The Capability of Sailing Warships Part 1: Windward Performance

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La capacité militaire d'un navire de guerre à voiles était étroitement liée à sa performance contre le vent, soit sa capacité de naviguer en direction opposée à celle du vent. La stratégie et les tactiques adoptées dépendaient d'elle; en matière de capacité militaire, il est donc essentiel que notre compréhension en soit réaliste. Cet article s'appuie sur des sources contemporaines pour démontrer à quel point notre compréhension actuelle, qui est détachée de cette réalité, doit être revue.

Wind dependence is a defining characteristic of the sailing navy, and it is only right that those who have written of the operations of sailing warships or fleets have acknowledged it and continue to do so.[1] Our existing understanding is somewhat confused, however. The subject of seafaring in the age of sail remains alien to many, a cold and inaccessible subject, rendered the more so by a technical language all its own. The inevitable result is a continuing and peculiar juxtaposition of the acknowledged importance of the subject and the poorly researched status of it. Continually regurgitated but seldom scrutinized by historians, our flawed understanding of sailing capability has exerted a malign influence on the work of those historians whose studies are based upon it.

By far the most frequently discussed aspect of wind dependence is windward performance: the ability of a ship to sail in a windward direction. It was a significant factor, determining both strategy and tactics and it is crucial that our understanding of it should be realistic in terms of practical capability. It has, however, become increasingly apparent that our understanding is in fact based on generalizations and beset with misinformation. It has even been suggested that square rig was the best choice for making good progress when

[1] A.T. Mahan. *The Influence of Seapower on History. 1660-1783* (Boston, 1890), 2; L.G. Carr Laughton, "'The Way of a Ship," *Mariner's Mirror* XIV, No. 2 (1928), 138-41 ; W.C.B. Tunstall, *Naval Warfare in the Age of Sail,* edited by N. Tracy (London, 1990), I ; M. Depeyre, *Tactiques Et Stratégies Navales De La France Et Du Royaume-Uni De 1690À 1815* (Paris, 1998), 57-63; N.A.M. Rodger, "Image and Reality in liighteenth Century Naval Tactics," *Mariner's Mirror* LXXXIX, 3 (2003), 283-4.

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sailing into the wind.[2]

Figure I: After D. Lever, *The Young Sea Officer's Sheet Anchor* (Ontario, 1998) 75.

The best choice for making good progress when sailing into the wind was, without question, fore and aft rig. Square-rigged ships are particularly restricted in their ability to sail close to the wind by the physical characteristics of their rig. The mariner's compass is divided into thirty-two points: each representing an angle of 11 1/4° ,[3] and a square sail, attached to its yard, can fill with the wind at the very best no closer than an angle of six points to the wind (Fig. I), the traverse of the yard being limited in front by the forestay and abaft by the lee shrouds (Fig. 2). Thus, with a northerly wind, the best course that could be sailed by a sailing warship was ENE, or WNW.

A sail rigged fore and aft, on the other hand, is not subject to such restrictions, and can fill with the wind a mere four points off the bow and sail a course of NE or NW with a northerly wind. Square-rigged ships did carry some fore and aft sails - lateen mizzen or spanker, staysails and headsails - and could effectively create a fore and aft rig by leaving all square sails furled and only hoisting headsails, staysails and spanker. However, any headway gained from such an arrangement would have been minimal and the ship would not have been able to make ground to windward since it could not gain sufficient speed for steerage to be relied upon.[4] Indeed, although jibs were universally acclaimed, some contemporaries had little use for staysails, some (but certainly not all) officers considering them "a useless waste of canvas."[5] In practice it was the square sails that had to be filled to provide the enormous power necessary to drive these ships forward. This is reflected in the contemporary practice of only setting fore and aft sails alone when lying to in a storm (Fig. 3), rolling heavily at anchor, getting underway or

[2] A.D. Lambert, *War at Sea in the Age of Sail* (London, 2000), 30.

000°	North	090°	East	180°	South	270°	West
0il'//	NbyE	101'//	EbyS	191 '/*'	SbyW	281 •/«*	WbyN
022 *W*	NNE	H2'/2°	ESE	202'/,°	SSW	292 *Vi'*	WNW
033'//	NEbyN	123%°	SEbyE	21374°	SWbyS	303'/4°	NWbyW
045'	NE	135*	SE	225°	SW	315'	NW
056'//	NE by F.	146%°	SEbyS	236'/4°	SWbyW	326'/4°	NWbyN
067/2°	ENE	157'//	SSE	247'/,°	WSW	337'/2°	NNW
078Y4	EbyN	i68y<°	SbyE	25874°	WbyS	348%°	NbyW
090°	East	180°	South	270°	West	000°	North

[4] *Minutes of the Proceedings at a Court Martial, Assembled for the Trial of Anthony James Pye Molloy, Esq., Captain of His Majesty's Ship Caesar,* (London, 1795), 95; P. W. Hourigan, *Manual of Seamanship* (Baltimore, 1903), 90.

[5] *BJ.Toitcn, Naval Text Book* (New York, 1864), 154; A.A. Hurst, "Modern Square-Riggers: Fact and Fallacy." *Maritime South West* VI (1993), 132.

coming to anchor[6] (Fig. 4).

Our misunderstanding is compounded by confused terminology and nomenclature. The evidence of Lieut. J. Dickinson, of the *Formidable* at the Court Martial of Sir Hugh Palliser in 1779 clearly illustrates the problem. Giving evidence of the course of the *Formidable* in relation to the *Victory* and the wind, the minutes run: "Q: Do you remember... in what manner the Formidable was cunned that afternoon? A: We kept the Victory about a point or a point and a half under the lee bow. Q: Did you go from the wind at that time? A: Yes, about a point or a point and a half from the wind."[7] In modern sailing parlance, sailing between a point and a point and a half from the wind would mean being able to point the bows of the ship, and make progress forward, at an angle between 11¼° and 17° from the direction in which the wind was blowing. With the wind northerly, this translates into a course somewhere between NbE and NNE. To the untutored eye, this suggests quite remarkable windward performance.

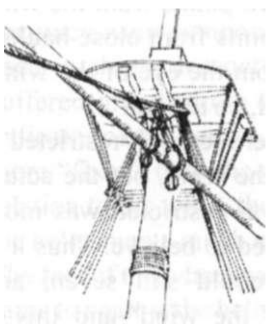


Figure 2: by Mark Meyers in J.H. Harland, *Seamanship in the Age of Sail* (London, 1985)62.

The same problem is illustrated in the minutes of the court martial of Rear-Admiral Knowles in 1750. There was much discussion over the exact positions of the Spanish and English Squadrons in relation to each other, and to the wind. The minutes record the following exchange: "Q: Were the Spanish and English squadrons both close hauPd when you got to the van of the fleet? A: No, - they were about 2 points from the wind, 1 judge: the wind upon the beam."[8] Again, this suggests startling windward performance. Fortunately, however, it also hints at the root of our misunderstanding. Although it is claimed that the course was just two points from the wind, further detail is added that the wind was *abeam,* an apparent contradiction. The solution to this conundrum lies in the contemporary definition of a ship's course in relation to the direction of the wind. Contemporaries did not measure their angle of sail from

Figure 3:Myers in Holland, 89.

' *The Trial of* I *ice-Admiral Griffin,* (London, 1751), 97. Log of the *Téméraire* 30 Oct 1805, T. Sturges Jackson, (ed.). *Logs of the Great Sea Fights, 1794-1805,* (London, 1981). 1:222; D. Lever, *The Young Sea Officer's Sheet Anchor, 2*ed. (London, 1819), 89,108; J.H. Harland, *Seamanship in the Age of Sail (*London, 1985), 84-5: J.H. Harland. "Answers." *Mariner's Mirror* LVI1 (1971).

[7] *Minutes of the Proceedings at a Court Martial Assembled for the Trial of Vice-Admiral Sir Hugh Palliser,* (London, 1779), 74,77. Lor published examples see Evidence of Pender, "The Yarmouth Court Martial" in J.K. Laughton, (ed.). *The Letters and Papers of Charles, Lord Barham,* (London, 1907-8), 1:394.: Howe Signal Book 1794, Jackson. *Logs.* 1:13.

* *Minutes of the Proceedings of the Trial of Rear-Admiral Knowles,* (London, 1750), 92.

the direction of the wind itself, as we do now, but from the point at which they could sail closest to the wind, that is close-hauled at no closer than six points from the wind. In contemporary parlance, therefore, sailing two points from the wind actually meant sailing two points from close-hauled; that is eight or nine points from the eye of the wind, where the wind would, indeed, be abeam.

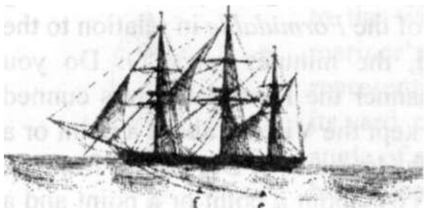


Figure 4: Lever, 569

Square rigged ships were certainly restricted in their ability to sail close to the wind, but the actual extent to which each ship was restricted was more complex than we have been led to believe. Thus it is widely accepted that they could sail seven, and possibly even six points off the wind[9] and this is correct in principle although certain provisos need to be borne in mind. Firstly, a ship had to be able physically to brace her yards around to allow the sails to fill at six points off the wind, and this was only feasible on some ships with certain rigs, where it was made possible by fitting a truss yoke, or by slacking off the truss-ropes. The yard could be also be brought round further by canting down the weather yardarm, or hauling tight the cat-harpins[10] (Fig. 5). There was, however, a good deal of danger in bracing the yards around so far. In 1787, Captain Brown, a restless innovator searching for improvements in windward performance, repeatedly braced the yards of his ship far enough round as to make the sails "as flat as a board." In doing so, however, he sprung more than his share of topsail yards, and Byam Martin quipped "more ... than the little dockyard at Port Royal could well supply."[11]

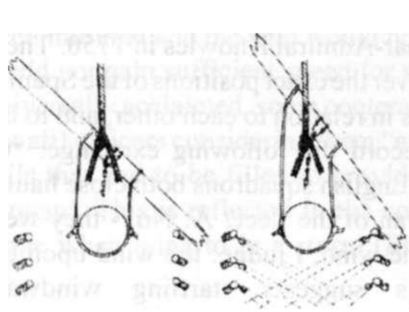


Figure 5: Myers in Harland. 62.

Once a ship was set up to sail close-hauled, it was up to the helmsman to keep her as close as possible to the wind without the weather leeches collapsing. This was an unforgiving process and there was only a very small margin for error: a ship sailing close-hauled at seven points off the wind is only a mere 11 $\frac{1}{4}$° away from sailing at right angles to the wind. Helming is not a straightforward process and is entirely different from steering; while the latter requires only sight and reason, the former

[9] Harland. *Seamanship,* 1 I.: Tunstall. *Naval Warfare,* L; N.Tracy. *Nelson's Battles: The Art of Victory in the Age of Sail* (London, 1996). 54; .1. Creswell. *British Admirals of the Eighteenth Century: Tactics in Battle* (London, 1972), 22; J. Boudriot. *The Seventy-hour Gun Ship,* (Paris, 1988), 3:8.
[10] Harland. *Seamanship,* 62.69.
[11] R.V. Hamilton, (ed.). *Tetters and Papers oj Admiral of the Fleet Sir Thomas Byam Martin.* (London, 1903). 1:91.

involves both feeling and intuition, and is a skill that has variously been compared to riding a bike or playing the violin.[12]

The accuracy of a ship's compass was particularly poor in the eighteenth century, the result of weakly magnetized needles and poor craftsmanship,[13] and these problems of accuracy were compounded in the nineteenth century by the increasing quantities of iron used in ship construction that causes deviation in the compass. A ship's compass also suffered greatly from the motion of the vessel and could only be relied on as a rough indicator of the course. The helmsman had to watch the ship's head relative to something more "fixed" than the compass as a more accurate guide. The movement of the bows in relation to the wind, the waves, the clouds, the land, the stars, or other vessels would give the helmsman a much more accurate idea of whether the ship was coming to or falling off. The feel of the wheel would also serve as an accurate indicator, feeling heavier as the vessel came to against the helm, or easing as she fell off.[14] In fact a ship could be accurately steered without the use of the compass at all. Hurst, for example, recalls how the binnacle light went out and he steered with the wind on his neck for five hours.[15]

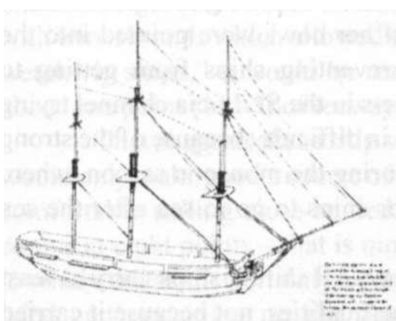


Figure 6: after Myers in Holland, 22.

The ability of a helmsman to keep a ship close to the wind was further affected by the prevailing sea and weather conditions. A ship trying to make ground to windward in rough weather was liable to carry something away if not regularly eased,[16] the all-important bobstay usually being the first casualty when sailing by the wind and in rough weather[17] (Fig. 6). Furthermore, wind does not always blow steadily, nor do waves come at regular intervals or sizes. Even the most experienced helmsman could be pushed ten degrees off course by an unexpected gust or wave and often, through no fault of his own, a helmsman could find himself encroaching on the 11¼° that represented windward progress.

Helmsmanship was so dependent on individual skill, borne of intuition and years of experience, that in windward sailing and particularly in chase, good helmsmanship could make all the difference. In these situations a "good man" would always be sent to the helm irrespective of his position on board.[18] Thus Captain Ambrose of the *Rupert* believed his

[12] E.G. Martin. *Helmsmanship* (London, 1934), 1-2.
[13] A.L. tanning. *Steady as She Goes: A History of the Compass Dépriment of the Admiralty* (London. 1986), xi,xix.
[14] F.L. Liardet, *Professional Recollections on Points of Seamanship* (London, 1849), 239.
[15] Hurst, "Modern Square-Riggers: tact and Fallacy," 146.
[16] *Molloy Trial,* 103.
[17] Liardet. *Professional Recollections,* 29.
[18] *A dialogue between volunteers, containing account of ship's complement, officers, duties of crew, etc,* 1742. National Maritime Museum, Greenwich, (NMM), RLJS1/NM/5/A.

cook to be such a good steersman that he always had him at the helm when in a chase or likely to come to an engagement,[19] and Cochrane recalls how the Doctor of the *Speedy* took the helm in a fight with the Spanish frigate *Gamo* in the spring of 1801.[20]

What needs to be remembered, however, is that that these methods and skills were essential to a ship achieving six points from the wind, rather than added extras to help her sail any closer. In practice, therefore, certain square rigged ships, in certain circumstances, could keep their square sails filled when sailing six points from the wind, and most could keep their sails filled and pulling well between seven and eight points. To do so successfully, however, was to win just one battle in the war to get a square-rigged ship to make ground to windward. In practice sailing even six points off the wind in no way guaranteed windward performance.

The sea itself is not static, but moves according to the current and tide, often at considerable speeds. A current of half a knot was not considered strong,[21] but even this, if in a leewardly direction, would quickly hamper progress to windward. A really strong current could even dictate the course a vessel might steer, as a ship caught broadside to in a strong current losing considerably more ground than if her bows were pointed into the current.[22] Current alone was thus often a factor in preventing ships from getting to windward,[23] and certain places were renowned for it. Fleets in the St. Lucia channel trying to get to windward of Martinique often found themselves in difficulty because of the strong currents,[24] and the coast off Negapatam was notorious during the monsoon season, where Vice Admiral Griffin declared that it was impossible for ships to go to sea after the sea breeze had set in.[25]

An ever-present and significant factor was leeway. All sailing ships carry at least some leeway and a ship would be renowned for its sailing qualities, not because it carried no leeway, but for being less leewardly than others. In fact the windage of the hull, the masts, yards and rigging was sufficient for a square-rigged ship to wear under bare poles alone,[26] and the action of a very leewardly ship was even known as "crabbing," the ship in effect moving sideways.[27] A song of the 1730s gives an impression, albeit exaggerated, of the extent to which windage could affect the speed of a ship. "Without a sail we'll scud

[19] "The Tryal of Captain John Ambrose," in *Copies of All the Minutes and Proceedings Taken at and Upon the Several Trials of Capt. George Burrish, Capt. Edmund Williams, Capt. John Ambrose, Etc. On Board It.M.S London, 23 Sept 1745* (London, 1746), 94.

[20] T. Cochrane, *The Autobiography of a Seaman,* (London, I860), 1:112.

[21] *Griffin Trial, il.*

[22] *Griffin Trial.* 147.

[23] T. Pasley, *Private Sea Journals 1778-1782* (London, 1931), 25.

[24] Rev. J. Ramsey to C. Middleton 23 April 1779, Laughton, (ed.), *Barham Papers,* 47; Anon, "Journal of an Officer in the Naval Army in 1781 and 1782," in *The Operations of the French Fleet under the Comte De Grasse in 1781-2: As Described in Two Contemporary Journals,* J.G. Shea, (ed.), (New York, 1783), I65; D. Spinney. *Rodney* (London, 1969), 389-90.

[25] *Griffin Trial,* **31,85.**

[26] Lever, *Sheet Anchor,* 90.

[27] For an example of this happening in practice, see Hamilton, *Byam Martin Papers,* 186.

beneath our naked poles/ To poop, and heave the log - it blows a tearing gale/ Nine knots she fully runs, without a knot of sail ,.."[28]

The leewardliness (tendency to leeway) of a particular ship was determined by her hull design, rig design and trim, but the amount of leeway she actually made depended on the prevailing wind and sea conditions. Anything more than a good breeze would add to leeway and many ships became exceedingly leewardly as the wind increased.[29] Similarly, any ship close-hauled in light airs, with barely any steerage way, would be affected by considerable leeway, even in smooth water.[30] It is therefore difficult to offer any accurate general conclusions about the amount of leeway any particular ship might have made at any one time. We know that weatherly ships such as the Niger and Lowestoffe classes of 32-gun frigates built in 1757 and 1760 only drew % point (just under 3°) of leeway with all sails drawing,[31] but these were the exception not the rule. As a rough guide, Mossel reckoned that a good ship should make no more than eight degrees of leeway up to six knots,[32] while Dick and Kretchmer thought it would make between six and twelve degrees.[33] Bearing in mind that these figures are based on more modern square rigged vessels with finer hull forms and with wire shrouds which allowed them to brace up sharper, and that not all ships were "good weatherly ships," it would be reasonable to say that most ships, most of the time, made about one point (11 *VA°)* of leeway.

That suggests that a ship sailing even at its theoretical best of six points off the wind would only make good a course of seven points. Consequently, and more realistically, a ship comfortably sailing close-hauled at seven points off the wind would only make good a course at eight points - that is ninety degrees to the wind and would thus make no ground to windward at all. Certainly a good weatherly ship, sailing close-hauled at six points to the wind and remaining on the same tack, would edge her way to windward. In theory, therefore, all she then had to do to make significant ground into the eye of the wind, was to tack or wear repeatedly. In practice however, it did not necessarily follow that a ship could make a particular destination that was dead to windward by repeated tacking or wearing. Confusion has arisen because "tacking" means the same in modern sailing parlance as it was understood by contemporaries, that is to put the bow through the wind. Because of the efficiency of the modern fore and aft rig, however, it is now regarded as being synonymous with making ground to windward.

Although there are examples of exceptional ships, such as the Unicorn class of 28-gun frigates from 1747 which were renowned for being able to tack in their own length,[34]

'* Anon, *The Sailor: Or a Sketch of the Seaman's Art in Working a Ship: in a Dialogue between a Captain and His Two Mates* (London, 1733), 5.

2" M. Maxwell to W. Marsden 7 Nov 1805. Public Record Officer, London (PRO), ADM 1/2149

"' W. Falconer, (ed.). *Universal Dictionary of the Marine* (London, 1771), 220.

31 R. Gardiner, "The First English Frigates," *Mariner's Mirror* LXI (1975), 98-9.

52 O.P..I. Mossel, *Manoeuvres Met Zeil-, En Stoomschepen* (Amsterdam, 1865), 28.

33 C. Dick and O. Kretchmer, *llandbuch Der Seemannschaft* (Berlin, 1902), 169.

14 R. Gardiner, *The First Frigates, Nine and Twelve Pounder Frigates 1748-1815* (London, 1992), 97.

tacking a square-rigged ship was not a reliable process; hence the need for a specific signal for "inability to tack."[35] Lever identifies five separate potential causes of failure in an attempted tack and further concedes that, for a tack to have the most chance of success, the sea must be "tolerably smooth;"[36] if the blunt bow was contending with a strong swell or tidal current from the intended direction of the tack, it would fail to turn through the wind and the ship would hang "in irons."[37] One hardly need add that the luxury of a tolerably smooth sea was rarely present.

To maximise the chances of a successful tack, a ship needed speed for the rudder to have greatest effect,[38] but close-hauled is the slowest possible point of sailing. A ship would therefore have to do her utmost to increase speed prior to initiating an attempted tack. In situations of urgency, anything that might increase speed was acceptable. In the heat of the battle of Minorca in 1756, the *Lancaster,* urgently needed to tack and cut away her longboat and barge to gain more way;[39] normal practice, however, was to increase speed by bearing away before initiating the tack.

Once the bows were through the wind, they would naturally fall off and the ship would have to be brought back under control before once again being brought up and held steady close-hauled. A ship did not recover her way as soon as she was about and, as speed through the water was a factor in weatherliness, it was therefore sensible to sail extra full for a few moments after tacking in order to regain speed and thus be able to sail the ship to her best advantage.[40] It was consequently an inherent paradox of square-rig sailing performance that maximising the likelihood of success in tacking required a ship to be sailed a few points away from close-hauled both before and after the manoeuvre, despite the fact that any time not spent close-hauled meant ground lost to leeward.

The most crucial stage in an attempted tack was the backing of the sails on the mainmast, the timing of which was down to the officer in charge of the manoeuvre. It was his task to judge the conditions, the speed of the ship through the water, its rate of turn, and the angle of the wind in respect to the ship's head. If the order for "mainsail haul" was given too early, the ship would surely hang in irons; too late, or the mast backed too slowly, and

[35] Creswell, *British Admirals,* 202. For an example of this being used in an action, see *Molloy Trial,* 8.
[36] Lever. *Sheet Anchor, 11.*
[37] "In Irons" meant that no movement was being made to port or starboard, and the ship began to make sternvvay. In such a situation, the ship can drop off onto the original tack and attempt the entire manoeuvre again, or she can drive her stern up into the wind and perform what is known as a "boxhaul." The idea of a boxhaul is that it serves as a "gel out of jail free card." Theoretically, in driving the stern up into the wind, you make back up the ground lost to leeward when in irons, but in practice it is impossible to regain all ground lost. The manoeuvre is then continued as a wear, and is subject to the leeway inevitable in such a manouevre. For an example of this happening in practice due to a high swell, see K. Digby, "Journal of a Voyage into the Mediterranean A.D. 1628," *Camden Society* XCVI (1868). 5.
[38] J. Bourde de Villehuet, *The Manoeuverer, or Skilful Seaman: Being an Essay on the Theory and Practice of the Various Movements of a Ship at Sea as Well as of Naval Evolutions in General,* trans. J.N.J, de Sauseuil (London, 1788), 75.
[39] *The Trial of the Honourable John Byng at a Court Martial,* (Dublin, 1757), 137-8.
[40] R. Park, *Defensive War by Sea* (London, 1704), 81.

the corresponding time lost would translate into loss of speed and hence of ground to leeward. In the latter case, the ship would no doubt tack, but much of the efficiency of the manoeuvre necessary for windward performance would be lost.

Despite these problems, a crew could greatly improve the chances of tacking successfully by practice and experience. It would not take a captain long to be able to judge time and again the exact moment for the mainmast to be backed. To help drive the bows into the wind the headsails would be dropped and the spanker set amidships, thus adding as much resistance as possible to help force the bows into the wind.[41] Once through the eye of the wind the spanker would be taken in, the headsails set and their windward sheets hauled to offer maximum resistance to the wind and thus to push the bows off the wind to complete the tack as quickly as possible, a process known as "flatting in."[42] Under-manned ships would be rigged with cross-braces for easier working,[43] and on all ships the ropes were laid out on deck to run freely to facilitate tacking.[44]

Wearing ship - putting the stern of the ship through the wind, the equivalent of a jibe in a modern yacht - was less fraught with inherent difficulties than tacking, and less demanding of ropes, sails and spars.[45] The only critical stage in a wear was the feathering of the main and mizen masts as the wind came abaft the beam and the stern passed through the wind. "Feathering" involved bracing the yards of a mast directly into the eye of the wind so that the sails would neither fill nor be backed. Without the requisite skill, the main and mizen masts would fill, preventing the stern from going up into the wind and the bows from falling off and pointing downwind. As with tacking, however, the quality of the ship was critical. Ships with a tendency to gripe (point their bows to wind) were notoriously difficult to wear. The *Nymphe* (36), captured in 1780, was reported as being a ship that "stays well but is long in wearing."[46] The *Cumberland* was so bad at wearing that she was tacked as a rule whenever she put about,[47] an incapacity that was to cause serious trouble for the English line of battle at the Battle of Cuddalore in 1758.[48]

Wearing ship was nevertheless the more reliable method of getting from one tack to the other. The downside was that, in so doing, considerable ground was lost to leeward: a ship wearing would turn through twenty points of the compass, eight points more than if

41 Bourde de Villehuet. *Manoeuverer,* 73-4.

42 Lever, *Sheet Anchor,* 78.

41 When rigged with cross-braces, the braces for the main or mizen mast would lead forward not art. the braces for both masts can then be worked easily from the main deck. Lever. *Sheet Anchor,* 67. Fig.357. This was also done on small ships (usually brigs) as the most efficient angle for the braces ofthe mainmast runs forw'd: the ship being too short for the braces to be rigged aft and worked efficiently. For another trick for shorthandcd ships see Liardet, *Professional Recollections,* 202.

44 *Molloy Trial,* 22.

45 Liardet. *Professional Recollections,* 201.

46 Other captured French ships with similar reports were the *Santa Leocadia* (36) captured 1781, *Heldin* (28) captured 1799. *Oiseau* (36) captured 1793, *Prévoyante* (36) captured 1795. Gardiner, *First Frigates,* 106.

47 *The Case of William Brereton Esq.,* (London, 1779), Appendix. D, 67.

4* Kempenfelt to Lord Colvill 23 July 1758. PRO, ADM 1/2010.

she was tacked and in the opposite direction. Even the very best ships, such as the Niger class of 32-gun frigates from 1757, would only wear in four times the ship's length.[49] A captain who was determined to make ground to windward therefore had no choice but to resort repeatedly to the less reliable method of tacking in order to work the ship from one tack to the other.

This heavy reliance on tacking meant that no vessel, except a small fore and aft rigged craft, could gain as much to windward in stays as she would gain in the same time by keeping close to the wind. Making effective ground to windward was best achieved by staying as close-hauled as possible on the same tack. Thus a ship could make good a course of one point to windward if she remained on the same tack but, if the wind were to back she would have to start tacking to make her destination. As the number of tacks required increased, so did the likelihood of losing ground to leeward. Very soon, reaching the destination became all but impossible, and tacking became nothing more than a means of reducing leeway.

Contemporary sailing practices reveal the extent of the problem. If the wind was right out of a river that a ship was to enter up, she would anchor off and wait either for a change of wind, or until the tide was strong enough to take her upriver against the wind.[50] In the latter case the ship would drift up broadside to or astern, the tide acting on the rudder as if she was going ahead and allowing her to be steered.[51] A time consuming and, for the crew, exhausting alternative would be to warp the ship upriver using transport moorings or warping buoys if available,[52] or, the ship could be "kedged:" an equally tedious method involving an anchor being carried forward and dropped by a boat's crew, and then hauling the ship forward on her anchor cable. Although impractical, kedging was nonetheless of great help in an emergency. In the winter of 1809, Cochrane was particularly cautious in coming close under the guns of a battery near Rosas in Cataluôa, Spain, that he laid a kedge out to seaward with a full mile of coir rope attached. With the marines embarked under heavy French fire, Cochrane was thus able to drag the *Impérieuse* out of range of the battery.[53]

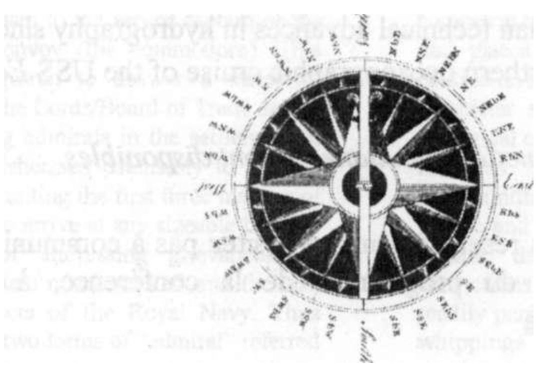
In a seaway, a ship had no option but to tack repeatedly, always a considerable struggle with no guarantee of success. In 1789 the Captain of the *Southampton* strove for three weeks in the teeth of strong south-westerly winds to get from the Downs to his sweetheart in Portsmouth,[54] and in 1780, Captain Wallace of the *Nonsuch* tried to work to windward towards a French squadron, but was obliged to bear up, having tacked "eleven or

[49] (jardiner. *First Frigates,* 98.
[50] B. McRanft, (ed.). *The Vernon Papers* (London, 1958), 570.
[51] Lever, *Sheet Anchor,* 98.
[52] The earliest recorded use of warping buoys is at Plymouth, 1747. P. MacDougall. "Hazardous Waters: Naval Dockyard Harbours During the Age of Fighting Sail," *Mariner's Mirror* LXXXVII, I (2001), 25.
[53] Cochrane. *Autobiography of a Seaman,* 330.
[54] Hamilton, ed.. *liyam Martin Papers.* 134.

twelve times."[55] As late as 1891, HMS *Téméraire,* the last fully rigged battleship in the Mediterranean and hence the culmination of centuries of development of seamanship, rig and ship design, was sailed against a headwind into her anchorage at Suda Bay, Crete by Gerard Noel out of principle. He managed it, but had to tack thirteen times.[56]

Not only must the difficulty of making ground to windward be emphasized, but also the variety in that capability. A fine ship, a fine crew, a fine breeze of wind, no swell, no current (or a current with a windward set) were the ideal, but rare conditions for reliable windward performance. So heavily dependent on such a variety of circumstances the windward performance of sailing warships in any given situation varied a great deal between ships of the same class as much as been between ships of different classes. Generalisations regarding windward performance are, therefore, an unhelpful way of understanding this key aspect of sailing warship capability.

Our accepted understanding of the windward performance of sailing warships is clearly in need of revision. Much of significance is not widely known; much that is widely known is inaccurate. That is symptomatic of a wider problem in maritime history: the history of sailing warfare has for too long been considered in a vacuum, divorced from practical realities when it was those realities which defined the very nature of seafaring. The true nature of seafaring under sail has neither been investigated in sufficient depth nor adequately described, with the direct result that its significance has been greatly undervalued. As a result, much received wisdom on the broader subject of sea fighting is inaccurate by default. An accurate understanding of the peculiar nature of seafaring should not remain peculiar to experts in ship technology, the preserve of a few, but should be the bedrock of any study in maritime history during the age of sail



The compass card graduated in points.
From Lever, 75.

[55] J. Wallace to P. Stevens 11 July 1780, PRO, ADM 1/2675
[56] A. Gordon, *The Rules of the Game: Jutland and British Naval Command* (London, 1996), 206.