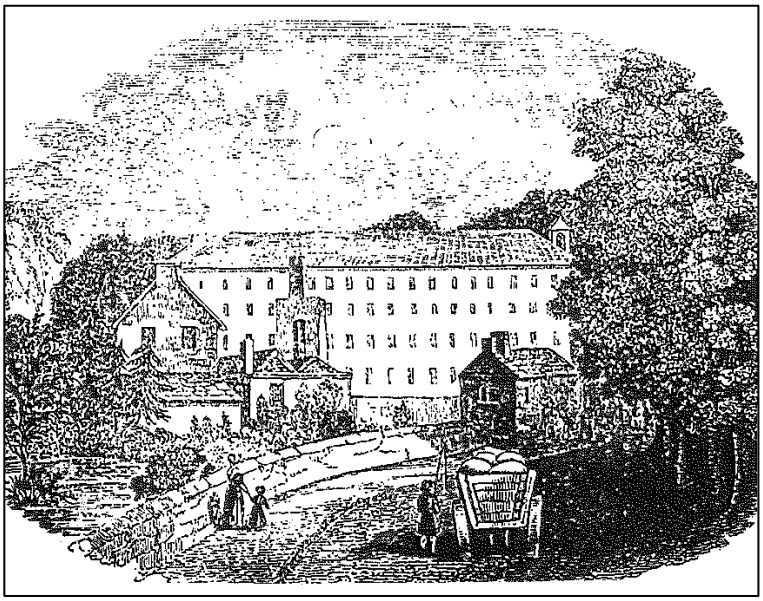
The Landmark Trust

NORTH STREET, CROMFORD History Album



Written and researched by Caroline Stanford

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BASIC DETAILS

A terrace of three storey dwellings each a single room deep, with later rear extensions.

Built and owned by Arkwright & Co. c1776 to house workers at Cromford Mill.

North Street in its entirety is listed Grade II*.

The Landmark Trust owns the freehold and is landlord for Numbers 4,5,6,8,10 and 11; Number 10 is a Landmark let.

Acquired from the Ancient Monuments Society and individual owners in 1974.

Restored 1974

Architect: George Lobb, Chapel-en-le-Frith, Stockport
Builders: Lewis Jackson (Builders) Ltd, Darley Dale, Matlock

Cromford is part of the Derwent Valley World Heritage Site, designated in 2001 for its significance to industrial archaeology.

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Summary

The late eighteenth century saw a period of rapid technological advance and expansion in Britain that later spread worldwide and represented the beginnings of modern industrial society. Cromford, then a tiny hamlet in an isolated valley, was to play a crucial role in that development and has helped earn the Derwent Valley its reputation of 'the cradle of the industrial revolution' and World Heritage site status.

In 1770, Richard Arkwright signed a lease on land in Cromford to erect a cotton spinning mill. Arkwright came from humble origins and was a barber and wigmaker by trade. There was a fever of invention at the time, and one of the chief quests was the need for a successful automated spinning machine. Arkwright teamed up with a clockmaker called John Kaye and his partner Thomas Hayes to perfect a model of the spinning machine, based on pairs of rollers rotating at different speeds. In 1769, Arkwright patented the design of his spinning frame (later also known as the water frame) and also took the crucial decision that the new spinning frame was to be licensed for use only in units of a thousand. This made it a factory-based innovation from the start (unlike the earlier but less efficient Spinning Jenny, which remained cottage-based). Such large machines also required external power to drive them; after a brief experiment with horsepower in Nottingham, Arkwright moved to Cromford.

Arkwright built his first mill in 1771, using waterpower from Bonsall Brook and the Cromford Sough (a drain from the lead mines in the hills above). He found his labour force partly from the miners' families, partly through advertising in the local papers. Those who moved to Cromford had to be housed, and it was for this purpose that North Street was built. Arkwright specifically advertised for large families, and the thirty houses on North Street would have housed much of his initial workforce. They are probably the earliest examples of the terraced industrial housing that was to become so characteristic of industrial towns over the next century. Unlike later versions, North Street was built to a high standard, with attention to details like sash windows and almost classical door frames which would have impressed those used to the poorer quality housing of the day. The upper floors still have their original, long windows, a sign that the occupants were expected to supplement their income by spinning or knitting. Typically, it was the women and children who were employed at the mill, tending the machines and joining broken threads. The men would be employed for building, for machine-making or mending, as mill supervisors or at home on their loom or knitting frame.

Arkwright became immensely wealthy and his development of the mills and community at Cromford was a model followed all over the world. Before his death in 1792, he started to build Willersley Castle on the Tor overlooking the mill site and St. Mary's Church. The mills in Cromford declined through the nineteenth century as steam power took over from water, and the cotton industry gradually migrated to Lancashire. Cromford was left much as Arkwright had built it. In 1979 the Arkwright Society acquired the former mill site from Burrells Paints and have been restoring it ever since in partnership with English Heritage.

The exact date of construction of North Street is not known, but by 1776 seems most likely, when Arkwright's second mill became operational. North Street was

probably the first of his projects in Cromford beyond the mill site. The houses are solidly built of the local gritstone and were originally built as one room deep dwellings on three floors. Compared with later such terraces, the rooms are relatively generously sized, at some fifteen feet square, and are spared neighbours to the rear as became more typical for later housing of this kind. They also offered more than just accommodation.

Internally, each house was the same. The front door opened from the street into a living room with a cooking range, where the family would have spent what few waking hours were left after the long day at the mill. The ground floor had stone flags on timber joists over a cellar. A narrow, slightly winding staircase led to a first floor bedroom, and then up to the workroom on the second floor (perhaps also used as a second bedroom). At No 10 North Street, filled-in blocks in the floor of the attic room suggest that frame knitting was carried out here, the vigour of the operation of the knitting head requiring such a machine to be stabilised by fixing it to the floor (unlike a hand loom). There would have been an earth closet outside; water was drawn from the village pump. At a later date, a lean-to was added onto the back of each house, providing a separate kitchen. The street would almost certainly have backed onto fields, much as Number 10 does onto its paddock. Arkwright once rewarded his best workers with 'a milch cow' each, and even in the twentieth century some of the houses had pig cotes at the bottom of their small back gardens. Urban patterns of work were being established, but the inhabitants of North Street would otherwise have lived a fairly rural existence.

The street had remained in the ownership of the Arkwright family until 1924 when the houses were sold to individual owners. In 1961, Matlock Urban District Council bought Numbers 4-9 with the intention of demolishing them and building an old people's home on the site. Derbyshire County Council intervened with a Preservation Order. In 1965, the Ancient Monuments Society agreed to buy them from the Council for £400. All had existing tenants and the houses were badly in need of repair and modernisation, specifically provision for bathrooms and toilets. The Society lacked the capital to initiate such improvements and the resources to act as landlord. The National Trust was approached initially, but was only interested in managing the whole street. The Society then approached John Smith, founder of the Landmark Trust in 1965 and also an honorary member of the Society of Ancient Monuments. Landmark agreed to acquire the properties.

Coincidentally, Landmark had also been approached about Numbers 10-11 at the other end of the street. Numbers 4, 5, 6 and 8 were acquired in April 1974 and numbers 10-11 soon followed. The appearance of North Street was considerably less uniform than it is now. Doors were of different styles and colours and most of the long second floor windows were partially blocked. With the help of grants from the Historic Buildings Council and the District Council greater uniformity began to be established, a process still continuing. Roofs were stripped and re-laid, and electric cables removed from the front of the houses. Wherever possible, the four-light windows on the second floor were reinstated. Today, all in Landmark’s ownership except Number 10 are let to private tenants.

1. Introduction

In 2001, the Derwent Valley was designated as a World Heritage site, to represent Britain's critical role in the industrial revolution[1]. The valley's significance lies in its role as the cradle of the Industrial Revolution in Britain. While Abraham Derby was building his famous bridge across what became known as the Ironbridge Gorge (1779), events were taking place in the Derwent Valley in the late eighteenth century that were to be equally important in the period of accelerated technological change which catapulted Britain and then the rest of the western world into the industrial age.

Cromford, through its association with Sir Richard Arkwright, was home to the first experiments in the factory system, and became a model settlement acknowledged and copied by contemporaries. Never before had people been set to work at fixed hours in such an organized, specialised way, on a mechanised process housed from start to finish in a single building. Sometimes called the 'Father of British Factories', Arkwright transformed Cromford from a scattered community of lead-mining families into a tightly knit village, providing work and basic social services for all ages. It is this achievement that is celebrated in the World Heritage designation, and in the Landmark Trust's protection of the mill workers' cottages on North Street, one of the earliest examples of social housing.

It will make it easier to understand Arkwright's achievement and follow the narrative of his life if a little background is provided first: a brief description of the process of cotton spinning, and then of the state of the British cotton industry before Arkwright's development of the spinning frame in 1769.

[1] In 2001, Ironbridge was the only British industrial site to have achieved this accolade, alongside such treasures as Stonehenge, Bath and Hadrian's Wall.

Richard Arkwright (1732-90)
by Joseph Wright of Derby *c.* 1789.

1.1 Cotton Spinning before Arkwright's Spinning Frame

An age-old skill, spinning had remained essentially unchanged for centuries. The fibres in the raw material would be teased out from a hunk by the spinner and a twist added by the twirling action of a weighted distaff or drop spindle, which often served as a bobbin onto which to wind the thread (Figure 1). Spinning was done in virtually all rural houses across the land. It was a job for any idle moment, requiring little equipment or light, and often providing useful supplementary income for poorer families. Once the hand- and great-wheels were invented, which provided the momentum for twisting from a wheel, the spinner could not only work faster but also sit down. Cotton spinning was a relatively new process in eighteenth century Britain, a country that owed much of its trading prosperity to wool. Cotton fibres are generally shorter than wool, which required some adaptation of technique.

Raw cotton was mainly imported from British colonies in America. It had to be first beaten (to loosen the fibres) and then picked clean of seeds and other fragments. Then it would be carded to straighten the fibres, by spreading the cotton onto toothed cards which were brushed together until the fibres were all lying in the same direction. The carded cotton was then lifted off in soft, fleecy rolls, about 30cm (12 inches) long and 1.5cm (3/4 inch) thick. These were the **cardings**. These cardings were then converted to **rovings** by twisting one end to the spindle of a hand wheel while at the same time drawing out the carding horizontally with the other hand. This spiral twisting produced a continuous coarse thread in which the fibres were only very loosely twisted, making the roving weak and irregular. The spinner then converted the rovings to weft thread by repeating the process, this time putting a stronger twist into the fibres, to make the finished thread stronger and more even. The whole process is illustrated in Figure 2. It took two operations to get from carded to spun fibres because the cardings were too weak to be drawn out into an even thread fine enough to be woven in a single operation.

Figure 1: **Spinning is a centuries old technology. An engraving published in 1826, showing an already idealised and nostalgic scene.**

However, this thread was, literally, homespun, in being somewhat weak and irregular. It was good only for the **weft** of a piece of cloth - the threads that were woven from the shuttle onto the threads fixed to the loom. The strength of a length of cloth came from the **warp**, or fixed threads. The warp was at this time provided by linen thread, imported by the hank from Ireland or Germany. The weaver prepared his loom by warping, or winding the linen onto pegs some five feet apart. **Fustians** (a coarse twilled cotton fabric with a nap) could be over a yard wide, and it could take two men to throw the shuttle back and forth across the loom. Before about 1740, such cloths were then sold by the individual weaver to the cloth merchants 'in the grey' (undyed). The textile industry was a part of the lives of many, but it was dispersed and labour intensive.

In 1733, John Kay invented the flying shuttle, which transformed the slow and clumsy process of weaving. Kay's shuttle was spring-loaded, which enabled the weaver to use it one-handed and to weave much wider cloths. Given sufficient thread for the weft, the fly shuttle had the potential to double the speed of weaving but in the short term, local weavers destroyed Kay's workshop and house because they saw only a threat to the labour force. The fly shuttle only came into its own when John's son, Thomas, developed the drop box in 1760, which enabled three or four differently coloured wefts to be stored in separate boxes which dropped to the loom as they were needed.

However, insufficient weft was clearly becoming a problem as weaving technology advanced. In this 'proto-industrial' era, the stages in production were almost always geographically dispersed, and this was especially true of the cotton industry. From around 1750, most large manufacturers had 'putters-out' who travelled the countryside, giving out raw materials and wages, and collecting the finished articles to return them to central depots. As in underdeveloped countries today, much of the poor's energy was given over to transport and there must have been thousands of workers – especially in the textile industry – who

Figure 2: **Spinning as a cottage industry. The hand cards straightened the fibres, the spinner on the left converts the carded cotton etc. into a loose rope or roving, which is then spun again to make thread.**

never set eyes on their employer.[2] The master would send linen warp and raw cotton to the weaver via his putter-out, and then receive them back in finished lengths of cloth, paying the weaver for the weaving, spinning and preparation of the raw cotton. Most houses had a loom and a distaff; if the spinning was not done by his own family, the weaver paid the spinner, who in turn might pay the carder and rover (Figure 3). On average, it has been estimated that eight to ten spinners were needed to keep one weaver at his loom. The spinners were not only dispersed, but were often in a sellers' market, the desperate weavers being forced to offer presents and high pay for yarn by the end of the week. The yarn was inevitably homespun, and quality control was poor.

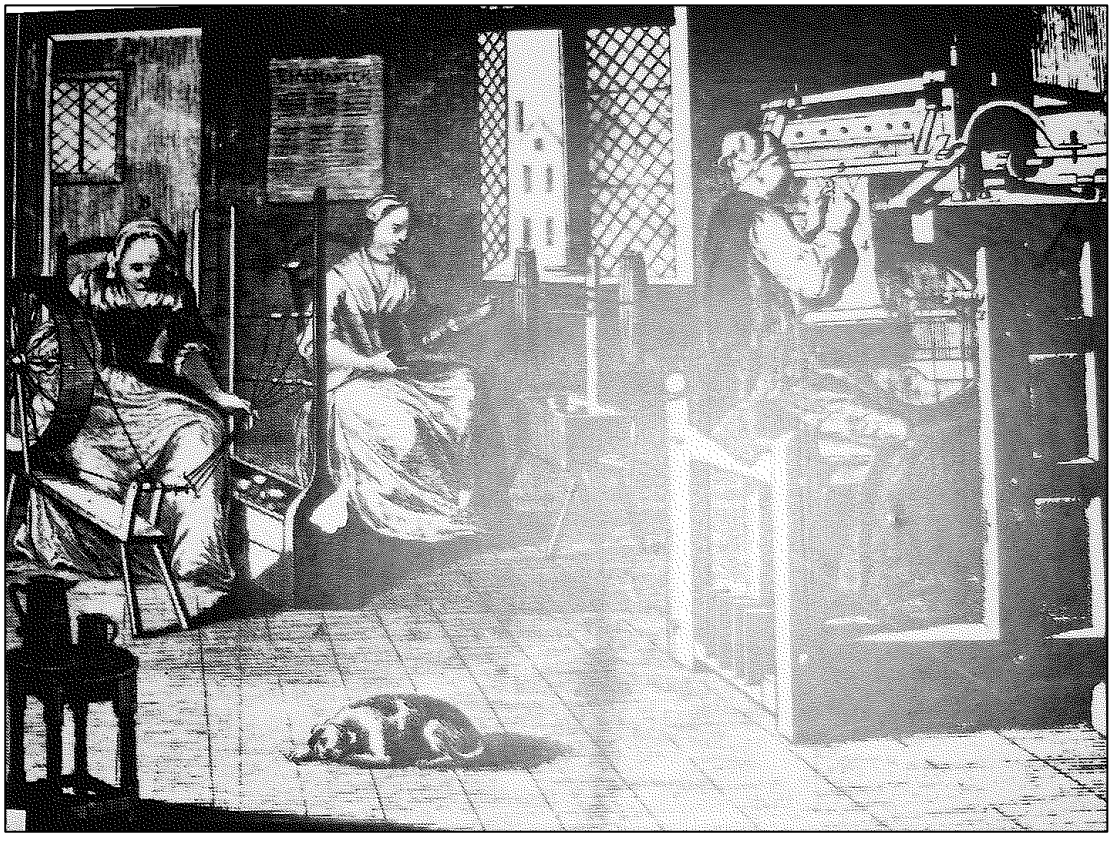


Figure 3: **Knitting as a cottage industry. Cotton and other threads were as in demand for knitting as weaving. Both activities could be carried out at home, in a well-lit room, with family members providing the labour for the various stages.**

[2] To this extent the idea that the coming of factories led to an immediate 'depersonalisation' of relations in industry is far from accurate.

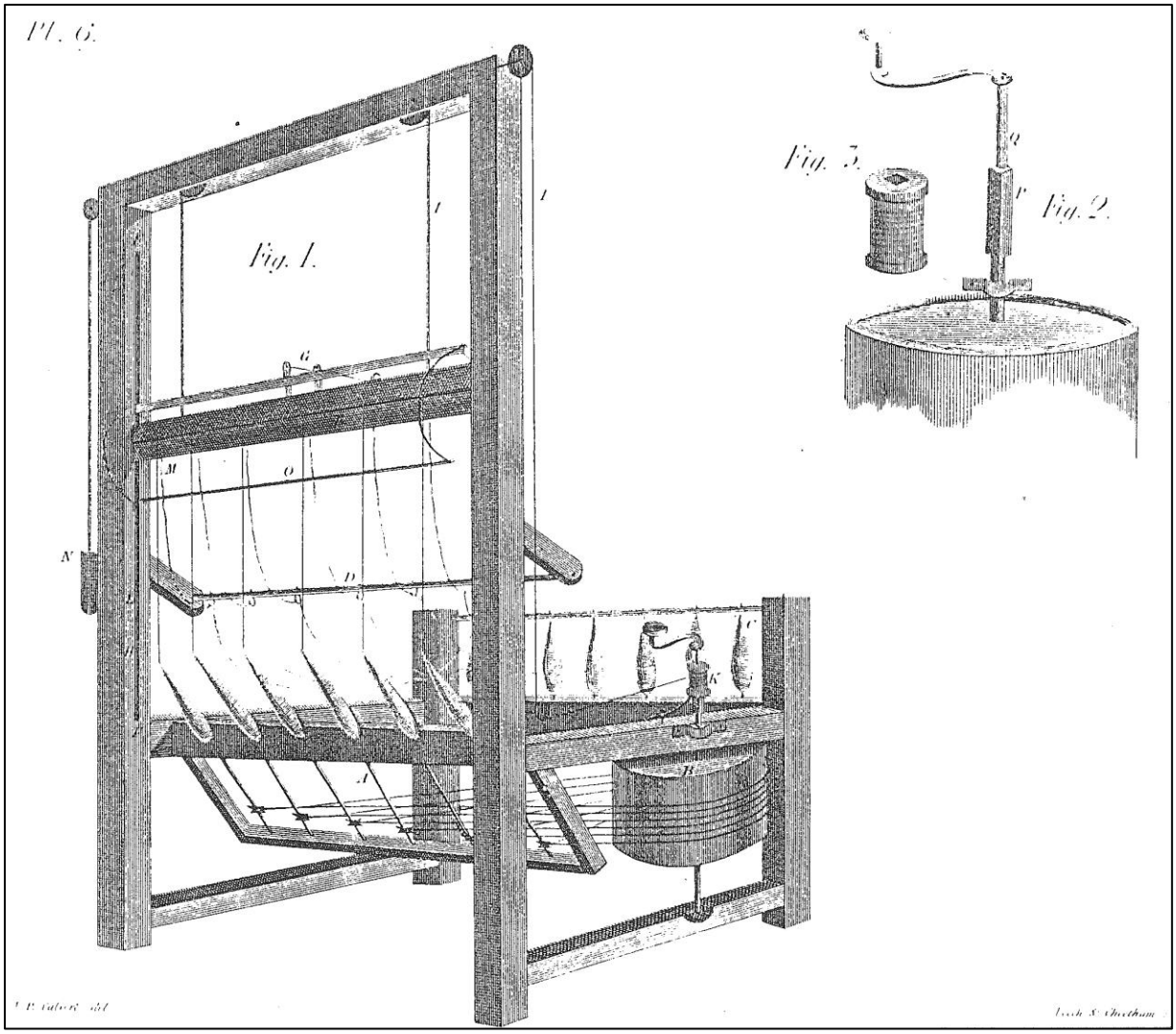


Figure 4: **An early Spinning Jenny. The spindles are revolved by the strings attached to the wheel, which is turned by a horizontal handle. The rovings are on the bobbins at C, then pass through a wire loop and over the 'clove' at M on their way to the spindles. The clove was also raised and lowered by the action of the wheel, thus teasing out the fibres which were then twisted into thread by a few turns of the wheel and wound onto the spindles.**

The first significant breakthrough in the mechanisation of spinning came with James Hargreaves' invention of the spinning jenny in 1764. The story goes that he called his invention after his daughter, Jane, who knocked over the spinning wheel at home. The spindle kept turning and Hargreaves realised that a single horizontal wheel could drive many spindles (Figure 4). His first machine had eight spindles onto which thread was spun from a corresponding set of rovings (the loose strands of untwisted fibres produced after the carding process). Thus a single operator could spin as much as eight had previously, and with improvements, a single jenny eventually ran as many as eighty spindles. However, a skilled operator was still required and even then the thread was often coarse and lacking in strength, suitable only for filling the weft. It was a significant advance, but not the definitive breakthrough.

Hargreaves was an illiterate carpenter and weaver, who lacked the acumen to profit fully from his ingenuity. At first the jenny was for family use only; when he began to sell his machines, other spinners marched on his house and smashed his machines for 'doing the work of eight men'. Hargreaves then moved to Nottingham, where the industrious hosiers were less suspicious of new inventions. Hargreaves did not apply for a patent until 1770, by which time many had copied his spinning jenny with no payment.[3] It has been estimated that 20,000 jennies were in use at his death in 1778. Even though one machine could eventually to take eighty spindles, the jenny remained essentially a cottage machine, requiring operating skill to twist, draw and wind the thread, and better suited to longer fibred wool than cotton. It provided the potential for spinners to catch up with the existing demand of the weaving industry, but not to drive its expansion.

[3] Although Hargreaves is generally accepted as the inventor of the spinning jenny, even this claim has not been without controversy. In 1823, Richard Guest wrote an apology on behalf of Thomas Hayes (or Highs), attacking Arkwright for stealing the credit for inventing the spinning frame from Hayes. Guest claimed that Hayes had also invented the spinning jenny (Hargreaves merely improving it in the late 1760s), a fact he believed Arkwright had suppressed to enable him to belittle Hayes' contribution as an inventor to the invention of the spinning frame.

1.2 The British Cotton Industry before 1770

Until the 1770s, the growth of the cotton industry was still restricted by the once-powerful wool interests, the backbone of the British cloth industry since the Middle Ages. In 1700 an Act was passed which imposed a heavy duty on imported printed calicoes, in response to the perceived threat to wool by imports from India. In the event, this merely served to encourage the small English calico-printing trade, so in 1721 a further Act banned the wearing of any printed cloth with cotton in it except for muslins, fustians and neck cloths. The situation eased in 1736 when the full production of fustians was permitted provided the warp threads (i.e. the fixed threads on the loom) were of linen (usually imported from Ireland). The cotton for the weft threads was largely imported from Britain's West Indian colonies, thus benefiting British trade still further. Trade became increasingly brisk, especially for cotton cloth from Lancashire, which not only had the ports but also the damp climate necessary to facilitate the spinning of cotton.

The stocking industry was also developing, and in a more innovative and fashion conscious manner. The stocking frame had been invented to knit stockings as long ago as 1589 by William Lee, and the industry had long flourished around Nottingham and Derby. Like weaving, it was the ideal cottage industry, and frameworkers' cottages sprang up, distinguished by their long attic windows to maximise the light. Workers would rent, then buy, a frame, and then several. From around 1730 cotton stockings (as opposed to silk) were being produced, but they remained expensive. Equally, the Nottinghamshire dominance began to be challenged. Cotton yarn spun in the north west was generally too irregular to be knitted satisfactorily: Lancashire spinners were used to longer staple wool, while their Gloucestershire counterparts in particular, whose sheep grew shorter fibred wool, were able to adapt more easily to spinning cotton. Tewkesbury especially began to produce large quantities of cotton stockings, inferior in quality but at a cheaper price than the Nottingham ones. The inhabitants of another

Landmark property, St. Mary's Lane in Tewkesbury, would have knitted their stockings in direct competition with their rivals in Nottingham and beyond.

Then, in 1759, Jedediah Strutt (later to be Arkwright's partner) invented the rib-knitting frame, which enabled stockings and their tops to be knitted together on the same frame. This was another significant innovation but, as with the fly shuttle, its potential was increasingly restricted by one vital bottleneck in the production process – insufficient thread.

Not everything was in the spinners' favour however. As smallholdings became ever more subdivided, agricultural areas grew increasingly dependent on the textile industry for supplementary income. Spinning might be neglected during the harvest, but the cyclical nature of the agricultural year meant that there were large numbers of part-time workers available for the textile processes. Equally, the age-old employment structures were breaking down, especially this far from London. Nottingham hosiers largely ignored the apprenticeship regulations, employing theoretically unlawful journeymen, women and children in sophisticated putting-out networks and centralised workshops. The concentration of both adult and juvenile labour in factories was thus already a familiar idea by the 1760s, although the processes undertaken represented a concentration of individual tasks, rather than sequential mechanisation of an entire process.

The need for a breakthrough in spinning technology was becoming increasingly urgent. Lewis Paul and John Wyatt had invented a spinning machine and established water powered mills in Birmingham and Northampton in the 1730s, which had both failed. As so often, it was the apparently simplest action, that of the spinner's forefinger and thumb, that was proving most difficult to replicate. In 1761, the Society for the Encouragement of Arts, Commerce and Manufactures offered a fifty pound prize for a successful spinning machine – a weaver could expect some 9s a week for his work, so the prize represented some two years' wages. Such incentives were not unusual in a society that could identify (and

was frustrated by) the brakes on its development. A ferment of inventive endeavour was encouraged, especially among the artisans involved with the actual processes. William Harrison's pursuit of the prize to measure longitude is another well-known example of this phenomenon. Often the eventual solution was the culmination of the adjustments and tweaking of many. A certain degree of business acumen and money were also needed to benefit in full through the patent process, which was further complicated because the rights to a given invention were often uncertain in the first place.

This, then, is the climate in which Richard Arkwright was growing up. The themes apparent in this brief introduction will reappear as we now turn to the man himself: the pressing need for better quality thread, and in quantity; mechanical ingenuity as a means to financial advancement; the destructive suspicion of others less forward-looking; the cumulative effect of collaborative effort – and the need for incisive self-interest, self confidence and force of personality to play the patent system for one's own success.

2. Richard Arkwright

2.1 A 'Biographical Enigma'

Only the bare bones are known about Arkwight's early life, and even his later activities are seen chiefly through the eyes of others and through the mills he left behind. Virtually none of his letters or business records survives, perhaps due to successive fires at the mills. Even his own son was driven to seek information on his father's early life, seven years after his death. According to his main historians, R. S. Fitton and A.P Wadsworth, Arkwright 'remains one of the biographical enigmas of the century'. William Nicholson, a potential biographer in the years after Arkwright's death, suffered the same dilemma – was he 'a superior genius' and remarkable inventor, or was he 'a cunning schemer and collector of other men's inventions, supporting them with borrowed capital and never afterwards feeling or showing any emotion or gratitude to the one or the other?' Nicholson could not decide and never wrote the biography.

The Victorian historian Thomas Carlyle's epithet is perhaps the best known if least flattering description – 'a plain, almost gross, bag-cheeked, pot-bellied man… of copious digestion'. Yet Carlyle, born in 1795, was writing long after Arkwright's death, and presumably applying his own poetic license to Joseph Wright's famous portrait. A typical school book view today is that Arkwright had 'ingenuity, ability, and tenacity but he is not an attractive personality, for he was ruthless in pursuit of his aims and rode roughshod over other people….Even in age not over-squeamish, he had the reputation of being a hard master'.[4] Yet some of his peers acknowledged and respected him. 'We all looked up to him and imitated his mode of building … a man who has done more to honour his country than any man I know, not excepting our great military characters', said the first

[4] S. Davis, *Living Through the Industrial Revolution*, 1966.

Sir Robert Peel in 1816.[5] Such views illustrate the widely differing interpretations of Arkwright's character passed down.

2.2 Arkwright's Early Life

Richard Arkwright was born in Preston on 23rd December in 1732, the youngest son of nine (some say thirteen) children. His father, Thomas, had been apprenticed as a tailor and died in 1753. Between 1767 and 1773, his mother Ellen received 2s 6d at Christmas as charity for the poor. They had two sons and seven daughters; their other son, William, attended a charity school in Manchester before also being apprenticed as a tailor. Tradition has it that Richard was taught to read and write by his cousin Ellen. He was later apprenticed as a barber. According to Thomas Ridgeway (founder of the Bolton Bleaching Company) when responding to Arkwright junior's appeal for information about his father's life, Richard moved to Bolton in 1750. He entered the employment of Edward Pollitt, a peruke- (or wig-) maker there. In 1755, he married Patience Holt, and in the same year their son Richard was born. A daughter followed in 1759. At this time, Arkwright had set up his own business in Bolton, and 'shaved chins in subterranean apartments at a-penny-a-piece'.[6]

Thomas Ridgeway's account of these days is worth quoting in full:

> *My first knowledge of your Father, was about the year 1750 when he came to reside in Bolton and was I think then about the Age of 18. He entered into the employment of one Edward Pollit, a peruke maker there, on whose death he remained with his widow for Sometime—He then married your Mother, and began business for himself; which he pursued with most indefatigable industry and with some success. He might now be considered in a comfortable situation; he had a decent House, a cleaner one could not be and his friends and acquaintance always found in it a cordial reception from him. These were persons of no mean consideration in the town, but such as were in Superior Stations to himself. To these he*

[5] Peel was giving evidence to the Commons' Select Committee Enquiring into the State of Children Employed in Manufacturies. In the immediate aftermath of the Napoleonic Wars, this was praise indeed. This Robert Peel was the father of the prime minister of the same name and a mill-owner himself.
[6] Fitton, p. 2.

recommended himself by his character for neatness, sobriety, industry and good Sense.

The latter part of his time in Bolton was not so pleasant as it had been. He became necessitous in consequence of taking a public house, which did not answer his purpose and upon which he expended much money in alterations. He was obliged to leave the house and had a [good] many interruptions caused by an inveterate asthma, which brought him very low in every sense of the word. Notwithstanding this, I believe there was only one Person to whom he owed Money when he left the town and his credit [was] otherwise good. His customers that had employed him in his business were generally of the better sort, he might probably have done better could he have Stooped to the vulgar, but his spirit was much superior to it, And he always seemed to [have] something better in view.

His genius for Mechanics was observed, it was perceived in his common conversation, which often turned on subjects of that kind. I well remember we had often great fun with a Clock he put up in his shop, which had all the appearance of being worked by the smoke of the chimney and we have caused a great many to believe it was so; I have often seen him cut pasteboard into different shapes such as forming squares from oblongs without adding or diminishing, and a Hundred curious knackey things that one cannot find words to explain. He was always thought very clever in his peruke making business and very capital in Bleeding and toothdrawing[7] and allowed by all his acquaintance to be a very ingenious man.[8]

Ridgeway's evidence must perhaps be regarded with certain wariness, since he must, to an extent, have been playing up to the themes that the second generation of a now wealthy dynasty was expecting to hear. Few specific examples of Arkwright's mechanical genius are given, and at this stage he was not altogether successful in business. Did Pollitt's business fall to him, while he 'remained with his widow'? Marriage would not normally take place until a degree of financial security could be offered, which does not seem necessarily so here (the comment about Arkwright's debt when he left the town has a ring of special pleading).

Ridgeway also plays upon Arkwright's desire to better himself, and he was certainly ambitious. By 1762, he had started his own wig-making company, as

[7] - all in a day's work for an eighteenth century barber.
[8] Fitton & Wadsworth, pp 61-2.

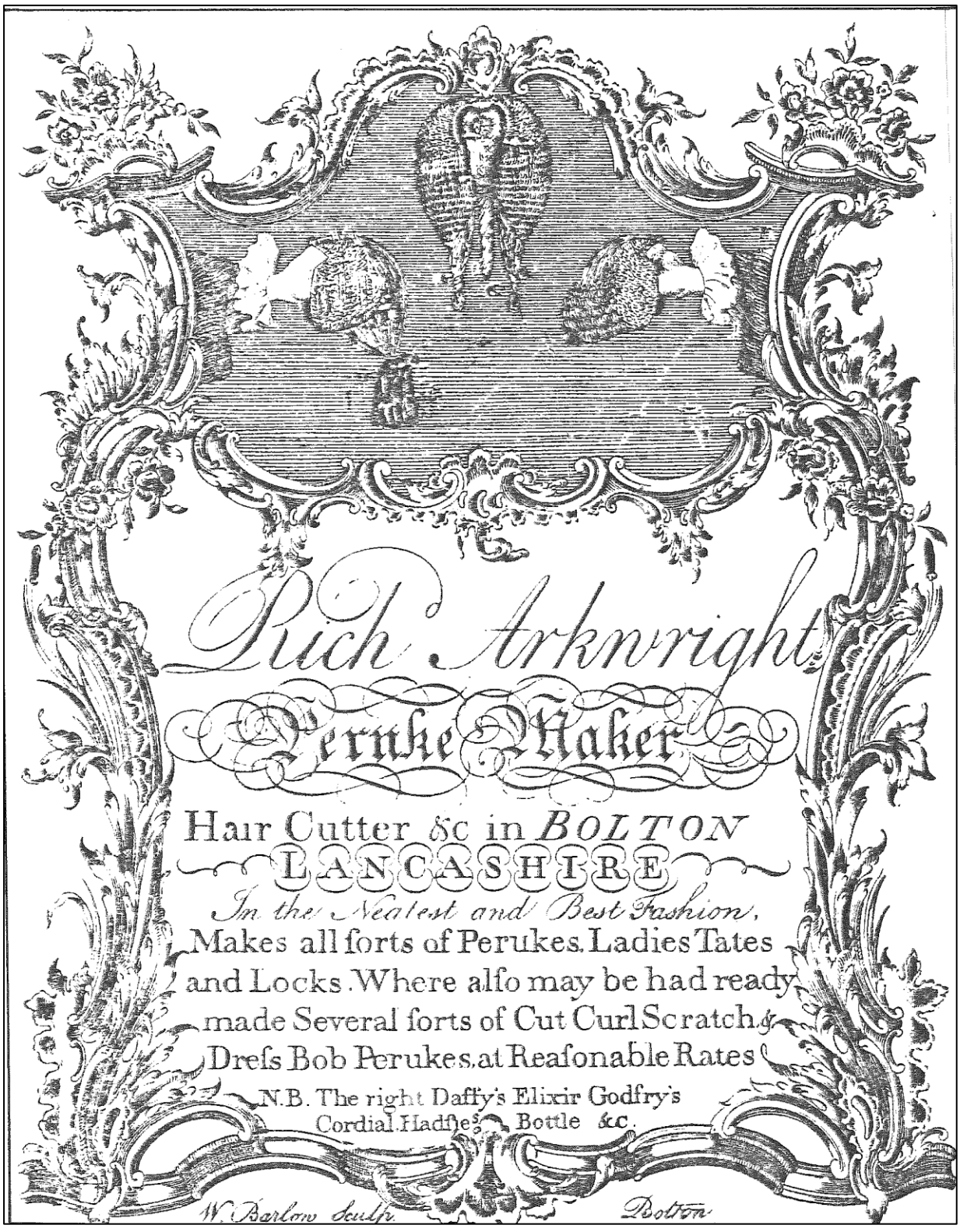


Figure 5: **Richard Arkwright's business plate from the days when he was a barber and wigmaker in Bolton.**

testified by his ornate business plate. His wife Patience had died sometime after 1759, but he soon re-married, to Margaret Biggins of Leigh in 1761. It seems likely that it was Margaret who brought him the capital to set up as a wigmaker. Arkwright was now travelling the country for hair to make his wigs – another way for the poor to supplement their income. Richard Guest tells us that 'Mr Arkwright's hair was esteemed the best in the country' and that he had also acquired 'a valuable chemical secret for dying it'. Both as a barber and as a hair collector, Arkwright would of course have had ample opportunity for idle chitchat; he would have been well aware, as he travelled the countryside, of the shortage of thread and the attempts to invent new machines for the textile industry. It is easy to picture him with this artisan or that, hearing about their near successes and failures in replicating the action of the spinner's forefinger and thumb mechanically, while the jenny spinners gradually improved their carding and roving mechanisms.

In the course of his travels he came across (or perhaps sought out) John Kay, a clockmaker who lived in Warrington. We have a rare eye witness account of that meeting from Kay himself, who was called to give evidence in the 1785 trial to determine Arkwright's right to a patent extension. Counsel for the prosecution asked Kay, 'What was it Arkwright applied to you about, or said to you; how did he introduce himself to you?' Kay replied at some length, and although he is recalling a conversation that took place almost twenty years earlier, we hear an authentic eighteenth-century voice:

> *'He comes to a public house, and I comes up there; and he said he was going to get a wheel-maker… to get a few wires bended, and he wanted a few bits of brass turned, and asked, where could he get them turned? I said if he would go down the street he would meet with a clockmaker, where he might be able to get them done.*
>
> *'He came to our house, when I was at work, and asked if I could do those things for him? I said I would see about it and I did; he paid me the next day, and came again, and wanted something else; I did him those things, and he asked me when I had done if I would drink a glass of wine with him in Dale Street? I went with him; in our discourse, he asked me, if mine was a profitable business? I said it was not; he asked me what I could get in a*

week? I told him about 14s. Oh, says he, I can get more than you: I said what business may you be of, he said "I was a barber, but I have left it off and I and another are going up & down the country buying hair, and can make more of it." We were talking of different things, and this came up, of spinning by rollers – he said, that will never be brought to bear, several gentlemen have almost broke themselves by it. I said, I think I could bring that to bear; that was all that passed that night.

'The next morning, he comes to my bedside, and says, Do you remember what I told you last night, and asked, whether I could make him a small model, at a small expense? Yes, says I, I believe I can; says he, if you will, I will pay you. I went and bought a few articles, and made a small wooden model and he took it with him to Manchester & in a week or fortnight's time, I cannot say which, he comes back again and I made him another.[9]

When asked where he got the method of making such models, Kay replied 'From Mr Hayes, the last witness'. Kay went on to introduce Arkwright to this collaborator, Thomas Hayes (or Highs), a reedmaker from Leigh, although it seems that only Kay became Arkwright's paid assistant. According to Guest in 1823, Hayes had been prompted to invent a spinning machine by 'being in the house of one of his neighbours whose son, a weaver, had returned home after a long and ineffectual search for weft. [Hayes] was, by the circumstance, roused to consider whether a machine could not be invented to produce a more plentiful supply of weft'.[10]

By the time Arkwright came along, it seems Kay and Hayes had been trying to make a spinning machine for some time, but had run out of money and destroyed their own work in their frustration. Hayes' critical advance was in devising fluted rollers carding the raw cotton, rotating at different speeds to draw out the rovings. The idea of using these draft rollers was not entirely new: Lewis Paul and John Wyatt had tried using rollers in their spinning mill at Upper Priory, but with no great success, and their patent had expired. According to Arkwright's apologist Guest, Hayes initially kept his roller spinning a secret. It was 'his favourite invention, and he promised himself much future advantage from it'. But

[9] *The Trial of a Cause instituted by Richard Pepper Arden, Esq., his Majesty's Attorney General… to Repeal a Patent Granted on the Sixteenth of December 1775 to Mr Richard Arkwright For an Invention of Certain Instruments & machines for Preparing Silk, Cotton, Flax and Wool for Spinning (1785)* p. 62.
[10] Guest, p. 11.

Hayes was poor with a large family and lacked the drive or funds to lodge a patent application.

Was Kay perhaps over-confiding to Arkwright? Arkwright clearly recognised the breakthrough. He persuaded a liquor merchant and house painter, John Smalley, and David Thornley, a merchant from Liverpool, to provide initial financial backing. In *Articles of Agreement* drawn up in June 1769, Smalley and Thornley agreed to 'Advance in equal Proportions all such sums of money as might be necessary in applying for a Patent as aforesaid and for Improving, Enlarging, Using and Working the Machine already Invented and others to be constructed for the same or like purposes, and all incident Charges and Expenses that might attend the same...'[11] Arkwright and Kay set up a workroom in the parlour of the Grammar School in Preston. They surface here through being disqualified from voting on the night of the election of General Burgoyne of Saratoga on grounds of too short a period of residency. Arkwright had been renting rooms in Preston since January 1768 at 7 guineas a year. His landlord, in his evidence over the electoral franchise dispute, said Arkwright was said to be engaged in 'making a machine to find out the longitude'.[12]

These must have been desperate as well as exhilarating times for Arkwright. He had spent all his savings and neglected his business. He was in debt, and around this time his wife Margaret apparently smashed one of his machines during an argument and Arkwright left her. (Nothing more is heard of Margaret, although presumably she continued to look after their son, who was to join his father's business in adulthood).

Hidden away in the Grammar School, behind some gooseberry bushes, Arkwright and his collaborators were so secretive that that neighbours grew suspicious, accusing them of sorcery. Two old women complained that the humming noises

[11] Cited in Hills, p. 42.
[12] The problem of finding an accurate means to measure longitude (for which prizes had been offered as long ago as 1713) was eventually solved by John Harrison in the early 1770s. His son John also gave evidence against Arkwright in the 1785 patent trial. Perhaps there was some kind of rivalry or connection at this time.

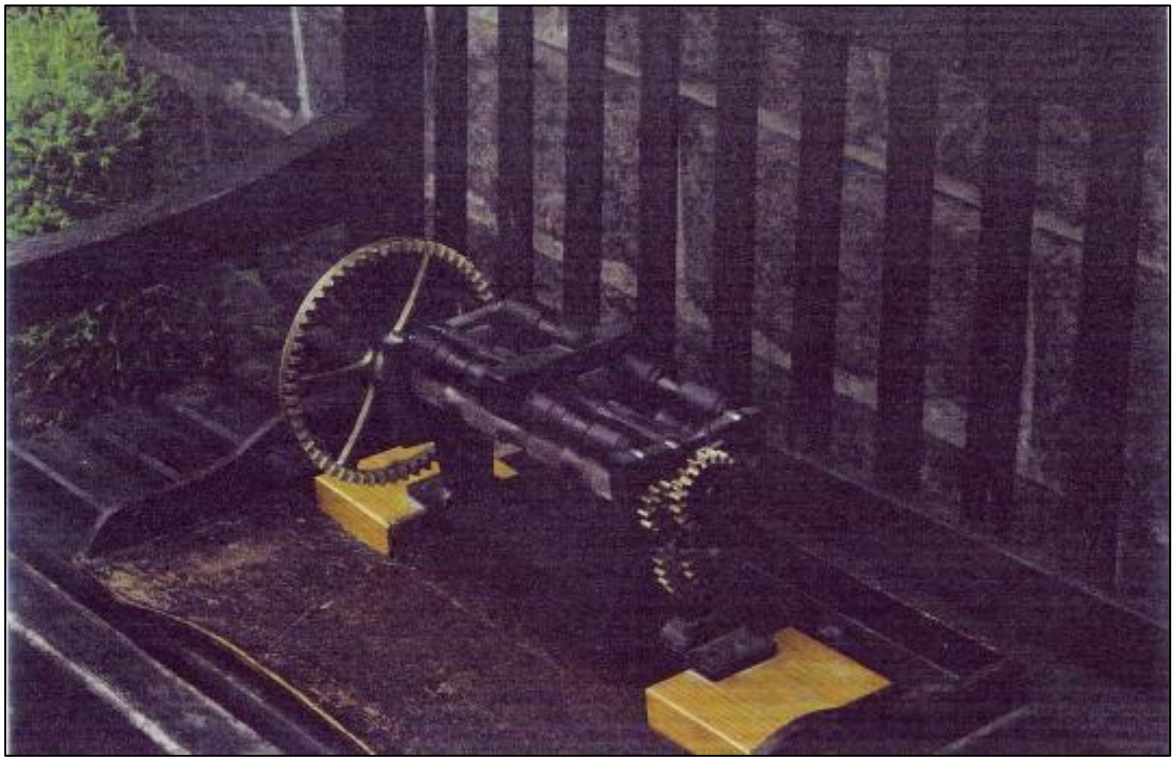


Figure 6: **The Arkwright Society's reconstruction of the model developed by Kay and Arkwright. The pairs of fluted rollers are apparent; the relevance of the clockmaker's trade is also clear.**

they heard at night must be the devil tuning his bagpipes. Nevertheless, after thirteen weeks, they perfected their model. They made a second, full-size machine to sell, but without a patent they were vulnerable to piracy, not to mention the machine-breakers. In April 1768, they therefore moved to more progressive Nottingham, where there was less hostility than in Lancashire towards either innovation or exclusive patent rights. By June 1768, a patent application had been lodged for the spinning frame. Interestingly, Arkwright describes himself as a clockmaker in the application, even though he had no formal connection with the trade until he met Kay. He may have been trying to use this to establish some credibility as an inventor, but his enemies were later to use this as evidence that he did not invent the spinning frame. The patent was granted in June 1769 on presentation of its specification in Derby, and Arkwright's business career entered its next phase.

So what exactly was the solution to mechanised spinning that Arkwright and Kay had come up with? The model Arkwright used to demonstrate the key features of the invention is shown in Joseph Wright's portrait; the Arkwright Society's reproduction of this model is shown in Figure 6. Arkwright's breakthrough was twofold. First, building upon the principle of using rollers to feed the rovings onto the spindles, he realised that four pairs of rollers were necessary (later reduced to three). The bottom rollers were fluted, the top covered in leather. The distance between the pairs of rollers was governed by the length of the fibres, and therefore critical. Too close, and adjacent pairs of rollers grip the fibres, which break. Too widely spaced, and the fibres drift apart between them. The relative speed with which the rollers rotated was also very important. By running the second set at twice the speed of the first and so on, the length of the roving was drawn out, but before it could break, it was passed forward to be twisted.

The second innovation was to use weighted rollers to ensure that the fibres were gripped tightly as they were driven forward. Neither Lewis nor Paul seems to have realised the necessity for this. Arkwright then used flyers above the bobbins

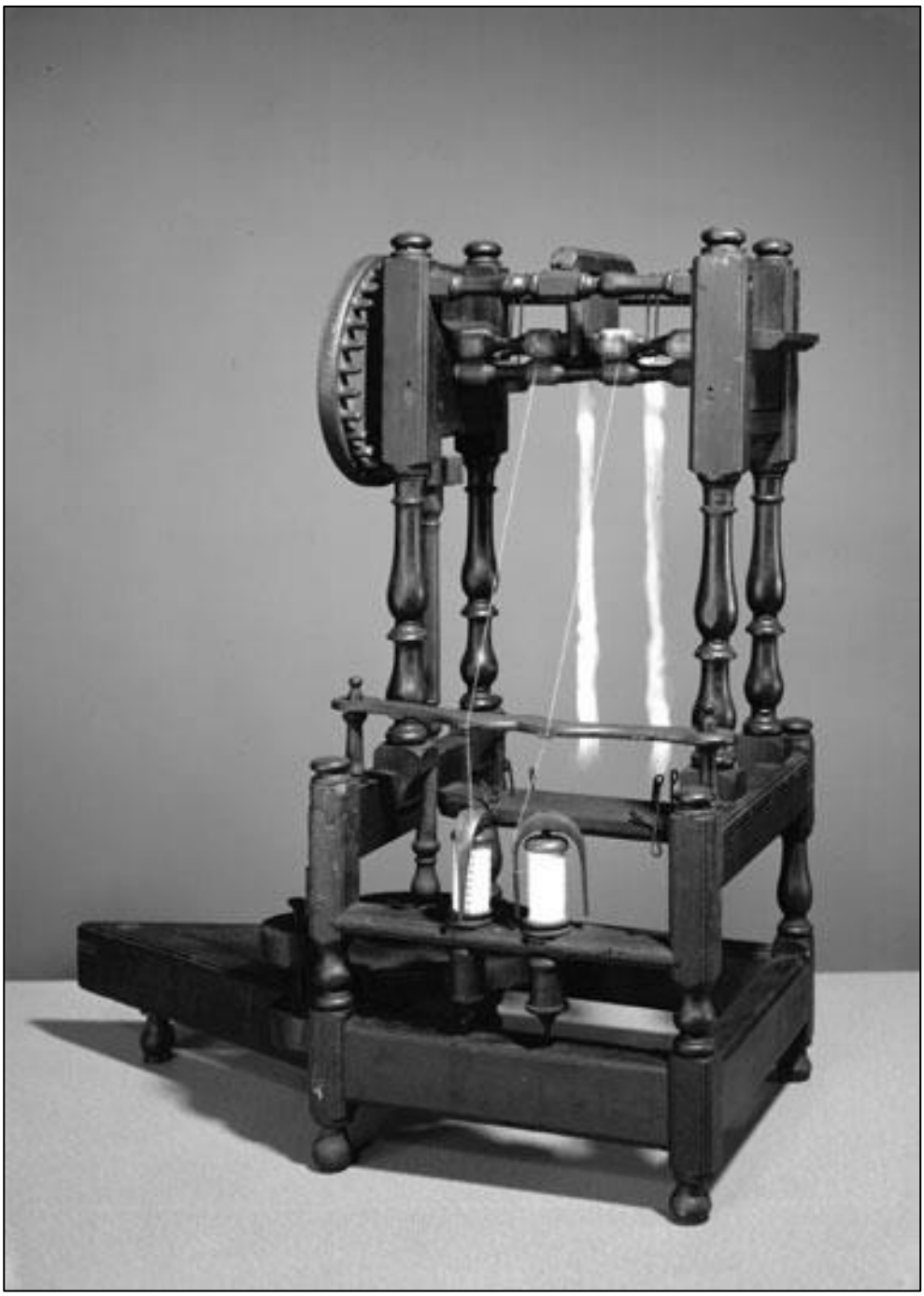


Figure 7: **Arkwright's prototype spinning frame, such as he must have shown to Strutt and Need to convince them to back him. This reconstruction is in the Science Museum in London, and reportedly still runs smoothly.**

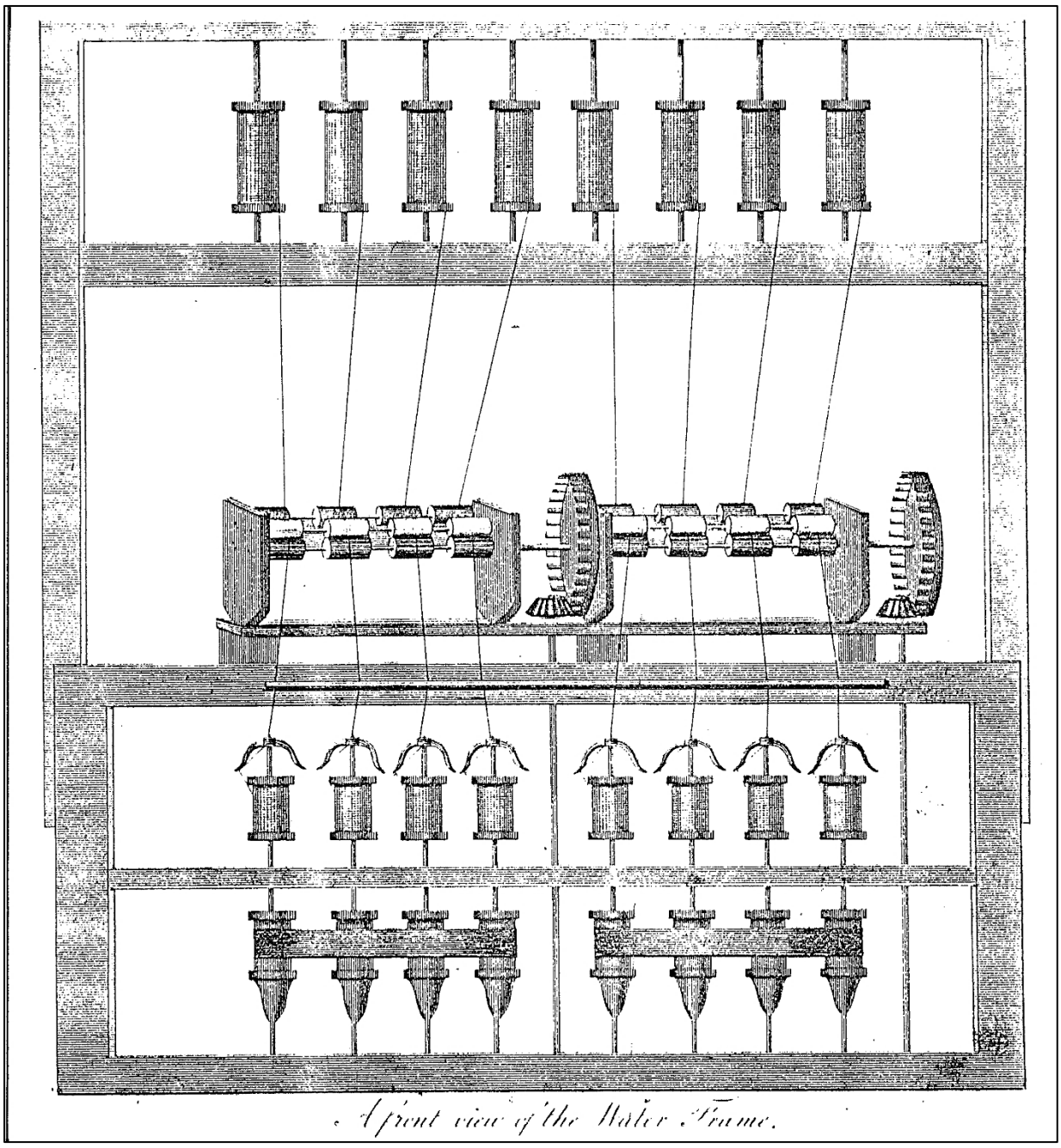


Figure 8: **'A front view of the Water Frame'. The rovings are held on the top bobbins, passing between a pair of rollers, one fluted, the other covered in leather. Subsequent pairs of rollers, revolving faster than the first, drew the roving on further (like the spinner's right hand). The thread then passes onto the spindles at the front; the flyer twisted the thread as the thread was wound onto the revolving spindles.** (This early drawing is inaccurate in showing only two pairs of rollers).

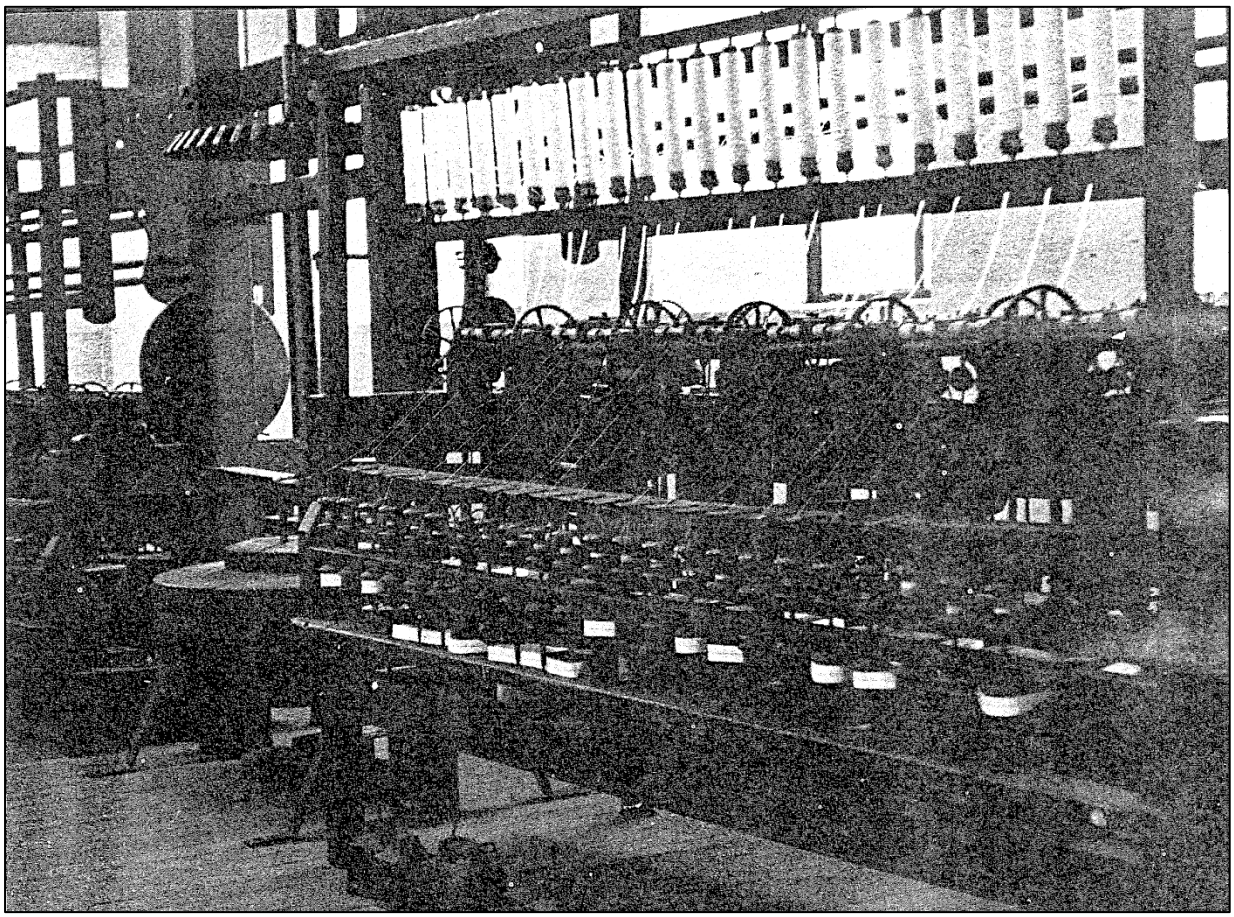


Figure 9: **A working spinning frame built from Arkwright's specifications. The difference between the rovings and the finished thread is clear here. The weights have been detached and put on the floor. The drive drum, powered by the water wheel, is on the left. The whistling sound produced by these machines when in full swing led to them being nicknamed 'throstles'.**

to put the twist into the thread. Power drove the rollers and the thread was pulled down by the weight of the spindles at the bottom of the machine. The bobbins onto which the thread was wound were not driven, but rather retarded by light spring brakes. All the operator had to do was supply the frame with rovings at the back, replace the bobbins as they filled and join the yarn if it broke. Compared to the jenny, this was unskilled labour; the sophistication was, all in the finely adjusted machinery, whose potential to run many spindles at once was clear. The prototype had four bobbins (see Figure 7); this was to rise to thirty-two and eventually a hundred and twenty eight. In the words of Ralph Mather, apologist for the hand-spinners, 'Arkwright's machines require so few hands, and those only children, with the assistance of an onlooker [that] a child can produce as much as would, and did on average, employ ten grown up persons. Jennies for spinning with one hundred or two hundred spindles, or more, going all at once, and requiring but one person to manage them.'[13] (See Figs. 8 and 9).

Arkwright may have taken advantage of some of the discoveries of others, but he certainly contributed much himself to this breakthrough, and with the spinning frame now invented, it was time for his particular brand of genius to come into its own. His determination to acquire a patent, a step at which his peers had faltered, is a first indication of his drive (Figure 10). This move gave his claim to intellectual property rights legal backing, which he was prepared to defend vigorously. At the 1785 patent rights trial, Thomas Hayes reported the following conversation in 'Mrs. Jackson's parlour' in 1772, about the use of fluted rollers:

[Hayes:] -- A. ...*he [Arkwright] told me, when I told him that it was my invention, suppose it was, he says, if any man has found out a thing, and begun a thing, and does not go forwards, he lays it aside, and any other man has a right to take it up and get a patent for it.*

[Mr. Sargeant Bolton]: -- *Q. Mr. Arkwright said, it was no matter, if a man does not proceed upon a thing, but let it lie so many weeks or months, he, or any other man, might get a patent for it?*

[13] Ralph Mather, *An Impartial Representation of the Case of the Poor Cotton Spinners in Lancashire* (1780).

A.D. 1769 . . . . . N° 931.

Spinning Machine.

ARKWRIGHT'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, RICHARD ARKWRIGHT, of the Town of Nottingham, in the County of Nottingham, send greeting.

WHEREAS I, the said Richard Arkwright, did by my petition humbly represent to His present most Excellent Majesty King George the Third, that I had by great study and long application invented "A NEW PIECE OF MACHINERY NEVER BEFORE FOUND OUT, PRACTISED, OR USED, FOR THE MAKING OF WEFT OR YARN FROM COTTON, FLAX, AND WOOL, WHICH WOULD BE OF GREAT UTILITY TO A GREAT MANY MANUFACTURERS IN THIS HIS KINGDOM OF ENGLAND, AS WELL AS TO HIS SUBJECTS IN GENERAL, BY EMPLOYING A GREAT NUMBER OF POOR PEOPLE IN WORKING THE SAID MACHINERY, AND BY MAKING THE SAID WEFT OR YARN MUCH SUPERIOR IN QUALITY TO ANY EVER HERETOFORE MANUFACTURED OR MADE;" I therefore humbly prayed His said Majesty to grant unto me, my executors, administrators, and assigns, His Royal Letters Patent for the sole making and vending the said machine or Invention within that part of His said Majesty's Kingdom of Great Britain called England, His Dominion of Wales, and Town of Berwick-upon-Tweed, for the term of fourteen years, agreeable to the Statute in that behalf. His said Majesty, being willing to give encouragement to all arts and inventions which might be for the publick good, was graciously pleased to condescend to my request; and therefore, by His Royal Letters Patent, bearing date at Westminster, the Third day of July, in the ninth year of His reign, of his especial grace, certain knowledge, and meer motion, for Himself, His heirs and successors, did give and grant unto me, the said Richard Arkwright, my executors, administrators, and assigns, His especial licence, full power, solo priviledge and authority, that I, the said Richard Arkwright, my executors, administrators, and assigns, and every of us, by myself and them-

Figure 10: **The first page of Patent No. 931, 1769 – the specification for Arkwright's first spinning machine.**

[Hayes] --A. *Yes, I cannot tell how that is, says I, for I never was much concerned in law.*

And of course Arkwright was right. It was this single-minded pursuit of success that marked him out among all the other artisan inventors, sprung from equally humble stock but lacking Arkwright's thoroughness and persistence.

There was however one more familiar obstacle that presented itself at this point. Smalley seems to have withdrawn his financial support between the patent application and its grant (this may explain the unusually long interval between the two), and Arkwright was in need of a new backer. He applied to the Wrights, Nottingham bankers, who in turn introduced him to Samuel Need, a financier. Need called in his partner, Jedediah Strutt, to pronounce on Arkwright's new invention. Strutt told 'Mr Need that he might with great safety close with Mr Arkwright; the only thing wanting to his model, being an adaptation of some of the wheels to each other, which for want of skill, the inventor, with all his powers of contrivance had not been able to accomplish'.[14] Arkwright, Need and Strutt then formed one of the most influential partnerships of this critical period in the Industrial Revolution.

Strutt, it may be remembered had invented the rib knitting frame, and both he and Need had profited by their exclusive patent.[15] The booming cotton hosiery industry would provide a market for the thread, and Strutt not only recognised the breakthrough when he saw it, but also had the financial means to put it into practice. A spinning factory was established in Nottingham, housing several spinning frames driven by horses. However, it soon became clear that horse-power was not only expensive, but could not provide sufficient power. There were precedents for the use of water power, and it was this that Arkwright decided to seek out. The stage was set for Arkwright's move to Cromford.

[14] Fitton & Wadsworth, p.63, from *The Encyclopedia Britannica* (1816).
[15] Strutt went on to establish his own model mill communities in parallel with Arkwright, most notably in Belper.

3. Arkwright in Cromford

'The decision to go to Cromford and apply water power to machinery far from perfect was one of the turning points in the history of the British factory system....we must recognise the daring in the experiment'.[16]

3.1 Why Cromford?

Why Arkwright chose Cromford has puzzled historians ever since. In 1770, Cromford was a scattered community that depended chiefly on lead mining. A pack-horse trail led through it (the stone bridge can still be seen in the mill complex) and it may well be that Arkwright had passed through it on his travels as hair collector. Otherwise, communications were poor, both with the ports from which the raw materials came and with the outlet towns. Cromford lay seventeen miles from Derby, twenty six from Nottingham and forty four from Manchester and was surrounded by unenclosed moorland. Roads were poor; the turnpike to Derby and London lay some way to the west. Plenty of other places in the hills around had water.

Yet Arkwright was to make Cromford his home for the rest of his life. His reasons for the choice can only be conjectured. At a practical level, he required only a small volume of water: it is thought the thousand-spindle unit required only ten horsepower. In any case, development on a major river would have been impossible given the very limited capital available at the beginning of the project. By the time he built Masson Mills in 1783, Arkwright was in need of more power, and was himself able to finance the harnessing of the Derwent (described by Daniel Defoe as 'a fury of a river'). In Bonsall Brook and Cromford Sough (pronounced 'suff'), he found a manageable water flow for his first attempt at turning his spinning frame into a water frame. The Sough water is also reputed to have never frozen, whether because of a constant ambience in its origins below

[16] Fitton & Wadsworth, p.64.

ground or because of some more sinister chemical change related to the lead mines.[17] The lead miners and their families also provided a potential employee force for the mill.

At another level, Cromford's small size and relative isolation seem to have attracted Arkwright, who was very sensitive to the possibility of others copying his invention. In one of his few surviving letters, a long rambling missive to Strutt written in March 1772 and bursting with ideas and optimism, Arkwright wrote:

> *'Desire Ward to send those other Locks and also some sorts of Hangins for the sashes he and you may think best and some good Latches and Catches for the outdoors and a few for the inner ons also and a Large Knoker or Bell to the First door. I am Determind for the feuter to Let no person in to Look at the wor[k]s except spinning'* [18].

Another side to Arkwright's character often mentioned in this context is his desire to climb the social ladder. While it is hard to believe this was other than a secondary consideration, Cromford was nevertheless close to the fashionable Matlock Baths, visited by the circles he wished to enter. It would also provide a less structured environment in which to prove himself. Nottingham was run by a closed Corporation of life members who were dominated by Non-Conformists. Arkwright, while there is little evidence that he was a particularly religious man, always professed to be an Anglican, and seems to have aspired to the ranks of the traditional gentry rather than being content with the more down-to-earth prosperity of Strutt, for example, who was a Dissenter. Cromford provided a setting in which Arkwright could, if all went well, develop the role of squire on his own terms. On 1st August 1771, he leased the land upon which the mills

[17] See page ** for a more detailed description of the waterways in Cromford.
[18] Fitton & Wadsworth, p.67.

Figure 11: **The Arkwright Society's model of the mill site as it would have appeared around 1800. Mill Road runs in the foreground.**

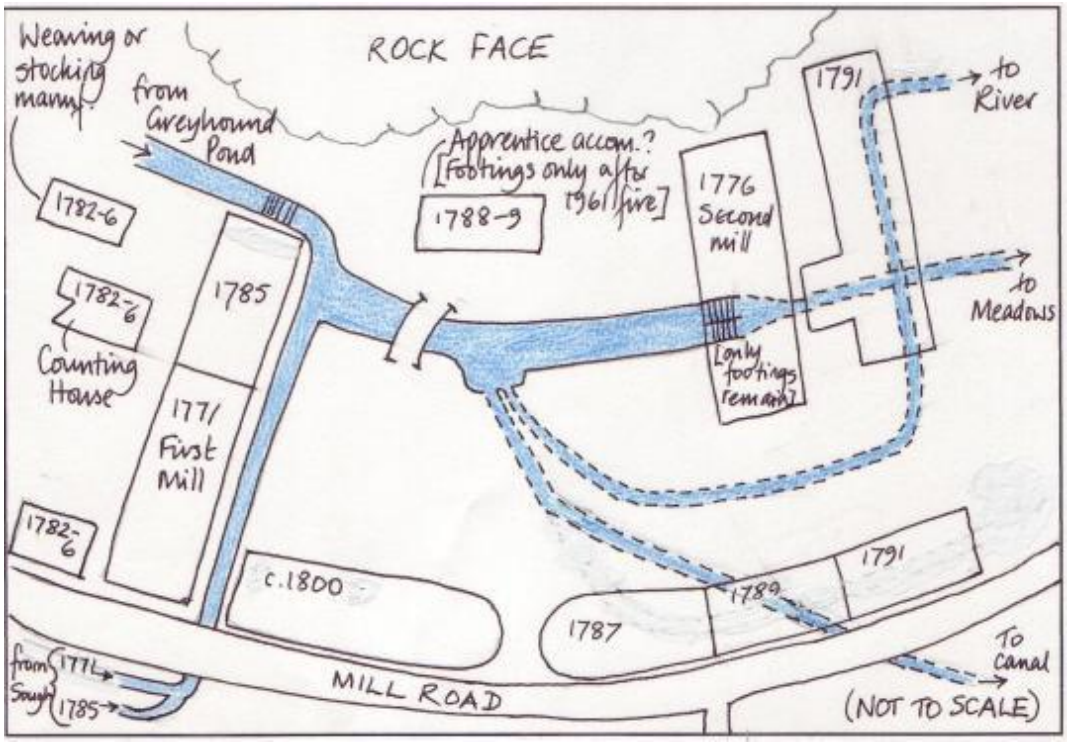


Figure 12: **Sketch map of the mill site around 1800.**

now stand for £14 a year. By December, he was advertising in the *Derby Mercury* for the many trades needed to build a working factory from scratch:

Cotton Mill, Cromford, 10th Dec. 1771

WANTED immediately, two Journeymen Clock-Makers, or others that understands Tooth and Pinion well: Also a Smith that can forge and file. – Likewise two Wood turners that have been accustomed to Wheel-making, Spoke-turning, &c. Weavers residing at the Mill, may have good work. There is Employment at the above Place, for Women, Children,&c. and good Wages. N.B. A quantity of Box Wood is wanted: Any Persons whom the above may suit, will be trated by Messr. Arkwright and Co. at the Mill, or Mr. Strutt, in Derby.

Figure 13: **The earliest surviving engraving of Arkwright's first mill as seen from Mill Road. Grace Cottage and the Counting House lie in front. The ground floor storey of the original five floors must be missing from view here; the top two storeys have since disappeared. (Reproduced from The Mirror, 22 October 1836).**

Figure 13a: **A similar view of the first mill today.**

3.2 The Building of the Cromford Mills

The Cromford Mills site is a complex one, and the map and photo of the Arkwright Society's model of the site opposite is helpful to grasp both the chronology and the layout. The concentration of adult and juvenile labour was already a familiar idea in the hosier workshops of Nottingham and Derby, and Matthew Boulton's Soho manufactory in Birmingham provided another precedent of centralisation. Arkwright's type of mill nevertheless marked a new departure. Once his first patent was granted, he granted licenses only to units of a thousand spindles, a centralization caused by business acumen rather than technological necessity – there was no reason why the spinning frame could not have been built in small units and horse-operated.[19] Arkwright knew the only way he could keep control of his invention was by centralising the units of production. The power required to drive a thousand spindles meant the frames could only operate in water powered mills, and the sheer cost of entry deterred the small, cottage investor. The size of his machinery in turn determined the structure of his mills.

The shell of his first water-driven mill was built between August and December 1771, where the Cromford Sough joins Bonsall Brook below the Greyhound Pond (see Figure 13). Some of the stone for the mill came from Steeple Hill Grange, a substantial house demolished for the purpose. Today's structure reveals two distinct building phases, although very little is known about this first mill. It is not even certain which side was the front and which the back. It had originally had five, well-lit floors. Its plan and shape were to become the pattern for most of the early mills: it was rectangular, and approximately thirty feet wide. This allowed two rows of frames, placed on either side of a central horizontal shaft (driven by the waterwheel) with just enough room for its child tenders to creep in and

[19] The licenses for use of the water frame were very expensive. In 1778, John Gardom and John Pares in Calver paid an initial premium of £7,000 and then annual royalties of £1,000. This side of Arkwright's business affairs was very significant to his prosperity, and he was to fight hard to defend it.

around the frames. Lavatory columns, stairwells and offices were attached to or alongside the main building so as not to detract from the factory floor space.

The experimental fever of these first years is clear in the very few remaining documents of this period. This extract from his letter of March 1772 to Strutt is typical of Arkwright's trenchant style:

> *'I see Greate Improvements Every day, When I rote to you last had not thorowly provd the spinning; several things apening I could not account for sinse then has proved it – I have made trial to twist it for Velverets & find what the[y] do with five operations [I] can do with one that is duble & twist it Redey for wharping at one time, first they reel, second wind, third Duble, fourth twist, 5 wind redey to wharp, & all these done on one thred at a time Except Twisting. shold Like you to try a little of this hard in a ribd frame; I think it shold not be whet but beate.'* [20]

And there were clearly times when tempers (and spelling) frayed:

> *'At the mill the[y] whant Cards putting on. Andrew might do that as it Requiers no greate judgement, but I sopose he is a deal taken up in those Looms & the profits of wich will scairsly pay whare house room. If he can be got to wheave by the Pees or yard & out of the mill [we?] shold sune set that plase in Beter order but while he is init it is scairsly posable. Except he has his own whay no good will be don with justis or him, & what I sade to George is what I shold say again, it whas unraisenable.'* [21]

John Smalley, Arkwright's first backer, was at Cromford with his family in these early years, perhaps as mill manager, but his relations with Arkwright were also strained at times. A draft letter survives from Strutt to Smalley, dated September 1773:

> *'Recd yours & am sorry to find matters betwixt you & Mr Arkwright are come to such extremities. (It is directly contrary to my disposition) & wonder he shoud persist in giving you fresh provocations. I said what I coud to persuade him to oblige you in anything that was reasonable & to endeavour to live on good terms at least & my Wife has said a great deal to him. (and what can I do more I cannot stop his mouth nor is it in my power to convince him) nor when I come to consider the matter seriously and the circumstances I am at a loss to think what we can do about it, you*

[20] Fitton & Wadsworth, p.66.
[21] Ibid, p. 67.

> *must be sensible when some sort of people set themselves to be perverse it is very difficult to prevent them being so. We cannot (stop his mouth or prevent his doing wrong) prevent him saying Ill-natured things nor can we regulate his actions, neither do I see that it is in our power to remove him otherwise than by his own consent for he is in possession & as much right there as we. Nay further suppose we was to discharge the Man that has been the occasion of all this he may say he shall not be discharged & if they two agree what could we do to pretend to do that by compulsion that we…'* [draft breaks off]*.*[22]

The following year, Strutt's son wrote to him in London 'You begin to be much wanted at Home and may also be at Cromford; I was there last Sunday but one, & heard very unfavourable accounts of Mr. Arkwright's behaviour. I suppose he is going to leave you. Mrs Smalley does not seem at all happy in her new situation'.[23]

Smalley and Arkwright finally parted company in 1777 and Smalley moved to set up a three-storeyed spinning factory in Flintshire.

The other characteristic of these early years is a constant striving for technological improvement. In 1775, Arkwright was granted a second patent, extending the term of his first and including specifications for carders and other machinery (see below).

This achieved, in 1776 he started to build a second mill, for which this time he demolished an old corn mill, whose parts he advertised in the *Derby Mercury.* He also advertised once more for labour:

> *'Wanted at Cromford. Forging and Filing Smiths, Joiners and Carpenters, Framework Knitters and Weavers with large families. Likewise children of all ages may have constant employment. Boys and young men may have trades taught them, which will enable them to maintain a family in a short time.'*

(Such adverts give the lie to the hand-spinners claim' that Arkwright's machines were reducing livelihoods. Rather, the huge increase in output drove an equivalent

[22] Ibid, pp. 75-6.
[23] Ibid, p. 75.

Figure 14: **View across all that remains of the second mill, built in 1776, destroyed by fire in 1890. The wheel pit lies to the right, the Bonsall Brook still flowing through. The old packhorse bridge lies between the wheel-pit, with the first mill immediately behind. The later mills run to the left. Facing inwards across the yard, these do not present the same windowless, fortress-like aspect found on the Mill Road Elevations.**

increase in demand, such that employment opportunities actually increased). The new mill straddled Bonsall Brook (see Figure 14). It was a massive seven stories high and 120 feet long. It had twin waterwheels fifteen feet in diameter, in a wheelpit twenty feet deep. This depth suggests that the wheels were now 'breast-' or 'overshot' wheels. They provided not just more efficient but also more sophisticated transfer of power, allowing the shaft to be driven in either direction. Despite such improvements, it seems that there was not enough water to provide power for flat-out production across all stages, so that carding, roving and combing were carried out at night and spinning during the day. When William Bray visited Cromford in 1776, he found 200 children employed in the first mill, working twelve-hour shifts.

It is thought that the raw cotton would enter the mills on the top storey, working its way down to emerge as the finished product at the ground floor, but surprisingly little is known about how the mills functioned because of the dearth of records and we are largely dependent on the eye witness accounts of tourists like Bray. These were not large mills, nor were they the 'Satanic', urban workshops that were to develop in the next century (the green countryside around Cromford is itself enough to dispel such an impression). Arkwright's first mill in Nottingham (destroyed by fire in 1781) had employed 300. By the time his second Cromford mill was operational in 1777, the workforce had risen to 800. This second mill was demolished following a disastrous fire in 1890 and only the footings remain today for archaeological investigation.

During the 1780s, building continued apace on the site, evidence of the enormous success of the enterprise. Further factories were built along Mill Lane in 1787 (with its distinctive rounded end) and, as successive extensions, in 1789 and 1791. Further adaptations of the watercourses were required for these (the Cromford waterworks need their own explanation – see below). Ancillary buildings were added in the yard behind the first mill: Grace Cottage and the peculiarly shaped building, probably a residence for an employee, in 1782-6.

Figure 15: **The mill manager's house on Mill Road. It was perhaps here that Thomas Smalley and his family lived before he fell out with Arkwright.**

Figure 16: **Masson Mill today, now a shopping village and museum of working mill machinery. The chimney postdates the main building. The River Derwent runs behind.**

These may have been intended as twin 'pavilions' originally, flanking the entrance to the first mill and a third block, a fine example of a multi-storied weavers' workshop. In the lee of the cliff face by the packhorse bridge was a further bow-fronted block, built in 1788-9 as a 'barracks' for unmarried male workers working away from home. This burnt down in 1961, and again, only footings remain.

Across Mill Lane from the later mills stands the mill manager's house, a pleasant four square building (Figure 15). Arkwright himself lived in Rock House, set back from Mill Lane just beyond. This solid but not unduly ostentatious building has been considerably enlarged since Arkwright's day, and is now converted into flats.

By 1783, Arkwright had gained sufficient confidence to harness the power of the Derwent itself, and he built the imposing Masson Mill on the road to Matlock Bath (see Figure 16). With its combination of Venetian windows and an almost classical symmetry, Masson represents a concession to architectural aesthetics not apparent in the Cromford mills, sign too of a more peaceful climate now the rioters of the late 1770s had been quashed (see below).

These mill buildings and others that sprang up along the Derwent Valley must have had a significant impact upon the landscape. Arkwright himself had other mills at Wirksworth (managed by his son), Bakewell and Matlock, and many others had followed his example. The period was one in which tourism was becoming more and more popular, as those not always able to afford a Grand Tour in Europe realised through the travel diaries of those like William Gilpin and John Byng, Viscount Torrington, that the desirable frisson of the sublime and the charm of the picturesque could also be found at home. The Dales were already a favourite destination and Matlock Bath a fashionable spa. Visitors found that the new mills brought a new dimension of drama to their appreciation of the landscape, and their comments are generally positive. 'These cotton mills', wrote John Byng in 1790, 'seven stories high, and fill'd with inhabitants, remind me of a first rate man of war; and when they are lighted up, on a dark night, look luminously beautiful'. Joseph Wright of Derby painted this scene, in a dark and brooding landscape (Figure 17).

Figure 17: **Arkwright's Cotton Mills by Night, by Joseph Wright of Derby.**

4. 'It is agreed by all who know him that he is a Tyrant and more absolute than a Bashaw…'[24]

Within his first decade at Cromford, Arkwright had become a very wealthy man. Yet a straightforward account of his building activities is only a part of the story of this success. He had to face various challenges to his position: legal, legislative and even physical. The pugnacious way in which he took these on, dealt with some and lost others, made a contribution to his ongoing success just as important as his initial technological invention. At the outset, there were two specific obstacles to be addressed: excise duties and the mechanisation of the preparation of raw cotton to the rovings stage. The first challenge, however, was of a more fundamental character – that of the mob.

4.1 The 1779 Riots

While the 1770s brought prosperity to Arkwright and his fellow mill-owners and secure employment for those employed in the mills, independent spinners and weavers remained deeply suspicious of the new machinery and the buildings that housed them. Matters came to a head in 1779 when, after several other mills had been destroyed, a drunken mob attacked the mill at Birkacre, near Chorley, owned by Arkwright, Strutt and Need. Josiah Wedgewood described the attack in a letter, which recounts that the attack was initially repulsed by the mill owner. An estimated mob of 8,000 returned the next day. Two were shot dead by troops; the rest went and found firearms and were joined by the Duke of Bridgewater's colliers. They returned to the mill, which was worth £10,000, repulsed the troops and destroyed the factory, declaring it their intention to destroy all the manufactories in England.

Not surprisingly, the mill owners reacted promptly to such threats, publicising their preparations through the local papers as a warning. Arkwright was not a

[24] Fitton & Wadsworth, p. 84.

man to do things by halves. He advertised for troops, and put Cromford in a state of siege. A letter from Cromford to 'a Gentleman in Manchester' appeared in both the *Manchester* and *Derby Mercuries* in October 1779:

> '*In your last you expressed some Fear of the Mob coming to Destroy the Works at Cromford but they are well prepared to receive them should they come there. All the Gentlemen in this Neighbourhood being determined to support Mr Arkwright, in the defence of his Works, which have been of such Utility to this Country, Fifteen hundred Stand of small Arms are already collected from Derby and the Neighbouring Towns, and a great Battery of Cannons raised of 9 and 12 pounders, with great plenty of Powder and Grape Shot, besides which, upwards of 500 spears are fixt in poles of between two & three yards long. … 5 or 6,000 Men, Miners &c. can be assembled in less than an Hour, by signals agreed upon, who are determined to defend to the every last Extremity, the Works, by which many Hundreds of their Wives & Children get a decent and comfortable livelihood.'*

In fact, the rioters never came within fifty miles of Cromford and it was never threatened again. Fear of disorder, however, determined the design of the extensions to the mill built in the 1780s, which present windowless, fortress-like walls to Mill Road. Some twenty rioters were tried for the burning of Birkacre at the Lancashire Quarter Sessions in 1780. A typical sentence was to be sent to Lancaster Goal for a year and bound over to keep the peace for £100 over the next six months. The magistrates called for legislation to protect the new establishments, declaring the development of cotton spinning to be 'of great utility to the country, affording labour and subsistence to the industrious poor'. The events of 1779 were to prove the last flare-up of such trouble for some time, as the benefits of the cotton boom became more apparent to all. Arkwright's other battles were to take place in the corridors of power and the law courts.

4.2 Excise Duties

The new spinning technology meant that British produced cotton cloth was increasingly handicapped in the open market by outdated excise duties, originally introduced to protect the woollen industry from Indian import (see section 1.1 above). Technically, only half-cotton cloths attracted the lower duty of 3d/yard, but the 1736 relaxation of double duty for home-produced goods with a flax warp and cotton weft gradually came to cover most of the industry's output. Arkwright's machine-spun twist was now strong enough to be used as weft as well as warp, and by the early 1770s was entering the calico trade in quantity. In Lancashire, the excise men seem to have cast a blind eye, and the new printed calicoes were still charged at 3d a yard despite now using cotton thread for both warp and weft. In London, however, full cotton cloths were being taxed at a prohibitive 6d/yard. From Arkwright's point of view, the situation had to be resolved if the market for his thread was to expand to keep up with his production capabilities.

In February 1774, a petition was presented to the House of Commons from 'Richard Arkwright & Co. of Nottingham, Spinners of Cotton and Manufactures of British White Stuffs'. It requested that the duty be equalised across all calicoes at 3d/yard and enquired whether printed calicoes were still prohibited from use and wear. In fact, it was Strutt who travelled to London to steer the petition through, not Arkwright, but it is nevertheless striking that, after only three years in business, Arkwright and Co. had the acumen and leadership to take on this restrictive anomaly. The petition was granted in June 1774 and an Act passed that determined that British full-cotton stuffs could all be charged at the lower rate, provided they were distinguishable by three blue threads running in the weft selvage.

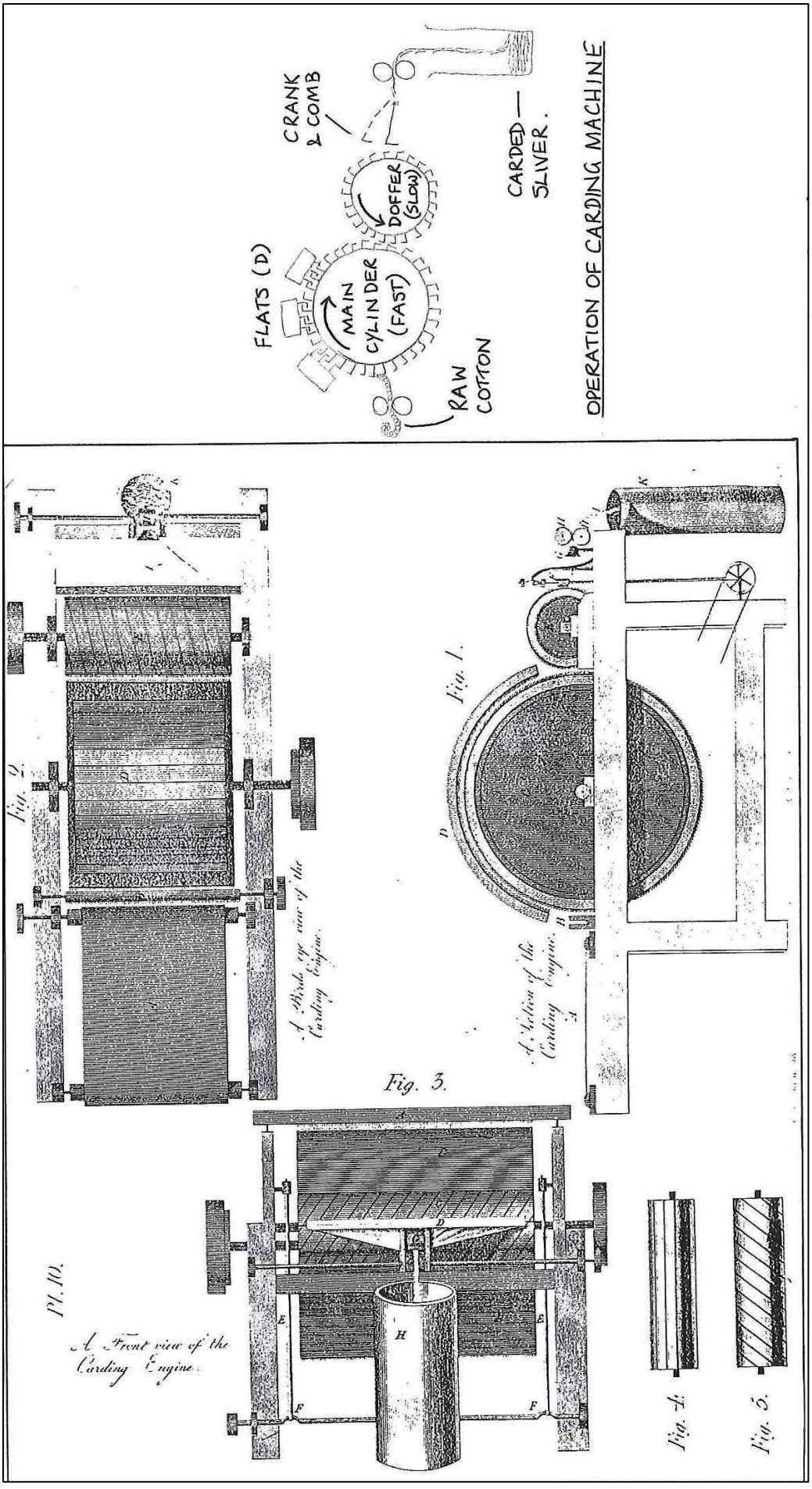


Figure 18: **A carding machine from Guest' s *Compendious History of the Cotton Manufacture*, with a sketch to show its operation. (Guest attempts to discredit Arkwright' s claim to its invention, but it seems fairly sure that the critical crank and comb mechanism was developed at Cromford even if other aspects of the machine were common knowledge).**

4.3 The Patent Trials

The 1785 determination of Arkwright's patent rights at the King's Bench in Westminster represents an important landmark in patent law, in basing the judgement of the principle of *scire facias,* or the right to know. The origins of the case lay in Arkwright's second patent, granted in 1775. This covered the innovations achieved at Cromford in the preparatory stages of spinning, the carding and roving, 'after several years of intense study and labour'. The 1775 patent is valuable in showing us the kind of glitches that had to be overcome and the experiments carried out at Cromford.

Cotton cleaning was not successfully mechanised until Snodgrass's 'scutcher', based on the threshing machine, was invented in the early nineteenth century. Arkwright must have used women beating the cotton with sticks and picking out the dirt by hand. Carding was solved in this 1775 patent by spreading the cleaned cotton on long lengths of cloth (a 'proto-conveyor belt') and feeding it into a carding engine (Figure 18). The teeth on the carding cylinder were provided on a long narrow strip, wound round the drum in a spiral.[25] The critical issue was how to lift the carded cotton from the 'doffer cylinder', which took it from the main cylinder.

Arkwright's solution was a crank and comb. The crank lifted and lowered the teeth of the comb so that the cotton was lifted off in a single long roll without joins. The device was to survive almost two hundred years and its importance and effectiveness is certain, although Arkwright's sole claim to its invention was not undisputed.[26] A further problem was that the cotton fibres bent as they were lifted off the comb, leading to irregularities in the eventual sliver, which in any case had to be thinner to be fed into the water frame, requiring more machines. Arkwright used cylinders to store the slivers and then feed them into a roving

[25] In 1785, one James Pilkington would claim prior antecedents for this idea.
[26] James Hargreaves and others claimed prior invention for the crank and comb in 1785, although others claimed that Hargreaves got it from one of Arkwright's workmen.

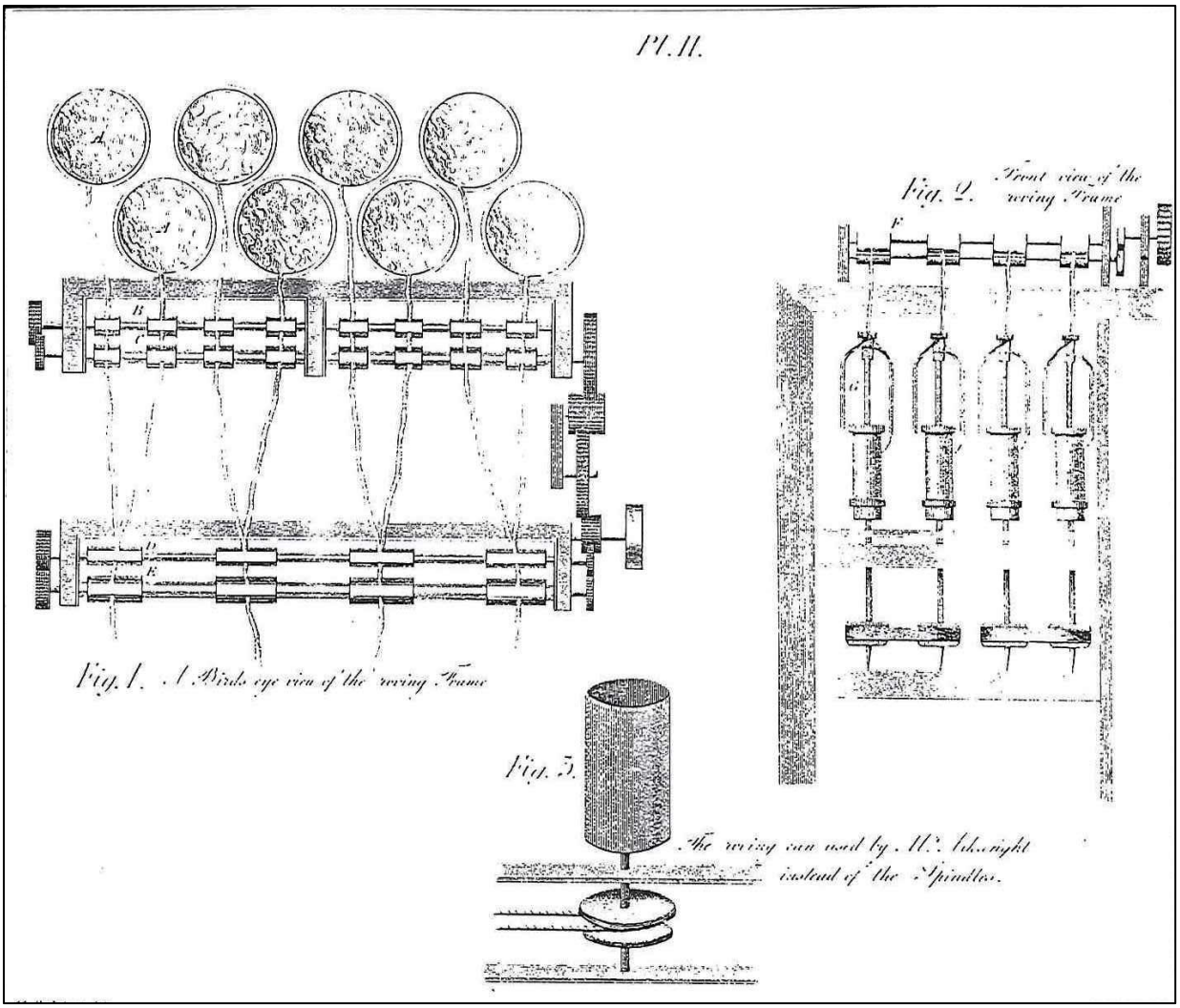


Figure 19: **A Roving engine, converting the carded sliver into roving read for spinning. Arkwright's innovation was to use cylinders to feed the slivers in. Otherwise, it is very similar in operation to the spinning frame. (Guest, *Compendious History*).**

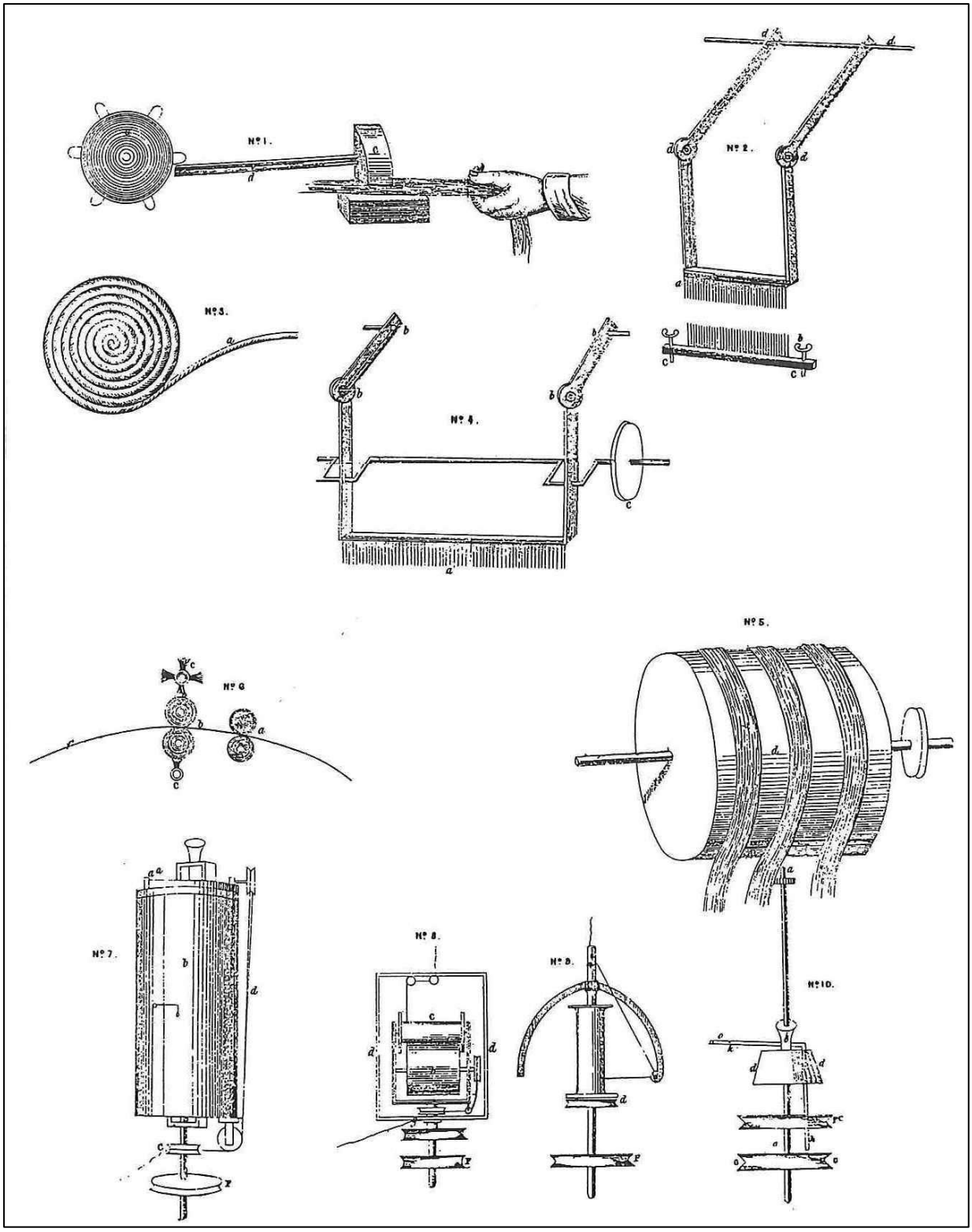


Figure 20: **A selection of the devices included in Arkwright's comprehensive patent of 1775.**

machine, which put a preliminary twist into two strands (see Figure 19). It was Arkwright's achievement that he overcame all these difficulties and the 1775 patent shows a series of machines capable of turning raw cotton into satisfactory cotton yarn – the first true production line. People were necessary only to carry the product from one stage to the next, tend the machines and mend broken threads.

With hindsight, the problem was that Arkwright tried to over-reach himself. His successful 1775 specification was suspiciously comprehensive in scope and included various inventions older than Arkwright's own (Figure 20). It was also later maintained that many of the machines included could never be brought to work. The suspicion was that Arkwright was not only plagiarising the inventions of others but also trying to 'sew up' the entire process of spinning for himself. At the very least, he was deliberately trying to make their reproduction by others as difficult as possible by making the specifications unclear. W.D. Crofts, a witness for the prosecution in 1785, claimed that Arkwright came to him a few days before the due date of the specification and asked him to prepare a specification and to make it vague. Strutt does not seem to have been involved in the patent application.

Another aspect to the eventual case against Arkwright was the manner in which patent law could be exploited to the benefit of the individual at the expense of an industry as a whole. Patent law was still founded upon the 1624 Statue of Monopolies, under which the Crown was empowered to make grants of privilege for up to fourteen years of 'the sole working or making of any manner of new manufactures', which had to be disclosed in an 'honest, fair and plain way'. Without such protection it was thought men would seek to conceal their inventions, while the registration of a patent gave at least some information to the public, and the expectation was that the information would enter the public domain once the patent expired. An early eighteenth-century decree further required that applicants should 'particularly describe' the nature of their

inventions, since many had succeeded in getting applications passed that were deliberately vague and that ring-fenced large areas of profit. This had the effect of refusing those stimulated by an invention the opportunity to exercise their talents.

Arkwright's original patent was due to expire in 1783, but his patents were very important to his business, and he was not a man to give up his rights without a fight. The 1775 patent set out to gain control of as much of the entire spinning process as he could; he followed this up in 1781 by launching a defence of his existing rights. Inevitably, in such a dispersed and fundamental industry, infringement of the patent rights was rife. In February 1781, Arkwright launched proceedings at the King's Bench against nine such offenders. The first case was against a small spinner called Colonel Mordaunt over the carding patent. The Lancashire manufacturers organised their case well and, to his surprise, Arkwright lost the case. The judgement effectively invalidated his carding patent and threw the trade wide open; his spinning patent had a mere two years to run. He took defeat badly, and swore that:

> '*He will take the cotton spinning abroad, & that he will ruin those Manchester rascals he has been the making of. It is agreed by all that know him that he is a Tyrant and more absolute than a Bashaw, & tis thought that his disappointment will kill him. If he had been a man of sense and reason [i.e. accepted the status quo despite the infringements], he would not have lost his patent*.' [27]

Arkwright did not give up. James Watt had just had his steam engine patent (also granted in 1769) extended to a term of twenty-five years by special Act of Parliament. In 1782, Arkwright submitted a petition to extend and consolidate his 1769 spinning patent to 1789. The industry was against him: he had made a huge fortune, his business was still expanding rapidly, and such special pleading came to seem merely greedy. The traders of Liverpool wrote that he had 'realised such a fortune as every unprejudiced Person must allow to be an ample

[27] Matthew Boulton to James Watt (inventors of the steam engine), Aug. 7th 1781, in Fitton & Wadsworth, p. 84. Other patent holders were watching these events closely for the influence any precedents could have on their own inventions. As Watt wrote back, 'I fear we shall be served with the same sauce *for the good of the public!'*.

compensation for the most happy efforts of Genius'. Parliamentary support was not forthcoming. Arkwright had also become deeply unpopular. He was physically threatened in a letter, which, undeterred, he published in the *Manchester Mercury* on December 31st 1782. Its tone of desperation spoke perhaps for many who owed their livelihood to the smaller branches of the textile industry:

Sir,

> *I am very sorry to hear that you still do all you can to distress the trade of Manr [Manchester]: after you had lost the Cause in London this town thought you would have been easy the remainder of your Time in the patent out. But you still keep doing all you can and not only that but you have been heard to say that you was determin'd to ruin every person that entered into the Business, the purport of this is to advise you that if you d'not withdraw all your prosecutions before Dec. is out I am determin'd to lay in wait for you either in this town Nottingham or wherever I most likely to find you. I ashure you as your name is what it is dam you do you think the town must be ruled by such a Barber as you. Take notice if you are in town on Saturday next I will make an end of you meet you wherever I can. I am not yours, but a friend of Manchester.*

Apart from publishing the letter, Arkwright's response was merely to offer rewards for the identity of the writer. Meanwhile, Arkwright & Co. continued to expand. The partnership with Strutt and Need dissolved on Need's death in 1781. Arkwright no longer needed outside support; he could now push on as bullishly as he pleased. In 1784 he was feted in Glasgow, and from that visit grew the New Lanark mills at the Falls of Clyde, begun in 1785.[28] Perhaps as a result of this activity, he resurrected his claim to the 1775 patent in the Court of Common Pleas, by setting out to prove that the specifications were valid. The initial case against him was badly put together, and Arkwright won. The cotton trade then rallied and the entire structure of Arkwright's patents was put on trial in 1785.

The published account of the trial is a marvellous source for Arkwright's life. Many of the key figures of Arkwright's story gave evidence – Thomas Hayes,

[28] Arkwright's involvement was short-lived however. The story goes that he fell out with David Dale over the siting of the factory bell. However, four mills were built to the Arkwright system, two strikingly similar to Masson Mill. Life at New Lanark in these early days was probably bleaker than in Cromford; Dale employed pauper children and housed them in multi-storey tenements. The more enlightened regime for which New Lanark is renowned did not begin until Robert Owen's arrival in 1799.

John Kay, James Watt, James Hargreaves' widow. The entire trial is reproduced verbatim, so that the heavy humour of the lawyers is as apparent as the Northern accents and speech of the craftsmen. Mr. Bearcroft, Counsel for the Crown, sought to prove that Arkwright's machines were 'not materially different from those before contrived'. He identified three key issues: was the invention at all new; was it Arkwright's, and was it 'sufficiently and accurately ascertained'? The case was acknowledged to be of national importance – 'every part of the process towards the making of that fine excellent cotton thread, is of the utmost importance to the kingdom in general … we are universally envied … that sort of manufacture is coveted by every nation under the sun … the well-being and existence of us as nation depends upon the flourishing of our trade & manufactures'.

The prosecution made a convincing case that key elements of the machinery had been in use before the 1769 patent, and certainly before the 1775 one, and also that Hargeaves and others had invented key elements. Arkwright's case used national interest as an excuse for the obscurity of his specifications, and sought to prove not only their novelty but also that the machines *could* be constructed from the details given. In the event, Mr. Justice Butler called upon a relatively new point of law for his verdict, that of *'scire facias'*, or the right to know. The law maintained 'that a man to intitle himself to the benefit of a patent for a monopoly, must disclose his secret & specify his invention in such a way, that others may be taught by it to do the thing for which the patent is granted.' On this technicality, Arkwright failed both to get an extension on the now expired 1769 patent and to resurrect the 1775 one.

Arkwright had pushed too hard and was in an impossible situation. Had he won this case (his subsequent appeal was also overruled) nearly every mill in Lancashire would have had to close. Too much was at stake for the country – it is significant that Strutt and Need had withdrawn their support from his legal

campaign when the case against Mordaunt was dismissed. For most, the 1785 verdict was a cause for celebrating deliverance from an oppressor.

Fellow patentees like James Watt, Thomas Boulton and Josiah Wedgewood had some sympathy and were wary of the precedents for their own interests. The verdict did little to dent Arkwright's self-confidence. Wedgewood records in his diary a meeting between himself, Arkwright and Sir Joseph Bankes (President of the Royal Society), in which they drew up plans for a statutory monopoly on wool spinning. Not surprisingly, these came to nothing, but show the extent of Arkwright's credibility as an inventor and charisma as a businessman even for men of Bankes and Wedgewood's calibre. The scheme also illustrates Arkwright's monopolising tendencies. Matthew Boulton summed up the debacle neatly when he wrote in March 1786:

> *Tyranny and an improper exercise of power will not do in this country … If he [Arkwright]had been a more civilised human being & had understood mankind better he would now have enjoyed his patent. Hence let us learn wisdom by other men's ills*.[29]

The decision also removed the brakes on the expansion of the cotton industry, so crucial in driving the prosperity of Britain over the next century. Imports of raw cotton increased eightfold between 1780 and 1800 alone, and finer spinning increased the yardage and value extracted. The availability of cotton fabrics affected the lives of everyone throughout society.

> *'Now cotton yarn is cheaper than linen yarn; and cotton goods are very much used in place of cambrics, lawns and other fabrics of flax: and they have almost totally superseded the silks. Women of all ranks, from the highest to the lowest, are clothed in British manufactures of cotton, from the muslin cap on the crown of the head to the cotton stocking under the sole of the foot.'* [30]

[29] Fitton & Wadsworth, p. 90.
[30] D. Macpherson, *Annals of Commerce*, 1805, Vol. iv, p.270.

4.4 Sir Richard Arkwright, High Sheriff of Derbyshire

After the disappointments of his legal campaign, Arkwright seems to have reconciled himself to expanding his business on its existing terms. He was also able to take consolation in achieving the trappings of gentry society. He was acknowledged leader of the cotton industry, heading the fight in 1788 against the East India Company (whose trade in imported cottons was inevitably suffering from the home-grown success). When the important bank Livesey, Hargreaves & Co. failed, Arkwright was voted to the chair of the committee appointed to pick up the pieces (and himself lost £32,000 in the collapse).

After a failed assassination attempt on George III by Margaret Nicholson in 1786, Arkwright presented the loyal address on behalf of the Hundred of Wirksworth and was knighted for his pains – one of several of 'Peg Nicholson's knights'. He was charged £98 8*s* 2d in fees for the honour, and a Wilhelmina Murray has left an account of the scene at Sir Joseph Bank's house on the day of the presentation. She was:

> *'Much entertained at the scene they had had the Morning before, in the arrival of the Great Mr.Arkwright who came to Sir Joseph's in a black wig, brown frock, worsted stockings and Boots to ask him to go with him to the* levée *when he was to present an address on Margaret Nicholsons affair. Sir Jos. too good natured to refuse agreed but asked him about his dress.Mr. Ark--- proposed going as he was, for he was not afraid they were but Men - and so was He --- however it was agreed that he should take off his boots & return with good shoes at the proper hour. Our friends had a hint he would be worth seeing so took care to be in the way, but were not a little surprised to see little fatty appear a beau with a smart powderd bag wig so tight that coming over his ears it made him deaf; a handsome striped satin Waist coat & proper coat with a sword, which he held in his hand, all provided it was supposed by Mr. Dempster. To crown the scene Mr. More introduced him telling Sir Joseph he did not know if he was prepared for the ceremony but Mr. Arkwright intended to accept the Honor his majesty offered --- this surprised all the company but proper dispatches having been sent to the Equerry in Waiting, Sir Joseph carried off his Beau and brought him back Sir Richard Arkwright. What a pity You happened not to be there as the scene was excellent, the little great Man had no idea of kneeling but crimpt himself up in a very odd posture which I*

> *suppose His Majesty took for an easy one so never took the trouble to bid him rise.*[31]

The tale gives some idea of the patronising attitude of the society into which Arkwright was so keen to enter, but on his own terms. It is hard to imagine him ever outfaced; on being asked by a lofty noblemen whether it was once true that he had been a barber, he is said to have replied 'I was once a barber, and I am apt to conclude, had your lordship been a barber, you must have continued a barber still'.[32] He adopted a cotton tree, a hank of cotton, a bee and an eagle in his armorial bearings and a motto, *Multa tuli fecique* - 'Many things have I conceived and made to happen' - which summed up his achievements with characteristic pithiness.

There were those who were only too glad to welcome such wealthy newcomers for their own reasons. Georgiana, Duchess of Devonshire was one such. Renowned for her charm but a compulsive gambler who spent most of her life in debt and whose family seat at Chatsworth was only a few miles away, she borrowed £5,000 from him around this time. Perhaps the usually hardheaded Arkwright was taken in by her charm: but early in 1788 he was writing to her chasing the repayments. He enters into her spirit of intrigue:

> *…Mr. Bonnet will return on Tuesday or Wednesday, but as he may probably be too late forthe Post that evening, and as I do not, for reasons I have before mentioned, wish him to call here, you will be pleased to desire that your answer may be left at the Greyhound publicroom in Cromford; I will send for it from thence, and by that means I shall be enabled to writeto London by that night's post, if I find it necessary, and it will prevent, what I have continuously guarded against – suspicion.Nothing has dropt from me to any person living that could lead to suspect what your Grace wishes to remain a secret. I must beg you will at all times be assured of my best wishes.*
>
> *I am with great respect*
> *Your faithful servant*
> *Richd. Arkwright*[33]

[31] Fitton, p. 184.
[32] *Ibid.*
[33] Fitton, p. 239. This letter is always attributed to Sir Richard, although the difference in style and literacy with his other extant letters suggests that someone else drafted the letter for him – or else that the author was in fact his

In the same year he was appointed High Sheriff of Derbyshire, an honour rarely given to a man of his origin. Despite a reputation for parsimony, Arkwright never skimped on matters of social display, and he chose to carry out his duties in style:

> *On Sunday last, about One o'clock at Noon, arrived in this Town Sir Richard Arkwright,Knight, High Sheriff of the County, arrived at Derby, accompanied by a great Number of Gentlemen, & c. on Horseback; his Javelin Men (consisted of 30 in Number, exclusive of Bailiffs, &c.) dressed in the richest Liveries ever seen here on such an Occasion. Their Coats were dark Blue elegantly trimmed with Gold Lace; Scarlet Waistcoats laced with Gold, & Buff colour'd Velveret Breeches; they also had Blue Great Coats, buckled behind them after the manner of His Majesty's Regiment of Horse Guards; their Hats were smartly Cock'd with Gold Buttons, Loop and Tasssell; they all rode on Black Horses and had new Bridles given them by the Sheriff, and also new Boots, &c. --- The Trumpeters were mounted on Grey Horses, and elegantly dressed in Scarlet & Gold. The High Sheriff's Coach was very elegant and fashionable, with plated Furniture, lin'd with drab Cloth, and bound with Livery-lace; purple Festoons at the Windows, trimmed with Silver Fringe; the Body painted BatwingColour with a white Border; the Arms painted in Mantle; Carriage and Wheels painted red and pick'd in the same Colours as the body; the Coach-box ornamented with an elegant Hammer-cloth, and very elegant plated Harness. We must not forget to inform our Readers that Sir Richard during the whole of the Assize provided a plentiful Table, with the choicest wines, &c. for such Gentlemen as pleased to partake of the noble Banquet (which was conducted by*
> *Mr. Mason of Matlock Bath).*[34]

There could be no doubt in anyone's mind that the erstwhile barber had arrived at the highest levels of society.

son Richard, by then in his thirties. Arkwright jnr. was also running Lumford Mill at Bakewell by the late 1780s: the Duke of Devonshire had been involved in a dispute over the watercourse there. Perhaps this was how the Arkwrights fell in with the unlucky Duchess. In December 1790 Georgiana accepted an offer financial help from the banker, Thomas Coutts, and confessed debts of almost £62,000. The Arkwright loan was not included in this total. It was still outstanding when she revealed it in typically gushing style to Coutts in 1801, nine years after Sir Richard's death: 'to you *alone* I trust the names. The 5000 is to one of the most interesting as well as respectable characters in the county, a man who unites to great talents uncommon simplicity, and with a heart replete with benevolence and a fortune almost princely, he is the most unassuming of characters. You already guess I must mean Mr. Arkwright.' *Ibid*. 240.

[34] *Manchester Mercury*, 27 March 1787.

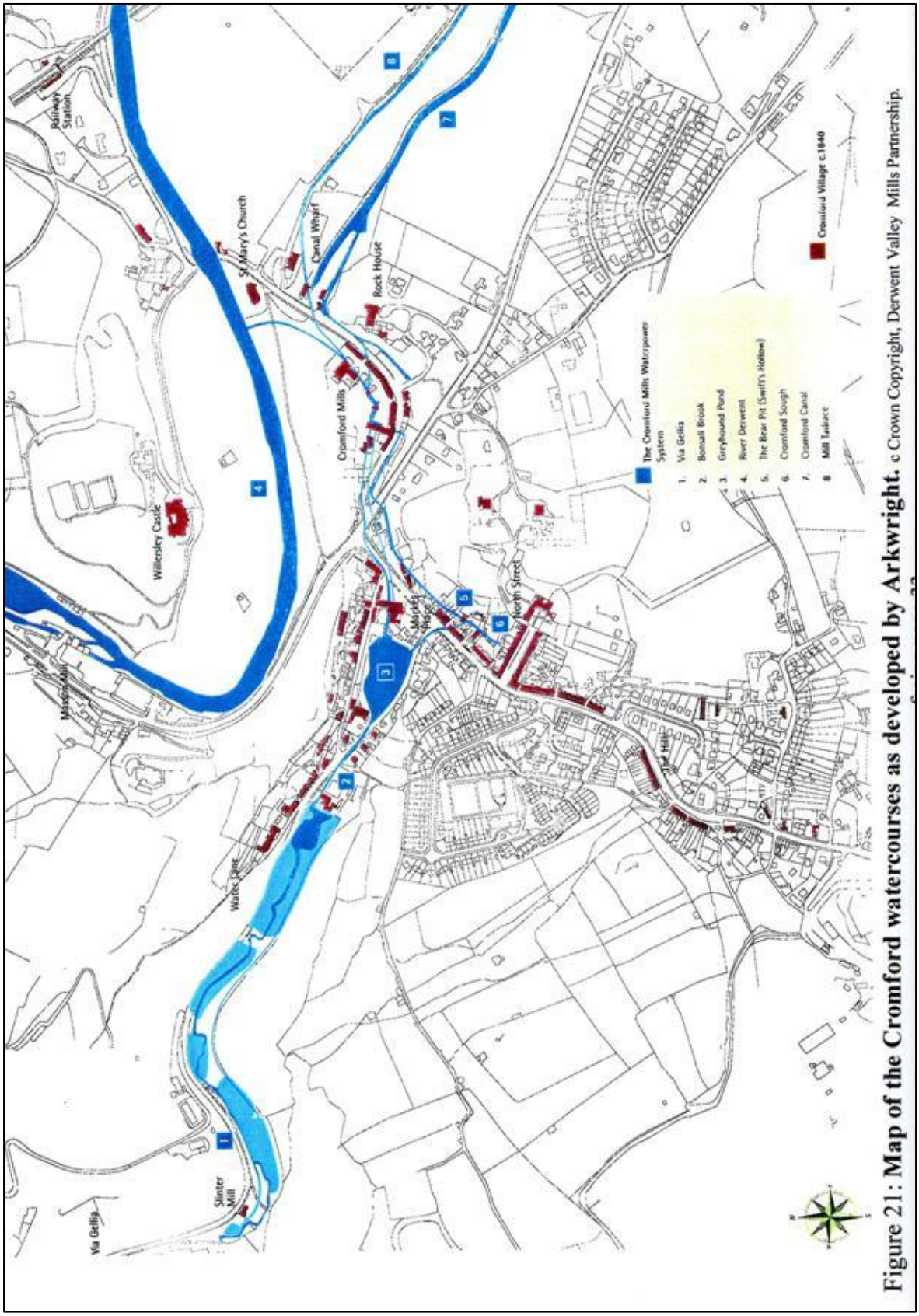


Figure 21: Map of the Cromford watercourses as developed by Arkwright. c Crown Copyright, Derwent Valley Mills Partnership.

5. Cromford: the Making of a Town

Cromford represents a further aspect of Arkwright's achievement, a very original and successful experiment in social engineering. The idea of a 'mill town' was to take on a quite different nature over the next century, but our received views of the (very real) iniquities of later factories and their associated housing should not be allowed to disguise the benefits of the early experiments in the Derwent Valley, Cromford's example being soon followed by Strutt and others. The enabling prerequisite was of course the configuration of the water supply, which will be addressed first as we consider how Arkwright constructed his town.

5.1 Water Courses in Cromford

The completion of a lease of water rights was one of the first actions of Arkwright and his partners on coming to Cromford. They paid an annual rent of £14 for an initial term of twenty-one years for:

> *All that River Stream or Brook called Bonsall Brook Situate and being within the Liberty of Cromford …together with the Stream of Water Issuing and running from Cromford Sough in Cromford… into the said Bonsall Brook with full Liberty and power… to divert Turn and carry the said Brook Stream and Water down the South Side of the Highway in Cromford… and under or over the said Highway… Together with full and free Liberty Power and Authority… to Erect and Build one or more Mill or Mills for Spinning Winding or throwing Silk Worsted Linen Cotton or other materials and also such and so many Waterwheels Warehouses Shops Smithies and other Buildings Banks Dams Gails Shuttles and other Conveniences as they should think proper for the eventual Working of the said Mills.*[35]

Bonsall Brook is a swift stream flowing into the Derwent some half a mile below the village (see Figure 21). The sough was essentially a drain from the lead mines in the hills above, which rises to the surface just below North Street. The sough head (or Bear Pit as it is known) still exists, although the flow is sluggish now that mining activity has ceased. The sough was vital: in 1791 the Cromford Canal Company calculated that its average flow was 71 ½ tons per minute, compared

[35] Fitton, p. 28.

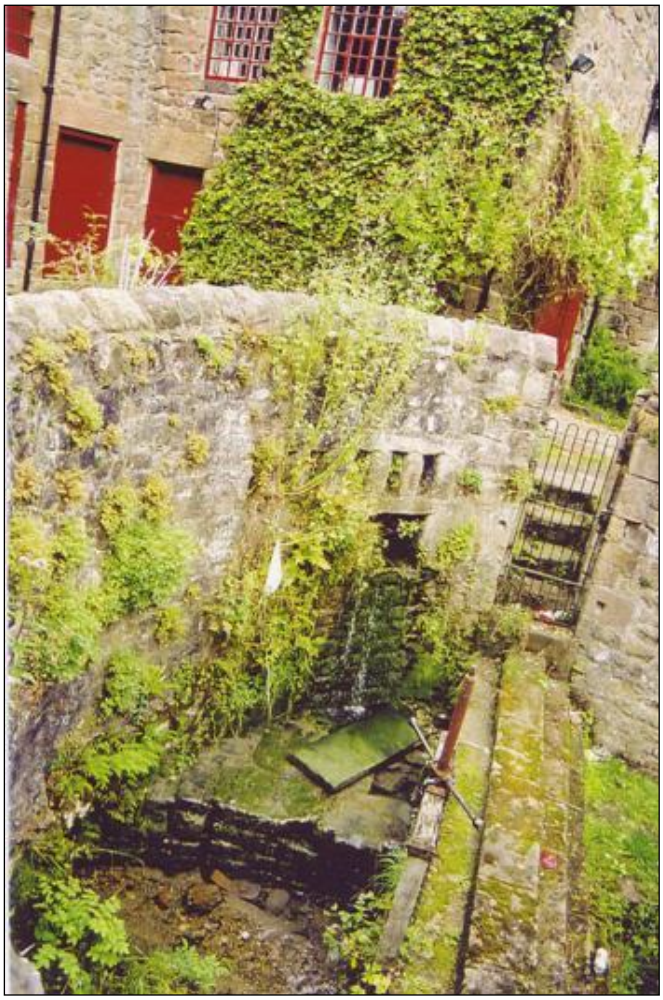


Figure 22: **The head of Cromford Sough, nicknamed the Bear Pit, with Arkwright's sluice gates and channel across to the Greyhound Pond. The sough's flow is much reduced today.**

Figure 23: **View across the Greyhound Pond today, the Boat Inn lying behind the trees at the far end.**

to a mere 5 ¾ tons for the brook. To begin with, the first mill was powered entirely by the sough.

However, as more stages of the spinning process were successfully mechanised, so more power was needed. By the time Arkwright was building his second mill in the mid-1770s, Watt and Boulton had refined their steam engines to provide an efficient form of power, and both knew Arkwright. They were to supply him with an eight horsepower steam engine in 1780, but Arkwright, like most of the early mill owners, remained wedded to waterpower. To provide a faster flow and higher fall to the new mill, he demolished Cromford's corn mill (building a new one in 1780, which still exists and is now the home to the Cromford Venture Centre.) He may also have raised the level of the Greyhound Pond.[36] He added an overshot wheel fed by the sough, which was now to be carried over the highway by a wooden launder. (The trough that remains today is a cast iron replacement dating from 1821).

The sough was forced across to the Greyhound Pond by an underground channel, from a dam at the so-called Bear Pit, which Arkwright built in 1785 (see Figure 22). This was controlled by a sluice gate in the corner of Greyhound Pond (next to the Boat Inn today – Figure 23). Arkwright would use his sluices every weekend so that the Greyhound Pond was topped up to ensure efficient working of the mills during the week. Unfortunately this varying flow had the effect of flooding several lead mines at Wirksworth and the angry miners demolished the first sluice gates. The sough owners took up the lead miners' cause and a lengthy legal dispute ensued, partially resolved in 1785 when Arkwright agreed to pay the proprietors their expenses of £300, and to pay for repairs to the sough and an annual rent of £20.[37] The battle over drainage from the mines into the sough

[36] It is not clear whether or when Arkwright constructed the Greyhound Pond himself. Only in 1785 are there explicit references to its existence, although 'ponds' are referred to earlier.

[37] Arkwright ought to have known better. Since 1777, he had been involved in a dispute over water rights on the River Wye with the Dukes of Rutland and Devonshire. The mill he had built at Bakewell was on Rutland's land and downstream of one of his corn mills. Upstream lay Devonshire's trout fishing. Arkwright changed the course of the river fro his dams and ponds and extracted building materials from common land. He did not consult either Duke (or perhaps he deliberately ignored them since both were known to be hostile to manufacturers on their

continued until 1837, when the miners won the cause and a new sough was cut, diverting the water away from the mills to feed the Cromford canal. However, by then Masson Mill was in full production with ample power from the Derwent.

The Cromford Canal had its origins in the Cromford Canal Bill of 1769. A solicitor's bill shows that Arkwright was initially against it, complaining that it was to be routed across his lawn at Rock House. However, by the time the project became active in 1788, he was one of the chief backers – but only on his own terms, often to the considerable irritation of others involved. Ultimately, of course, Arkwright needed the canal to transport his finished goods and it is no accident that it starts across the road from his mills.

The Cromford Canal Act finally received royal assent in 1789 (cannily modified a year later to give Sir Richard mining rights to any deposits found on his land during the cutting of the canal, of which there were many). The canal was constructed by William Jessop and Benjamin Outram and ran for some twenty-three kilometres to join the Erewash canal at Langley Mill. It was intended to provide a link through to Manchester, although it was to be superseded in this by the next advance in transport, and the construction of the Cromford and High Peak Railway between 1824 and 1830. Nevertheless, the canal was of great benefit in opening up central Derbyshire in the early nineteenth century, especially for the transport of coal. Its use gradually declined as the railways took hold, until the final collapse of the Butterley Tunnel between Hammersmith and Golden Valley in 1900 sealed its fate as a working canal.[38] In recent years, the Cromford Canal Society has restored parts of the canal as an 'amenity waterway' and it is now a popular route with walkers.

estates). Rutland sued Arkwright father and son (owner of the mill from 1783) for encroachment and diverting the Wye from its 'ancient course' to the corn mill. Agreement was only reached in 1786 when Arkwright jnr. admitted trespass and agreed to pay compensation and an annual rent of £10. It is another illustration Arkwright snr's litigious nature, and willingness to try his luck against anyone, regardless of station.

[38] The canal was restored by the Cromford Canal Society in the early 1980s.

5.2 Roads

Cromford's isolation in 1770 has already been noted. The packhorse trail on which it lay could not be adequate for Arkwright's schemes and transport must have been a real handicap. Almost unbelievably, for most of his time at Cromford all Arkwright's activities must have been based on the packhorse. This may have been the era of the turnpike,[39] but the Derwent Valley as a whole was isolated. Eighteenth-century turnpikes tended to follow existing routes that avoided valley bottoms, and the ancient tracks in and out of Cromford, which fell down steep slopes to the dale and back up again, did not fulfil the requirement for broad and usable routes.

Arkwright's name is nevertheless to be found among the subscribers and trustees for most roads in the area. Strutt and he built a private carriage road along the Derwent Valley from Cromford to Belper, but it was not until 1817 that an Act was passed to build a riverside turnpike from Cromford to Belper, using much of the route of the carriage road. This has now become the A6.

5.3 Arkwright's Cromford

'...crowded with cottages... with so much water, so much rock, so much population and so much wood that it looks like a Chinese town.' [40]

One of Arkwright's greatest achievements was to found a thriving community at Cromford. Whatever his brash abrasiveness with the outside world, one senses that in Cromford he felt secure in his own small kingdom and was intuitively sensitive to the requirements and motivation of his workforce. He approached the need to attract and keep committed, and in many cases skilled, workers by two routes: by providing an efficient infrastructure, and by engineering a vibrant community life to infuse the village.

[39] A turnpike road was one financed by a number of investors who recouped their initial outlay by charging tolls to users.
[40] John Byng, describing Cromford in 1789.

Cromford remains architecturally special precisely because the village we see today is so similar to the one built by Arkwright two hundred years ago. North Street was probably the first of his projects in Cromford beyond the mill site and addressed the most basic need of his new workforce – somewhere to live. Assuming that Arkwright managed to get the 'large families' for which he advertised, the twenty seven houses would have provided shelter for some hundred and twenty workers, adult and child. The houses offered more than just accommodation. The distinctive long windows on the top floor indicate that the houses were built with the express purpose that residents not employed at the mill might supplement the household's income by weaving or knitting stockings (remembering that it was primarily women and children who were employed at the mill, and men who were weavers).

The houses were undoubtedly superior to the average rural house in Derbyshire at the time, many of which would have been little better than hovels. North Street also exhibits subtle signs of social pretension which would not have been lost on its first inhabitants: the combination of leaded lights and sashes on two storeys and the quasi-classical design of the doorways would all have signalled a degree of prosperity. Interestingly, subsequent terraces built after the enterprise had gained its reputation were not built to such a high standard of design (for example on Cromford Hill and in Water Lane).

In 1778, the Greyhound Inn (now Hotel) was built. This imposing building was to provide a focus for the community and its visitors, for Cromford soon became a tourist attraction in its own right to rival the beauty of the Dales. Byng described the scene in June 1790:

> *'At two o'clock I was at the black dog [Greyhound?] at Cromford; around which there is much levelling of Ground & Increase of Buildings for their new market (for this place is now so populous as not to do without) which has already once been held and will be again tomorrow… The landlord has under his Care a Grand Assortment of Prizes from Sir Richard Arkwright, to be given at the year's end to such Bakers, Butchers, etc. as shall have best*

> *furnished the Market. How this will be peaceably settled I cannot tell!! They consist of Beds, Presses, Clocks, Chairs etc., and bespeak Sir Richard's Prudence and Cunning, for without ready Provisions his Colony could not prosper. So the Clocks will go very well.*[41]

Byng's use of the word 'colony' is interesting, because in a sense this was exactly what Arkwright was creating. He had gained a charter for a weekly market in 1790, which continued to be held until about 1880. He also built two rows of 'shambles', or single storey shops or workshops in the market place. Only one survives today, a now rare example. When Byng stayed at the Greyhound, he already found a lively social life being enjoyed in Cromford, and was disturbed by such 'rustic revelry'. He was kept awake by 'Solos, and in parts, and all kinds of chauntings, increasing with the beer, to an excess of bawling: but some of the voices I was obliged to hear, seem'd to possess much power'.

Arkwright consciously set out to foster this kind of community spirit. He created a local festival known as 'candlelighting', held every September from at least 1776, when the *Derby Mercury* reported that five hundred workmen and children paraded from the mills around the village, led by a band and a boy working on a weaver's loom. They were watched by 'an amazing Concourse of people' who then all enjoyed buns, ale, nuts and fruit back at the mill, with music and dancing. On the same day, Arkwright and Co. had also feasted some two hundred workers who had erected the new mill through the summer, who 'were regaled with a large Quantity of Strong Beer &c. yet the Day was spent in the greatest Harmony imaginable.' In 1778 the same festivities took place, this time with the novel introduction of a song to their benefactor, sung 'in full Chorus among Thousands of Spectators from Matlock Baths and the neighbouring Towns':

[41] Cited by Ashton, p. 214.

Tune: Roast Beef of England

Ye num'rous Assembly that makes up this Throng
Spare your Mirth for a Moment, and list to my Song,
The Bounties let's sing, that our Master belong,
At the Cotton Mills now at Cromford,
The famous renown'd Cotton Mills,

Our number we count seven Hundred or more,
All cloathed and fed from his bountiful Store,
Then Envy don't flout us, nor say any's poor, &c.

Ye know we all ranged in Order have been,
Such a sight in all Europe sure never was seen,
While Thousands did view us to complete the Scene, &c.

Likewise for to make our Procession more grand,
We were led in the Front by a Musical Band,
Who were paid from the Fund of that bountiful Hand, &c.

Ye hungry and naked, all hither repair,
No longer in Want don't remain in Despair,
You'll meet with Employment, and each get a Share, &c.

Ye Crafts and Mechanics, if ye will draw nigh,
No longer ye need to lack an Employ,
And each duly paid, which is a great Joy, &c.

To our noble Master, a Bumper then fill,
The matchless Inventor of this Cotton Mill,
Each toss off his Glass with a hearty Good-will,
With a Huzza for the Mills now at Cromford
All join with a joyful Huzza.

Presumably Arkwright saw to it that song sheets were distributed, in what must have worked as a masterful exercise in public relations as well as a rallying of community pride. To round it all off, 'The evening was concluded by a Ball, which Mr. Arkwright gave at his own House, to the neighbouring Ladies & Gentlemen, at which the whole Company was very numerous and brilliant'.

Sylas Neville, a physician, visited Cromford in October 1778, and commented perceptively on Arkwright:

> *…by his conduct [he] appears to be a man of great understanding & to know the way of making his people do their best. He not only distributes pecuniary rewards, but gives distinguishing dresses to the most deserving of both sexes, which excites great emulation. He also gives two Balls at the Greyhound to the workmen & their wives & families with a week's jubilee at the time of each ball. This makes them industrious and sober all the rest of the year.* [42]

Doubtless news spread of the jolly times to be had at Cromford, and the local newspapers were always eager to publicise Arkwright's gestures, as in July 1783 when the *Derby Mercury* reported that he 'has generously given to 27 of his principal Workmen, Twenty Seven fine Milch Cows, worth from 8*l.* to 10*l.* each, for the Service of their respective Families'. It is clear that the later division between industrialised and rural life was still blurred in Arkwright's Cromford; perhaps the 'milch cows' were kept in the paddock behind North Street.

Bishop Berkeley had mused in 1775 'whether the creation of wants be not the likeliest way to produce industry in a people?' Money was short in country districts; to succeed, industrialists not only had to put purchasing power into their workers' hands, but also provide a variety of goods and desires on which to spend it. It is unlikely that Arkwright ever read Berkeley, but he reached the same conclusion, and his ability to attract and keep a thriving workforce was critical to his success. 'The more one looks at the difficulties that had confronted Arkwright and Strutt in the 1770s and 1780s the greater their achievement appears. All the contemporary evidence … is of great reluctance to enter factories and to submit to factory discipline and, in consequence, a migratory and often disreputable factory population.'[43]

Given the ethos of the day, provision for the workers' spiritual needs also formed an important part of factory discipline. In 1777, Arkwright built a chapel, which held a congregation of 300. He was never as zealous as Strutt (and indeed an Anglican rather than a Non-Conformist) and in 1784 he sold the chapel to the

[42] These descriptions are all cited in Fitton & Wadsworth, p. 99 and ff.
[43] Ibid.

evangelical, Lady Glenorchy. It was the time of a wave of enthusiasm for Sunday Schools, which were perceived as offering a cure for ignorance as well as vice. By February 1785, the *Manchester Mercury* reported that the Cromford Sunday School already had two hundred pupils, adding 'pleasing is it to the friends of humanity when power like this is so happily united with the will to do good'. Visiting in 1801, Joseph Farrington left the following description:

> *On each side [of the] Organ is a gallery in which about fifty Boys were seated. These children are employed in Mr. Arkwright [jnr]'s work in the week-days, and on Sundays attend a school where they receive education. They came to the Chapel in regular order and looked healthy and well and were decently cloathed and clean. They were attended by an old Man, their School Master. To this school, girls go for the same purpose, and alternately with the Boys go to the Church, the Boys on one Sunday – the girls on the next following. – Whichever are not at Chapel are at the School, to which they both go every Sunday, both morning and afternoon. The whole plan appears to be such as to do Mr. Arkwright much credit.'* [44]

The village school, which closes one end of North Street, with matching provision for the accommodation of a schoolmaster and mistress, was built by Arkwright's son in 1832 to comply with the provisions of new legislation. This required young mill workers to work a 'half-time system', under which part of the day was spent at school and part at work. This perhaps reflects the intensification of working life for children in the factories, since in 1816 Arkwright had maintained that he did not employ children until they had learnt to read and write, and not before they were ten (see below). The school was extended in 1893.

After his knighthood in 1786, Sir Richard sought a residence more fitting for a knight of the realm than foursquare Rock House. He began Willersley Castle in the late 1780s, demolishing a hamlet and closing a public way from Willersley to Matlock to create more privacy. He blasted through the rock at Scarthin Rock to provide an alternative route, which in time became the A6. The house stands across the valley from the mill site, apart from yet still surveying the factory to which he owed his success. It is built of ashlar sandstone and set in a landscaped

[44] Fitton & Wadsworth, p.102.

park where 100,000 trees were planted. Sadly, the house was damaged by fire in 1791 before its completion and Sir Richard never lived there himself (Figure 24).

Figure 24: **Willersley castle – 'the house of an overseer surveying the works'.**

John Byng was acerbic about Willersley Castle in his diary:

> *It is the house of an overseer surveying the works, not of a gentleman wishing for retirement and quiet. But light come, light go, Sir Richard has honourably made his great fortune; and so*
> *let him still live in a great cotton mill.*

Byng also visited Willersley after its completion, condemning it finally as 'within and without an effort of inconvenient ill-taste'.[45] Nevertheless, it was to become a happy home for Arkwright junior and his family of ten children. A successful banker, there is a story that he celebrated one Christmas at Willersley by making a present of £10,000 to each of his children present. It was to remain the family

[45] One sometimes wonders if Byng is an entirely trustworthy observer. He also criticised the grounds of Chatsworth as lacking in taste (even though they were designed by Capability Brown) and dismissed the house itself as 'vile and uncomfortable'. – Foreman, p.24.

seat until 1926 and is now owned by Christian Guild Holidays. Arkwright's final contribution to Cromford lies at the foot of the slope from Willersley Castle, as he attended at last to his own hopes for salvation. St. Mary's Church was originally founded as an Anglican family chapel within the grounds of the house. It was unfinished when Sir Richard died in 1792 and his body was at first interred in Matlock. Arkwright junior opened the church to public worship in 1797, and re-interred his father's remains in a brick vault. It was considerably altered and Gothicised in 1858, when the chancel and western portico were added. It is now the parish church.

View of Willersley Castle **by Joseph Wright of Derby.**
St. Mary's Church is visible on the opposite river bank and the mill is just visible in the distance.

6. Daily Life in Cromford

So far, this account has focussed on the man who masterminded what Cromford became, and those who toiled on his behalf have featured only incidentally. But how did ordinary people, such as those might have lived in North Street, spend their daily lives in Cromford at the end of the eighteenth century? Unfortunately, no records remain of names or families; their traces must be gleaned from the comments of others more literate and worldly. Yet a picture can be built up of some of the features of their lives.

6.1 Life in the Cromford Mills

There can be no doubt that submitting to the discipline of factory life brought a wholly new routine and shared sense of responsibility. Absence or slacking could now not only affect the individual, but also his fellows' output. Records for other mills show fines were imposed for failing to keep to the specified hours, and there is no reason to suspect that things were any different at Cromford. There was a limit to the amount of adult employment available: while men were needed for supervision, mill building, machine making and upkeep, the workers on the spinning frames were mostly children, women helping them to beat the cotton clean. There is no evidence that Arkwright and Strutt imported pauper apprentices (as others did) although they may have taken individuals from parish overseers. They could draw from the miners' families, but Arkwright was constantly advertising for labour through the 1770s. Sometimes ordinary apprenticeships and long term hiring were offered, and advertisements appeared frequently in the local newspapers for runaways from the mills. In 1777 for example, we find:

> *'Committed to the House of Correction at Derby, one John Jeffries, a Gunsmith of Cromford,for the space of one Calendar Month; & to be kept at hard Labour and corrected, he being charged by Mr. Arkwright Cotton-Merchant, with having absented himself from his Master's Business*

> *without Leave (being a hired servant for a year) & likewise having been guilty of divers Misdemeanors and Misbehaviour.'* [46]

Despite such examples, Adam Smith expressed conventional wisdom of the day when he wrote that 'The liberal reward of labour, as it encourages the propagation, so it increases the industry of the common people … A plentiful subsistence increases the bodily strength of the labourer, and the comfortable hope of bettering his condition, and of ending his days in ease and plenty, animates him to exert that strength to the utmost.'[47] In the relative innocence of the early factories, this tenet could still hold some truth.

Certainly, a family's income from the mills was much greater than they could expect to earn elsewhere, and the work was regular throughout the year. In 1795, a woman could earn 3-5s a week in the Derbyshire cotton industry, with children between 8 and 14 years old bringing home between one and five shillings. An overseer might earn twelve shillings a week. Flour was tuppence a pound, milk a penny a pint, beef four pence a pound and bacon seven pence a pound. It was not an opulent life, but shelter and a measure of security were available. We know from other mills that the workers might receive some of their wages in the form of vouchers to be redeemed for goods at the mill shop. This certainly happened at Belper, although no evidence remains for Cromford.

As for what went on inside the mills, we have Richard Arkwright II's own evidence, given to a Select Committee *Enquiring Into the State of Children Employed in the Manufactories* in 1816. By this time, concern was growing about the conditions suffered by children working in factories. Arkwright, who had been running mills for some forty years by this time, maintained that he did not employ children younger than ten, for there was 'no benefit' in admitting them earlier and 'I never heard of any children being employed so young as five until I came into this room'. As far as Cromford was concerned, children's only employment up to

[46] Fitton & Wadsworth, p. 105.
[47] Cited by Ashton, p. 214.

the age of ten was their schooling, although he admitted that in his father's day, they might have been employed from the age of seven.

This is borne out by the breakdown he gave of his child employees, who made up 259 of the total workforce of 725 then employed in the Cromford mills:

Age	No. Employees
Under 11	4
Under 12	22
Under 13	25
Under 14	39
Under 15	49
Under 16	58
Under 17	32
Under 18	40

It is clear from this that more than four fifths of his child workforce were in 1816 were in their teens.

They worked a thirteen-hour day (including meals) from 6am to 7pm in summer and from 7am to 8pm in winter. They were allowed out for one hour for dinner, although breakfast arrangements varied. When asked about the mealtime arrangements, he gave the following evidence:

> *There is a room called the dinner-house in which there is a range of hot plates or stoves, much the same as in gentlemen's kitchens; the mothers, or the younger sisters of the hands employed, bring the breakfasts into this room; they bring them probably a quarter of an hour before the bell rings. As soon as the bell rings, a number of boys, perhaps eight, carry those breakfasts into the different rooms in the factory; those who come first may receive their breakfasts probably in two minutes; those who come later may not receive it for quarter of an hour; so that possibly some of the hands may have eight and twenty minutes at breakfast, others cannot have more than fifteen, they cannot have less. In the afternoon, the bell rings at four and they are served in like manner, but very few have their refreshment, probably not one in five I should think… so that there may be from forty to forty five minutes allowed in the whole, in the morning and afternoon.*

It seems hard to believe the children were so engrossed in their work that they did not wish to stop at teatime.

KEY

1. Flour mill
2. Blacksmith
3. Post Office
4. Pork butcher
5. Newsagent
6. Tinsmith
7. Bonnet shop
8. Butcher
9. Grocer
10. Baker
11. Barber
12. Tailor
13. Druggist
14. Bootmaker
15. Cobbler
16. Saddler
17. Draper
18. Hotel
19. Bank
20. Carpenter/wheelwright
21. Cooper
22. Joiner/stonemason

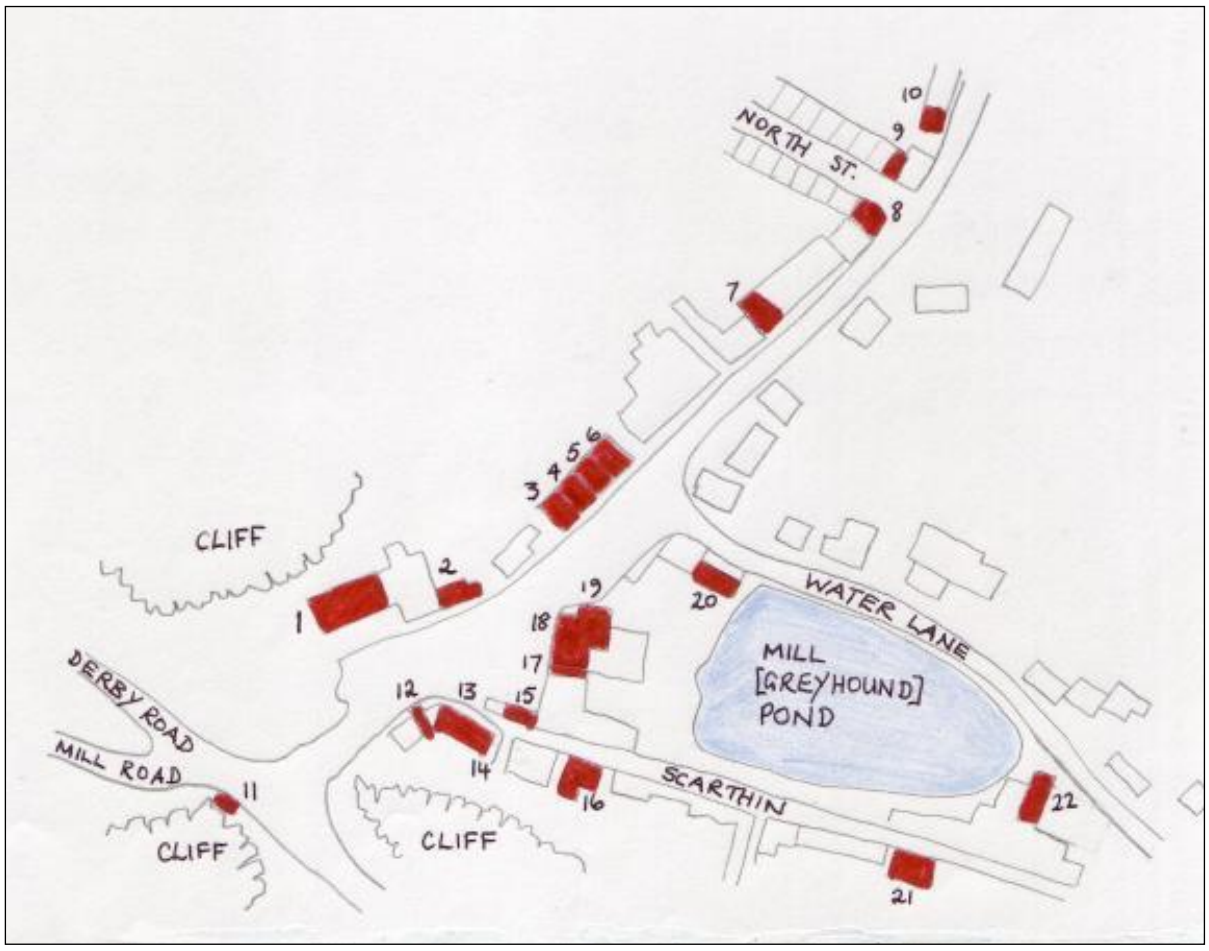


Figure 25: **A map of Cromford at the end of the nineteenth century, as Alison Uttley knew the town.**

Arkwright also denied any physical or mental impairment to the children working in his mills, although the emergence of evidence of such abuse elsewhere had prompted the inquiry. 'I never saw the children affected at all by the work', said Arkwright, 'and it is very extraordinary, from my house [Willersley Castle], I see the children playing in groups in the summertime until it is dark'. Relative to the conditions which were to develop in the industrial towns over the next fifty years, these were the days of innocence of the factory system, and children in Cromford, hard worked as they were, must have enjoyed an essentially country childhood in what little time remained from their working day.

6.2 'Pigeon-fanciers, Canary-breeders and Tulip-growers'

A Country Childhood was, of course, how another of Cromford's famous inhabitants, the authoress Alison Uttley, described her own childhood, writing of it more than a hundred years later.[48] In *Our Village* she left a map of Cromford at the turn of the last century (see Figure 25). The diversity of the small businesses is striking illustration of the self-sufficient and lasting community created by the Arkwrights, many of which may have dated back to the early days of the mills.

North Street, it will be noted, had its own butcher and baker in the 1880s. A century earlier, it seems workers also ate quite well. Over time, the change in working habits seems to have affected eating habits, sedentary workers needing something easier to digest than the hearty fare of their predecessors. 'Rye and barley bread are looked on with horror even by poor cottagers' wrote Arthur Young in 1767 and wheat flour became the staple instead. One Saturday in 1784, an unfortunate collier was trapped for seven days in a mine. The celebrated Manchester physician, Dr. Thomas Percival, investigated what he had eaten in the twenty-four hours before his death. On the Friday, he had had milk and porridge for breakfast, roast beef and potatoes for dinner and broth and pudding for supper. On the Saturday he had had broth and cheese for breakfast.

[48] Alison Uttley was born in 1884 at Castle Top Farm near Cromford and knew the village well. She wrote children's stories, including the well-loved Little Grey Rabbit series.

Similar meals must have been cooked over the ranges in North Street. Vegetable consumption (apart from potatoes, another staple) only became widespread with later improvements in transport. There was little time for home cultivation with a typical thirteen-hour day.

Tea replaced gin as the wealthy's favourite complaint about the habits of the poor (gin had become expensive due to grain shortages). In 1771, inmates of the workhouse at Nacton were allowed to spend 2d in the shilling of what they earned; Arthur Young reports that they spent it all on tea and sugar to drink with their bread and butter dinners. These too must have brought some comfort on a cold night after trudging home up Cromford Hill. Yet hot tea is hardly a vice, and the early mill-owners had no doubt that the social structure provided by the mill routine improved their workers' lives. 'It is well known in this neighbourhood that before the establishment of these works, the inhabitants were notorious for vice and immorality', said Strutt to the Commons Select Committee in 1816, 'and many of the children were maintained by begging; now their industry, decorous behaviour, attendance on public worship, and general good conduct, compared to neighbouring villages where no manufactures are established, is very striking'.[49]

The patriarchal factory village appealed to the sense of order and benevolent feudalism of many of the day, and the role that the mill-owners took upon themselves owed much in these early days to that of earlier lords of the manor running their estate villages. Their benevolence even included rudimentary health insurance in the form of sickness clubs.

Others commented on further shifts in behaviour. Richard Guest, who we met earlier as Thomas Hayes' apologist, gave some insightful observations in 1826:

> '*The progress of the Cotton Manufacture introduced great changes in the manners and habits of the people. The operative workmen being thrown in together in great numbers, had their faculties sharpened and improved by*

[49] Cited by Cooper, p. 247.

> *constant communication. Conversation wandered over a variety of topics not before essayed; the questions of Peace and War, which interested them importantly, inasmuch as they might produce a rise or fall of wages, became highly interesting, and this brought them into the vast field of Politics and discussions on the character of their Government, & the men who composed it.... From being only a few degrees above their cattle on the scale of intellect, they became Political Citizens'*.[50]

Organised labour in the form of trade unions was eventually to develop from such discussions (and indeed from such patronisation). Guest had more mixed feelings about how the workers spent their spare time:

> *'The amusements of the people have changed with their character. The Athletic exercises of Quoits, Wrestling, Foot-ball, Prison-bars & Shooting with the Long-bow, are become obsolete and almost forgotten; and it is to be regretted that the present pursuits and pleasures of the labouring classes are of a more effeminate caste. --- They are now Pigeon-fanciers, Canary-breeders and Tulip-growers. The field sports, too, have assumed a less hardy and enterprising character....we now see half a dozen Fustian Masters and Shopkeepers, with three or four greyhounds & as many beagles, attacking the poor Hare with such a superiority, both as respects scent & fleetness, as to give her no chance of escape, and pouncing upon their game like poachers, rather than pursuing it with the fairness & hardihood of hunters.'*[51]

So perhaps we should also hang a canary in a cage and place a pot of tulips in the window in our mental picture of Number 10, North Street in the Arkwrights' days.

[50] Guest, p. 37.
[51] *Ibid*, p. 38. One James Longsdon also complained in 1780 about the number of packs of hare hounds in Derbyshire and the excessive interest shown in them by workers in the manufactories 'to the detriment of themselves and their families & greatly so of their employees'. - Arkwright Society Exhibition Catalogue.

View of Cromford Mill by Day, by Joseph Wright of Derby (sold at Christie's, 26th November 2003).

7. Sir Richard Arkwright's Significance

When Sir Richard's funeral cortege wound its way past the High Tor on the way to Matlock in 1792, the scene was recorded in *The Gentleman's Magazine*:

> *'The road was now nearly impassable from the crowds of people and carriages... The Ceremony was conducted with much pomp, and, as nearly as I can remember, was thus: ... A coach and four with the clergy; another with the pall bearers; the hearse, covered with escutcheons... then the horse of the deceased, led by a servant; the relations, and about fifteen or twenty carriages, closed the procession, which was perhaps half a mile in length. The evening was gloomy, and the solemn stillness that reigned was only interrupted by the rumbling of the carriages and the gentle murmurs if the river; and as they passed, the echo of the Tor gently returned the sound.'*

The same magazine's obituary was guarded however. Arkwright was summed up as 'if not a great, a very useful character'. 'Sir Richard, we are informed, with the qualities necessary for the accumulation of great wealth, possessed to an equivalent degree, the art of keeping it. His economy and frugality bordered very nearly on parsimony'. He certainly died a rich man; his fortune at his death was estimated at £500,000. He left, said the *Gentleman's Magazine,* 'manufactories the income of which is greater than that of most German principalities'.[52] It would seem Arkwright was not a popular man among his immediate contemporaries: no contemporary memorial was erected to him other than the simple tablet in St. Mary's Church.

Yet his lasting significance was soon recognised. Sir Robert Peel's description of him as 'a man who has done more honour to our country than any man I know, not excepting our great military characters'[53] was made even more explicit by Edward Baines in *The Cotton Manufacture in Great Britain*, written in 1835:

[52] Edward Baines recorded an anecdote that 'so unbounded was his [Arkwright's] confidence in the success of his machinery, & in the national wealth to be produced by it, that he would make light of discussions on taxation and say that he would pay the national debt'.
[53] See above, p.7.

> *The Cotton Manufacture arose in this country at a critical period of our history. England had just lost her American colonies, but that loss was more than compensated by this new source of prosperity springing up at home. The genius of our mechanics repaired the errors of our statesmen. In the long and fearful struggle which followed the French Revolution this country was mainly supported by its commerce; and the largest, though the newest branch of that commerce was furnished by the cotton manufacture. To Arkwright and Watt, England is far more endebted for her triumphs than to Nelson and Wellington. Without the means supplied by her flourishing manufactures and trade, the Country would not have born up under a conflict so prolonged and exhausting.*[54]

Arkwright's place in history has been confirmed in the two centuries since his death, and is now reinforced further by the numerous references to his name that scatter the Derwent Valley. Samuel Smiles, proponent of 'self help' as a means of bettering one's station, found in Arkwright an exemplar of his theories, 'a man of great force of character, indomitable courage, much worldly shrewdness, with a business faculty amounting to genius'. Sir Richard Arkwright was perhaps the first to employ such faculties in a recognisably 'modern' manufacturing industry. This is the achievement celebrated in Cromford.

[54] Baines, p. 503

8. Later History of the Cromford Mills

The Arkwright family presence continued in Cromford until 1926. Sir Richard's son enjoyed a privileged and wealthy position in life, but led a quiet, unostentatious life. He augmented the family fortune through his own activities in the Arkwright Topless Bank in Wirksworth. He seems to have been a less abrasive character than his father, described by an aristocratic customer as uniting 'great talents, uncommon simplicity, and a heart repleat with benevolence.' He sent his sons to Eton, and set up each of them with a landed estate. He left a series of charming portraits of his children which, when compared with Wright's depiction of bluff Sir Richard with his spinning frame, encapsulate the distance the family had risen within the space of a generation (Figures 26 & 27).

Cotton was produced at the Cromford mills until 1891. Production had in any case declined after 1837, when the company finally lost the long running battle to maintain a strong water supply for the mills from Cromford Sough. When the Lower Mill (built from 1776) burnt down in 1890, it was being used as a hosiery warehouse. The upper or first mill ceased production in 1846. It became successively a brewery, a laundry and then in 1921 a paint works, home to first the Cromford Colour Company and then Burrell Colours until 1979. It lost its top two floors in a fire in 1930.

Mason Mill was in full production until 1898, powered directly by the Derwent. Most other mills had by then moved to steam power and were no longer dependent on the water of the valleys. The cotton industry had migrated to Lancashire, closer to the point of entry for the raw cotton. From the 1790s, Compton's spinning mule had also grown in popularity and superseded Arkwright's water frame as the most efficient means of spinning. Sir Richard had steadfastly ignored this development; his son was more interested in managing capital than mills. In 1898 the English Sewing Company took over Masson Mill,

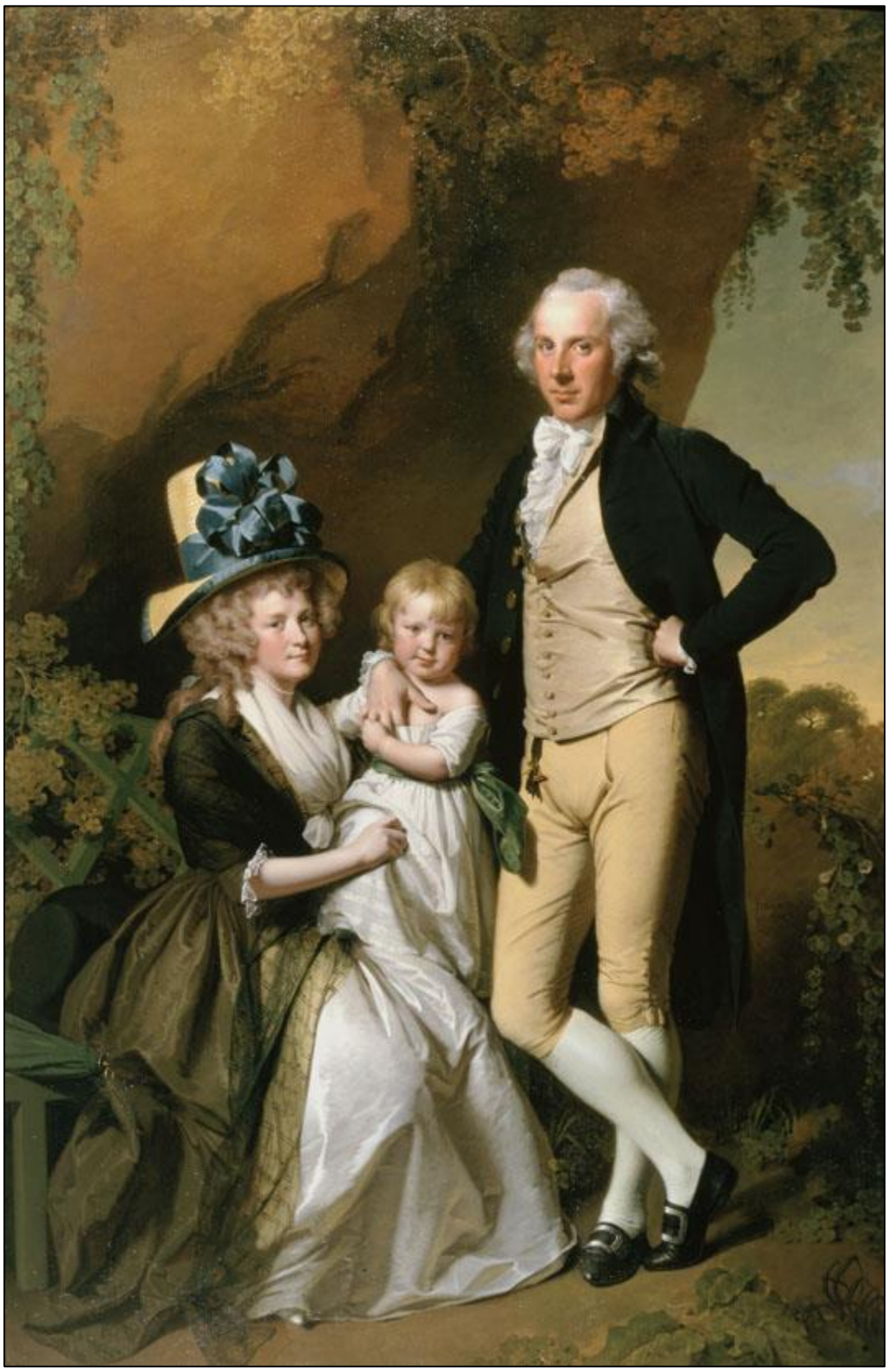
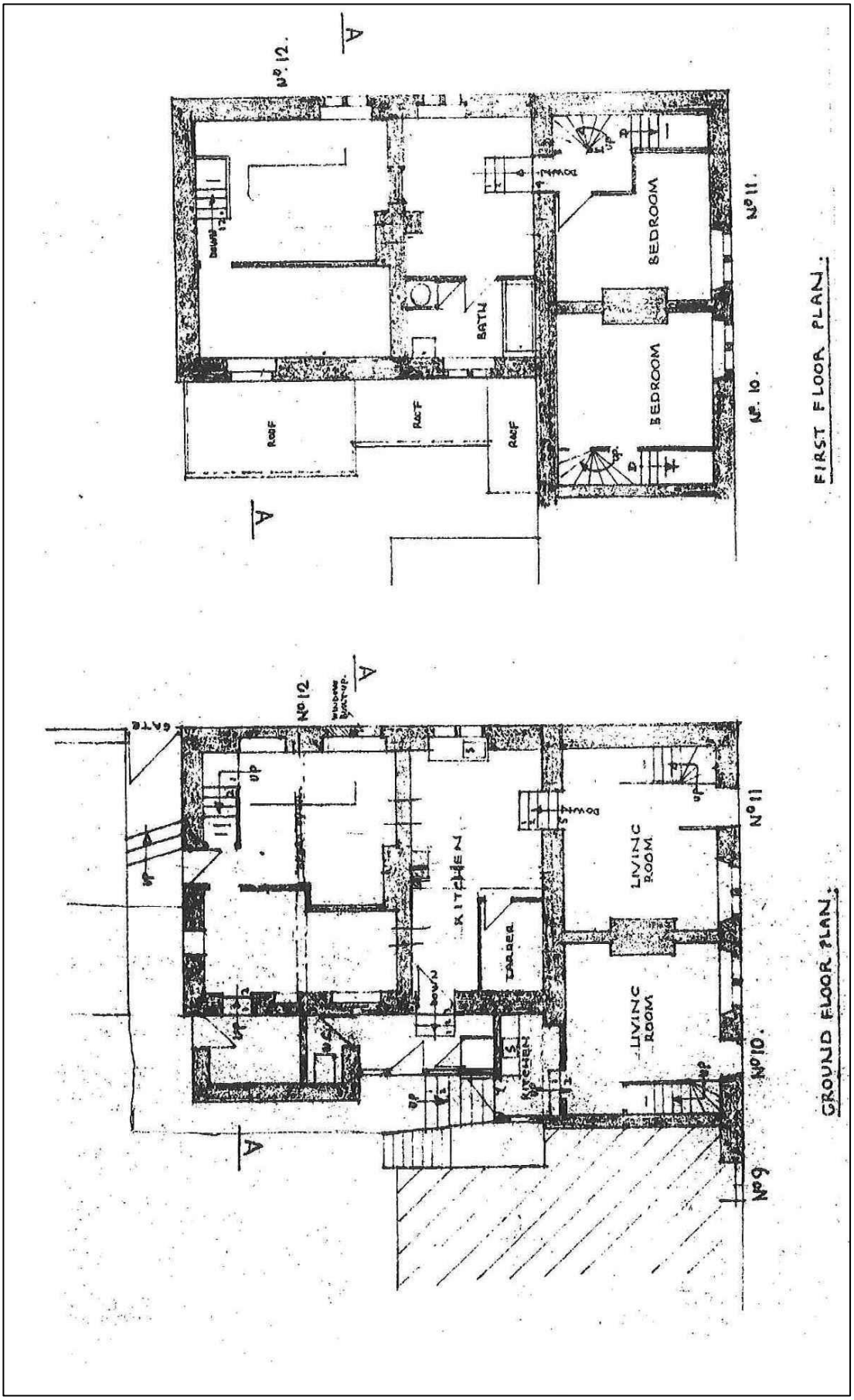
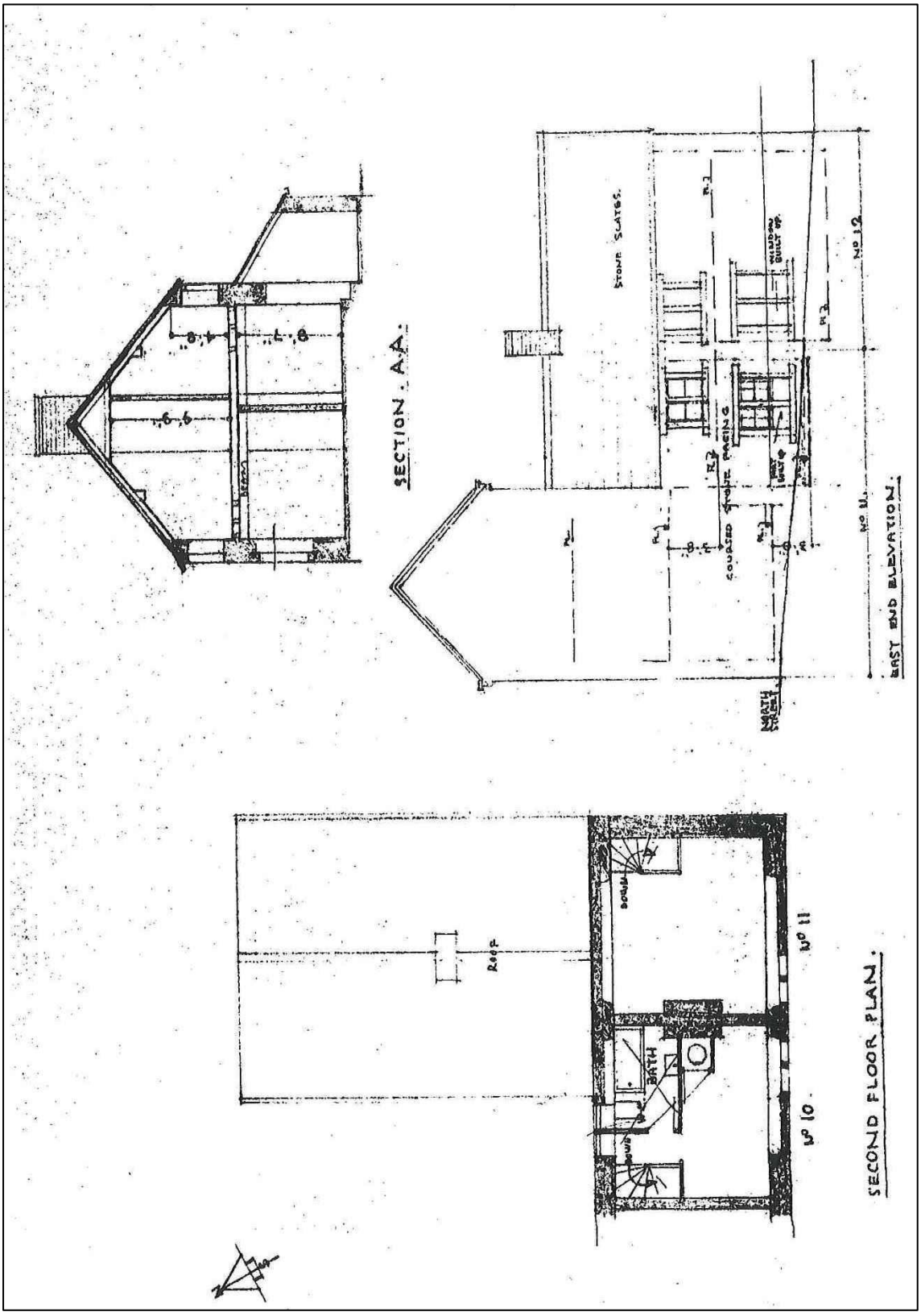


Figure 26: **Richard Arkwright, his wife Mary and (it seems reasonable to assume) his first son, Richard. Painted by Joseph Wright of Derby (1782).**

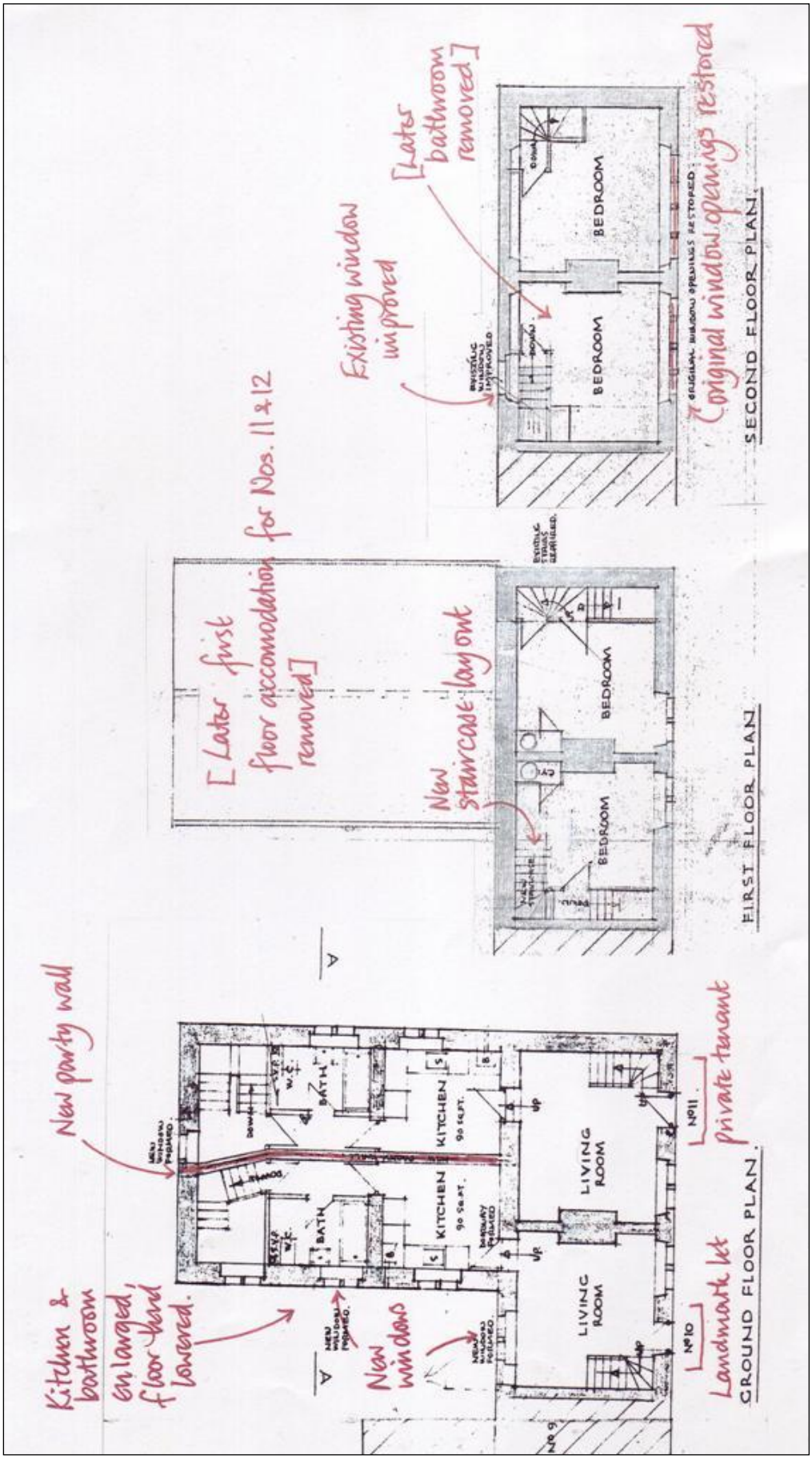
Figure 27: ***Three Children of Richard Arkwright with a Goat*, painted in 1791 by Joseph Wright of Derby. These children would have known Sir Richard as their grandfather.**



Floor plans for Nos. 10 & 11 before restoration by the Landmark Trust. No. 12 was incorporated to enlarge them.



Floor plans for Nos. 10 & 11 before restoration by the Landmark Trust.



Floor plans after restoration by the Landmark Trust. Alterations have been marked in red.

replacing the waterwheels with water turbines in the 1920s to generate electricity. The Mill was operational in this form until the mid-1980s.

Cromford itself was left almost cocooned by the gradual decline of the industry that had for a brief period placed it at the forefront of industrial development. Gradually, its inhabitants turned back to the lead mines and stone quarries, to the land, and to paint mixing.

In 1971 the bicentenary of Arkwright's arrival in the village was celebrated, at a time when his achievements were otherwise only celebrated in textbooks. Out of the enthusiasm generated by this occasion, the Arkwright Society was formed under the aegis of Dr. Christopher Charlton. In 1979 the Society succeeded in acquiring the mill site from Burrell Paints. It took twenty years to cleanse the site of the lead cadmium used in the paint manufacture before archaeological investigation could begin.

A major programme of restoration was undertaken in partnership with English Heritage, under a philosophy of sustainable re-use of materials of which Sir Richard himself would have approved. Once refurbished, the units are re-let, and the site has become both an important example of the earliest factories, and a thriving example of mixed, modern day function. That the site should continue in a commercial function while maintaining its physical integrity is perhaps the most fitting memorial to its former master that Cromford could provide.

Bibliography

Place of publication is London unless otherwise stated.

Arden, Richard Pepper	*The Trial of a Cause…to Repeal a Patent granted on the Sixteenth of September 1775 to Mr. Richard Arkwright For an Invention of Certain Instruments & Machines for preparing Silk, Cotton, Flax and Wool for Spinning* (1785)
Arkwright Society	*Cromford Mill* (leaflet).
Arkwright Society	*Richard Arkwright, Master Spinner* (exhibition catalogue).
Ashton, T. S.	*Changes in Standards of Comfort in the Eighteenth Century* in Proceedings of the British Academy, XLI, 1955.
Ashton, T. S.	*An Economic History of Britain: The Eighteenth Century* (1955)
Baines, Edward	*The Cotton Manufacture in Great Britain* (1835).
Berg, Maxine	*The Age of Manufactures 1700-1820,* (1985).
Chapman, S.D.	*The Early Factory Masters* (1967).
Christian, Roy	*Canal of the Lawrence Country* in Country Life, 31st Aug 1961.
Cooper, Brian	*Transformation of a Valley*, Scarthin Books, Cromford (1991).
Deane, Phyllis	*The First Industrial Revolution,* Cambridge University Press (1955)
Fitton, R.S	*The Arkwrights: Spinners of Fortune*, Manchester University Press (1989).
Fitton, R.S. & Wadsworth, R. P.	*The Strutts & the Arkwrights1758-1830*, Manchester University Press (1958).
Guest, Richard	*A Compendious History of the Cotton Manufacture* (1823).
Hills, R. L.	*Richard Arkwright & Cotton Spinning* (1973).
Thomas, Ivor Bulwer	*North Street, Cromford* in Transactions of the Ancient Monuments Society, Vol. XX .
Taylor, Boswell	*Richard Arkwright, Man of the Mills* (1957).
Uttley, Alison	*Our Village: Alison Uttley's Cromford*, Scarthin Books, Cromford (1984).

Outside works meant that the project could continue despite lockdown, but the winter of 2020/21 saw some very cold conditions, as here in February 2021 when film maker Mark Todd (left) visited to film the works for Historic England.

Half the north side of the street had to be swathed in scaffolding from October to March.

Major maintenance works at North Street, 2020-21

Funded by the Cultural Recovery Fund

Conservation surveyor: Peter Napier
Landmark project manager: Stuart Leavy
Contractor: H.A. Briddon Ltd of Tansy, Matlock (masonry and carpentry)
Site Manager: Neil Goodall
Lead Mason: Ian Williams

As well as the Landmark holiday let at No. 10, Landmark owns The Old Workshop, Out of the Blue, and Nos 4,5,6,8 and 11 along the north side of North Street, shown shaded in red below. All except No. 10 are let to residential tenants, and this of course gives us obligations as a landlord as well as a conservation charty.

By 2020, all the exteriors were in need of general maintenance, and major cyclical maintenance had been planned in for some time. Then, in March 2020, the COVID-19 pandemic hit the UK. In line with government policy, all Landmark's buildings were closed for successive lockdowns through nine of the next twelve months. The holiday income we rely on to maintain our buildings dried up. However, we were enormously grateful to receive a major grant channelled by Historic England from the Cultural Recovery Fund (CRF), a fund set up by the government during the pandemic to support the heritage sector as well as other cultural areas. This enabled the North Street and other major planned works to take place, in a period when we might otherwise have had to batten down the hatches.

Above: masonry damage caused by clumsy re-pointing in cement.

Below: example of masonry after repair, brushed back to its original pointing, with a replacement block (centre) marked up for tooling. Unlike cement, the breathability of the fine lime mortar joints will allow moisture to evaporate, minimising the erosion of the stone.

The CRF not only benefited Landmark's buildings, of course, but also provided secure employment for the specialist crafts people who carried out the work during the difficult months of the pandemic. Works began in October 2020 and completed late April 2021. The timing of the works through the winter months avoided disturbing the nesting season of the swifts that return every year to raise their young under the eaves of the terraces.

Masonry work

The local gritstone of which the houses are built is a red sandstone which is surprisingly friable. Ill-advised repointing in cement done before Landmark's arrival in 1974 meant the gritstone was crumbling away around the wide cement joints, which were standing proud in many places. We set out to retain as much of the existing stone as possible, dressing back loose surfaces. Despite decay around the joints, the blocks were mostly still sound, and only isolated replacement was needed, where overall erosion was more than 50mm. This brought a temporary change to the appearance of the stonework that weathering will soon restore a more consistent appearance.

Birchover stone from near Matlock was used for any necessary replacement blocks; the window dressing and sills had suffered even more erosion. The masons set up a banker's shed in the back garden of No 10, where they dressed individual blocks. The 1760s masons had tooled each block beautifully as they dressed it, and all new work has been tooled to the midline with similar care under the supervision of master mason Ian Williams.

After much discussion, rather then repointing the now widened joints in lime, it was decided simply to rake out the cement pointing to take the joints back to their original lime, since this is holding well (the primary joints are very thin). The original mortar mix in the joints is softer and more breathable than the stone instead of vice versa with cement, so that less water will be trapped, and therefore the gritstone no longer degrade.

Lead mason Ian Williams working in the bankers shed, and a half-tooled replacement window sill, an example of his work.

Replaced window sill, with plastic repairs visible as the as yet darker areas in the eroded jambs just above the sill. As they dry, they will be hardly visible.

The new mortar for masonry repairs was made of non-hydraulic lime, a good colour match obtained by keeping the gritstone sweepings to use as aggregate in a 1:1 mix. We hope the work will be regarded as an exemplar for future repairs along the street. Drip detailing has also been improved so that less water runs down the wall faces.

Door jambs were being pushed out by their original cast iron fixing pins as they corroded and expanded. These have been drilled out and re-fixed with stone dowels made by mason. In some cases, the cast iron originals were found to have been already replaced with timber ones and mortared over; these too had rotted and were replaced.

Plastic repairs were used for the stone jambs and window dressings wherever possible. ('Plastic' refers to the repairs being modelled by hand rather than to the material used, which was a self-coloured 1:1 lime mix). For larger areas of plastic repair, stainless steel pins with copper wire wound round them were used to provide a skeleton for the new mortar to key to. Adhesive was added to the mix as it had to adhere to both metal and stone. The next level of repair was the letting in of a new stone slip, much as a timber repair might be spliced into a beam. There were many ad hoc, pre-Landmark repairs to unpick – for example at No 11, an old repair to the stone door jamb was found to be done in timber finished with rough cast cement, a very strange and ill-advised mix of materials.

Top: Site foreman Neil Goddall with Stuart Leavy.
Below left: new stone dowels tying a door jamb firmly in place.
Below right: Stuart and Susan McDonough, Landmark's Head of Historic Estate, inspecting the repaired chimney stacks.

Roofing

The works at North Street were originally prompted through concern about inadequate fire compartmentalisation in the internal roof spaces along the terrace. However, once inspected internally across our properties, this was found to be fully compliant. The roof coverings of plain clay tiles were also found to be in good condition. They had all been repaired in the 1970s when the bottom ten courses only were replaced, and the underlying roofing timbers are also still sound, so only localised repair was needed

The chimney stacks were also suffering from repairs done with cement, so have been re-pointed and re-flaunched where they meet the roof slope using a hot lime mortar for greater resilience. Hot lime is a mix made by stirring quick, or unslaked, lime directly into the aggregate and water, rather than slaking the quick lime first. Only a few bricks needed replacing in the chimney stacks.

The guttering on all Landmark's properties is cast iron and has been overhauled. The inner gutters faces are coated with bitumen which typically extends their life by at least ten years. We now have consistent rainwater goods across all our properties.

Joinery/ Doors and windows

All the doors and windows have been overhauled, many being found to have rotted due to water ingress. Those beyond on-site repair were sent back to the contractor's workshop for repair. A few have had to be re-made, the carpenters following the survey drawings of Arkwright-era originals that were sensibly taken by the local authority in 1974 when demolition of the street was being discussed (see following pages).

The doors all have been returned to their original two panel, framed and battened design, again following survey drawings of a surviving original.The windows have been kept, or returned, to their eighteenth-century form, which is a 24-pane fixed

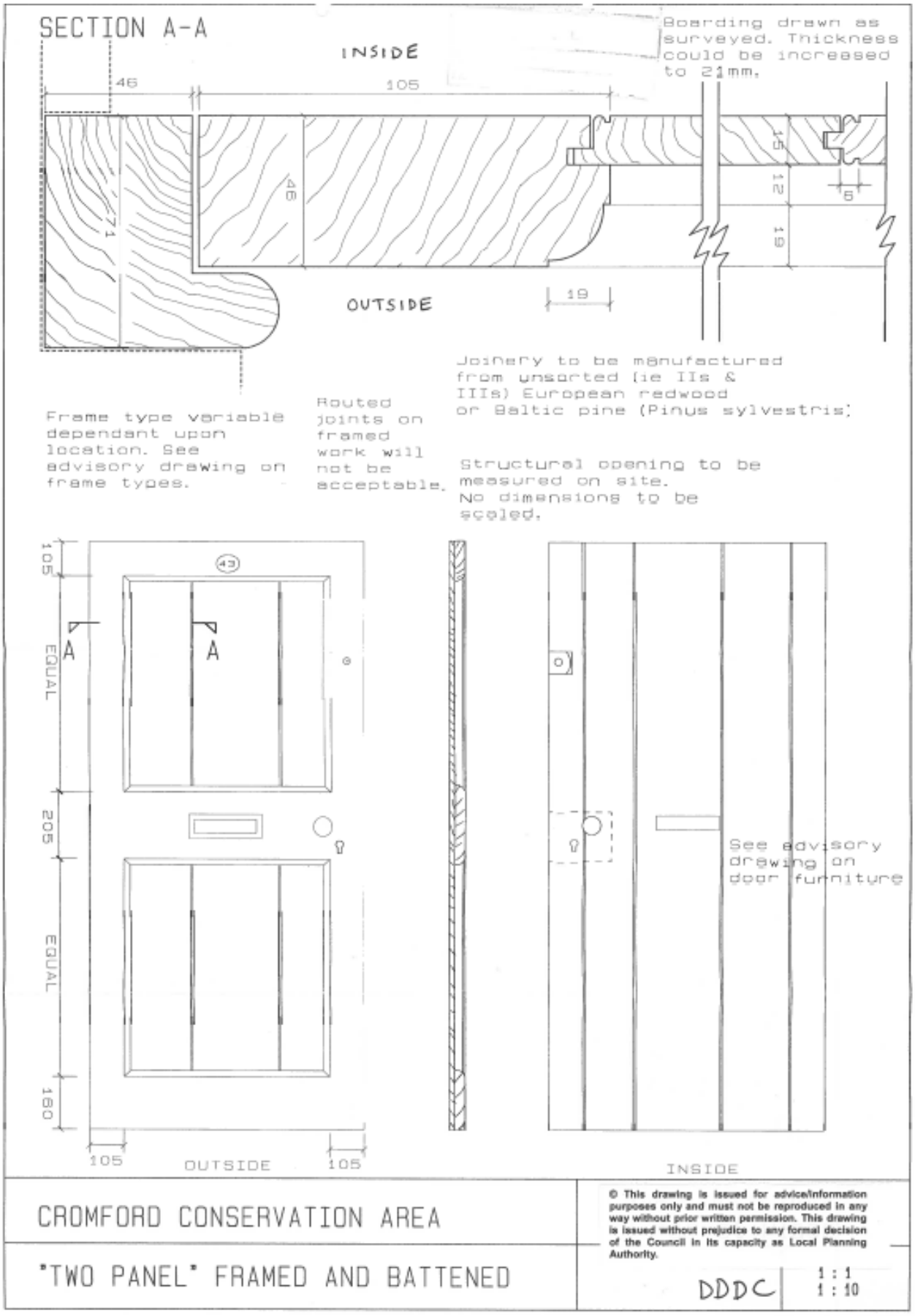
leaded light with a small vertical sliding sash alongside. The top floors have the characteristic long, four-light windows that lit the weavers' looms. A few of the opening iron casements on these upper floors also needed replacement.

Windows and doors were redecorated in linseed oil paint in the primary soft blue, which meant taking existing woodwork back to bare wood.

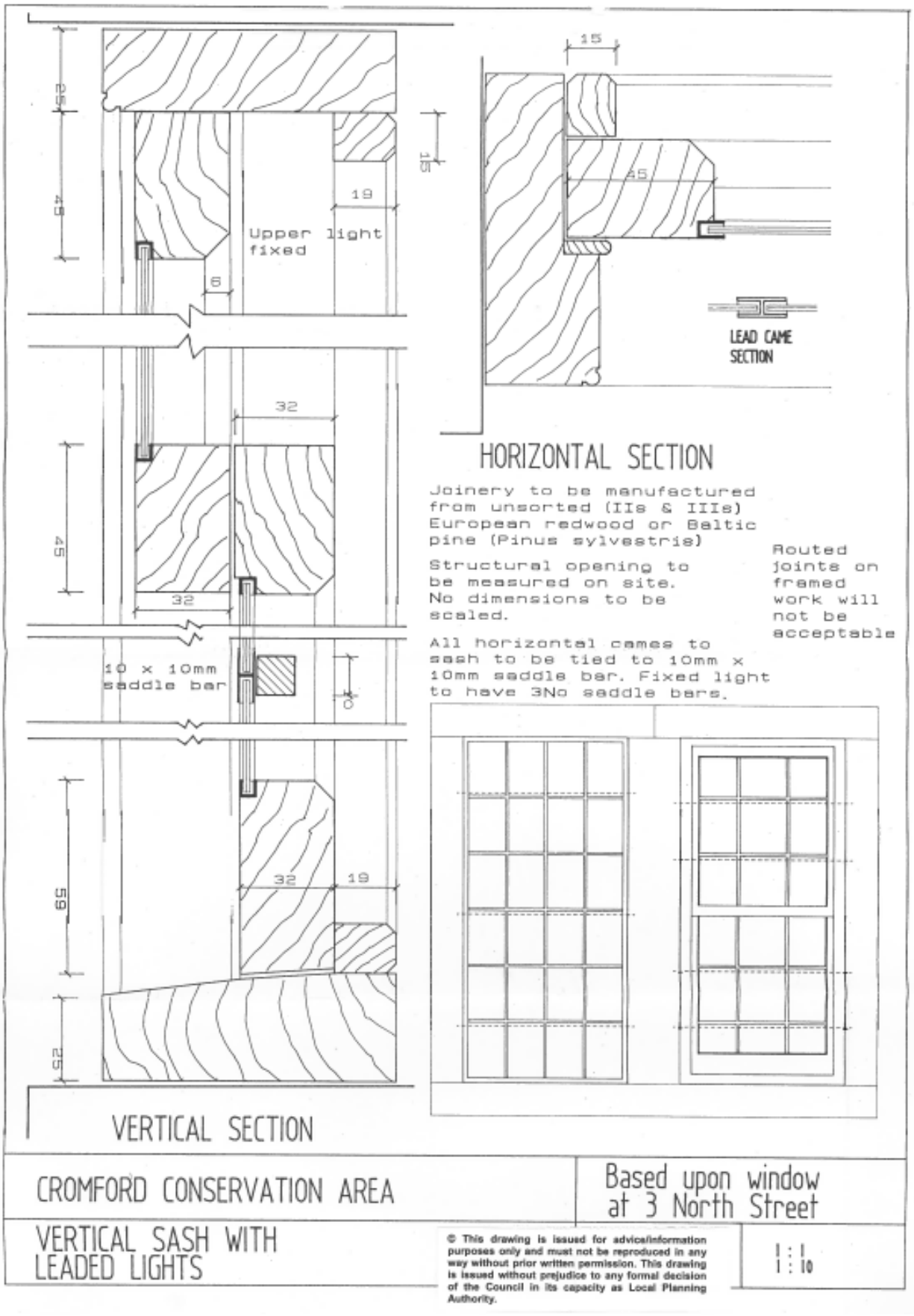
No 11 was damaged by fire a few years previously, so the opportunity was also taken to refurbish it completely, ready for the next tenant.

Thanks to the Cultural Recovery Fund, these major works have not only benefited Landmark's buildings along North Street (and elsewhere) but also provided months of secure employment for the specialist crafts people who carried out the work. Our North Street cottages now face their future in considerably better heart.

Apprentice Adam Winson worked alongside the experienced masons, gaining valuable experience, here raking out cement pointing with Ian Williams.



1974 survey drawing of 1777 Arkwright-era door.



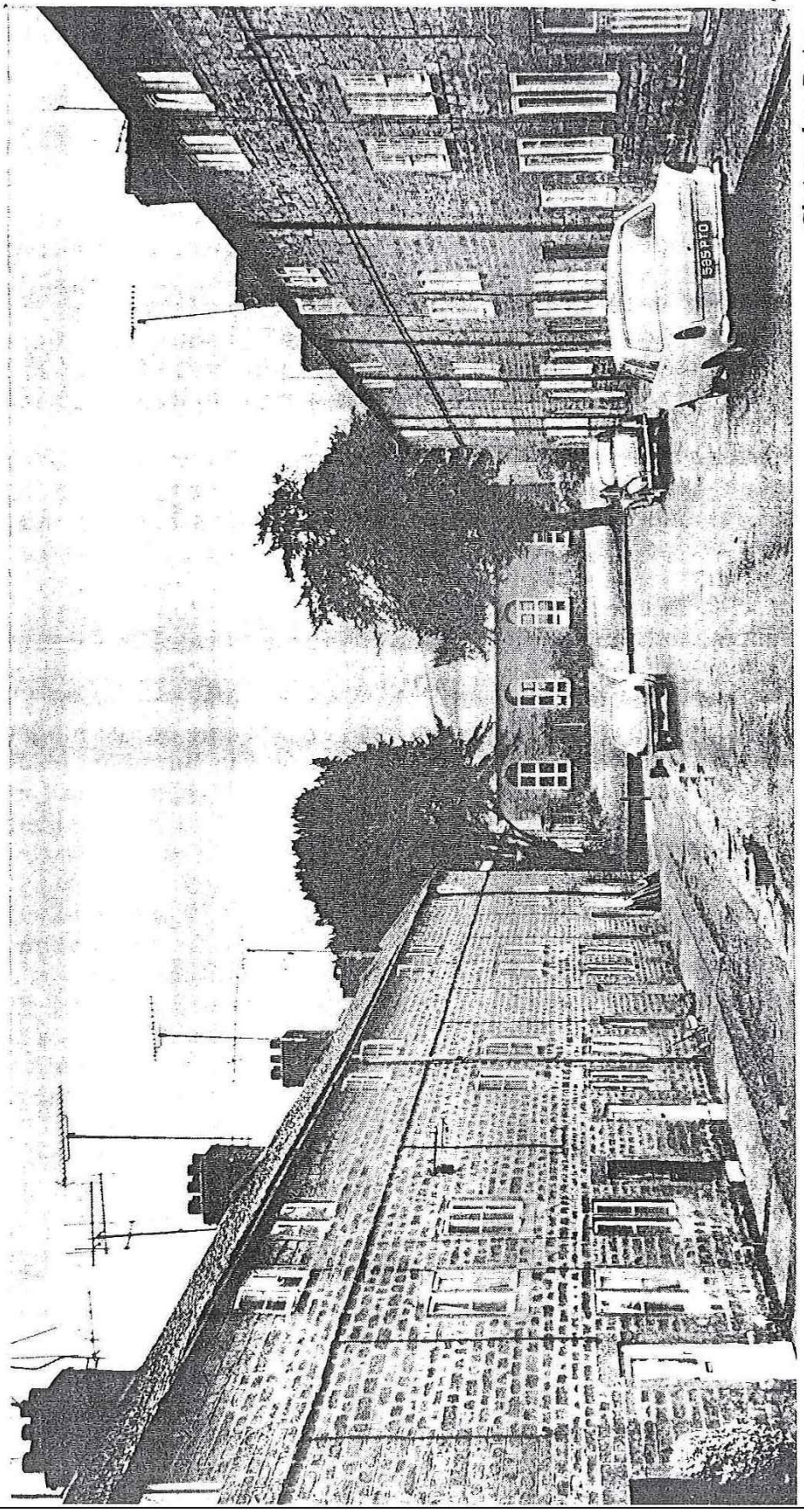
1974 survey drawing of 1777 Arkwright-era window.

NORTH STREET, CROMFORD

by Ivor Bulmer-Thomas

From 2 January 1965 to 23 April 1974 the Ancient Monuments Society was the owner of six houses in North Street, Cromford near Matlock in Derbyshire, which mark a significant stage in the Industrial Revolution. In these days when "industrial archaeology" is increasingly recognized as an essential part of the study and conservation of ancient monuments it may be well to set on record this episode in the Society's history.

Richard Arkwright (1732–1792) was born at Preston and, after serving an apprenticeship to a barber at Kirkham, settled in Bolton.[1] He added a public house to his barber's business, but it did not prosper, and his difficulties were increased by asthma. He decided to leave Bolton and travelled about buying women's hair for wigs. But he had already shown an aptitude for mechanical contrivances, and the decisive turn in his fortunes came in the late sixties when he took up the idea of roller-spinning in association with Thomas Highs of Leigh and John Kay, the Warrington clockmaker. In 1768 he and Kay were in Preston working on the model of a machine, but when their right to vote in the Burgoyne election in March was contested they left for Nottingham, then the centre of cotton hosiery. It was in Nottingham that he obtained the backing and partnership of Jedediah Strutt (1726–1797), inventor of a process for making ribbed stockings by machine instead of by hand. Strutt had secured his first patent in 1759 and obtained the financial backing of Samuel Need, a wealthy Nottingham hosier. They flourished as a result of the invention, and were prepared to look for others to exploit. Arkwright had first tried to get cash backing from Peter Atherton of Warrington, but was more successful with John Smalley, a liquor merchant and painter of Preston, who became his first partner. In 1768 Arkwright applied from Nottingham for a patent and a year later it was granted. On Smalley's resources giving out, according to one account, Arkwright turned to the Wrights, the Nottingham bankers, but as they found progress slow they handed the matter over to Need, who asked his partner Strutt to pronounce on the merits of the invention. There is some uncertainty about the sequence of events at this stage, but whatever the exact sequence Arkwright and Strutt had been brought together and began an association almost without parallel in industrial history. As R. S. Fitton and A. P. Wadsworth wrote in 1958, "They began business in cotton-spinning together, they parted, and then, as part of the changes in the modern cotton trade, the firms they founded came together sixty-one years ago (1897) under the same ownership, though retaining



Christopher Dalton

NORTH STREET, CROMFORD

their titles. The continuity of W. G. and J. Strutt and of Sir Richard Arkwright and Company is unique in textile history. The picture stretches from the first successful cotton factory of 1769 (the earlier Paul-Wyatt factories were failures) to the great combine which embraces all the fibres, natural and man-made, of the 1950s."[2]

It was at Nottingham that the assocation began, but in 1771 the two men took a momentous decision which transferred production to Cromford. This was nothing less than a decision to use water power as the motive force in turning the machinery. The patent of 1769 had mentioned only horse power, and no more was attempted at Nottingham. True, the use of water power had often been thought about and even attempted in the previous decades. Twenty years earlier Lewis Paul, whose first machines at Birmingham had been turned by horses, had actually used water power for his primitive spinning factory at Northampton. Strutt as a silk manufacturer was familiar with Lombe's mill at Derby, which used water power and was being copied elsewhere.[3] But the process was still rudimentary, and Strutt and Need were risking a good deal of capital by then standards in backing its application to Arkwright's invention. In retrospect they had no regrets, for this was one of the turning points in the development of the factory system.

But why Cromford? There was, it is true, plenty of water, tumbling down in streams from the surrounding hills as it still does today. The water for Arkwright's mill was supplied by a stream which issued from the local lead mines and joined the Derwent near Cromford bridge. The stream was reputed never to freeze, and the mill was built at its confluence with the Derwent. But there were many other places in that hilly country with water supplies just as good, and in 1771 Cromford had very poor communications with the ports from which its raw material came and the towns through which its products would have to be sold. It was ~~fourteen~~ seventeen miles from Derby, twenty-six from Nottingham and nearly forty-five from Manchester. The high ground around Cromford was unenclosed moorland and the roads near it were poor. The turnpike from the north of England to Derby and London ran some miles to the ~~east~~ west, through Brassington, as shown by Burdett's county map of 1762–67;[4] the direct road to Derby ran over the moors and the valley road, now A6, was not made until 1820.

Nevertheless it was Cromford that Strutt and Arkwright selected for their great adventure, and their first task was to recruit labour and build houses for the immigrants as their needs could not be satisfied locally. The first contemporary reference is the following advertisement in the *Derby Mercury* of 13 December, 1771.

'Cotton Mill, Cromford, 10 December, 1771

"WANTED immediately, two Journeymen Clock-makers, or others that understands Tooth and Pinion well; Also a Smith that

can forge and file.—Likewise two Wood Turners that have been accustomed to Wheel-making, Spole-turning, &c. Weavers residing at the Mill, may have good Work. There is Employment at the above Place, for Women, Children, &c. and good Wages.

"N.B. A Quantity of Box Wood is wanted: Any Persons whom the above may suit, will be treated with by Messrs. Arkwright and Co. at the Mill, or Mr. Strutt, in Derby."

It is not necessary to pursue the story of cotton manufacture at Cromford, and, indeed, hardly any records of the Arkwright mills have survived. Although Richard Arkwright established mills in many other places, it was Cromford that he regarded as his home, and there in 1790, having bought most of the land around, he built Willersley Castle, which still testifies to his independent and arrogant spirit. By that time Arkwright was a wealthy man and on his own. When Need died in 1781, the partnership with Strutt had been dissolved.

Enough has been said to show how North Street, Cromford came to be built. In 1776, when a second mill was begun, about 500 workmen and children were given a feast. Arkwright and Strutt frequently advertised for more labour in those years. In the absence of documentary evidence it is not possible to say when exactly this street with terraced stone houses on both sides was built, but it was probably in 1771 and certainly by 1780. The houses remained in the ownership of the Arkwright family until 1924 (see Appendix 1.)

The walls facing the street are substantial. The houses were planned as "one room deep dwellings" on three floors. A report made by the Society's Honorary Architect, Dr. T. Marsden, in December 1972 conjectures that "the upper floors were formerly used as workrooms and provided with continuous mullioned windows, giving light from two sides of the building". Dr. Marsden added in his report: "The plan arrangement and elevational character show the influence of symmetry; reflected pairs of houses have doors to the fronts planned on either side of the dividing wall between units. The staircases are deep and fit into a small floor area."

Nos. 4–9 came into the possession of the Ancient Monuments Society in this way. In 1961 the Matlock Urban District Council bought them with the intention of demolishing them and building on the site an old people's home. In view of their interest as monuments of the Industrial Revolution, the Derbyshire County Council placed a Building Preservation Order on the properties under the Town and Country Planning Act, 1947. Being unable to carry out its intention, the Matlock U.D.C. sought to divest itself of the ownership and offered the houses to the Ancient Monuments Society; and after some debate the Society's Council agreed to buy them at the District Valuer's valuation of £400. The tenants were all paying low rents and were then all rent protected.

It was realized that the roofs needed overhauling, and that modernization was desirable, particularly the provision of new bathroom and toilet accommodation at the rear. Although such work would have attracted improvement grants, and the rents could have been raised to meet the expenditure, it would have meant the immediate injection of capital which the Society at that time was in no position to provide. Accordingly, although the most necessary repairs were always executed punctiliously, the Society was never able to carry out desirable improvements. The houses were always in demand as vacancies occurred, but the Society is not equipped for owning and maintaining property at such a distance from its headquarters, and in due course it was decided to seek to divest the Society of the ownership, subject to assurances about the future preservation of the houses and the security of the tenants. An approach was first made to the National Trust, and the Trust would have been interested if it could have been given the whole of the street. (It is, indeed, desirable that the street as a whole should be preserved, including the Church school which was built at one end in the nineteenth century and provides a charming architectural stop to it, as well as keeping it as a *cul-de-sac.*) In the meantime our Honorary Life Fellow, Mr. John Smith, had taken the generous and far-sighted step of founding the Landmark Trust, and he was asked if the Trust would be willing to acquire the property. It so happened that the Trust was being simultaneously approached to see if it would accept houses at the other end of the street, and an agreement was soon reached. As the houses had not been acquired for an investment but for the purposes of the charity, i.e. the Society, the consent of the Charity Commissioners had to be obtained. The Commissioners in accordance with their practice required a valuation by a surveyor acting solely on behalf of the Society to be made, and in due course made an order authorizing the sale to the Landmark Trust for not less than £3,000 —a measure of the increase in property values in recent years. The conveyance to the Landmark Trust was concluded on 23 April, 1974.

The Society can look back with a measure of pride on this episode for we played our part in ensuring the preservation of these interesting monuments of the Industrial Revolution, we proved ourselves good landlords, and we have now handed over the houses to a body which is better equipped than the Society is for carrying out our original intention in acquiring them.

APPENDIX I

Recent changes in ownership, from the title deeds

25 July, 1924	Richard Alleyne Arkwright, son of Frederick Charles Arkwright of Willersley Castle, of Willersley House, conveyed the property to Tom Wilson Austin and James Austin.
13 August, 1928	James Austin sold the property to Silvester Britland and Martha Ann Britland.
9 March, 1946	Miss Martha Ann Britland sold the property to Mrs. Harriet Annie Walker.
15 June, 1961	Mrs. Harriet Annie Walker conveyed the property to the Matlock Urban District Council.
2 January, 1965	Matlock Urban District Council conveyed the property to Ivor Bulmer-Thomas, Raymond Richards and Lionel Milner Angus-Butterworth as Trustees for the Ancient Monuments Society. (N.B. Raymond Richards retired as a Trustee on 29 December, 1966 and was succeeded by Leslie Phenix Beckley, who died 9 September, 1973.)
23 April, 1974	Ivor Bulmer-Thomas and Lionel Milner Angus-Butterworth, the surviving Trustees for the Ancient Monuments Society, conveyed the property to the Landmark Trust.

APPENDIX II

Sealed 28th March 1974

$\frac{444}{74}$ General) / Charity) – Ancient Monuments Society

$\frac{A}{209,605\ A/1.}$

Authority to sell real estate.

CHARITY COMMISSION

In the matter of the Charity called the Ancient Monuments Society; and
In the matter of the Charities Act, 1960.

THE CHARITY COMMISSIONERS FOR ENGLAND AND WALES, being satisfied that it is expedient in the interests of the above-mentioned Charity that the property described in the schedule hereto and belonging to the Charity should be sold upon the terms mentioned below, HEREBY ORDER that:

The Trustees of the Charity may sell the said property to the Charity called The Landmark Trust for not less than £3,000 subject to the condition that the sale shall be completed within one year from the date of this Order.

SCHEDULE

4 to 9 (consecutive) North Street, Cromford, in the County of Derby.

Sealed by Order of the Commissioners this 28th day of March, 1974.

L.S.

413-19-3-74JH

APPENDIX III

A letter from the Hon. Secretary of the Ancient Monuments Society to the tenants of Nos. 4–9 North Street, Cromford

33 Ladbroke Square,
London W11
18 April, 1974

Dear Tenant,

The houses in North Street are historically important as having been built by Richard Arkwright in conjunction with Jedediah Strutt in 1771 to house workmen for the first cotton mill to use water power. When they were offered to the Society by the Matlock Urban District Council in 1964 we therefore felt bound to accept them, and we have held them for nearly ten years. We believe that the tenants feel that we have been good landlords. But the Society is not equipped to administer property at such a distance from its headquarters, nor have we the resources to bring the amenities of the houses up to current standards. Since the houses were acquired the Landmark Trust has been formed by our Honorary Life Fellow, Mr. John Smith, and this Trust has both the ex-

perience and the resources for dealing with such property. We accordingly inquired whether the Trust would be willing to buy the property from us, and we are glad to say that the Trust has agreed to do so. This will ensure the preservation of the houses and their modernization more effectively than we could do, and I am sure the tenants will find the Landmark Trust to be as good landlords as we have been.

Tenants pay rent fortnightly in arrears (with a free fortnight at Christmas) and the last rent will be collected for the Ancient Monuments Society on 23 April. Thereafter the rents will be collected for the Landmark Trust.

We send our best wishes to the tenants, confident that your relationship with the Trust will be as happy as it has been with the Society.

Yours sincerely,

IVOR BULMER-THOMAS

Notes

[1] The information about Richard Arkwright, Jedediah Strutt and the Cromford mill in this paper is derived from R. S. Fitton and A. P. Wadsworth, *The Strutts and the Arkwrights* (Manchester University Press, 1958), to which I wish to express my deep indebtedness.

[2] The English Cotton Corporation.

[3] A. P. Wadsworth and J. de L. Mann, *The Cotton Trade and Industrial Lancashire, 1600–1780* (Manchester, 1931), chapter xxi.

[4] Reproduced from the revision of 1791 as an end paper in Fitton and Wadsworth, *op. cit.*