

# BARRETT, EXALL & ANDREWES' IRON WORKS AT READING: THE PARTNERSHIP ERA 1818-64

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Barrett, Exall & Andrewes' iron foundry at Katesgrove, Reading—which became the Reading Iron Works Ltd. in 1864—went into liquidation as long ago as 1887, and no trace of its former premises can be seen above ground. Nor can much of its history be gleaned from the standard works. The Victoria County History of Berkshire, for instance, has a chapter dealing with Industries, but the section on 'Ironworks' merely refers to 'Perry & Barret' (sic) in 1830,<sup>1</sup> and W. M. Childs, in his book *The Town of Reading in the First Half of the Nineteenth Century*, does no more than note that it was extensive in the middle of that century.<sup>2</sup>

Yet even today there are some tangible reminders of the firm's past existence locally, from street lamps embossed with the firm's name to iron monuments of the Barrett and Andrewes families in Reading cemetery. To gain a more coherent picture of how its main products developed, it is necessary to consult the *Journal of the Royal Agricultural Society of England* and *The Engineer*, as well as catalogues of agricultural and other shows. There is a lack of any internal archives, and the company's file of statutory returns to the Board of Trade is very slender.<sup>3</sup> The present account therefore relies very heavily on these periodical sources.

It is hoped that this account will be of some local as well as general interest. From the local

point of view, it impinges on Berkshire's past since the firm was a substantial employer of labour in Reading for many years, and helped to enhance the town's industrial good name both at home and overseas. In a wider context it became one of the three or four leading firms in Britain's agricultural engineering industry and gained an almost unrivalled reputation for at least one of its products. Finally, to economists and management scientists here is an instructive case-study of a firm in which commercial skills never quite matched its technical attainments; its long-term survival was therefore at risk.

In the following account, the changes in its organisation at different periods are interspersed with sections on the various products in which it tended to specialise from time to time. The products singled out for attention are the plough, agricultural machinery and the steam engine.

## I. THE ERA OF THE PLOUGH

In the 1880s the firm described its reputation for ploughs as 'with one exception, the oldest in the trade'. No doubt the exception was intended to be Ransome & Sons, situated at Ipswich from 1789 onwards, although the manufacture of ploughs by firms such as Garretts of Leiston seems to go back quite as far, if not farther. The standard work on *The Implements of Agriculture*, by the founder Robert Ransome's grandson, James Allen Ransome, gives us our first glimpse of what later became the Reading firm. This refers to a mould board manufactured by Pritchett &

<sup>1</sup> V. C. H. Berkshire I (1906) p. 384.

<sup>2</sup> W. M. Childs (book published in 1910, reprinted by Reading Public Library 1967) p. 24.

<sup>3</sup> P.R.O. B.T. 31 952/1282C.

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Perry of Millbrook near Southampton in 1809 and fitted to Hart of Wantage's plough.<sup>4</sup> The partners were both Quakers, Henry Pritchett and Thomas Perry (1777-1840); Pritchett came from a local family, while Perry was the son of a London baker who migrated to Suffolk after finding that his Quaker principles prevented him from continuing his trade there, because of malpractices such as the adulteration of ingredients.

The Millbrook firm very soon collapsed, for in 1810 the partners were reported as having 'absconded and not paid their just debts', and the Quaker Monthly Meeting sent a deputation to interview them. Perry thereupon accused Pritchett of having failed to pay in the additional capital he had promised, but was himself charged with having taken a 'considerable' sum out of the business for his own private use. In the circumstances the Monthly Meeting judged both equally culpable and disowned them.<sup>5</sup> Pritchett disappears from view, but after holding a clerk's job for some years Thomas Perry and his brother Joseph (1793-c. 1830) moved to Reading and together set up a new foundry.

They may have chosen Reading because it was not then well off for foundries. There were besides trading contacts between the town and the locality of Millbrook: iron 'masses' were shipped from near Beaulieu and used to make wire for pin-making in the oracle and elsewhere in the town.<sup>6</sup> The new foundry was situated at the corner of Horn Street and Katesgrove Lane. Then in 1820 Thomas Perry ran into further financial trouble, connected with either his previous or a new bankruptcy. By an unexplained metamorphosis he became a biscuit-baker in Reading's Market Place; his biscuits earned the commendation of the

novelist Mary Russell Mitford.<sup>7</sup> Joseph continued as an ironfounder on his own until in 1825 he took a new partner.

This was George Barrett (1771-1858), a fellmonger born at Alton who for a number of years had run a saltworks at Lymington.<sup>8</sup> Perhaps their Hampshire nonconformist backgrounds had brought the two partners together. Barrett was not a trained engineer, but he contributed both capital and some much-needed commercial expertise. As well as undertaking the general foundry work common in those days, the firm specialised in ploughs at a time when the demand for them was rapidly changing. Until a few years before 1825 the old country foundries had simply adapted plough designs by rule of thumb in response to practical needs and the more progressive Berkshire landowners had bought their ploughs from as far afield as Leicestershire, Gloucestershire and even Northumberland. Now they were abandoning the old types of wooden plough in favour of lighter ones, and looking to more specialist firms which would design ploughs scientifically for the various types of work and local agricultural conditions.

It was an Oxfordshire landowner, H. J. Hannam, who in about 1827 pioneered a special version of Perry & Barrett's lightest plough, and continued to be so impressed with its 'excellent performance' that when the Royal Agricultural Society of England held its first exhibition at Oxford in 1839 he submitted a model of it adapted for a single horse. There many rival varieties of plough were also put on view by landowners and manufacturers; not unexpectedly, Ransomes as the leading firm in the field won the principal awards both for a plough and for its display in general.

Even so, the Reading firm's plough won a prize at the 1841 exhibition, and in the following year was tested against a number of

<sup>4</sup> Book published in 1843, p. 29.

<sup>5</sup> The misfortunes of the Pritchett and Perry families can be followed in the Quaker records: Poole & Ringwood Monthly Meeting (in Hampshire Record Office) 24 M 54/91-2, 1804-13, and the Reading Monthly Meeting (in Berkshire Record Office) D/F 2B 3/10-13, 1817-51.

<sup>6</sup> V. C. H. Hants. V (1912) p. 464.

<sup>7</sup> T. A. B. Corley, *Quaker Enterprise in Biscuits: Huntley & Palmers of Reading 1822-1972* (1972) p. 18

<sup>8</sup> George Barrett's earlier career is mentioned in Hampshire Record Office 4 M 49/40, deed of March 1802, and 4 M 49/41, deed of January 1832.

rival models. The ease of working it was remarked on, although its lightness made it suitable only for shallow ploughing. By making what it called in 1851 a 'peculiar study' of ploughs, the firm felt itself to have acquired a reputation 'second to none' for the manufacture of ploughs. By then it was already developing new and more specialised agricultural machinery, which will be considered after the organisational changes of the 1830s have been described.

## 2. THE TRANSITION: BARRETT & EXALL

Joseph Perry died in about 1830, and for a time his widow's name was associated with the firm. But it needed some trained management, and Barrett, who had no children of his own, brought in his nephew George Allam Barrett (1799-c. 1871). He also appointed to a clerical post in the office Charles James Andrewes (1815-95), son of a Hounslow businessman. More significantly for the immediate future, he offered a position to his nephew by marriage, William Exall (1808-81).

Exall was to become the architect of the firm's subsequent greatness.<sup>9</sup> As a child he had emigrated with his parents to America, but after being apprenticed to a bookbinder, he had joined his two brothers in establishing an agricultural machinery business at Richmond, Virginia. His uncle's invitation to return to Britain gave him an opportunity to build up the mechanical side of the business where his real interests lay and in which the Reading firm was well behind its rivals, especially Ransomes and Garretts. He enjoyed the activity of invention, being extremely resourceful in an emergency or when confronted by a particularly troublesome task. He was not so interested in following up his inventions so as to benefit himself or his firm, although the number of patents he took out remains impressive.

<sup>9</sup> An authoritative memoir of William Exall is in the *Proceedings of the Institution of Civil Engineers* LXVII, Session 1881-2, Part I.

The firm's new managerial vigour encouraged Barrett in 1836 to buy some land on the banks of the river Kennet in Katesgrove Lane, whither the firm moved. This was the main situation of such large-scale industry as existed at that time, including brick-making and the manufacture of sailcloth. It was said locally that the battle of Trafalgar had been won in Katesgrove Lane because so many of the sails used in Nelson's fleet had come from the 140 looms in production there.<sup>10</sup> The wharves allowed finished goods to be shipped out easily; as late as 1851 the foundry's products were delivered free by water as far as Birmingham and Banbury, along the Oxford canal. Raw materials could also be brought in. Coal for iron-smelting, for instance, came from Somerset via the Coal canal there.<sup>11</sup> As Berkshire had no indigenous sources of iron, this was probably shipped along the Kennet and Avon Canal from Bristol and South Wales, as were the supplies of Taskers' foundry at Andover.<sup>12</sup>

It was none too soon for the firm to be occupying a new and less cramped site which gave room for future expansion. Only a short while later Exall, by virtue of his engineering knowledge, was put into touch with Isambard Kingdom Brunel, engineer of the Great Western Railway, who was planning the line between London and Bristol via Reading, and relied on local purchases of raw materials and manufactured iron products.

The G.W.R. archives show how in 1838 it made a loan of £1,500 to the foundry, no doubt as extra capital to provide iron work for the railway; the loan was repaid almost exactly two years later just before the London to Reading line was opened. By then the firm was receiving sums, notably from the contract for the Ruscombe and Sonning cuttings east of

<sup>10</sup> L. Harman, *The Parish of St. Giles-in-Reading* (published privately, 1946) p. 62.

<sup>11</sup> V. C. H. Somerset II (1911) p. 353.

<sup>12</sup> For Taskers of Andover's history from 1809 onwards see L. T. C. Rolt, *Waterloo Iron Works* (1969). Except that it still survives, that firm in many ways parallels the Reading one.

there, and the adverse comments passed by the judges on entries that were deficient either in design or in performance. Predictably, in the early years Ransomes, as a leading national firm, was awarded many of the chief prizes.

Not until 1843 did Barrett, Exall & Andrewes exhibit any mechanical implement, but from then on these revealed two characteristics that were to be hallmarks of the firm's work: simplicity and originality. Its hand threshing machine offered in that year was advertised as being a greatly simplified model, requiring only two men and two strong lads, one of each alternately turning, one feeding in the wheat and one clearing away. The model submitted to the 1844 show was recognised by the judges as being the most original on display, so that several others had apparently been copied from it. Four awards (two by the Yorkshire Agricultural Society, one by the Royal Dublin Society and one by the Gloucester Agricultural Association) between 1843 and 1845 give it the kind of national reputation it sought, and in its 1847 catalogue the firm claimed that the machines were to be found in every county in England.

The list of 530 customers named shows that its retail sales were concentrated in southern England, with a sprinkling in the Midlands and the north. The counties most strongly represented were Hampshire (115 machines), Berkshire (62), Oxfordshire (49), Sussex and Wiltshire (33 each), Essex (30), Somerset (25) and Lancashire (22). In addition, many were acquired by foundries and implement dealers up and down the country, such as Mapplebeck and Lowe's Midland Counties Agricultural Implement Repository at Birmingham, and Cooke & Butt's Kingholme Foundry at Gloucester, on wholesale terms (12½ or 15% discount), their final destinations not being recorded.

This machine's wooden frame with cast metal breasting made it rather cumbersome, but in 1851 the firm brought out a patented iron version, which was simpler to work and more portable and compact. It had introduced a horse-driven threshing machine in about

1845, the horse pulling round a bar in a circular motion so as to rotate a bevil wheel worked into a pinion; this turned the main shaft at 33 times the number of revolutions that the horse actually completed. Any number of horses up to four could be used, the most common number being two.

By 1847 the firm had sold 1,200 of the hand- and horse-powered varieties together. Of the 250 named customers who had bought the latter type, the adjoining counties of Berkshire (48 machines), Hampshire (33) and Oxfordshire (27) were the main sales areas, followed by Essex (22), Derbyshire (15) and Somerset (14). The importance attached by the partners to high quality and reliability is demonstrated by their acquisition of a farm near Reading 'for the purpose not of profit but of PRACTICALLY TESTING EVERY MACHINE AND IMPLEMENT we make'. They were able to claim that between 2,000 and 3,000 in all of their threshing machines had been sold by the mid-fifties.

At this time an agricultural engineering industry had clearly been established in Britain, but it would be false to think of the industry as being a tidy one in which firms competed among themselves with textbook neatness. Frequently they bought from one another complete machines or parts. Moreover, as in other industries of the day, there may have been an exchange of information about prices and discounts, although the number of annual shows, each with its full catalogue, made this practice not so essential as in other trades; at one time or another the firm exhibited practically all over England as well as in Ireland.

One weakness common to these shows generally was that the most avid contenders for the prizes learnt to produce what the judges wanted to see rather than what might be most suitable for practical conditions. The Reading firm concerned itself very much with the latter, especially as it affected the colonial market. Although its hand threshing machine needed two men to turn large wheels, the patented variety was claimed in 1851 to be very suitable

for hot climates, and to be regularly exported to Natal and the Cape of Good Hope as well as to other colonies. They were soon recognised as 'good pioneers' or stepping stones to the power-driven machines that many owners later went on to buy.

As to the horse-driven threshing machines, these were over the years steadily improved and simplified. They proved ideal for overseas as well as home use since they were made entirely of metal and could be transported by one horse and boxed up compactly for shipment; they were therefore named the 'colonial' and 'Irish' threshers. Similarly, the firm later on adapted the principle of the horse-drawn machine to the slower motion of bullocks in Egypt and India, for instance. Since these beasts moved at no more than  $1\frac{1}{4}$  miles an hour the gear ratio was increased from 33 to 100, which proved fast enough to drive cotton gins and machines for pumping water, cleaning rice and threshing grain.

One activity in which the firm seemingly had both the will and the expertise to be a leader was the mechanisation of ploughing. In 1849 Exall constructed the earliest set of machinery for steam ploughing on the 'roundabout' system. Here two separate drums respectively paid out and wound in a wire rope, which was carried through pulleys fixed at each corner of the field and therefore drew a plough round the field. The engine revolving the drums remained stationary outside the ploughing area. Exall superintended the working of this machinery for H. J. Hannam, the landowner mentioned in Section 1 above.

In the event the tests, while vindicating the principle of Exall's ideas, encountered practical difficulties because the tackle—and in particular the 1,600 yd. long wire rope—was mishandled. These difficulties were all too likely to arise in many cases where the equipment was being used under ordinary working conditions. Hence the Reading firm never put any machinery of this kind on the market and left its commercial development to be carried out largely in the following decade by John Fowler of Leeds. Exall himself

preferred to concentrate on producing really efficient steam engines, and these will form the subject of the next section.

#### 4. THE ERA OF THE STEAM ENGINE

It is not surprising that Exall should have been responsible for the firm's development of the steam engine as one of its specialities, since the technical problems appealed to his original and inventive mind. A Memoir of him notes that he was the first to apply the double-acting air pump to horizontal engines, the air pump being a prolongation of the piston-rod through the back cover of the cylinder. A number of his patents after 1850 were to do with engines of one kind or another.

The firm actually produced its first individual brand of steam engines in the late 1840s, a little later than some rivals, and was exhibiting them at the Royal Agricultural Society's show from 1848 onwards. Its early entries left something to be desired, the 1848 one being judged 'defective in construction' and therefore incapable of remaining steadily at work for more than a few minutes. But its exhibit of 1850 gained official commendation for good performance and economy in the consumption of fuel, even though the workmanship was still felt to be moderate.

Exall was in fact developing his ideas in his own way. Here he was helped by technical advances. As the firm explained in its catalogue submitted to the Great Exhibition in 1851, the very recent improvement in engineering tools, notably for turning and finishing spindles and bearings, was helping it to produce machines that ran far more evenly and were less subject to friction than ever before, and thus gave improved performance at a reduced cost. In one significant way its portable steam engine, the *Ceres* with its quaint high funnel and large flywheel, was ahead of earlier models because the engine could easily be removed without affecting the boiler in any way. The 4 horse-power model, put on show at the 1851 exhibition, still did not reach the high standard of construction that Exall was seeking. Yet outside observers

considered it to be decidedly superior to, say, Garretts' models, and in fact it won a prize medal there.

Then at the 1852 Royal Agricultural Society show one of the firm's engines was awarded first prize, Ransomes coming second. In most of the succeeding shows for the remainder of the decade, its engines won prizes or commendations, their coal consumption being steadily reduced from over 10½ lb per horse power per hour to under 5 lb in 1858. A noteworthy triumph was winning a gold medal for a fixed engine and a silver medal for a portable one at the Paris agricultural exhibition of 1856. Yet the firm was beginning to suffer from the handicap of being well in the lead technically, but far from efficient. On the technical side, its very exacting standards were now being matched by rivals, notably Clayton & Shuttleworth of Lincoln, and as that firm began to carry off prizes at shows consistently year after year, Barrett, Exall & Andrewes was compelled to incur substantial expenditure of time and money in its efforts to remain at, or even near, the summit. The consequences of this pressure on the firm, in relation to the organisational changes that occurred from 1849 onwards, are dealt with in the next section.

##### 5. REORGANISATION

In 1849 George Barrett retired at the age of 78. Since his arrival in Reading nearly 25 years before, he had seen the firm grow from a local plough-making and general foundry into an agricultural implement manufacturer for a national market. The partnership capital apparently totalled £10,000, as he sold his share to the other three partners, George Allam Barrett, William Exall and C. J. Andrewes, for £2,500. Instead of drawing out the proceeds he left them on mortgage, which continued after his death in 1858, being reduced only to £1,800 at the end of the partnership era.<sup>16</sup>

The firm's position in the industry by 1851

can be seen from the fact that at the Great Exhibition of that year its display was among the most extensive in Class IX (Agricultural and Horticultural Machines and Implements). Moreover, it filled one of the four prime sites on the south-west side of the Crystal Palace's ground floor, its neighbours being Ransomes (800 employees), Garretts (300 employees) and Crosskills of Beverley. Its own numbers at that time were 250, nearly twice as many as its nearest industrial rival in Reading, Huntley & Palmers.

Yet only a year or two later, in 1854, it reached a 'low ebb'. This was according to an engineer from London, John Pinchbeck, who was appointed manager of the firm that year at the age of 30.<sup>17</sup> Perhaps one reason for this low ebb was that both William Exall and C. J. Andrewes were then playing a very active role in the affairs of the local council at an eventful period in the town's development, and served as Mayors of Reading in the 1850s. Their absence could well have been at the expense of the firm's efficiency.

According to his own account, Pinchbeck over the next decade 'worked steadily to raise the professional reputation of the firm'. Although he probably lacked the inventive gifts of Exall or of G. A. Barrett's son Alfred who joined the firm about that time, his achievements were probably on the managerial rather than the strictly technical side, for instance trying to ensure that prices were right in relation to those of rivals and also to costs. Certainly from 1854 onwards there was a steady increase in turnover, and numbers employed went up from 250 in 1851 to 400 by 1864. Of the 350 or so employees in 1861, nearly two-thirds had been born in Berkshire, Oxfordshire and Hampshire combined—30% in Reading itself—and the remainder almost entirely from southern England, one coming from France and one from Germany.<sup>18</sup>

Yet however successful Pinchbeck had been

<sup>17</sup> J. Pinchbeck, *A Letter to the Proprietors of the Reading Iron Works Ltd.* (pamphlet c. 1867, in Reading Public Library's Local Collection).

<sup>18</sup> T. A. B. Corley, *op. cit.*, Appendix II.

<sup>16</sup> Some deeds, especially for 1849 and 1864, are in Reading Borough Archives, Acc. no. 72.

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in making the workshops more efficient, the firm as a whole continued to suffer from certain long-term problems, notably a shortage of liquid funds. In relation to its size it had inadequate partnership capital, substantial research and allied expenses—especially in connection with exhibits for shows—and partners who expected to live in some style and preferred to draw out profits rather than plough them back so as to build up financial strength. Nevertheless, reasonably good profits were then being made, in contrast with the period after 1864.

When Alfred Barrett was admitted partner in 1863, he neither brought in capital nor became entitled to a share in the profits; in some other local family enterprises, such as Huntley & Palmers at that time, new partners were expected to borrow their capital shares and later repay them out of earnings. The firm's cash problems reached a peak in the following year when G. A. Barrett retired at the age of 65 and sought a 'competency' in return for his share in the business. That share was worth £3,300 plus whatever sum would capitalise future earning power, and such money just could not be provided from the firm as it was then constituted. In this difficult situation Peter Spokes (1830–1910), a successful Reading chemist, offered to buy the firm outright and put down £3,000 so as to secure the right of pre-emption. On second thoughts the partners agreed to turn the enterprise into a limited company and refunded the advance.

A new company, the Reading Iron Works Ltd., was therefore set up in April 1864, with an authorised capital of £200,000 in £20 shares, of which the first issue was to be £100,000.<sup>19</sup> The old partnership's assets were valued at £50,000, to which £20,000 goodwill was now added. At a time when the turnover was probably a little below £70,000 this financial structure seemed to anticipate substantial increases in both sales and profits.

According to the Prospectus, these were to be looked for from the already growing trade with continental countries, now that free-trade agreements with France and elsewhere were coming into force.<sup>20</sup> The partners sold the freehold land to the new company for just over £9,000, which when the £1,800 mortgage had been repaid to George Barrett's executors gave the senior partners about £2,400 each in cash. They also received 500 shares of £10,000 nominal value each, apart from Alfred Barrett who received £5,000 worth.

The Board of directors included some distinguished names from outside the firm. As Chairman a 'prestige' figure was appointed: Henry Adolphus Simonds (1823–1910), a leading citizen of the town as former Mayor and a senior partner in the very prosperous brewery. Financial stability was foreshadowed by the presence of his kinsman John Simonds (1802–76) of J. & C. Simonds' banking house and of a director of the North Wilts. Banking Co. Peter Spokes was one of the largest outside shareholders and also on the Board. Yet the day-to-day work remained with the former partners, and C. J. Andrewes became Managing Director on the commercial side and William Exall an executive director on the engineering side. Under Exall were Alfred Barrett, John Pinchbeck and William Bridger—a relative of George Barrett's wife. The company's fortunes (and misfortunes) after 1864 go beyond the scope of this article, but despite such an array of directors and senior managers and the access to new sources of funds afforded by the limited liability of its shareholders, it was not to have much over twenty years longer to survive.

### CONCLUSION

As the foregoing account will have illustrated, it is exceptionally difficult to give a full history of a firm which proved to be a failure. In the nature of things, only successful

<sup>19</sup> The background to the incorporation is given in the company's file, referred to in fn. 3 above.

<sup>20</sup> For the prospectus see the *Berkshire Chronicle* 28th May 1864; see also *ibid.* 4th and 11th June 1864, and the *Reading Mercury* for the same three dates.

firms are likely to have kept their archives, and not always then. Any lessons to be learnt from Barrett, Exall & Andrewes' fate must therefore be somewhat tentative.

Nineteenth-century Reading seems to have had more than its share of enterprises that went on to become nationally and internationally famous, as well as leaders in their field. It does look as if the most successful of all, such as Cocks's of Reading sauce fame, Huntley & Palmers in biscuits, Simonds the brewers and Suttons the seedsmen, all reached the top of their particular tree because a single family provided a succession of able entrepreneurs who searched unceasingly for expanding markets in Britain and overseas and for constant economies in costs. Those firms where a number of different families were involved as partners, such as Huntley, Boorne & Stevens and the Iron Works, had less successful outcomes. Whether this theory turns out to be a valid one, will depend on investigations in depth into all these firms' histories that is at present under way.

AUTHOR'S NOTES

Many people have assisted this research, including Dr Ursula Andrewes, Miss Darita Barrett, Mr Peter Spokes, Mrs Audrey Taylor, and the late H. S. Andrewes and W. Lindahl Brown. The staff of the Museum of English Rural Life, University of Reading, notably Dr E. J. T. Collins and Mr D. C. Phillips, have been very helpful, as have the County Archivists and staffs of the Berkshire and Hampshire Record Offices, the Reference Librarian of Reading Public Library, and the British Railways Archivist in London.

The following publications in the Museum of English Rural Life library have been extensively used:

Royal Agricultural Society of England: Catalogues annually 1839 (Oxford show) to 1864 (Newcastle show).

Royal Agricultural Society of England: Journal 1st series Vol. I 1840-XXV 1864.

The Engineer Vols. I-XVII 1856-64 (these include useful lists of patents).

Sales catalogue of Barrett, Exall & Andrewes for 1847, also for Reading Iron Works (in German) for 1865 and Part no. 2 (Agricultural Implements etc.) for c. 1885. N.B. The firm's 1851 sales catalogue, together with the Official Catalogue and Awards of Juries, are in the Great Exhibition collection in Reading University Library.

Detailed references to any of the sources mentioned, will be gladly given by the author.