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RESPONSE

Britain's Atlantic slave economy, the market for knowledge and skills, and early industrialisation: a response to Joel Mokyr's 'Holy Land of Industrialism'

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Abstract: Joel Mokyr attributes Britain's precocious industrialisation to an enlightened economy in which a tiny elite of intellectuals, and uniquely competent artisans, supplied the necessary knowledge and skills which were, themselves, the product of a flexible, and high-quality, training system. Mokyr pays little attention to the demand side of the human capital market and is especially dismissive of the view that the Atlantic slave economy might have played a critical role. This comment argues, on the contrary, that it was the British Atlantic slave system that transformed the market for knowledge and skills. The extension of the market, itself, encouraged more division of labour and specialisation. Moreover, the technical imperatives of making the Atlantic trading system work incentivised the accumulation of the high quality mechanical and metal-working skills which allowed more intensive use of slack resources and played a critical role in shaping Britain's industrial revolution.

Keywords: Britain, industrial revolution, skills, Atlantic, Caribbean, slavery, knowledge economy, mechanics, metallurgy, metalwares.

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Joel Mokyr has long attributed Britain's industrial revolution to an 'enlightened economy' driven by a tiny elite of able and competent people, or what he calls Upper Tail Human Capital (UTHC). 'Useful knowledge' generated by natural philosophers, applied mathematicians, and other intellectuals, was exploited and turned to material advantage by a supply of uniquely skilled artisans, mechanics, and engineers distinguished by a sophisticated knowledge of metallurgy and a capacity to perform reliable precision work in metals.[1] In 'Holy Land of Industrialism', Mokyr (2021) focuses attention on the artisan component of this elite and asks why, by the early 18th century, Britain possessed the favourable supply of skills which gave it a comparative advantage in the techniques which drove its industrial revolution.[2]

Mokyr rightly notes that there is no single one-line explanation for Britain's mechanical competence and lists a number of contributory demand factors which have received attention in recent literature: rising middle-class incomes and consumption, the expansion of the coal-mining sector, and increasing defence expenditures with special reference to the navy. None are treated in any detail and their connections with each other and with urbanisation, agricultural improvement, and, above all, with the expanding Atlantic slave system are ignored.[3] Mokyr sees the impact of demand factors as subsidiary to the supply of high quality training through a flexible apprenticeship system and he is especially dismissive of the 'rich scholarly tradition' which places the rise of the Atlantic slave system at the centre of the story of British industrialisation.[4] In his view it remains a 'difficult task to demonstrate [that] the slave economy and Atlantic trade were critical factors in the Industrial Revolution'.[5] The comments below focus on this 'difficult task' and, with supporting evidence from trade and patent statistics, argue that participation in the Atlantic slave economy did, in fact, make a very critical contribution to re-shaping Britain's knowledge economy and the accumulation of its specialist skills by the early 18th century.[6]

Mokyr is correct to assert that Britain needed a good supply of skilled artisans to make the industrial revolution work and that training arrangements in mechanics and the metal trades were important.[7] However, even in the 18th century, when Britain had established a competitive edge in mechanical and metallurgical skills, it continued to employ large numbers of foreign workers in these areas as noted in a Swedish observer's

[1] Mokyr (2009).
[2] Given the paucity of relevant data this competitive edge cannot be tested with rigour, but abundant anecdotal evidence supports a broad consensus that, by 1700, English mechanics and metal-workers did have an international reputation for excellence (Harris 1988).
[3] Acemoglu *et al.* (2005); Pomeranz (2000); Allen (2009).
[4] Williams (1944); Solow (1991); Solow & Engerman (1989); Inikori (2002).
[5] Mokyr (2021: 238).
[6] Induced innovation has gained ground in the economic literature in recent years (Acemoglu 2002).
[7] Ben Zeev *et al.* (2017).

travel diary of the 1750s.[8] Britain's training system varied widely between places, and occupations, with many shortfalls, and Patrick Wallis has recently concluded that there is little evidence that the British apprentice system was much different from others in northern Europe.[9] Furthermore, it is hard to see why families on either side of the training contracts would have invested in such costly arrangements without a buoyant market for the skills. The argument made here is that the European Discoveries of the late 15th century most mattered because they expanded this market for human capital.

Adam Smith was adamant that the 'Discoveries' of the 15th century were 'the greatest and most important events in the history of mankind'. They opened a new and inexhaustible market for European manufactured goods which stimulated, not only 'new divisions of labour', but also 'improvements in art', or technology, which were unthinkable in the 'narrow circle of the ancient commerce' within Europe.[10] Europeans grabbed additional land and resources and, with cruel use of coerced labour, improved their stock of wealth, but this was not a free lunch (even for those who were not enslaved). Expansion offered high rewards but rested on a massive technological thrust and raised the returns on investment in human capital, above all, in the mathematical, mechanical, and metallurgical skills needed to navigate new oceans; to survey and map new lands; to discover, mine, and refine mineral deposits; to cultivate new crops; to perfect and equip new industrial processes such as textile dyeing, and sugar-refining; and to organise and finance new supply and distribution chains. Overseas expansion both exposed the shortcomings in the ancient truths which Europeans inherited from their classical world, and also opened a large and profitable market for innovation, invention, and mechanical skills which allowed different regions to pursue comparative advantages and make more intensive use of slack resources.[11]

The link between overseas expansion and the accumulation of 'useful' human capital is reflected in parallel chronologies. In 1600, England was a European laggard on both fronts: it had barely begun to embark on colonial expansion and was a scientific backwater.[12] Overseas trade was heavily focused on Europe and dominated by woollen textiles, largely unfinished, which accounted for 90 per cent of commodity exports. Although possessing abundant mineral resources, the metals and mining sector was small and catered largely for a limited domestic market.

[8] Berg & Berg (2001).
[9] Wallis (2014).
[10] Smith (1812).
[11] Barrera-Osorio (2006); Bleichmar *et al.* (2009).
[12] Chaplin (2001).

By 1700, England had moved towards the fore on both the Atlantic and the technological frontier. After a uniquely strong push to expand its overseas territories, and long-distance trade, including taking the lead in the Atlantic slave trade, England created a supposedly sealed Atlantic trading system combining a continuous strip of territory down the east coast of North America with six islands in the Caribbean in a mutually dependent trade, or 'system', behind the protective walls of the Navigation Acts.[13]

From the first, Britain's colonial thrust rested on active investment in the pursuit of 'useful knowledge', with early advocates of expansion such as Francis Bacon equally vocal in support of a new empiricism joining minds and hands, intellectuals and artisans, in a programme of systematic enquiry and experimentation which they saw as playing a critical role in unlocking the riches on the colonial frontier.[14] At the Restoration, as English expansion was beginning to deliver large profits through commercial agriculture, above all with the introduction of sugar to Barbados, and increased use of enslaved labour, it was no coincidence that the Baconian programme took on institutional shape with the creation of the Royal Society in the same year as the formation of both the Royal African Company, with a monopoly of English trade with west Africa, and the Committees of Trade and Plantations designed to oversee a vigorous colonial policy and enforcement of regulation.[15] The heavily overlapping membership of these three bodies reflected an understanding that useful knowledge would play a necessary role in employing colonies and commerce to promote national profit, prestige, and power.

In the decades between 1660 and 1700, English population, agricultural prices, and rents stagnated or fell, while overseas trade grew at a steady pace, rising by about 35 per cent, driven by the booming colonial sector which grew by 120 per cent. Merchant shipping tonnage doubled, largely to cater for Atlantic trade which, because of the long distances involved, made disproportionate demand for shipping services.[16] By 1700, London, which accounted for three quarters of England and Wales's colonial trade, became the largest shipping centre in Europe and at the same time it rose to prominence as an intellectual hub at the forefront of scientific pursuits with the necessary supporting capabilities in making instruments .

[13] Britain appropriated more land and exported a higher proportion of its population than the rival late-comers, France and the Dutch Republic (Zahedieh 2014; Harley 2015).

[14] Bacon's view of the relationship between 'science' and the natural world is revealed in *New Atlantis* (1627) which describes an uncharted island society with an advanced technological command over nature. The moral of the parable is that venturing beyond the limits of the known world promised untold power through dominion over nature. Delbourgo & Dew (2007); Roberts *et al.* (2007).

[15] Govier (1999); Davies (1957); Svalastog (2018).

[16] Zahedieh (2010).

Ocean navigators, cartographers, surveyors, and others who found employment in overseas expansion provided a strong market for clocks and other precision instruments and placed a premium on accuracy. Middle-class, even elite, 'civilian' consumers might be content with a poorly performing time-piece if it provided status or aesthetic appeal, but an ocean navigatotor required reliable measurements from both clocks and astronomical instruments especially as the search for a way to measure longitude at sea became the quest of the age. A loss of ten, or even five minutes a day mattered. Led by savants such as Robert Hooke, an enthusiastic horologer, in communication with continental counterparts and an influx of Protestant refugees, the London makers delivered solutions to a range of performance problems in the late 17th century although longitude evaded them until the 1760s. The solutions depended on the simultaneous development of improved tools as there is a limit to the precision of hand-guided tools and the possibilities of more accurate work were greatly enhanced by the invention of wheel-cutting engines in the 1670s (attributed to Hooke), better drills, presses, lathes, fusee-cutters and other special-purpose machines along with superb files that could turn out uniform, if not identical, parts in large batches. Thomas Tompion moved in this direction in the mid 17th century and others followed with significant implications for the sector.[17] The new devices allowed greater division of labour (including using provincial workshops), employment of less skilled labour (including women and children), and lowered costs as noted by Smith who reported that a watch costing £20 in the 1650s could be had for 20 shillings in the 1770s.[18] These ways of working had innumerable spillover effects in other branches of mechanics and metal-working and gave England a lead in instrument-making which it retained for a century.

Overseas expansion not only affected the market for instruments but also transformed the broader demand for metal-wares which had previously focused on small-scale, local exchange with only London offering possibilities for larger operations. The colonists opened new markets for batches of standard products: cooking and heating equipment (pots, pans, vats, coppers, and stills); tools (axes, bills, hoes, shovels, files, knives, saws, shears, needles, and pins); millwright's work; construction materials (nails in dozens of different sizes, hinges, locks, rivets, axels, barrel hoops); and hundreds of other items in everyday use in the homes, fields, and factories of the plantation economy. Metal-wares accounted for around 12 per cent of exports to the plantations in the 1660s, and over 30 per cent by 1730, with the colonies taking almost 40 per cent of brass exports, 56 per cent of wrought iron, 76 per cent of

[17] Landes (1983).
[18] Smith (1812); Kelly & O'Grada (2017); Berg & Hudson (1992); Cookson (2018); Bailey & Barker (1969).

wrought copper, and 96 per cent of nails.[19] Africa took further smaller supplies in the slave trade.[20] By the early 18th century, most were of English/British manufacture (although often using foreign raw materials), and most were funnelled through London which provided a large central market-place and strong scope for regional specialisation.[21]

The new Atlantic demand for metal-wares encouraged producers to expand scale and invest in new machinery which often relied on semi-skilled and unskilled labour but also provided opportunities for a small number of highly trained mechanics to design machines and oversee their construction and maintenance. The process is illustrated in the business records of Abraham Crowley, a London ironmonger, who set up a nail-making operation in Sunderland, in County Durham, in the 1680s, to take advantage of London's booming demand. The location was chosen on grounds of good access to raw materials (Swedish iron and local coal) and cheap sea transport to the London market, but took little account of the skills supply as the region had no nail-making tradition and Crowley spoke of 'planting' workers including a large number from overseas. By 1688, he employed 100 nail-makers including eight or ten from Liege, a centre of this trade, which supplied the Amsterdam ship-building market and where the slitting mill was developed. According to Crowley, these foreign workers 'taught the English to work better and swifter than formerly and to make such nails as are used in the sheathing of ships in Holland', and there is evidence that they also helped him in setting up a slitting factory along the lines developed in Liege.[22] The firm prospered and, according to Michael Flinn, by 1713, Crowley possessed 'the greatest industrial organization of his age', with three factories in the north east including two slitting-mills, four steel furnaces, and innumerable smiths' workshops, as well as seven warehouses in the Thames and a chain of others in the provinces.[23] In 1728, the Thames warehouses held iron-work to the value of £58,000, including tens of thousands of plantation hoes, with over half the firm's output directed to export markets, largely in the plantations, and much of the rest to the merchant and naval fleets with their heavy involvement in Atlantic trade.[24] Provincial producers were also able to tap into London's expanding colonial markets. As early as the 1660s, George

[19] BL MS 36,785; Schumpeter (1960: 63–4). Schumpeter does not provide figures for pewter exports in her summary tables.
[20] Ibid.
[21] Zahedieh (2021).
[22] In 1688, he petitioned for protection of 8 or 10 workmen from Liege who were being molested on account of their Catholic religion (Flinn 1962: 55).
[23] Flinn (1962: 73–4).
[24] Flinn (1962: 139); Evans (2012). In the 1750s, the Swedish traveller, Angerstein, left a detailed description of the firm's high-volume, rapid through-put operation at Swalwell which with 54 hoe shops and 162 hammermen had the capacity to produce 11,000 hoes a week (Berg & Berg 2001: 260-6).

Sitwell, a Sheffield iron maker, took active steps to perfect production of sugar-making equipment for the West Indies by learning to design and produce specialised stoves and mill rollers.[25]

As export demand for metal-wares rose in Atlantic markets, there was an increasing incentive to expand primary production. England possessed good deposits of non-ferrous metals and iron, but none were worked to full capacity in the early 17th century and the small copper-mining industry disappeared by the 1650s.[26] Charcoal was becoming increasingly scarce and expensive, and coal could not yet be substituted in the furnaces as it contaminated the product on direct contact with the metal. The limited domestic market was largely supplied from re-cycled materials and cheap Swedish imports, and there was little incentive to risk investment in the development of new technologies.[27] However, the situation changed as new export and maritime demand gathered pace in the expanding Atlantic slave system. Shifting partnerships of profit-seeking experimenters took out five patents of invention between 1675 and 1688 and, in cooperation with skilled artisans, developed a new style of reverberatory furnace, or cupola, which could smelt metals with coal and transformed the industry in the 18th century.[28]

The initial breakthrough was made in 1688 with lead, but the innovation was brought into commercial use in the copper industry which had revived from nothing after export demand surged with the introduction of sugar into Barbados in the 1640s: by the 1680s a sugar plantation expended £1 on copper equipment for every £6 it spent on enslaved labour.[29] Mokyr incorrectly claims that the major innovations in copper preceded the rise of sugar whereas, on the contrary, innovation lagged demand by several decades and came into commercial use only after a sound market was established.[30] Slavery's capital was prominent in the expansion of the industry as nine copper companies were set up in the 1690s to use the ground-breaking reverberatory furnaces and, at least, 43 of the 65 named shareholders were London merchants with strong Atlantic interests, including William Dockwra, a leading slave-trade interloper, and Dalby Thomas, a prominent West India merchant and later agent of the Royal African Company. Annual output of refined copper was expanded from around 10 tons in 1690 to around 600 tons in the 1720s and, by the second half of the century, Britain became Europe's leading producer.[31] After success in the copper industry, the

[25] Riden (1985: xx-xxi, 242–3, 261).
[26] Hammersley (1973).
[27] Burt (1995).
[28] Zahedieh (2013).
[29] Ibid.
[30] Mokyr (2021: 239).
[31] Zahedieh (2013: 822).

reverberatory furnace came into use in the lead industry after 1698, tin from 1707, and iron from 1708, although the latter process was not perfected until the last quarter of the 18th century.[32]

Increased export demand for metal-wares, above all in Atlantic markets, stimulated expansion in both metal and coal mining and encouraged deeper workings which posed drainage problems especially in areas such as Cornwall. By the early 18th century, two west country engineers, Savary and Newcomen, each aware of the market in the deep metal mines in their region, separately combined theory, and artisan skill, in developing a working steam pump. Newcomen's engine, with further minor and major improvements, above all those of James Watt, transformed the mining sector in England and overseas. [33] Although the initial pump was conceived in the west country, the first engines were produced in the Midlands which had a more skilled and specialised work-force but, as recognised by Mokyr, as steam engines were later built in Cornwall, the county developed its own internationally renowned capabilities in mechanical engineering.[34] Upper Tail Human Capital was developed to supply the market. Overlapping and mobile personnel and technologies within the broader metals and mining sector ensured that changes in one sector had impact on others, and nurtured investment in metal-working and machine-making skills that had applications beyond one industry, or region, to promote increased specialisation, division of labour, and technical improvements which underpinned Britain's competitive advantage in Europe.

The impact of the colonial project on inventive activity cannot be measured with any precision but is dimly perceptible in the patent records.[35] Most patent applications noted the intended uses of an invention and, as shown in Table 1, in the decades after the Restoration, a large majority was aimed at improvements in navigation, precision instruments, metallurgy, and mining (including the five patents for reverberatory furnaces and a number for pumps). The surge in interest in diving in the 1690s also had a New World dimension, as it followed the hugely profitable salvage of a Spanish treasure ship in the Bahamas in 1688 which set off a wrecking boom in the 1690s.[36] The textile industries accounted for less than 10 per cent of the patents and agriculture still fewer, attracting little more interest than sugar, although some of the drainage improvements were used to reclaim land.

[32] Evans & Ryden (2005: 1–27).
[33] Zahedieh (2013: 821–2).
[34] Mokyr (2009: 131–2).
[35] For caution needed in use of these records see MacLeod (1986).
[36] Earle (1979).

Table 1. Intended uses in patents of invention in England and Wales, 1660–1719.

	1660s	*1670s*	*1680s*	*1690s*	*1700s*	*1710s*	*TOTAL*
Navigation	8	7	8	12	2	3	40
Textiles	–	7	7	11	1	3	29
Metallurgy	3	4	7	8	4	1	27
Drainage	4	6	4	7	–	3	24
Wrecks/diving equipment	–	2	3	11	–	1	17
Glass	2	1	2	3	3	–	11
Pumps unspecified	–	1	2	6	–	1	10
Agriculture	–	7	1	–	–	2	10
Sugar	2	–	–	3	1	1	7
Furnace/boiling equipment	3	1	–	2	–	1	7
Clocks/instruments	2	–	–	1	2	1	6
Ordnance	2	–	1	1	–	–	4
Other	13	22	18	24	10	23	110
Total	38	58	53	89	23	40	301

Source: Woodcroft (1854).

The construction of Britain's Atlantic trading system, based on the production of commercial cash crops produced by enslaved African labour, required the active pursuit of new knowledge and changed the nature and scale of the market for skills. Overseas expansion incentivised innovative effort on a broad range of fronts but, above all, it raised the premium on mathematical, mechanical, and metal-working capabilities. In enlarging the market for 'useful knowledge', it encouraged regional specialisation and investment in better communication networks including transport, print materials, and other vehicles for the dissemination of information. Of course, a need does not automatically produce a supply and, as Mokyr notes, it was critical that Britain had flexible training arrangements (although these may not have been as exceptional as he suggests) and, as he neglects to discuss, it was also important that Europe had a mobile work force which helped match supply to demand. In conclusion, it is not a difficult task to argue that the rise of the Atlantic slave economy re-shaped the market for natural knowledge in ways that encouraged Britain, an island with excellent access to the Atlantic and favourable resource endowments, to invest in training the artisan component of its Upper Tail Human Capital in the mechanical and metallurgical skills necessary for the construction, maintenance, and exploitation of the colonial trading system: skills that turned out to be of critical importance in shaping its particular style of industrial revolution.

References

Acemoglu, D. (2002), 'Directed technical change', *Review of Economic Studies*, 69: 781–809. https://doi.org/10.1111/1467–937X.00226

Acemoglu, D., Johnson, S. & Robinson, J. (2005), 'The rise of Europe: Atlantic trade, institutional change and economic growth', *American Economic Review*, 95: 546–79. https://doi.org/10.1257/0002828054201305

Allen, R.C. (2009), *The Industrial Revolution in Global Perspective* (Cambridge, Cambridge University Press).

Bailey, F.A. & Barker, T.C. (1969), 'The seventeenth-century origins of watch-making in south-west Lancashire', in J.R. Harris (ed.), *Liverpool and Merseyside: Essays in the Economic and Social History of the Port and its Hinterland* (London), 1–15.

Barrera-Osorio, A. (2006), *Experiencing Nature: The Spanish American Empire and the Early Scientific Revolution* (Austin TX).

Ben Zeev, N., Mokyr, J., & van der Beek, K. (2017), 'Flexible supply of apprenticeship in the British Industrial Revolution', *Journal of Economic History*, 77: 208–50. https://doi.org/10.1017/S0022050717000043

Berg, T. & Berg, P. (eds) (2001), *R.R. Angerstein's Illustrated Travel Diary, 1753–1755: Industry in England and Wales from a Swedish Perspective* (London, Science Museum).

Berg, M. & Hudson, P. (1992), 'Rehabilitating the Industrial Revolution', *Economic History Review*, 45: 24–50. https://doi.org/10.2307/2598327

Bleichmar, D., De Vos, P., Huffine, K. & Sheehan, K. (eds) (2009), *Science in the Spanish and Portuguese Empires, 1500–1800* (Stanford CA). https://doi.org/10.1515/9780804776332

Burt, R. (1995), 'The transformation of the non-ferrous metals industries in the seventeenth and eighteenth centuries', *Economic History Review*, 48: 23–45. https://doi.org/10.2307/2597869

Chaplin, J.E. (2001), *Subject Matter: Technology, the Body, and Science on the Anglo-American Frontier, 1500–1676* (Cambridge MA).

Cookson, G. (2018), *The Age of Machinery: Engineering in the Industrial Revolution, 1770–1850* (London). https://doi.org/10.1017/9781787442382

Davies, K.G. (1957), *The Royal African Company* (London).

Delbourgo, J. & Dew, N. (eds) (2007), *Science and Empire in the Atlantic World*. https://doi.org/10.4324/9780203933848

Earle, P. (1979), *The Wreck of the Almiranta: Sir William Phips and the Search for Hispaniola Treasure* (London).

Evans, C. (2012), 'The plantation hoe: The rise and fall of an Atlantic commodity, 1650–1850', *William and Mary Quarterly*, 69: 71–100. https://doi.org/10.5309/willmaryquar.69.1.0071

Evans, C. & Ryden, G. (2005), *The Industrial Revolution in Iron: The Impact of British Coal Technology in Nineteenth-Century Europe* (Aldershot).

Flinn, M.W. (1962), *Men of Iron: The Crowleys in the Early Iron Industry* (Edinburgh).

Govier, M. (1999), 'The Royal Society, Slavery and the Island of Jamaica 1660–1700', *Notes and Records of the Royal Society of London*, 53: 203–17. https://doi.org/10.1098/rsnr.1999.0075

Hammersley, G. (1973), 'Technique or economy? The rise and decline of the early English copper industry, ca. 1550–1660', *Business History*, 15: 1–31. https://doi.org/10.1080/00076797300000001

Harley, C.K. (2015), 'Slavery, the British Atlantic economy and the Industrial Revolution', in A.B. Leonard & D. Pretel (eds), *The Caribbean and the Atlantic World Economy: Circuits of Trade, Money and Knowledge, 1650–1914* (London), 161–83. https://doi.org/10.1057/9781137432728_8

Harris, J.R. (1988), *Industrial Espionage and Technology Transfer: Britain and France in the Eighteenth Century* (Aldershot).

Inikori, J.E. (2002), *Africans and the Industrial Revolution in England* (Cambridge, Cambridge University Press). https://doi.org/10.1017/CBO9780511583940

Kelly, M. & O'Grada, C. (2017), 'Adam Smith, watch prices, and the Industrial Revolution', *Quarterly Journal of Economics*, 131: 1727–52. https://doi.org/10.1093/qje/qjw026

Landes, D.S. (1983), *Revolution in Time. Clocks and the Making of the Modern World* (Cambridge MA).

MacLeod, C. (1986), 'The 1690s patent boom: invention or stock-jobbing?', *Economic History Review*, 39: 549–71. https://doi.org/10.2307/2596483

Mokyr, J. (2009), *The Enlightened Economy: An Economic History of Britain, 1700–1850* (New Haven CT).

Mokyr, J. (2021), '"The Holy Land of Industrialism": rethinking the Industrial Revolution', *Journal of the British Academy*, 9: 223–47. https://doi.org/10.5871/jba/009.223

Pomeranz, K, (2000), *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton NJ). https://doi.org/10.1515/9781400823499

Riden, P. (ed.) (1985), *George Sitwell's Letterbook, 1662-66* (Chesterfield).

Roberts, L., Schaffer, S. & Dear, P. (eds) (2007), *The Mindful Hand: Inquiry and Invention from the Renaissance to Early Industrialisation* (Amsterdam)

Schumpeter, E.B. (1960), *English Overseas Trade Statistics, 1697–1808* (Oxford).

Smith, A. (1812 edn), *An Inquiry into the Nature and Causes of the Wealth of Nations* (London).

Solow, B.L. (ed.) (1991), *Slavery and the Rise of the Atlantic System* (Cambridge, Cambridge University Press). https://doi.org/10.1017/CBO9780511523892

Solow, B.L. & Engerman, S.L. (eds) (1988), *British Capitalism and Caribbean Slavery: The Legacy of Eric Williams* (Cambridge). https://doi.org/10.1017/CBO9780511572722

Svalastog, J. (2018), 'Mastering the worst of trades: England's early African companies and their traders, 1618–1672', unpublished PhD thesis, University of Leiden.

Wallis, P. (2014), 'Labour markets and training', in R. Floud, J. Humphries & P. Johnson (eds), *The Cambridge Economic History of Modern Britain*, 2 vols (2014), I, 178–210. https://doi.org/10.1017/CHO9781139815017.007

Williams, E. (1944), *Capitalism and* Slavery, 1994 reissue (University of North Carolina Press).

Woodcroft, B. (1854), *Chronological index of patents of invention*, 2 vols, I, 27–77.

Zahedieh, N. (2010), *The Capital and the Colonies: London and the Atlantic Economy, 1660–1700* (Cambridge, Cambridge University Press).

Zahedieh, N. (2013), 'Colonies, copper, and the market for inventive activity in England and Wales, 1680–1730', *Economic History* Review, 66: 805–25. https://doi.org/10.1111/j.1468–0289.2012.00676.x

Zahedieh, N. (2014), 'Overseas expansion and trade', in R. Floud, J. Humphries & P. Johnson (eds), *The Cambridge Economic History of Modern Britain*, 2 vols (2014), I, 392–420. https://doi.org/10.1017/CHO9781139815017.015

Zahedieh, N. (2021), 'Eric Williams and William Forbes: Copper, colonial markets and commercial capitalism', *Economic History Review*, 74: 784–808. https://doi.org/10.1111/ehr.13050

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