

## The British Industrial Revolution in Global Perspective

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Emma Griffin

During the past two decades, Robert Allen's researches into English agriculture have fundamentally reshaped our understanding of the nature and pace of rising agricultural productivity between the late middle ages and the 19th century. More recently, Allen has turned his attention to the study of real wages as a measure of economic development and begun investigating the progress of wages in other parts of the globe. These different strands have come together in this book, *the British Industrial Revolution in Global Perspective*. The book is neatly divided into two parts, the first looking at the British economy prior to industrialisation, and the second looking at the industrial revolution itself. Whilst parts of the book recapitulate research previously published, there is much that is new and Allen presents us with a clear yet many-layered argument about the nature and causes of the industrial revolution, and about why it occurred in Britain, as opposed to anywhere else, when it did. These of course are questions that have already received substantial attention, yet there can be no doubting that this book makes an important contribution to the existing literature. Though by training an economic historian, Allen manages to present complex economic analysis in a clear and intelligible style, and the book largely succeeds in the series' remit of writing guides accessible to undergraduates. This is more than a student textbook, however. *The British Industrial Revolution in Global Perspective* provides a novel interpretation of the industrial revolution that will be important to experts in the field. So without further hesitation let us start to unpack Allen's account of the world's first industrial revolution.

Part one of the book begins with an introductory chapter, covering some of the existing literature and laying out the structure of the book. Chapter two opens with some evocative contemporary accounts suggesting that English living standards, whilst low when contrasted with the present day, were relatively high when compared with those of workers in Asia and other parts of Europe, and proceeds to present fresh statistical

evidence confirming their view. From the outset, the reader is offered a taste of the 'global perspective' promised in the title with information about wages and living costs offered for several European cities, Delhi, Beijing and Massachusetts, as well as for London, Oxford, and York. Allen's results are presented as 'subsistence' and 'respectability' ratios (defined as the ratio of income to the cost of a subsistence, or respectable, lifestyle) rather than the more familiar 'real wage', making comparison with other indices tricky. Nonetheless, Allen develops a convincing case for a high wage economy confined to Britain and the cities of the Low Countries and points to the pivotal role played by international trade in creating these high wage economies. Furthermore, Allen points out that income surplus to that required for subsistence left the labouring population with money to spend, money that was fed back into the economy in a number of ways – on more and better food, on small consumer goods, or schooling for children. Higher levels of consumption and education, therefore, were not simply the outcome of a dynamic economy but also an important contributor to it.

Chapter three considers agriculture and tells a story that those familiar with Allen's work will quickly recognise. Allen argues that the rise in agricultural productivity between 1500 and 1750 was sufficient to be labelled an 'agricultural revolution', but rejects the view that enclosures, capital investment, and the modernisation of agriculture fuelled this growth. The old open farms, he suggests, were equally capable of impressive innovations and points instead to the role played by the expansion of world trade, rural industry and urban manufacturing as 'engines of growth', forcing up agricultural productivity. In this account, the shift to large farms and enclosures was the endpoint of this process, not the cause. Whilst most of Allen's arguments about agriculture have already been made elsewhere, this chapter also underscores two themes from the previous chapter more germane to his account of industrialisation. Firstly the evidence from agriculture, like that from real wages, points to the underlying strength of the English economy during the pre-industrial period and suggests that trade and urbanisation had been key driving forces of growth. Secondly, rising agricultural productivity, like high wages, had a number of positive consequences for the economy. The agricultural revolution freed large numbers of workers from the land (the proportion of the total population working the soil approximately halved between 1500 and 1800, from 74 per cent to 35 per cent). The consequence was a steady flow of labour moving into rural industry and urban trades. It all helped to create an economy and a society uniquely positioned for the dramatic restructuring that we know was about to occur.

The theme of British distinctiveness is developed yet further in chapter four, which turns to the nation's cheap energy economy. Between 1560 and 1800, output from British mines increased 66 fold and by the end of the period Britain enjoyed the cheapest energy supplies in the world. This cheap energy was to have profound implications for future economic growth, but for the present Allen confines himself to questions of causation: why did this expansion occur in Britain (not elsewhere) and why now (and not earlier)? Once again, Allen points at Britain's success in the world economy and the role that international trade played in promoting urbanisation in general and the growth of London in particular. In a style that will be more fully developed in the second half of the book, Allen also pays close attention to the role that human actors played in causing economic change. Heating London's homes with coal, he observes, was not a straightforward matter as the traditional open hearth situated at the centre of the home was unsuited for the burning of coal. Before London's demand for fuel could power the growth of the coal industry, builders needed to design new homes with hearths and chimneys suitable for burning coal. But once this had occurred, the capital's insatiable demand coal for domestic heating began to exert a powerful force on the nation's coal-producing regions. Coal producers increased output to meet the demand, and Britain's cheap and abundant coal supplies created an energy situation unique in the world. This, coupled with Britain's high wage structure, set the stage set for inventive activity designed to substitute the expensive labourer for the relatively inexpensive fuel instead.

Before looking at the ways in which high wages and cheap coal came together to foster the technological innovation that underpinned the industrial revolution, the strands of these opening chapters are brought together in the and final chapter of the first half of the book, which turns to mathematical representation to explain why Britain succeeded in industrialising when it did. Using simultaneous equations to represent

social and economic development, Allen tests four variables – the wage rate, urbanisation, agricultural productivity, and proto-industrialisation – in several European countries. The model shows England and the Netherlands developing along a different trajectory from 1500, characterised by urbanisation, rising agricultural performance, and high real wages. Allen further tests a number of possible causes for England's distinctive economy – representative government; enclosure; the new draperies; trade owing to Britain's empire; and energy costs. The first two he largely discounts as factors accelerating growth; the second three, by contrast, all contributed to England's economic growth throughout the early modern period. He thus memorably concludes that 'The success of the British economy was ... due to long-haired sheep, cheap coal and the imperial foreign policy that secured a rising volume of trade' (p. 131).

In the second part of the book, Allen switches into a different gear. Part one has sketched the contours of the British economy with a broad brush, highlighting its key distinctive features – high wages and low energy costs – and developing an account of how it had come to take this form. Part two, turns away from the general and focuses instead upon the particular. Starting from the observation that Britain's industrial revolution was essentially characterised by a series of stunning technological breakthroughs, Allen seeks to explain why some of these key inventions took place in Britain, rather than elsewhere. Rejecting the idea that the British possessed a special genius for invention, Allen instead focuses upon how the combination of expensive labour and cheap energy provided industrialists with an incentive to innovate. What follows are three tightly-focussed case studies tracing the ways in which abstract ideas were transformed into inventions with practical utility, and contrasting British receptiveness to new technologies with the indifference towards them initially displayed by manufacturers in other parts of the globe.

Chapter seven takes as its subject the invention often considered most pivotal to British industrialisation: the steam engine. Allen identifies two phases of the development. First came Thomas Newcomen's 'macro-invention' – the atmospheric engine, which used steam to convert heat energy into mechanical energy. The difficulty with the Newcomen engine, however, was that it operated with a jerky motion and had a prodigious appetite for fuel – both of which served to limit its usefulness to pumping water from coal mines. Nonetheless, engineers and manufacturers were quick to grasp the steam engine's potential to improve a range of industrial and transport processes, and this opened the way for a very long second phase – the succession of micro-inventions designed to engineer Newcomen's engine into something far more versatile and efficient. Allen convincingly argues that making versatile and fuel-efficient engines that actually worked was a complex and expensive process, and looks in detail at how and why British engineers invested so much time and effort into solving this problem. He points to the way in which inventors responded to the precise engineering challenges posed by local conditions and to how this promoted numerous piecemeal improvements. He also observes, however, that once British engineers had successfully reduced the fuel consumption of engines and improved their operation, the way was paved the way for their use first in a wide range of British industries, and ultimately for their export across the globe.

Chapters eight and nine tell a largely similar story for two different industries. Chapter eight looks at the succession of inventions that transformed cotton spinning and carding between the 1760s and the 1830s; chapter nine turns to coke-smelting. Both examples carefully trace the ways in which big ideas were translated into working machines. In each case, Allen makes a convincing case for the pivotal role played by Britain's high wage economy in providing a demand for processes that substituted energy and capital for labour.

It is at this point that one might hope for more in the way of global comparisons. The chapter on cotton spinning provides a brief comparison with France, arguing that low wages in that country ensured that the new inventions at first brought no economic benefit: it was only once the productivity of the English machines had been improved that their purchase made economic sense to French cotton manufacturers. The slow adoption of coke-smelting on the continent also gets some attention, but the global context for the development of the steam engine receives scarcely a mention. Of course it is not difficult to relate the evidence for Britain's relatively high wages and low fuel costs presented in the first part of the book to this problem, but the argument would be yet more strongly grounded if the analysis of British inventiveness was counterpoised with more concrete evidence concerning the actions and choices of French, Belgian, Chinese

or Indian manufacturers.

The tenth and final chapter, looking at ‘inventors, enlightenment and human capital’, takes us to the end of the book. In a fascinating discussion of why high wages and cheap energy promoted industrialisation in Britain in the 18th century, when a similar combination of forces after the Black Death had not had the same result, Allen suggests that culture and education also played a role in promoting technological inventions. In some ways this final chapter seems to complicate the very neat and tidy account that has been presented in the preceding chapters with its tight focus on wages and energy costs, though this is not to the book’s detriment. What emerges is a realisation that the British industrial revolution was a very large, complex and untidy event, not amenable to any single explanation. Whilst Allen brings wages and fuel to the fore of his account, he nonetheless leaves space for a complex of cultural and social forces to play their part in the process.

Though published as part of a textbook series, this is more than a standard textbook – indeed students in search of a basic understanding of the industrial revolution will no doubt continue to turn to the existing textbooks on the subject.<sup>(1)</sup> In place of the standard survey of agriculture, population, finance, and so forth, this book provides an important and novel argument about why industrialisation took root when and where it did – it is an interpretation of, not an introduction to, the subject. Allen has convincingly argued that the combination of high wages and cheap fuel deserves a central place in our analyses of industrialisation. This will not of course be the final word on the matter, but with such a clearly articulated and strongly-supported argument, *The British Industrial Revolution in Global Perspective* is sure to become required reading for both students and scholars for many years to come.

## Notes

1. S. King and G. Timmin, *Making Sense of the Industrial Revolution* (Manchester, 2001); Martin Daunton, *Progress and Poverty: An Economic and Social History of Britain 1700-1850* (Oxford, 1995); Pat Hudson, *The Industrial Revolution* (London, 1992).[Back to \(1\)](#)

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