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CHAPTER ONE

THE WAREHOUSE OF THE WORLD
 COMMERCE AND PRODUCTION IN THE EARLY
 MODERN ATLANTIC WORLD

In the Great Warehouse

			cwt.qr.lb	@	£.s.d.
Iron Crows			58.0.4	21/-	60.18.19
	Old				
Brewer's Squares			274.2.15	12/6	0.10.0
Broads Short			67.0.24	15/6	52.1.10
	Swedish		01.1.25	21/3	1.11.3
Steel Blister'd			11.1.16	23/-	14.10.10
	Rolled		3.0.6	25/-	3.16.4
	German		0.2.6	44/-	1.9.1
	Faggot		0.3.0	25/-	0.18.9
Rod Iron			62.1.0	17/6	54.12.6
Outside Rods			7.0.0	16/-	5.12.0
Rod wire			1.2.18	21/-	1.4.10
Strong hoops			2.1.1	17/6	1.19.6
Rolled plate			1.1.4	27/-	1.17.1
Mill hoops			5.1.6	16/-	4.4.10
Coach & Chaize	Tyre		3.3.22	22/-	4.6.10
Cart Tyre			1.3.0	20/-	1.15.0
				
Hoes Barbados					
	Narrow	No. 0	24 & 1)	
		1	185 & 8)	
		2	391 & 8)	8/-
		3	70 & 9)	268.17.4
	Broad	No. 1	86)	
		2	95 & 10)	12/-
		3	59 & 10)	145.0.0
[Hoes] Jamaica		No. 0	72 & 8)	
		1	138 & 11)	12/-
		2	24 & 3)	141.10.0
[Hoes] Carolina		No. 0	88 & 11)	
		1	46 & 8)	13/-
		2	9)	93.19.7
				

In the Nail Warehouse

Flat heads	4lb	42m	1/6	3.3.0
	9	71	2/8	9.9.4
	11	94	3/2	14.17.8
	14	23	3/9	4.7.2
Sharp	9	36	2/8	4.16.0
	10	52	2/11	7.11.8
	11	213	3/2	33.16.1
	14	9	3/9	1.16.11
	18	3	4/8	0.16.6
	20	15	5/2	3.17.6
	21	47	5/4	12.15.4
Clasp	22	15	5/7	4.5.9
	7	210	2/4	24.10.0
	20	48	5/3	12.12.0
Flat points	21	48	5/5	13.2.0
	7	110	2/4	12.16.8
	11	211	3/2	33.8.2
	14	22	3/9	4.5.4

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In the Bar Iron Warehouse

Russia Iron	95.3.7	13/—	62.5.7
Swedish squares	3.3.7	17/—	3.4.10
Old Iron	34.1.1	11/—	18.16.10
Pig hogs	12.0.7	15/6	9.6.11
Short Broads	14.0.0	15/6	10.17.0
Swedish ditto	1.2.15	21/3	1.14.8
Thimble Iron	21.1.1	17/—	18.1.5
Boltstaves	98.1.24	19/—	93.10.9
Scrap steel	15.2.24	14/—	11.0.0

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The Warehouse

The list above is part of an inventory of goods stored in the warehouses of Crowley Hallett & Co at Deptford in 1751. The warren of shops, cellars and garrets occupied by Hallett and his partners was crammed with a great miscellany of iron and steel articles.¹ Each entry in the inventory veiled untold processes and transactions, for the nails, hinges,

¹ BL, Oriental and India Office Collections, MSS Eur F 218/115.

chains or shovels that had come to a temporary rest in the shuttered darkness of Hallett & Co's warehouses had arrived by the most circuitous and varied of routes. The blister steel in the Great Warehouse had been shipped from the North East of England, where iron from the Swedish county of Uppland underwent conversion in cementation furnaces; and it was iron from the Basque Country that lay ready for the smiths in the Company's anchor shop beside Deptford Creek. Some commodities had already been carried thousands of miles. The Russian bar iron, for example, had been smelted and refined amid the *taiga*; the distance from Russia's Ural frontier to the Thames was so great, and the logistical difficulties so acute, that two years were required for the journey. Other goods were being held in readiness for shipment across the Atlantic. The destination of different plantation hoes, each dedicated to a specific form of tropical agriculture, was announced by their description in the inventory. 'Hoes Barbados' were distinguished from 'Hoes Jamaica' and from 'Hoes Carolina'.

Hallett & Co's warehouse was home to a range of rather prosaic goods. Whip saws and poll axes had none of the finesse that polished Hanoverian consumers looked for in foliated Sheffield plate or japanned *objets*. These were working tools, not ivory-handled table cutlery. The Caribbean-bound hoes had a severe practicality to them, suggesting little of the sugar or coffee that would be served in metropolitan salons. Much has been written in recent years about the role of exotic groceries and tropical timber in enriching the material culture of eighteenth-century Britain; but for all that, it was the humble tools that lay oiled and wrapped in Deptford that were of fundamental importance for Britain's Atlantic empire. They were at the commercial hinge that joined Baltic Europe—the Europe of rye bread and herring, of tar and potash—to the western ocean. The English merchantmen that heaved their way south to the Canaries and then westward on the trade winds to the Antilles were held together by hemp from Riga and by bolts and hoops beaten out of Swedish iron. And every one of the steeled machetes swung by enslaved Africans in Jamaica originated in ore that had been hauled from the giant mine at Dannemora, 60° north of the equator. In short, the westward advance of British capitalism drew strength from a northern hinterland that was rich in the mineral and vegetable resources that Britain lacked. It is that relationship that supplies the main theme of this book: how trade between the Baltic and Britain—more particularly, the trade in iron—contributed to the world economy in the eighteenth century.



Map 1.1. Deptford and Greenwich in the 1740s, as shown in John Rocque's *Cities of London, Westminster, the Borough of Southwark, with the Country near Ten Miles around* (1746).

Courtesy of the Guildhall Library, London.

Caption: Deptford, three miles below London Bridge, was an important staging post for the export of English ironmongery, where many hardware merchants maintained warehouses. With its anchor shops and a naval base ('The King's Yard'), Deptford was host to a lively maritime economy. A little further downstream was the imposing Royal Naval Hospital at Greenwich, and just beyond, the warehouses of Theodosia Crowley.



Illustration 1.1. The Royal Dockyard, Deptford in the 1750s.

Courtesy of the National Maritime Museum, London.

Caption: This 1757 painting by John Cleveley the Elder shows the *Cambridge*, a 100-gun man-of-war, being floated from the dry-dock in which she was built. The Great Storehouse of the Yard stands adjacent. The warehouses of Crowley Hallett & Co were just downstream, where Deptford Creek emptied into the Thames.

In all, Crowley Hallett and his partners had goods valued at £13,000 stored at Deptford and at locations in the City of London. At Greenwich, a few hundred yards to the east, a still larger magazine could be found. The Thameside depot of Theodosia Crowley, the aunt of Crowley Hallett, was unrivalled for the range of hardwares that it housed, for ‘the Lady Crowley’ was Britain’s foremost manufacturer.² When inventoried in 1728, upon the death of Theodosia’s husband John, the goods that lined the racks and gangways of the Greenwich warehouse were appraised at £48,115. The variety was such as to tax the descriptive powers of Mrs Crowley’s clerks. Over 80 types of file were manufactured at one of her factories on Tyneside, and 154 varieties of nail emerged from the complex of workshops she owned at neighbouring Winlaton.

The inventory was a device for bringing order to this tumult of goods. It categorised and labelled, fixing on metallic objects designations that would be as well understood by the storekeepers who retailed them in tidewater Virginia as by the artisans in south Staffordshire who had hammered them out. The inventory also enumerated, assigning weight and measure to the contents of the warehouse. Above all, the inventory imposed synchrony on articles that had been fabricated at various points in time and that were at different stages in their life-cycles as commodities. For the sake of analytical clarity it immobilised goods that were in transnational flux.³

Although the inventory is an ancient way of handling data, one that can be found on the Sumerian clay tablets that are the earliest forms of human inscription, it had particular appeal for the early eighteenth-century European—still more the British—mind. It was a tool of enormous utility for a society in which the ‘exchange of forms of mobile property’ had a new salience, threatening, as many contemporaries saw it, the eminence of land as the embodiment of wealth. It was a means of mapping out a ‘world of moving objects’ in which novel commodities proliferated and freshly minted financial instruments hastened the circulation of goods.⁴ Yet the zest for listing and quantifying that was so

² For the Crowley family see M.W. Flinn, *Men of iron: the Crowleys in the early iron industry* (Edinburgh, 1962).

³ See the discussion in Jack Goody, *The domestication of the savage mind* (Cambridge, 1977), chapter 5.

⁴ Quotations taken from J.G.A. Pocock, *Virtues, commerce, and history: essays on political thought and history, chiefly in the eighteenth century* (Cambridge, 1985), p. 109.

marked a feature of Augustan England masked a conceptual difficulty. How was wealth to be defined? And were certain forms of property more fruitful than others? How, to extend the question, was new wealth generated? And how best retained?

Daniel Defoe (*c.* 1660–1731) supplied one answer with a hydraulic metaphor:

...an estate's a pond, but trade's a spring: the first, if it keeps full, and the water wholesome, by the ordinary supplies and drains from the neighboring grounds, it is well, and it is all that is expected; but the other is an unexhausted current, which not only fills the pond and keeps it full, but is continually running over, and fills all the lower ponds and places about it.⁵

The agrarian world, in other words, was stable and secure, but that was 'all that [could be] expected'. Landed property was stately but it was not dynamic. The generation of new wealth depended upon trade and the protean energies that it embodied. For Defoe, as for the mercantilist writers of the seventeenth century, it was axiomatic that foreign trade was the key to economic aggrandisement. If the shipment of British goods to overseas markets outweighed the influx of foreign-made goods onto the domestic market then the nation's wealth would grow. Foreign merchants would have to make good their deficit by shipping bullion to their British counterparts—a satisfyingly tangible settlement of accounts. Such a desirable state of affairs should be enforced, wherever possible, by appropriate legislation. The Navigation Acts of the 1650s did just that. Overseas trade was to be conducted in British or colonial-made bottoms, the colonies were to be the exclusive preserve of British exporters, and the most valuable colonial goods could only be shipped to foreign markets via British ports.

It was the necessity of monitoring trade that made the listing and enumerating of goods such an important practice in the early modern period. Mercantilist thinkers believed that wealth was a finite substance; it comprised products of the natural world, which were, of necessity, fixed in extent. It followed, then, that enrichment, whether of nations or individuals, would be the result of capturing a larger share of the wealth that a benign providence had put at humankind's disposal. Circulation should therefore take priority over production, and little importance was to be attached to consumption. In mercantilist theory

⁵ Daniel Defoe, *The complete English tradesman* (1738; first edn 1725) p. 322.

it was the movement of goods that merited the most intense scrutiny, not the method of their fabrication or the final uses to which they were put.⁶ It was this that accounted for the salience of the inventory as an intellectual and organizational device in the mercantilist age.

But this is to treat mercantilism as a static mode of thinking when it was not. Although circulation and exchange were ever the preoccupations of mercantilist thought, by the end of the seventeenth century there was a keener appreciation of production. The workshop, so to speak, was encroaching upon the warehouse. Debate over the 'balance of trade', which early theorists such as Thomas Mun and Edward Misselden had considered largely in terms of the inflow and efflux of specie, gave way to discussion on the effective exploitation of labour. Later seventeenth-century controversialists such as Nicholas Barbon and Sir Josiah Child placed more emphasis on the role of commerce in providing employment. A vigorous promotion of trade would boost manufacturing activity, which would in turn encourage the growth of population. A large population, industriously employed, was identified as a central component of national wealth.⁷

The later mercantilists took a more capacious view of trade, one that extended beyond the act of exchange to include aspects of production. Defoe presented trade as a complex and ambiguous phenomenon. 'Trade', he wrote in his *Plan of the English commerce* (1728), 'like Religion, is what every Body talks of, but few understand: The very Term is dubious, and in its ordinary Acceptation, not sufficiently explain'd'. Defoe ventured a clarification that explicitly yoked production to exchange:⁸

The general heads of Home-Trade are best contain'd in the *two* plain and homely Terms *Labouring* and *Dealing*. 1st *The Labouring Part*, this consists of Art, Handicraft, and all Kinds of Manufactures; and those who are employ'd in these Works, are properly called *Mechanicks*; they are employ'd, generally speaking, about the first Principles of Trade, (*viz*) the Product of the *Land* or of the *Sea*, or of the Animals living on both: In a Word, the ordinary Produce of the *vegetative* and *sensative* Life; such as Metals, Minerals and Plants, the immediate Produce of *Vegetation*, or

⁶ Lars Magnusson, *Mercantilism: the shaping of an economic language* (1994), pp. 68–80.

⁷ Joyce Appleby, *Economic thought and ideology in seventeenth-century England* (Princeton, 1978), pp. 112 and 154ff; Magnusson, *Mercantilism*, pp. 134–38. See also Julian Hoppit, 'Political arithmetic in eighteenth-century England', *Economic History Review*, XLIX, 3 (1996), 516–40.

⁸ Daniel Defoe, *Plan of the English commerce. Being a complete prospect of the trade of this Nation, as well home as foreign* (2nd edn, London, 1737), pp. 2ff.

such as Flesh, Skins, Hair, Wool, Silk &c. grown with, and produc'd by the Animals as the Effect of *sensitive* Life.

2. *The Dealing Part*; this consists of handing about all the several Productions of Art and Labour, when finish'd by the Hand of the industrious Mechanick, and made useful to Mankind; conveying them from Place to Place, and from one Country to another, as the Necessity and the Convenience of the People call for them; and that upon such Terms and Conditions of Delivery, as they can best agree about among themselves, and this is Trade...

'One vast Piece of Machinery'

'Dealing and Manufacturing', Defoe concluded, 'comprehends all Trade.'⁹ Malachy Postlethwayt took up the theme. The entry on 'Manufacturers' in his *Universal dictionary of trade and commerce* (1751) began with a conventional genuflection to the bounty of nature, but Postlethwayt moved on to advocate a closer attention to manufacturing.

We begin to be now convinced, that we are nearly as much enriched by the labours of our fellow-creatures, as by the productions of the earth; and, if we have reason to rejoice at the abundance which nature, from year to year, produces for us, we may reap no less reasonable satisfaction from all the variety of employments in human society, and especially by means of our manufactural arts. The first proof of this have been taken from numberless kinds of business, which our servants and the very meanest labourers perform for us; not in our houses only, but from one end of the earth to the other: what they are doing on the banks of Newfoundland, at Potosi, at Mocha, or in the island of Amboyna, concerns us no less than the being decent in our apparel and habitations. Let us consider the reason we have to esteem artizans of every kind for their industry, and find new motives, from the numberless services they do us, to rectify our way of thinking concerning them.¹⁰

Joseph Massey, writing in 1760, concurred. Production and trade were functionally integrated: '[t]he various Branches of our Manufacture and

⁹ Defoe, *Plan*, p. 3.

¹⁰ Malachy Postlethwayt, *The universal dictionary of trade and commerce: with large additions and improvements* (4th edn, London, 1774), sub 'Manufacturers'. Postlethwayt alluded to four of the major centres of world trade: the great cod fishery of the Grand Banks, the immense Andean silver mine at Potosi, the coffee-growing hinterland of the Arabian port of Mocha, and the East Indian spice island of Amboina.

Trade, when nationally considered, may aptly enough be compared to one vast Piece of Machinery'.¹¹

A willingness to look upon manufacturers and artisans in a positive light could also be found among contributors to the *Encyclopédie* (1751–1766), the *magnum opus* of the French Enlightenment. Production had a pivotal position in the intellectual universe that the encyclopédists defined. They did not share the mercantilists' reverence for trade; their concern was to bestow 'a new dignity on craft and technology'.¹² Denis Diderot, editor-in-chief of the enterprise, boasted of the unusual lengths to which his contributors had gone in their pursuit of knowledge:

We addressed ourselves to the most skilful artisans of Paris and the kingdom: we took the trouble to go into their workshops, to question them, to write under their dictation, to develop their thoughts, to draw from them the terms proper to their professions...¹³

The encyclopédists were generally respectful of the craftsmen whose practices they described. The expertise of artisans should be acknowledged, Diderot thought, and the self-regard that it bred in workmen tolerated as 'the only means to obtain from them more perfect products'.¹⁴ Yet the *Encyclopédie* was as prescriptive as it was descriptive. The illustrative plates that accompanied the *Encyclopédie* appeared to fulfil Diderot's claims for the work as a repository of concrete, useful knowledge, but the plates presented a vision of workshop practice that was, despite the detailed depiction of tools, abstract and deracinated. Operatives were shown in postures that were curiously lifeless, gesturing towards the implements with which they laboured rather than wielding them. The workshop as envisioned by the encyclopédists was far removed from the clutter, noise and noisomeness of the actual *atelier*. The project of the *Encyclopédie* was to critique the hierarchies of the *ancien régime*. This was most clearly the case with respect to the aristocracy and the Church, but the encyclopédists also detected obscurantism in the workshop where, they asserted, craft mystery and artisanal conviviality

¹¹ Joseph Massey, *Representation concerning the knowledge of commerce as a national concern* (1760), quoted in Hoppit, 'Political arithmetic', 521.

¹² C.J. Koeppe, 'The alphabetical order: work in Diderot's *Encyclopédie*', in S.L. Kaplan and C.J. Koeppe (eds), *Work in France: representations, meaning, organization, and practice* (Ithaca, 1986), p. 239.

¹³ Denis Diderot, 'Prospectus to *Encyclopédie*', quoted in Koeppe, 'Alphabetical order', p. 248.

¹⁴ Denis Diderot, 'Arts' in *Encyclopédie*, quoted in Koeppe, 'Alphabetical order', p. 240.

stood in the way of rational, productive labour—hence the conceptual concern with the division of labour as a way of reducing human toil to a scientifically irreducible core, shorn of the drinking, joshing, feasting, cruel horseplay and camaraderie that encrusted workshop routine in the Paris of Louis XV.

The *Encyclopédie* devoted 5,000 words to the common pin, an item that ‘undergoes eighteen operations before it gets into the shops’.¹⁵ In doing so, the *Encyclopédie* anticipated Adam Smith, who famously extolled pin making in the opening pages of *The wealth of nations*. This ‘very trifling manufacture’, as Smith described it, exemplified the ‘increase in the productive powers of labour’ brought about by the division of labour. ‘One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head... the important business of making a pin is, in this manner, divided into about eighteen distinct operations’.¹⁶ An opulent nation, Smith declared, was one that had carried the division of labour to its furthest extent. Yet the division of labour in manufacturing industry was not arbitrary; it was governed by the extent of the market. An extensive market allowed for the subdivision of tasks, whereas in the ‘lone houses and small villages which are scattered about in so desert a country as the Highlands of Scotland, every farmer must be butcher, baker and brewer for his own family’. By linking the division of labour to the extent of the market Smith posited a firm and mutually beneficial relationship between trade and production. The two marched *pari passu*.¹⁷

‘In the stages that preceded capitalist society’, Karl Marx averred, ‘it was trade that prevailed over industry; in modern society it is the reverse.’¹⁸ From his vantage point in the nineteenth-century industrial

¹⁵ Quoted in Philipp Blom, *Encyclopédie: the triumph of reason in an unreasonable age* (2004), p. 144.

¹⁶ Adam Smith, *An inquiry into the nature and causes of the wealth of nations* (1776; Indianapolis, 1981), p. 15.

¹⁷ It was once common to speak of a Smithian revolution in economic thought. Recent authorities are more circumspect, allowing for greater continuity between Smith and the mercantilist writers against whom he set himself. See Appleby, *Economic thought*, pp. 94, 182, 202 and 271ff, and Magnusson, *Mercantilism*, pp. 1ff. Studies linking mercantilism and the Enlightenment are in short supply. For one important exception see John Robertson, ‘The Enlightenment above national context: political economy in eighteenth-century Scotland and Naples’, *Historical Journal*, XL, 3 (1997), 667–97, which identifies political economy, a study of ‘human betterment’, as being at the very core of the Enlightenment project (673).

¹⁸ Karl Marx, *Capital: a critique of political economy*, vol. III (Harmondsworth, 1981), p. 448.

world, Marx could be confident in this assertion. For the economic theorists who preceded him the situation was less clear-cut. The relationship between commerce and production was problematic and whether one should be assigned priority over the other a matter of dispute and puzzlement. In the eighteenth century, as high mercantilist theory fell from favour, models that emphasised the primacy of commerce gave way to those that acknowledged the wealth-generating capacities of manufacturing industry. Enlightenment thinkers dwelt more upon the reciprocity of trade and production and hesitated about elevating one over the other.

This book takes the analytical ambivalence towards trade and production in early eighteenth-century economic discourse as its point of departure. That ambivalence should not be viewed as a sign of intellectual bewilderment; rather, it should be seen as reflecting a reality whose features were hybrid and transitional, in which trade and production were intermelled in such a way that it would be impossible to speak of one as dominant. When contemporaries spoke of the 'Iron Trade' they spoke of trade as Defoe defined it: a process that comprehended 'Dealing *and* Manufacturing' [italics added]. When a group of eighteenth-century ironmasters declared that the 'Iron Trade is beyond all dispute for Employment of Hands & on all other Accts the second in ye Kingdom', acknowledging the seniority only of woollen textiles, they were defining the sector as extending far beyond blast furnaces and forges.¹⁹ Those capital-intensive installations gave work to fewer than 1500 men nationally at the mid century; far larger numbers, tens of thousands more, were employed in the making of hardware. All of them, nailers and scythe grinders as much as blast furnace keepers, were seen as members of the iron trade. Equally, the capitalists who were concerned in the iron trade rarely restricted themselves to a single facet of production. Crowley Hallett and his partners were exemplars in this respect. They were international merchants who imported iron from Stockholm and shipped hardware to the New World; they were industrialists who owned blast furnaces, forges and slitting mills; and they were wholesale ironmongers. They roved across the boundaries that would later demarcate 'primary processing', 'secondary manufacturing', and 'wholesale distribution'.

¹⁹ Sheffield Archives, SpSt 60487.

The Swedish traveller Samuel Schröder showed similarly scant regard for sectoral boundaries when he compiled his ‘Notes on the English Iron Trade’ in 1749. His starting point was a survey of bar iron making at English forges. That led to a discussion of the market for bar iron in Britain, and how imports from Sweden, Russia, Spain and the American colonies swirled about it. A description of the uses to which malleable iron was put in British manufacturing followed. Finally, Schröder addressed the marketing of British-made hardware domestically and internationally. Samuel Schröder’s approach prefigures that taken in this book. Our aim is to range across sectoral and national frontiers, and by so doing disinter a commercial web that once joined the Baltic and Atlantic worlds. In this, forges in Siberia and *Bergslagen* (the iron making region of central Sweden) were yoked to the metal ware manufacturing districts of the English Midlands, and the articles wrought up in Dudley or Wednesbury were consigned to places as varied as the Bight of Biafra and the Carolina Lowcountry.

Iron Histories

By adopting this wide-angle perspective on the making and marketing of iron and iron wares we depart from established historiographical practice in both Britain and Sweden. Writing on the British iron industry has been surprisingly sparse given the centrality that the industry had for the Industrial Revolution. Major studies have been few and far between, dwarfed by those devoted to textiles and comfortably out-numbered by those concerning coal. T.S. Ashton’s classic study of 1924, *Iron and steel in the Industrial Revolution*, set the tone for much of what followed.²⁰ A magisterial treatment of its subject, Ashton’s attention to technological change provided a template from which his successors were reluctant to depart. The origins of coke smelting developed a sub-literature all of its own, whilst the most important synoptic addition to the canon, Charles K. Hyde’s *Technological change and the British iron industry 1700–1870* (1977), cleaved to Ashton’s priorities, its methodological superiority notwithstanding.²¹

²⁰ T.S. Ashton, *Iron and steel in the Industrial Revolution* (Manchester, 1924; revised edition 1963).

²¹ See R.A. Mott, ‘Abraham Darby (I and II) and the coal-iron industry’, *Transactions of the Newcomen Society*, XXXI (1957–59), and *idem*, ‘The Coalbrookdale group

The historiography of British iron making has been obdurately supply-sided. Revisions to Ashton have been made by those who wished to reassess the take-up of new technologies (in the case of Hyde), and by those who disputed Ashton's gloomy assessment of the iron industry in the last decades of the charcoal era (in the case of Flinn and Hammersley), but little has been done to explore the use of iron.²² Very little notice has been taken of the fact that most of the iron consumed in the British Isles between the 1720s and the 1790s would have been of Swedish or Russian provenance; massive import penetration, a matter of great concern for contemporaries, has gone largely unremarked by historians. Indeed, the market for malleable iron in Britain has gone virtually unexplored.²³ Insofar as explorations have been made, they have been oblique and indirect, embedded in studies of the entrepreneurial organisation of the iron industry in the charcoal era. By the late seventeenth century the British iron industry comprised a number of interlocking partnerships, each controlling a network of blast furnaces, forges and processing mills, and each with members engaged in the hardware trades. These were meticulously, not to say exhaustively, investigated in the mid-twentieth century. The best-known of the partnerships, that centred on the Foley family in the West Midlands, was unravelled by B.L.C. Johnson in the 1950s.²⁴ Arthur

Horsehay works: Part I', *Transactions of the Newcomen Society*, XXXI (1957–59), 271–87 and 'Part II', XXXII (1959–60), 43–56, and more recently Nancy Cox, 'Imagination and innovation of an industrial pioneer: the first Abraham Darby', *Industrial Archaeology Review*, XII, 2 (1990), 127–44.

²² M.W. Flinn, 'The growth of the English iron industry 1660–1760', *Economic History Review*, XI (1958), 144–53, and G.F. Hammersley, 'The charcoal iron industry and its fuel', *Economic History Review*, XXVI (1973), 593–613. For an overview see J.R. Harris, *The British iron industry 1700–1850* (1988).

²³ Gross domestic consumption of bar iron is calculated in Peter King, 'The production and consumption of bar iron in early modern England and Wales', *Economic History Review*, LVIII, 1 (2005), 1–33, but the functioning of the market is not attended to.

²⁴ B.L.C. Johnson, 'The Stour valley iron industry in the late seventeenth century', *Transactions of the Worcestershire Archaeological Society*, XXVII (1950), 35–46; *idem*, 'The charcoal iron industry in the early eighteenth century', *The Geographical Journal*, CXXVII (1951), 167–77; *idem*, 'The Foley partnerships: the iron industry at the end of the charcoal era', *Economic History Review*, VI (1952), 322–40; *idem*, 'The iron industry of Cheshire and Staffordshire, 1688–1712', *Transactions of the North Staffordshire Field Club*, LXXXVIII (1953–54), 32–55. See also B.G. Awty, 'Charcoal ironmasters of Cheshire and Lancashire, 1600–1785', *Transactions of the Historical Society of Lancashire and Cheshire*, CIX (1975), 71–124; R.G. Schafer, 'Genesis and structure of the Foley "Ironworks in Partnership" of 1692', *Business History*, XIII (1971), 19–38; and P.W. King, 'The Vale Royal company and its rivals', *Transactions of the Historical Society of Lancashire and Cheshire*, CXLII (1992), 1–18.

Raistrick performed the same service for the scarcely less important partnership of the Spencer family in Yorkshire.²⁵ Together, Johnson and Raistrick presented clear evidence of the seamlessness of primary production, secondary processing and marketing—evidence that the *industry* was, in fact, a *trade*. The iron industry was characterised less by vertical integration within firms—for these ‘firms’ were amorphous, shifting entities—than by a constant exchange of raw materials and semi-processed goods between loosely connected business associates.²⁶ Yet the insights of Johnson and Raistrick remained implicit in the empirical material that they presented. Nor was much attention given to the role of Baltic iron in the web of exchange that they described, salient though it was. Indeed, the recognition that British iron making and metalware manufacturing was but part of an international division of labour, as seemed plain to Samuel Schröder in the 1740s, has not been taken up by subsequent historians.²⁷

The historiography of the Swedish iron industry is quite different, not least in its scale. Iron making plays a central role in the narrative of Swedish national development from the sixteenth century to the present; its history has therefore been accorded lavish attention. That said, Swedish studies, like their British counterparts, tend to be limited

²⁵ A. Raistrick, ‘The South Yorkshire iron industry, 1698–1756’, *Transactions of the Newcomen Society*, XIX (1938–39), 51–86; A. Raistrick and E. Allen, ‘The south Yorkshire ironmasters, 1690–1750’, *Economic History Review*, IX (1938), 168–85. See also G.G. Hopkinson, ‘The charcoal iron industry in the Sheffield region, 1500–1775’, *Transactions of the Hunter Archaeological Society*, VIII (1961), 122–51.

²⁶ ‘Although there was vertical integration within each of the partnerships, considerable traffic took place between them, as well with independent forge and slitting-mill masters. Iron at all stages of manufacture entered into this trade.’ Johnson, ‘Foley partnerships’, p. 331. Curiously, the most overt application of the approach developed by Johnson in the 1950s came in a work devoted to the significance of transport in European industrialisation, not the British iron industry *per se*: Rick Szostak’s *The role of transportation in the Industrial Revolution* (Montreal, 1991). ‘Iron, as a producer goods industry, needs special treatment’, Szostak announced; ‘proper coverage requires that one looks at the uses to which iron was put’ (p. 91). This led Szostak to reconstruct a production chain that began with the smelting of ore and terminated with the marketing of metal wares. This, in turn, was the basis for conjectures about the relationship between improved transport organisation, price levels and the extent of the market for metalwares. The analysis of the latter may not have been wholly convincing, but the line of inquiry was suggestive, despite its brevity and reliance upon secondary literature.

²⁷ The issue was broached by Marie B. Rowlands in her important study *Masters and men in the West Midland metalware trades before the Industrial Revolution* (Manchester, 1975) but not pursued at any length. It does not feature at all in David Hey’s *The rural metalworkers of the Sheffield region: a study of rural industry before the Industrial Revolution* (Leicester, 1972).

in scope. As in Britain, entrepreneurship and technological development have been foregrounded. This ‘top-down’ bias stems from the format in which the literature first appeared, that of the company-sponsored history. Many steel combines commissioned official histories in the years after 1945 and these, naturally enough, dwelt upon the foundation and descent of their various constituent works, many of which had been in existence for two or three hundred years. The best-known of these company histories, and the only one to transcend the limitations of the genre, was *Fagerstabrukens Historia*, published in five volumes between 1957 and 1959.²⁸ Its authors did not restrict themselves to the institutional history of the five steelworks that had merged to form *Fagerstabruk* in the 1920s; they ventured an overview of the Swedish iron industry as a whole, one that was to stand as an orthodoxy for the remainder of the twentieth century.²⁹

In 1987 Karl-Gustaf Hildebrand, one of the *Fagerstabrukens Historia* authors and doyen of Swedish industrial history, revisited the themes that he had first explored three decades earlier. His book, issued in English in 1992 as *Swedish iron in the seventeenth and eighteenth centuries: export industry before the industrialization*, was a brilliant summation of Swedish iron making in the preindustrial era. There were, nonetheless, striking lacunae. Very little was said, for example, about the world of work. However, Hildebrand’s restatement of the orthodoxy came at a moment when research on the premodern iron industry, which had known a period of quiescence, was reviving. A new generation focused upon the very issues that were underplayed in the established literature, namely labour and everyday life in iron making communities (*bruk*).³⁰ The work of Anders Florén on the making of bar iron and metalwares at Jäders

²⁸ *Fagerstabrukens historia* (Uppsala, 5 vols, 1957–59). The key volumes were: K.-G. Hildebrand, *Del I. Sexton- och sjuttonhundratalet* (1957); A. Attman, *Del II. Artonhundratalet* (1958); and S. Montelius, G. Utterström, and E. Söderlund, *Del V. Arbetare och arbetareförhållanden* (1959).

²⁹ The reason for the enduring influence of the *Fagerstabrukens historia* authors, particularly Hildebrand and Attman, apart from the intrinsic value of their scholarship, is that parts of the first two volumes in the series were published separately in the 1980s: Artur Attman, *Svenskt järn och stål* (Stockholm, 1986) and K.-G. Hildebrand, *Svenskt järn. Sexton- och sjuttonhundratalet. Exportindustri före industrialismen* (Stockholm, 1987). The latter, which was revised extensively to take in research completed since its first publication, has been translated into English (see below). For a general treatment of Swedish iron making see E.F. Heckscher, *Sveriges ekonomiska historia från Gustav Vasa. Andra delen. Det moderna Sveriges grundläggning* (Stockholm, 1949), chapter 6.

³⁰ See Maria Ågren (ed.), *Iron making societies: early industrial development in Sweden and Russia, 1600–1900* (Oxford, 1998) for a presentation in English of these new trends.

bruk between 1640 and 1750 led the way. Taking his cue from the model of proto-industrialization propounded by Jürgen Schlumbohm, Florén explored how workers in the forges and workshops of the *bruk* were gradually deprived of their autonomy.³¹ Control over the labour process shifted. It did so, at least in part, in response to developments on the market for metalwares. The market, Florén suggested, was a historical variable in grievous need of investigation.³² The need to understand Swedish iron in the context of an international market had been acknowledged by Hildebrand when he had made a provisional appraisal of overseas markets in the 1950s, but in a valedictory survey in 1997 he could still lament the paucity of research on distribution and marketing: ‘what is needed is many more studies in the history of iron from a consumer perspective’.³³

The British and Swedish historiographies of iron mirror one another in one important respect. The British have been steadfastly incurious about the Baltic iron that flooded their domestic market in the

³¹ Jürgen Schlumbohm, ‘Relations of production—production forces—crises in proto-industrialization’, in Peter Kriedte, Hans Medick, and Jürgen Schlumbohm, *Industrialization before industrialization* (Cambridge, 1981), pp. 94–125.

³² Anders Florén, *Disciplinering och konflikt. Den sociala organiseringen av arbetet. Jäders bruk 1640–1750* (Uppsala, 1987). Florén returned to the issue of the market at greater length in a subsequent study of the iron trade in the southern Netherlands: *Vallonskt järn. Industriell utveckling i de södra Nederländerna före industrialiseringen* (Uppsala, 1998).

³³ K.-G. Hildebrand, ‘Gammalt och nytt i det svenska järnets historia. En översikt över fem årtionden’, *Dædalus 1997. Svenskt järn under 2500 år. Från gruvpigor och smedsdrängar till operatörer* (Stockholm, 1997), pp. 1–30. For Hildebrand’s pioneering work in this area see his ‘Foreign markets for Swedish iron in the eighteenth century’, *Scandinavian Economic History Review*, VI (1958), 3–52. Because iron was such a significant part of Sweden’s export trade in the eighteenth century it has also been studied by historians concerned with trends in external trade and shipping. See in particular Heckscher, *Sveriges Ekonomiska Historia*, pp. 644–91; Staffan Högberg, *Utrikeshandel och sjöfart på 1700-talet. Stapelvaror i svensk export och import 1738–1808* (Lund, 1969) and Kurt Samuelsson, *De stora köpmanshusen i Stockholm 1730–1815* (Stockholm, 1951). None of these older studies, however, with the partial exception of Heckscher, concerned themselves with international markets in the way that Hildebrand did in 1958. In recent years, however, a new generation has addressed these issues more directly. Leos Müller has analysed the sale of Swedish iron on the Amsterdam market in the seventeenth and eighteenth centuries in his *The merchant houses of Stockholm, c.1640–1800* (Uppsala, 1998) and explored the links between the development of the American market and Swedish shipping policy in the nineteenth century in his *Consuls, corsairs, and commerce: the Swedish consular service and long-distance shipping, 1720–1815* (Uppsala, 2004). Åsa Eklund has studied the regional distribution of Swedish iron on the British market in her ‘Iron production, iron trade and iron markets. Swedish iron on the British market in the first half of the eighteenth century’, (Licentiate thesis, Department of Economic History, University of Uppsala, 2001).

eighteenth century, while the Swedes have shown little taste for tracking the routes taken by iron from *Bergslagen* once it had been shipped from Stockholm and Gothenberg. This book seeks to step into this historiographical no-man's-land and open a dialogue between the two national literatures, one that can enrich both. In doing so, we draw upon a conceptual construct first deployed by Immanuel Wallerstein and his World-System school, that of the global commodity chain (GCC).³⁴ At its simplest, a GCC can be defined as a 'network of labour and production processes whose end result is a finished commodity'.³⁵ But what is to be gained by tracing an apparently common-sense sequence of events? Firstly, there is much analytical value in following a GCC along its entire length, appraising each link or node that it contains, for this allows an analysis of economic activity that crosses conventional sectoral boundaries. The 'sequential stages of input acquisition, manufacturing, distribution, marketing, and consumption' are considered as a whole. The GCC model is also to be commended for highlighting issues of 'territoriality' and 'governance'. Global commodity chains, by their very nature, traverse national frontiers and thereby pose questions about why certain functions are spatially distributed in the way that they are. The dispersal or concentration of activity has to be accounted for. So too does the concentration of authority—for decision-making and profit extraction are powers that are spread unevenly, often very unevenly. Finally, the GCC model is valuable for its willingness to relate different levels of social organisation one to another. A GCC comprises 'sets of interorganizational networks clustered around one commodity or product, linking households, enterprises, and states to one another within the world-economy'.³⁶

Conceiving of the world economy in the early modern era as a set of interlaced global commodity chains is helpful. It lends shape and direc-

³⁴ In what follows we draw upon the discussion of recent developments in GCC theory in the editors' introduction to S. Reimer and A. Hughes (eds), *Geographies of commodity chains* (London, 2003), and Peter Dicken, Philip F. Kelly, Kris Olds and Henry Wai-Chung Yeung, 'Chains and networks, territories and scales: towards a relational framework for analysing the global economy', *Global Networks*, I, 2 (2001), 89–112.

³⁵ Thomas K. Hopkins and Immanuel Wallerstein, 'Commodity chains: construct and research', in Gary Gereffi and Miguel Korzeniewicz (eds), *Commodity chains and global capitalism* (Westport CT, 1994), p. 17.

³⁶ Gary Gereffi, Miguel Korzeniewicz and Roberto P. Korzeniewicz, 'Introduction: global commodity chains', in Gereffi and Korzeniewicz, *Commodity chains*, p. 2.

tion to commercial networks that might otherwise remain analytically amorphous and vapid. But that is not to say that GCC theory supplies automatic answers to the questions that it poses. On the contrary, there appears to be no satisfactory method of accounting for shifts in the territoriality of production or the overturn of governance structures. The GCC model, despite foregrounding dynamism as a distinguishing feature of the capitalist world economy, does not provide a theoretically grounded explanation of that dynamism, other than by invoking abstract and empirically questionable macro-level phenomena such as Kondratieff waves. For that reason, our use of the commodity chain concept is largely as an organising metaphor; it allows us to explore the multiple transactions and physical transmutations that *inter alia* took metallic matter from *Bergslagen* ore pits to the rice fields of the Carolinas. We are not committing ourselves to the more prescriptive features of world-system theory, those that see the eighteenth-century world economy as irrevocably structured in concentric socio-geographical zones that turned around Amsterdam or London.³⁷ The volume of recent research that argues for a multi-centred world economy, one in which European domination was not destiny foretold, precludes that.³⁸ The commodity chains that passed through Basra, Surat or Molucca were multi-directional; they did not converge on London or Amsterdam.

³⁷ For a survey of world-system theories see Fernand Braudel, *Afterthoughts on Material Civilization and Capitalism* (Baltimore, 1977); Immanuel Wallerstein, *The modern world-system: capitalist agriculture and the origins of the European world-economy in the sixteenth century* (New York, 1974) and *The modern world-system II: mercantilism and the consolidation of the European world-economy, 1600–1750* (New York, 1980); Giovanni Arrighi, *The long twentieth century* (1994).

³⁸ See K.N. Chaudhuri, *Trade and civilisation in the Indian Ocean: an economic history from the rise of Islam to 1750* (1985); Sushil Chaudury and Michel Morineau (eds), *Merchants, companies and trade: Europe and Asia in the early modern era* (Cambridge, 1999); Andre Gunder Frank, *ReOrient: global economy in the Asian age* (1998); Jack A. Goldstone, 'Efflorescences and economic growth in world history: rethinking the 'Rise of the West' and the Industrial Revolution', *Journal of World History*, XIII, 2 (2002), 323–89; Kenneth Pomeranz, *The great divergence: China, Europe, and the making of the modern world economy* (2000); John K. Thornton, *Africa and Africans in the making of the Atlantic world 1400–1800* (Cambridge, 1998). See also, for scepticism about the role of overseas trade in European development, Patrick O'Brien, 'European economic development: the contribution of the periphery', *Economic History Review*, XXXV (1982), 1–18.

Trade in the Early Modern World

What was the significance of trade in the pre-industrial age? A word of warning from Ferdinand Braudel should be kept in mind. Early modern peasants, he claimed, ‘lived in their villages in an almost autonomous way, virtually in an autarchy’, alongside yet separate from a market-orientated economy. There were ‘two universes, two ways of life foreign to each other’.³⁹ Trade affected only a fraction of Europe’s people, four-fifths of whom were engaged in agriculture in 1700. Most produced little in the way of surplus, and those that did usually saw it diverted into the pockets of ‘unproductive aristocrats and rulers’.⁴⁰

By 1700, however, change was afoot. Braudel’s distinction becomes too emphatic. The market economy did not float, like a film of oil, atop a sea of self-subsisting peasant households. The phenomenon of proto-industrialization depended precisely upon the integration of peasant households into long-distance trading networks, upon structural affinity not repulsion between the two spheres. Many families devoted slack periods in the agricultural calendar to the making of textiles, metalwares or wooden goods. Merchants who were equipped with the financial resources and *savoir faire* that most farming households lacked would market the finished goods, enabling peasant communities to augment their subsistence. In such ways were peasant weavers from Silesia to Ulster harnessed to international markets.⁴¹ Proto-industrialization is one example of what Jan de Vries has identified as the ‘industrious revolution’ of the seventeenth and eighteenth centuries: namely, a redivision of household labour in which individuals engaged with the market economy, seeking money wages as a means of increasing household income and domestic comfort.⁴² Why, some Europeans asked themselves, grind corn if you can earn the money to buy bread?

³⁹ Braudel, *Afterthoughts*, pp. 5–6.

⁴⁰ Sheilagh Ogilvie, ‘The European economy in the eighteenth century’, in T.C.W. Blanning (ed.), *The eighteenth century: Europe 1688–1815* (Oxford, 2000), p. 95. See also Jan de Vries, *European urbanization 1500–1800* (London, 1984) for the relatively low levels of urbanization at the start of the eighteenth century.

⁴¹ Sheilagh Ogilvie and Markus Cerman (eds), *European proto-industrialization* (Cambridge, 1996).

⁴² Jan de Vries, ‘The industrial revolution and the industrious revolution’, *Journal of Economic History*, LIV (1994), 248–71. See also Jan de Vries, ‘Between purchasing power and the world of goods: understanding the household economy in early modern Europe’, in John Brewer and Roy Porter (eds.), *Consumption and the world of goods*, London 1993, 85–132.

Embracing the ‘industrious revolution’ was not something that could be done arbitrarily or unilaterally, however. There were preconditions. ‘Industrious’ households required a context, that of bouyant markets, an advanced social division of labour, and—as is implied by the two foregoing conditions—a relatively high level of urbanization. North-western Europe met those conditions. Demand grew prodigiously. Europe underwent a substantial rise in population in the eighteenth century; the 81 million inhabitants of 1700 had become 123 million by 1800. Admittedly, there was not a corresponding rise in the level of urbanization—that scarcely rose at all—but what appeared as pan-European urban stagnation masked major regional disparities. While parts of Southern Europe experienced urban decay there was a dramatic growth of the non-agricultural population in the north and west of the continent. Britain was the outstanding example. Its population (taking in that of Ireland) rose from nine to sixteen millions during the eighteenth century. One-fifth of that population lived in towns with more than 10,000 inhabitants, double the European average, by 1800.⁴³

This tilt to the north and west will be familiar to readers of Braudel, who long ago described the early modern European economy as having successive focal centres, each marking a gradual shift from the Mediterranean to the Atlantic. In brief, the Venice of 1450 was surpassed by the Antwerp of 1550. War and political upheaval in the 1570s and 1580s may have extinguished Antwerp’s greatness, but Antwerp’s eclipse merely facilitated the rise of Amsterdam and the inauguration of Holland’s Golden Age.⁴⁴ Dutch hegemony over international trade was lengthy, stretching across the seventeenth century. Yet capitalism abhors fixity, so after 1713 it was London that rivalled and then surpassed Amsterdam as the organising centre of European and, for that matter, global commerce.⁴⁵

⁴³ De Vries, *European urbanization*, pp. 36–39.

⁴⁴ Braudel, *Afterthoughts*; *idem*, *Civilization and capitalism: 15th–18th century. Volume 3: The perspective of the world* (Berkeley, 1992). For the rise of the Dutch see Jonathan Israel, *The Dutch Republic: its rise, greatness, and fall 1477–1806* (Oxford, 1995), and Jan de Vries and Ad van der Woude, *The first modern economy: success, failure, and perseverance of the Dutch economy, 1500–1815* (Cambridge, 1997).

⁴⁵ See the summary of developments in Patrick O’Brien, ‘Inseparable connections: trade, economy, fiscal state, and the expansion of empire’, in P.J. Marshall (ed.), *The Oxford history of the British Empire. Volume II: the eighteenth century* (Oxford, 1998), pp. 60–63.

These developments reflected the rise of an Atlantic economy in the sixteenth and seventeenth centuries. The landfall of Spanish adventurers in the Caribbean in 1492 opened a radically new chapter in the history of both the Old World and the New. The southward thrust of Portuguese navigators along the coast of Africa was no less epochal: it took them to India and, less advertantly, to Brazil. Europeans had hitherto existed on the bleak western margins of a Eurasian economy whose pulse was set in China, India, and the Levant. With the opening up of the Atlantic basin an entirely new arena was added to the world economy and the once peripheral Europeans now found a role of their own. The Americas furnished the precious metals that allowed the Portuguese (and then the Dutch) to buy their way into the Asian spice trade. More importantly, the New World offered an environment in which a range of exotic commodities could be produced on a massive scale. Some, like chocolate, were entirely novel. Others, like sugar and coffee, had been obtainable from the Levant, but only in limited quantities. Now they could be grown in large volumes under the auspices of European planters. Other articles, such as deerskins and beaver pelts from North America's boundless forests, proved to be excellent substitutes for expensive Old World commodities.

Pelts and hides were supplied by Indian trappers who adapted their existing hunting patterns to fit in with European demand, but most New World products depended upon intensive plantation agriculture.⁴⁶ The labour demands of such a system were formidable: far too high, in fact, to be met by native populations, especially after Old World pathogens brought about demographic collapse in the decades after the first European contacts. Nor could free European migrants be induced to undertake the gruelling labour of sugar harvesting in sufficient numbers. The labour needs of the plantations could only be satisfied through force. Coercing Native Americans or Europeans proved impractical: the former were too few or too elusive, whilst the supply of European candidates for forced labour—condemned criminals

⁴⁶ A vast literature addresses this issue, from which it is invidious to select just a sample, but see Robin Blackburn, *The making of New World slavery: from the baroque to the modern, 1492–1800* (1997) for a synoptic interpretation; Ira Berlin, *Many thousands gone: the first two centuries of slavery in North America* (Cambridge MA, 1998) for developments in what was to become the USA; and Herbert S. Klein, *African slavery in Latin America and the Caribbean* (New York, 1986), for developments to the south.

or prisoners of war—was fitful and unpredictable.⁴⁷ Africa offered an alternative. Not only were there zones of sub-Saharan Africa that were densely populated, but slavery was widely recognised as a legal condition. Before 1500, however, the *trade* in slaves was relatively limited, and most slaves were women and children employed domestically, not adult males engaged in collective agriculture. Moreover, the busiest export routes ran east and north, to the Islamic world and the Indian Ocean.⁴⁸ Insofar as Europeans engaged in the trade, as the Portuguese did in the late fifteenth century, they did so on a small scale. The Luso-Hispanic incursion into the New World changed all that. The African slave trade was transformed in orientation and intensity: the Atlantic supplanted the Indian Ocean, and the steady outflow to the east became a quickening torrent to the west. As the Dutch, French and English established their own transatlantic settlements in the seventeenth century the slave trade gathered pace. At the start of the sixteenth century the Portuguese were shipping about 2,000 captives annually; by the start of the eighteenth century European slave traders were consigning nearly 36,000 a year.⁴⁹

By 1700 it was possible to speak of an integrated Atlantic system. It was characterised by the ecological transformation of those parts of the Americas that were fit for plantation agriculture, and it depended upon massive infusions of African labour. Slaves were procured by trading European or Asian-made textiles, metalwares and fancy goods with African merchants along the Guinea and Angolan coasts. In the African interior the insatiability of American demand prompted the emergence of predatory political formations—states for which slave gathering was a *raison d'être*. In the Americas, slavery flourished best in tropical or semi-tropical zones, but its influence was also felt in more temperate regions of the New World where European settlers grew prosperous by growing foodstuffs to nourish slaves. Farmers in the Delaware valley, for example, were not paragons of homespun self-sufficiency; they sold their surpluses to Philadelphia factors for shipment to the sugar islands of the Caribbean. Similarly, New Englanders traded salted

⁴⁷ For the problems of enslaving Native Americans see Klein, *African slavery*, pp. 41, 83–84, and Alan Gallay, *The Indian slave trade: the rise of the English empire in the American south, 1670–1717* (New Haven CT and London, 2003).

⁴⁸ Ronald Segal, *Islam's Black slaves: the history of Africa's other Black diaspora* (2002).

⁴⁹ Herbert S. Klein, *The Atlantic slave trade* (Cambridge, 1999), pp. 208, 210.

cod for sugar and molasses, processing the latter into rum.⁵⁰ Europe's role in this widening web of commerce was twofold. Firstly, it was the principal source of the manufactured goods that flooded into both the African and the American segments of the Atlantic economy. Secondly, Europe was the principal market for New World commodities. Indeed, the material culture of Europe—its very style of life—was transformed: exotic groceries enlivened Europe's palate, Atlantic hardwoods introduced variety into its domestic interiors, and tropical dyestuffs such as indigo extended its colour spectrum.⁵¹

But above all, Europe was at the centre of a process of hemispheric capital accumulation. European planters repatriated the fortunes that their African chattels had produced; European manufacturers enjoyed the profits that the sales of their goods in African and colonial marts had generated; and European merchants and brokers took a disproportionate share of the earnings to be had in shipping, insuring, and handling the cargoes, animate and inanimate, that were carried back and forth across the Atlantic. It is the extent and significance of this capital accumulation that has driven the historiography of the Atlantic world forward in recent years. That Atlantic enterprise was of central importance for the emergence of the modern world was the thesis, masterfully expressed, of Eric Williams, whose *Capitalism and slavery* (1944) posited a firm, direct relationship between the slave economies of the Caribbean and industrialization in Britain. Enslaved Africans, Williams argued, had not merely added to the wealth of their owners, they had generated the new investment capital that made the Industrial Revolution possible. Such an argument, advanced by a West Indian anti-colonial intellectual, did little for the imperial *amour propre* of most British historians. As a result, the Williams thesis was subjected to sustained criticism, with most critics focusing upon the extent to which repatriated profits from the Caribbean were ploughed into the new technologies of Britain's Industrial Revolution. Since the empirical difficulties of demonstrating that planters tended to sink their wealth in the woollen mills of the West Riding were considerable, the critics felt that the inadequacy of the Williams thesis had been sufficiently exposed.

⁵⁰ John J. McCusker and Russell R. Menard (eds), *The economy of British North America* (Chapel Hill NC, 1985).

⁵¹ Maxine Berg, *Luxury and pleasure in eighteenth-century Britain* (Oxford, 2005).

Since the 1970s, however, a new Atlantic historiography has given fresh force to Williams's hypothesis about slavery and industrialization. For one thing, there has been a vast growth in the study of slavery in the Atlantic world. Impressionistic or catch-penny accounts of the slave trade have been superseded by systematic investigation and statistical rigour.⁵² The new knowledge that has emerged has done nothing to diminish the ethical enormity of the 'Guinea Trade' but much to document its far-reaching ramifications. The slave trade was a colossal enterprise, involving the transportation of approximately 12 million Africans between the 1440s and the 1870s. It absorbed a vast amount of shipping, commanded the labour of thousands of maritime workers, and summoned into existence skein-like supply networks that carried goods to Liverpool or Nantes, Ouidah or Calabar, Havana or Charleston. These supply chains stretched for thousands of miles; some, as we shall see, began in places such as Gammelbo, a tiny iron making community in central Sweden.

An appreciation of the slave trade's tentacular reach has changed the terms of debate about Atlantic slavery's relationship to the economic development of Europe. This is no longer conducted on the narrow ground of whether the fruits of plantation slavery were invested in new industries (or squandered in conspicuous consumption). It is the logic of Atlantic slavery *as a system* that now seems central to European—and above all British—advancement. The slave trade was a powerful force for transoceanic integration. The infamous triangular trade, by its very nature, brought different parts of the Atlantic littoral into permanent contact with one another. Moreover, the slave system encouraged the spread of market relationships around the entire Atlantic zone. The demand for food on the sugar islands (where every available acre was devoted to raising cane) stimulated farmer-settlers along the Delaware and Susquehanna rivers to grow grains and legumes for export, as has already been noted. Likewise, African farmers along the lower Niger harvested more and more yams in response to the demands of the slave captains at Bonny and Calabar for bulk carbohydrate to sustain their captives during the Middle Passage. By expanding the number of circum-Atlantic agriculturists who produced for the market the slave system drove up the number of potential consumers for manufactured

⁵² David Eltis, Stephen D. Behrendt, David Richardson, and Herbert S. Klein (eds), *The transatlantic slave trade: a database on CD-ROM* (Cambridge, 1999).

goods. Nowhere was this clearer than in British North America, which took just 6 per cent of English exports in 1700–01, but 32 per cent in 1797–98.⁵³ The surge of English goods could only be paid for by exporting American crops and commodities to the Caribbean, or by building the ships—a New England specialism, this—that triangulated the ocean. In these ways, the Atlantic slave system became more than an adjunct to the economic life of Europe; by extending, diversifying and integrating markets around the Atlantic basin it became the mechanism through which Europe's economy was transformed.⁵⁴

Our understanding of this complex system of transoceanic exchange and reciprocation has had a long and troubled gestation. Advocates of the 'Atlantic' as a historical subject *sui juris* have had to contend with older, nationalist historiographies that concentrated on the exploits of Portuguese or British empire-builders, or the prehistory of the United States. Atlantic histories that self-consciously transgress imperial boundaries have been slow to emerge.⁵⁵ Indeed, the first attempts to build a pan-Atlantic historiography foundered. The notion of an 'Atlantic civilization' had been broached by Jacques Godechot and Robert Palmer in the 1950s. Did the fact that revolutionary upheavals struck both America and France in the late eighteenth century justify talk of an Atlantic or a 'democratic' revolution, stemming from a common transatlantic experience? Godechot and Palmer thought so, but their suggestion was not always warmly received in the age of the Cold War; for too many it appeared as an ideological cover for NATO. Nor did the notion of a broadly-based 'Atlantic Revolution' appeal to those French historians who were temperamentally committed to the uniqueness of 1789.⁵⁶ Other historians took inspiration from Fernand

⁵³ Kenneth Morgan, *Slavery, Atlantic trade and the British economy, 1660–1800* (Cambridge, 2000), p. 19. The later figure refers to exports from Britain as a whole, not just from England. It should also be noted that Britain's Caribbean possessions, home to 450,000 slaves in the later eighteenth century (and an elite of super-wealthy planters), absorbed 25 per cent of British exports in their own right in 1797–98.

⁵⁴ Joseph E. Inikori, *Africans and the Industrial Revolution in England: a study in international trade and economic development* (Cambridge, 2002).

⁵⁵ For surveys of the historiography see Bernard Bailyn, *Atlantic history: concept and contours* (Harvard, 2005), and Horst Pietschmann, 'Introduction: Atlantic history—history between European and global history', in Horst Pietschmann (ed.), *Atlantic history: history of the Atlantic system 1580–1830* (Göttingen, 2002), pp. 11–54.

⁵⁶ Jacques Godechot, *France and the Atlantic Revolution of the eighteenth century* (1965); Robert R. Palmer, *The age of the democratic revolution* (2 vols., 1959–64). The debate continues to resound, with the latest contribution a firm denial that Anglo-America and France

Braudel, whose vision of the Mediterranean as a single, indivisible civilisation had been dazzlingly expressed in his study of the Mediterranean world in the age of Philip II.⁵⁷ Huguette and Pierre Chaunu's monumental *Séville et l'Atlantique (1504–1650)*, published in 11 volumes between 1955 and 1959, owed a plain debt to Braudel and the *Annales* school. Nevertheless, what the Chaunus had embarked upon was a statistical investigation of Spain's trade with her overseas possessions, reliant upon a single national archive. Vast though it was, their work could not match the transnational sweep or thematic range of Braudel's. Nor was it clear that the Atlantic, an ocean that was scene to some of the most dramatic changes in the early modern world, lent itself to the conceptual vocabulary of the *Annalistes*. Braudel's preference for *l'histoire immobile*, in which the pace of change was glacial, seemed ill-suited to the turbulent western ocean.

The dynamism of the Atlantic economy in the eighteenth century was eminently suited, however, to the intellectual agenda set by globalization in the closing decades of the twentieth century. Flux and turmoil, ever-changing transnational production networks, cultural hybridity, religious syncretism, and movements of peoples and goods that overspread national boundaries: these were as characteristic of the early modern Atlantic as they are of the contemporary global economy.⁵⁸ It has been this that has given force to contemporary scholarship on the Atlantic world and led to talk of a full-blown Atlantic History paradigm.⁵⁹ Proponents of the new Atlantic history are far less mindful of imperial structures and far more sympathetic to the notion of a single, culturally fluid, polyglot and spontaneously integrated Atlantic world. Here was a multitude of peoples, an infinity of things, a babble of tongues, and an inexhaustible medley of faiths and beliefs. These interwove, trespassed upon one another, and multiplied fruitfully in ways that were essentially

were yoked together in a common Atlantic Enlightenment: Gertrude Himmelfarb, *The roads to modernity: the British, French, and American Enlightenments* (New York, 2004).

⁵⁷ Fernand Braudel, *La Méditerranée et le monde méditerranéen à l'époque de Philippe II* (1949). An English translation was not issued until 1972, which did much to mute Braudel's influence on Anglo-Saxon scholarship.

⁵⁸ The literature of globalization is so vast as to defeat any attempt at citation, but if one place of reference has to be given it should be Manuel Castells's magisterial *The information age: economy, society and culture* (3 volumes, Oxford, 1996–1998).

⁵⁹ The literature is so fast-moving that it is best monitored online: for regular updates see the 'Bibliography in Atlantic History' at www.fas.harvard.edu/~atlantic/atlantbib.html. The emergence of a specific paradigm is mooted in S.D. Smith, 'The Atlantic History paradigm', *New England Quarterly* (March 2006), 123–33.

ungovernable. The ocean was not a blank space to be quartered and divided by imperial administrators; it was a fluid environment inhabited by traders, refugees, slaves, sailors, scientists, and religious seekers who habitually evaded mercantilist regulation and bypassed state edict.⁶⁰ As a result, there is now a plurality of Atlantics—black, green, red, proletarian, Quaker and Calvinist, and criminal—jostling for historical attention.⁶¹ Likewise, a medley of methodologies and conceptual tools compete for historical business. Should the history of the ocean be Trans-Atlantic, Circum-Atlantic, or Cis-Atlantic?⁶²

The old imperial divisions have not been erased from historical scholarship—indeed, the dialogue between the Anglo-Saxon Atlantic and the Iberian Atlantic remains stumbling and irregular⁶³—but the study of empire has taken new paths. Some historians, taking their cue, perhaps, from modern commentators who have asked what future the nation state has amid the surge and counter-eddy of globalization, have been led to ponder the origins of those nation states, such as Great Britain and the United States, that rose from the Atlantic cauldron.⁶⁴ The question of how an archipelago without dynastic, confessional, ethnic or linguistic homogeneity came to be moulded into a ‘United

⁶⁰ For a programmatic statement see David Hancock, ‘The British Atlantic world: co-ordination, complexity, and the emergence of an Atlantic market economy, 1651–1815’, *Itinerario: European Journal of Overseas History*, XXIII (1999), 107–26. For examples of work in this vein see Robin Law and Kristin Mann, ‘West Africa in the Atlantic community: the case of the Slave Coast’, *William and Mary Quarterly*, 3rd ser. LVI (1999), 307–34, and Ira Berlin, ‘From Creole to African: Atlantic Creoles and the origins of African-American society in mainland North America’, *William and Mary Quarterly*, 3rd ser. LIII (1993), 251–88, and some of the essays in Peter A. Coclanis (ed.), *The Atlantic economy during the seventeenth and eighteenth centuries: organization, operation, practice, and personnel* (Columbia SC, 2005).

⁶¹ Gail D. MacLeitch, ‘“Red” labor: Iroquois participation in the Atlantic economy’, *Labor: Studies in Working-Class History of the Americas*, I, 4 (2004), 69–90; Peter Linebaugh and Marcus Rediker, *The many-headed hydra: the hidden history of the revolutionary Atlantic* (2000); Gwenda Morgan and Peter Rushton, *Eighteenth-century criminal transportation: the formation of the criminal Atlantic* (Basingstoke, 2004).

⁶² These are the approaches identified by David Armitage in ‘Three concepts of Atlantic history’, in David Armitage and Michael J. Braddick (eds), *The British Atlantic world, 1500–1800* (Basingstoke, 2002), pp. 11–27.

⁶³ J.H. Elliott, *Empires of the Atlantic world: Britain and Spain in America 1492–1830* (New Haven CT and London, 2006) provides a comparison of two imperial experiences.

⁶⁴ J.G.A. Pocock, ‘British history: a plea for a new subject’, *Journal of Modern History*, XLVII, 4 (1975), 601–28; *idem*, ‘The limits and divisions of British history: in search of an unknown subject’, *American History Review*, LXXXVII (1982), 311–36; David Cannadine, ‘British history: past, present—and future?’, *Past and Present*, 116 (1987), 169–91.

Kingdom' between the sixteenth and eighteenth centuries has attracted huge interest.⁶⁵ Likewise, the 'British-ness' of the Anglophone colonies in the New World has provoked prolonged debate. To what extent, it has been asked, did denizens of Britain and her Atlantic colonies share a common mentality? Were there not political vocabularies, religious affinities, and cultural practices that spanned the ocean? If so, little reliance can be placed upon the old historiographical reflex of viewing the history of colonial North America as no more than a prelude to the American Revolution, with independence as the pre-given outcome.⁶⁶

To focus in this way upon the American Revolution—as an event in British history, stemming from ideological disputes that were distinctively British—is to return to the question of empire. It is to ask afresh about the role of the state. The tendency of the new Atlantic historiography is very much to downplay imperial structure. Two examples, from two very different points on the historiographical compass, can illustrate that. David Hancock presents a vision of the Atlantic economy as a scene of ebullient commercial endeavour, swarming irresistibly over hapless officialdom. Although not unmindful of the Atlantic's cruelties, this is an essentially positive portrayal that emphasises collaboration and mercantile networking as unifying the ocean. Human agency takes precedence over structure.⁶⁷ Peter Linebaugh and Marcus Rediker offer an alternative model, although for them, as for Hancock, the early modern Atlantic was a place of restless activity, driven by the aspirations of human actors. The difference lies in the human actors selected for study. Linebaugh and Rediker deal with the wretched and the outcast, not the sleek merchants analysed by Hancock; their Atlantic is a place riven by ferocious class struggles. The ocean was convulsed by repeated multi-ethnic rebellion as slaves, indentured servants and

⁶⁵ See Linda Colley, *Britons: forging the nation, 1707–1837* (1992); Steven G. Ellis and Sarah Barber (eds), *Conquest and union: fashioning a British state, 1485–1735* (1995); Brendan Bradshaw and John Morrill (eds), *The British problem, c. 1534–1707* (1996); Laurence Brockliss and David Eastwood (eds), *A union of multiple identities: the British Isles, c. 1750–c. 1850* (1997).

⁶⁶ For two very different yet landmark additions to the literature see Ian K. Steele, *The English Atlantic, 1675–1740: an exploration of communication and community* (Oxford, 1986) and T.H. Breen, 'An empire of goods: the anglicization of colonial America, 1690–1776', *Journal of British Studies*, XXV (1986), 467–99.

⁶⁷ Hancock, 'The British Atlantic world'; *idem*, *Citizens of the world: London merchants and the integration of the British Atlantic community, 1735–1785* (Cambridge, 1995).

maritime proletarians of various lands and racial hues joined together to repudiate Atlantic capitalism.⁶⁸

Yet by emphasising Atlantic insurgency Linebaugh and Rediker give fresh prominence to the state, for it was state-organised coercion that was brought to bear on the masterless men, maroons, and runaway mariners who threatened the process of capital accumulation. Capital was accumulated best in an orderly environment; those who disrupted the process, be they antinomian pirates or mutinous slaves, were to be gibbeted. This reminder of the sanguinary nature of the eighteenth-century state is salutary, for the state had an inescapable presence in the Atlantic trading system, as a well-established literature attests.⁶⁹ Mercantilist regulation was the resort of every European power. It prescribed, for good or ill, the course of commercial development. Imperial bureaucracies specified the ports through which trade would run; customs officers defined what was contraband. Legal codes, such as Sweden's *Produktplakat*, granted privileges to national shipping fleets and preferential employment to native seamen. One of the reasons that large merchant fleets were smiled upon was that they were seen as a nursery for the seamen who were to man naval vessels in time of war. As one English commentator explained, 'without that naval force which trade produces, we shall be constantly exposed to the insults and invasions of our neighbours'.⁷⁰ Indeed, success in trade was intimately connected with naval aggression. Commercial profits were underwritten by military protection. Maintaining a fleet was expensive, but increases in trade led to an increased tax base, which laid the basis—at least for those states that could harvest the revenues efficiently—for a renewed cycle of imperial advance.

The state was of critical importance. If that was true as a general proposition, it applied *a fortiori* in the case of the international iron

⁶⁸ Linebaugh and Rediker, *The many-headed hydra*. For a critique, see Nicholas Rogers, 'Archipelagic encounters: war, race, and labor in American-Caribbean waters', in Felicity A. Nussbaum (ed.), *The global eighteenth century* (Baltimore, 2003), pp. 211–25, and Arne Bialuschewski, 'Between Newfoundland and the Malacca Strait: a survey of the golden age of piracy', *The Mariners' Mirror*, XC, 2 (2004), 167–86.

⁶⁹ John Brewer, *The sinews of power: war, money and the English state, 1688–1714* (1989); Daniel A. Baugh, 'Maritime strength and Atlantic commerce: the uses of "a Grand Marine Empire"', in Lawrence Stone (ed.), *An imperial state at war: Britain from 1689 to 1815* (1994), pp. 185–223; O'Brien, 'Inseparable connections'.

⁷⁰ Charles Davenant, *An essay upon ways and means* (1695), quoted in William J. Ashworth, *Customs and excise: trade, production, and consumption in England 1640–1845* (Oxford, 2003), p. 87.

trade, for the context in which iron was produced and exchanged in Europe and the Americas was defined by the rise and fall of empires. The ascendancy of Britain in the early eighteenth century coincided with the dismemberment of Sweden's Baltic empire and the aggrandisement of Sweden's nemesis, the Russia of Peter the Great. These contrasting imperial trajectories were of major consequence for the makers and traders of iron: new centres of demand opened up and new supply chains were laid down.

Baltic Transformations

Sweden's emergence as a great power in the seventeenth century was rooted four-square in mining and metal processing. Swedish copper and iron had been exported since the middle ages, but the shipments that went to Danzig and other cities of the southern Baltic in the sixteenth century were rather modest. From the 1620s they underwent a revolution in scale and scope. Iron exports, which had averaged little more than 3000 tons per annum in the late 1620s, leapt to 11,000 tons in 1640, then to 18,000 tons in 1650, and 27,000 tons in 1680. Their destination changed too. Swedish iron now passed through the Sound in large volumes, bound for the Dutch Republic, the gravitational centre of North European commerce.⁷¹

This startling escalation was a matter of policy. The Swedish state entertained territorial ambitions that could only be fulfilled if the poor and sparsely populated kingdom of Gustav II Adolf (Gustavus Adolphus) could exploit its latent mineral wealth more effectively. For their part, a group of Amsterdam-based merchants were alert to the advantages that preferential access to Swedish copper and iron would give them. The Dutch Republic in its Golden Age, with its busy shipyards and bustling towns, consumed iron on a grand scale. Yet the Thirty Years' War (1618–1648) disrupted the supplies of German iron that usually came down the Rhine, and jeopardised the flow of metalwares from the Spanish Netherlands. Iron was needed in the capital-rich Netherlands; iron was to be had in capital-poor Sweden. This realisation spurred the intervention of Louis De Geer, Willem de Besche and other Dutch merchants in the 1620s, heralding a transformation of Sweden's

⁷¹ Hildebrand, *Fagerstabrukens historia*, pp. 35–59.

industries. The Dutchmen were awarded wide-ranging privileges by the Swedish state, allowing them to establish a network of processing plants. The newcomers were therefore able to take control of Sweden's copper resources (which were Europe's richest), set up cannon foundries at a time when endemic warfare made the gun trade especially lucrative, and to re-direct Swedish iron exports westwards. The greatly increased export revenues that accrued to the Swedish state enabled Gustavus Adolphus to make his sensational entry into the Thirty Years' War in 1628 and humble the Catholic-Habsburg cause in Germany. It was this twin military-industrial initiative that ushered in Sweden's 'Age of Greatness' (*stormaktstiden*).⁷²

The transfiguration of Swedish iron making in the mid seventeenth century involved more than an influx of Dutch capital. It was based upon a profound alteration in the social matrix of iron production. Traditionally, iron making was the work of peasant miners (*bergsmän*) who smelted ore at communally owned furnaces and then refined the pig iron into crudely shaped lumps of *osmund* iron. It was this *osmund* iron that was exported to Danzig, Lübeck, and other commercial centres to the south. And it was forge owners in Danzig and elsewhere who had the *osmund* iron drawn out into bars, the form that malleable iron took as an international commodity. Changes imposed by the Swedish state from the 1620s onwards were intended to improve the quality of iron made in *Bergslagen*, and to ensure that the production of bars—the high value-added part of the production process—was carried out in Sweden. A new social division of labour was introduced. Henceforth, *bergsmän* were restricted to the smelting of ore, while the refining of pig iron was entrusted to a new class of professional ironmasters (*brukspatroner*). The *brukspatroner*, deploying greater capital resources and a more specialised workforce, were charged with improving the quality of output. The export of the finished bars was to be the province of international merchants based in specified trading centres. Every town in Sweden was allotted its particular place in an ordered urban hierarchy (the so-called *Stapelstadssystem*). Heading the hierarchy were 24 towns, the *stapelstäder*, through which overseas trade was to be channelled; below

⁷² For the relationship between the Swedish state and Dutch entrepreneurs see M.-B. Nergård, *Mellan krona och marknad. Utländska och svenska entreprenörer inom svensk järnhantering från ca 1580 till 1700* (Uppsala, 2001). See also Göran Behre, Lars-Olof Larsson, and Eva Österberg, *Sveriges historia 1521–1809. Stormaktsdröm och småstadsrealitet* (Stockholm, 2001), pp. 190–94.

them came the *uppstäder*, towns that were restricted to internal trade. Of the *stapelstäder*, two were of commanding importance: Gothenberg, founded in 1624, was the outlet for iron from the western county of Värmland, whilst the output of the older mining areas to the north of lake Mälaren was funnelled through Stockholm. The entire production process, from forest clearings to the Stockholm quayside, was policed by a special state agency, the *Bergscollegium* (Board of Mines), founded in 1649.⁷³

The establishment of the *Bergscollegium* coincided with the close of the Thirty Years' War. The peace of Westphalia, sealed in 1648, confirmed Sweden as the arbiter of Northern Europe. Sweden's provinces on the eastern shore of the Baltic were extended and consolidated; new territories in Northern Germany were acquired. Riga and Bremen were Swedish cities; the marshy delta on which St Petersburg would one day be built was an as yet insignificant corner of the Swedish province of Ingermanland. It was a striking vindication of the Swedish state's distinctive blend of military mobilisation and industrial *dirigisme*. Yet Swedish power, for all its martial lustre, was insecure. Despite a considerable increase in numbers during the seventeenth century, Sweden remained thinly populated; Charles XII (d. 1718), the last of the great warrior kings, had no more than 1.5 million subjects.⁷⁴ Sweden's enemies, on the other hand, were numerous. Were they to combine—as the Russians, the Poles, and the Danes did in 1699—the consequences might be severe. The Swedish crown lacked the manpower to compensate for repeated battlefield losses, so when Charles XII's principal field army was annihilated at Poltava in the Ukraine in 1709 the curtain fell on *stormaktstiden*. The Treaty of Nystad, which concluded the Great Northern War in 1721, brought humiliation. The Baltic empire was lost, ceded for the most part to Russia.

If the collapse of Swedish power was dramatic, so was the near simultaneous advance of Britain. The 'Glorious Revolution' of 1688 had turned Britain, a peripheral actor in European affairs in the 1670s,

⁷³ Anders Florén and Göran Rydén, *Arbete, hushåll och region. Tankar om industrialiseringsprocesser och den svenska järnhanteringen* (Uppsala, 1992).

⁷⁴ There was, as will be seen in chapter 3, continuing growth in population, urbanization and agricultural productivity, before and after the end of *stormaktstiden*. See J. Myrdal, *Jordbruket under feodalismen 1000–1700* (Stockholm, 1999); S. Lilja, *Tjuvehål och stolta städer. Urbaniseringens kronologi och geografi i Sverige (med Finland) ca. 1570-tal till 1810-tal* (Stockholm, 2000); and C.-J. Gadd, *Den Agrara Revolutionen 1700–1870* (Stockholm, 2000).

into a key protagonist of Louis XIV's France. The Nine Years' War (1689–1697) and the War of Spanish Succession (1702–1713), fought to thwart Bourbon expansionism, brought about a major overhaul of the British state. Naval and military expenditure grew stupendously, sustained by new methods of public finance that allowed the British state to bring national resources to bear with an unmatched efficiency.⁷⁵ The outcome was extremely favourable. The British benefited massively from the Treaty of Utrecht, not least by the granting of the *asiento*, the exclusive right to supply slaves to Spain's American empire. But this triumphal extension of British commercial might in the Atlantic was accompanied by a thickening of Britain's links to the east, to the Baltic. The long struggle against France deepened an already existing dependence upon Swedish *matériel*.

Heightened military demand for malleable iron added to an already extensive civilian market, one buoyed by urban expansion and by slow but sure industrial growth. Then there was demand from colonial markets, which, although starting from a far lower base, grew prodigiously as plantation agriculture in the West Indies and British North America intensified. All of this required a greater volume of iron, but British ironmasters were unable to respond. Their industry was hobbled by a seemingly insurmountable supply problem: the volume of charcoal available for smelting and refining was strictly limited. Despite the careful husbanding of coppice woods, the industry had hit a production ceiling through which it could not break. In the fifty years between 1660 and 1710 the make of bar iron in England and Wales hovered around 13,000 tons. Since the demand for malleable iron moved relentlessly upwards in the same period there was a shortfall that had to be made good with iron from overseas. In 1660 imported iron already amounted to 57 per cent of domestic production. By 1680 imports had achieved virtual parity (96 per cent), and by 1700 foreign imports were equivalent to 127 per cent of domestic output.⁷⁶ English consumers had traditionally looked to Spain for additional supplies of iron, but the Basque iron industry was not capable of meeting a surge in demand on this scale, hence the turn to the Baltic.

⁷⁵ Brewer, *The sinews of power*; D.W. Jones, *War and economy in the age of William III and Marlborough* (1988).

⁷⁶ Calculated from figures presented in King, 'The production and consumption of bar iron', p. 23.

When Swedish iron first appeared on West European markets in the 1620s and 1630s it was funnelled through Amsterdam, the headquarters of Louis De Geer and the other Dutch merchants who had revamped Sweden's metallurgical industries. From the 1660s, however, the locus of the European iron market swung westwards, to England. At first this trade was managed by Dutch and Scottish factors, but by the late 1670s English merchants, mostly Londoners, had assumed control.⁷⁷ In 1700 the English market took 44 per cent of Stockholm's iron exports, and the Scottish market a further 5 per cent. Less than 25 per cent went to the once dominant Dutch Republic.⁷⁸

By the 1720s Swedish imports to the British Isles were running at over 15,000 tons annually, edging past the output of Britain's own forge sector. Yet demand continued to spiral upwards, straining even Swedish capacity, so British merchants sought a fresh source of supply. They found it in Russia. Russian iron, shipped from St Petersburg, came to augment and eventually surpass Swedish iron. The rise of an export-orientated iron industry in Russia, as in Sweden, had its origins in military ambition. Peter the Great could not hope to supplant Sweden as the Baltic's leading power while Russia remained dependent upon its great rival for so strategic a material as iron. Thus, the first of a string of state-owned metal works was established in the Urals in 1699, far from the older centres of Russian metallurgy. It was a fateful first step. Seventy-one iron or copper works were established on the Russian empire's eastern edge in the first half of the eighteenth century.⁷⁹ The impact of Russian bar iron on the international market was at first muted, but after the Peace of Nystad exports from Siberia began in earnest. Iron from the Urals began to trickle into British ports in the late 1720s, mounting slowly in volume in the 1730s, and taking off in the middle years of the century.

By the 1730s, then, the British iron market had become an arena in which a variety of different irons contended. The locally made product was confronted by Swedish imports, Russian iron had made its debut, and Spanish iron retained a small but significant market share. Bar iron was an ostensibly prosaic material, but the brands that were offered

⁷⁷ Sven-Erik Åström, *From cloth to iron: the Anglo-Baltic trade in the late seventeenth century. Part I: The growth, structure and organization of the trade* (Helsinki, 1963).

⁷⁸ W.S. Unger, 'Trade through the Sound in the seventeenth and eighteenth centuries', *Economic History Review*, XII, 2 (1959), 217.

⁷⁹ Ågren, *Iron-making societies*, p. 7.

for sale in Britain could be differentiated by subtle variations in their chemical composition and physical properties. Such differences were not apparent to the untrained eye, but the brand marks and identifying symbols stamped on each bar were quite legible to experienced iron merchants. Such marks indicated the distant forge from which the bars had been brought; they also spoke of the very different social environments in which they had been manufactured.

The British iron industry was clearly capitalist in its mode of operation. The indirect method of iron making—the two-stage process involving a blast furnace at which ore was smelted and a forge at which the outcome was refined—had been introduced to the British Isles in the 1490s. It had been taken up by entrepreneurial landowners who saw an opportunity of putting ore and timber on their estates to good account. The landowning elite had the capital to invest in the costly infrastructure, but they lacked the inclination to oversee production. So, by the middle of the seventeenth century, there was a clear tendency for landowners to hire their plant out to an emergent group of professional ironmasters. These ironmasters took charge of every part of the production process: they hired charcoal makers, they set miners to work digging ore, they employed furnacemen and forgemen, and they disposed of the final product. In Sweden, on the other hand, the state consciously parcelled out the production process among distinct social groups. *Bergsmän* and *brukspatroner* each had their allotted tasks, and the sale of iron on international markets was reserved for specialised merchants. Unlike Britain, where ironmasters obtained their inputs for cash, the Swedish system rested in large part on non-monetary exchanges. Peasant leaseholders paid rent to *brukspatroner* in the form of charcoal, and forgemen were often paid in kind. Regulation by the state was designed to optimise the use of forest resources. The *Bergscollegium* imposed production maxima on *bruk* to ensure that *bergsmän* and *brukspatroner* did not compete for charcoal. It was a strikingly successful strategy. The number of forges at work never fell below 400 between the middle of the seventeenth century and the middle of the eighteenth.

In Sweden smelting and refining were kept functionally distinct and spatially dispersed, scattered across an archipelago of production sites in *Bergslagen*. The policy in Russia was quite different. Gigantism and centralisation were preferred, with furnaces, forges, and processing facilities being gathered together. At Ekaterinburg, Peter the Great's showpiece industrial settlement, the works comprised a blast furnace, two forges, and a rolling mill, as well as shops for the making of anchors,

sheet iron, steel, and wire.⁸⁰ All of this took place within the confines of a single feudal jurisdiction. In the Urals, as in Britain, all parts of the production process were carried out at the behest of ironmasters. But whereas British ironmasters were capitalists who obtained their material and labour inputs on the market, Russian ironmasters were feudal landlords who relied almost exclusively upon extra-economic compulsion. The labour requirements of the Urals iron industry were met by serf labour. Forgemen and artisans, as well as charcoal burners and forestry workers, lacked judicial freedom.

Counterpoint in the 1730s

The presence of Baltic iron on British markets was a matter of deep anxiety for imperial administrators in Whitehall. Each new projection of British power in the Atlantic seemed to highlight British vulnerability in the Baltic. Swedish and Russian iron were required if the transatlantic demand for metalwares was to be satisfied. Worse, from a strategic point of view, was the reliance of Britain's merchant fleet on Russian hemp or Swedish tar. Most deplorable of all was the dependence of the Royal Navy on Baltic supplies. It was this that prompted the British Parliament, from the very start of the eighteenth century, to counterpoise the Atlantic to the Baltic. Given adequate encouragement, could not tar and pitch be obtained from the pine forests of Carolina? That was the aim of legislation passed in 1705 to award a bounty on imports of naval stores from the American colonies.⁸¹ And might not similar legislation be enacted to loosen Britain's ties to Sweden and Russia by promoting colonial iron smelting? Such proposals were actively canvassed in the 1730s and 1740s. The extension of iron production on Europe's eastern frontier should, it was argued, elicit a riposte from across the Atlantic. The toil of serfs in Siberia should be answered by the efforts of enslaved Africans at furnaces in Maryland and Virginia.

⁸⁰ Anders Florén, 'Social organization of work and labour conflicts in proto-industrial iron production in Sweden, Belgium and Russia', in Catharina Lis, Jan Lucassen and Hugo Soly (eds), *Before the unions: wage earners and collective action in Europe, 1300–1850* (*International Review of Social History*, supplement 2, 1994), p. 97.

⁸¹ See D.G. Kirby, 'The Royal Navy's quest for pitch and tar during the reign of Queen Anne', *Scandinavian Economic History Review*, XXII (1974), 97–116.

As this suggests, writing the history of the trade in iron in the eighteenth century cannot be done as an exercise in Baltic history; it can only be done as a contribution to the history of the Atlantic world, for the need for bar iron in the manufacturing districts of Britain was driven upwards by the deepening demand for metalwares around the Atlantic basin. Nor can the history of the commerce in iron be written as a history of trade in the commonly accepted sense of the term; it must be a history of ‘trade’ as contemporaries understood it—as an amalgam of ‘Dealing and Manufacturing’ in Defoe’s words, or as Joseph Massey’s ‘one vast Piece of Machinery’. We must linger in the workshop, not just the warehouse.

Our aim is to extend the reach of Atlantic history, to register how market signals from the western ocean reverberated deep into the European continent. The flow of exotic goods from the Atlantic world into the coffee houses and domestic parlours of bourgeois Europe is well attested to by historians; the impact of oceanic trade on production networks is less familiar.⁸² Yet the demands of Atlantic commerce mobilised producers far beyond the hinterlands of the great westward-facing ports. Historians are increasingly aware that weavers in landlocked Silesia, say, felt the tug of Atlantic demand as they bent over their looms making cloth destined for American or African users. We should recognise that forgemasters in *Bergslagen* felt the same centripetal pull, so too their counterparts in far distant Ekaterinburg. This had important consequences for the ways in which working life was played out in iron making communities in northern Europe, as we shall see.

The waxing of Atlantic ties also had important intellectual repercussions in northern Europe, notably so in the Swedish case. Swedish intellectuals and state officials—categories that overlapped considerably—were obliged to rethink how the economy and society they knew was configured. The more export-orientated that economy became, the less plausible a closed, cameralist conceptualisation of the Swedish state became. And as the focus of Swedish exports shifted steadily westward in the eighteenth century, so Swedish thinkers and policy makers were compelled to think of their own iron industry as part of an over-arching ‘iron system’ that girdled the northern hemisphere. An understanding

⁸² For an exception, see Klaus Weber, ‘The Atlantic coast of German trade: German rural industry and trade in the Atlantic, 1680–1840’, *Itinerario: European Journal of Overseas History*, XXVI, 2 (2002), 99–119.

of this international dimension affected the development of economic science in Sweden deeply. The Atlantic experience, in other words, was an important component of the Swedish Enlightenment.⁸³

An appreciation of the transnational ‘iron system’ that emerged in the eighteenth century is pertinent for historians of industrialization generally. One of the most significant debates of recent years over the transition to industrial society has concerned energy use. E.A. Wrigley distinguishes between ‘organic’ economies, which depend upon vegetable matter for energy, and ‘mineral-based energy’ economies whose needs are met by fossil fuels. Pre-industrial economies were by definition ‘organic’, and because of that their growth was constrained. Virtually everything necessary for the sustenance of human life—foodstuffs, raw materials, and fuel—came from the land, so the productivity of agriculture set strict limits on growth. Because the area of cultivable land was finite, any significant rise in the demand for food, for raw materials, or for energy would press too hard on the soil. More industrial materials (like flax, leather hides or wool), more construction materials (principally wood), more energy (wood once more), and more food could not all be had from the same fixed acreage of land. Growth might occur, as Adam Smith suggested, through a more elaborate division of labour or through other efficiency gains in the spheres of production and exchange, but ultimately growth would peter out.⁸⁴

The only escape from the ever-diminishing returns of ‘organic’ economic growth, Wrigley has argued, was through substituting mineral energy, obtained from coal, for vegetable energy. Put simply, burning coal removed the need to keep large areas of land forested, and if woodlands were no longer needed as a source of fuel then the space they occupied could be devoted to other productive uses. This was the secret of the British Industrial Revolution: the abundance of coal and the deployment of coal-based technologies allowed the British

⁸³ There is little discussion on the links between the Enlightenment and economic discourse in Sweden. For a preliminary treatment see Göran Rydén, “‘Det Andra’ som det kommersiella och det industriella—Svenska tankar om handel och produktion under 1700-talet”, in Maths Isacson and Mats Morell (eds), *Industrialismens tid. Ekonomisk-historiska perspektiv på industriell omvandling under 200 år* (Stockholm, 2002), pp. 37–56. For Swedish economic thought in the eighteenth century generally see K. Petander, *De nationalekonomiska åskådningarna i Sverige. Sådana de framträda i litteraturen* (Stockholm, 1912); Heckscher, *Sveriges ekonomiska historia*, pp. 812–26; and Lars Magnusson, *Åran korruptionen och den borgliga ordningen* (Stockholm, 2001).

⁸⁴ E.A. Wrigley, *Continuity, chance and change: the character of the Industrial Revolution in England* (Cambridge, 1988).

economy to slip the bounds of the 'organic' economy and erupt into mineral-fuelled growth.

There was no more spectacular instance of coal-fuelled expansion than that of the British iron industry in the closing decades of the eighteenth century, but it was not obvious that coal-burning technologies would be decisive until very late in the century. Before then ironmasters, merchants and policy makers applied themselves to stretching the boundaries of the 'organic' economy. They did so by acting and thinking globally. Was the British-dominated seaborne trade in bar iron of the early eighteenth century anything less than a raid on the vegetable energy stocks of Sweden and Russia? And was not the promotion of smelting in colonial America by the British authorities inspired by similar motives? It is of course true that some ironmasters in Britain were busily engaged in the development of coal-based technologies, but others were more committed to evading the dilemmas that energy shortages brought about. Their solution was not technological but organisational. It lay in extending an international division of labour so that the energy demands of metals fabrication were dispersed across the northern hemisphere, not concentrated in the wood-depleted British Isles. Only in the 1780s did the technological fix, one that unleashed an immense growth in output, emerge triumphant.

But this is to leap ahead in our story. Our starting point is the 1730s, when Baltic domination of the British market appeared to be irreversible. Our analytical approach, appropriately enough for the late baroque age, is contrapuntal. We follow the French musician François Roberday who opined, when writing of fugues, that 'the Parts being all together, and yet distinguished from one another, may the more easily be examined separately and the relationship they each have to one another more easily be seen'.⁸⁵ But for us, commodity chains take the place of the intertwined musical parts. Each can be followed independently, yet each takes its full meaning from the wider Atlantic fugue in which it is situated. Each may, for the purposes of analytical clarity, be accorded priority for a time, but, in the manner of the fugue, none retains its eminence for long. Counting houses, shipping lanes,

⁸⁵ François Roberday quoted in Jordi Savall, 'J.S. Bach's Musical Testament', in the booklet accompanying the CD *Die Kunst der Fuge* (AliaVox: AVSA9818, 2001). For a discussion of Johann Sebastian Bach in relation to scientific developments in the seventeenth and eighteenth centuries see Christoph Wolff, *Johann Sebastian Bach: the learned musician* (Oxford, 2000), pp. 1–11.

and artisanal workshops are each given their moment of contrapuntal exposure, but none is awarded primacy.

Chapter two picks out a selection of the commodity chains that girded the iron Atlantic. The outcome is a tour of the Atlantic economy from the perspective of the Baltic. Of the commercial nodes that are visited, some have conventional Atlantic coordinates (Bristol, Calabar and Charleston); others (Stockholm and St Petersburg) do not, but—considered as way stations of the international iron trade—they should be seen as part of the Atlantic littoral. Two well-documented actors in this commerce provide the empirical foundation for our analysis: one is Charles De Geer, *brukspatron* at Leufsta, Sweden's largest ironworks; the other is a Bristol iron merchant named Graffin Prankard. For a few brief years in the mid-1730s the connection between Leufsta and Prankard's Bristol warehouse was one of the principal axes of the international 'iron system'. We examine that connection in detail and track the commodity chains that span off, east and west, from the Leufsta-Bristol axis.

Chapter two, then, is a panorama of the ocean at a particular moment in time. The canvas is broad and the depiction detailed. Indeed, chapter two is almost a book in itself. Chapters three and four provide a more orthodox historical narrative. They follow the fortunes of the iron trade in the northern seas from the mid-eighteenth century to the mid-nineteenth century. Chapter three describes how between the 1740s and the 1760s merchants, manufacturers and policy makers in both Sweden and Britain sought to alter the institutional framework within which iron was traded. Chapter four reveals how those efforts were subverted by the sweeping technological changes that revolutionized iron production in Britain between the 1760s and the 1790s. Those changes ended Britain's reliance on Baltic imports, save in a few niche markets. In so doing, they reconfigured the Atlantic economy. Russia was excluded so comprehensively that she ceased to be a major iron exporter in the nineteenth century. Swedish iron was also expelled from the British market in the post-Napoleonic years, but not from the Atlantic world as a whole. Indeed, Sweden found a new point of entry into Atlantic commerce, one that did not rest upon British mediation, which allowed Swedish producers to extend the life of the iron Atlantic into the 1830s and 1840s.