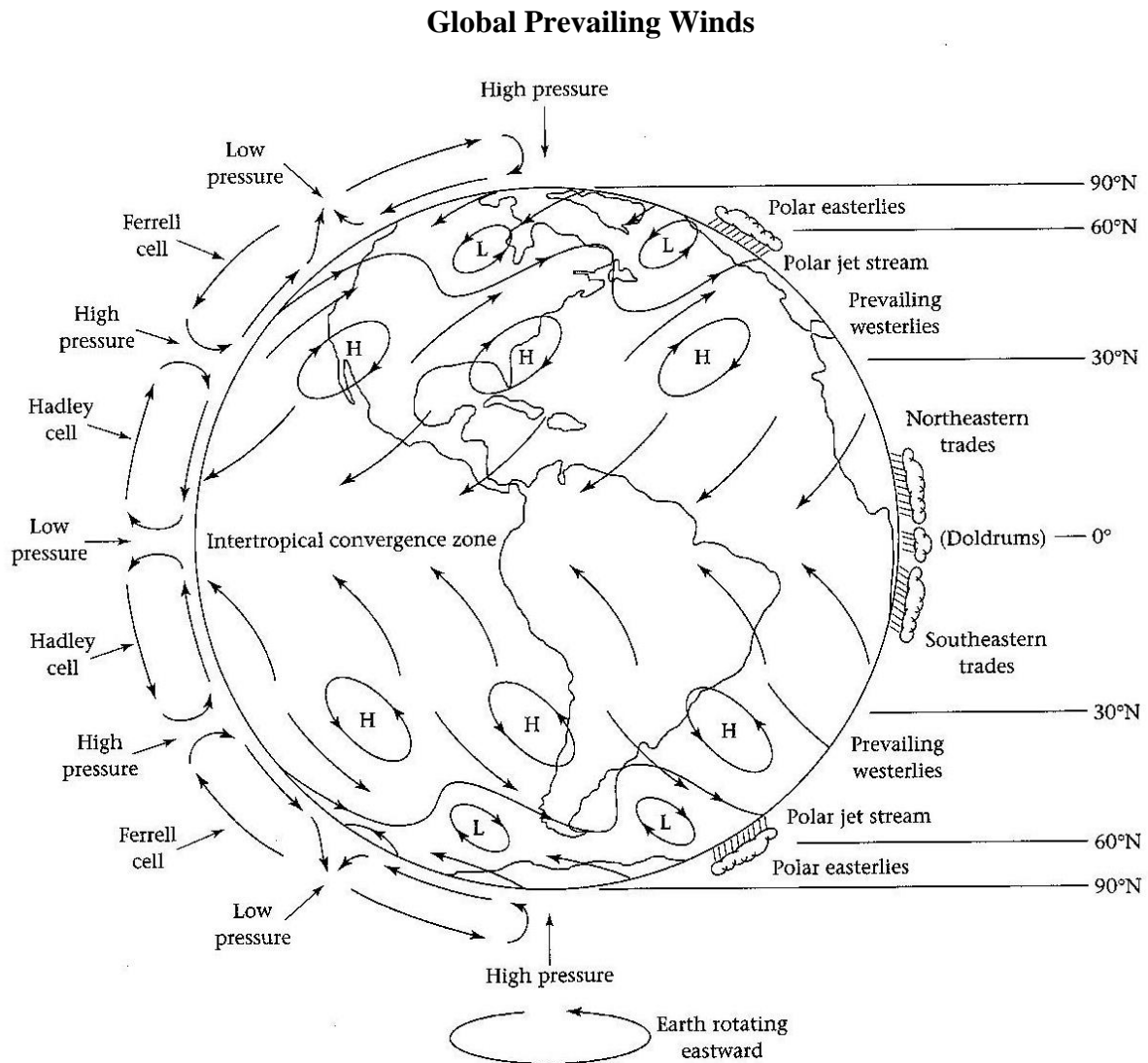
While half the air flowing from the 30 degree north and south latitude high pressure band returns to the intertropical convergence zone, the remaining air moves pole-ward. As the air flows over the earth's surface it warms and rises into the atmosphere, generating a low pressure belt between 50 and 60 degrees north and south latitude. At the same time, the Coriolis Effect and the other direction influencing forces deflect the air flow eastward, producing the mid-latitude northern and southern westerlies.¹⁴

The third and final primary wind occurs near the poles, where solar radiation is at a minimum. Because the poles do not receive much heat energy from the sun, a large high pressure zone dominates the Polar Regions. The cold dense air flows away from the poles towards the low pressure band created by the rising warm westerlies between 50 and 60 degrees north and south latitude. As the cooler denser air moves toward the low pressure

¹³ Ernst, *Earth Systems*, 161-62.

¹⁴ Ernst, *Earth Systems*, 162.

band, it is deflected westward and warmed by its contact with the earth's surface, creating the northern and southern polar easterlies.¹⁵



(Graphic obtained from *Earth Systems: Processes and Issues*, pg. 161.)

¹⁵ Ernst, *Earth Systems*, 162.

In addition to the prevailing winds that dominate global air currents, specific regions also experience circulations that can override global wind patterns. These regional circulations result from two systems, the monsoons, which are responsible for seasonal wind reversals in the equatorial region, and cyclonic storms, such as hurricanes in the tropics and winter storms in the mid-latitudes. As a result, during certain times of the year regional wind circulations can cause wind directions to reverse or become highly variable, making understanding these regional wind changes instrumental for effective sailing in these regions.

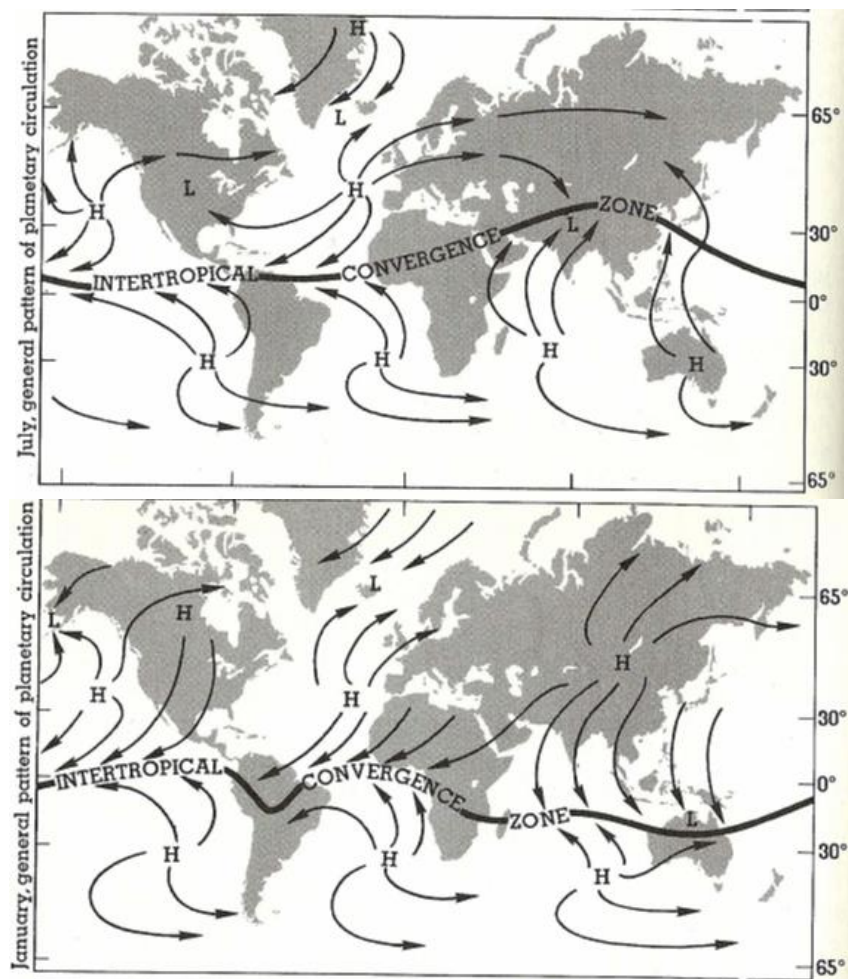
Though monsoons are best known for their heavy rainfall, their influence over a region's wind gives the system its power. Located near the equator, monsoonal systems trigger seasonal changes in wind direction, prompting winds in the summer to blow from the opposite direction from which they blow in winter. The earth's most well developed monsoonal system occurs in South Asia, but lesser developed systems also affect the southeastern United States, the Iberian Peninsula, western Africa, eastern Asia, and northern Australia. These reoccurring wind reversals rely on a region's seasonal alternation between high and low pressure zones, caused by the earth's tilted axis. Because the earth revolves and rotates on a tilted axis, the location on the planet that receives the most direct sunlight varies according to the time of year, triggering the intertropical convergence zone's low pressure band location to change.¹⁶

For example, take the monsoonal system that affects the Indian Subcontinent. During the summer, the sun's rays most directly strike the northern tropics, causing the intertropical convergence zone to shift north. In South Asia, this means that its low

¹⁶ Lounsbury and Ogden, *Earth Science*, 86-87.

pressure band is situated north of the Himalayan Mountains. Air then flows from the 30 degree south high pressure band, creating a moist southwest wind that drops large amounts of moisture on the subcontinent. During the winter, the winds reverse as the intertropical convergence zone travels to the southern tropics. Air now flows from the 30 degree north high pressure band, creating a dry northeast wind.¹⁷

Earth's Monsoonal Systems



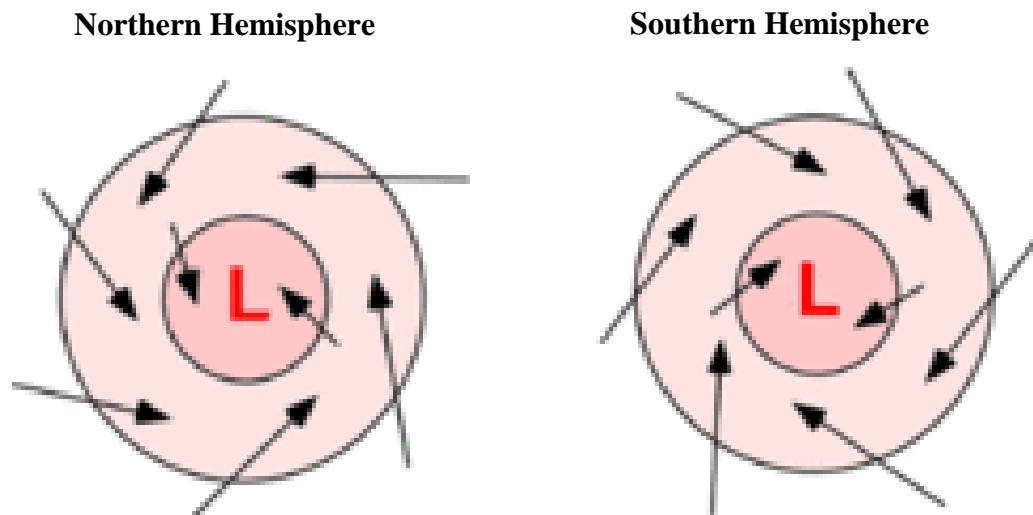
(Graphic obtained from *Earth Science*, figure 4-12, pg. 86.)

¹⁷ Lounsbury and Ogden, *Earth Science*, 87. For additional information about monsoonal systems see Mike Leeder and Marta Perez-Arlucea, *Physical Processes in Earth and Environmental Science* (Malden, MA: Blackwell Publishing, 2006), 244.

Besides the monsoonal systems, another regional circulation, cyclonic storms, also profoundly influences wind in large geographical areas. Formed by the collision between warm and cold air masses in the mid-latitudes and the rapid evaporation of water vapor in the tropics, cyclonic low pressure systems such as winter storms and hurricanes possess the ability to change surface wind direction as they approach and pass through a location.

Unlike the massive high and low pressure bands that occupy specific latitudinal ranges and initiates the earth's prevailing winds, cyclonic low pressure systems are smaller and have the capacity to move vast distances across the earth's surface. As a cyclonic storm moves, air begins spiraling in towards the low pressure system's center, counter-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The spiraling produces surface winds that vary in speed and direction based on location within and proximity to the cyclonic storm's center.¹⁸

Cyclonic Storms

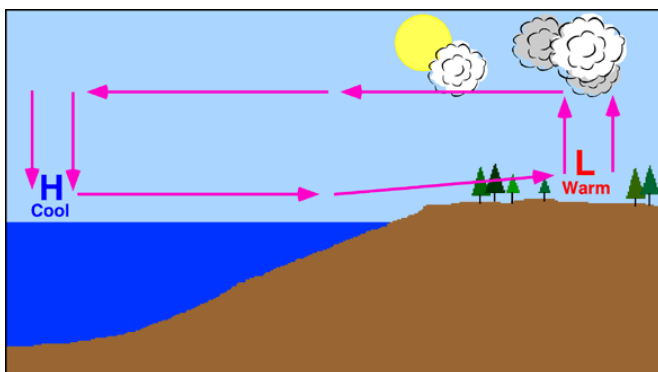


(Graphic obtained from <http://www.physicalgeography.net/fundamentals/7n.html>)

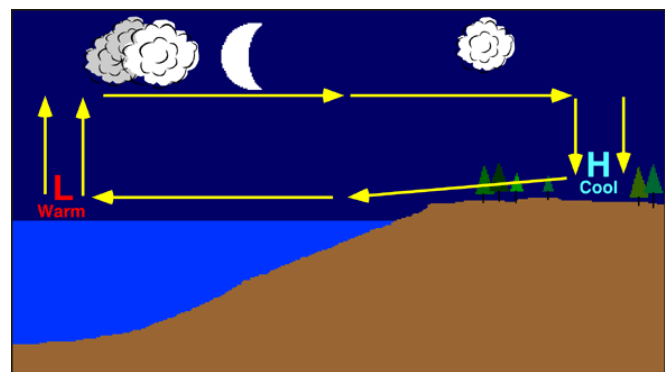
¹⁸ Ernest, *Earth Systems*, 220-21.

While the previous two wind types affect large areas, global and regional circulation, the third and final wind type that influences sailing, localized land and sea breezes, confine themselves to coastal areas. Like the monsoonal system, an alternation between high and low pressure zones also causes land and sea breezes to trigger reversals in wind direction. However, the high and low pressure zones involved are significantly smaller and the wind reversals occur on a daily rather than a seasonal cycle. During the day, the land absorbs the sun's heat energy faster than the water, creating a small low-pressure area over the land and a small high-pressure area over the water. In turn, air begins flowing from the water-centered high pressure zone to the land-centered low pressure zone, creating a wind blowing inland from the water, known as a sea breeze. At night, the situation reverses. The water retains its heat more effectively than the land, generating a low pressure zone over the warmer water and a high pressure zone over the cooler land. With the high and low pressure zones now reversed, the wind then switches direction, blowing from the land out to sea, known as a land breeze.¹⁹

Land and Sea Breeze



Sea Breeze



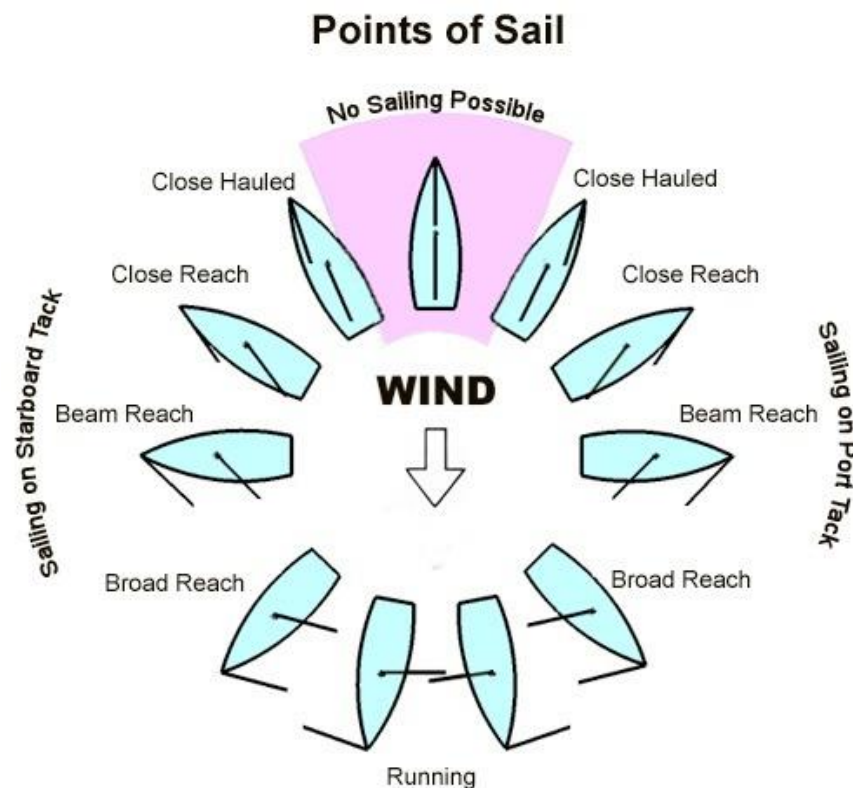
Land Breeze

(Graphic Obtained from <http://www.physicalgeography.net/fundamentals/7o.html>)

¹⁹ Lounsbury and Ogden, *Earth Science*, 87.

Wind and Sailing

No matter what form wind takes or what forces and effects influence it, wind represents the most important force to any sailing ship for three reasons. First, prior to the steam engine's invention and other modern means of sea power, wind represented the only suitable method for long-distance oceanic travel. Catching wind with a sail provided the energy necessary to push a vessel through the water, making travel, intercontinental trade, establishing overseas colonies, and projecting military power worldwide possible. On the other hand, a lack of wind could either strand ships in the harbor, making it impossible for them to depart on trade or military operations, or even worse, strand a ship at sea with limited provisions.



(Graphic obtained from <http://www.discoverysailing.org/funvancouver/members-lounge/general-library/navigation/points-of-sail.html>)

In addition to providing the means of movement, wind also dictated in which directions oceanic travel occurred. Because sailing depends on capturing the wind's power, the angle with which the wind contacts the sail determines the efficiency with which the ship moves. A vessel with a point of sailing between forty-five degrees on either side of the wind's direction will not sail effectively, since the wind will not impact the sail correctly, causing the boat to slow, and if the course is continued, stop.²⁰ For example, any sailing ship attempting to reach North America's eastern coast from Europe cannot sail directly westward due to the westerlies. In turn, the ship must first sail to the south, and then utilize the northeastern trade winds to cross the Atlantic Ocean, before turning northwest to reach North America's coast. Only on the return voyage to Europe could a vessel travel straight east. Therefore, when plotting a course or performing maneuvers, a captain must understand the wind's prevailing direction and any changes that occur.

Lastly, though wind acts in a positive manner for sailing ships, it also has a dangerous side. Periods of high winds, such as storms or sudden gusts, present unique dangers to sailing vessels. To begin with, gales possess the ability to damage a ship's rigging and sails, inhibiting the vessel's ability to maneuver, reducing its speed, and if severe enough, leaving the craft dead in the water. Strong winds also may cause a ship to capsize and sink.²¹ In addition to inflicting damage through sheer air velocity, winds also transfer energy, through friction, to the ocean surface, producing waves.²² Prolonged strong

²⁰ John Muhlausen, *Wind and Sail: A Sailing Primer* (Chicago: Quadrangle Books, 1971), 21.

²¹ Mulhlausen, *Wind and Sail*, 46.

²² Ernst, *Earth Systems*, 162, for an advanced mathematical explanation of how wind helps to generate ocean surface waves see: Peter Janssen, *The Interaction of Ocean Waves and Wind* (Cambridge, UK, 2004), specifically chapter 3, pages 56-128.

winds can initiate heavy seas, which could sweep men and material overboard, damage water sensitive stores like gunpowder, and even swamp and sink a ship. As a result, wind represents an extremely useful, but possibly destructive force to sailing vessels, which needs careful observation.

Period Understanding of Wind

The question remains, with wind as such a dominating force to period navies, how much did they understand about the science behind it? To answer this, one must look at when scientists first gained the ability to accurately measure the wind. Invented in 1644 by mathematician and physicist Evangelista Torricelli, the first barometer allowed scientists to measure wind's source and atmospheric pressure, and predict short-term weather changes.²³ Scientific observations utilizing the technology allowed a reexamination of wind. In 1671 Ralph Bohun published his *Discourse Concerning the Origins and Properties of Wind*, which utilized data from voyages around the globe, as well as the writings of philosophers, such as Aristotle, and scientists, such as Francis Bacon, to analyze global, local (land and sea breezes), and tempestuous winds (hurricanes).²⁴ Bohun even called for fitting vessels with barometers to predict and protect ships from hurricanes. However, at the time the instruments were too fragile to go to sea, often breaking as the

²³ Anita McConnell, "Barometer, Europe 1450 to 1789: Encyclopedia of the Early Modern World," Encyclopedia.com, <http://www.encyclopedia.com/doc/1G2-3404900091.html>.

²⁴ "The Helen Carmichael Purdy Foundation: A Legacy of Florida History," University of Miami Library, http://www.library.miami.edu/specialcollections/collections/Purdy/purdy_bohun.htm, provides a synopsis of Ralph Bohun, *A Discourse Concerning the Origin and Properties of Wind, With a Historical Account of Hurricanes and Other Tempestuous Winds* (Oxford: Printed by W. Hall for Tho. Bowman, 1671).

ship's motion caused the mercury filling its tubes to osculate and shatter the glass. It took almost one hundred years before Edward Naime produced a seaworthy barometer and until 1854 before Admiral Robert Fitz-Roy installed them onto Royal Navy ships.²⁵ As a result, even if American captains had understood the science behind wind, and some may have, the lack of a seaworthy barometer made this knowledge mute since there was no way to utilize it at sea. In addition the United States Navy was also slow to adopt the scientific examination of wind, not creating the Department of Charts and Instruments, which maintained the service's naval instruments, conducted measurements, including wind, and supplied the Navy with nautical charts, until 1830.²⁶

While the science describing wind emerged in the early 17th century, the technology to utilize that knowledge had yet to become widely available by the early 1800s. In turn, collective experience played a sizable role in a naval commander's decision-making processes. As the following examples will show, a captain's personal knowledge of an area's wind characteristics often made the difference between victory and defeat. These experiences accumulated slowly as future captains progressed through the ranks, engaging in a naval apprentice system, and as they exchanged information about their experiences

²⁵ McConnell, "Barometer, Europe 1450 to 1789: Encyclopedia of the Early Modern World,"

<http://www.encyclopedia.com/doc/1G2-3404900091.html> and National Research Council, *Environmental Information for Naval Warfare* (Washington, DC: The National Academies Press, 2003), 16. Since the British Royal Navy was the most powerful and advanced navy of the era, the date given for their adoption of the barometer seems close to when the US Navy would adopt the technology also. In addition, no barometric pressures are recorded in any of the ships logs utilized later in this thesis.

²⁶ Naval Oceanographic Office, "Our History," U.S. Navy, www.public.navy.mil/fltfor/cnmoc/Pages/History_NAV.aspx.

with each other. As Europeans began exploring the world's oceans they soon realized that the Atlantic and Pacific Ocean's air circulations flowed in massive wind wheels.²⁷ This early understanding of the world's primary wind system helped Europeans begin their rapid colonization and economic expansion.

With Europeans coming into contact with areas previously unknown to them, wind knowledge increased to include regional and later local patterns. Upon entering the Indian Ocean, Europeans came in contact with the world's most powerful monsoons. Having minimal experience with monsoonal winds, early explorers suffered. Portuguese explorer Vasco Da Gama spent ninety-five days crossing back from India to Africa, losing so many crewmembers that they could barely operate their ships.²⁸ Understanding local winds and land and sea breezes took more time, requiring mariners to gain the information either by visiting the area or talking to or reading about someone who had. By 1522, "Europeans had a sketchy but reasonably accurate comprehension of" the world's ocean winds in the Atlantic from the Arctic Circle to 40°S latitude, from the Indian Ocean's northern coasts to 15°S latitude, as well as the Pacific Ocean's trade winds and the winds off southern Africa.²⁹ Continued ocean exploration over the next several hundred years enhanced collective wind knowledge leading to circumnavigation, international trade routes, and improved naval warfare wind tactics.

²⁷ Crosby, *Ecological Imperialism*, 108.

²⁸ Crosby, *Ecological Imperialism*, 121-22.

²⁹ Crosby, *Ecological Imperialism*, 127.

Chapter 3: Wind as Friction

Clausewitz said, “Everything is very simple in war, but the simplest thing is difficult.” Though referring more to land warfare, the statement is no less true when applied to naval engagements.¹ On paper such action seems easy; ships are sent from one area to another and ordered to undertake a variety of actions such as patrolling for and engaging enemy vessels, blockading enemy ports, and escorting friendly ships. However, understanding war in this way provides an incomplete comprehension of its difficulties. Clausewitz distinguishes this difference between “war on paper” and “real war” by using a concept called “friction.”²

Similar to friction’s previous description used in chapter 2, wind friction referred to the physical resistance wind encountered when passing over a surface such as land or water. Clausewitz expanded and applied it to war as a “force that makes the apparently easy so difficult.”³ In war it encompasses all aspects ranging from command and control, movement, danger, hardship, privation, and uncertainty to luck and chance, which are essential in this chapter. To depict chance and luck, Clausewitz employed weather as an example, discussing how fog and rain could slow movement and communication or prevent, hinder, or change the tide of battle.⁴ While these weather phenomena have a significant impact on war, one aspect lacking analysis is wind and its influence on naval warfare.

¹ Carl von Clausewitz, *On War*, ed. Beatrice Heuser, trans. Michael Howard and Peter Paret (Oxford: Oxford University Press, 2008), 65.

² Clausewitz, *On War*, 66.

³ Clausewitz, *On War*, 68.

⁴ Clausewitz, *On War*, 66.

For sailing ships victory comes from maneuvering to bring their guns to bear against the enemy or out sailing them if outnumbered or outgunned. A sailing vessel's ability to accomplish these tactics depends almost entirely on how the wind at the time behaved. Because wind is a natural force, it cannot be controlled, only reacted to. As a result, wind plays an active role in creating friction both inside and outside battle. In its early wars, the United States Navy often faced friction events where changes in wind direction and intensity directly altered battle dynamics. Doing so led to delays, hindered movement, allowed escapes, and even inflicted damage upon vessels.

Delay of Commodore Dale's Squadron

Because wind dictates the direction sailing ships may travel, it is possible for wind to prevent or make sailing in a desired direction difficult. One example where wind prevented travel occurred in mid-1801 as relations with North Africa's Barbary States began breaking down. Unwilling to give in to the rising tribute demands and wanting to present a show of force, newly elected President Thomas Jefferson dispatched a squadron to the Mediterranean to protect American merchant vessels from pirate attack.⁵

Assembled in Norfolk, Virginia under Commodore Richard Dale, the squadron (United States frigates *President*, *Philadelphia*, and *Essex*, as well as the schooner *Enterprise*) prepared to depart on their mission.⁶ However, as the vessels readied to sail, "adverse winds" thwarted the squadron's effort to leave port until the end of May and

⁵ Gregory Fremont-Barnes, *The Wars of the Barbary Pirates To the shores of Tripoli: the rise of the US Navy and Marines* (Long Island City, NY: Osprey Publishing, 2006), 39.

⁶ Lambert, *The Barbary Wars*, 128.

hampered the group's journey across the Atlantic. With the schooner *Enterprise* being faster and better able to deal with the unfavorable winds, Commodore Dale sent its ahead to Gibraltar, arriving several days before the other squadron members, who did not reach Gibraltar's harbor until July 2nd.⁷

Upon arrival, Dale's ships encountered two large Tripolitan cruisers preparing to pass through the strait and enter the Atlantic, where they could prey on the large number of American merchant ships traversing those waters. Though the Tripolitan's commander assured Commodore Dale that "no state of war existed between Tripoli and the United States," the Americans did not put any trust in this assurance. To prevent the cruisers from slipping out into the Atlantic, Commodore Dale ordered one frigates to stay behind and guard the Strait of Gibraltar.⁸

Even after entering the Mediterranean, the weather continued impeding the remaining American ship's progress, preventing them from appeared off Tripoli's coast until July 24th, nearly a month after leaving Gibraltar. Here the United States learned that it was too late to negotiate with Tripoli's ruler. Having already declared war, the Pasha claimed that "the United States had been delinquent in meeting the terms of the treaty," and found the treaty proposed by the Americans "unfavorable" in comparison to those between the United States and other Barbary States. With diplomatic channels no longer open, Commodore Dale commenced the First Barbary War by instituting a blockade on Tripoli that lasted until the war's end.⁹

⁷ Chidsey, *The Wars in Barbary*, 73.

⁸ Chidsey, *The Wars in Barbary*, 73.

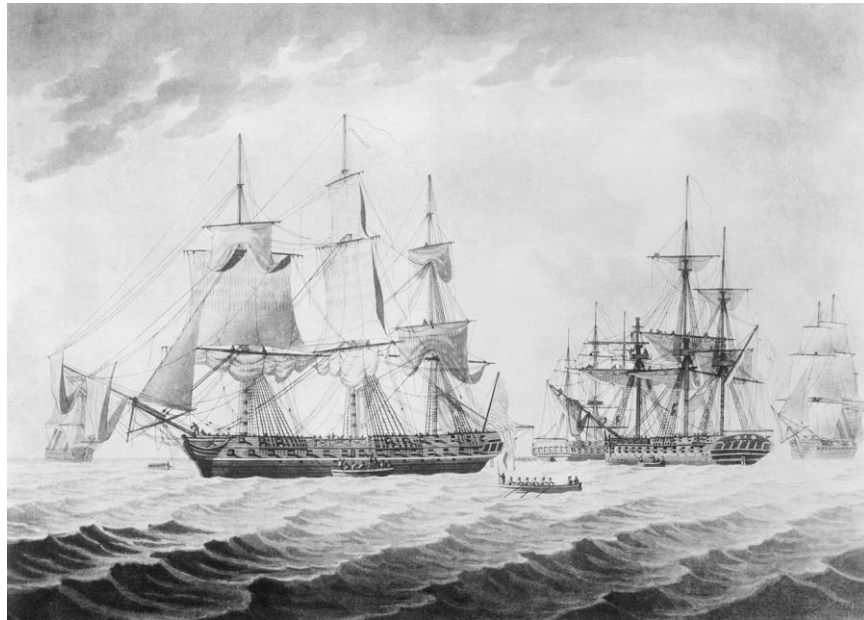
⁹ Fremont-Barnes, *The Wars of the Barbary Pirates*, 40.

Sending Commodore Dale's squadron to the Mediterranean marked a significant development in the United States Navy, representing one of its first missions to project power overseas. Yet, the wind's friction elements, specifically unfavorable wind direction, presented a serious hindrance in accomplishing the mission. Not only did wind prevent the American squadron's timely sailing, forcing it to stay in port for several days, but it also inhibited its journey across the Atlantic, almost proving disastrous for United States commerce. The American ships reached the Strait of Gibraltar just in time to intercept the two Tripolitan cruisers preparing to slip into the Atlantic. Had the wind presented any additional delays, the Tripolitans may have entered the Atlantic Ocean and freely attacked the United States merchantmen sailing there. The adverse wind conditions continued as the remaining United States ships entered the Mediterranean, once again slowing the force. In this case, the delay resulted in the Americans arriving off Tripoli after the Pasha had already declared war on the United States, making negotiations to avert the conflict doubtful.

Finally, this case also revealed a key weakness of relying on any sort of wind, even primary winds, for movement. While primary winds represent the main direction that the wind blows in an area, they can be overcome periodically by disruptions to their normal flow, in Commodore Dale's case the east blowing westerlies. Possible causes for these interruptions include local land and sea breezes that last for several hours, cyclonic storms that can last a week or more, or unseasonably high or low ocean temperatures, which can alter global wind currents for months by moving, strengthening, or weakening an atmospheric convection cell's high or low pressure zones. These last two examples provide the best explanations for the squadron's delays, though it is difficult to determine

which one exactly because of a lack of meteorological data on ocean temperatures, barometric pressures, or storm tracks from the time.

Surrender of the *USS President*



(Graphic obtained from <http://collections.rmg.co.uk/collections/objects/148101.html>)

The next example detailing wind-creating friction occurred when Commodore Stephen Decatur took over command of the frigate *President* in April 1814. While anchored in New York harbor, the frigate received orders to “sail to the far side of the world to prey on the enemy’s East India commerce.”¹⁰ Over the months that followed, the *President* refitted for its mission and waited for its chance to slip by the British squadron blockading the harbor. On the evening of January 13, 1815, Decatur got his wish, when a strong winter gale created by a cyclonic low pressure system forced the blockading

¹⁰ Toll, *Six Frigates*, 442.

squadron off its station near Sandy Hook and exposed an unguarded corridor to the open ocean.¹¹

The following evening, Commodore Decatur weighed anchor and proceeded out to sea. However, the driving winter storm and the pitch-black night made navigation increasingly difficult and, not long after casting off, the heavily laden frigate grounded itself on a sandbar.¹² For over an hour and a half the ship struggled to free itself from the bar, in the process breaking several rudder braces, and “received such other material injury as to render her return into port desirable.”¹³ At this point the strong westerly gale, which originally seemed a blessing, now turned into a curse, preventing the wounded ship from returning to harbor.¹⁴ With few options available, Decatur ordered the ship over the bar before the low tide completely stranded it. By 10 o’clock that night the frigate freed itself and set a course northeast along the Long Island coast, proceeding 50 miles before turning southeast by east.¹⁵

While the *President* floundered on the sand bar outside New York harbor, the displaced British squadron sought to reestablish its blockade. Rather than fight its way through the gale back to its original position, Commodore John Hayes ordered one

¹¹ C.S. Forester, *The Age of Fighting Sail* (Sandwich, MA: Chapman Billies Inc., 1956), 260.

¹² Toll, *Six Frigates*, 442.

¹³ Letter from Commodore Decatur to the Secretary of the Navy, January 18, 1814, in Abel Bowen, ed., *The Naval Monument, Containing Official and Other Accounts of All the Battles Fought Between the Navies of the United States and Great Britain During the Late War; and an Account of the War with Algiers* (Boston: George Clark, 1830), 160.

¹⁴ Decatur to the Secretary of the Navy, January 18, 1814, in Bowen, *The Naval Monument*, 160-61.

¹⁵ Decatur to the Secretary of the Navy, January 18, 1814, in Bowen, *The Naval Monument*, 161.

British ship to cover the southern approaches to New York. The remaining ships headed north to the Long Island coast covering the path he thought an American vessel would use to escape the harbor.¹⁶ By 5 a.m. the following morning, Commodore Hayes's squadron spotted the *President* and began closing on the American frigate.¹⁷

Outnumbered four to one Decatur turned to run north, but the damage done to the *President's* hull slowed the ship by several knots and caused it to take on so much water that its pumps needed to be worked.¹⁸ By midday the winds that allowed Decatur to open some distance from the pursuing British had turned light and baffling, permitting the undamaged frigate *HMS Endymion* to gain considerably on the running American. In a last ditch effort to escape, Decatur ordered all articles not essential for battle, such as anchors, spare rigging, and even provisions, thrown overboard to lighten the ship.¹⁹

The effort proved futile as the British continued to advance on the *President*, reaching cannon range at three that afternoon and beginning a gun duel between the *Endymion's* bow guns and Decatur's stern guns. Two hours later, the *Endymion* reached a position so close to the *President's* starboard quarter that Decatur could bring neither his stern nor quarter guns to bear on the British. Decatur then prepared to board the British frigate, hoping "that she would close with us on our broadside," but the British maintained their position being perfectly happy to peck away at the *President's* sails and rigging.²⁰ With the enemy in perfect position to cripple the United States frigate without

¹⁶ Forester, *The Age of Fighting Sail*, 260.

¹⁷ Decatur to the Secretary of the Navy, January 18, 1814, in Bowen, *The Naval Monument*, 161.

¹⁸ Toll, *Six Frigates*, 443.

¹⁹ Decatur to the Secretary of the Navy, January 18, 1814, in Bowen, *The Naval Monument*, 161.

²⁰ Decatur to the Secretary of the Navy, January 18, 1814, in Bowen, *The Naval Monument*, 161.

presenting itself as a target, Decatur found himself lacking options. Decatur therefore adjusted course, turning towards the enemy with the intention to either board and capture the *Endymion* or disable it before the British squadron's remaining members could close, thus allowing the *President* to escape into the falling darkness.²¹

Due to the Commodore Hayes's seamanship and insufficient wind, Decatur proved unable to put his ship in boarding position. In the battle that followed, the two frigates went muzzle to muzzle exchanging broadsides. Although taking heavy casualties, the *President* badly cut up the enemy's sails and rigging, knocking the *Endymion* out of the chase.²² Even though the American frigate escaped, the battle cost Decatur vital time, allowing the remaining enemy ships to close in and inflict additional damage, slowing the ship more. Over the next two hours, the *President* attempted to outrun the fresh British ships *Pomone* and *Tenedos*. Nonetheless, by eleven that night Decatur found his ship surrounded "without a chance of escape" and determined he had no choice but to surrender.²³

As a force of friction the wind's direction and intensity played an important role in the *USS President's* eventual capture, affecting both sides during the long battle. At first the gale obstructed the British, forcing their squadron off station and preventing it from returning to its position. This opened an escape lane for the American ships blockaded in New York harbor. Yet, when the *President* struck the sand bar, the strong west gale prevented Decatur from returning his wounded ship to port, forcing him instead

²¹ Toll, *Six Frigates*, 444.

²² Toll, *Six Frigates*, 444.

²³ Decatur to the Secretary of the Navy, January 18, 1814, in Bowen, *The Naval Monument*, 162.

to run over the bar and damage his ship more in a desperate attempt to beat the recovering British to open sea. Finally, as the chase proceeded, a new obstacle presented itself to the American frigate. As the cyclonic storm, which had originally caused heavy winds, moved out of the battle zone the winds began lightening. This change in wind velocity now prevented Decatur from successfully executing maneuvers that may have saved his ship. Together, all the wind elements in this encounter exemplify the role that chance and luck play in friction.

Escape of the *USS Hornet*

Besides preventing movement in a desired direction, wind also possesses the ability to alter battle dynamics by changing direction suddenly. On April 27, 1815, the sloops *USS Hornet* and *USS Peacock* were patrolling the shipping lanes off Africa's southern tip searching for British merchant ships.²⁴ Around 7 a.m., the *Peacock* sighted a strange ship bearing south-southeast and signaled the *Hornet*.²⁵ Thinking the ship to be a British Indiaman, a merchant ship engaged in trade with India, the two sloops set all sails in chase.²⁶

The American sloops continued the chase through the night and into the following day. However, as two ships closed, the *Peacock* began to question their chase's identity.²⁷

²⁴ Letter from Captain Biddle to Commodore Decatur, June 10, 1815, in Bowen, *The Naval Monument*, 194-195.

²⁵ *USS Hornet, Logs of US Naval Ships, 1801-1915* (Record of the Bureau of Naval Personnel), Record Group 24, Entry 118 (PI-123), Vol. 3 of 15, April 29-30, 1815.

²⁶ Forester, *The Age of Fighting Sail*, 276.

²⁷ Biddle to Decatur, June 10, 1815, in Bowen, *The Naval Monument*, 195.

At roughly 3:30 p.m. the *Peacock* signaled the *Hornet* that their “chase was a line of battle ship” and determined fifteen minutes later “that the strange sail was English.”²⁸ Immediately, both sloops abandoned the chase and turned to flee on differing courses. The *Peacock*, being faster, soon left the *Hornet* behind.²⁹ The *Hornet*’s captain, James Biddle, ordered the ship tacked as close to the wind as possible, hoping that his smaller ship would out-weather (that is steer farther into the wind) than the much larger *HMS Cornwallis*.³⁰

Over the next few hours, to Captain Biddle’s surprise, the *Cornwallis* demonstrated its speed and quickly closed on the *Hornet*. By nine that night, the British ship of the line had narrowed the chase so much that Biddle considered it essential to lighten the ship and started cutting away the sheet anchors and “hove overboard the sheet cable, a quantity of shot, spare rigging, and heavy spars.”³¹ Nevertheless, the action seemed in vain as by daybreak on the 29th the *Cornwallis* pulled within gun-shot on the American’s lee-quarter and by 7 a.m. commenced fire with its bow guns.³²

With shot sailing over his ship, Biddle endeavored to lighten his ship even more, ordering his crew to “cut away the remaining anchor and cable, threw overboard the launch, six of our guns, more of our shot, and every heavy article that was at hand.”³³ The action seemed to work, allowing the *Hornet* to open up enough distance on their British

²⁸ *USS Hornet, Logs of US Naval Ships*, April 29-30, 1815.

²⁹ Forester, *The Age of Fighting Sail*, 276.

³⁰ Biddle to Decatur, June 10, 1815, in Bowen, *The Naval Monument*, 195.

³¹ *USS Hornet, Logs of US Naval Ships*, April 29-30, 1815.

³² Biddle to Decatur, June 10, 1815, in Bowen, *The Naval Monument*, 195.

³³ Biddle to Decatur, June 10, 1815, in Bowen, *The Naval Monument*, 195.

pursuer that it ceased fire around nine that morning. Two hours later, the enemy once again came up and recommenced fire. With defeat and capture staring him in the face, Biddle made his last and most aggressive order to lighten the ship. Throughout the early afternoon, the *Hornet's* crew threw overboard the remaining guns except one long gun, the remaining shot, twenty four barrels of salted provisions, the armorer's forge, and everything else below and on deck that would lighten the ship, including cutting away the top gallant forecastle to take advantage of any squalls that might occur.³⁴

Even with the ship nearly emptied, the *Hornet* seemed at the *Cornwallis's* mercy as grape and round shot sailed through its rigging and splashed around it. Just as surrender seemed the only option though, "the wind which had [been] previously and greatly to our disadvantage, backed to the southeast, hauled to the westward, and freshened up," as the mid-latitude westerly prevailing wind strengthened and allowed the *Hornet* to pull away.³⁵ Over the evening of the 29th, the *Cornwallis* fell farther and farther behind, until the mighty ship of the line finally gave up the chase that morning.³⁶

In the chase that developed between the *USS Hornet* and *HMS Cornwallis*, wind once again showed its unpredictability and the friction it causes in battle. Through the bulk of the chase, the wind favored the much larger and heavier British ship. This allowed it to gain on the smaller American sloop and prevented the *Hornet* from escaping, even after being drastically lightened. As the last options seemed exhausted, the wind changed direction back to the westerly prevailing wind of the region and increased

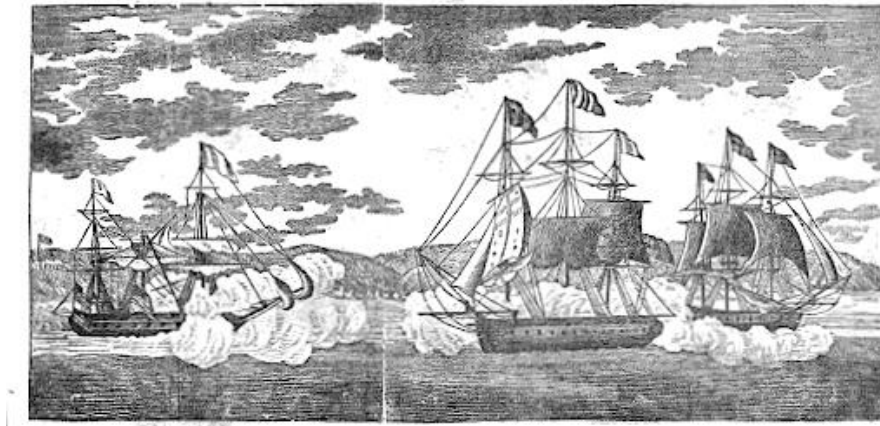
³⁴ *USS Hornet, Logs of US Naval Ships*, April 29-30, 1815.

³⁵ Biddle to Decatur, June 10, 1815, in Bowen, *The Naval Monument*, 195.

³⁶ *USS Hornet, Logs of US Naval Ships*, April 29-30, 1815.

velocity as the pressure gradient force between increased. In doing so, the new wind reversed the chase's dynamic and permitted the *Hornet's* escape.

Capture of the *USS Essex*



(Graphic obtained from Abel Bowen's *The Naval Monument*)

While a shift in direction and an increase in wind speed enabled the *Hornet* to escape a British ship of the line, a sudden gale and a shift from a land to a sea breeze proved disastrous for another American ship. Under Captain David Porter, the United States frigate *Essex* set out on its naval tour on October 17, 1812 with orders to link up with his superior, Commodore William Bainbridge, and the frigate *USS Constitution* off the Brazilian coast. From here the two ships would confront the British force patrolling the area. However, the *Constitution's* clash with the British frigate *Java* forced Bainbridge to return to the United States. Upon learning this Captain Porter resolved to

round South America and take the battle to the enemy in the Pacific Ocean, reaching Valparaiso, Chile on March 14, 1813.³⁷

For nearly a year, the *Essex* prowled South America's western coast terrorizing British commerce. Aggravated by the state of affairs, the British Admiralty dispatched two ships commanded by Commodore James Hillyar with "orders to find him [*USS Essex*] at all hazards."³⁸ After receiving letters detailing the two British vessels sent to hunt the *Essex*, Captain Porter prepared his ships, making repairs and taking on provisions. Confident in his ship and crew, the *Essex* then headed for the waters off Valparaiso, Chile, believing the British would likely seek the American frigate there.³⁹

On February 8, 1814 the British 36 gun frigate *HMS Phoebe* and the 18 gun sloop *HMS Cherub* sighted the 46 gun *Essex* and a small 20 gun prize named the *Essex Junior* resting at anchor in Valparaiso harbor.⁴⁰ Upon arrival, Commodore Hillyar ordered his force to enter the harbor, intending to meet with the American commander and discuss the port's neutrality. Yet, due to the area's variable winds, which would later trouble the *Essex*, the British misjudged the distance between themselves and the Americans upon entering the harbor, nearly leading to a collision.⁴¹ After agreeing on Valparaiso harbor's

³⁷ James Barnes, *Naval Actions of the War of 1812* (London: Osgood, McIlvaine & Co., 1897), 171-172.

³⁸ Barnes, *Naval Actions of the War of 1812*, 173-74.

³⁹ Letter from Captain D. Porter to Secretary of the Navy Paul Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains ("Captains 'Letters")*, 1805-1861 and 1866-1885 (U.S. National Archives and Records Administration, Washington D.C.), Microfilm Publications M125, Roll 37.

⁴⁰ Theodore Roosevelt, *The Naval War of 1812: The History of the United States Navy During the Last War with Great Britain* (Lexington, KY: Createspace, 2012), 145.

⁴¹ Forester, *The Age of Fighting Sail*, 207-09.

neutrality with Captain Porter and taking on provisions, the British withdrew and took up a blockading position.⁴²

The British blockade continued for well over a month as the American ships provisioned and issued challenges attempting to draw the British into a frigate-on-frigate duel. The British continually declined, refusing to engage the *Essex* in a contest that put them at a disadvantage. Amid the British refusing to give battle, Captain Porter soon feared that more British ships might soon arrive. As a result, on March 27th Porter devised a plan to leave port. The following morning with a fresh south wind, the *Essex* made sail for open sea seeking to pull the British away from the harbor and give the smaller *Essex Junior* the opportunity to escape and rendezvous later.⁴³ Shortly after weighing anchor Captain Porter, thinking his ship faster than the enemy, noticed a gap opening up in the British blockade and immediately sought to exploit it and out-weather (meaning steer closer to the direction of the wind) the enemy.⁴⁴

However, just as it seemed the *Essex* might escape, disaster struck. “On rounding the point, a heavy squall struck the ship and carried away her [the *Essex*’s] main top mast,” drowning the men aloft and significantly slowing the ship.⁴⁵ With both the *Phoebe* and the *Cherub* bearing down on the wounded American frigate, Captain Porter struggled

⁴² Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

⁴³ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

⁴⁴ Roosevelt, *The Naval War of 1812*, 146.

⁴⁵ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

to regain his ship's former anchorage but a shift in wind direction and the ship's crippled condition made doing so nearly impossible.⁴⁶ Instead, the *Essex* retreated to a small bay on the harbor's east side and set about repairing its damaged main mast. The British refused to let the American frigate off the hook, perusing the damaged ship and preparing to attack "regardless of the neutrality of the place where [the *Essex*] was anchored."⁴⁷

At just before 4 o'clock that afternoon, the British duo brought the *Essex* to battle. The *Phoebe* took up position on the *Essex*'s stern, while the *Cherub* placed itself off the starboard bow. Over the next half hour, the two warships fired shot after shot at each other with great effect on both sides. The *Essex* commenced a hot fire on the *Cherub*, forcing the sloop to join the *Phoebe* on the American's stern.⁴⁸ From their location, the British did terrible damage, killing and wounding many, as they repeatedly raked the *Essex*'s hull and thwarted Captain Porter's attempts to bring his broadside to bear.⁴⁹ Even in its vulnerable position the *Essex* fought back, firing three long twelve pounder's, the only guns that Captain Porter could aim at the British, soon disabling both British ships and compelling them to withdraw for repairs.⁵⁰

⁴⁶ Roosevelt, *The Naval War of 1812*, 146.

⁴⁷ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

⁴⁸ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

⁴⁹ Barnes, *Naval Actions of the War of 1812*, 180-181.

⁵⁰ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

Quickly repairing the damage, Commodore Hillyar renewed the attack, with both ships taking up positions at distance on the *Essex's* starboard quarter. Here the *Phoebe* and *Cherub* “kept up a most galling fire,” severely damaging the American ship’s sails and cutting nearly every rope in the rigging with their long guns. While the destruction devastated the vessel, worst of all was the *Essex's* inability to return the British fire. Even though Captain Porter’s ship mounted 46 guns, the overwhelming majority, 40, were carronades, a very destructive but short range weapon. In addition to outreaching the *Essex's* carronades, the British position also prevented the American ship from bringing its six long guns on target.⁵¹

Not willing to go down without a fight and realizing that the only way to attack the enemy meant “getting under way and becoming the assailant,” Captain Porter ordered his only remaining operational sail hoisted. He then “ran down on both ships” intending to board the *Phoebe*. With heavy fire coming from both sides, the *Essex* “was rendered a perfect wreck,” its decks “strewed with dead,” its “cock-pit filled with wounded,” and on fire. Even facing such carnage, Captain Porter kept closing on the *Phoebe* and forced the *Cherub* to haul off, reinvigorating the crew and giving them hope that the ship might yet be saved. The *Phoebe* dashed these hopes, keeping their distance instead and utilizing their superior range to rain death and destruction on the *Essex*.⁵²

Realizing that the British possessed the capacity to choose the distance at which the battle was engaged, the American frigate “gave up all hopes of closing with [the

⁵¹ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

⁵² Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

Phoebe].” With night falling and few options remaining, Captain Porter decided to run the ship aground, put ashore his men, and burn it, rather than let it fall into British hands. At first the wind’s direction favored the *Essex*’s endeavor, being a sea breeze. However just as the ship neared the shore, the wind direction reversed, changing to a land breeze as the faster cooling land became a high pressure area and the warmer sea became a low pressure zone. This reversal of the wind’s direction in turn blew the American frigate back towards the enemy. Once again under the enemy’s murderous fire, Captain Porter observed, “The slaughter on board my ship now became horrible, the enemy continued to rake us, and were unable to bring a gun to bear.” With the situation now desperate, Captain Porter managed to fasten “a hawser to the sheet-anchor,... bringing his ship’s head around” and allowing the *Essex*’s few remaining guns to fire a broadside into the *HMS Phoebe*. This forced the British frigate to withdraw thereby giving the Americans one last hope to escape defeat.⁵³

The *Essex*’s misfortune continued as the hawser soon snapped, leaving the ship now completely uncontrollable. To make matters worse, the fires set earlier on the *Essex* now spread throughout the ship, threatening to ignite the powder magazine. Learning this, Captain Porter ordered the crew to abandon ship and swim the roughly three quarters of a mile to shore. Nevertheless, most crewmembers refused to leave their captain, preferring to share his and the ship’s fate. Those who remained extinguished the flames and returned to their guns, keeping up their fire for several more minutes.⁵⁴ In spite of the

⁵³ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

⁵⁴ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

crew's courage, winning the battle at this point proved unobtainable. With all but one officer killed or wounded, the crew decimated, and the British using the crippled *Essex* for target practice, Captain Porter saw no reason to prolong the engagement.⁵⁵ At roughly twenty minutes past six that evening, the *Essex* struck its colors, surrendering to Commodore Hillyar and ending the bloody struggle.⁵⁶

As the *Essex's* capture shows, wind possesses the ability to quickly and without warning wreak destruction upon an unsuspecting ship. Starting out, the wind seemed to favor the American frigate as a fresh south wind gave the vessel an opportunity to escape the British blockade. Yet, just as it appeared Captain Porter would succeed in out-weathering the enemy and enter the open ocean, the wind halted the *Essex's* plans.

At the most inopportune moment, a squall caused by the sudden increase in the pressure gradient forces, followed by a shift in the wind's direction from a sea breeze to a land breeze not only crippled the frigate, significantly slowing its speed and limiting its maneuverability, but also prevented the *Essex* from returning to its previous anchorage to make repairs beyond the enemy's reach. Instead, the wind's friction in this case plunged Captain Porter's already wounded ship into a battle he did not want to fight, against an enemy with superior range and now superior maneuverability. After taking significant damage and casualties throughout the fight, Captain Porter attempted to run the *Essex* aground and burn it in order to save his wounded crew and prevent the ship from falling into British hands. Once again the wind supported *Essex's* move at first, but as night

⁵⁵ Barnes, *Naval Actions of the War of 1812*, 184.

⁵⁶ Porter to Hamilton, July 3, 1814, *Letters Received by the Secretary of the Navy from Captains*, Microfilm Publications M125, Roll 37.

began to fall and the land cooled, the wind switched direction, this time from a sea to a land breeze, which blew the frigate back into the battle and more slaughter. Together this example of wind's friction displays its destructive side, first through direct destruction and next through preventing the ship from disengaging from a losing battle.

Destruction of the *USS Alligator*

Lastly, while wind friction elements like direction and intensity change, though sometimes unexpected, are not uncommon, such as the daily change from a sea to a land breeze that affected the *Essex*, others were extremely rare and therefore difficult to fathom. One such example led to the schooner *USS Alligator's* destruction and sinking. On July 1, 1814, the schooner lay at anchor in Port Royal Sound when a severe thunderstorm caused either by a hurricane or mid-latitude low pressure system rolled into the area. Suddenly, a violent tornado appeared and struck the *Alligator*, causing the ship to capsize and sink, killing twenty-three crewmen.⁵⁷ In modern eyes, weather forecasting seems commonplace, but in the early nineteenth century no such warning systems existed. As a result, what happened to the *Alligator* highlights not only how violent and destructive wind can be, but also how vulnerable sailing ships were to strong thunderstorms and hurricanes.⁵⁸

⁵⁷ Bowen, *The Naval Monument*, 246-47.

⁵⁸ For additional examples of wind as friction on U.S. Navy ships see: "Escape from an Enemy Squadron, 1812: Old Ironsides' Battle Record: Documents of *USS Constitution's* Illustrious Deeds," Naval History and Heritage Command, <http://www.history.navy.mil/docs/war1812/const4.htm>; *USS Constitution, Logs of US Naval Ships* (Records of Bureau of Naval Personnel), Record Group 24, Entry 118 (PI-123), Vol. 3 of 47,

July 17-19, 1812; Captain Jones to the Secretary of the Navy, Nov. 24, 1812, in Bowen, *The Naval Monument*, 14-21; and *U.S. Navy Ships Lost in Selected Storm/Weather Related Incidents*, Naval Historical Center: <http://www.history.navy.mil/faqs/faq102-2.htm>.

Chapter 4: Combating Wind as Friction

Though the instances in which wind's friction elements directly influenced engagement outcomes in America's early wars impart exciting and interesting stories, they do not present the entire role that wind played in shaping the naval development and history. Throughout the history of warfare human beings have attempted not only to react to nature, but to overcome and control its foreseeable friction components through intellect and technology. Such examples include understanding wind's influence on a projectile's flight path and adjusting aim to compensate or utilizing tracked vehicles to traverse muddy or rugged terrain. In a similar way, over the centuries mariners adapted naval tactics that exploited wind as a source of movement. As a result, in addition to examining wind's direct influence on engagements, comprehending wind's full impact on the navy's development must also include a discussion of combat tactics.

At the time, two competing schools, coming from the world's two most dominant naval powers, dictated the discussion on naval tactics, both having their own opinion on how to best utilize their ships in warfare. The first doctrine came from the French who advocated a cautious approach to battle. Arming their ships primarily with long, heavy guns, made them deadly at long range. The French then instructed their captains to fight only in situations where the odds favored them, such as advantages in speed, numbers, or firepower, or when retreat proved impossible. Using this strategy created a doctrine that placed the ship and crew's safety above defending honor and achieving personal glory.¹

On the other hand, the British promoted a far more aggressive attitude, expecting their ships to fight at a moment's notice and continue until disabled, sinking, or

¹ Chidsey, *The Wars in Barbary*, 29, 48-49.

victorious. In order to accomplish this, the Royal Navy took on a more balanced approach toward arming their ships. Rather than equipping their navy with only traditional heavy long guns, the British also placed the newly designed carronade on their vessels. The new weapon, though short ranged, proved ideal for the close quarters combat the British favored, by allowing Royal Navy ships to load and fire a large, heavy projectile quickly.²

The French navy's tactical conception, which refused to expose its vessels to undue risk, seemed a wise decision for the American navy due to its small size and limited pool from which to draw crewmen. Navy captains instead chose the more familiar and aggressive British approach toward combat, showing that the Americans would not back down from challenges to the young country or its honor.³ However, the British strategy created a vital question that needed answering. How could the small and inexperienced United States Navy fight aggressively without losing valuable ships? Whereas the Royal Navy's gargantuan size mitigated the loss of any one ship, any defeat sustained by the small American fleet seriously inhibited its ability to function. To lessen the danger, the United States Navy focused on several specific wind tactics allowing its captains to act aggressively, but at the same time limiting the small American fleet's exposure to unfavorable engagements.

Weather Gage Tactics

In the age of sail, the weather gage or any position upwind of an opponent represented the most advantageous attack position for a warship. Achieving this location

² Chidsey, *The Wars in Barbary*, 29-30, 51.

³ Chidsey, *The Wars in Barbary*, 51.

allowed the vessel possessing it to dictate the engagement by deciding whether to press or break off an attack. As such an important tactical position in any battle, understanding how to utilize the weather gage, as well as how to deny its advantages to the enemy often represented the difference between victory and defeat.

Of these engagements, the battles between the United States frigate *Constellation* and the heavy French frigate *La Vengeance*, fought during the Quasi War, and the United States frigate *Constitution* and the British frigate *Guerriere*, fought early in the War of 1812, provide excellent characterizations of how the navy utilized the weather gage. In both encounters, the United States frigates possessed the weather gage from the battle's beginning to its end, providing a sample of how American naval captains exploited this advantage, destroying or capturing the enemy.

USS Constellation vs. La Vengeance

At 7 a.m. on February 1, 1800, while sailing east near the Caribbean island of St. Kitts, the United States frigate *Constellation*, commanded by Captain Thomas Truxtun, sighted an unknown sail to the southeast. Believing the large unknown ship to have come from the nearby English holding of Martinica, Captain Truxtun ordered English colors raised, hoping to induce the ship to come towards them and avoid a long chase.⁴ On board the yet unrecognized *La Vengeance*, Captain F.M Pitot, operating under orders to return to France and wanting to avoid conflict so close to an English holding,

⁴ *Naval Documents Related to the Quasi-War Between the United States and France*, United States Navy Department, Office of Naval Records and Library, Vol. 5 (Washington, D.C.: United States Printing Office, 1937), 164.

immediately changed course and set sail to the southwest after discovering the disguised vessel. The *Constellation* mirrored this move and the chase continued.⁵

As the morning progressed, the distance between the two ships narrowed, allowing Captain Truxtun to ascertain his quarry's identity as the French heavy frigate *La Vengeance*.⁶ Shortly before noon, Captain Truxtun ordered the ship prepared for action and the English colors taken down. Yet, just as the engagement seemed imminent, the wind suddenly fell calm and threatened to end the chase if the condition persisted. By 1 p.m. the wind freshened, permitting the *Constellation* to close quickly on their chase, but even as the distance between the two ships narrowed, Captain Pitot refused to give the battle. Seven hours later and with night already fallen, Captain Tuxtun finally pulled the *Constellation* within hailing distance, raised the United States ensign, and demanded the French frigate's surrender.⁷

The *La Vengeance* responded by opening fire from its stern guns, targeting the *Constellation's* rigging with the intent to disable the American. Undeterred, Captain Truxtun bore down on the enemy, maintaining the weather gage by closing in on the enemy's starboard quarter. This forced the French captain into a difficult situation. Either do nothing and allow the *Constellation* to fire broadsides into the *La Vengeance* without the capability to return fire, or maneuver to engage the enemy in close combat. Captain Pitot chose the latter, ordering the French frigate to tack into the wind and bring its broadside to bear against the American.⁸

⁵ *Naval Documents Related to the Quasi-War Between the United States and France*, Vol 5, 166.

⁶ *Naval Documents Related to the Quasi-War Between the United States and France*, Vol 5, 164.

⁷ *Naval Documents Related to the Quasi-War Between the United States and France*, Vol 5, 160.

⁸ *Naval Documents Related to the Quasi-War Between the United States and France*, Vol 5, 167.

Taking the French broadside, Captain Truxtun copied the maneuver, successfully maintaining the weather gage and bringing his ship into close action along the *La Vengeance's* weather quarter. Locked in battle, the two frigates thundered away at each other late into the night. Just before 1 a.m. the battle finally reached its conclusion when the French frigate's guns fell silent and it fell off into the *Constellation's* wake. Having sustained heavy damage to his own ship's rigging, Captain Truxtun decided to pull away from his prize for repairs. However, while doing so the *Constellation's* mainmast collapsed, permitting the heavily damaged French vessel to slip away into the darkness to make repairs and fight another day.⁹

USS Constitution vs. HMS Guerriere

Another instance portraying the American navy's exploitation of the weather gage comes from the battle between the United States frigate *Constitution* and the British frigate *Guerriere*. On August 19, 1812, the *Constitution* commanded by Captain Isaac Hull was patrolling the North Atlantic off New England. At 2 p.m. that afternoon, while riding a north wind on a south southwesterly course, the *Constitution* spotted a mast off its bow. Unable to ascertain the ship's identity due to its great distance, Captain Hull immediately ordered all sails set and made chase of the unknown vessel.¹⁰

⁹ *Naval Documents Related to the Quasi-War Between the United States and France*, Vol 5, 161, 167.

¹⁰ Letter from Captain Isaac Hull to Secretary of the Navy Paul Hamilton, August 28, 1812, "Engagement with *HMS Guerriere*, 1812: Old Ironsides' Battle Record: Documents of *USS Constitution's* Illustrious Deeds," Naval History and Heritage Command, <http://www.history.navy.mil/docs/war1812/const5.htm>.

Over the next hour, the *Constitution* closed rapidly on the unknown ship's weather beam, and by 3 p.m. determined the chase's course to be west by southwest on a starboard tack close on the wind. Half an hour later the vessel was identified as a large frigate.¹¹ Shortly after 4 p.m. the two ships closed within cannon range, hoisted their colors, and prepared for battle. The *HMS Guerriere*'s commander, Captain James Dacres, then initiated the fighting, firing a broadside at the *Constitution* and wore, changed tacks by turning its stern to the wind, to prevent the American from crossing its bow and raking the deck with impunity. Captain Hull quickly returned fire, exchanging broadsides with the *Guerriere* as it wore from one tack to the other trying to prevent the *Constitution* from utilizing the weather gage.¹²

For more than an hour and a half the two ships fired and maneuvered, but neither inflicted a decisive blow. However, not long after 6 p.m. the *Constitution* successfully exploited the weather gage by running up alongside the British frigate and engaging at close range. Pouring round and grape shot into the enemy, Captain Hull devastated the *Guerriere*, felling the ship's mizzen mast and main yard as well as damaging its hull and sails, all in under fifteen minutes. The damage made controlling the British frigate difficult, leaving it vulnerable. Now possessing a speed advantage, the *Constitution* shot ahead of the enemy, crossing its bow and taking up a raking position. From there the Americans unleashed more punishment upon the already damaged British vessel, firing

¹¹ Hull to Hamilton, August 28, 1812, "Engagement with *HMS Guerriere*,"

<http://www.history.navy.mil/docs/war1812/const5.htm>.

¹² Letter from Captain James R. Dacres to Vice Admiral Herbert Sawyer, Sept. 7, 1812, "Engagement with *HMS Guerriere*, 1812: Old Ironsides' Battle Record: Documents of *USS Constitution's* Illustrious Deeds," Naval History and Heritage Command, <http://www.history.navy.mil/docs/war1812/const5.htm>.

broadships with impunity into the enemy and wreaking “havock amongst his men on the forecastle and did great injury to his forerigging and sails.”¹³

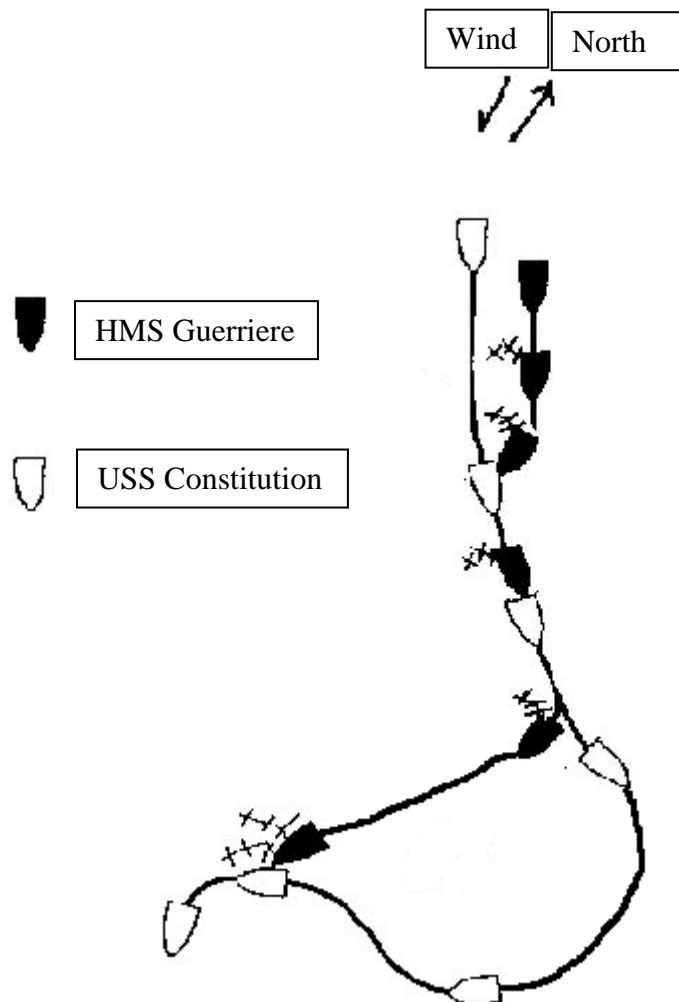
Attempting to fight back, Captain Dacres got his bow guns trained on the *Constitution* and moved off a little from his opponent to disengage and make some quick repairs. However, just as it seemed the British might be able to get back into the fight, the *Guirriere* suddenly lost both its fore and main mast, which were damaged earlier in the fight, “leaving the ship a perfect unmanageable wreck.”¹⁴ Seeing the enemy disabled, Captain Hull disengaged to make repairs to his ship’s rigging. Half an hour later, the *Constitution* returned to determine if the enemy had struck its colors and after investigating received the *Guirriere*’s surrender.¹⁵

¹³ Hull to Hamilton, August 28, 1812, “Engagement with *HMS Guerriere*,”
<http://www.history.navy.mil/docs/war1812/const5.htm>.

¹⁴ Dacres to Sawyer, Sept. 7, 1812, “Engagement with *HMS Guerriere*,”
<http://www.history.navy.mil/docs/war1812/const5.htm>.

¹⁵ Hull to Hamilton, August 28, 1812, “Engagement with *HMS Guerriere*,”
<http://www.history.navy.mil/docs/war1812/const5.htm>.

USS Constitution vs. HMS Guerriere Battle Map



(Graphic obtained from [http://www.usconstitutionmuseum.org/constitution-](http://www.usconstitutionmuseum.org/constitution-resources/the-captain-speaks/constitution-defeats-hms-guerriere)

[resources/the-captain-speaks/constitution-defeats-hms-guerriere](http://www.usconstitutionmuseum.org/constitution-resources/the-captain-speaks/constitution-defeats-hms-guerriere))

The illustration shows how using the weather gage, the *USS Constitution* controlled the engagement with the *HMS Guerriere* by approaching from its dead angle and then closing and firing several broadsides. Finally after disabling the enemy, the *Constitution* crossed its bow, delivering the coup de grace.

In the battles described above, both the *Constellation* and the *Constitution* observed an unknown sail on the horizon and immediately turned to give chase, each time paying close attention to acquire and exploit the weather gage. Approaching their targets from their weather quarter, Captains Truxtun and Hull were both able to control the engagement, possessing the ability to react to and counter any move made by the enemy, as well as force the enemy to make mistakes and expose themselves to attack. Furthermore, once the two American ships closed on their targets, each took up and attempted to maintain a position in the enemy's dead angle, a position off either stern quarter in which none of the targeted ship's guns can be trained to fire.¹⁶

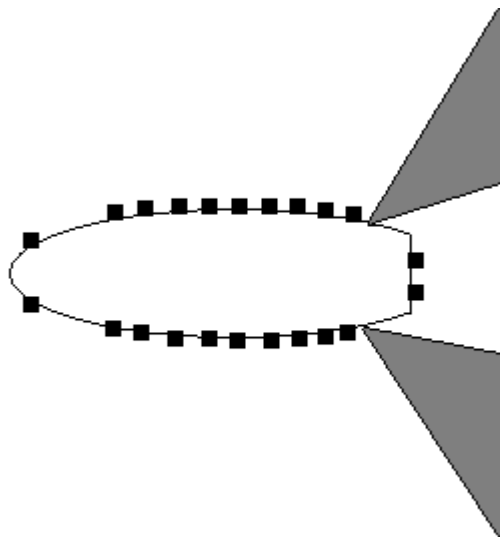
This left the chase (that is, the enemy ship being pursued) with two options. One, maintain course and attempt to outrun the enemy, risking that the pursuer might close and open fire at close range without itself presenting a target. The other option was to wear, bringing the ship's broadside to bear against its pursuer. Both *La Vengeance* and *HMS Guerriere* chose the latter option, deciding to turn repeatedly so as to fire on the American frigates trailing them. However, performing such a maneuver greatly decreases a vessel's speed, allowing in each case for the chasing ship to bring the enemy into a close quarter engagement. In addition, the disparity in speed caused by wearing also gives the faster chase ship the possibility to cross the enemy's bow and take up a raking position, allowing the attacker to fire down the entire length of the enemy's deck without exposing itself to return fire.

¹⁶ Rear Admiral S. S. Robison and Mary L. Robison, *A History of Naval Tactics From 1530 to 1930: The Evolution of Tactical Maxims* (Annapolis, Md.: The U. S. Naval Institute, 1942), 493.

As the tactics used by the *Constellation* and the *Constitution* demonstrate, American captains understood just as well as captains from other more experienced navies the importance of gaining, maintaining, and exploiting the weather gage. In doing so, both American frigates and the navy as a whole proved able to stand up to a more heavily armed opponent, in the *Constellation*'s case, and out-fight a seasoned opponent from the era's most powerful navy as did the *Constitution*.¹⁷

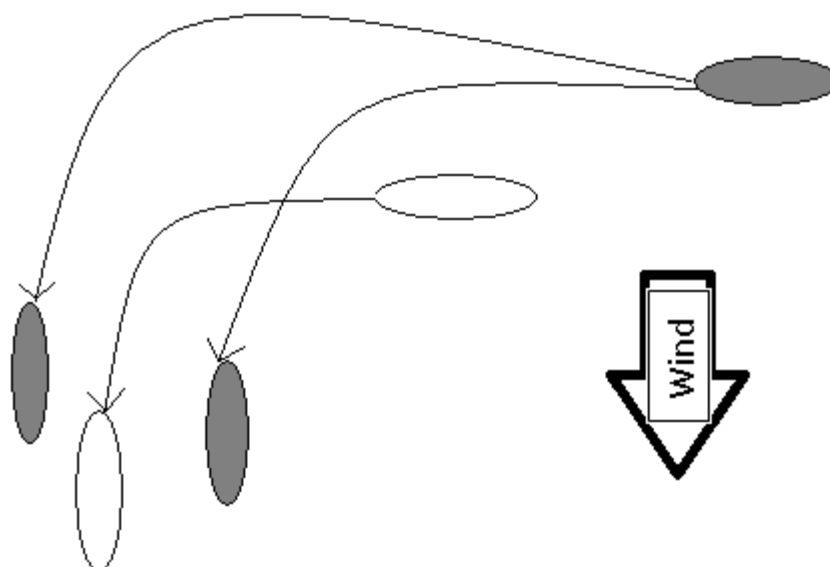
¹⁷ For additional examples of U.S. ships maintaining and exploiting the weather gage see: *U.S.S. Constellation* vs. *L'Insurgente* in U.S. Navy Department, *Naval Documents Related to the Quasi-War*, Vol. 2, pg. 326-337, *USS Boston* vs. *Berceau* in U.S. Navy Department, *Naval Documents Related to the Quasi-War*, Vol. 6, pg. 457-458, *USS Enterprise* vs. *Tripoli* in United States Navy Department, Office of Naval Records and Library, *Naval Documents Related to the United States Wars with the Barbary Powers*, Vol. 1, (Washington, D.C.: United States Printing Office, 1939), 536-540, *USS Enterprise* vs. *HMS Boxer* in Letter from Edward R. M'Call to Commodore Isaac Hull, Sept. 7, 1813, in Bowen, *The Naval Monument*, 77-78, Capture of *Cyane* and *Levant*, 1815: Old Ironsides' Battle Record: Documents of *USS Constitution's* Illustrious Deeds," Naval History and Heritage Command, <http://www.history.navy.mil/docs/war1812/const7.htm>, and *USS Constitution, Logs of US Naval Ships, 1801-1915* (Records of the Bureau of Naval Personal), Record Group 24, Entry 118 (PI-123), Vol. 4 of 47, February 21-22, 1815.

Dead Angle



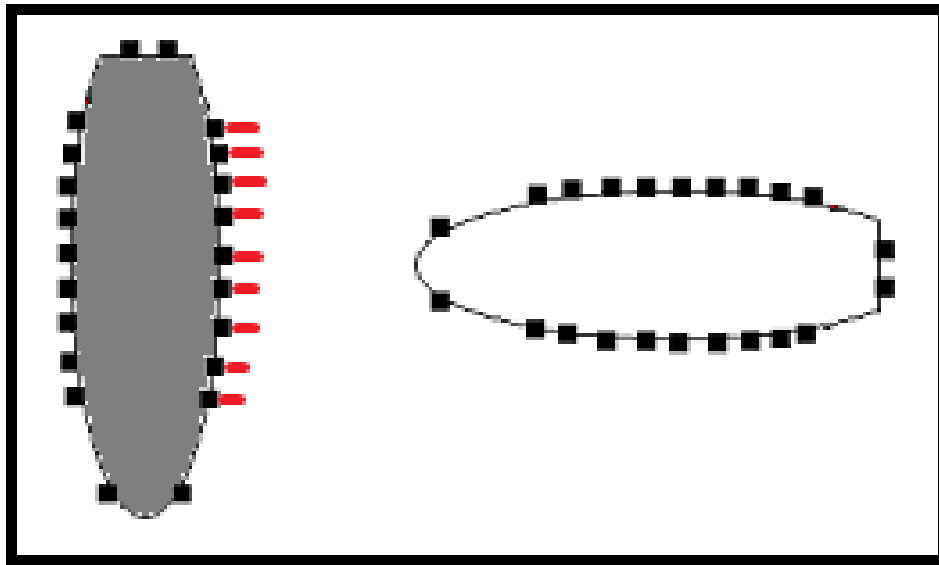
Dead Angles (colored in grey)

Advantages of the Weather Gage



This illustration demonstrates the advantage in maneuvering that possessing the weather gage (grey ship) allows.

Bow Raking Position



In this graphic, the grey ship possesses a raking position across the white ship's bow.

Negating or Seizing the Weather Gage

While the battles illustrate how the navy utilized the weather gage to defeat the enemy, fighting from such an advantageous position was not always possible. As a result, American captains employed two defensive wind tactics, wearing and hauling close to the wind. Each tactic either negated the weather gage's advantages or seized it from the enemy. Two battles fought during the War of 1812 exemplify these defensive tactics, the United States frigate *Constitution* vs. the British frigate *Java* for wearing and the United States sloop *Hornet* vs. the British brig *Peacock* for hauling close to the wind.

USS Constitution vs. HMS Java

Sailing off Brazil's coast on the morning of December 29, 1812, the United States frigate *Constitution*, commanded by Commodore William Bainbridge, observed two strange sails off his weather bow. However, being at such a great distance, identifying the vessels or their course proved impossible. Finally at 10:00 a.m. Commodore Bainbridge determined that one ship had spotted the American and started moving away from its companions, towards the shore. In the hours that followed, the *Constitution* hoisted the private signal for the day to determine the pursuer's identity. Answering with the incorrect countersignal, Commodore Bainbridge now assumed the ship a British frigate and made sail away from the coast to draw the chaser out of neutral Portuguese waters and separate it from the rest of its company.¹⁸

The following afternoon, Commodore Bainbridge, thinking his ship far enough from shore, ordered the sails taken in, tacked, and stood for the enemy waiting to give battle. Twenty minutes later, the engagement began as the *HMS Java*, which possessed the weather gage, rushed toward the *Constitution* attempting to gain a raking position. Commodore Bainbridge deftly avoided this danger by wearing his ship. Both ships opened fire with a mixture of grape and round shot. For a little over two hours the frigates dueled, both vessels making substantial maneuvers. The *Java* repeatedly attempted to gain a raking position, while the *Constitution* completed wear after wear to counter each move and bringing the vessel's guns to bear against the enemy.¹⁹

¹⁸ Journal of Commodore Bainbridge, December 29 & 30, 1812, in Bowen, *The Naval Monument*, 30.

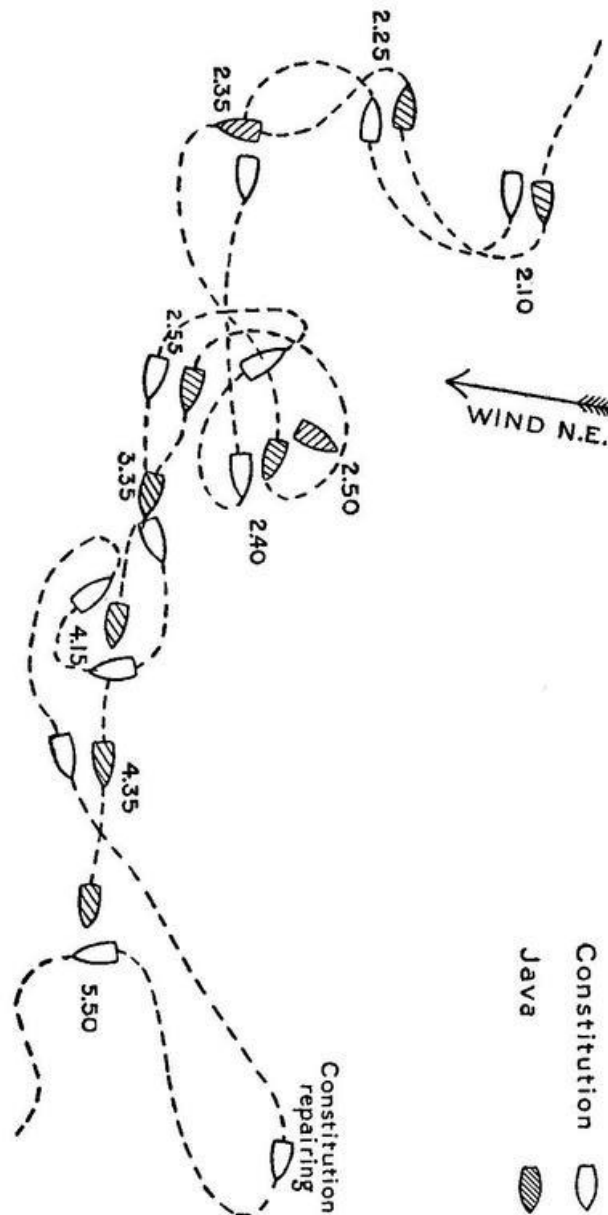
¹⁹ Bainbridge's Journal, December 29 & 30, 1812, in Bowen, *The Naval Monument*, 31.

Firing volley after volley, each ship inflicted damage on the other. At 2:30 p.m. a broadside from the *Java* wounded Commodore Bainbridge and shot away the *Constitution*'s helm, forcing steering to be done below deck by marines with a block and tackle.²⁰ Nevertheless, the American gun crews inflicted considerably more destruction than their British counterparts, felling all the *Java*'s masts and rigging. With the British frigate dead in the water, Commodore Bainbridge, thinking it had struck its colors, disengaged and conducted repairs on his own damaged rigging. At 5:25 p.m., the *Constitution* returned to finish off the *Java*, taking up a raking position on the enemy's bow. Realizing the American's intentions, the *Java* immediately struck its colors and surrendered.²¹

²⁰ "Constitution America's Ship of State, 1812-1815," Naval History and Heritage Command, <http://www.history.navy.mil/ussconstitution/history.html>.

²¹ Bainbridge's Journal, December 29 & 30, 1812, in Bowen, *The Naval Monument*, 32.

USS Constitution vs. HMS Java Battle Map



(Graphic obtained from <http://www.history.navy.mil/ussconstitution/history.html>)

As described above, note that for each movement made by the *Java*, the *Constitution* executes a corresponding turn to bring each broadside to bear against the enemy in alternating succession.

USS Hornet vs. HMS Peacock

Fought on February 24, 1813, the battle between the United States sloop *Hornet* and the British brig *Peacock* represents another tactic, hauling close to the wind, that American captains used to neutralize or recover the weather gage. While cruising off northern South America's Demerara River, the *Hornet*, captained by James Lawrence, bore down on an anchored brig. At 3:30 p.m., as the *Hornet* neared its target, its crew "discovered another [vessel] on our weather quarter, edging down for us."²²

Fifty minutes later, having ascertained the ship moving toward them to be the British brig *Peacock*, Captain Lawrence cleared his ship for action and ordered the pilot to "keep close by the wind, if possible, to get the weather gage."²³ By 5:10 p.m., Captain Lawrence, seeing that he could obtain the weather gage and gain the tactical advantage, tacked into the wind and stood for the enemy, placing the *Hornet* on a converging course with the *Peacock*. Fifteen minutes later the two ships passed each other and exchanged broadsides.²⁴ Taking substantial damage, the *Peacock* attempted to regain the initiative by wearing to starboard so as to bring their opposite broadside to bear against the American sloop. However, Captain Lawrence anticipated the enemy maneuver and executed it first, taking the enemy's broadside and running the *Hornet* up on the *Peacock's* starboard quarter. From its position, the *Hornet* directed an extremely heavy fire on the enemy vessel, receiving the *Peacock's* surrender in less than fifteen minutes.

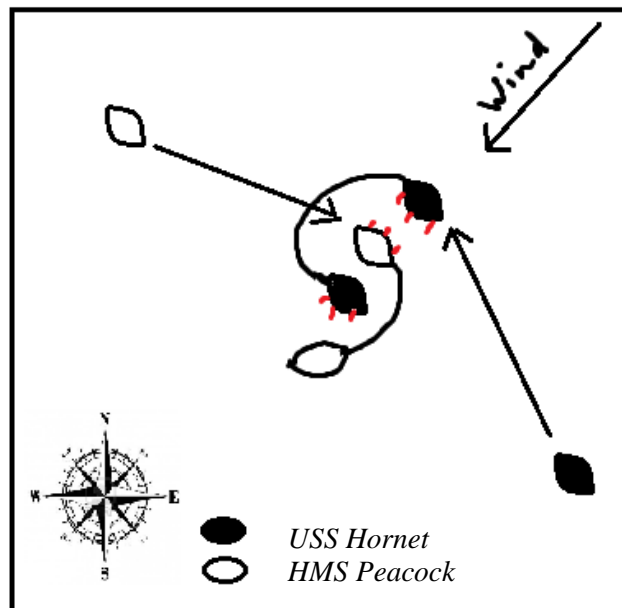
²² Letter from Captain Lawrence to the Secretary of the Navy, March 19, 1813, in Bowen, *The Naval Monument*, 38.

²³ Lawrence to Secretary of the Navy, March 19, 1813, in Bowen, *The Naval Monument*, 38.

²⁴ *USS Hornet, Logs of US Naval Ships, 1801-1915* (Records of the Bureau of Naval Personnel), Record Group 24, Entry 118 (PI-123), Vol. 1 of 1, February 23-25.

A short time later the British sloop sank.²⁵ By this time, the anchored ship that the *Hornet* had originally sighted had escaped from the area.

USS Hornet vs. HMS Peacock Battle Map



In the graphic, the *USS Hornet* is able to out weather the *HMS Peacock*, meaning it could sail closer into the direction of the wind. This in turn allowed the *Hornet* to obtain the weather gage from the *Peacock* and ultimately win the battle.

Exhibited by the battles fought by the *Constitution* and *Hornet*, these two defensive tactics designed to counter an enemy that possessed the weather gage highlight the importance wind played in each engagement. As demonstrated by the action between the *USS Constitution* and *HMS Java*, the first tactic described, wearing, allowed the lead ship to fire on the pursuing vessel with its broadside guns. To accomplish such a

²⁵ Lawrence to Secretary of the Navy, March 19, 1813, in Bowen, *The Naval Monument*, 38.

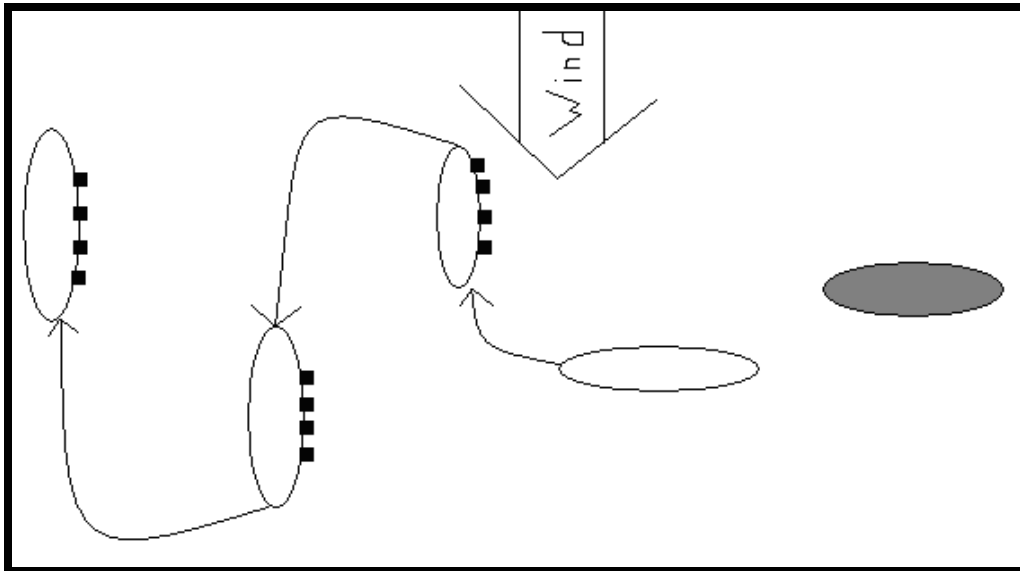
maneuver, the chased ship engaged in a series of successive turns across the enemy's bow, usually targeting the enemy's rigging and sails with their fire in an attempt to slow or disable the advancing enemy ship. If successful, the tactic gave the wearing ship the option to either disengage or continue the battle on its own terms.

The second defensive wind tactic involved sailing close hauled to the wind. Employed by the *USS Hornet* in its fight against the *HMS Peacock*, the maneuver sought to force the enemy ship to give up the weather gage or end the chase all together. Completing the strategy required the pursued ship to steer as close as possible to the direction the wind was blowing from without losing the ability to sail effectively. This in turn restricts the enemy's possible movements and forces it either to sail a similar course to its chase or risk losing the advantage and allowing the targeted ship to control the battle or escape. As the *Hornet* illustrated, if the pursuing enemy is unable to duplicate the maneuver it will pass below the chase ship and lose the weather gage.

Together these two defensive tactics helped the United States Navy to even the odds in battles. In addition, engaging in wearing and hauling close to the wind also indicated that American captains had a detailed understanding of how the wind affected these engagements and their outcomes, which they had accumulated throughout their careers at sea, demonstrating the aggressiveness with which they faced the enemy.²⁶

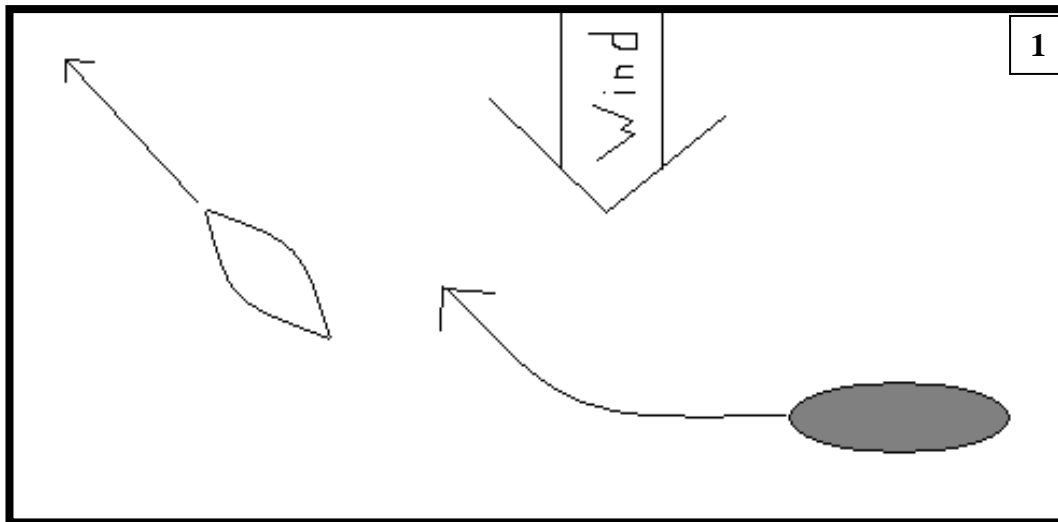
²⁶ For additional examples of battle fought by the United States navy when not possessing the weather gage, see: *USS Argus* vs. *HMS Pelican* in Letter from *Argus* surgeon James Inderwick to the Secretary of the Navy, Sept. 5, 1814, in Bowen, *The Naval Monument*, 67-70, *U.S.S Wasp* vs. *HMS Reindeer* in Letter from Johnston Blakely to the Secretary of the Navy, July 8, 1814, in Bowen, *The Naval Monument*, 135-38, and *USS Hornet* vs. *HMS Penguin* in Letter from Captain Biddle to Commodore Decatur, March 25, 1815, in Bowen, *The Naval Monument*, 189-94.

Wearing

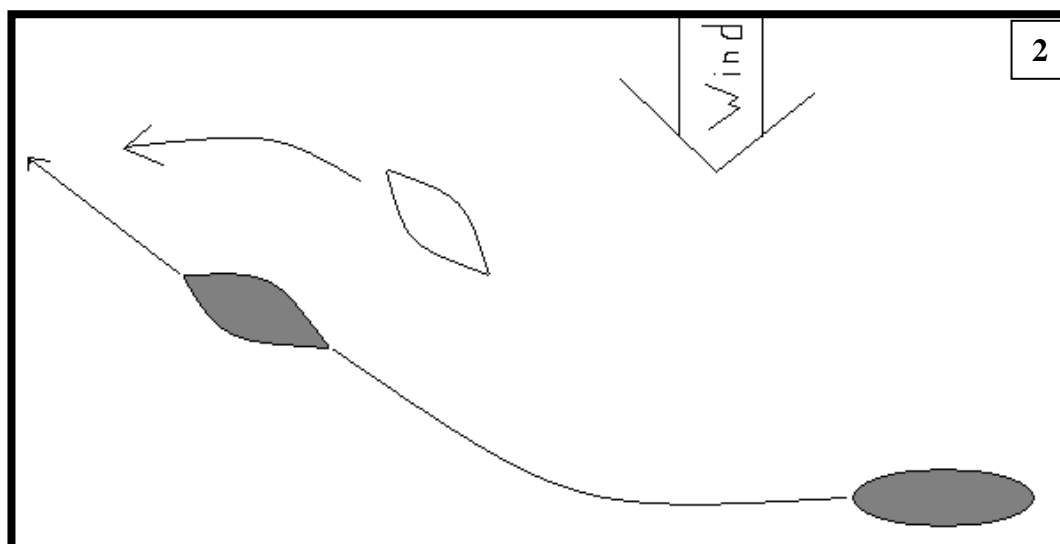


Wearing allows the white ship to fire repeated broadsides on a pursuing grey ship through repeated turns across the enemy's bow.

Hauling Close to the Wind



In graphic 1, the white ship hauls close to the wind forcing the pursuing grey ship to copy the white ship's maneuver and restricting the enemy's options for attack.



If the pursuing grey ship cannot match the maneuver, meaning sail as close or closer to the wind's direction, the white ship can gain the weather gage or escape, portrayed in graphic 2.

Conclusion

Throughout history, wind has played an incredibly important role in influencing sailing and naval warfare by representing the primary engine of movement, determining the direction of possible travel, and embodying a dangerous and destructive natural force. Together, the wind's characteristics embodied a critical role in the United States Navy's development, directly affecting battles in its early wars and shaping the tactics utilized to complement its captains' aggressive styles. Such examples as the losses suffered by the frigates *President* and *Essex*, the sinking of the sloop *Alligator* by a tornado, as well as the narrow escapes symbolized by the sloop *Hornet* and frigate *Constitution* just when capture seemed inevitable, all testify to the power and unpredictability that wind as a source of friction brought to naval engagements. On the other hand, the celebrated victories achieved by the *Constellation*, *Constitution*, *Hornet*, and other United States Navy vessels illustrate the significant role that wind tactics, specifically those involving the weather gage, performed in ensuring America's early naval independence. Without this tactical understanding of wind that its captains provided, the Navy may well have withered in the crucible of its early wars, leaving the United States vulnerable militarily and economically.

While this paper presents an examination of wind and its influence on the early United States Navy, it by no means the story's end. Instead, more investigation into the effects not only of wind, but also other natural forces on historical events, not just warfare, is needed in order to understand the environment's central role in shaping human civilization. Only by grasping how mankind interacted with the environment in the past

can we hope to comprehend how our environment will affect our future wars and way of life.

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Glossary of Nautical Terms

Aground: The situation of a ship when its bottom, or any part of it, rests in the ground

Bow: The front of a ship.

Brig: A two masted, square-rigged ship.

Broadside: A discharge of all the guns on one side of a ship both above and below deck.

Carronade: A short, smoothbore, cast iron cannon that served as a powerful, short-range
anti-ship and anti-crew weapon

Chase: A vessel pursued by another vessel.

Chaser: The pursuing vessel.

Close on the Wind (Close Hauled or Hauled): To trim the ship's sails in order to sail as
near as possible to the direction from which the wind is blowing.

Cruiser: (19th century meaning) A classification of ship which goes on independent
scouting or raiding missions.

Dead Angle: The position off either stern quarter in which none of the targeted ship's
guns can be trained to fire.

Fore Mast: The mast nearest the bow in all vessels having two or more masts.

Forecastle: The upper deck of the ship's frame that lies near the stern.

Frigate: A square rigged, heavily armed, medium sized warship with either one or two
armed decks.

Grape Shot: A cluster of small cast iron or lead balls used primarily as an antipersonnel
weapon.

Hawser: A small cable

Helm: The instrument by which the ship is steered, and includes both the wheel and the tiller, as one general term.

Hull: The ship's body.

Knot: Measurement used to calculation of the ship's velocity over one nautical mile.

Launch: A smaller boat carried by a large ship.

Lee-Quarter: That quarter of a ship that is farthest away from the direction the wind is blowing from.

Main Yard: The lower yard on a mainmast.

Main Mast: The tallest mast, usually located near the center of the ship.

Maintop Mast: The top portion of the main mast.

Mizzen Mast: The third mast or the mast immediately behind the main mast, typically the shortest mast on a ship.

Out-weather: To sail closer to the direction of the wind than an opponent.

Port Quarter: The back, left part of a ship.

Powder Magazine: The place on the ship where gunpowder is stored.

Quarter: One of the four counters of a ship.

Rake: To carronade a ship at the stern or bow, so that the balls scour the whole length of the decks.

Rigging: The part of the ship that propels a sailing ship through the water, including the masts, yards, sails, and cordage.

Round Shot: A solid projectile without explosive charge, fired from a cannon and used primarily to target an enemy's hull.

Rudder Braces: Braces used to secure the rudder to the ship.

Set All Sail: To unfurl and expand all the ship's sails to the wind, in order to give maximum motion to the ship.

Sheet Anchor: A large spare anchor used only in emergencies.

Sheet Cable: The cable attached to the sheet anchor.

Ship of the Line: A sailing warship armed powerfully enough to serve in the line of battle, usually having cannons ranged along two or more decks.

Sloop: A single-masted, fore-and-aft-rigged sailing vessel, with or without a bowsprit, having a jib-headed or gaff mainsail, the latter sometimes with a gaff topsail, and one or more headsails.

Spar: A stout pole such as those used for masts, etc.; a mast, yard, boom, gaff, etc.

Stand (Standing): To advance in a direction.

Starboard Quarter: The back, right part of a ship.

Stern: The rear of a ship.

Strike Colors: Universally recognized indication of surrender, especially for ships at sea.

Tack: A heading of a sailing vessel, when sailing close the direction from which the wind is blowing.

Wear (Wearing or Wore): To change a ship's course from one tack to the other, by turning its stern to the wind.

Weather(ing): To go to windward of anything.

Weather Beam: The side of the ship on which the wind is blowing.

Weather Gage: When a ship or fleet is to windward of another, it is said to have the weather gage on them.

Weather Quarter: The quarter of the ship on which the wind is blowing.

Windward: the direction from which the wind is blowing.

