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Who or what sank HMS *Sirius* at Norfolk Island in 1790?

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Introduction

Great Britain's establishment in 1788 of the New South Wales Colony in the South Pacific was arguably the most successful colonisation venture ever undertaken by any nation. However, in March 1790, less than two years after the arrival of the First Fleet on the east coast of Australia, the very existence of the colony was put in jeopardy by the wreck of HMS *Sirius*, principal consort to the First Fleet and chief protector of the colony. The vessel struggled to get off a lee shore, failed to tack and was driven aground. Was it due to the incompetence of the Master or a performance deficiency of the vessel? The vessel's stability, power to carry sail and ability to manoeuvre may have been compromised by offloading of ballast. Examination of the naval architectural aspects of this event will help to explain one of the most controversial maritime incidents surrounding the British colonisation of Australia. In this project a combination of historical and scientific method will be used to explore the reasons for the loss of HMS Sirius.

Traditional arguments

Eighteenth century observers and modern historians, commenting on the reasons for the loss of HMS *Sirius* at Norfolk Island after it became embayed, failed to tack, and ran onto a reef, have pointed to sea conditions (an onshore, shifting wind and onshore current), and hinted at culpability on the part of people there at the time, namely Norfolk Island's Lieutenant Governor, Philip King, who hoisted a signal in the bay indicating that it was safe for boats to bring provisions ashore, and Captain John Hunter. In regard to Hunter, historian John Bach wrote:

> …the master of a sailing vessel had to get a job done and usually had to strike a compromise between excessive caution and obvious rashness. To put it more bluntly, danger could always be avoided by staying hove-to at sea or by remaining on one's moorings, but in both cases the ship would have been rendered useless for the particular project in hand.

An alternative argument

Hunter was court-martialled, as was usual when a Navy ship was lost, and acquitted of all blame. So a later comment by King is of interest. Writing to the Navy Board about the importance of correct ballasting of ships to stiffen them sufficiently to enable effective steering and to avoid going ashore, he went on to say, 'the *Sirius* was lost from not answering her helm', that is, from not being able to be steered through a tack. King was suggesting an unmanageable vessel, pointing the finger not at Hunter, but at some aspect of the ship, or its fitout. Because King was generally negative about the *Sirius*, this comment about its steering has not attracted attention. Historians have assumed it failed to tack simply because of environmental conditions – the wind turned onshore at the wrong time. King however was effectively saying that *Sirius* was cranky, or unstable. Falconer, in his 1780 *Dictionary of the Marine*, defined crank as the quality of a ship, which for want of a sufficient quantity of ballast or cargo, is rendered incapable of carrying sail without being exposed to the danger of oversetting. Instability in square rig ships can make steering difficult.

King later wrote to Sir Joseph Banks about HMS *Porpoise*, another Navy ship that came to grief off the east coast after failing to tack, warning that it was a bad sailer and extremely cranky, not answering its helm. He elaborated several days later,

> …the *Porpoise* would neither sail nor steer going large, and … when beating to windward … fell bodily to leeward, while every other vessel was carrying a proper sail for the weather, and getting fast to windward.

Why might *Sirius* have been in want of sufficient ballast, or cranky? Dockyard officers at Deptford knew how much iron ballast in the form of Kentledge (rectangular blocks fitted snugly together) was necessary for a ship to maintain correct balance (and steerage) while sailing. Navy ships were assigned ballast plans according to rate. In 1782 the 511 ton Navy storeship *Berwick* carried 80 tons of iron ballast and 40 tons of coal, which clearly suited it well during performance trials, the dockyard official noting, 'she soon answers her helm and is quick about and makes just little way'.

During the 1786 refit which transformed the *Berwick* into the 20-gun 6th rate warship HMS *Sirius*, an upper deck or spar deck was built over the main deck, raising the centre of gravity. The hold was cleared and Captain Arthur Phillip, anxious to maximise stowage of provisions for the new colony, replaced just 28½ tons of iron ballast, later supplemented with approximately 90 tons of the less stable, less compact, shingle ballast and coal. The Agent for Transports, Captain George Teer, explained to the Navy Board:

> …the proportion of iron ballast warranted for the *Sirius* was 80 tons, the quantity supplied her when fitted from hence in 1782, of which they have received but 28½ tons, optional in her Commander, who at the time [it] was taken on board observed if that was not sufficient he would apply for more.

Two days later Teer had more to say on the subject:

> … she was governed by no proportion, her supply of all kinds of stores being entirely at the will of Captain Phillip and therefore we did not think it necessary to acquaint you with the ballast he thought proper to take short of what she was before supplied with as a common storeship.

Phillip then added an extra 20 tons of Kentledge, making a total of 48½ tons of iron ballast. As the Senior Captain and Governor designate of the proposed British penal colony of New South Wales, Phillip, through a desire to maximise the supply of provisions for the men and women under his command, ignored the established ballast plan for HMS *Sirius* knowing that Second Captain Hunter, once in the antipodes, would not have been able to source Kentledge. So the question arises: does the historical record and archaeological evidence support *Sirius* having been insufficiently ballasted on 19 March 1790, resulting in it failing to answer its helm?

During the on-site survey work in the 1980s, a detailed seabed count was made of the ballast blocks on the wreck, and an assessment made of their weight. Of the original 80 tons of Kentledge, just 215 pigs, weighing a maximum of 35.8 tons, have been accounted for on the seabed and the island, indicating that Captain Hunter removed more of the Kentledge, to make room for provisions on the voyage to Norfolk Island.

Naval architect input required

How great a deficiency of ballast would it take for *Sirius* to become unmanageable in circumstances such as it faced at Norfolk? Naval architects at Greenwich University (UK) have generated a digital model from the lines of the Sirius using Delftship software. (https://www.youtube.com/watch?v=TCOmPcBZv58). Our aspiration now is to have the digital model used to show the ability or inability of the *Sirius* to tack under the sea conditions at Norfolk Island on the day of the wreck. There are three components to the project:

1. Calculation of the hydrostatic stability of the vessel

This is a relatively straightforward process of determining the righting moment curve for the vessel from the available Delftship lines plan. However, it is complicated by the challenge of estimating the mass distribution of the vessel from limited historical records. The answers will help determine whether the vessel was operating in a catastrophic load condition, and will also provide vital input into the second stage of the project.

2. Prediction of windward performance

Having established the stability characteristics, the resistance, side-force and sail forces have to be modelled in order to solve the quasi-steady state equations. This is usually achieved using a Velocity Prediction Program (VPP). However, the semi-empirical algorithms found in most VPPs are for modern sailing vessels; they will need review and modification in order to work for older vessels. The resulting output of windward performance will indicate whether such a vessel could have sailed off a lee shore.

3. Prediction of manoeuvring performance through a tack

The dynamic process of tacking requires a different approach to the quasi-static VPP solution. The VPP output would assist with manoeuvring prediction, but it is possible that a manoeuvring model could be developed independently of the VPP modelling.

Are there any naval architects out there willing to help us by tackling one of these three components? Each component would make an excellent student project; indeed the application of forensic archaeology and maritime engineering skills to the entire problem make this a very exciting postgraduate research topic. Interested? Contact either:

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