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ARTICLE

# Navigating the British Atlantic in the Eighteenth Century: What the Logbooks Tell Us

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## Abstract

Crossing the North Atlantic was one of the world's most important oceanic voyages by the eighteenth century. By then, ships built and owned in the British North American colonies and, late in the period, the United States were crossing this dangerous and often-fickle ocean in large numbers. The surviving logbooks of such vessels can serve as unique source material for understanding the Atlantic experience for scholars prepared to interpret and exploit them. Recording the Atlantic passages of the small schooner *Sultana,* the snow *George,* and the brig *Reward* in the Global Sea Routes (GSR) database creates a record for future researchers with a broad array of interests, but only after the obstacles to interpretation are overcome, to the extent possible. I will discuss what those obstacles are, laying out the information to be found in these logs, how it is entered and why, and what it has to tell us about the Atlantic and those who used it at the time. I will make the case that what is contained in these sources justifies the acquisition of the technical and historical expertise necessary to use them.

Note: the snow rig was popular among mid-size ocean-going Atlantic merchant ships by the mid-eighteenth century. It is similar to the two-masted brig, as opposed to the three-masted ship, but it has a small "try-mast" just behind the main mast (the after mast), on which the mizzen sail was hoisted.

**Keywords:** North Atlantic history; history of navigation; logbooks; shipping

## Introduction

The two somewhat disparate impressions a novice researcher is likely to get when first opening an eighteenth-century logbook are of both tidiness and inscrutability.[1] The pages are lined off carefully with a straightedge. Grids compartmentalise bits of shorthand, a code with some (though we could wish for far more) consistency, known both to the author and, ostensibly, anyone else who may later consult the log. Grids of shorthand code, written in ink now purplish with age, represent one of the principal

[1] The originals of the logbooks we will examine in this article are located in the National Archives of the United Kingdom [hereafter TNA]: ADM 51/43, The Log Book of Lieut. John Inglis, Commander, SULTANA, 18 Jul. 1768 to 7 Dec. 1772 (copy, located in the private collection of the Sultana Education Foundation, Chestertown, Maryland); TNA ADM 52/1455, Logbook of David Bruce, Master of SULTANA, 19 Jul. 1768 to 7 Dec. 1772 (copy, located in the private collection of the Sultana Education Foundation, Chestertown, Maryland); Historical Society of Pennsylvania, Am. 6823, George (ship) logbook, 1805–1806 [also contains return passage of the brig *Reward* from Jamaica to New York].

components of the overall enterprise of navigating a sailing ship on the ocean: the imposition of order on chaos.[2]

Both numbers and letters are key to this shorthand code. Numbers generally give us an impression of objective precision that letters do not; but, in these logs, that impression is misleading. The reader must understand how those numbers were derived, and by doing so, gains an understanding of the acting and thinking that put them there. The letters, usually found in the "Remarks" column of the log, are more numerous than the numbers, as numbers generally do a better job of conveying more information in fewer characters. The Remarks column, then, takes up more space than any other part of the log's entry for a given day. While most consistently devoted to weather observations, Remarks can contain anything and everything from sail changes or damage incurred to personal grievances and poetic musings. The only consistency is brevity; a man's death was usually recorded in just a few words. An inference of callousness would be unwarranted; there was limited space in the Remarks column, and limited time to write in it.

In general, a logbook tells us much, but not all, of what we could wish to know about the navigation and operation of the vessel. It provides glimpses into life on board, and life on and around the sea. The observations it contains, whether astronomical or cultural, were recorded for an audience who, the author assumed, already possessed the contextual knowledge necessary to correctly interpret the grid of shorthand code and the only slightly more expansive Remarks inscribed for each day afloat. We do not possess such knowledge; we must acquire it if we are to exploit these rich primary sources.

## Navigating on Paper at Sea

The information recorded in the logbook is, first, a record of the crew's attempt to find their way from their departure to their destination while preserving life and property. While the specific methods for doing so varied somewhat over time, all logbooks contain some common information, laid out in similar fashion, toward this end. They all divide the ship's day into one- or two-hour increments, from noon to noon, as the keeping of time on board, like most other aspects of life, differed from the way it was done ashore. Ships operated twenty-four hours a day; the measuring of work time and passage time reflected that. Noon was the moment when the ship was directly underneath the sun; by establishing that moment with a sighting instrument, the master could easily work out the ship's latitude—how far the ship was north or south of the equator. Expressed in degrees between zero and ninety, that latitude would be recorded in the log. If the sun was obscured at noon, the master might record a sighting of the sun at another time during the day, or of one or more stars at dawn or dusk, when the horizon was visible. Those sightings required more calculations, but a fully-qualified navigator would know how to perform them.

The rest of the day-to-day navigation of the vessel was conducted by a set of techniques collectively known as "dead reckoning," from "ded." or "deduced" reckoning. Deduced reckoning may sound like an educated guess; it was. The basic principle was that keeping up with the vessel's speed, compass course, and elapsed time since departing a known position would provide an updated position. In theory that is true, but in practice, the wind, the sea, the earth's magnetic field, and human fallibility introduced too much error into this "reckoning" for it to be any more than an estimate of position, and this error was compounded the longer the vessel sailed away from that initial known position. So, the "DR," as it was usually noted, would be corrected by

[2] Phillip Reid, *The Merchant Ship in the British Atlantic, 1600–1800: Continuity and Innovation in a Key Technology* (Leiden: Brill, 2020), 175–82.

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"observation"—whether that meant the noon sun sight, a sighting of another celestial body, or the distance and bearing of a known landmark. Navigators also applied corrections based on their apprehension of current, leeway (the side-setting of the vessel by the wind and sea), known or suspected errors in the reported compass courses steered by the helmsmen, and variation—the difference between magnetic north and true north, measured as an angle, which itself varied by location on the earth's surface.

With no widely available means of determining longitude with any accuracy, the DR would provide an estimated longitude to go along with the observed latitude; one requires both a vertical and a horizontal point to establish a fixed position on the earth's surface—otherwise, one has only a line of position.[3] Needless to say, the estimated longitude was not nearly as trustworthy as the observed latitude—and every navigator knew that.

The caution engendered by the lack of faith in estimated longitude is evident in the logbooks. When the master believed he was approaching any land, including his intended destination, he grew cautious. He slowed the vessel down by taking off sail. Sometimes he tacked or wore ship—put the vessel through the wind, zig-zagging back and forth—or he "lay to"—put a little bit of sail against a hard-over helm, so the vessel did nothing but scallop slowly along, like a duck with her head under her wing.[4] He might do this, even in good weather, if it would help him avoid closing with the coast at night, when he could not see ahead. This gave him the time to take soundings—cast a lead line to determine if they were coming into shallower water, and if so, what the bottom composition was, which could help tell him where they were, especially how close to shore. The cautions masters took when approaching their destinations, largely out of awareness of the likely error of longitude in their logs, set a trap for historians trying to determine trends in vessel passage speeds over time; how fast the vessel completed a passage, from departure to entering the destination port, was not the same as how fast she could travel through the water.[5]

A vessel could be carried along, or set off her intended course, by a current, but her ability to reach her destination in a timely manner was entirely dependent on the wind, so it is natural enough that the direction and speed of the wind, in the context of general weather conditions, take up so much space in a logbook. We find, in the narrow columns on the left-hand side, wind directions next to courses steered. In the Remarks column, on the right-hand side, only an event of most unusual import could usurp the otherwise-universal place of weather conditions as the first, and most frequent, notations. If we are lucky, we also find frequent records of sail changes associated with changes in wind direction and strength.

One cannot overstate the violence of heavy weather at sea on a sailing vessel of modest size. In the North Atlantic, a vessel making a transoceanic passage could expect to encounter such conditions. From late autumn to spring, there might well have been as much violent weather as moderate. The labour required to work the vessel in such conditions is something we moderns can only dimly imagine. Yet, such labour was all in a day's work for an average North Atlantic sailor, who did it over and over again, carrying out the master's orders to put this up or take that down, tie a reef in that sail or let one out of another. The Remarks column routinely records broken spars, split sails, parted control lines, and worse damage. Occasionally, a man would fall or slip overboard. The

[3] On the quest for longitude, see Derek Howse, *Greenwich Time and the Longitude* (Oxford: Oxford University Press, 2003).

[4] Modern yachtsmen call this "heaving to."

[5] An additional important source of error in historians' estimates of passage times and speeds is introduced by the use of certificates of clearance and entry. Masters would obtain official permission to leave or enter a port sometimes days before or after they actually did so. See David Riggs, "Transportation Efficiency in Eighteenth-Century Merchant Vessels," *International Journal of Maritime History* 33:2 (May 2021), 425–34.

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crew might see him go under, or lose sight of him first. The event would be recorded in Remarks.

## "NOTD": Reading More into the Logbooks

The acronym "NOTD," occurring twice in the log kept aboard the snow *George,* means, I believe, "nothing occurred this day." That, of course, is not literally true; it reminds us that, like any written document, the log contains what its author deemed important enough to include. Excluded by that filter will almost surely be twenty-four hours' worth of interaction and communication between crew members, routine minor adjustments of sail trim (and some major ones), and the interior monologues and free-associative ruminations rightfully beloved of novelists. I added the qualifier "almost" before "surely" because no two logs are alike, and the idiosyncrasies of individual authors vary enough that predicting with certainty what will and will not be found in a given log is impossible. That is one of the compelling aspects of these sources. Fortunately, much that is routine and mundane does find its way into the logbooks. Anything the master or another supervisor has assigned to a group of sailors will likely appear, in a form such as: "People employed making matts" or "People employed scraping the sides." Because log authors typically include large work tasks, as well as incidents of damage, an intact logbook provides a useful maintenance and repair record for the period of time it covers.

It also tells us some things about the crew, although what it does not say is as important as what it does. Historians are accustomed to finding rich source material in legal case records, keeping in mind that legal case records exist only when something is amiss; if everything goes smoothly and everyone is happy, there are no lawsuits. On board ship, if everything is going smoothly and everyone is reasonably happy, the best indication of that is either blank space or something to the effect of "People employed variously." On the other hand, if there is personnel trouble, it will be recorded, unless it is a private matter between crew members that does not reach the attention of the log's author. Discipline and desertions are routinely recorded, along with, in most cases, some indication of the circumstances surrounding them—though a desertion may well be succinctly recorded with no further elaboration: "Robert Jenkins ran."

As a log's author was a person at the top of the ship's hierarchy—a master, commander, or supercargo—his Remarks on interactions with other people will also include those with business and official contacts, such as agents and merchants in both home and destination ports, other ship's officers and crew with whom he might have contact, customs officials, and lawyers.[6] Much of this content provides only clues that prompt the researcher to investigate further: "Dined with Mr. Carroll at his home." Who is Mr. Carroll? What was the relationship between the two?

Again, it is worth keeping in mind that what we think is important and what the author thought was important may or may not coincide. In neither the master's nor commander's logs for July 1770 is there any mention of both men from *Sultana* having dined ashore with a gentleman in Virginia. The only way we know it happened is from the gentleman's—George Washington's—day diary.[7]

[6] If the logbook is part of a collection that also includes the ship's correspondence, those letters can provide great detail about the running of the ship's business, especially letters between masters and owners, highlighting the nature of that relationship, in which masters acted as the business managers for owners in destination ports. Their correspondence includes instructions from owners to masters, setting out the parameters within which the masters were free to act on their own judgement; and, from masters, justifying their decisions to their employers.

[7] Jim Tildesley, *"I Am Determined to Live or Die on Board My Ship": The Life of Admiral John Inglis: An American in the Georgian Navy* (Kibworth Beauchamp: Matador Press, 2019), 138.

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Aside from the human world and the immediate concerns of the weather, logs do occasionally include information about the nonhuman marine world. The log kept aboard *George* mentions a red tide off the coast of Ireland, and that same log contains several mentions of encounters with sea creatures, most of which were fatal—for the sea creatures. Mentions of marine animals provide just as stark a reminder of cultural difference between then and now as records of floggings and enslavement. Dolphins, other porpoises, and sea turtles were, to them, sources of fresh food, and pursued as such. The author of the *George*'s log lists the specific internal organs of a harpooned porpoise that he found particularly tasty.

Cultural differences across time also play out in descriptions of ports of call or passing scenery. As the *George* arrived in the Leeward Islands in late May 1806, the log's author recorded the following observation:

> At 11 Passed the Island of Nevis, which exhibited a beautiful display of West India scenery, viz. Plantations, Rich, elegant and variously colourd agreeable to the Produce & Situation, Sugar Wind Mills & scatterd buildings at the Bottom of Lofty Mountains which projected above the Clouds, afforded a handsome View.

The author lived in a world where the brutal and dehumanising regime of plantation slave labour was a normal part of the colonial landscape. It is not surprising, then, that he did not feel the need to express any opprobrium about that; indeed, in a few weeks, he would agree to take thirty enslaved persons from St. Thomas to Campeche as human freight.

## Cracking the Code: Deciphering the Eighteenth-Century Atlantic Logbook

A key to the shorthand found in a logbook is accessible, though the historian's ability to comprehend the navigation recorded there will depend to a large extent on that person's technical expertise. The importance of such technical expertise to the history of navigation has been noted in scholarly journals; without it, one cannot, for example, reconstruct the voyages of a vessel adequately enough to plot them, or make informed judgements about adjusting such plots for obvious errors in the original source.[8]

Logs vary somewhat in content and format, but not dramatically. I have worked with both merchant and Royal Navy logbooks; significant differences were limited to content in Remarks specific to their respective activities. As noted, the most basic division of each day's entry may be considered "left-hand" and "right-hand"—the left-hand side being the information necessary to construct the DR for the day, given in one- or two-hour increments, and the right-hand side being the Remarks column. Below both is a horizontal row for recording the summary navigational data for the whole day. Without further ado, here is a transcription of one page of the *George* logbook, formatted exactly like the original (see Figure 1).[9]

Taking the left-hand side first, we have abbreviated column headings standing for Hour, Knots, Half-Knots. Since the nautical day begins at noon, the first "2" here is 1400, or 2:00 p.m. ("p.m." stands for "post-meridian," or "after noon"). The middle "12" is midnight, and the final one is noon, which ends the day and begins the following. "Knots" is nautical miles per hour. While we would express "three-and-a-half knots" as

[8] See for example Willem F. J. Mörzer Bruyns, "Research in the History of Navigation: Its Role in Maritime History," *International Journal of Maritime History* 21:2 (Dec. 2009), 261–87.

[9] Text in brackets in these transcription excerpts are my own notations, inserted for clarity or to note an obvious error in the original. The excerpt is from page 66 in the original logbook.

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| H | K | HK | Courses | Winds | Remarks on Sunday 25th May 1806 |
|---|---|---|---|---|---|
| 2 | 3 | 1 | West | East | Begins with Moderate Breeses & clear |
| 4 | 3 | 1 | -- | -- | Weather -- |
| 6 | 3 | 1 | -- | -- | At Midnight Squally with a |
| 8 | 4 | " | -- | -- | heavy shower of Rain -- |
| 10 | 2 | 1 | -- | -- | took in Main Sail & Stearing Sails |
| 12 | 4 | " | W by S | -- | At 4 AM made all Sail, Moderate |
| 2 | 4 | " | -- | -- | Cloudy Weather -- |
| 4 | 3 | 1 | -- | -- | At 9 Made the Island of Deserada [La Désirade] |
| 6 | 3 | " | -- | -- | bearing S by W. Dist 8 or 9 Leagues |
| 8 | 3 | " | West | -- | At Meredian Made Antigua Bearg |
| 10 | 3 | " | -- | -- | W by N Dist 7 Leagues. -- |
| 12 | 3 | 1 | -- | -- | Pleasant Breeses & clear -- |

| Course | Dist | Dif lat | Depar | Lat by DR | Lat by Ob | Mer Dist | Lon made | Lon in | B & Dist |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 16.57 | | | | |

| H | K | HK | Courses | Winds | Remarks on Monday 26th May 1806 |
|---|---|---|---|---|---|
| 2 | | | | E by S | Begins with Moderate Breeses & clear Weather |
| 4 | | | | | At 1 PM Made the NW End of Guadaloupe-- |
| 6 | | | | | At 4 AM passed Dunder Rock [Redonda] remarkable for its |
| 8 | | | | | small circumference & lofty apperance – |
| | | | | | At 11 Passed the Island of Nevis, which exhi |
| 10 | | | | | bited a beautiful display of West India |
| | | | | | scenery,.viz. Plantations, Rich, elegant and |
| 12 | | | | | variously colourd agreeable to the Produce |
| 2 | | | | ESE | & Situation, Sugar Wind Mills & scatterd |
| | | | | | buildings at the Bottom of Lofty Mountains |
| 4 | | | | | which projected above the Clouds, affor |
| 6 | | | | | ded a handsome View – At Meredian |
| 8 | | | | | St Kitts bore NW – Caught a Baracute [barracuda] |
| 10 | | | | | about 3 feet in length – Saw several |
| | | | | | small Craft standing in Various direc |
| 12 | | | | East | tions – light Airs & clear -- |

| Course | Dist | Dif lat | Depar | Lat by DR | Lat by Ob | Mer Dist | Lon made | Lon in | B & Dist |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

**Figure 1.** Transcription of a page from the *George* (ship) logbook 1805–1806, Am .6823, Historical Society of Pennsylvania, p. 66.

"3.5," they were less inclined to use decimals in general; this can in fact be misleading, because what looks like a decimal, as in the "16.57" Lat by Ob entry in the top section of this excerpt, is actually just one of an assortment of punctuation marks, used seemingly at random, to separate the first pair of numbers from the last. Indeed, it is common to see no such punctuation at all; a space serves the same purpose.

This is a good place to point out the rampant inconsistency of eighteenth-century writing. Sometimes it seems as if the author is being inconsistent on purpose; would it not be easier to get in the habit of using the same mark for the same purpose? They did not. Nor can the researcher assume that the same mark in one place means the same thing as it does in another. A good example is the use, in the above excerpt, of quotation marks or ditto marks in the "HK" column. Ditto marks were already in use by this time, so it was reasonable for me to assume that the author was using these as such. It was only

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by adding up the distances for the day both ways—one, assuming these were ditto marks; and two, assuming they meant "0"—that I could determine that, actually, they meant "0." I performed those computations on several examples to make sure the author was, indeed, being consistent.

The double-dashes, which I transcribed as written, may be inferred to be ditto marks; in the Courses and Winds columns, that is the only interpretation that makes any sense. I would never assume that another log author would employ the same marks the same way. It would be necessary to test any and all inferences as best I could.

Courses and Winds are expressed using the 128-point compass, and that is one consistency of eighteenth-century logs. Courses here are courses by the compass, uncorrected. They are expressed as a direction toward which the vessel is steered. Winds are expressed as the direction from which the wind is blowing. A vessel with a compass course of NW (northwest) is being steered toward the northwest, or roughly three hundred fifteen degrees on the 360-degree compass. A NW wind is one coming from that direction.

In our own time, we use the 360-degree compass. They used a compass divided into "points." A point, for reference, is 11.25 degrees. In the excerpt above, "ESE" means East Southeast, and "W by S" means West by South. Trained on the 360-degree compass from an early age, I find it helpful to convert these directions to the system with which I am familiar. It is likely that some experts find this unnecessary; that would save time and effort. However, an advantage of degrees (expressed in decimal format, rather than degrees-minutes-seconds) has the advantage of allowing for calculations, especially automatic ones, such as those Microsoft Excel can perform. For conversion, I use a table in Wikipedia.[10] Occasionally, I have found an error in the original log when it records a direction in this system that is not to be found anywhere in the table. Context is helpful for correcting those.

Once I have both course direction and wind direction for a given time increment, I can make a close estimation of the point of sail—the angle the vessel is sailing to the wind. Even for those not interested in analysing sailing performance, a general understanding of this concept is necessary for grasping the limitations and imperatives of sail power, and thus the structure of the voyage itself. As a general rule, it was difficult for any eighteenth-century commercial or naval vessel to sail any closer to the wind direction than forty-five degrees, and sailing that close tended to be an uncomfortable business, with wind-driven seas hitting the bow of the vessel and the wind creating maximum heeling—leaning—force in the sails, and maximum leeway—side-slippage—through the water. Sailing close to the wind also reduced the vessel's speed from what it would be with a greater angle, and increased the danger of being taken aback in a sudden wind shift; with the sails trimmed as close to the wind direction as they could be and still fill, a small wind shift could put that wind on the other side of those sails, back-filling them and stopping forward progress. Without momentum to move water past the hull and rudder, a sailing vessel will not respond to her helm; she is temporarily out of control. Being taken aback was also likely to cause shock-induced rig damage.

Sailing vessels preferred, then, to sail downwind if at all possible, sailing upwind only when necessary. The ability to sail into the wind was, indeed, necessary for manoeuvring in tight quarters and avoiding dangers such as a lee (downwind) shore or reefs, but it was an exhausting and slow way to make passage. Thus, all the favoured ocean sailing routes offered consistent downwind sailing. In the Atlantic, that meant the prevailing westerlies, curving eastward from the northeast coast of North America toward northern Europe; and

[10] The table may be accessed at https://en.wikipedia.org/wiki/Points_of_the_compass. Scroll down the page to "Naming of points on 128-point compass," and click "[show]" to expand the table. Note that the table presents multiple alternatives for each row; these are explained above the table.

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the Trade Winds, offering steady and sufficient propulsion from the west coast of Africa to the Caribbean. The Atlantic is naturally traversed in a clockwise direction by wind-powered vessels. Sailing from northern Europe to New England, then, as *Sultana* did in the late summer and early autumn of 1768, was a "wrong-way" passage, requiring sustained upwind sailing against the prevailing weather in the North Atlantic. That is why her westward passage took twice as long as her later eastward return.

Masters thus had to make sailing decisions that took into account the impossibility of sailing too close to the wind, and the desirability of sailing at an angle to it of at least 90 degrees but preferably short of 180, at which point the vessel's speed would drop somewhat, as some sails were shadowed by those behind, and the vessel took on some amount of a corkscrewing motion notorious for inducing nausea, a word that shares its root with "nautical." Running dead downwind, like sailing close upwind, also exposed the vessel to the chance of having the wind suddenly shift to the other side of the sails, transmitting a shock to the rig. In a severe storm, however, this point of sail was a common survival tactic, when no other options remained. In such cases, however, the vessel would likely have no sail up, and be running "under bare poles."

## The Remarks Column: Details and Valuable Incidentals

With some understanding of the physical imperatives dictating the course of the voyage, the researcher is better equipped to understand what is recorded in the Remarks column to the right—a feature universal in eighteenth-century logs, both commercial and naval. The first important ingredient here is the weather; the terminology they used is not what we use now.

### *The Weather*

As the wind was the vessel's power source; and, at the same time, a potential lethal threat to all on board, it is no surprise that logbook remarks give pride of place to it. The Remarks columns of logbooks contain wind and weather information valuable enough to be mined by today's climatologists; but, just as with directions in the 128-point compass system, researchers need to have a good idea of how to interpret the terminology before taking advantage of what we find here.

The Beaufort scale of wind strength, named for the Royal Navy admiral of that name, was first devised by him in 1805, at the same time the voyages of the *George* were recorded in the logbook discussed here, but not adopted until the 1830s. Until then, descriptions of wind and weather were somewhat idiosyncratic, like other elements we have already discussed. I found it helpful, in analysing the logbooks of *Sultana,* to compare wind descriptions with sail changes, and then to discuss those with the captain of the replica *Sultana* for cross-reference. Even then, I refrained from assigning fixed values, in knots of wind speed, to the descriptive terms found in the logs. Inference always increases the chance of error. Instead, I kept those terms intact, and ranked them, as best I could, in increasing order of intensity, acknowledging that some of them were likely partially or completely interchangeable and that there was certain to be some overlap. The resulting list is as follows:

a-Calm
b-Light airs and calms
c-Light airs
d-Light breezes and calms
e-Light breezes mixed with calms

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f-Light winds mixed with calms
g-Light breezes
h-Light breezes with lightning and rain
i-Light breezes, squall
j-Moderate breezes
_____light air
k-Moderate
1-More moderate
m-Fresh breezes and calms
n-Fresh breezes
o-Strong breezes
p-Fresh gales
q-Fresh gales with lightning
r-Fresh gales and squally (considered bad weather)
s-Strong gales
_____moderate air
t-Strong gales and squally
u-Hard squalls
v-Hard gales
w-Hard gales with thunder and lightning
x-Hard gales and squally
y-Very hard gales
z-Very hard gales and squally
_____ bad weather

Based on the sail changes recorded for these weather conditions, and in order to derive meaningful interpretations from an analysis of the relationship between the two, I divided the above descriptors into light air, moderate air, and bad weather. The list of terms presented this way may give the misleading impression that this is more precise than it is. "More moderate," for example, is a term relative to the conditions directly preceding its use. It was clear to me from context, however, that the conditions it consistently described were, indeed, best characterised as moderate.

It is worth specifically noting that the word "gale" did not mean to them what it does on the Beaufort scale, and thus to us. It had a wider range of meaning, from what we might consider "windy" to storm conditions. The other important specific term here is "squall," which mariners still use in the same way; it means a thunderstorm—localised, bringing gusty winds, lightning, and, usually, brief heavy rain. Squalls quickly and significantly increased the risk of rig damage, both from strength and unpredictability of direction, and they reduced or eliminated visibility for their duration. The logbooks make clear that the crew tended to work the hardest in squally conditions, as they had to make frequent and frequently drastic sail changes.

Log authors also noted sea state in the Remarks column. A "heavy sea running" means that high waves, generated by high winds either nearby or farther away, were moving through. These may well have dictated what courses the vessel could take, as they could make some headings severely uncomfortable, cause the ship to work so much that she began to leak, or even come aboard, over the deck, perhaps causing a knockdown—a partial capsize onto her side, from which she might recover or not. In severe storm conditions, the vessel might have been forced to run downwind, with the waves, but then, she risked being "pooped"—having a wave from astern come aboard, slewing her sideways so that she was broadside to wind and waves, and highly likely to be knocked down. In the worst of seas, she could even be "pitchpoled"—the wave astern could tip her

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up so that her bow buried itself in the trough ahead, and the wave behind could then flip her end-over-end. That was a fatal occurrence; it would be highly unlikely that anyone would live to report that their vessel had been pitchpoled.

Another common storm tactic recorded in the log—and also used for slowing or stopping progress near shore—was lying-to. How exactly the master chose to do that depended to some extent on the sea state and direction of wind and waves. These considerations are consistently recorded in Remarks.

Finally, gear breakage, damage, and repairs were consistently recorded. I was able to compile a table of *Sultana*'s repairs and maintenance over the four-and-a-half years of her service from her logs. Even the casual reader can get a clear sense of the frequency of such occurrences, and their relationship to weather conditions. Mishaps involving minor collisions with other vessels in crowded anchorages are also commonly noted.

### *Interesting Incidentals*

Any information in Remarks that is not directly related to the progress of the voyage and the conditions directly influencing that progress was incidental to the original author, though it may be of principal interest to some researchers, and contributes much to making these logs such rich resources. In the excerpt above, for example, the first day's entry contains nothing but weather and navigational information; on the second day, the author pens his description of the scenery he observed while passing close to Nevis in the Leeward Islands. A writer familiar with what the author describes could recreate the scenes here faithfully, in descriptive language.

In a merchantman's log, much of the extra-navigational material in the Remarks column will be directly concerned with the ship's business. In a naval log, there will be considerable information about operations, the specifics depending on what the vessel is employed doing—fighting, intercepting merchantmen for customs enforcement or the taking of prizes, surveying, and so on.

## The Bottom Lines: Understanding the Day's Navigational Data

In the later section on plotting a voyage, I will explain how the daily navigational data entries are derived, and how to estimate them if they are missing. Here, I will explain what they mean.

The "Course" entered at the bottom left of the *George*'s log excerpt is based on all the courses steered that were recorded for the day, but corrected for variation, leeway, and any other factors of deviation the master may have deemed relevant. The "Dist" (Distance) here is the total distance run in the twenty-four hour period, in nautical miles. "Depar" (also sometimes abbreviated "Dep") is Departure, which is one leg of the basic navigational right triangle. "Dif lat" means difference in latitude, and records the difference between the navigator's best estimate of yesterday's latitude and today's. "Lat by DR" means latitude by dead reckoning, which is calculated using the data recorded in the upper left-hand side of the day's entry. "Lat by Ob," on the other hand, is latitude calculated from either a celestial sight or a bearing and distance from a known fixed object. It is thus more reliable than Lat by DR. Any difference between the two is a good indication to the navigator of the error in his DR.

The next three entries have to do with estimating longitude which, as discussed, was far less reliable than estimating latitude. "Mer dist" means meridian distance, and it is a running total of the nautical miles of longitude run. That means that when the longitudinal direction reverses, such as from west to east, the number moves in the other direction too. "Lon made" is the difference, in degrees and minutes, between the estimated

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longitude for the day before and that of the current day. "Lon in," or longitude in, is the estimated longitude, again in degrees and minutes (a degree contains sixty minutes; a minute contains sixty seconds). As noted, there is no consistency in the use of punctuation to differentiate degrees from minutes. It may be a period: 2.59; a dash: 2–59; a comma: 2,59; double comma: 2,,59; or a space: 2 59. The entry right next to it may employ a different mark. In the *George/Reward* logbook, this is all seemingly random. Finally, we have "B & Dist," bearing and distance, for use when such a desirable line of position was obtainable.

The reader will notice, however, that on the first day of the excerpt above, only one of these items—Lat by Ob—is recorded; and on the second day, none are. This is why I had to reconstruct all that data from the information in the other parts of the log. More on that in the section on plotting a voyage.

## Commercial Versus Naval Logbooks

I have not worked with naval logbooks from vessels in active combat; that is outside my purview of interest. I will speak to those I have worked with: those of His Majesty's Schooner *Sultana,* working in dispatch and customs enforcement on the North American Station 1768—1772. As was standard on naval vessels, *Sultana* had a commander—the commissioned officer in charge of carrying out her orders—and a master and pilot, a warrant officer in charge of her sailing operation and day-to-day navigation. Both of their logs survive in their entirety. They are similar, though the master's log contains somewhat more sailing details than the commander's. I should note that the logs do not always agree; it is obvious that one was not copied from the other, and their points of divergence, though minor, offer the researcher the opportunity (and obligation) to think about why such differences might exist, and where errors or differences of judgement may lie.

The Royal Navy was easily one of the largest and most complex bureaucracies on earth, and its policies and procedures were unusually standardised for the time. Muster books, in which commanders recorded who was on board, and in what capacity, as well as who had deserted and who owed what for items purchased from the ship's stores, were preprinted with the lines and column headings. These records, invaluable in themselves, were sent ashore to be checked by those responsible for the Navy's accounts. On the other hand, the logbooks of *Sultana*'s master and of her commander were, like those of *George/Reward,* drawn by hand. The navigational data for the day was all combined on one row on the left-hand side, with Remarks taking up the right-hand side, as with the mercantile log.

## The Perennial Challenge of Transcription

The primary challenge in interpreting the log of *Sultana*'s master and pilot, David Bruce, was transcription. Reflecting the social-class differences of commissioned versus warrant officers in the Navy, Lieutenant Inglis, the commander, was obviously literate; his biographer tells us that he attended the Philadelphia school that eventually became the University of Pennsylvania.[11] Bruce, on the other hand, was barely literate, relying largely on phonetic spelling, as was so typical of non-elites in the eighteenth century; in all probability a Scot, he struggled with the place names of North America, largely corruptions of indigenous words, and ships named for Greek gods and Biblical Hebrews. His handwriting was terrible, probably exacerbated by the hurriedness with which he had to make his

[11] Tildesley, *Life of Admiral John Inglis*, 14.

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entries, and perhaps too by the motion of the little vessel. Merely reading and understanding the log required a much greater investment of time and effort than would be required for reading something of the same length and scope of content written in clear modern English. However, experience has convinced me that the process of careful transcription yields benefits beyond the extraction of concrete information from the source. In attempting to interpret place names, the names of other ships, and even standard nautical terms that were difficult to make out, I learned, much more thoroughly, the world in which Bruce was writing his log. I had help with this; a native English mariner helped me with landmarks along the south coast of England, used by Bruce and Inglis—and countless other mariners—to pilot the English Channel.[12] That, in turn, allowed me to follow their route on a chart, and check my plot against the bearings and distances recorded to those places in the logs. My need for expert help there brings up another important point about transcription: it is a difficult task to do well in the absence of some prior expertise in the subject matter. Someone not already familiar with nautical terminology, with the basic concepts of piloting, navigation, and operation, would be hard-pressed to read one of these logs; whereas someone equipped with such understanding is in a good position to solve puzzling bits of handwriting using context. As with transcription in general, a familiarity with the grammatical conventions and punctuation habits (such as they were) typical of the time and place also helps.

I am firmly convinced that to extract full value from one of these logbooks requires commitment to transcription. The researcher who has to type out what the log says, word for word, cannot avoid all the judgement calls required in any transcription; and thus cannot avoid finding out what is not immediately apparent. That is true whether or not the researcher has any interest in using the navigational data in the log to reconstruct a voyage.

## Plotting Atlantic Voyages from Eighteenth-Century Logbooks

An important component of the GSR database project, as other articles in this issue make clear, is the plotting of the voyages recorded in the logbooks. Any sort of step-by-step guide to that process would be a full-length article in itself; here, I will note some important considerations, and what this process contributes to understanding the eighteenth-century human Atlantic.

First, the obstacles: even with the benefit of a logbook containing full navigational data, the researcher's judgement will be called upon constantly, as with transcription. With *Sultana,* not only did I have one logbook with complete data; I had two. Still, plotting the schooner's passage out of the English Channel and into the Atlantic to begin her westward crossing, adhering faithfully to the positions recorded, put her on land in northwest France. That, obviously, was impossible. Where is the error? Is that even possible to determine after the fact? In this instance, it was not. This forces us to think about how masters and commanders used these logs; what faith did they routinely place in their own reckonings and observations, and how did they guard against falling victim to potentially fatal error? In this case, there is no mention in the logs of straying dangerously close to the French coast; it is safe to assume that the schooner tacked her way out of the channel with no close calls. My judgement call was to move the plotted track north and westward; and to think about why that was necessary. We know that, unfortunately, navigational errors did indeed lead to disaster. I found many instances in *Sultana*'s logs where Bruce's and Inglis's recorded positions did not agree; both could not be correct. Sometimes, the Remarks column provided clues, such as mention of an off-setting current and the correction made to the DR accordingly.

[12] Thanks to Nick Burningham.

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With the log of the *George/Reward,* as is obvious in the excerpt included above, most of the summary navigational data was left out much of the time. The author of this log was a supercargo, not the master, and therefore this was not the primary navigational log of either vessel.[13] It is, however, what we have; to plot the voyages contained therein, I had to determine a way to reconstruct them, using the information at hand.

I was trained in modern piloting and navigation, not eighteenth-century piloting and navigation. Basic concepts convey, but basic techniques differ. I had to consult secondary sources to interpret the summary data column headings, and to learn indispensable facts, such as that the courses recorded throughout the day were compass courses, whereas the course-made-good—the course recorded at the bottom, for the entire day—was corrected for variation.[14] Variation—the difference between the direction of the magnetic north pole and the geographic North Pole—can be over twenty degrees in the North Atlantic; failing to account for it could put the vessel's estimated position so far off as to be useless. It also changes as the vessel's position changes, so the correct estimated value must be looked up using an estimated position. Fortunately, the U. S. National Oceanic and Atmospheric Administration maintains an online calculator using a model dating back to 1590.[15]

Through trial and error to determine what yielded plausible answers, and comparison with examples mentioned in secondary sources, I was able to determine that the method used in this logbook was "plane sailing"—computing position each day using the plane right triangle. This is simple to visualise: for every shift in position from one place to another, regardless of the direction of travel, there is a vertical and horizontal component; the vessel moves up and over, or down and over. Those two components form the two straight legs of a right triangle—a triangle in which those two legs form a ninety-degree angle. The hypotenuse—the diagonal line connecting the two straight legs—is the distance travelled on the course-made-good (expressed as an angle). While it is true that the surface of the Earth is curved, not flat, the error introduced by assuming a plane rather than a spherical triangle is too small to be significant as long as distances are limited to a few hundred miles. Since an eighteenth-century sailing vessel was doing well to make more than a hundred miles a day, that was not a problem. The basic trigonometric functions, then, could solve the triangle, allowing for the combining of the various courses steered throughout the day into one average course-made-good, and the adding-up of the distances for each leg by multiplying the knots (nautical miles per hour) by the number of hours (two, in this log). This provided the values needed to use those trigonometric functions. In the eighteenth century, tables of those solutions—called traverse tables—were carried aboard. With a modern computer at hand, though, I set up auto-calculations in an Excel spreadsheet, after consulting my own set of traverse tables as an orienting reference.[16]

Generating the data I needed to reconstruct the *George/Reward* voyages took three weeks of full-time, mentally exhausting work, and I may never repeat the exercise; it

[13] Authorship cannot be determined from the log itself; it is unsigned, and the provenance of the logbook was not clear when it was acquired. However, vice-admiralty court records of the case resulting from the *George*'s seizure and condemnation survive in the National Archives (TNA HCA 42/419/477, Manuscript prize appeal No 477; HCA 44/56 Assignation book, recording process and decrees in prize appeal sessions, 1807 Apr 7–June 13). These reveal that the supercargo was Samuel Guirey, nephew of the *George*'s owner, John Towers of Philadelphia.

[14] Peter Reaveley, "Navigation and Logbooks in the Age of Sail," https://web.archive.org/web/20150217124507/http://www.usna.edu/Users/oceano/pguth/website/shipwrecks/logbooks_lesson/logbooks_lesson.htm, accessed 8 March 2024.

[15] https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml#declination, accessed 11 April 2022.

[16] Among other sources, these may be found in the *American Practical Navigator,* originally written by Nathaniel Bowditch (1773–1838), and updated and reissued ever since by the U.S. Government (Pub. No. 9, Volume II, Defense Mapping Agency Hydrographic/Topographic Center, 1981).

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reminds me of carefully crafting a set of moulds for a fibreglass boat, and then only using them to make one hull. That analogy fails, however, when I consider what I learned about how the daily navigation of these ordinary trading vessels worked. I had to make the calculations myself, and evaluate their reliability. I had to compare them with those from the sections of the log where the original author provided them. When I finally got to the point where I could plot the voyages, the obvious errors revealed a situation more complex than simply my work being wrong: the voyage for which the author provided full data put the vessel at least one hundred miles too far west toward the end of the voyage, and I had to think about why that was. My own plot, from Jamaica to New York, looked good until the *Reward* turned northeast after coming out of the Yucatan Passage around the west end of Cuba; it then turned north too early, sending the vessel across the Florida peninsula, and, while moving over open water again, turned west too early, with the final position in the mountains of West Virginia. Only with these plots laid out on the chart could I begin to compare them with what the currents were likely doing to create growing divergence between estimated and actual position. Only then could I see for myself how dangerous the inability to accurately fix longitude could be to these vessels and their crews. Yet the *Reward* did not crash into Florida or Maryland's Eastern Shore, just as *Sultana* did not crash into Brittany. The masters knew what they were doing; they knew how much to trust what they wrote down in the log, and how much to trust what they did not. Unfortunately for us, what they did not record in the log is what we as researchers have to learn about their navigation. As Willem Mörzer Bruyns argued, advancing the history of navigation requires the acquisition of technical expertise on the part of historians of navigation.[17]

## Analysing Sailing Performance and Operation

Mining a logbook for insight into eighteenth-century navigational practice requires the acquisition of some technical expertise. Mining one for insight into operating an ordinary period sailing vessel requires the same thing. In my experience, such an effort proceeds in three stages. First, the researcher goes into the logbook with a working knowledge of how these vessels worked. This is not the knowledge of a professional: the knowledge of, say, the master of a period replica vessel. It is adequate, though, to understand the terms used, and to be able to make sense of the correlations between recorded conditions, navigational objectives, and operational decisions: sail changes, changes in course, the shifting of ballast and cargo for weight redistribution, storm tactics. The second stage is processing the log: first transcribing, and then attempting to make the correlations above. The log will not provide all the information one could want for doing this; it will not, for example, make completely clear how shifts in the wind correlate with sail changes. It will not provide exact correlations between course steered and wind direction at the same time; exact point of sail at that time will thus remain elusive. My experience with *Sultana*'s logs, however, taught me that these correlations may be guessed at with enough certainty so as to be useful. That in itself was instructive. I was able to construct tables of such correlations for *Sultana,* and those in turn led to questions about why some decisions were taken in some specific circumstances. The third stage of the process was, then, to discuss these questions with those whose expertise far exceeds my own, and always will: professional mariners, some of whom have spent decades at sea on traditional sailing vessels. These discussions were mentally challenging, but they resulted in a level of understanding of how *Sultana* behaved at sea, and why her crew worked her as they did, that surpassed anything I could have arrived at on my own. They contributed to

[17] Mörzer Bruyns, "Research."

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interpretations I could present in the book I wrote on *Sultana* that are more sophisticated than what is usually found in the historical literature, yet written in language accessible to the layperson. We cannot work on these subjects without technical expertise, but our own technical expertise will rarely if ever prove adequate to fully exploit all of what these logbooks can teach us. Collaboration with those who possess the expertise we do not is the only way to do that. Our own expertise does, however, equip us to understand and use what those consulting experts are telling us.

## Summary: What Can We Find in an Eighteenth-Century Atlantic Logbook?

As with other eighteenth-century primary source documents, these logbooks have much to tell, and much more to suggest; they were not written for posterity, but for a more immediate purpose. Their most obvious contributions are to the history of navigation, vessel operation, and climatology; but they should not be overlooked by scholars interested in other aspects of the eighteenth-century Atlantic. They contain observations about marine wildlife, geography, harbours and towns, social and cultural attitudes and assumptions, warfare, maritime predation, and commerce. Real life is full of the unexpected, of random happenings, and logbooks are too. *Sultana*'s logs tell of the murder of a Cherokee in Virginia by a white man, as the schooner was charged with transporting the accused for trial. They tell of four wretched "lunatics," whom they also transported, as there was no place to house them in Williamsburg, Virginia, but the jail. The *George/Reward* logbook describes the scenery of the West Indies plantations, and offers a basic account of the acquisition and attempted disposition of thirty enslaved people. It recounts the attendance of the author at a musical performance in Kingston, describing the venue as charming and the performance as disappointing. He records a poignant note about the poverty in Cork, Ireland, struck by the throngs of beggars waiting outside the door of every church as services let out. Often, these details offer enough information that the researcher can pursue supplementary sources to fill in what is left out.

## Supplementary and Complementary Sources

Nontraditional sources can also prove useful. I have had more success than I expected entering terms from the logbooks into a Google search box and exploring results. For example, I found a description of the entertainment venue in Kingston mentioned in the *George/Reward* log on the website of a local amateur historian there. Should I choose to, I can now, armed with the name of the place and its brief history, make an archival inquiry much more likely to yield results in a timely manner than I could have without such information.

For commercial voyages, historians interested in maritime commerce can search for the port records recording the entry and clearance of the vessel at its points of origin and destination. These will provide details about the vessel itself, its cargo, and its crew that will likely be missing from the logbook. Not all of these port records survive; archivists in the port or at national repositories should know which ones have, and where they are. I have found that it may require several steps, starting locally, to ascertain that.

For naval logbooks, muster books are invaluable records of personnel matters, even recording the ages and birthplaces of the crew members, as well as their conduct while in service, wages, and expenses. I made an extensive analysis of these for *Sultana*.[18] I would also point out that the United Kingdom Hydrographic Office retains a large

[18] TNA ADM 36/7269, Royal Navy Ships' Musters (Series I) Ship SULTANA Type Schooner, 1768 Jul–1770 Dec; TNA ADM 36/7270, Royal Navy Ships' Musters (Series I) Ship SULTANA Type Schooner, 1771 Jan–1772 Dec.

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collection of the sailing and piloting directions required to be kept by Royal Navy commanders on foreign service, describing the ports of call visited, including what provisions and services were available, what defensive installations were to be found, and what maritime commerce went on there. I used digital images of those kept by Lieutenant Inglis.[19]

Depending on the researcher's specific interests, references in the logbooks might lead to newspapers, legal records (in the case of the *George,* vice-admiralty court proceedings), merchants' correspondence, or other logbooks. For me, *Sultana*'s logbooks, which spanned four-and-a-half years, provided the bulk of the source material I needed for a monograph. The *George/Reward* logbook, spanning only ten months, will yield a full-length article with a rich narrative, providing enough contextual clues for the location of helpful primary and secondary sources to flesh out the detailed story of an ordinary vessel and her crew navigating the hazards of the British Atlantic.

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[19] United Kingdom Hydrographic Office, Miscellaneous Papers Volume 26 Item 29, Individual pages for: HMS Sultana, 1768–1770; Miscellaneous Papers Volume 26 Item 30, Individual pages for: HMS Sultana, 1769–1772.

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