A. Background

Before coal technologies revolutionised the iron industry at the end of the eighteenth century, iron-making in the British Isles was constrained by energy shortages. Only very finite volumes of charcoal were available for smelting and refining iron. As a result, the demand for malleable bar iron in Britain’s burgeoning metalware manufacturing zones outran domestic supply. The deficit was made good by importing bar iron from the Baltic – from Sweden, then from Russia. Swedish iron first appeared on the British market in substantial quantities in the 1650s, and by the time that Russian iron made its debut in the 1720s imports from the Baltic exceeded the output of British forges. Indeed, it was not until c.1800 that domestic bar iron production, now based upon Henry Cort’s puddling technique, outweighed imports.

This fact is little recognised in the historiography of British industrialisation, but it raises some important issues. For one, it recasts the terms of debate on the contribution of foreign trade to Britain’s Industrial Revolution. This debate usually has an Atlantic focus, concentrating on the dynamic impact of north
American demand for British manufactures, on the role of exotic groceries (sugar, coffee, tobacco) in diversifying consumer tastes in the metropolis, or on the ‘super-profitability’ (or otherwise) of New World slavery. Yet Britain’s industrialisation clearly had an important Baltic dimension as well. Indeed, it might be said that maritime endeavour in the North Sea, by making available a prosaic industrial commodity like bar iron, should be rated above maritime enterprise that dealt in more eye-catching tropical produce.

It should also be said that the Baltic iron trade has an important bearing on current debates over energy usage in British industrialisation. E.A. Wrigley has insisted upon the centrality of coal to the Industrial Revolution, defining the phenomenon as a transition from organic to mineral energy usage. The tapping of subterranean energy reserves was crucial. No amount of Smithian growth or organisational innovation could compensate for the pressures that economic growth imposed on the land – the source of food, raw materials, and (in the form of wood/charcoal) fuel. The trade in Baltic iron is of importance here because it offers a concrete example of how international trade offered a means of evading an incipient energy crisis. By importing bar iron from Sweden and Russia, British entrepreneurs were raiding the energy reserves of Bergslagen (the Swedish mining district) and the Urals, reserving their own energy resources for high-value-added manufacturing operations.

Finally, the abundance of Swedish and Russian iron on the British market poses questions about technological change in Britain’s own iron industry. The development of new, coal-fuelled technologies by the Darbys, the Wood
brothers, Henry Cort, et al is one of the heroic episodes in the narrative of British industrialisation. Conventionally, the coal technology revolution is thought of as being necessary to overcome a bottleneck in the supply of iron. Yet if Baltic iron was available in large volumes (as much as 60,000 tonnes in 1793), this bottleneck was appreciably eased. If the alleged bottleneck in British iron production was counteracted by a vast international division of labour in northern hemispheric iron-making, it could not have operated as a direct stimulus to technological change, and so an alternative model of technological development is called for.

These issues can only be adequately addressed if the operation of the international iron market is understood. ‘Baltic iron and the organisation of the British iron market in the eighteenth century’ attempts to supply that understanding. It is the first substantial investigation of how Baltic iron entered the British market, how it interacted with domestically produced bar iron, and how it was distributed among different sectoral and regional sub-markets. Empirically, the project was based upon the business records of Graffin Prankard (d. 1756), a Bristol iron merchant. Prankard began importing Swedish iron in the 1720s and he soon became the largest vendor of Baltic iron in western Britain. Prankard’s extant accounts, running from the late 1720s to the early 1740s, provide a unique insight into the structure of demand for bar iron in the West Midlands, the West Country, and south Wales in the early industrial period, whilst his letter books reveal the entrepreneurial strategies that Prankard developed in conjunction with his suppliers in Stockholm and Saint Petersburg, and his principal customers in Britain.
B. Objectives

1. The immediate objective of the project was to uncover the links in a global commodity chain that stretched from iron-making communities in Sweden’s Bergslagen, through Stockholm and Göteborg, to Bristol, and thence to manufacturing districts in western Britain and beyond. To do so would constitute a major study of one of the most important industrial commodity markets in eighteenth-century Britain. The operation of commodity markets in this period is not well understood in general (‘[a]lmost nothing has been published on commodity brokers’, writes one authority), whilst that for bar iron has (until now) resisted analysis altogether (‘tantalisingly little has so far been found out about… any… iron importer’s dealings’).¹

2. Data from Graffin Prankard’s accounts were to be used to plot the destination of bar imports, allowing regional markets and specialised production zones to be detected.

3. The nature of entrepreneurial networks in industrialising Britain was to be explored by contrasting Prankard’s behaviour with that of merchants in other regions and that of institutional buyers of bar iron (such as the Navy Board or the East India Company).

4. Finally, the role of Prankard's principal trading associates in Stockholm in transmitting information from the British market to their iron-making hinterland was to be explored in conjunction with collaborators at the University of Uppsala.

Objectives 1, 2, and 3 have been fulfilled. See ‘Results’ below. Work on objective 4, which is dependent upon a parallel programme of research being undertaken by Swedish collaborators, is still in progress. See section F ‘Future Research Priorities’ below.

C. Methods

The project was based upon the systematic exploitation of manuscript material in Somerset Archives: Prankard's ledgers and waste books (1728-1739) and his letter books (1728-1738), together with subsidiary records (ref. Somerset Archives, DD/DN).

The accounting data were transferred into machine-readable form, making a database that has been deposited at the Essex Data Archive. These quantitative data were used to compute the total volume of sales made by Prankard and to isolate seasonal patterns, regional variations, and peculiarities in the distribution of particular brands of iron, (thereby addressing objectives 1 and 2). Further details are available via the History Data Service website (http://hds.essex.ac.uk).
Prankard’s letter books were searched for evidence of his commercial relationships with his correspondents in Stockholm or Saint Petersburg, and with buyers in the Severn Basin and the Bristol Channel, (in compliance with objectives 3 and 4).

In order to situate Prankard’s activities in Bristol within a national framework (objective 3) a variety of additional manuscript sources were consulted in the British Library (Oriental and India Office Collections); Bristol City Library; the Brynmor John University Library, Hull; Hull City Archives; the Ironbridge Gorge Museum; the John Rylands University Library, Manchester; the Mitchell Library, Glasgow; the National Maritime Museum; the Public Record Office; Sheffield Archives; and Worcestershire Record Office.

D. Results

1. The dimensions of the market. Graffin Prankard was selected for a case study because of the richness of his archive, but it is now apparent that his importance extends far beyond the fact that his activities are well documented. He was, it emerges, the most important iron merchant in western Britain in the 1730s, the period for which his accounts survive. In 1730, for example, he was responsible for 54 per cent of the Swedish iron that entered Bristol.

Between 1732 and 1739 Prankard sold over 10,000 tons of iron to customers in the Severn basin, south Wales, and the South West. The scale of
Prankard’s business is in itself of some significance, for the only existing survey of the market for iron suggests that high transport costs excluded Swedish iron from the western half of the British Isles. This was plainly not the case. Indeed, Prankard’s business records reveal a rapidly growing market for Baltic iron. His sales of bar iron grew from less than 800 tons in 1729 to over 2050 tons in 1738. (See Figure 1) More than that, Prankard’s accounts reveal a variety of markets, each demanding iron of a particular type or quality.

2. The organisation of trade. Prankard was, before he entered the Baltic trade, a participant in Atlantic commerce. In the 1710s he regularly exported metalwares, guns, gunpowder, and cast iron pots from Coalbrookdale (where he was briefly a partner with Abraham Darby) to the north American colonies. From the 1720 these transatlantic ventures were integrated with expeditions to the Baltic, making a circuit of trade that looped around the northern seas. Prankard despatched a ship to South Carolina every autumn carrying nails, steel, and other articles of hardware. The ship would return to Europe in the spring, laden with rice and logwood. The rice would be disposed of in Hamburg and Prankard’s ship (the Parham Pink) would head for Stockholm, where Prankard’s agent, Francis Jennings, would have assembled a cargo. Jennings, a Belfast merchant by origin, but by the late 1720s one of Stockholm’s leading iron exporters, arranged for the Parham to be loaded with

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a mixture of iron and timber, and sent on her way in time for the St James fair in Bristol, the highpoint of the city’s commercial calendar.

The advantage of this year-round circuit was that it kept Prankard’s ships fully occupied during the winter months when ice closed the Baltic ports. Its disadvantage was that ships had to enter the Baltic in ballast because the Swedish equivalent of the English Navigation Laws prevented the importation of colonial goods from British north America. An alternative was for chartered vessels to be sent straight to the Baltic. The difficulty here was the low level of demands for English commodities. Prankard tried various expedients: luxury goods from Bristol such as glassware and spa water, or (more successfully) bulk industrial commodities such as salt, calamine (for brass manufacture), or coal.

3. The organisation of markets and credit. The cat’s cradle of commercial exchanges that Prankard elaborated in the 1720s was designed to facilitate the movement of Swedish iron into western Britain. This was a complex procedure because there was more than one variety of Swedish iron. Baltic iron came in various forms and was intended for a variety of specialised uses.

Some specialised markets were to be found in Bristol itself. No less than a quarter of Prankard’s sales of Swedish iron were of ‘voyage iron’. This was a type of bar that was exported to west Africa to be exchanged for slaves. Since the bars acted as a form of currency in slave markets they had to be cut to a very precise physical form and be of an exact weight (25lb). Naturally
enough, these bars were bought exclusively by Bristol’s slaving community, then at the height of its powers. This was a market that Prankard effectively monopolised. In 1738, the peak year for this branch of his trade, he supplied voyage iron to nineteen of the twenty partnerships that fitted out slaving vessels in the city. Because the dimensions and weight of voyage iron were of such importance – customers demanded discounts if the bars were too heavy – Prankard had to ensure that the product was made in a thoroughly consistent way. But establishing quality control over a product made in remote Swedish iron-making communities was far from easy. To do so Prankard exploited his links with Francis Jennings.

Every year Jennings received orders from Prankard about the volume and type of iron that would be required for the coming season. In turn, Jennings placed orders with a selection of ironworks proprietors (*brukspatroner*). Because the iron made on ironworks estates was despatched to such distant markets, *brukspatroner* often needed advances of credit from Stockholm merchants in order to maintain production while they waited for returns on their overseas sales. The outcome was predictable: in time, many *brukspatroner* became chronically indebted. This allowed merchant-creditors like Jennings to dictate production patterns in the forest communities of the mining district, or even to take ironworks estates over completely. Prankard, making use of Jennings’s good offices, was therefore able to lay claim in advance to a proportion of the annual output of specified forges, where the workforce was well practised in the making of voyage or other gauges of iron.
In other words, Prankard was able to intervene in production networks in Bergslagen, obtaining bespoke goods.

The importance of Francis Jennings is also apparent in Prankard’s efforts to procure supplies of Öregrund iron. Öregrund brands, made at a handful of forges in the eastern county of Uppland, commanded a premium price on international markets. Made from the fine, non-phosphoric ores of the famous Dannemora mine, Öregrund was the only iron considered suitable for conversion to steel by English steel-makers. As such, it was the object of much manoeuvring by merchant groups intent on monopolising so precious a commodity. At the start of the eighteenth century Öregrund iron was in the hands of well-established merchant houses in London and Amsterdam, the great entrepôts of the north European iron trade. It is a mark of Graffin Prankard’s entrepreneurial aggression and ambition that he was, after much effort, able to force his way into this cartelised market, shifting the locus of the British iron market away from London.

Prankard was determined to control the entry of iron from the forges at Åkerby and Lövsta to the British markets. Åkerby and Lövsta bars were regarded as essential for successful steel production in the cementation furnaces of Birmingham, Sheffield, and the North East. Acting in concert with Samuel Shore of Sheffield, the dominant figure in that town’s steel trade, Prankard sought to wrest control of these keys brands from London. Francis Jennings was instructed to offer long-term contracts, generous prices, and bribes (‘presents’) in order to secure success. In 1734 success duly came, when
Jennings sealed a two-year exclusive contract with the De Geers, the proprietors of the Lövsta estate. Prankard enjoyed monopoly rights over the supply of Åkerby and Lövsta in the south and west of Britain. Samuel Shore exercised a corresponding power in the north of England. Prankard was, as he told one customer, ‘Determined to confine the Steele trade in a few hands’. That Åkerby and Lövsta were destined for conversion to steel is confirmed by the regional distribution of Prankard’s sales. Figure 2 shows the distribution of sales of Swedish ‘common sorts’, the standard varieties. Major sales were rather evenly divided between the West Midlands, the West Country, and Bristol. Figure 3, showing the distribution of Öregrund sales, reveals a very different pattern. Some 74 per cent of Öregrund iron went to the West Midlands. In fact, almost all of this iron went to just two customers, John Kettle of Birmingham and Francis Homfray, steel manufacturers of Birmingham and Stourbridge respectively. Much of the Öregrund iron that was sold in Bristol, the only other market of any significance, was probably used in steel making as well, since the Shallard brothers, owners of a cementation furnace at Keynsham, acted as subcontractors, converting iron to steel on behalf of Bristol ironmongers, Prankard included.

The markets for both Öregrund and voyage iron were closely defined. Each involved a rather small number of specialist users who bought from Graffin Prankard on a regular basis and did so in bulk. Some, like John Kettle of Birmingham, had rolling contracts to take a hundred tons or more of Öregrund iron every year. The market for Swedish common sorts was quite different. The number of customers was far larger; they were more evenly distributed
through the Severn valley and the West Country; and their purchases were rather more spontaneous and *ad hoc*. This can be seen in the seasonality of Prankard’s sales. Figure 4 shows the monthly distribution of Öregrund sales over the years 1732-39. Sales are bunched in the late summer and early autumn, the period in which Prankard’s ships ordinarily arrived in Bristol with cargoes from the Baltic. Öregrund iron had been ordered in advance by Prankard’s clientele of steel-makers; it could be transferred immediately onto river craft for shipment up-Severn. The sales of common sorts, as shown in Figure 5, were distributed very differently. There were two distinct peaks: one in January, the other in July. The buyers of common sorts, in other words, tended to make their purchases at the Bristol’s two major fairs, the one in the New Year, the other in high summer.

4. Production networks in the metalware trades

Prankard’s books disclose more than his sales to a set of anonymous customers; they reveal his close involvement in metal manufacturing networks in western Britain. Prankard sold large amounts of iron to the Homfray family, slitting mill proprietors and nailers in the West Midlands. Yet he also used Francis Homfray as a subcontractor, having him put out nail rods – which were Prankard’s property – to domestic nailers. Homfray returned the nails to Prankard, who exported them to Charleston and Philadelphia in bags stamped with his own trademark. Such examples, of which there are many, call into question the conventional distinction that is made in histories of the British iron industry between industrialists (owners of forges and mills) and merchants.
Traditionally, the great ironmaking partnerships of the early eighteenth century (the Foleys, the Spencers, the Knights) have been regarded as precociously modern firms that integrated all stages of the production process from the smelting of ore, through the refining of iron, to the processing of sheets and nail rods. Yet from the vantage point of Bristol these seemingly monolithic combines appear rather different: their component parts seem only loosely articulated one with another, and their boundaries appear indistinct or porous rather than solid. The Homfray family business was far from monolithic. The Homfrays owned their own forge, but they bought Swedish (and Russian) bar iron from Prankard in order to feed their slitting mill. The Knights, the other great West Midland ironmasters of the 1730s, did not buy bar iron from Prankard. They had forges of their own. But the capacity of the furnaces they ran was insufficient to keep their forges supplied with pig iron, so they bought American pig iron imported by Prankard’s Bristol rivals Lyde and Cooper & Co. And if the Knights’ slitting mills could not keep pace with the output of bar iron it was put out to independent slitting mill proprietors, like the Homfrays.

Looked at in this way, whilst merchants like Prankard start to resemble industrialists, producing their own branded goods, industrialists appear more as merchants, continually engaged in the trading of a variety of raw materials and intermediate goods amongst themselves. As is suggested below (‘Future Research Priorities’), this calls for a new model of how the early modern iron industry functioned in the British Isles.
5. A crisis of the north European iron trade? Prankard did not restrict himself to the importation of Swedish iron. Indeed, in the mid 1730s the importation of Russian iron was the most dynamic element in his business. Russian iron was, however, a thoroughly disruptive influence. Supplies of well-harvested Urals timber and the labour of serf workers allowed Russian ironmasters to send their product into west European markets at very low prices. This threatened the success of Swedish exports and was an important factor in the debate, which opened up amongst Swedish policy makers in the 1730s and 1740s. Those who felt that iron exports could only be maintained by lowering prices were divided from those who believed that the superior quality of their iron gave Swedish exporters an effective monopoly, not least in the critical English market. The ‘monopoly’ school was also aware that the Swedish peasantry, the suppliers of charcoal to brukspatroner, would not welcome increases in the quantities of charcoal they were expected to deliver as taxes or rents in kind. Nor would peasants, still mired in subsistence agriculture, respond to monetary inducements. Such reasoning helped the ‘monopoly’ school to prevail, leading to an abrupt change in the late 1740s. The Swedish state capped iron output, opting for market stability and the careful husbandry of forest resources. With this, the policy of promoting exports, one that had endured for over a century, was put aside.

The impact of the Russian export drive on the British iron trade was also profound. Swedish and British irons, having different technical qualities – the one ‘tough’, the other ‘coldshort’ – had been in only partial competition on the British market. Coldshort Russian iron, however, entered into full competition
with British brands, not least in the nail trade. Prankard’s accounts show a rapid growth in the sales of Russian iron to Midland nailers in the 1730s, much to the anguish of some native ironmasters, who petitioned Parliament for heightened tariffs on Baltic imports. Metal manufacturers retaliated by asking for barriers to be lowered to the import of colonial bar iron. Thus, the 1730s and 1740s in Britain, as in Sweden, saw a prolonged debate about the future of the national iron industry. The solution that many participants in the debate edged towards in the 1750s was for a giant re-division of labour within Britain’s Atlantic empire. Let the charcoal-rich colonies devote themselves to smelting, many ironmasters declared, and export the pig iron to Britain. British ironmasters would abandon their furnaces and concentrate on the high value-added segments of the trade, refining and processing, making use of the additional charcoal supplies, which the indigenous smelting sector had once consumed. Such a solution, soon to be obviated by the coal technology revolution, appears far-fetched in retrospect, but it must have seemed a feasible outcome to merchant-manufacturers like Prankard and his associates. If the British iron industry was an essentially mercantile phenomenon, as the evidence of this project suggests, then a transatlantic division of labour and the transoceanic trading of intermediate goods would have been quite compatible with the traditions of British iron-making, not a break with them.