

ART. VIII.—*Langthwaite Cotton Mill*. By D. J. W. MAWSON.

Read at Edenhall, September 3rd, 1976.

IF the emergence of Carlisle as an industrial centre is to be attributed to a specific period, this must be the decade of the 1790s, for it was during these years that the foundations of the local spinning industry were laid. Indeed, within fifty years the district had become the fourth most important cotton manufacturing area in the United Kingdom.¹

Shortly before the Restoration, fustians were manufactured in the city, while in 1745 Hamburg merchants established a woollen factory which prospered for a time.² Thirteen years later, the new road to Newcastle, built primarily for strategic reasons, also gave Cumbrians a better trade route to northern Europe and the Baltic, and this led to the development of a small osnaburg industry, with a few looms also weaving fine linen.³ Such seems to have been the extent of Carlisle's textile industry until 1761, when a group of Newcastle men, Messrs Scott, Lamb & Co., established print fields for the printing and stamping of calico.⁴

Statutory prohibition against weaving pure cotton fabrics only ended when the prolonged opposition of the woollen cloth merchants to reform was overcome in 1774.⁵ That at least five manufacturers were producing textiles in Carlisle by the following year, is evident from an advertisement in the *Cumberland Pacquet* inserted during the early part of August 1775 by the firms of Messrs Ferguson, Forster, Robert Stoddart, Barton & Hodgson and Jos. Stoddart & Co. Having encountered a mass withdrawal of labour, they sought by means of this advertisement to recruit

operatives acquainted with the check, stripe and linen branches of the trade, declaring that:

“The weavers who have quitted our respective manufactures have thought proper to assert in an advertisement in the Newcastle Chronicle of the 22d of July that they were not able to earn more than 5s 6d per week working 15 hours per day — we think it necessary to inform the public that on a particular examination of their accounts it appears that their constant wages throughout the year amount, on an average, from 7 to 8 shillings per week clear of all deductions; and that some individuals among them have frequently earned from 10 to 12 shillings per week; nor is it necessary to work any such hours as they talk of, for earning the wages here mentioned.

We are ready to give full satisfaction concerning this or any other particular to those who may chuse to apply for work and we hope this assurance of the falseness of their assertion (an assurance which shall be supported by indisputable evidence) will most effectually invalidate the aim of an advertisement, evidently calculated to deceive the public and to deter other men from supplying the places they have imprudently left.

We will venture further to assure the public that the lowness of their wage was not the real cause of the step they have taken, but they wished to avail themselves of a supposed extraordinary briskness of orders for the article, and hoped to force their employers into a compliance with their unreasonable demands.”⁶

The newborn industry survived this dispute. Indeed, within twenty years Messrs Wood & Co., who had been the first to introduce mechanised spinning to Carlisle, alone employed some 200 workers. Four print fields gave employment to a further 1,000 in or near the city, and Messrs Forsters are said to have been the biggest concern at that time in the north of England undertaking the entire process of textile manufacture. Of five other businesses similarly employed, the largest was Messrs Ferguson.⁷

At Dalston, three miles to the south, Mr Hudson, a Manchester man, opened a cotton mill on the banks of the Caldew in 1782, and twelve years later eight textile works in the village together employed nearly 500 people. Elsewhere in the area there were several

weaving firms and print fields at Wigton, while Brampton and Longtown were also weaving towns.⁸ In 1793, Messrs Ferguson completed a new cotton mill at Langthwaite, Warwick Bridge.⁹

During the following century the local textile industry expanded rapidly. By 1810, for example, Messrs Holme were operating steam-powered looms.¹⁰ In 1829 the district boasted about 80,000 spindles, and had more than half as many again eighteen years later. By 1847 there were four large spinning mills in Carlisle, two more at Dalston, and one each at Warwick Bridge and Cummersdale. In the last village there was also a substantial calico-printing establishment, and in the city itself no less than eight weaving factories and several bleaching and finishing works.¹¹

In spite of the important part which cotton played in Carlisle's development, and although some of the firms founded by the early entrepreneurs were major employers until their identities were lost in takeovers by national corporations during recent years, there remains a dearth of documentary material concerning these early mills.

Recently, however, there has come to light a bundle of correspondence and machinery schedules from the early nineteenth century and relating to Langthwaite Mill at Warwick Bridge. The deeds of the mill also survive practically intact from 1790 to the present day. It is possible from these sources not only to trace the history of the building itself, but to say with some precision how it was equipped fifteen years after its erection. The papers also afford an insight into the problems which beset its early owners, and give a glimpse of a modernisation programme in the 1830s.

Langthwaite Mill 1790-1832.

On 20 November 1790 Philip Howard of Corby Castle, with the concurrence of his son Henry, leased

Lowfield, a 6-acre site adjoining Langthwaite Farm, Warwick Bridge, to John, Richard and George Ferguson, sons of the late Richard Ferguson (1716-1787) a check manufacturer who is believed to have occupied rooms beneath Carlisle Town Hall in 1746. At the date of this lease the family was in business in one of the lanes leading off English Street,¹² but there is evidence that they were already spinning cotton at Warwick.¹³

Lowfield lay conveniently between two small streams, Cairn Beck and Trout Beck, which converged a few hundred yards downstream to become a minor tributary of the Eden. To run for 99 years from the ensuing Candlemas, the lease not only gave the Fergusons the right to build a mill and waterwheel with all necessary mill-races, sluices and weirs, but also granted them exclusive use of the Cairn Beck. Should they wish to do so, they might also tap the Trout. During the first twenty-one years, the annual ground rent was fixed at £9, but thereafter it was to rise at regular intervals until after sixty-three years £24 a year became payable.

The brothers took a little over two years to build the mill and a 700 yard mill-race to harness the Cairn. Around the mill itself were sundry ancillary buildings, including warehouses and dye-houses. The factory contained 443 spindles, and in a short space of time was producing 800 lbs. of yarn each week.¹⁴ During the early hours of Thursday 8 August 1793, however, there was a major disaster, as the following week's *Pacquet* relates:

"On Thursday morning about 3 o'clock a fire broke out at the cotton manufactory at Warwick near Carlisle (belonging to Messrs John, Richard and George Ferguson of that city) which destroyed the main building, leaving nothing standing but the bare walls, and those very much shattered in many places — all the raw cotton in the garrets was burnt, the jenny wheel on the next floor, and several other articles — the principal articles

saved from the flames were almost the whole of the twist and spun cotton, and of the fixtures some frames of the carding-engine. The great waterwheel is also preserved, and happily none of the adjoining buildings are damaged. The property, we understand, is insured with the Phoenix fire office, so that the loss sustained by Messrs Ferguson will not be great, except for the interruption of their business, which must also be severely felt by at least 150 labouring people. A large stock of spun cotton happily escaped the ravages of the fire. The manufactory, which was very complete and well situate, was a new erection and had been at work only a few months."¹⁵

The Phoenix paid for the repairs, and the Fergusons re-built. Their new mill, measuring 66 feet by 33 feet (20.13 × 10.06 metres) in ground plan, and containing three floors as well as an attic, was a functional but pleasant building in the Georgian style. It is still in use to this day. The waterwheel which survived the fire was mounted in the south-eastern gable, and if, as seems likely, the factory was now equipped with water-powered mules, it must have been among the most modern in the country, since these had only become available towards the beginning of the decade.¹⁶

Before 1798 it is evident that the Cairn coped adequately with the mill's power needs, for the firm had not invoked the licence to tap the Trout. However, that year the brothers took steps to safeguard the future. A lease of Langthwaite Farm was negotiated with Henry Howard, who also consented to the construction of a reservoir in the land lying between the factory and the farm. Although agreeing that this should be fed by a cut from the Trout, Howard made it clear that the water supply to his corn mill downstream was not to be jeopardised. For the time being, the Fergusons were content to have secured the additional rights. They did not seek to exercise them immediately, and although a mill-race from the Trout was constructed in 1806, no reservoir was built during their occupancy.

John Ferguson died in 1802,¹⁷ but his brothers continued the business at Langthwaite until 1809 when they leased the mill for seven years to their brother-in-law, Peter Dixon, and his sons.¹⁸ Three inventories of the factory's equipment and machinery have survived from this period. The first, dated 22 December 1808, is printed at the end of this paper. It shows that the mill then contained 1,064 spindles and enables the contemporary lay-out of its equipment to be plotted with some certainty. (Fig. 1).

On 26 December 1809 an inventory of "Old Machinery at Warwick Co. Works" records the disposal of machinery when the Dixons took possession. Some items are shown as fixtures and others as passing to the new occupants at valuation, but the warping-mills were dismantled and removed to the Carlisle factory.¹⁹

The third inventory, also set out at the end of this paper, is undated, but seems to be slightly later than the others. Rather scrappy, and possibly a preliminary draft for insurance purposes, it nevertheless gives some indication of the value of each piece of equipment then in the factory.

Two years before the expiration of their lease, Peter Dixon's sons John, Peter (the younger) and George, having ambitious plans to enlarge the factory, sought the security of a longer tenancy, and on 20 September 1814 George Ferguson, who upon the death of his brother Richard three years before had become the sole owner, granted his nephews a new sub-lease of Langthwaite Mill and its "waterwheels, machinery, gears and implements to be attached to the waterwheels" for 22 years from the ensuing New Year's Day.

Building started almost at once. The Fergusons' original mill was extended by a new wing, four storeys high, with an attic. New cottages were built,

LANGTHWAITE COTTON MILL

165

LANGTHWAITE 'COTTON' MILL IN 1808.

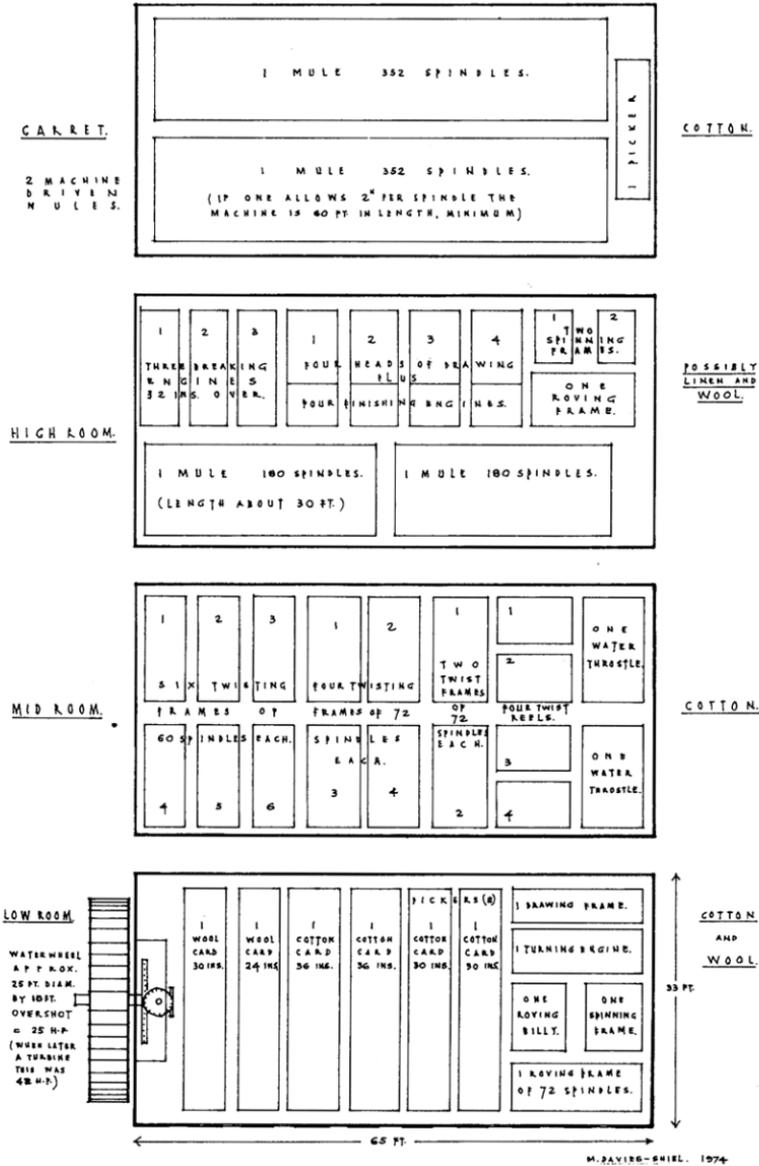


FIG. 1.—Plan drawn by Mr W. D. Cross from a sketch prepared by Mr M. Davies-Shiel illustrating the probable layout of machinery at Langthwaite Mill in 1808.

and so was the reservoir authorised 16 years earlier. These improvements, although supervised by the Dixons, were undertaken at their uncle's expense, on the understanding that the annual rent of £582 should be increased by 10% on his outlay. The extensions were completed by New Year's Day 1816 at a cost of £6,694 13s 7d, and at the month-end the local newspapers carried advertisements for additional labour — 10 mule spinners, a card master, 2 rovers, and a few large useful families being required.²⁰

Before concluding their arrangements with George Ferguson, the Dixons had been well aware of the need to secure sufficient reserves of water to power the larger factory then planned and, indeed, sought assurances from Henry Howard that he was still prepared to authorise the reservoir, and particularly the cutting of a feeder through his land. Howard not only confirmed this, but proposed that the Dixons should also take over the tenancy of the adjoining farm at an annual rent of £210, in order to safeguard their water for the future.

Although the 1790 lease had given the owners of the mill exclusive use of the Cairn Beck, resort to the Trout, which also powered Howard's corn mill, was a different matter. Contemporary papers disclose that the problem was resolved by the Dixons agreeing not to shut the sluices to their new reservoir on weekdays before 8 p.m., nor open them before 6 a.m., while on Saturday nights the sluices were not to be shut before midnight.

It was with Peter Dixon that Henry Howard corresponded when in September 1816 an opportunity arose to buy some nearby farmland, the ownership of which would protect the mill's water, and again five months later, following disputes with two riparian owners, Ebdell and Clark. Howard had instituted Court proceedings against these men, but lost his case. The unsuccessful actions not only cost £500 but obliged

him to buy out his adversaries. Since his endeavours had been largely for the benefit of the mill, he suggested that the partners should take a tenancy of the purchased land at 4% on his outlay of £1,570. In the event, however, they accepted only 21 acres, the rest being put to another of Howard's farms.

In 1822 the Dixons undertook improvements to the mill-races, employing one James Dunlop to construct banks and weirs at a cost of £159, but in 1832 the complete dependence of the firm upon water was diminished with the installation of a steam engine, supplied by Peel, Williams & Peel's Soho Works, Manchester.²¹

The purchase of this engine was evidently part of a more general re-equipment. In the previous year, Sharp, Roberts & Co. of Manchester²² had been approached concerning the supply of Danforth spinning machines at £72 each, and that the Dixons chose the Danforth Throstle says much for their entrepreneurial ability to experiment with new equipment. Danforth's invention had been patented in the U.S.A. in 1828, and was introduced to Britain in the following year. Although ring spinning was subsequently to evolve from it, British cotton masters generally afforded it a cool reception, many of them apparently preferring Sharp, Roberts and Co.'s own recently developed self-acting mule to the more revolutionary principle of Danforth's machine, which the Manchester firm manufactured under licence.²³ It seems from contemporary correspondence that the Dixons must have been anxious to install the new Danforth machines across the width of a building which was a little too narrow for the purpose, but the difficulty was overcome by overlapping the belt drive, while further space was gained by removing masonry from the internal facings of the lateral walls.

In 1831 the firm also asked Jenkinson & Bros of

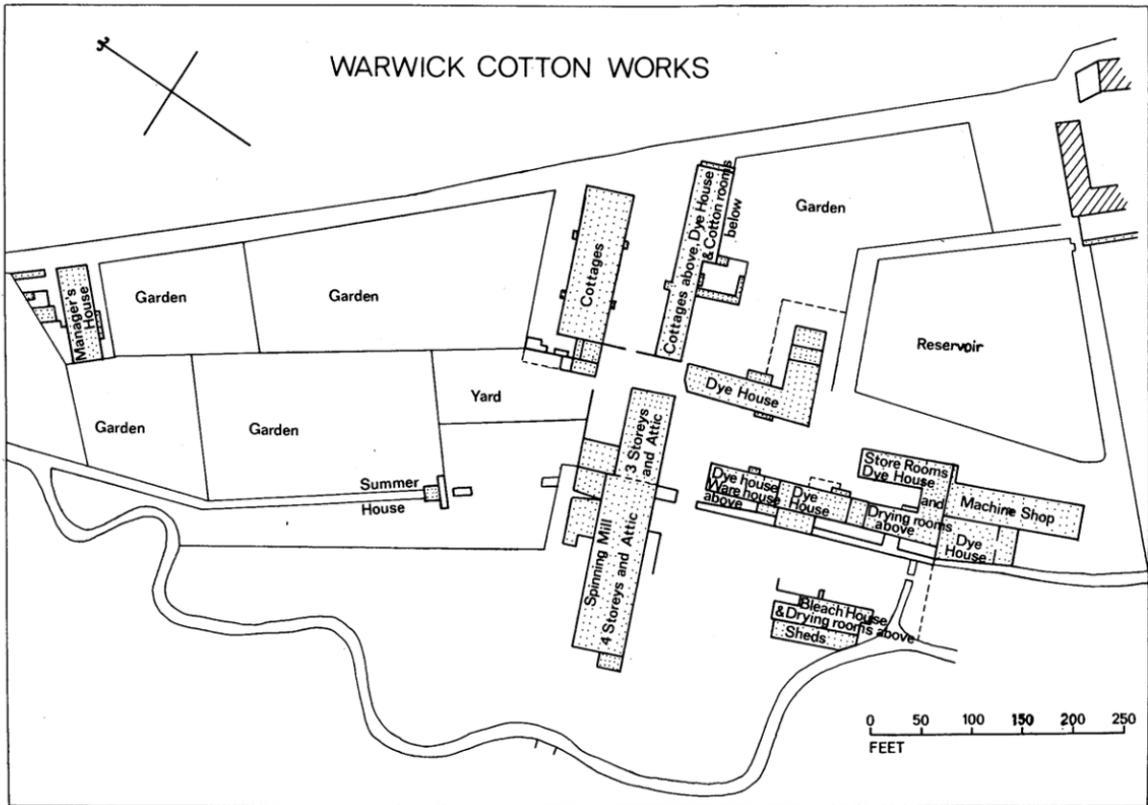
Salford to supply 12 carding engines at £24 each, and a drawing frame for £30. A selection of letters from this period is printed after the machinery schedules.

These post-Napoleonic decades were a period of remarkable expansion for British industry. The cotton trade led the boom, and Langthwaite Mill shared in the general prosperity. Certainly the factory was working round the clock when James Losh visited it in 1826 and reported:

“At the cotton spinning factory at Warwick Bridge the good workmen earn 23s per week, women and children from 3s to 10s according to their age etc. The works are carried on night and day. The day labourers begin at 6 in the morning and leave work at $\frac{1}{2}$ past 7 in the evening. They have 1 hour for breakfast and 1 for dinner. The night labourers begin at $\frac{1}{2}$ past 7 and leave off at 6, having $\frac{1}{2}$ an hour at midnight to themselves. None are employed as night labourers under 16 years of age.”²⁴

Langthwaite Mill 1832-1889.

As the firm's new Shaddongate factory in Carlisle neared completion, early in 1836, an attempt was made to dispose of Langthwaite. The sale notices referred to the imminent opening of the Newcastle-Carlisle railway with a coal depot at the nearest point, as well as to the factory's dye-houses, capable of containing 130 vats, to its bleach-houses, 34 cottages, a gas-house, and accommodation for a steam engine.²⁵ (Fig. 2). There appear to have been no takers, however, and Peter Dixon & Sons stayed on. Indeed, by 1844 the firm had built another row of cottages, and a school for 150 children,²⁶ and by 1847 was employing 320 hands at Warwick Bridge.²⁷ From time to time the under-lease was renewed, on the first two occasions for fourteen years, but in 1864, at the height of the American Civil War, for only five, and again in 1869 for a similar period. By the latter year the annual rent had fallen to £360, but business did not improve, and three years



LANGTHWAITE COTTON MILL

169

Fig 2.—Langthwaite Mill circa 1836. Source C.R.O. D/Cart. Box B13 (Temp Ref). The building shown "3 storeys and attic", is the mill built by Messrs Ferguson to replace that destroyed in the 1793 fire.

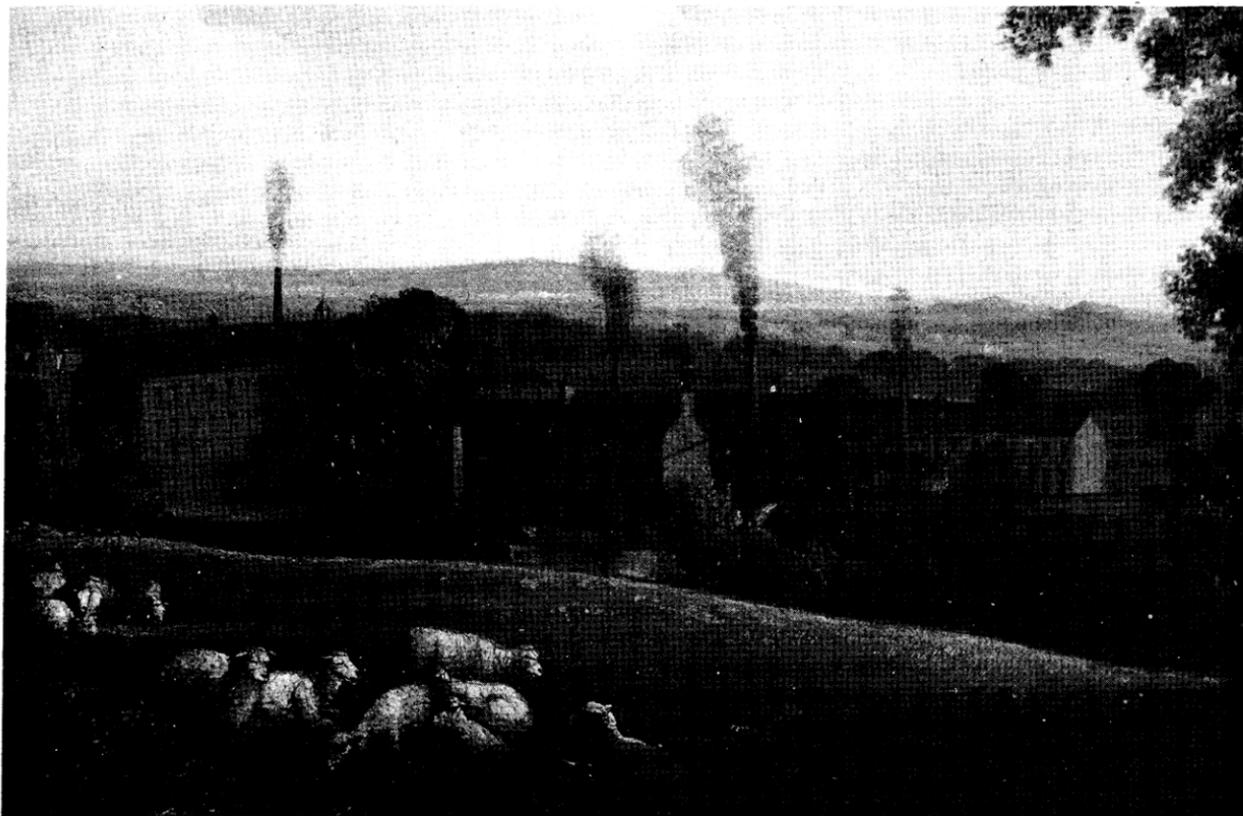


PLATE I.—Langhwaite Mill from the south. Oil-painting by an unknown
artist, circa 1840.
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Photo: Tullie House

later the partners, Peter James Dixon, John Dixon and Joseph Forster, were declared bankrupt on their own petition.²⁸

A joint stock company, Peter Dixon & Sons Ltd, was floated almost at once, and on 20 January 1873 it purchased Langthwaite Mill with all its engines and machinery at a cost of £13,000. Although the mill itself was idle, the adjoining dye and bleach works, containing over 300 iron dyeing vats and 17 indigo mills, driven by a condensing engine, a waterwheel and two turbines, were fully employed on finishing work for the firm's Carlisle factories which the company had also acquired.²⁹ The under-lease of the Warwick Bridge works, due to end in 1874, was extended until 1890, but in the event the company surrendered the lease in 1885, having ceased to trade two years earlier.³⁰ Although the entire factory was re-let, the new tenant, Mr J. N. Calvert only occupied some of the buildings, and shortly afterwards it was reported that "the cotton spinning mills and a large portion of the dyeing and bleaching works have not been used for some time past for manufacturing purposes, and considerable repairs are necessary."

In 1886 the Rev. Richard Ferguson bought the freehold reversion for £1,800, and also took an assignment from his co-owners of the remainder of the 99-year term granted by the 1790 lease. Two years later he sold the property to Messrs William Waddell & Son, the Otterburn woollen manufacturers who a few years earlier had established the Cumberland branch of their business not far away at Heads Nook. Otterburn Mill Ltd, successors to William Waddell & Son, own and occupy Langthwaite Mill at the present time.

APPENDIX A

Machinery at Warwick Cotton Works
December 22nd 1808.*Low Room*

1 Engine for Carding Wool 30 in. over	Good order
1 " " " " 24 in. over	Good order
1 Picker for Wool	" "
2 Engines for Carding Cotton 36 in. over with a Head of drawing at each	" "
2 Engines for Carding Cotton 30 in. over	" "
1 Engine " Turning " 26 in. over	Mid. order
1 Roving Billey — 42 Spindles for Cotton wick	" "
1 drawing Frame 3 Heads	New
1 Spindle Frame 24 Bobbins	" "
1 Roving Frame 72 Spindles	" "
1 Picker for Mule Cotton	" "
1 " for Jenny Cotton	Mid. order
Gr. Doz.	
6. 5. 9 Tin cans for Roving Frame 18 doz. bobs for Spindle	New
12 large tin cans. 39 mid. Do. 35 small Do.	Good
3 Candlesticks, 5 Lamps, 3 Snuffers	" "

Mid. Room

6 Twist Frames, 60 Spindles each	Good order
4 " " , 72 " each	" "
2 " " , 72 " each	Bad order
4 Twist Reels, 40 Bobbs each	Good order
2 Water Thros.	" "
3 Tubs, 1 Water Cask, 1 Chest, 1 Cupboard	" "
1 Hammer, 4 Washer Cutters, 4 Pr. Plyers	" "
1 Scraper, 1 Time Piece, $\frac{1}{2}$ Minute Glass	" "
13 Candlesticks & a full sett of Twist Bobs	" "

High Room

3 Breaking Engines, 32 in. over	New
4 Finishing " , 34 in. over	New
a Head of drawing to each of the Finishing Engines	" "
a drawing Frame with 8 Heads	Nearly "
2 Spindle Frames, 12 Spindles each	" "
1 Roving Frame — 144 "	" "

1 Cilender for Sharping Top Cards	New
54 Large Cans, 5 Small Cans, 3½ Grs. Spindle Bobs	Good order
1 Cupboard, 1 Box for Trimmings, 1 Water Cask	„ „
5 Candlesticks, 4 Globes, 1 Lamp Lantern	„ „
2 Mules — 180 Spindles each	New

Garret

2 Mules — 352 Spindles each	Good order
1 Picker for Twist Cotton	„ „
6 Candlesticks, 1 Water Cask, 1 Lantern	„ „
1 full sett of Patterns	„ „

Warping Room

a Warping Mill, a Heck with 130 Eyes, 2 Banks	„ „
1 with 60 & the other with 120 turners	„ „
Gr. Doz. Gr. Doz.	
3. 4. 4 Muslin Bobbins 1. 10. 8 Calico Bobbins	„ „
1 Winding machine 40 Drums with pegs etc.	„ „
4 Candlesticks, 1 Lantern, Snuffers etc.	„ „

Office

Counters, Shelves, Scales & weights, 1 Desk	„ „
1 Chair, 2 Tables, 2 Gigs, 2 Chairs, 1 small Bell	„ „
1 Reel, 12 Pegs, 2 Souters, 2 Steelyards, 2 Step ladders, 2 Yarn Baskets, 1 Bell, 1 Weather Glass	„ „
1 Time Piece to go by Water, 1 Tin Skope, Fire Irons	„ „
Fender, 2 Wheels for making Carding Skips	„ „
Baskets, Boxes, Lamps, Lanterns, Candlesticks	„ „
Snuffers, Extinguishers etc.	„ „
9 Reels with 21 Pegs	„ „
3 „ „ 30 „	„ „
1 Candlewick Reel with 16 „	„ „

Great Store Room

1 Weigh Beam, weights etc., Indigo Chest, Tackle	Good order
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Small Store Room

Weigh Beam & weights, Counters, Shelves	Good order
3 Tar Tubs, 4 Brushes & a Flour Skope	„ „

Stove

a large Stove for drying warps, 4 Horses, 1 strainer	„	„
5 Tubs, 1 Ceive & Frame, 7 Bags, 1 Lantern, 1 Hack	„	„
1 Candlestick, 1 Pocker, 2 Fire shovels, 2 Spades	„	„
2 Boilers, 1 Small Boiler, 1 Boiler for steaming	„	„
Twist, 2 Riddles, 1 Table, 5 Batters, 1 Tin pan	„	„
1 Boiler Cover, 1 Lime Shovel, 1 Wheel & Hand barrow	„	„

Room adjoining Fancy Dyehouse

1 Picker, 1 Twilley & Chest for Rovings	„	„
a Thro' for turning Iron at Jas. Robinson's, a Rat trap	„	„
Joiners Shop fitted out with all kinds of Utensils and a Chest of Tools, a foot Thro'	„	„

Blue Dyehouse

13 Leaden Vatts, a large Stove, 4 Wringers	„	„
8 Tubs, 2 Kits, 2 Tables, 6 Shaking Posts	„	„
2 Pots for Grinding Indigo, fire Shovel, Pocker	„	„
8 doz. large Sticks, 4 doz. Small Sticks, 21 Powls	„	„
1 Wheel Barrow, 2 Riddles, 1 Coal Rake	„	„
a Pr. of Sizing Wringers, 1 Drainer, 1 Dish	„	„
2 Hawks, 3 Forms, 5 Spouts, 2 Tin skopes	„	„
6 Iron Crosses, 1 Brush, 1 Lantern, 3 Stands	„	„
7 Candlesticks	„	„

Fancy Dyehouse

1 Copper Boiler, 1 Cast metal Boiler	„	„
1 Leaden Vatt, 8 Tubs, 117 Sticks, 2 Dishes	„	„
2 Pots, 1 Shovel & pocker, 3 shaking posts	„	„
a Pr. Wringers, 1 Stands, 1 Table, 1 Form	„	„
2 Drainers, 1 Rake, 1 Kit, 1 Ceive, 1 Coal Rake	„	„
20 Jennies — 90 Spindles each	Md	order

Undated Machinery valuation which appears to be later than that set out above.

	[£ s d]
2 Mules Garrett — 352 ea. — 704 — 4/-	150. 16. 0.
a Picker	15. 0. 0.

High Room

1 Roving Billey — 144 — 7/6	50. 0. 0.
1 Bobbin Frame	40. 0. 0.
1 drawing Frame — 8 Heads	10. 0. 0.
5 New Carding Engines 24 & 8 — £32	160. 0. 0.
1 Old " " £20 }	48. 0. 0.
1 " " " £28 }	
Sds	
2 Mules — 360 — 7/-	126. 0. 0.
10 Twist Frames — 648 sds. 7/-	226. 16. 0.

Low Room

1 Picker	22. 0. 0.
old Engine	5. 0. 0.
" "	7. 10. 0.
" "	20. 0. 0.
" "	25. 0. 0.
Drawing Frame	10. 10. 0.
Bobbin Frame	40. 0. 0.
Billy	55. 0. 0.
Wool 144 in.	35. 0. 0.
"	10. 0. 0.
	1,056. 12. 0.

Amt. Brot. over	1,056.	12.	0.
5 Cards on High Room Engines £8	40.	0.	0.
2 " " " " £2	4.	0.	0.
Winding machine	30.	0.	0.
Machine Bobbins	7.	5.	0.
2 Warping Mills & Hecks £5	10.	0.	0.
8 Looms £4	32.	0.	0.
8 weft Reels 30/-	12.	0.	0.
13 Leaden Vatts at £15	195.	0.	0.
Sticks, Tables & Powls	10.	0.	0.
Stove & Pipes	2.	10.	0.
Tubs etc.	2.	0.	0.
Cistern Lead	16.	0.	0.
Copper Boiler	7.	0.	0.
Tubs & Sticks etc.	3.	0.	0.
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Furniture in House	1,426.	2.	0.
Office fitted up	60.	0.	0.
Baskets	2.	10.	0.
3 Twist Reels 30/-	4.	10.	0.
old Machinery etc.	20.	0.	0.
	<hr/>		
	1,523.	12.	0.
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Brot. over	1,523.	12.	0.
Sundry other articles such as Garden Chair, Dyers Chest etc.		10.	0.

APPENDIX B

Manchester

March 5th 1831

Messrs Peter Dixon & Sons
Carlisle

Gentlemen,

We are favoured with your letter of the 28th Feby., respecting Danforth spinning machines — and have consulted Mr Danforth on the subject.

On the other side is a sketch of the mode in which two Machines are driven, where the gearing is suitable, and of the room two machines of 96 spindles occupy; from which you will perceive that a room of 30 feet wide will hold two Machines, allowing for a passage of 2 feet 6 ins. to 2 feet 8 Inches wide.

Mr Danforth does not recommend any machine to be made of a greater number of spindles than 132, of which we are now making some, but many parties prefer 96 spindle machines.

With regard to making machines with Bobbins to hold a greater quantity of yarn, we are now making with spindles $3\frac{1}{8}$ instead of $2\frac{7}{8}$ distant, and Bobbins $1\frac{1}{2}$ instead of $1\frac{1}{4}$ In. diameter. Now we can make you two machines with the $1\frac{1}{2}$ Inch caps, on the 96 spindle frames which will hold 88 instead of 96 spindles.

The price of two machines of 96 spindles of $2\frac{7}{8}$ distance, will be £75 each. The price of two machines of 88 spindles of $3\frac{1}{8}$ distance will be £72 each; and then, if you should be disposed to extend your order, we have no doubt but the Patentees would make some little reduction in the price.

The above prices are for the machines delivered at our works, exclusive of packing, for which we have provided several sets of cases, for the use of which, if returned to us free of expense, we charge 15/- per machine — with respect to a first machine.

We provide a person to assist in setting up and gearing the machine, for whose time we make no charge; but his travelling expenses and board are defrayed by the purchasers. If you favour the Patentees with an order, it would be well that we

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should provide a few gross of Bobbins just to start the machine, and they will serve you as a sample to get others made by. This we have done in all instances.

Waiting the pleasure of hearing from you,
We are, Gentlemen,
Your very obed. Serv.
Sharp Roberts & Co.

The Patentees terms are payment net in cash on receipt of the Machines.

[a drawing accompanies this letter]

Salford

March 5th 1831

Gentn.

We have yours of yesterday's date before us and in reply we beg to inform you that the price for 12 Carding Engines 24 Inches on the wire made on the same principle as the last will be £24 each and the Drawing frame same as last £33 the frame — payment equal to Cash in 4 months after Delivery. As to delivering them in Liverpool, it is a thing we never do, but as we did it last time we have no objections to do the same again. We can deliver them in 8 or 10 weeks from the time you order them.

Remaining yours very
respectfully
Jenkinson & Bros.

Manchester

April 4th 1831

Messrs Peter Dixon & Sons
Carlisle

Gentlemen,

We are favoured with your letter of the 2nd inst. enclosing a Bill value £72 which is placed at your credit with Messrs A. & R. Carrick, on account.

With respect to the price, we have shewn your letter to Mr Danforth, who confirms the correctness of our letter on the 5th March.

The price he quoted to Mr Dixon who was here, viz. 15/- per spindle, was for the making of 132 spindles, wide space, being the sort we were just then commencing to make; but with respect to Machines of 96 spindles, no sale whatever had been then made, or has since been made, at less than £75 for less than 1,000 spindles.

The price now arranged for such machines viz. 96 spindles is 15/6 from the 1st of this month, for all orders less than 1,000 spindles — orders for a greater quantity are negotiated with the Patentees, who allow a discount.

With respect to the space required between the Machines, sideways, what is usual with respect to Throstles will suffice, viz. about 3 feet.

There is not any improvement whatever in the construction of the Machine, either made or contemplated, but Mr Danforth has made an experiment for the purpose of obtaining a larger cop upon spindles $2\frac{7}{8}$ distant.

The contrivance consists of a tin guard, placed between the spindles, level with the caps, which prevents the threads lashing each other. The plan admits of using a cap $1\frac{1}{2}$ diamr. with spindles $2\frac{7}{8}$ dist., instead of requiring $3\frac{1}{8}$ or upwards, without such guard; it also tends to wind the yarn much harder on the Bobbin. The experiment has been completely successful. Annexed is a rough sketch of the application.

We are, Gentlemen,
Your most obed. serv.
Sharp Roberts & Co.

[a drawing accompanies this letter]

Manchester
Sepr. 14th 1831

Messrs Peter Dixon & Sons
Carlisle

Gentlemen,

Owing to the broken week caused by the Coronation, we found it quite impossible to get two sets of Spindles and Tubes ready to forward on Monday for the Steamer to sail on Tuesday; but we shall have *four* sets ready to forward on Friday, pr. next Monday's steamer.

We beg however to enquire if you would like us to send you one or two sets per coach, in order to facilitate the setting to work of one or two more Machines, before the arrival of those per steamer.

An answer in course of post will oblige. In the box with this we send the 4 Dozn. Tubes and washers before stat.

We are Gent., your very etc.
Sharp Roberts & Co.

Soho Iron Works and Forge
Manchester
12th April 1832

Gentlemen,

By this Evening's mail we have forwarded the plans for the Engine etc. We trust on examination you will readily understand them and we request you will not deviate from them because if any alteration is made without our knowledge we shall be wrong in what we are doing here. We shall make the necessary preparation on the shaft and fix on the spin wheel here and we recommend you by all means to have it geared with wood. We wait your instructions on this point. We are getting very well on with the Boiler and hope to have the Engine in Liverpool by the time named.

We remain Gentlemen
Your obedient servants
Peel, Williams & Peel

Messrs Peter Dixon & Sons
Carlisle

Acknowledgements.

I am grateful to the Directors of Otterburn Mill Ltd for lending me the correspondence and machinery schedules, and to Mr J. V. Waddell who first told me about these papers. I am also indebted to Mr M. Davies-Shiel B.Sc., for his technical assistance, and particularly for his help in preparing Figure 1.

References and Notes.

- ¹ Edward Baines, *History of the Cotton Manufacture of Great Britain*, 1835, 417. Baines defined the Carlisle district as the whole area southwards to Lancashire and northwards to the Glasgow district.
- ² Mannix and Whellan, *History Gazetteer and Directory of Cumberland*, 1847, 146.
- ³ R. S. Ferguson, *The M.P.s of Cumberland and Westmorland 1660-1867*, 305, states that the Fergusons started to make osnaburgs in Carlisle in 1746, and the Hodgsons in 1750. He suggests that before the building of the military road their flax was obtained from Scotland and the Borders, while the new road enabled it to be imported from the Baltic.
- ⁴ Hutchinson, 2, 664.
- ⁵ *14 Geo. III, C 72*.
- ⁶ *Cumberland Pacquet*, 3 August 1775.
- ⁷ Mannix and Whellan, *op. cit.*, 146; Hutchinson, 2, 664.
- ⁸ *Ibid.*, 451, 468 and 548; and Hutchinson, 1, 127.
- ⁹ Unless otherwise indicated, matters relating specifically to Langthwaite Mill are taken from the muniments of title, letters, schedules, and other papers either in the possession of the present owners, Otterburn Mill Limited or at C.R.O. (D/Cart, Box B.J3.). The letters concerning machinery written in 1831 and 1832 are addressed to Peter Dixon & Sons, Carlisle, but are nevertheless considered to relate to Langthwaite not only by reason of their being retained with the other Warwick Bridge correspondence, but because the firm's expansion in Carlisle came a few years later, with the construction of its Shaddongate Mill in 1835/6.
- ¹⁰ *Jollies Cumberland Guide and Directory*, 1811, Part 1, 83.
- ¹¹ Parson and White's *History Directory and Gazetteer of the Counties of Cumberland and Westmorland*, 1829, 152, and Mannix and Whellan, *op. cit.*, indicate that Peter Dixon and Sons alone employed about 8,000 hands at this time.
- ¹² C.R.O., Ferguson Pedigrees, DX/249/10.
- ¹³ *Universal British Directory*, 1790, states "At Warwick a cotton yarn manufactory is carried on by Messrs Ferguson", which suggests that the brothers' connection with the village pre-dated the building of Langthwaite Mill.
- ¹⁴ Hutchinson, 1, 169.
- ¹⁵ *Cumberland Pacquet*, 13 August 1793.
- ¹⁶ M. M. Edwards, *The Growth of the British Cotton Trade 1780-1815*, 43. Mr M. Davies-Shiel is of the opinion that the general size and shape of Fergusons' re-built mill indicates that it was designed to accommodate water-powered mules.
- ¹⁷ C.R.O. Ferguson Pedigrees.

- 18 Ferguson Pedigrees, *ibid*, which should be consulted concerning the Ferguson and Dixon family connection. Peter Dixon's sons had served their time in their uncle's factories and even before they took over Langthwaite Mill in 1809 had played an increasing part in the management of the Fergusons' manufacturing concerns. R. S. Ferguson, *op. cit.*, 306.
- 19 The Carlisle factory was trading as Ferguson and Dixon in 1810, Jollie, *op. cit.*, Part 1, 82.
- 20 *Carlisle Journal*, 27 January 1816.
- 21 Peel Williams & Peel's Soho Foundry, established soon after 1800 by David Whitehead, was acquired by George Peel and William Ward Williams in 1813. Peel was the son of a Blackburn cotton merchant, and Williams an ironfounder from the Carron Works. Their Soho Foundry specialised in the design and production of mill gearing and gear wheels; it also made steam engines, *Industrial Archaeology, Journal of the History of Industry and Technology*, 8, 366; O. Ashmore, *Industrial Archaeology of Lancashire*, 84.
- 22 Richard Roberts of the firm of Sharp, Roberts & Co., was trained in Henry Maudslay's London workshops, and set up business in Manchester in 1816. His firm made an important contribution to the growth of precision engineering, and in particular played a leading role in the development of the self-acting spinning mule. Ashmore, *op. cit.*, 91.
- 23 H. Catling, *The Spinning Mule*, Newton Abbot, 181-3.
- 24 Losh MSS, Tullie House, Carlisle, quoted by Edward Hughes, *North Country Life in the Eighteenth Century*, 1963, 2, 360.
- 25 *Carlisle Journal*, 16 January 1836.
- 26 C.R.O. Corby and Warwick Bridge tithe award map 1844, DRC/8/48; Ordnance Survey Map 1st edition, 1862, 25-inch sheet xxiv. 3., and W. Whellan, *History and Topography of Cumberland and Westmorland*, 1860, 196.
- 27 Mannix and Whellan, *op. cit.*, 218.
- 28 The Carlisle cotton mills had been very reliant on the American market, since the plantation owners regularly placed large orders for gingham to clothe their slaves, and to save expense, seldom required the pattern to be changed from one order to the next. The emancipated negro naturally demanded a choice, and it has been suggested that the golden age of cotton spinning in Carlisle ended when the Carlisle manufacturers failed to adapt to this new market. T. F. Bulmer, *History, Topography and Directory of East Cumberland*, 1884, 52.
- 29 *Cumberland Pacquet*, 7 January 1873.
- 30 G. Topping and J. J. Potter, *Memories of Old Carlisle*, 1922, 164.