Journal of Historical Geography xxx (2017) 1–12

Contents lists available at ScienceDirect

Journal of Historical Geography

journal homepage: www.elsevier.com/locate/jhg

Fuelling mobility: coal and Britain's naval power, *c.* 1870–1914

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ARTICLE INFO

Article history:
Received 29 April 2016
Received in revised form
20 April 2017
Accepted 26 June 2017

Keywords:
Mobility
Fuel
Coal
Oil
Royal Navy
British Empire
Contingent mobilities

ABSTRACT

This article considers the introduction of steam powered warships to the Royal Navy to show how oceanic mobility in the late nineteenth and early twentieth centuries was contingent on the global availability, and consequently mobility, of coal. Whilst the introduction of steam technology may have freed warships from the vagaries of wind and tides, the navy was now chained not just to coaling stations, but also to the wider infrastructure which guaranteed coal's movement to these stations around the globe. Thus, the ability to control both the source of the fuel and its movement was crucial to the mobility of British naval vessels tasked with protecting British interests worldwide, and was, therefore, central to British global power. This article explores how the navy ensured the availability of high quality steam-coal at British overseas stations, analysing the processes involved in sourcing high quality coal for naval ships and its transportation overseas. It also shows how the admiralty sought to make such arrangements more professional, and to guarantee the highest quality of coal at every station. It explores how these changes ensured that the infrastructure remained remarkably robust, despite its complex nature. It then assesses how Britain's rivals failed to achieve the same control over fuelling in the age of the coal ship, offering Britain a huge advantage in the wider world. Finally, the paper considers the ramifications of Britain losing this advantage when it switched to oil. Overall, it argues that, although generally ignored, fuel, and particularly the ability to control its global movement, is crucial to understanding naval mobility. This, of course, is true not just in terms of the navy, but also applicable to other significant geopolitical contexts and processes.

In the last fifteen years scholars have become increasingly interested in shifting seas and oceans 'from the margins to the centre of academic vision'.[1] Such a focus has produced many interesting avenues of research, showing how an oceanic framework can reveal previously hidden networks, connections and experiences. Perhaps unsurprisingly, many of these have assessed imperial themes.[2] Furthermore, new concepts and ideas about mobility have also taken a watery turn, and arguments have been made for the importance of understanding the processes of mobility within the framework of the oceans.[3] In terms of the age of steam, work by Frances Steel, Valeska Huber and Anya Anim-Addo has brought oceanic mobility in the nineteenth century to the attention of scholars.[4] Yet whilst this work has added enormously to our understandings of imperial networks, more-than-human geographies of the sea and circulations, little of this new focus on mobilities has been aimed at state power in the nineteenth century, particularly through the navy.

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[1] K. Wigen and J. Harland-Jacobs, Guest editors' introduction, *Geographical Review* 89 (1999) ii. See also, P. Steinberg, *The Social Construction of the Ocean*, Cambridge, 2001; D. Lambert, L. Martins and M. Ogborn, Currents, visions and voyages: historical geographies of the sea, *Journal of Historical Geography* 32 (2006) 479–493; K. Peters, Future promises for contemporary social and cultural geographies of the sea, *Geography Compass* 4 (2010) 1260–1272; J. Anderson and K. Peters (Eds), *Water Worlds: Human Geographies of the Ocean*, Farnham, 2014.

[2] For an introduction to the 'mobility turn' and 'the new mobilities paradigm', see J. Urry, *Mobilities*, Cambridge, 2007. For Atlantic histories, see D. Armitage and M.J. Braddick, *The British Atlantic World, 1500–1800*, Basingstoke, 2002; J. Greene and P. Morgan (Eds), *Atlantic History: A Critical Appraisal*, Oxford, 2009; B. Bailyn and P. Denault (Eds), *Soundings in Atlantic History: Latent Structures and Intellectual Currents, 1500–1830*, Cambridge, MA, 2009.

[3] See, for example Anderson and Peters (Eds), *Water Worlds*; A. Anim-Addo, W. Hasty and K. Peters (Eds), *The Mobilities of Ships*, London, 2015.

[4] F. Steel, *Oceania Under Steam: Sea Transport and the Cultures of Colonialism, c. 1870–1914*, Manchester, 2011; V. Huber, *Channelling Mobilities: Migration and Globalisation in the Suez Canal Region and Beyond, 1869–1914*, Cambridge, 2013; A. Anim-Addo, 'With perfect regularity throughout': hybrid geographies of the Royal Mail Steam Packet Company, in Anderson and Peters (Eds), *Water Worlds*, 163–176. Interestingly, studies of military mobilities have tended to concentrate on air and land forces. See, for example, C. Kaplan, Mobility and war: the cosmic view of US 'air power', *Environment and Planning A* 38 (2006) 395–407.

http://dx.doi.org/10.1016/j.jhg.2017.06.013
0305-7488/

Scholarship which does focus on the steam navy has often been concerned with the effect that new technology had on the speed, convenience and efficiency of ship movement, and especially those movements which allowed the imposition of power. This is perhaps understandable. One only needs to think about 'gunboat diplomacy' to understand the effect that technology could have in achieving Britain's imperial aims. Furthermore, the navy was key to Britain's comprehensive command of shipping routes worldwide, the lifeblood of its power in the late nineteenth and early twentieth centuries. Yet little consideration has been given to the factors which allowed these ships to be mobile. In most histories of the navy, it is the advantages of perpetually improving ship technology, alongside huge increases in ship numbers, which have attracted the most attention, assessing the effects of the technological evolution of warships without ever considering the enormity of the infrastructure required for these ships to function, particularly abroad.[5] Daniel Headrick's *Power over Peoples* contains an entire chapter on steamboat imperialism, yet there is no mention of coal, the fuel which allowed the ships to move. Instead it deals with the effects of the technological evolution of warships without ever considering the actors, processes and mobilities required for these ships to function abroad.[6] Yet, the importance of the navy to the security of British trade and other imperial interests means that naval coaling infrastructure was, in fact, integral to Britain, empire and the world in the nineteenth century. The 'centrality of coal and coal depots to nineteenth-century imperial defence' means this lack of understanding of the fuelling infrastructure of the navy is also a gap in our understanding of nineteenth-century imperialism.[7] Indeed, coal has also been largely ignored in imperial history. The volume of the *Oxford History of the British Empire* covering the nineteenth century has more references to coconuts and coffee than to coal, which only has three mentions.[8]

However, as this article will show, fuel powered steam ships made oceanic mobilities more complex in the nineteenth century. More than ever, ships relied on infrastructure – particularly coaling facilities – without which even a fleet as large and powerful as Britain's would be rendered impotent. Yet it is too simplistic to see the movement of steamships as dependent on a static network of coaling stations. Fuel did not simply appear at stations across the globe, but was subject to multiple movements before arriving. It needed to be sourced, moved to ports, shipped and unloaded. There is, therefore, a need to recognise that ships relied on the separate flows and networks of fuel. The reliance of ships on these discrete movements of coal meant their movement was a part of what I term 'contingent mobilities'; that the mobility of the navy across the world relied on the transoceanic and global mobility of fuel. If the movement of coal was interrupted or terminated, those ships dependent on the affected stations would have remained immobile. As the full protection of Britain's trade could only be assured by the presence and movement of the British fleet across the oceans, a guaranteed availability of quality coal at stations, through its regular, timely and uninterrupted movement, was crucial to the empire.

This article therefore furthers the argument of those, such as Jon Anderson and Kim Peters, who have suggested that the sea is highly significant in the movement of resources globally, by showing how many of these mobilities are themselves contingent on the separate oceanic movement of fuel.[9] Just as scholars have questioned the 'freedom' that the automobile brought by not being limited by rails, or by timetables, this article questions the free mobility of naval ships, since they are limited by the movement of fuel and the presence of infrastructure. Furthermore, it questions the perceived immobility of the constituent parts of coaling infrastructure, showing that in fact they were conduits for the mobility of fuel, without which the more visible mobilities of ships would be impossible. Although focusing on the ecological issues with carbon-based mobilities, Matthew Paterson is right to question how the issue of fuel shapes 'a whole range of physical mobilities'.[10] In fact, we can see the movement of coal as one of John Urry's 'systems' which 'make possible movement' and 'permit predictable and relatively risk-free repetition of the movement in question'.[11] In this way, we may see the movement required of a Royal Navy steam ship to be a contingent mobility, utterly dependent on the distinct flows and networks associated with moving fuel across vast oceanic spaces. Thus, this article argues that, although often ignored, Britain's ability to provide its fleet with a supply of high quality coal throughout its empire was crucial to the oceanic power it held in the late nineteenth and early twentieth centuries.[12] In doing so, it invites consideration of how many large mobile networks, and their effective functioning, are in fact contingent on other quotidian, hidden or supposedly 'uninteresting' systems of movement.

The coal question

The development of steam technology in the nineteenth century instigated a revolution in ship design. The transfer from a sail to a steam navy was gradual in the Royal Navy. As long as early steam engines lacked sufficient power and efficiency, steamships remained marginal. Thus, even though steamships had been used in the Opium Wars, and the Battle of Navarino in 1827 was the last to be fought entirely with sailing ships, it was the actions of the Crimean War that marked the beginning of the end for wooden sailing ships in the Royal Navy.[13] The Battle of Sinop, in November 1853, between Russian and Turkish fleets, showed the susceptibility of wooden hulls to exploding shells. Steam propulsion enabled the use of iron and, later, steel in hull design, offering protection from new projectile technologies. Steam power also

[5] See, for instance, P.G. Halpern, *A Naval History of World War I*, London, 1994. For a prominent exception to this dearth of studies of late nineteenth-century infrastructure, see A. Lambert, Economic power, technological advantage, and imperial strength: Britain as a unique global power, 1860–1890, *International Journal of Naval History* 5 (2006). The period up to 1879 has been covered in R. Wilson, Fuelling the steam navy: naval coal supplies from Comet to the Carnarvon commission, unpublished MA dissertation, Exeter University, 2010.

[6] D.R. Headrick, *Power Over Peoples: Technology, Environments, and Western Imperialism, 1400 to the Present*, Princeton, NJ, 2010, 177–217.

[7] J. Beeler, Steam strategy and Schurman, in: G. Kennedy, K. Neilson and D.M. Schurman (Eds), *Far-Flung Lines: Essays on Imperial Defence in Honour of Donald Mackenzie Schurman*, London, 1996, 27.

[8] See A.N. Porter (Ed.), *The Oxford History of the British Empire. Volume. 2: The Nineteenth Century*, Oxford, 1999. Some work has been done on the shift from coal to oil, for example N.L. Madureira, Oil in the age of steam, *Journal of Global History* 5 (2010) 75–94; W. Brown, The Royal Navy's fuel supplies, 1898–1939: the transition from coal to oil, unpublished PhD thesis, King's College London, 2003; E.J. Dahl, Naval innovation: from coal to oil, *Joint Force Quarterly* XXVII (2001) 50–56; M. Gibson, British strategy and oil, 1914–1923, unpublished PhD thesis, University of Glasgow, 2012. Whilst coal has increasingly come into focus within geography, especially in looking at ecological issues, there is little connection between the period of imperialism, mobilities, the military and fuel.

[9] Anderson and Peters (Eds), *Water Worlds*.

[10] M. Paterson, Governing mobilities, mobilising carbon, *Mobilities* 9 (2014) 570–584.

[11] Urry, *Mobilities*, 13.

[12] The importance of quality as well as adequacy of supply chimes with the arguments of N. Clark and K. Yusoff, Combustion and society: a fire-centred history of energy use, *Theory, Culture and Society* 31 (2014) 203–226 that it is not just the fuel, but the combustion itself which gives us the power. There has also been wider work in geography on the importance of fuel resources, especially with regard to ecological issue. See, for example, Paterson, Governing mobilities.

[13] Wilson, Fuelling the steam navy, 14.

Please cite this article in press as: S. Gray, Fuelling mobility: coal and Britain's naval power, *c.* 1870–1914, Journal of Historical Geography (2017), http://dx.doi.org/10.1016/j.jhg.2017.06.013