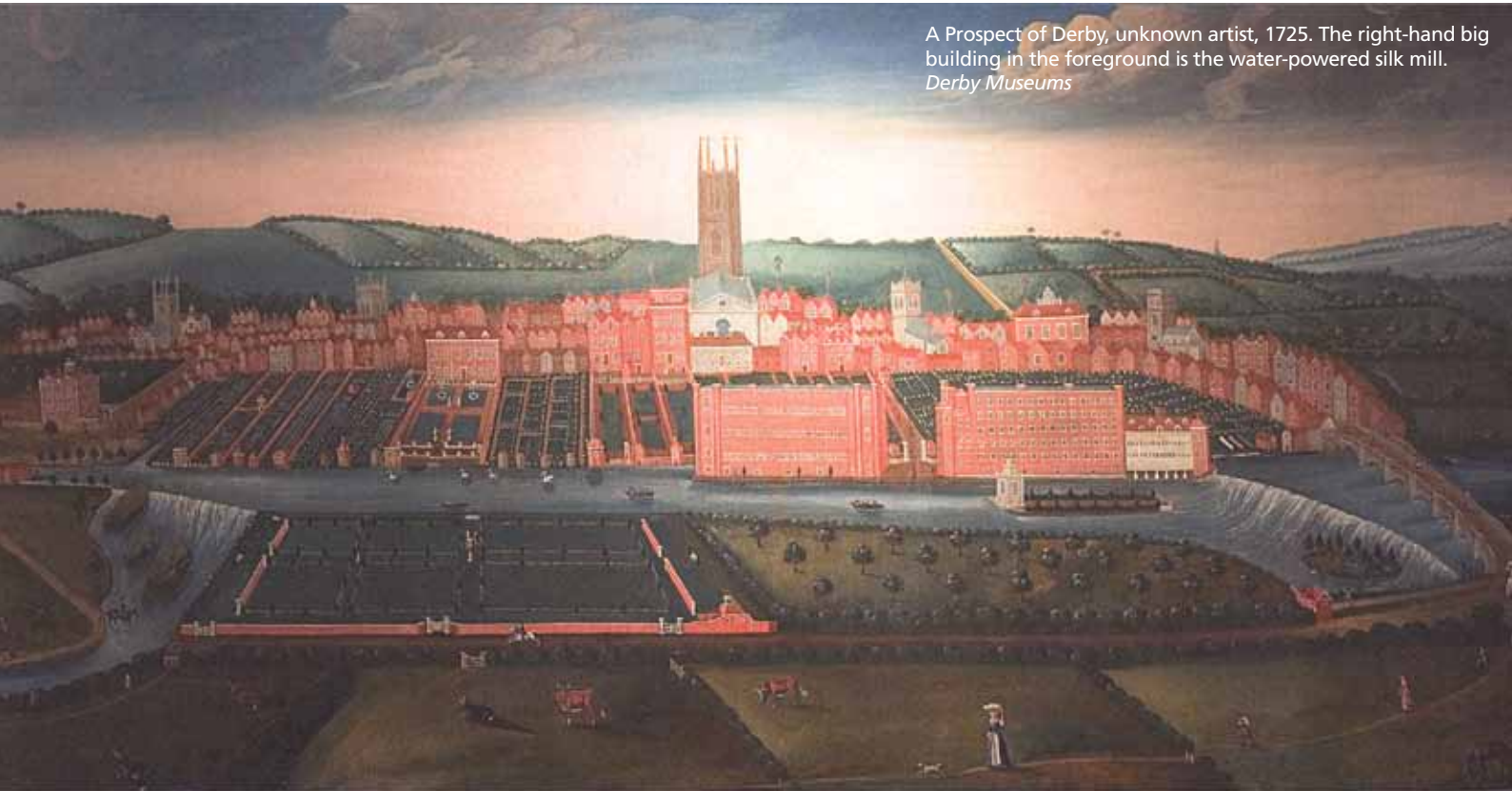


Out and about in Cromford Mill, Lea Mills and the Lumsdale Valley

Chris Wrigley

A Prospect of Derby, unknown artist, 1725. The right-hand big building in the foreground is the water-powered silk mill.
Derby Museums



Cromford Mill, one of the best known, and the Lumsdale Valley, one of the least known of the early industrial sites, are linked today by being managed by the Arkwright Society. They have also been the subject of a recent BBC1 programme in a series: 'Britain's Hidden Heritage'. They are located in Derbyshire. Cromford Mill is just off the A6 at Cromford, near Matlock. The Lumsdale Valley is on the outskirts of Matlock, off the Chesterfield Road at Upper Lumsdale, towards Tansley. Both sites operated using waterpower, and both suffered from being remote from supplies of raw material and from their markets. At the end of his life Arkwright attempted to remedy Cromford's poor location by supporting the construction of the Cromford Canal. Nearby is another enterprise of the Arkwright era, Lea Mills, but, unlike Cromford and the Lumsdale Valley cotton mill, textiles are still being produced there by the firm of John Smedley. This essay explores the

appeal of this area for the establishment of industry in the early period of British industrialization, its early successes in cotton before location and other matters led to the area being superseded by Lancashire.

The significance of regional industrial development in the Industrial Revolution has been emphasized by Pat Hudson and others. In the area discussed in this essay, Arkwright's technological changes led to a cluster of mills trying to exploit the fresh opportunities in cotton spinning, before the locational disadvantages became very apparent and they turned away from full reliance on cotton and diversified into wool, finance or other interests.¹

Richard Arkwright's two mills at Cromford were at the heart of late eighteenth century industrialization in the East Midlands. For a short period Arkwright (1732-92) was in the vanguard of mechanized cotton spinning. In his 1769 patent he had

specified horse power to operate his water-frame, but he very quickly saw the advantages of water wheels common in the eighteenth century, as they had already been successfully harnessed for corn and power. Cromford appealed to him because the supplies of water did not freeze in winter and had been successfully used by corn and other mills. Yet, as Stanley Chapman has emphasised, the first mill at Cromford, established in 1771, was poorly supplied by water from the Bonsall Brook.² Arkwright soon realized the need for greater waterpower when he built a second, larger mill close by. Even then, he needed an eight horse-power engine to raise water to ensure the steady running of his water-wheel.

Arkwright's choice of Cromford is also often attributed to the availability of labour that was used to textile work through the earlier putting-out system. Factory production needed an ample labour force, and Arkwright at

View from 1775 building over the water channel with remains of the second mill across the channel's end.



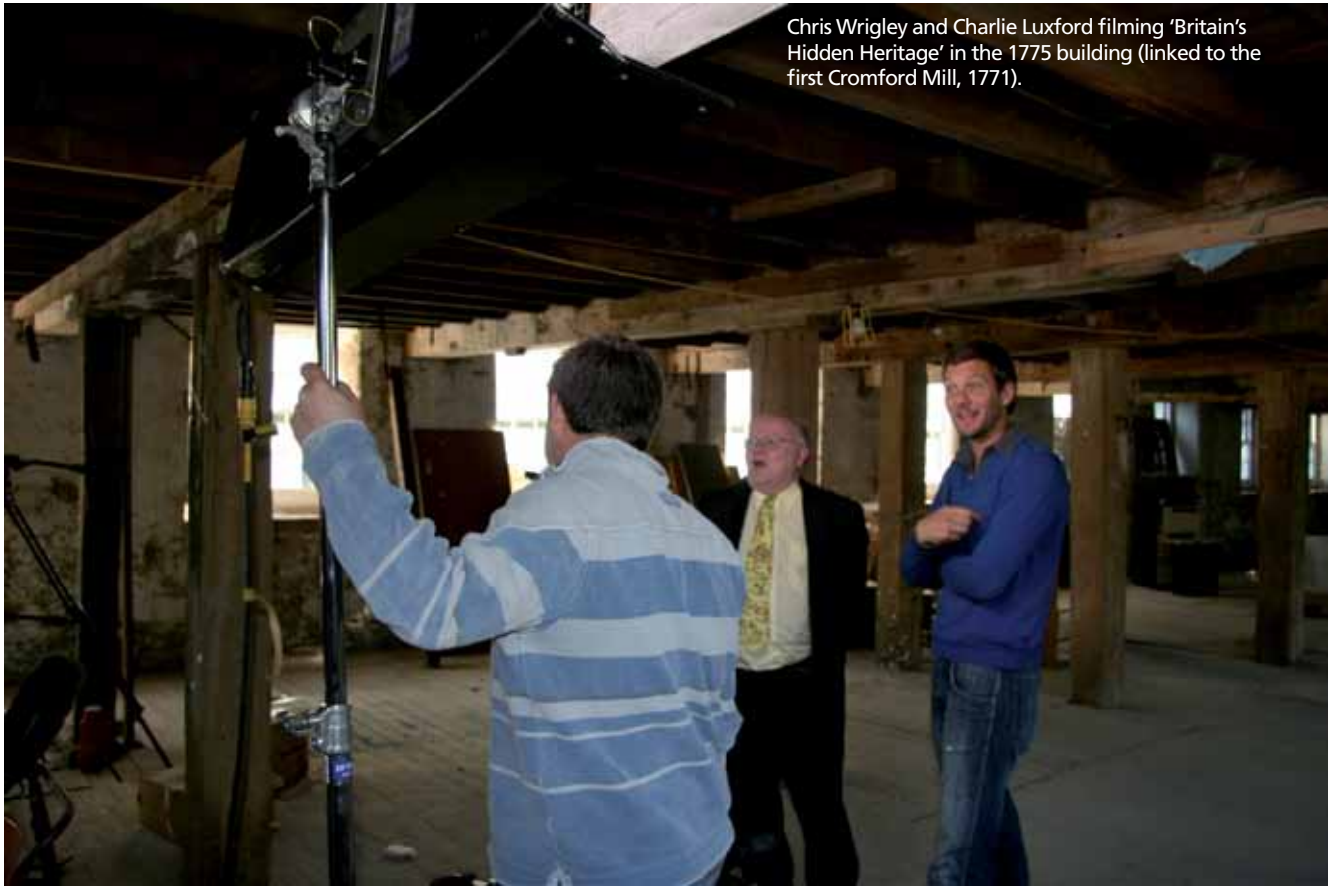
Arkwright at Cromford employed some 200 people in his first mill and 450 in his second mill by 1777. Arkwright set up in an area with many men engaged in lead mining while women and children were available for textiles. Arkwright liked to emphasise that his machinery offered poor people employment. He also advertised further afield, seeking labour from Nottingham and Manchester in particular. He placed an advert in *The Daily Mercury* 13 December 1771 for some skilled workers: 'two Journeymen Clock-Makers, or others that understand Tooth and Pinion well', 'a smith that can forge and file' and 'two Wood Turners that have been accustomed to Wheel-making, Spole-turning' and other such work. In addition he wanted 'weavers residing at the mill' plus women and children.³ Such a way of attracting labour was not enough. He needed to build a village for his workforce at Cromford and to secure a supply of goods for its market place, he even offered prizes to the best traders.⁴ Arkwright employed few paupers at Cromford, unlike Samuel Greg at Styal who spent £300 building

an apprentice house for 90 pauper children.⁵ Early on he behaved in the manner of a paternalist squire in putting on festivals, involving parades and a supper from September 1772. From 1776 this annual event in September marked candle-lighting. It began with a celebratory parade led by a band round Cromford, followed by consuming beer, buns, fruit and nuts, then an evening of dancing. He also paid for balls at the Greyhound Inn for his workpeople and their families.⁶

Cromford had an advantage of being well away from major dangers of machine-wrecking. Arkwright's mill of 1777 at Birkacre, near Chorley, was destroyed by people whose livelihoods were threatened by the Arkwright-style factory. In October 1779 Arkwright sufficiently feared an attack at Cromford to prepare the defence of his mills with cannon and small arms as well as the support of lead miners whose wives and children worked for him.

It has also been suggested that an attraction of Cromford was that it was relatively safe from industrial espionage. Arkwright was understandably

protective of his technological innovations and his patents and, unlike some other mill owners, did not permit visitors to look round his mills. Nevertheless, the general secrets of his machinery were taken to France by Englishmen, two of whom, John Theakston and John Flint, had worked for Arkwright at Cromford. Other former employees of Arkwright or his partner, Jedediah Strutt (1726-97), such as Samuel Slater (an apprentice of Strutt) and Thomas Marshall (a manager of Masson Mill), were hired at high salaries to develop cotton spinning in the United States. The French apparently thought Arkwright's exercise of his patent in Britain would harm the British economy, whereas the unrestricted use of his machines in France would enable France to overtake Britain in textiles.⁷ Arkwright, of course, did not see it that way. After he lost his patent case Arkwright talked to Josiah Wedgwood (1730-95) of having his machinery made public, publishing 'descriptions and copper plates of all the parts, that it might be known to foreign nations as well as our own,' something



Chris Wrigley and Charlie Luxford filming 'Britain's Hidden Heritage' in the 1775 building (linked to the first Cromford Mill, 1771).

Wedgwood deprecated as making the many suffer for the anti-patent action of a few.⁸ The point is that Arkwright's innovations were highly important and the details were eagerly sought by potential competitors at home and abroad, who offered former employees handsome sums to divulge the details. Perhaps in developing his machinery at Cromford Arkwright could expect his work to remain secret at least a little longer than if in a big city.

At the heart of his drive for profits were Arkwright's patents. His patents protected him from others taking up his successful technological developments and patenting them as their own. Moreover, as Christine Macleod has observed, 'Arkwright's water-frame was developed to use a centralized power source in the context of factory production: distinctive and factory-based, it was an ideal subject for patenting.'⁹ However, Arkwright went too far. He sought to milk patents much in the way that early Stuart figures had sought wealth through monopolies. This had been the route taken by Lewis Paul (died 1759) who claimed, probably with exaggeration, to have made £300,000 from his patents. Arkwright prioritized defending his patents, spending huge sums in the courts on what became a hopeless cause. His major court cases included one against his near neighbour, Peter Nightingale.¹⁰ Matthew Boulton

(1728-1809), his fellow manufacturer and patent holder, felt that if Arkwright had not charged such high prices to use his patents and not pursued his defence of his patents with such zeal, he would not have united other manufacturers against him and 'he might have gone on and got £40,000 {per annum} by all the works he has now erected, even if there be some interlopers.'¹¹ Nevertheless, Arkwright's water-frame patent lasted from 1769 to 1785, and his great wealth owed a great deal to his exploitation of his patents.

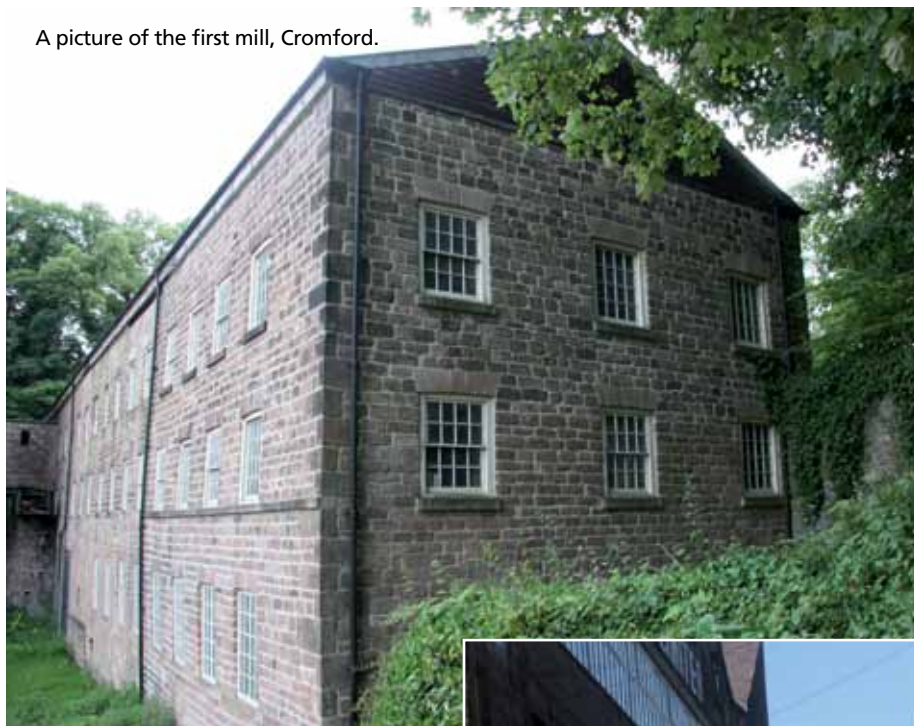
The original Cromford Mill was very much a base for testing Arkwright's innovatory machines and factory organization. Wadsworth and Fitton observed that early on the first Cromford mill was 'then more of an experimental machine-shop than a properly equipped spinning factory.'¹² Arkwright and his associates were learning on the job, adapting and adjusting as was found to be desirable.

Arkwright's initial success lay in his persistence in seeking an effective means of using rollers in cotton spinning. Arkwright had begun his career in improving one of the consumer goods popular after 1660, namely developing an improved method of dyeing hair for wigs. However, from early on he had a taste for talking about mechanical items and for making 'a hundred curious knackey things'. His fascination with

gadgets and inventions became focused on making his fortune by successfully applying rollers to cotton spinning to supply the strong consumer demand for cotton goods. He had some mechanical skills but, generally, his innovations were carried out with some assistance from skilled mechanics following his instructions. He had a magpie eye for successful aspects of existing mechanical and other developments. He was as much an innovator as an inventor. In the case of his water frame, patented in 1769, he was building on earlier less successful attempts to use rollers in cotton spinning. Lewis Paul, in association with John Wyatt, a mechanic, had developed with limited success a system he patented in 1738. Arkwright may also have been influenced by the way rollers were used in the iron industry. He took the key matter of effective gearing from clock making. Arkwright's big achievement was to get a system of rollers to work well. Associated with this development was his second major contribution to the cotton industry, his carding machine which ensured a steady and even flow of cotton into his spinning machinery, his water frame. Again, Arkwright drew on others' successes in producing a new machine that worked very well.¹³

At Cromford Arkwright also developed efficient factories, with machinery on several floors driven by

A picture of the first mill, Cromford.



Lumsdale Valley: ruins beside the gorge.



water power. Again, Arkwright was building on practices elsewhere. One of these was perhaps the first large factory, the Derby Silk Mill (built 1717-23), which was successfully run by John and Thomas Lombe (1693-1722 and 1685-1739), which had machinery for winding, spinning and twisting silk that was powered by a waterwheel and employed some 300 people. Another precedent was the water powered cotton factory in a converted corn mill in Northampton which Lewis Paul established in 1743.¹⁴ Strutt, and presumably Arkwright, knew at least the Derby Silk Mill. Arkwright was also adept at organizing production, including managing labour according to the needs of work regulated by factory time. Arkwright's system spread quickly.¹⁵ In 1788 Patrick Colquhoun (1745-1820) estimated there were 143 Arkwright-style mills, and later analysis suggested an average investment of £3,000 per mill.¹⁶

The Cromford area was also one of several sources for Arkwright of working capital during his career. Capital from the profits of lead mining went into the Derby bank of Crompton, Evans and Co. which made loans to Arkwright as did Wrights of Nottingham¹⁷. Like other successful entrepreneurs of this and the nineteenth century, most of his finance came from ploughing back profits.

Lea Mill, a few miles beyond Cromford Mill and bridge, was built on the site of a medieval flour mill in 1784 by Peter Nightingale (1820-1910) for cotton spinning and manufacturing calico. In turning to factory production he was following



Smedley's Mill.

Arkwright, but his family had experience of textiles, probably including the putting-out system which preceded factory production. His great niece, Florence, gave welfare advice to the mill's employees on her return from the Crimea. The Nightingales held the freehold to the mill until 1893. However, as with Cromford, cotton spinning was soon less viable and by the end of the eighteenth century Lea Mill was moving in to wool spinning and knitting.¹⁸ Arkwright had been confident of adapting his mechanized production from cotton to wool, but never actually did so, but this was achieved at Lea Mill.

The mill was leased by John Smedley (1764-1840) in 1818. He had been a spinner of worsted for hosiery on a small scale in Wirksworth, apparently a business established by his grandfather, but chose to move to nearby Lea Mill for bigger scale production. John's son, also named John (1803-74), was apprenticed to his father as a hosier and wool comber

in 1819. Eight years later, John Smedley, the father, was devastated by the death of his younger son, George (1808-27), and chose then to retire from active involvement in the business. The business became highly profitable once John, the son, had managed successfully to adapt cotton machinery for the production of high quality (merino) woollen knitwear.¹⁹ Like Arkwright, Smedley worked with skilled mechanics and on his own to develop effective technology to mass-produce the right goods for large markets and, also like Arkwright, substantial wealth followed within relatively few years. Also, Smedley's managerial abilities played their part in his success. He was an early riser, was deemed to have the energy of two men and had a very 'hands-on' approach, checking and even doing work at various stages of the production process.

John Smedley had taken over from his father in 1827 and by 1840 (at the age of 37) he believed he had

Modern day production at Smedley's Mill.



amassed enough money to retire. He did buy an estate in Cheltenham, but he was unable to sell the business so he continued running the firm until his marriage in 1846. While on honeymoon in Switzerland he became very ill, with accounts differing as to whether he suffered a severe chill or contracted typhoid. This changed him from a man of rude health to being weak and depressed. After trying conventional medicine for some two years from 1848, Smedley turned to alternative remedies, most notably hydrotherapy as practised by Dr William Macleod at Ben Rhydding (a hydro set up about 1844), near Otley, Yorkshire.²⁰ The treatment which involved a mix of very cold and very hot water, a severe diet and fresh air worked for him. He became an evangelist for hydrotherapy, first providing it free for his workforce and at first for others. He and his wife initially ran their hydro, doing so with rules as strict as at his factory. Demand became great so John and Caroline Smedley expanded their hydro several times, notably from 1853. An account of their hydro of about 1857 included:

From the road it looks like a hybrid building, uniting the characteristics of a factory, a warehouse, and a barrack – high walls of monotonous gray stone, pierced with small windows peering out in rows.but its front aspect is of an entirely different nature. A double row of terraces abutting on a garden slope: long corridors with gravel walks beside them; a range of extensive rooms, the front of which is formed of glass, glittering all day while the sun is shining, and at night seen far across the valley when lighted up from within; and above them tier upon tier of windows, with a balcony in front of each set, all fantastically coloured, gaudily gleaming with red and blue and gold.²¹

Quite clearly John Smedley invested heavily in his second enterprise. It grew to 76 bedrooms in 1859 and to 94 bedrooms in 1867. He did not need to advertise his hydro as people flocked to take the treatments at two guineas a week. Apparently, 2000 people per year attended the Smedleys' hydro in 1867 and 3000 in 1874. After John Smedley's death the hydro remained a going concern until the Second World War, after which it made losses and in 1955 it was compulsorily purchased by Derbyshire County Council (which still occupies the building).²²

John Smedley also fostered another major interest. During his period of poor health he became very religious. He had little time for either Anglican or for the conventional Nonconformist beliefs. Instead he developed his own variant of Wesleyan Methodism. He spent nearly £10,000 building churches and schools in the area: at Matlock Bank, Ashover Butts, Holloway, Higham, Bonsall and Birchwood-by-Alfreton. He preached fiery sermons in these buildings as well as, from 1853, in a giant marquee he took to other villages, often along with a choir.²³ Smedley sold his Cheltenham estate and returned to direct management of his mill. Fired up with religion, from his return he started the working day at the mill with a half hour compulsory service held in the dining building or, in summer, in his marquee, the employees being paid for that time.²⁴

Smedley was very much the stern paternalist employer. He firmly controlled his workforce, operating, as was common, a system of fines. They prayed with him at the morning service and they worked hard. He brooked no dissent, and boasted that there had never been a strike at his mill. The docility of his rural labour force, given

the limited alternative employment, was surely a major consideration in choosing to produce textiles at Lea Mills. Smedley was generous according to the times in side benefits but not in wage rates, especially in his early years of high profits. He offered early welfare provision. Early on he had a considerable faith in pills, and gave his sick employees Fearn's Family Pills. In 1853, after his recovery through hydrotherapy, he established a free hospital at considerable cost at his mill, and gave sick people what he believed to be the considerable benefits of this form of treatment. He provided subsidized tea, coffee, porridge and had meals prepared in the mill's dining hall. He also provided those female workers who lived three or four miles from the factory with rainwear. On occasion, he even went in for bulk buying and selling to his workers at a little above cost price flour and American clocks.²⁵ Perhaps in this he was emulating the co-operative movement. The Derby Co-operative Society, for instance, had been founded about 1850 in Sadler Gate, Derby.²⁶

Although Arkwright was much more motivated by social aspirations than Smedley, they both spent part of their wealth on ostentatious homes. In John Smedley's case he poured some £70,000 into Riber Castle from 1862. After Caroline Smedley's death in 1892 Riber Castle became home to a boys' school, in 1936 it was bought by Matlock Urban District Council, was used by the Ministry of Defence during the Second World War, and later the site became a wildlife park until 2000. However, John and Caroline Smedley also were notable for their generous philanthropy. After his death she founded the Smedley Memorial Hospital at Matlock Bank.²⁷

Lea Mills is still a successful enterprise and a relatively rare example of a long surviving family firm. There was an older family firm in Hinckley, Atkins, which ran from Robert Atkins and a cottage industry initially in 1723 through to factory production, ending with the retirement of Tom Atkins in 1994, when the firm was taken over by Coats Viyella. With Lea Mills, after the death of John Smedley, the business was owned by his cousin John Thomas Marsden, who adopted the surname Smedley (1840-77). He was succeeded by his son, John Bertram Marsden-Smedley (1868-1959), who was chairman and manager for seventy years. The family continued to run the firm through a son-in-law (Ian D. Maclean, 1902-86) and a grandson (Andrew B. Marsden-Smedley). In contrast, in the nearby Lumsdale Valley most of what remains today can be termed industrial archaeology.

Once again the location chosen had proven use of waterpower. By the end of the sixteenth century there had been a corn mill using the Bentley Brook in the Lumsdale Valley near Tansley. Following on from the success of Arkwright at Cromford, a mill was built in about 1785 by Watts, Lowe and Company. It drew on a large mill pond (known now as the Upper Pond, of three). This cotton mill operated until 1813, when it failed economically and was sold to John Garton. Thereafter, as Garton Mill the building was used for bleaching. In its area of the Lumsdale Valley there were seven mills; at various times they ground corn, bones or ingredients for paint, sawed wood or smelted lead. Now the valley is a heritage site, which combines natural beauty and the remains of industrial buildings, and is managed by the Arkwright Society.²⁸

The Cromford, Lea and Garton mills provide an interesting microcosm of the spread of the Arkwright-style cotton spinning factories of the late eighteenth century. Arkwright in the 1770s was the man to emulate. It was his approach that excited French cotton spinners, who eagerly paid relatively high sums to men who had worked for and been trained by Arkwright. In Germany, emulation even led to there being a Cromford in Ratingen, Germany, which now claims to be 'the oldest mechanical cotton spinning mill on the continent of Europe' (1783/4).²⁹ Arkwright was lionized in Scotland, being admired as a major industrial entrepreneur. By 1797 Stanley Chapman has estimated that about a third of the 900 or so cotton mills then in existence was of the Arkwright variety.³⁰ In Derbyshire there were at least eighteen by 1789, being at Bakewell, Belper(2), Calver, Cressbrook, Darley, Derby (2), Litton, Matlock (2), Milford, Wilne and Wirksworth as well as those at Cromford, Lea and Tansley.³¹

As for Arkwright himself, he amassed a fortune in two decades, even though Derbyshire lacked the advantages of Lancashire. For a short period he was the price leader in cotton spinning.³² He made a substantial contribution to the very impressive social savings estimated to have been made by cotton spinning; the most recent analysis has found that the benefit of process innovation amounted to 17.6 per cent of GDP (and so being higher than either railways or the internet).³³ Nevertheless, Sir Richard Arkwright seems an old fashioned figure in some respects, dreaming of ever greater monopolies. According to Edward Baines, the early historian of the cotton industry, he spoke of himself paying the

national debt and also of 'buying up all the cotton in the world in order to make an enormous profit by the monopoly'.³⁴ Yet he was a dynamic acquisitive figure, motivated by upward social mobility, building his huge mansion – Willersley Castle – and achieving the respect of his peers. Not surprisingly he was one of Samuel Smiles' heroes of self help.³⁵

Cromford Mill is open to the public, with guided tours put on by the Arkwright Society. The Society manages the Lumsdale Valley, offering occasional guided tours. Smedley, with prior arrangement, arranges group visits to the factory, while its factory shop is often open. Nearby are the attractive Lea Gardens, formally the gardens of John Marsden Smedley, which are open to the public.

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