

## REVIEW ARTICLE

# THE GREAT DIVERGENCE\*

*The Rise of the Western World, The European Miracle, The Wealth and Poverty of Nations.*<sup>1</sup> All of these works attempt to answer a major question in the history of the modern world: why did the path of economic development in Europe diverge radically from that of the great agrarian societies of Asia? Although the works differ widely in their approaches and conclusions, they, along with much else written on the question, share a deeply held belief that Europe was fundamentally different from Asia. It is this difference, whether in the realm of mentalities (rationality, technological creativity), political and economic institutions (property rights, capitalism) or environmental and demographic conditions (protection from disasters, low birth rates), which produced the European breakthrough to self-sustaining growth and industrialization. Not surprisingly, specialists in the history of Europe, and to a lesser extent of North America, played a major role in the production of these accounts. Voices from Asia contributed only rarely to the debate, but even they shared the belief in the exceptionalism of Europe.<sup>2</sup>

The faith in European difference has come to be questioned, however, and much of this questioning has come from historians working on the history of Asia, primarily India and China. Nearly two decades ago, in the pages of *Past and Present*, Frank Perlin

\* Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton and Oxford: Princeton University Press, 2000), x, 382 pp. I am very grateful to James Cronin, Robin Fleming and Kevin Kenny for their comments on earlier versions of this essay.

<sup>1</sup> Douglass C. North and Robert Paul Thomas, *The Rise of the Western World: A New Economic History* (Cambridge, 1973); E. L. Jones, *The European Miracle: Environments, Economies and Geopolitics in the History of Europe and Asia*, 2nd edn (Cambridge, 1987); David S. Landes, *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor* (New York, 1998).

<sup>2</sup> The title of a special issue of the *Journal of Economic History*, 'Capitalism and the Extent of its Early Development outside Europe', reveals an earlier faith in the historical exceptionalism of Europe: *Jl Econ. Hist.*, xxix (1969). This may be contrasted with a recent special issue of *Daedalus* on 'Early Modernities' which covers many of the same regions of the world, but now sees them as developing forms of modernity which paralleled European transformations: *Daedalus*, cxxvii (1998).

described a broadly similar world of monetary and commercial relations that spanned the Eurasian land mass from north-western Europe to southern China, with stops in India, south-east Asia, and even west Africa, en route. The research of Perlin, C. A. Bayly and others have so thoroughly revised our picture of early modern India that it scarcely resembles the historical accounts of a generation ago and they have shown powerful parallels with historical developments in Europe. More recently, Jack Goody has dismantled long-standing assumptions about the uniqueness of European rationality and economic practices. And more recently still, Andre Gunder Frank has put forward a powerful argument for China's centrality in the seventeenth- and eighteenth-century world economy. The implication of this research is that the stark differences between Europe and Asia, which had for very long received wide consensus, are no longer tenable. As a consequence, the whole problem of European economic divergence must be rethought. In this historical ferment, Kenneth Pomeranz's *Great Divergence* has made a timely and important appearance. Pomeranz is particularly well suited to take up this question. He is a Chinese historian by training, but is deeply versed in the economic history of modern Europe and south and south-east Asia.<sup>3</sup>

## I

The first part of Pomeranz's work is a wide-ranging comparison of economic practices and standards of living in Asia and Europe in the eighteenth century. Due to limitations on the availability of data, Pomeranz is forced to range rather widely to make these comparisons; for instance, he compares transport capacity in Germany and north India, fuel supply in France, Lingnan and northern China, and manure use in north China and Europe. Nevertheless, his comparisons add up to a powerful refutation of the view that north-western Europe was economically far ahead of the most advanced regions in Asia, in particular China, Japan, India and south-east Asia. Pomeranz has marshalled evidence to

<sup>3</sup> Frank Perlin, 'Proto-Industrialization and Pre-Colonial South Asia', *Past and Present*, no. 98 (Feb. 1983); C. A. Bayly, *Rulers, Townsmen and Bazaars: North Indian Society in the Age of European Expansion, 1770-1870* (Cambridge, 1983); Jack Goody, *The East in the West* (Cambridge, 1996); Andre Gunder Frank, *ReOrient: Global Economy in the Asian Age* (Berkeley, 1998).

show that life expectancy, wage rates and levels and patterns of consumption, both in ordinaries and luxuries, were broadly similar between these core regions of Eurasia. He shows that property rights in land and financial assets were not fundamentally different and that the distribution and role of markets and market activity were very comparable. Therefore, he concludes, markets in Asia were efficient mechanisms for the allocation of resources. Finally, he demonstrates that the availability and deployment of capital, both human and physical, did not fundamentally differ between east and west. From this foundation of broad similarity, Pomeranz reinterprets Europe's divergence, and in particular Britain's (and he correctly goes to great pains to distinguish between the two). This forms the second part of his work.

For Pomeranz, the key to economic divergence was the ability to transcend ecological constraints posed by simple limits on the quantity of land. The land constraint existed in advanced areas of Europe and in China, particularly in Britain and the lower Yangzi valley which form the geographical foci for the argument. The constraint operated in several ways: it limited stocks of food, supplies of fibres for textile production, and, perhaps most importantly for Pomeranz, the availability of fuel or energy. From this basis of shared constraint, Pomeranz asks why Britain, unlike the Yangzi valley, successfully escaped the ecological bottleneck posed by simple limits on the quantity of land and maintained rapid economic growth in the nineteenth century.

To answer this question Pomeranz relies upon the method of 'reciprocal' or 'two-way' comparison, which he has adopted from R. Bin Wong.<sup>4</sup> According to Pomeranz, this method allows the historian to view 'both sides of the comparison as "deviations" when seen through the expectations of the other, rather than leaving one as always the norm'.<sup>5</sup> The task then is 'to look for absences, accidents, and obstacles that diverted England from a path that might have made it more like the Yangzi Delta or Gujarat, along with the more usual exercise of looking for blockages that kept non-European areas from reproducing implicitly normalized European paths'.<sup>6</sup>

Consistent with this approach, Pomeranz argues that two

<sup>4</sup> R. Bin Wong, *China Transformed: Historical Change and the Limits of European Experience* (Ithaca, 1997).

<sup>5</sup> Pomeranz, *Great Divergence*, 8.

<sup>6</sup> *Ibid.*

factors were critical for Britain to break out of the ecological trap. The first, developing an argument from E. A. Wrigley, was its abundant supplies of coal, which allowed for the replacement of timber in important industrial processes, most crucially in iron production, and to power the steam engine.<sup>7</sup> The second was the New World plantation complex, which provided cheap calories in the form of sugar and abundant and cheap cotton for the mills of Manchester.<sup>8</sup> China, by contrast, was unable to overcome its ecological constraints. In the eighteenth century the major population centres lay in the Yangzi valley, which was very far from supplies of coal. This mineral, which was largely located in north China, had been effectively exploited in an earlier era when the political centre of China, and consequently population centres, lay closer. By the eighteenth century, however, these abundant deposits of coal remained largely untapped. Furthermore, unlike Britain, the Yangzi valley did not have access to the resources of a periphery that provided cheap and plentiful agricultural products to complement its own production. As a result, in the nineteenth century China succumbed to population pressures and descended into ecological and economic decline. According to Pomeranz, it is this nineteenth- and twentieth-century picture that historians have incorrectly projected into the Chinese past.

## II

The similarities Pomeranz establishes between eastern China and western Europe in the eighteenth century are invaluable. He has marshalled an impressive quantity of data and made sophisticated use of it. His contribution provides a much-needed corrective to glib assumptions of European superiority and will have to be reckoned with in all future writings on the divergence between Europe and Asia. Taken together they represent a seminal contribution to the economic history of Eurasia. His arguments for why China and Britain parted paths in economic development are more problematic, however.

First, there are problems with the method of 'reciprocal' comparison. It is laudable to recognize the defects of taking the

<sup>7</sup> E. A. Wrigley, *Continuity, Chance and Change: The Character of the Industrial Revolution in England* (Cambridge, 1988).

<sup>8</sup> Pomeranz also points to the windfall that the economies of Europe received from New World silver.

European case as the 'normal' path. However, then to conclude that in the absence of coal and the New World the European path of development would have mimicked that of China (or the reverse) ignores the many respects in which China and Europe differed and leaves out many important factors which went into the divergence. Most conspicuously absent is the realm of politics. There is little discussion of state policies, which were fundamental to economic development in western Europe, and in Britain in particular. Nor is there much discussion of labour, save to say that labour markets were equally efficient in China and Europe. This is a significant omission as the politics of labour disciplining are central to numerous accounts of economic and social change in early modern Europe and therefore presumably to Europe's economic divergence.<sup>9</sup>

A further problem with the method of reciprocal comparison is that it treats the different regions of Eurasia in isolation and ignores the important exchanges and links between Europe and Asia, especially in the trade of manufactured goods. This trade in manufactures across the Eurasian land mass provided an important context for economic activities in both Europe and Asia and, because of this trade, the economic pressures and opportunities that actors faced in various parts of Eurasia were radically different, both before and after the divergence. By ignoring this context, Pomeranz presumes a *telos* or, to put it more weakly, a sort of evolution towards economic progress and industrialization. This evolution unfolded in Britain, but came to be blocked in China because certain essential conditions were missing. However, this approach has become increasingly discredited. As H. J. Habakkuk observed nearly forty years ago, 'The attempts often made to distinguish between the "pre-conditions" or "pre-requisites" of growth and growth itself have not it seems to me been fruitful. From [For] most of what are classified as pre-conditions . . . prove on examination to be essential manifestations of growth'.<sup>10</sup>

<sup>9</sup> Sidney Pollard, *The Genesis of Modern Management: A Study of the Industrial Revolution in Great Britain* (Cambridge, Mass., 1965), ch. 5; David Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (Cambridge, 1969), ch. 2; E. P. Thompson, 'Time, Work-Discipline, and Industrial Capitalism', *Past and Present*, no. 38 (Dec. 1967).

<sup>10</sup> H. J. Habakkuk, 'The Historical Experience of Economic Development', in E. A. G. Robinson (ed.), *Problems in Economic Development* (London, 1965), 118.

Second, Pomeranz's focus on the escape from ecological constraints as the key to divergence in paths of development may be misplaced. A logically and temporally prior question must ask why north-western Europe experienced revolutionary technological breakthroughs in the late eighteenth century, which had *the effect of expanding ecological possibilities*. With the exception of the steam engine, Pomeranz consistently downplays the importance of technological change for Europe's path of economic development. For instance, he writes: 'One core, western Europe, was able to escape the proto-industrial cul de sac and transfer handicraft workers into modern industries *as the technology became available*'.<sup>11</sup> This passage makes the transcendence of ecological blockages paramount and obscures both the centrality of technological innovations and the sources of these innovations. Pomeranz goes to great lengths to argue that these breakthroughs were not the product of a dynamic Europe versus a technologically stagnant Asia, and these points are very well taken. Yet between 1750 and 1850 no part of Asia experienced such changes in manufacturing technique, which suggests that far more was at play in the divergence than the overcoming of ecological bottlenecks.

Another limitation of Pomeranz's ecological approach is that it is unable to explain why measures that expanded Europe's ecological frontiers came to be adopted in the first place. The simple presence of resources was not sufficient and Pomeranz himself observes that in the eighteenth century coal was available in Holland 'at a price not that far above its cost in London'.<sup>12</sup> Yet Holland did not lead the way to a new energy economy. Pomeranz attributes the Dutch failure to its 'unusual niche as an exporter of commercial, financial, and insurance services'.<sup>13</sup> Linked to this, we may add the remarkable openness of the Dutch economy in this period, a product of the trader and banker alliance, which dominated the republic. However, throughout his book Pomeranz is reluctant to pursue more fully the role of political as well as social and cultural factors in Europe's divergence.<sup>14</sup>

<sup>11</sup> Pomeranz, *Great Divergence*, 264 (emphasis added).

<sup>12</sup> *Ibid.*, 221.

<sup>13</sup> *Ibid.*

<sup>14</sup> This Dutch failure persisted into the nineteenth century, in striking contrast to Belgium: see Joel Mokyr, *Industrialization in the Low Countries, 1795–1850* (New Haven, 1976), chs. 2–3.

Nor can the breakthroughs be interpreted as a response to ecological pressures, as much of Europe in the eighteenth century had not reached such limits. For instance, ecological factors do not appear to have been decisive for the adoption of coal in British iron production. In the first half of the eighteenth century, British charcoal prices were stable, which suggests that there was no shortage of timber. In the 1750s the price of charcoal began to increase, encouraging the switch to coal in iron manufacturing, but this price rise was not due simply to ecological factors. Charles Hyde has shown that prices for both charcoal and pig iron went up, which he argues was due to a sudden surge in demand for iron. At the same time, British iron producers were unable to pass on higher costs by raising prices because of cheap and plentiful iron imports from Sweden and Russia. It was these structures of costs and prices that made coal a more attractive raw material for iron production.<sup>15</sup> In food as well, Britain does not appear to have been played out in the eighteenth century. Despite a very large increase in bread prices, which was due not to shortages but to the disturbed conditions on the Continent during the Revolutionary and Napoleonic wars, grain output in 1800 was at the same level of fifteen bushels per capita as it had been in 1750.<sup>16</sup>

Although Pomeranz concedes that Britain was not ecologically exhausted before 1800, he repeatedly appeals to an apocalyptic vision of the disaster that would have struck if coal and the New World plantation complex had not saved Britain from hitting the wall ecologically. He writes, for instance, ‘without the dual boons of coal and colonies, Britain would have faced an ecological impasse with no apparent internal solution’.<sup>17</sup> Leaving aside the problem that a statement like this produces no testable hypotheses — after all, we may speculate endlessly about what might have happened — is this an accurate interpretation of nineteenth-century developments?

The massive use of coal certainly made possible an energy

<sup>15</sup> Charles K. Hyde, ‘Technological Change in the British Wrought Iron Industry, 1750–1815: A Reinterpretation’, *Econ. Hist. Rev.*, 2nd ser., xxvii (1974), 195–6. See also Charles K. Hyde, ‘The Adoption of Coke-Smelting by the British Iron Industry, 1709–1790’, *Explorations in Econ. Hist.*, x (1972–3).

<sup>16</sup> These figures were calculated from the data contained in tables 4.1 and 5.1 in Roderick Floud and Donald McCloskey (eds.), *The Economic History of Britain since 1700*, 2nd edn, 3 vols. (Cambridge, 1994), i, 64, 102.

<sup>17</sup> Pomeranz, *Great Divergence*, 218.

economy that far surpassed one based on timber and made possible huge iron output, the steam engine and eventually railways. But should we read this as Britain overcoming an ecological constraint, which was not binding in the first place, or rather tautologically as one of the outcomes of industrialization? In other words, was the adoption of coal the cause of the divergence of the British economy or an effect of other changes, which ultimately were more important? These other changes would include technical advances in iron production, which made it possible both to utilize coal and to increase iron output. Pomeranz has little to say about technical developments such as the potting and stamping process and the puddling and rolling method. The latter, in particular, was crucial as it gave rise to modern techniques of iron production and a great expansion of the British iron industry.<sup>18</sup> Given the importance of technical change for iron production, Carlo Cipolla's framing of the sequence of change seems more accurate: 'One can say that the Industrial Revolution, by introducing large-scale exploitation of new sources of energy, dramatically changed the patterns of the energy budget of human societies'.<sup>19</sup> It was not simply the presence of coal that expanded ecological possibilities, but technical developments that made possible the widespread adoption of coal.

Similarly, the American south provided fibre in quantities far beyond what could have been obtained in Europe itself. But the need for fibre on such a scale, and for cotton in particular, was itself a product of British technological breakthroughs. What would have happened to Manchester if American cotton had not met the demand? This is a question that has no answer and we could speculate endlessly that cotton might have been supplied from Egypt, India, sub-Saharan Africa, or elsewhere. Surprisingly, while Pomeranz argues repeatedly that the lower Yangzi valley had no periphery that could complement its own agricultural production, he pays little attention to the large-scale imports of Indian cotton into Canton, which began in the 1780s. Between 1836 and 1846, for which years reliable data are available, imports from Bombay averaged 56 million pounds (lb) a year, with an additional 25 million pounds shipped from Madras

<sup>18</sup> Hyde, 'Technological Change', 196–203.

<sup>19</sup> Carlo Cipolla, *The Economic History of World Population*, 5th edn (Harmondsworth, 1970), 57 (emphasis added).



and Calcutta.<sup>20</sup> (The total is roughly equal to British cotton imports in 1815.) This is a surprising oversight on Pomeranz's part given that these supplies of cotton surely could have helped the Yangzi delta overcome its own pressures on land. The trade showed signs of weakening from the 1820s and observers attributed this to the growing influx of cheap Manchester and American twist into Canton, which led to a decline in demand for the raw material.<sup>21</sup> Therefore, the rise and fall of this Asian cotton trade shows that far more than ecological factors may be necessary to understand even China's nineteenth-century economic decline.

Finally, New World sugar. While British agriculture in the early nineteenth century could not keep pace with population growth (per capita grain production in 1850 had fallen to ten bushels<sup>22</sup>), it does not follow that *New World* sugar provided the escape from impending ecological doom. After the abolition of slavery in the 1830s, sugar production declined in the British West Indies, and by the 1840s almost 40 per cent of the sugar consumed in Britain came from Africa and India.<sup>23</sup> Even if sugar played the role Pomeranz ascribes to it, the mechanism was not simply the exploitation of the New World. Moreover, sugar imports were not the only supplement to the output of British agriculture. Britain was importing substantial quantities of grain at the time, chiefly from Ireland in the early nineteenth century and later from central and eastern Europe and North America. When imports are included, according to some calculations, grain availability per person was stable between 1800 and 1850.<sup>24</sup> These figures for grain supply, however, must be interpreted in the light of the dampened state of demand in Britain, especially in the second quarter of the nineteenth century. The 1830s and 1840s were very hungry decades, as a downturn in the trade cycle

<sup>20</sup> *Cotton Wool (India): A Return of the Quantity of Cotton Wool Exported from the British Possessions in India*, Parliamentary Papers, 1847 (353), xli, 159–63. See also Louis Dermigny, *La Chine et l'Occident: le commerce à Canton au XVIII<sup>e</sup> siècle, 1719–1833*, 3 vols. (Paris, 1964), iii, 1302.

<sup>21</sup> Michael Greenberg, *British Trade and the Opening of China, 1800–1842* (Cambridge, 1951; repr. New York, 1979), 92; *Cotton Trade (East India): Report of the Committee Appointed by the Government of Bombay, on the Decline of the Cotton Trade*, Parliamentary Papers, 1847 (712), xli, 110.

<sup>22</sup> See n. 16 for the sources for this calculation.

<sup>23</sup> Ralph Davis, *The Industrial Revolution and British Overseas Trade* (Leicester, 1979), 122.

<sup>24</sup> Gregory Clark, Michael Huberman and Peter H. Lindert, 'A British Food Puzzle, 1770–1850', *Econ. Hist. Rev.*, 2nd ser., xlviii (1995), 218.

along with structural changes in the economy subjected the British working class to massive unemployment, widespread pauperism and the merciless working of the New Poor Law.<sup>25</sup> Focusing on the supply side and neglecting demand, as Pomeranz tends to do, produces an incomplete picture of economic conditions and ecological possibilities in Britain.

Nonetheless, sugar did become an important source of calories for the nineteenth-century British diet. But here Pomeranz, while elsewhere relying on Sidney Mintz, omits an important part of his argument, which again has to do with demand. For Mintz, rising sugar consumption was a reflection of systematic inequalities in British society, particularly between men and women and fathers and children. With the establishment of the male breadwinner family, husbands and fathers in the working class came to receive a disproportionate share of household expenditure on food. Men received meat, which was seen as essential for hard, physical work, and other expensive foodstuffs, while women and children subsisted on the cheap calories provided by sugar. Therefore, rising sugar consumption must be placed in the context of gender and age hierarchies in British society.<sup>26</sup>

To sum up, Pomeranz has done us a service in pointing to the relatively neglected ecological dimension in European industrialization. Although ecological pressures may have been central to immiseration in nineteenth-century China, it is mistaken to elevate the escape from them as the most important factor in European economic divergence. The mere existence of resources does not explain the capacity to exploit them. To explain Europe's divergence we must account for the development of this capacity.

### III

For more than a century, the secret of Europe's exceptional economic development has been thought to lie in features that distinguished the economy, polity or culture of Europe from other regions of the world. This approach has produced accounts that are macro-historical or structural in their approach, as they

<sup>25</sup> For a discussion of these decades, see E. J. Hobsbawm, *Industry and Empire* (New York, 1999), ch. 4; Lynn Hollen Lees, *The Solidarities of Strangers: The English Poor Laws and the People, 1700–1948* (Cambridge, 1998), chs. 4, 6.

<sup>26</sup> Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York, 1985), 144–6.

deal with large categories and put forward broad generalizations about essential and enduring differences between Europe and Asia. Divergences in paths of economic development are then attributed to these differences. The writings of Karl Marx on capitalism (a uniquely European phenomenon), Max Weber on instrumental rationality (again a product of European civilization) and E. L. Jones on human capital formation (a product of European demographic and ecological conditions) are exemplary works in this tradition. Kenneth Pomeranz's *Great Divergence*, while its comparative insights lead to a rejection of many previously postulated differences, in its method does not depart from this approach. What distinguishes Europe, or more precisely Britain, is coal, and access to the New World.<sup>27</sup>

Writings on European divergence have long coexisted with another approach to the economic development of Europe in the seventeenth and eighteenth centuries. Many of these writings accept some form of European exceptionalism, but focus far more closely on the *process* of economic growth and development, examining such issues as growth in agriculture and the nuts and bolts of industrialization. In other words, these writings have not been content with simply identifying the structure that made agricultural and industrial growth possible, but seek carefully to reconstruct the path of growth and the factors that promoted or impeded that process. For the case of Britain, Paul Mantoux's *The Industrial Revolution in the Eighteenth Century*, Phyllis Deane's *The First Industrial Nation* and E. J. Hobsbawm's *Industry and Empire* are classic works in this tradition. Of course, these two approaches to European economic development have not been separated into airtight compartments. Several major works on industrialization, perhaps most famously David Landes's *The Unbound Prometheus* (which in many respects forms the foundation for his more recent *The Wealth and Poverty of Nations*), rest upon explicit comparisons with Asia.<sup>28</sup> For the most part, however, the comparative question of why Europe diverged has rarely led to a deep engagement with the complex process

<sup>27</sup> Pomeranz's focus on the structure of the British economy may also explain the rather loose attention to time in his analysis. When discussing Britain he freely ranges from the late seventeenth century to the late nineteenth century without considering the massive transformation of the British economy in these centuries.

<sup>28</sup> Even these are confined to the first chapter of the work.

that was industrialization. Therefore, the task at hand is to bring the insights of comparison to bear upon this historical process.

#### IV

Recent efforts to identify similarities between the core regions of Eurasia should not obscure the very profound differences between east and west. Nor should it be assumed that difference translated invariably into European advantage or superiority. In fact, from the vantage point of regional and global trade in textiles and iron, the two most important manufactured goods in the eighteenth century, the economically most advanced regions of Europe, Britain included, were at a severe disadvantage. The core regions of Asia, as exemplified by the Indian subcontinent, held a competitive advantage in manufacturing, especially in the production of cotton textiles. The source of this advantage lay in lower prices for grain, which allowed Indians simultaneously to maintain high standards of living and to produce manufactured goods at prices Europeans could not match.<sup>29</sup>

From the perspective of world trade in manufactures, European divergence may be reinterpreted as the product of a historical conjuncture between the conditions of global competition and the political institutions of seventeenth- and eighteenth-century Europe, and in particular Britain. Taken together, competition and state policies contribute much towards explaining the path of technological change and the massive reorganization of the work process in Europe, which ultimately produced the great divergence. Such a framework is particularly powerful in explaining the transformation of the cotton and iron industries, the two industries that were indispensable to the early growth and divergence of the British economy. Traditional views of the industrial revolution as well as more recent macroeconomic approaches to British economic history are in agreement that between 1760 and 1830 — the first stage in the divergence between Europe and Asia — cotton and iron formed the backbone of British economic growth.

Cotton alone may have accounted for 50 per cent of total factor

<sup>29</sup> See my 'Rethinking Wages and Competitiveness in the Eighteenth Century: Britain and South India', *Past and Present*, no. 158 (Feb. 1998).

productivity growth in British manufacturing in this period.<sup>30</sup> However, without the iron industry, and of course the diffusion of steam power which took on great importance after 1830,<sup>31</sup> the mechanization of the cotton industry alone would have produced only a shallow economic transformation.<sup>32</sup> Conversely, the rise of the cotton industry and its staggering size meant that it made massive contributions to the spread of iron and steam. The scale of the Manchester industry may be gauged from British cotton consumption, which stood at 80 million pounds in 1815. In that year south India, which only twenty years earlier had been one of the world's major cotton cloth producing regions and whose population was about twice that of Britain's, consumed only 20 million pounds.<sup>33</sup> By 1850, Britain imported nearly *1,000 million pounds* of cotton a year. The profits created in Manchester were indispensable for many economic projects in nineteenth-century Britain, perhaps most importantly for the financing of the early railways. The industry also pioneered numerous innovations. Iron-framed buildings, gas lighting, new standards of working-class housing, the practice of specialized machinery for mass production of components, and the idea of standardized machinery may all be traced to the cotton industry. In addition, the cotton industry stimulated iron-founding, engineering and chemical firms in Glasgow, Lancashire, the West Riding of Yorkshire, and the Vale of Trent.<sup>34</sup>

It is remarkable that technological developments in cotton and iron, as well as the steam engine, were clustered in a very short span of time, and it is tempting to see this, as many have done, as evidence of unique European technological prowess and creativity. But as Pomeranz points out, along with others, Asian technological backwardness has been over-drawn. What most

<sup>30</sup> N. F. R. Crafts, *British Economic Growth during the Industrial Revolution* (Oxford, 1985), 85.

<sup>31</sup> Steam power contributed significantly to British economic growth after 1830: see G. N. von Tunzelman, *Steam Power and British Industrialization to 1860* (Oxford, 1978); Dolores Greenberg, 'Reassessing the Power Patterns of the Industrial Revolution: An Anglo-American Comparison', *Amer. Hist. Rev.*, lxxxvii (1982).

<sup>32</sup> Nevertheless, as the experience of early nineteenth-century New England shows, even industrialization based on cotton and waterpower could produce a dramatic economic transformation.

<sup>33</sup> See my *The Transition to a Colonial Economy: Weavers, Merchants and Kings in South India, 1720–1800* (Cambridge, 2001), 67.

<sup>34</sup> S. D. Chapman, *The Cotton Industry in the Industrial Revolution* (London, 1972; repr. 1977), 68.

distinguished China and India technologically from Europe was their very advanced state of knowledge of things agricultural, especially in the areas of irrigation and water control. Likewise, although India and China possessed sophisticated manufacturing industries with knowledge and techniques unknown to Europeans, the focus of technical change and development was very much on agriculture. Therefore, the contrast is not between a dynamic Europe versus a stagnant Asia, but a path of technological development in Europe that resulted in a massive transformation of manufacturing. The problem then is how to explain this path of technical change.

In the case of cottons there is abundant evidence that the need to out-produce Indian textiles propelled the innovative activities of British cotton producers, and there is much to suggest that the manufacturers themselves saw their activities in this light.<sup>35</sup> Samuel Oldknow, the great late eighteenth-century cotton master, closely followed the market for Indian muslins in Britain; his papers contain extensive correspondence with his London agents on the prices these cloths commanded, the sales of the English East India Company, and even a Company auction list. Of course, earlier in the century major elements of the cotton industry in Lancashire, especially the check manufacturers of Blackburn and Manchester, owed their inspiration to Indian textiles, which they sought to imitate and compete against in the markets of west Africa.<sup>36</sup> Textile producers in India, on the other hand, did not come under these competitive pressures, as they dominated the world trade in cotton stuffs. Nor did textile manufacturers in China, which was self-sufficient in cloth, whether silk, cotton or hemp. For the Indians and the Chinese there was no need to mechanize spinning, rationalize the use of labour, or in other ways transform the manufacturing process. It was these breakthroughs in textile production from the mid eighteenth century that commenced the great divergence between Europe and Asia as Manchester supplanted Indian producers in markets all over the world, and eventually entered the Indian and Chinese markets. Therefore, technological development in textiles in eighteenth-century Britain was not something inherent to Europeans

<sup>35</sup> See my 'Rethinking Wages and Competitiveness in the Eighteenth Century'.

<sup>36</sup> Alfred P. Wadsworth and Julia de Lacy Mann, *The Cotton Trade and Industrial Lancashire, 1600–1780* (Manchester, 1931), 148–61.

and lacking in Asians, but a response to economic pressures and social need.<sup>37</sup>

Similar differences in competitive pressures existed in the iron industry where British manufacturers faced inexpensive iron imports from Sweden and Russia. And as has already been indicated, technical advances in British iron manufacturing in the eighteenth century were closely linked to that competition. Indian iron, on the other hand, was cheap and of high quality. The European Companies sold small quantities of Swedish and Spanish iron in India, much of which was carried as ballast, but in general local production was sufficient for demand, and was even exported.<sup>38</sup> Indian steel was also exceptionally well made and it was sold in Turkey and Persia, according to a British report from the early nineteenth century.<sup>39</sup> In the case of iron, differences in the demand for the metal may have also shaped the path of technological innovation. In Britain, the navy and army were major iron purchasers and the puddling and rolling method may have been stimulated by naval needs.<sup>40</sup> The less developed state of Indian navies and the infrequency of direct military engagements in India, both of which stemmed from very different attitudes to politics and warfare as André Wink, Dirk Kolff and others have observed, most likely translated into much less state stimulus for iron production in India.<sup>41</sup>

These pressures of competition emanating from global and regional markets were a necessary condition for European industrialization and divergence. But they were not sufficient. This is illustrated by the different paths of economic development in

<sup>37</sup> For a brilliant interpretation of twentieth-century Indian industrialization in terms of social need and choice, see Rajnarayan Chandavarkar, 'Industrialization in India before 1947: Conventional Approaches and Alternative Perspectives', *Mod. Asian Studies*, xix (1985).

<sup>38</sup> K. N. Chaudhuri, *The Trading World of Asia and the English East India Company, 1660-1760* (Cambridge, 1978), 221. In the late seventeenth century the Dutch East India Company exported iron products from south India to Batavia; in 1667 this trade stood at nearly half a million pounds of iron products: Tapan Raychaudhuri, 'Non-Agricultural Production: Mughal India', in Irfan Habib and Tapan Raychaudhuri (eds.), *The Cambridge Economic History of India*, i, c.1200-c.1750 (Cambridge, 1982), 275.

<sup>39</sup> Henry Wilkinson, 'On the Cause of the External Pattern: or, Watering of the Damascus Sword-Blades', *Jl Roy. Asiatic Soc. Great Britain and Ireland*, iv (1837).

<sup>40</sup> J. R. Harris, *The British Iron Industry, 1700-1850* (London, 1988), 39-40.

<sup>41</sup> André Wink, 'Sovereignty and Universal Dominion in South Asia', *Indian Econ. and Social Hist. Rev.*, xxi (1984); Dirk H. A. Kolff, 'The End of an Ancien Régime: Colonial War in India, 1798-1818', in Patrick Tuck (ed.), *The East India Company: 1600-1858*, 6 vols. (London, 1998), v, *Warfare, Expansion and Resistance*.

western Europe and the Middle East. Both regions came under competitive pressures from Indian cottons, and imported large quantities of Swedish and Russian iron, but only western Europe forged a response to that competition. Although several factors made possible the European counter to the Indian challenge, the political ideas and institutions that existed in western Europe, and particularly in Britain, were absolutely central. Most importantly, mercantilism emerged in western Europe as an ideology of state formation, economic improvement and labour disciplining.

Since at least the sixteenth century Englishmen had been arguing that it was better to produce at home than to import, even if the cost was greater. Sir Thomas Smith, for example, declared in 1549: 'It were better for us to pay more to our own people for wares than less to strangers; for how little gains so ever go over, it is lost to us clear. But how much so ever the gains be, that go from one of us to another, it is all within the Realm'.<sup>42</sup> With this economic philosophy, the English, and then British, state acted to protect the home market from competitive pressures in both textiles and iron and these policies permitted these industries to innovate and respond to that competition.<sup>43</sup> British manufacturers were well aware of the importance of these policies of protection. As late as 1785 a pamphleteer in Manchester wrote that 'an alleviation of duties on India muslins and callicos, or giving encouragement to them by laying a heavier tax upon the good cotton goods of this country, especially upon the infant manufac-

<sup>42</sup> *A Discourse of the Common Weal of this Realm of England*, ed. Elizabeth Lamond (Cambridge, 1954), 65 (spelling has been modernized). For an exploration of the many projects this economic philosophy gave rise to, see Joan Thirsk, *Economic Policy and Projects: The Development of a Consumer Society in Early Modern England* (Oxford, 1978).

<sup>43</sup> For a discussion of protection for cotton manufacturing, see Patrick O'Brien, Trevor Griffiths and Philip Hunt, 'Political Components of the Industrial Revolution: Parliament and the English Cotton Industry, 1660–1774', *Econ. Hist. Rev.*, 2nd ser., xlv (1991). According to Julia de Lacy Mann, 'It was protection which was almost entirely responsible for the use of English-made cottons by the printers. Had it not been for the artificial stimulus provided in 1721, it seems doubtful whether there would have been sufficient incentive to produce a satisfactory material in any quantity': Wadsworth and Mann, *Cotton Trade and Industrial Lancashire*, 144. In the case of iron, Charles Hyde has written, 'The high bar iron prices prevalent over the period 1795–1815 were not simply a reflexion of high wartime demand. The tariff policy followed by the government during these years kept bar iron prices artificially high and allowed British ironmasters to drive foreign competitors from the domestic market': Hyde, 'Technological Change', 204.



ture of muslins and fine callicos, must depress and discourage the industry and ingenuity of our manufacturers at home'.<sup>44</sup>

In marked contrast to these British policies, those of the Ottomans focused on provisioning, with the goal of ensuring abundant supplies of goods at low prices. Of course, there were some exceptions to this general rule, especially when it came to procuring essential goods for the military or the state, but for the most part state policy with respect to trade and manufacturing followed the dictate of provisioning. And from this perspective, low-priced Indian cloth was welcome. To the Ottomans it made no difference if goods were made locally or imported, as long as the price was low and the supply was plentiful.<sup>45</sup> As a consequence, textile manufacturers in Ottoman territories received no protection from imports of cheap Indian cotton cloth. Without this insulation from continued competition, their attempts to imitate Indian cloth were on a much smaller scale and far less successful.<sup>46</sup> Similarly, in the case of Safavid Iran, the lack of restrictions on Indian cloth imports translated into a major drain of specie to the trading world of the Indian Ocean. This trade imbalance created a host of economic and political problems and it figures prominently in explanations for the early eighteenth-century decline of the Safavid state.<sup>47</sup>

The state also made a decisive contribution to British economic divergence through its disciplining of labour. The regimentation

<sup>44</sup> John Wright, M.D., *An Address to the Members of Both Houses of Parliament on the Late Tax Laid on Fustian and Other Cotton Goods* (Warrington, 1785), 9–10.

<sup>45</sup> Halil İnalçık, 'The Ottoman State: Economy and Society, 1300–1600', in Halil İnalçık and Donald Quataert (eds.), *An Economic and Social History of the Ottoman Empire 1300–1914*, 2 vols. (Cambridge, 1994), i, 44–54; Mehmet Genç, 'Ottoman Industry in the Eighteenth Century: General Framework, Characteristics, and Main Trends', in Donald Quataert (ed.), *Manufacturing in the Ottoman Empire and Turkey, 1500–1950* (Albany, 1994); Şevket Pamuk, *A Monetary History of the Ottoman Empire* (Cambridge, 2000), 11–15.

<sup>46</sup> Halil İnalçık, 'The Ottoman Cotton Market and India: The Role of Labor Cost in Market Competition', in his *The Middle East and the Balkans under the Ottoman Empire: Essays on Economy and Society* (Bloomington, 1993); Halil İnalçık, 'When and How British Cotton Goods Invaded the Levant Markets', in Huri İslamoğlu-İnan (ed.), *The Ottoman Empire and the World Economy* (Cambridge, 1987), 374–5.

<sup>47</sup> John Foran, 'The Long Fall of the Safavid Dynasty: Moving beyond the Standard Views', *Internat. J. Middle East Studies*, xxiv (1992). For details on imports of Indian cloth to Iran, see Rudiger Klein, 'Trade in the Safavid Port City Bandar Abbas and the Persian Gulf Area (ca.1600–1689): A Study of Selected Aspects' (Univ. of London Ph.D. thesis, 1994), ch. 5. For a more general discussion of economic policies of the Safavid state, see Rudolph P. Matthee, *The Politics of Trade in Safavid Iran: Silk for Silver, 1600–1730* (Cambridge, 1999), 61–74.

and intensification of work, the massive increase in working hours, and the rise of new forms of work organization such as the factory were crucial for industrialization and economic development in eighteenth- and nineteenth-century Britain.<sup>48</sup> These changes increased the 'efficiency' of labour and cheapened the costs of production, making it possible for British manufacturers to respond to competitive pressures. According to George Unwin, in the case of Samuel Oldknow, 'The effect of the *competition of India* combined with that of Lancashire and Scotland was to give Oldknow a stronger impetus towards the adoption of the factory system'.<sup>49</sup> This remaking of the lives of labourers to meet the needs of manufacturers was heavily dependent upon state policies and regulations, including measures such as the combination acts, limits on the mobility of labourers, and regulations on the form of labour contracts.<sup>50</sup> Such state policies had a long history in Britain, but they received further justification from mercantilist thinking, which was deeply concerned with labour in the name of national wealth and competitiveness.<sup>51</sup> The relationship between the state and labour that was found in eighteenth-century Britain had no counterpart in much of Asia. In India the use of state power to discipline labour was introduced with the establishment of British colonial rule.<sup>52</sup> Such exercise of state power was also foreign to Safavid Iran and the Ottoman empire. In the Safavid case, as one historian has put it, peasants and labourers always possessed the right to rebel and the freedom to flee.<sup>53</sup> In the Ottoman empire, guilds continued to enjoy their monopoly

<sup>48</sup> It is striking that in the eighteenth century no part of Asia experienced the huge increase in working hours that Britain did. For the British story, see Hans-Joachim Voth, *Time and Work in England, 1750–1830* (Oxford, 2000).

<sup>49</sup> George Unwin, *Samuel Oldknow and the Arkwrights: The Industrial Revolution at Stockport and Marple*, 2nd edn (New York, 1968), 98 (emphasis added).

<sup>50</sup> For further discussion, see T. S. Ashton, *An Economic History of England: The 18th Century* (London, 1955), ch. 7; John Rule, *The Experience of Labour in Eighteenth-Century Industry* (London, 1981); Peter Linebaugh, *The London Hanged* (Cambridge, 1992).

<sup>51</sup> The classic treatment still remains Edgar S. Furniss, *The Position of the Laborer in a System of Nationalism: A Study in the Labor Theories of the Later English Mercantilists* (Boston, 1920).

<sup>52</sup> See my *Transition to a Colonial Economy*, ch. 5.

<sup>53</sup> Roger Savory, 'Notes on the Safavid State', *Iranian Studies*, i (1968), 98. This may partly explain Jean Chardin's observation that peasants in Safavid Iran were better off than their western European counterparts: see Roger Savory, 'The Safavid State and Polity', *Iranian Studies*, vii (1974), 185–6; Amin Banani, 'Reflections on the Social and Economic Structure of Safavid Persia at its Zenith', *Iranian Studies*, xi (1978), 97.

privileges throughout the eighteenth century.<sup>54</sup> It is likely that the failure of cloth manufacturers and merchants in the Middle East to out-compete Indian cottons may in part be traced to their inability to discipline labour and lower wages. Therefore, the political institutions governing labour in Britain were pivotal for its eighteenth-century economic divergence.

## V

With the *Great Divergence*, Kenneth Pomeranz has moved the debate on Eurasian economic development on to entirely novel terrain. His innovative and sophisticated comparisons between the core regions of Eurasia reveal a world of surprising resemblances. From this point on, it will be difficult to sustain tired and worn-out arguments about European superiority. Thanks to the far-reaching comparative work of Pomeranz, the debate on the great divergence will now flourish on a much higher plane. Nevertheless, there remains much room for diverse perspectives on the forces that produced divergence, and historians will need to move beyond broad comparison to consider in detail the interactions between the core regions of Eurasia. And we must not only consider ecological factors, but also technology, the state and labour.

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<sup>54</sup> Bruce McGowan, 'The Age of the Ayans, 1699–1812', in İnalcık and Quataert (eds.), *Economic and Social History of the Ottoman Empire*, ii, 695–709.