

RESPONSE

‘The doings of the land of Egypt,
wherein ye dwelt’: slavery, empire and
Mokyr’s industrial revolution

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Abstract: Responding to Mokyr’s recent article on early modern Britain as the ‘Holy Land of Industrialism’, this article considers how far the role of slavery and empire may have been overlooked, and what these can contribute to explanations of British industrialisation. It notes the case for their role as markets for manufactured goods, and second-order effects such as the development of corporate expertise and the creation of a financial system capable of collateralising and reinvesting plantation profits. Focusing on Mokyr’s argument that the quality of British human capital was the decisive factor in industrialisation, it notes that this too had a colonial dimension, based on the circulation of knowledge and artisans throughout the British Atlantic in the 18th century. This was reflected by the trans-imperial nature of patenting and innovation during this period. Britain may have been the ‘Holy Land’, but the industrial revolution was therefore also marked by ‘the doings of the land of Egypt’.

Keywords: Industrialisation; Britain; empire; slavery; finance; patenting; innovation.

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The scholarship on the British industrial revolution is now so vast in its scale and so complex and ramified in its scope that few can hope to master even a part of it, let alone set its agenda. Yet for several decades Joel Mokyr has been one of the few who has done precisely that. Bob Allen in particular has argued for demand-driven explanations for industrialisation, whereby the high costs of British labour and the low costs of coal created the demand for technological innovations which saved labour.¹ Mokyr offers instead an explanation based on the unique quality of British human capital, in the form of scientific and technical expertise, refined here with the concept of ‘upper tail human capital’ to show how a small group of leading artisans, mechanics, scientists and intellectuals were able to punch well above their weight and drive forward technological invention. Acting as intermediaries between the scientists and the broader public, skilled artisans helped adapt abstract inventions and discoveries into useful knowledge by the application of technical expertise. The highly quality of British mechanics and artisans reflected in turn a flexible system of apprenticeship, a high standard of living, and the high cultural premium that British society placed on improvement and useful practical skills compared to other places in Europe. The demand created by increased domestic consumption, new foreign markets, the pressure for greater efficiency and productivity, the easy access to cheap coal and many other changes would therefore have been nothing without these factors, which turned Britain into the ‘Holy Land of Industrialism’. But in the light of several decades of work on the colonial dimensions of that industrialisation, is it still ‘a difficult task’, as he argues, ‘to demonstrate ... that the slave economy and Atlantic trade were critical factors in the Industrial Revolution despite its size’?²

With his focus upon the supply of metropolitan labour in British industrialisation, Mokyr is generally swimming against the tide, not only in respect of the demand-driven arguments of Allen and Wrigley, but also in respect of recent scholarship on ‘slavery’s capitalism’ and the contribution of empire to British industrialisation. As Mokyr notes, this was first articulated in its modern form by Eric Williams in 1944.³ Williams argued that the profits of slavery were funnelled back into metropolitan industrialisation and also that slave societies provided the initial markets for the burgeoning manufacturing industry, which eventually outgrew them and brought about the abolition of the slave trade in 1807 and slavery in 1834. Though key elements of his thesis have been questioned, not least because proofs of capital flowing from cane field to factory are lacking, the argument has in recent years enjoyed something of a

¹ Allen (2009).

² Mokyr (2021: 238).

³ Williams (1944).

renaissance which has pushed the overall argument to extremes.⁴ Joseph Inikori's work on the importance of West African markets for Birmingham gun manufacturers has been seized on by Priya Satia, for example, to assert that private and public arms contracts for imperial warfare were the driving force behind industrialisation: 'these were', she concludes, 'not coincidental but deeply interconnected developments'.⁵ The close connections between slavery, empire and industrialisation have been stated most forcefully by Sven Beckert, Calvin Schermerhorn, Seth Rockman and Edward Baptist in their publications on 'slavery's capitalism' in 19th-century America.⁶ They propose that slave-grown cotton was the raw stuff of industrialisation, that slavery was maintained by violence and imperial power, and therefore that both slavery and empire wholly underpinned the British and American industrial revolutions.

Not surprisingly, such a sweeping vast and thesis has faced substantial criticism. Alan Olmstead and Paul Rhodes conclude that this scholarship 'makes spectacular but unsupported claims, relies on faulty reasoning, and introduces many factual inaccuracies'.⁷ Yet Mokyr rejects even the more moderate forms of this approach, such as the case by C.K. Harley that colonial populations provided a crucial market for manufactured goods, either directly or, in the case of British America, by the profits of the provisions trade with the British Caribbean.⁸ Mokyr's view is not grounded in the standard critiques that such trade only ever formed a negligible proportion of British exports, and that other imperial powers such as Spain did not industrialise while continental powers such as Belgium and Germany did. These have been answered by a growing body of work which notes the additional markets provided by Britain's informal exports to Spanish America and other parts of the 'informal empire' even before the 19th century, and the 'slavery hinterland' which enabled industrialising territories in Germany to sell their textiles and other manufactures to colonists through major entrepôts such as London, Amsterdam or Hamburg.⁹ Moreover, an established literature by Pat Hudson and others on the regional nature of industrialisation in the 18th century suggests the potential for specific economic sectors and regions, such as the textile and iron industries in Lancashire, Yorkshire and the Midlands, to experience rapid technological progress in response to demand,

⁴For the complex history of responses to Williams since 1944, see Drescher (1997); Burnard (2020: 217–37); and the essays in Solow & Engerman (1987) and Carrington & Cateau (2000).

⁵Inikori (2002); Satia (2018). For a critical view of Satia's argument, see Stephenson (2019).

⁶Beckert (2015); Baptist (2016); Beckert & Rockman (2016); Schermerhorn (2015).

⁷Olmstead & Rhode (2018: 2). For a criticism based on a Caribbean perspective, see Burnard & Riello (2020) and Burnard (2020: 217–37).

⁸Harley (2015). For a stronger view, see Findlay & O'Rourke (2007: 311–65).

⁹For Spanish America, see Finucane (2016); Pearce (2007). For the 'slavery hinterland', see the essays in Brahm & Rosenhaft (2016); Wimmeler & Weber (2020).

despite stability or regression in other regions.¹⁰ Finally, a growing range of scholarship also suggests some of the second-order effects that colonial development may have had on industrialisation in Britain, particularly the ability to organise economic activity – including technological innovation and exploitation – over long distances, and to assemble the necessary capital.

For example, co-ordinating economic activity upon a vast scale and over considerable differences encouraged the development of large companies such as the East India Company for managing and co-ordinating technical expertise, laying the foundations for Alfred Chandler's 'managerial revolution', though the collapse of the Royal African Company in 1712 is a reminder that this development had its limits.¹¹ The difficulties of managing finance over such distances stimulated the creation of new financial mechanisms intended to raise capital, offer credit, manage cash flows and spread risk. For example, the West Indian 'acceptance houses' arose in London in the late 18th century to help manage the risks of the West Indian merchants by underwriting the bills of exchange they received from planters, creating major pools of liquid capital which were then funnelled into other parts of the economy.¹² Although instances of direct capital flow between plantation profits and industrial investments are still rare, the recent work by the Legacies of British Slavery project at UCL on the £20 million compensation granted to slaveowners in 1834 during the abolition of slavery has shown that slaveholding was widely distributed throughout British society, creating capital or collateral which the burgeoning financial system could transfer elsewhere.¹³ Nicholas Draper has shown large sums of West Indian money were ploughed into infrastructure such as the West India docks in London in 1795.¹⁴ Even in 1714 it was possible for a West Indian security to be laundered by the financial system and end up, after a chain of transactions, in the possession of Mary Bouchier of St Martin's in the Fields in Middlesex, spinster.¹⁵ In 1814 the total value of the empire was very roughly estimated at £1.34 billion (Table 1), just under half the total capital of Britain and Ireland, and all of it – including slaves on plantations – potential collateral for securing loans that might be invested back into industrialisation at home:

¹⁰ Hudson (1989); King & Timmins (2001); Wilson & Popp (2017).

¹¹ Carlos and Nicholas (1988). For the Royal African Company, see Davies (1957: 47–152). Though see also Carlos & Kruse (1996) for a more positive view of its managerial capacities.

¹² Morgan (2016); Checkland (1958). For their place in the wider financial system, see King (1936: 1–101).

¹³ Draper (2010); Hall *et al.* (2014).

¹⁴ Draper (2008).

¹⁵ Graham (2018a). For Bouchier, see p. 694 and The National Archives of the United Kingdom, E407/26 p. 14.

Table 1. Estimated capital in the British Empire, 1774 and 1814 (nominal £ sterling)

<i>Region</i>	<i>Capital (1774)</i>	<i>%</i>	<i>Capital (1814)</i>	<i>%</i>
Great Britain, Ireland and Europe	£314,000,000	66.0	£2,758,801,330	58.7
<i>British America and West Indies</i>	£162,000,000		£221,810,224	4.7
<i>West and South Africa</i>	–		£4,770,500	0.1
<i>South-East Asia and Australia</i>	–		£38,721,090	0.8
<i>East India Company</i>	–		£1,072,427,751	22.8
British Empire	£162,000,000	34.1	£1,337,729,565	28.5
Total	£476,000,000		£4,696,530,895	

Source: Colquhoun (1814: 80); Burnard (2018: 111).

Mokyr instead rejects such arguments because his focus is on the supply of labour, and demand therefore has no analytical power in explaining industrialisation: ‘such increases in demand’, he argues, ‘where colonial or domestic, in and of themselves, would have done little to drive the technological breakthroughs of the industrial revolution had there been no prior high level of engineering competence’.¹⁶ Even so, the colonial experience deserves to remain an important part of this wider story, insofar as both colonial and metropolitan industrialisation benefited from the circulation and interplay of that engineering competence. Trevor Burnard, John Garrigus, Justin Roberts and others increasingly argue that the plantation was like a factory in its operation, both in its close control and management of labour but also in ‘its scale of capital investment and output’.¹⁷ The greatest costs were land and slaves, but the Jamaican planter Edward Long estimated in 1774 that a large plantation might spend several thousand pounds on its coppers and milling equipment.¹⁸ Building and maintaining the cattle-, wind- and water- mills on sugar plantations – there were at least 680 in Jamaica in 1774, for example – relied upon the technical expertise provided by carpenters, blacksmiths, millwrights and other artisans and mechanics in these islands, many of them free or enslaved people of colour trained up by planters or tradesmen specifically for this purpose.¹⁹ Too little is still known about the circulation of technical expertise in the British Atlantic, beyond the drain of British artisans to the United States that Mokyr notes, but it is probable that the true level of this ‘imperial careering’ has been understated.²⁰

¹⁶ Mokyr (2021: 238–9).

¹⁷ Burnard and Garrigus (2016: 20, 25–49); Roberts (2013).

¹⁸ Long (1774: i, 457–62).

¹⁹ For the number of estates, see Long (1774: i, 494). For the numbers of artisans, see Higman (1995: 37–42).

²⁰ Karras (1992); Hamilton (2013); Burnard (1996). For the concept of ‘imperial careering’, see Lambert and Lester (2006).

The dependence of plantation economies upon a skilled technical workforce meant that they were frequently well-placed to contribute to the general level of technical expertise that Mokyr argues was vital for industrialisation, not least because there was a degree of circulation and interdependence between the two. For example, in the early 19th century the firm of Boulton & Watt marketed to the Falmouth Water Company in Jamaica a new technology, the hydraulic ram, which would pump water for their waterworks but could also be used to irrigate fields.²¹ ‘Should one of your patent engines be ordered here under the direction of a competent person, it would be the means of creating a great demand for them’, the directors told Boulton & Watt, ‘... [and] there are at this moment many proprietors of estates who ... are anxiously waiting the result’. However, the British mechanic sent out to set up the invention proved to be entirely useless, so the company drew on local expertise to replace the defective iron valves, ‘having very good tradesmen on the spot ... to repair some of them, and have ... replace[d] the iron valves with strong brass ones, which are already cast’, though they relied on Boulton & Watt to suggest improvements. Veront Satchell has argued that the replacement of the existing cattle-, wind- and water-mills in the same period with steam engines was disrupted by the lack of such expertise, and the problems of finding competent artisans who could adapt the engines to burn cane trash rather than coal, and produce mechanisms suitable for cane milling.²² Other technologies such as the copper pans and distilling apparatus and even the humble plantation hoe were all developed in dialogues between colonial and metropolitan artisans.²³ The enslaved population also made contributions through the application of West African artisanal or technical practices or botanical and medical knowledge, which often entered into wider circulation by the means, and under the names, of European scientists.²⁴

The importance of the circulation of this sort of technical expertise and knowledge in the development of both the metropolitan and colonial economies can be seen in the process of patenting across this period. As Christine MacLeod has shown, total numbers of patents are at best imperfect guides to technological change, but can nevertheless be indicative.²⁵ Until 1852, all English patentees could for a small fee add a ‘colonial clause’ to the patent extending its jurisdiction to the wider empire.²⁶ The proportion doing so rose from 20 per cent in the 1740s to 40 per cent in the 1760s, suggesting that many inventors and mechanics saw the colonies as important areas for their technology

²¹ Graham (2018b).

²² Satchell (2005: 226–8); Tann (1997).

²³ For copper, slavery and industrialisation, see Zahedieh (2013); Zahedieh (2021a); Zahedieh (2021b). For the plantation hoe, see Evans (2012).

²⁴ For science, see Ogborn (2019: 109–42) and, more broadly, Appleby (2013). For technical skills, see Satchell and Roper (2007).

²⁵ Macleod (1988: 144–57).

²⁶ Graham (2020).

and innovation. This fell after 1770 to only 5 per cent by the 1800s, but had begun to rebound by 1813, and reached 25 per cent between 1847 and 1852, suggesting that the colonies were once more becoming valuable markets for technical expertise. Jamaica and several other territories, mostly plantation colonies growing sugar, coffee, indigo and cotton, also organised their own patent systems to protect local inventors and inventions, and figures for Jamaica suggest that most were local planters or artisans using their own technical knowledge and expertise to improve the local machinery and techniques. The patent systems also overlapped with other measures for promoting innovation. In Britain the Royal Society for Arts, Manufactures and Commerce was founded in 1753 to promote useful improvements in six categories, including the colonial.²⁷ The Jamaican legislature made its own grants, and also worked with Sir Joseph Banks to introduce the breadfruit to the island in the 1780s to provide nutrition for slaves, a process which benefited from the facilities of the botanical garden it funded and the expertise of the Island Botanist and his workforce.²⁸ The money put into the promotion of colonial technological innovation demonstrates its importance for islands such as Jamaica, and their reliance on the technical expertise available.

Mokyr's broader argument is that specific factors created an abundance of human capital that was uniquely well-placed to meet the demand, in Britain and its colonies territories, for technological solutions. This leaves little space for the demand-driven studies of industrialisation which note the importance of colonial markets. Yet even an explanation focused on the supply of technical labour arguably needs to make due allowance for the contribution of the colonial experience. Besides the other factors that Mokyr mentions must be included the experience of empire and slavery. Quite apart from the key role of technical expertise in the development of these colonies as important markets for British manufactures, stimulating demand, they contributed to the supply of labour by providing opportunities for artisans as permanent or temporary migrants in the burgeoning empire. The circulation of technical knowledge and expertise was not a one-way process but a complex conversation between numerous groups as they responded to the technical challenges created by the experience of the colonial environment. More work is, as ever, necessary on this topic, inspired by and in dialogue with Mokyr's broad survey of the development of British human capital, but it will undoubtedly show that even if the metropole remain the 'Holy Land of Industrialism' in this period, British artisans, mechanics, engineers and scientists were also strongly marked by 'the doings of the land of Egypt, wherein ye dwelt'.²⁹

²⁷ Burrell & Kelly (2014). For a different view, see Kahn (2015).

²⁸ Graham (2020: 954–7). For the breadfruit, see Sheridan (1989).

²⁹ Lev. xviii, 3: 'After the doings of the land of Egypt, wherein ye dwelt, shall ye not do: and after the doings of the land of Canaan, whither I bring you, shall ye not do: neither shall ye walk in their ordinances'.

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