

THE HAIGH IRONWORKS, 1789 - 1856 : A NOBLE- MAN'S ENTERPRISE DURING THE INDUSTRIAL REVOLUTION ¹

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DURING the sixteenth century, when it might be truly said that the modern iron industry got under way (with the blast furnace superseding the old bloomery), "an ever increasing number of noblemen" were pioneers in exploiting the mineral wealth of England and Wales. T. S. Ashton, in his *Iron and Steel in the Industrial Revolution*,² gives a list, including, among others, the Queen, the Earls of Derby, Surrey and Northumberland. Later, however, again as Ashton points out, the intimate association between ironmaking and the ownership of land survived only in a much diluted form: "the landed proprietors had long ceased to participate in the industry directly, but they continued to provide much of the fixed capital by leasing mines of coal and ironstone and sometimes furnaces and forges to the active industrialists".³ When the association continued, it was the result of that reciprocal process—the rise of the new industrial gentry—when the nouveaux riches, the prosperous ironmasters, bought country seats and insinuated themselves into Society by marriage and other means. This rise in the status of the ironmaster was a marked feature of the social position of the second generation of industrialists in the

¹ I am greatly indebted to the Earl of Crawford, not only for his very kind permission to consult his private family papers at the John Rylands Library, Manchester, but also for his considerable interest in my work by critically reading through this article and correcting one or two errors of misinterpretation of the documents upon my part. However, I am responsible for all the deficiencies of this essay in industrial history.

My debt to Dr. F. Taylor of the library staff must also be acknowledged for his unobtrusive work as archivist and editor which so much lightened the work of research and publication.

² 2nd edn., 1951, p. 5.

³ *Ibid.* p. 209.

first half of the nineteenth century. As far as the iron industry was concerned, the ultimate result of this tendency was for the ironmaster to disappear as such and to be replaced by the technician, the manager and financier-investor.

Nevertheless, there were one or two "true-born aristocrats" who played an active part in the industrial enterprise. A list of furnaces and their proprietors drawn up in 1805 shows furnaces owned and worked by Earl Gower in Shropshire, and the Earl of Balcarres at Haigh, near Wigan in Lancashire.¹

This article is concerned with the early history of the Haigh ironworks and, in particular, its aim is to illustrate the rôle of its titled entrepreneur by means of quotations from surviving business records of the firm.² Since these are by no means complete, it has not been possible to present a coherent and detailed history of the development of the ironworks.

The iron and steel industry of Lancashire today is largely the product of a renewed burst of activity (following the adoption of the Bessemer converter process) in the eighteen sixties. In the Furness district in north Lancashire it is true that the charcoal industry survived after passing its peak of production in the eighteenth century, but here, as in south Lancashire, the iron industry was to make a new beginning. On the Wigan coalfield itself, it was in 1858 that the large Kirklees Hall ironworks were erected to smelt iron ore from Ulverston, coke being obtained from the local source, although it had to be expensively and slowly washed to remove excessive sulphur. By 1867 there were ten furnaces in operation with an output of over 70,000 tons of iron a year.³

However, during the intervening period, when Lancashire was more important as a source of iron ore to the other smelting districts,⁴ the manufacturing and finishing side of the industry flourished. Among the several examples which could be cited

¹ Boulton and Watt MSS. (Assay Office, Birmingham).

² Earl of Crawford Papers (Haigh MSS. in the John Rylands Library).

³ F. Kohn, *Iron and Steel Manufacture* (London, 1869), pp. 20-1.

⁴ In *The Torrington Diaries*, ed. C. B. Andrews, i. 24 it was noted in the 1781 Tour to the West, when speaking of Tintern Abbey, "All the iron ore is brought from Lancs. . . ."

of this development¹ was the Haigh ironworks itself. It was, in fact, as a foundry and forge that Haigh first comes to our notice. The real mineral wealth of Wigan and district was the famous "cannel" coal, remarked upon by travellers from the time of Leland in the sixteenth century onwards.² There was some iron ore to be found, but it was not of sufficient quality to persuade any industrialist to build a blast furnace in the seventeenth and early eighteenth centuries. However, pig-iron (obtainable perhaps from Shropshire and Cheshire via Liverpool, or the Furness area) was to be had at an economic cost to supply the neighbouring coal-pits with castings and forgings. In 1766 the sale of a forge on the river Douglas one mile from Wigan was advertised in a Liverpool paper.³ This almost certainly was the Brock Mill Forge. A few years later, in 1775, another sale was advertised by the assignee of a Mr. James of Wigan, a bankrupt.⁴ As we shall see, it was an existing foundry which was taken over by the Earl of Balcarres.

The Earl of Balcarres (1752-1825) was all that one expects an eighteenth century peer to have been. His descent, it goes without saying, was of an illustrious line. He himself, after a continental education,—not the usual Grand Tour, it is true, but two years at Göttingen University—made the Army his career. By 1789 he had risen to the rank of Colonel of the 63rd foot, and during the threat of Napoleonic invasion of this country was in command of the forces in Jersey with the rank of Major General.⁵ This episode and his subsequent

¹ Others were Hannah Lees and Sons at Ashton under Lyne, and the Dallam Forge established in 1840 at Warrington.

² See A. J. Hawkes, *Sir Roger Bradshaigh of Haigh* (Manchester 1943). Mr. Hawkes, to whom I am indebted for much valuable information about Haigh, gives a detailed account, based upon the Haigh Colliery orders, 1635-90, of the industrial activities of the Earl of Balcarres' predecessor. In 1678 there was a glass-making enterprise, but most important was the construction of the great sough, 1652-70 (chap. iii, pp. 13-20). See also the Earl of Crawford's paper to the Manchester Statistical Society, 1933, "Haigh Cannel".

³ *Williamsons' Liverpool Advertiser*, 28 November 1766.

⁴ *Gore's General Advertiser*, 5 May 1775. Mr. T. R. Harris kindly pointed out these references to me.

⁵ *D.N.B.*, Alexander, 6th Earl of Balcarres (1752-1825).

appointment as Governor of Jamaica from 1794 to 1801,¹ it has to be admitted, interrupted his career as an industrial entrepreneur. However, finally incapacitated from further military service on account of a lame leg, economic necessity forced him to recognize the need for "the improvement of his property" as the official history of the family succinctly puts it.² This property, which came to Balcarres as his wife's inheritance in Lancashire, obliged him to become an "improving landlord" of necessity, "the mansion house being in ruins, the furniture sold—the mines of coal and cannel forsaken, the lands undrained and every farmhouse and fence in the last stage of decay."³ Thus it was that, as a beginning to the exploitation of the great potential wealth of the estate, he entered into a partnership in 1788 (20 August) with one James Corbett, an ironfounder in Wigan.⁴ The foundry was sold to the partnership for £400 and the new company, which was also to include Robert Lindsay, the Earl of Balcarres' brother (at that time in India), was to set up furnaces at "Lalland Mill within Haigh", as part of an integrated concern together with the Brock Mill Forge, or, as it appears in the original, "when the same should be compleated they and the said iron foundry should be thrown together and carried on to such an extent as the scheme would admitt of". The ownership of the concern was to be divided in the following manner: The Earl of Balcarres, 5 parts, James Corbett, 3 parts, Robert Lindsay, 4 parts.⁵

¹ Cf. G. H. Tupling, "The Early Metal Trades and the Beginnings of Engineering in Lancashire", *Trans. Lancs. and Cheshire Antiquarian Society*, vol. lxi. 1949. He says the Earl left Haigh in 1798, and the furnace was abandoned and the works turned over to the manufacture of shot and shell. See below for a correction of this statement.

² Lord Lindsay, *Lives of the Lindsays*, ii (London, 1849), 360.

³ *Ibid.* p. 361.

⁴ The Earl also developed the coalmines again, selling coal by means of the Liverpool-Leeds canal in Liverpool and Lancaster. This side of the business activities of the estate is not dealt with in this paper, although it is certain they were by far the most remunerative of his activities. The deed of partnership unfortunately could not be traced among the Haigh muniments. It is recited, however, in substance, in the Contract dissolving the partnership, 1791.

⁵ Robert Lindsay, it appears, at first withdrew, and then later consented to become a partner. There was no mention, it seems, of the amount of capital to be paid into the concern by the partners.

The partnership, then, represented a typical alliance between landed, technical and commercial capital. For Robert Lindsay was by experience and training the vital man to the success of the concern. As a younger son, he had been put into trade, in fact, the service of the East India Company. "He went out as a writer to the East Indies, but without any help to forward his views (other) than his own genius."

In India he put his genius to practical use, building up a fortune for himself in the course of an eventful and versatile career as "soldier, magistrate, political agent, farmer, ornamental gardener, elephant-catcher, tiger-hunter, ship-builder, lime manufacturer, physician and surgeon!" Thus "having in his line the quickness of a projector", as the official history describes this business instinct, the success of the Haigh concern would seem to have been assured if Lindsay had played an active part in the building up of the ironworks.

In fact, Lindsay, returning to this country to enjoy his retirement, was reluctant to live at Haigh and take upon his shoulders the responsibility of managing the works, but all the same, he was dragged in to get the works under way. Corbett, the original owner of the foundry, it appears, was full of grandiose schemes for expansion, including setting up a boring mill to manufacture cannon. In June, 1789, he wrote to the Earl: "I am now making the pit, building [a] large receiving furnace and getting forward with the Boring Mill, which I will now venture to say shall not be equalled by any in the Kingdom. It will be constructed [so] as to bore seven cylinders of different diameters or six pieces of cannon at one time."¹ However, he died in 1790, leaving the plan to outstrip John Wilkinson, the great ironmaster of the day, unfinished. What is more, the contract previously quoted reveals that "the said business having been carried on for some time under the management of the said James Corbett, it was found upon his decease that he had conducted them with great want of economy and that they had cost a much more considerable sum than they ought to have done". This state of affairs was to be endemic with several managers.

¹ James Corbett—Earl of Balcarres, June 1789.

In contrast to this neglect of the appointed managers, however, several letters in the Balcarres collection from Lindsay to his brother show that despite Lindsay's affirmation that he knew nothing of the business, his natural energy and practical ability were devoted to reorganizing the concern. Finding that most of the men had left the sinking ship, he "engaged an overseer for one twelve-month, his name—John Coward, who at present has the management of the Duckinfield works . . . he is perfectly master of the Manchester business".¹ Also, he got his brother to recruit moulders from Scotland. The recruiting and handling of labour—in fact, disciplining hands into an efficient working force—was one of the chief concerns of the industrialist of this period, and there are several pieces of evidence in the correspondence to support this statement. On 20 July 1790, Robert Lindsay was writing: "yesterday warned off Sam Furnace for getting drunk upon his post, which had nearly played the devil with the machinery. In a few days I expect to have all our best people bound down for three years; this has required vast manoeuvring."² Other essential acts of reconstruction were not neglected. He repaired the weir, got the building of the casting house under way, as well as tenements for the men and stables for the horses. He showed an intelligent interest in the metallurgical side of the business. He experimented with the different varieties of coal and ironstone available locally in the two blast furnaces (built 1789-90) and tried the method of casting direct from the furnace, as the following extracts from his reports show:

1. "Our metal is again excellent but very much in a state of fluctuation from some unknown cause—last week gave us near 15 tons—the furnace without doubt works best with about 2/3rd portion Bath and 1/3rd Brock miln stone." (20 July 1790.)

2. "The Black Brock Mill stone, hitherto universally condemned and with which they talked of repairing the roads, proves by much the best stone we have—the metal came down this morning, of an excellent quality and much kished,

¹ Robert Lindsay—Earl of Balcarres, 5 June 1790.

² Robert Lindsay—Earl of Balcarres, 20 July 1790. A later manager complained not of drunkenness, which, perhaps, was all too common, but of the harm caused by the wife of one of the keepers with her intriguing, profligacy and sabotage (by putting sulphur in the furnace). A. Haliburton—Earl of Balcarres, 21 August 1806.

which has not been the case for two or three months . . . several other things that I have lately tried have succeeded well, particularly in the casting of goods from the blast instead of running the metal a considerable distance as hitherto. It goes into a hole at the mouth of the furnace by a gentle stream and from thence [is] carried bit and bit as it comes out to the different moulds and a proper arrangement of carriers fixt beforehand to prevent confusion—this answers prodigiously—for many days we have not run a pig of metal.” (16 July 1790.)

3. “. . . I have engaged as many hands as I think we can employ for the present . . . by degrees we shall weed until we can get a set of good hands. . . . I shall push on the building rapidly to be ready when the people come. If the loam moulder does not answer my expectations I will let you know. Our furnace is again doing well. If it is now evident that she requires to have the dust drawn out frequently, we begin likewise to be much better acquainted with the materials.” (14 July [?] 1790.)

The final extract, however, makes it clear that the plan for moulding directly from the furnace had to be abandoned :

4. “After some experience and much observation upon the propriety of using the Blast metal I perceive clearly that we must soon drop the plan altogether except in cases of heavy goods [and] use only the metal from the air furnace . . . for we seldom fail to make a number of wasters owing to the coldness of the metal.

I am quite in love with the cupula [sic] for working up our scraps, of which we had a shameful quantity. This alone keeps all the moulders agoing, nor can they keep pace with it it melts so fast—I have known it charged 20 times a day.” (15 June [?] July] 1790.)

As a result of this attention, the concern, which at one time Balcarres was considering giving up, was firmly established and in 1790 (September) the following advertisement appeared in the Liverpool newspaper, *Gore's General Advertiser*: “The Hon. Robert Lindsay & Co. announce they have erected a Blast furnace and Boring mill at Haigh, offer services in Foundry business. Having engaged Engineers and able workmen, they are enabled to undertake the complete construction of Fire Engines of every kind.”

Nevertheless, in one respect Robert Lindsay's influence upon the works was to be almost disastrous. For, despite his work of reorganization, he was not reconciled to the idea of being tied to Haigh (perhaps because the Earl also was not prepared to become a tradesman); and in 1790, after an extensive correspondence, in which the two brothers haggled over the conditions under which Robert should be allowed to withdraw from the partnership, in September a formal deed of dissolution was drawn up and under this Lindsay appears to have paid heavily

for his freedom. He was to forfeit £3,000 of capital advanced in the concern and was to leave £7,000 as a loan, secured only by the works buildings and stock-in-trade.

This, however, it should be noted, did not clear up the matter, as negotiations dragged on until 1793. One complication was the claims of Corbett's widow (the wife of the deceased partner) upon the concern for a share in its uncertain profits.¹ This state of affairs is, of course, another example of the inconveniences of partnership which (apart from the rare Chartered Company, e.g. the Carron Company, chartered in 1773) was the only accessible form of joint stock investment then available to business entrepreneurs.

Since neither Lindsay nor the Earl wished to take upon themselves the burden of active management,² the problem of securing an honest, efficient manager was of the first importance to the prosperity of the enterprise. Indeed, in this matter the unreliability of the first manager (which, again, is a cause for reflection upon the development of industrial discipline and responsibility represented by the rise of the managerial class) nearly brought ruin to the concern.

¹ *Manchester Mercury*, 16 April 1793. "Haigh Iron Works. Partnership Dissolved. Notice is hereby given that the Co-partnership in the Ironworks erected on the estate of the Earl of Balcarres at Haigh . . . heretofore carried on by the Honourable Robert Lindsay, James Corbett, and the said Earl under the name of Lindsay, Corbett & Co., and which since the death of the said James Corbett hath been carried on by the said Robert Lindsay and Alice Corbett, widow, and the said Earl hath been this day . . . dissolved. Accounts to Mr. Alexander Halliburton, manager at Haigh. 21 March 1793.

Robert Lindsay.
Alice Corbett
Balcarres

The concern of Haigh Ironworks will be carried on in future under the firm of James Lindsay & Company."

² In January 1790, Lindsay made his point of view quite clear: ". . . now that the value of the metal and manufacture is so far established that the works can be disposed of in a manner so that you will reap a benefit from the concern instead of losing, it is high time to think of myself. I say disposed of with much reason, for unless the Merchants bestow their whole time and attention to a manufacture of this kind, where there is so much competition, it never can be productive but to the proprietor of the estate . . . you cannot suppose that I can make so great a sacrifice as to take up residence at Haigh nor can your rank of life admit your doing of it."

An engineer to the court of Bavaria, Joseph von Baader, came to England in 1789 or 1790. Very little is known of his connections with this country, which brought him here intermittently for a period of approximately eight years. At all events the Earl arranged for Baader to meet Robert Lindsay at Haigh. Now, not the least of Baader's assets was a very plausible tongue and an attractive personality.¹ He obviously impressed Lindsay with his ability to expound engineering matters and with his accounts of the reorganization he had carried out at the famous ironworks of Coalbrookdale as well as those of John Wilkinson. During his visit to Haigh, a letter tells us, he drew up a history of the works, which unfortunately is not with the papers which survive. We know his opinion of the Haigh ironworks, for what it is worth—"upon the whole he likes the situation of our works and pronounces that at a future day they will make a Figure—Hitherto he says every thing has been carried on in a style infinitely too expensive".² As this judgement confirmed the Earl's own ideas, particularly about the latter tendency, the young engineer made a favourable impression upon the two brothers. Baader did not take up the management of Haigh immediately—he came some time in 1791—but when he did, the result was the complete undoing of Lindsay's work of reorganization and he did nothing to alter the state of affairs which he had criticized earlier. Having caused

¹ At that time he was a pleasant young man of twenty-five, not a grumpy old German, as Lindsay expected.

² Robert Lindsay—Earl of Balcarres, n.d. There is an interesting sidelight upon the Earl of Balcarres' lack of business acumen in the Boulton & Watt papers (in letters, Bundle E, MIV) by P. Ewart, who describes several visits to the works: (In 1791) "On our arrival at the Ironworks we found Lord Balcarres to whom we introduced ourselves . . . he informed us he had laid out a great deal of money there, he believed to very little purpose, for he had been beset constantly by a set of rascally swindling schemers. . . . His Lordship, however, appeared to us to be rather a weak brother and was probably an easy prey to such gentlemen as he described. I remember Cooper [his companion on the visit] observed when we came away that he was certainly like a lord. His Lordship informed us, however, that he was then getting into a good train for he had engaged the best and most ingenious mechanic in the world, a person who had invented great improvements in the Steam Engine, Cotton Machine and everything else. This man was the great Doctor Baader." Letter to James Watt Junr. dated 27 July 1800 (a reference kindly supplied by Miss P. M. Giles).

offence to the English and Scottish workers, he introduced German carpenters and miners into the concern. According to the steward of the Earl, Donald McDonald, these underlings of Baader did nothing but smash the moulding patterns to make furniture for themselves, in the case of the carpenters, and the miners showed none of that industry which Baader had praised, but started the day's work as late and finished as early as possible. As for Baader himself, "he looks after nothing, nor cares not, as far as his department can be read, whether matters sink or swim".¹

It took some time, apparently, for the Earl to recognise what the true state of affairs was, but at last it became clear to him. "Contagion and destruction seems to follow his (Baader's) steps everywhere", he lamented; not without cause, for Reichenbach (Baader's associate) had dismantled the steam engine for the blast and left it in pieces. Thus Baader had Balcarres in his power. Unfortunately we do not know the exact details of Baader's departure from Haigh but it was only a question of the Earl resolving to dismiss him and to cut his losses on the misplaced confidence.

Another manager, Alexander Haliburton of Inverkeithing, Scotland, was appointed in January 1793, but of the progress of the works under his rule we have little evidence. From the manuscripts which survive it appears that his association with the Haigh ironworks lasted until 1823 or 1824, when the Earl compiled confidential notes upon his manager's incompetence. This was again a belated realization upon the part of the Earl of the consequences of a misplaced confidence. It was the anti-climax of a period of high hopes of an extension of the foundry's trade to the West Indies, supplying the plantations with sugar mills and steam engines. Haliburton had apparently weathered one crisis in 1808, a year of depression in the iron trade, and had managed to console His Lordship that "if these works are getting nothing—Smalley and others must be losing, and that consequently there will soon be less competition".² The works foundry was at that time reported to be "now complete in all patterns and other utensils, and adapted to all sorts,

¹ Donald McDonald—Earl of Balcarres, n.d.

² A. Haliburton—Earl of Balcarres, 12 July 1808.

large and small, and the style of the business, though not extensive, is established on pretty good grounds". More will be said of the financial state of the business later; however, the firm launched out into the new market in 1811. A circular giving the "Descriptive advantages of the Haigh ironworks", after informing the reader that they were favourably sited on the Liverpool Canal "as to admit delivery of goods in 24 hours" to Liverpool, indicated that the works "are of considerable magnitude, and the proprietors have particularly and pointedly adapted them to an extensive intercourse with America". The circular also tells us that the works had long been in the habit of making "Fire Engines, every description of machinery and all manner of castings".¹ This new venture, for which, Haliburton assured the Earl of Balcarres, "every exertion shall be made to ensure success", was, it is fair to note, begun on a note of cautious modesty. Haliburton's advice to His Lordship was surely exemplary: "Two conditions however, seem absolutely necessary—the assistance and guarantee of a substantial House or Houses in England, who are well acquainted with the Trade and stability of the merchants and proprietors of those Countries and a capital at the works here to warrant an increase of Trade and such extended credit as a Foreign Connexion generally requires". But despite this initial statement of sound business sense, in 1824 among the papers of the ironworks there is a list of bad debts amounting to £17,293 due from the sugar dealers of New Orleans, and £6,575 of Isle of France (Mauritius) debts. Finally, as to the consequences of Haliburton's managership, although there is little evidence to substantiate the charge, it does appear that he had financial interests in mines and a copperas works which he fostered at the expense of the Haigh works.

Thus it appears that again the Earl was unfortunate in his business associates. However, it must be recognized that there were deeper seated causes for the decline of the enterprise. The first and most important of these was the unsuitability of the Haigh coals.

Even in the early days of promise, under the keen supervision of Robert Lindsay, his experiments with the different

¹ Circular dated 1811.

kinds of coal and ironstone had revealed some of the disadvantages of the resources available locally. Even then modest results had only been achieved because they were "using much (iron) stone which had been picked up in the rivulets and long exposed to the air and had thrown off all the nasty stuff that adheres to the newly got". The output then per furnace was a mere 17 tons; and the average was nearer 14 tons per week. This prompted the Earl to compute that the concern would lose £1,000 a year at that rate, when iron was selling for £6 per ton.¹

In this connection, one cannot avoid observing, never was an enterprise so bedevilled by continual estimates of loss upon the working of the ironworks. The Earl of Balcarres devoted a great deal of energy to this aspect of the business. Indeed, there are at least twenty such estimates of losses impending. The worst of the matter is that it appears that the Earl was all too correct in his calculations in so far as the accounts will allow us to estimate the profitability of the firm. These, like the rest of the correspondence, are fragmentary, and no extensive analysis of the financial state of the firm is possible. The figures of profit and loss, indeed, relate only to the early period of the firm's history. A letter dated 29 January 1790² estimated a loss of £417 for the period of the blast and the writer goes on to say: "I am very clear that in making 14 Ton per week, supposing it all sold at £6 per ton we lost £1,000 a year". Perhaps this estimate was not sanguine enough of the ability of the furnaces to pay their way; at all events a few years later, between 1793 and 1795, a loss was sustained of £920 13s. 6d. over the three years.³ The next set of accounts is the most precise of all. Between 8 November 1806 and 31 March 1807 (when 435 tons of iron were made) on the working of No. 1 furnace there was a gross profit of £828 3s. 3d., but on No. 2 furnace there was a

¹ Estimate of 29 January 1790. Balcarres added: "I am convinced that our expenditure, before our outlays are at an end, in completing the one furnace and the Boring Mill and the Stock on hand, will be £15,000 to £16,000."

² It is essential to point out that although the figures given are of losses, the letters fail to make it clear over how long a time and therefore no strict comparisons of progress can be made.

³ Perhaps it is not remarkable that another ironmaster, Thomas Butler of Kirkstall Forge, near Leeds, during a visit to Haigh in 1797, also commented

loss of £517 16s. 5d. Of the balance some £245 had been spent upon a coal-pit, leaving a net profit of £65 or so.

In the period March-July 1808 the furnaces were even more promising in their prospects, a net profit of £221 10s. being registered. However, it appears that Balcarres was disappointed because he had expected a profit of £520 for the quarter, with a gain of £2 per ton of pig iron. Once more, this was an occasion for him to declare: "Should the answer to this (query) prove unsatisfactory, I have done with my blast iron concern". One furnace had been out of blast during this period, and Haliburton in reply could only propose continuing this policy. "I think, in the present state of the country and of the Funds of the works, it would not by any means be advisable to re-attune the blast."

This was a period of widespread slump in the industry, and, in fact, Balcarres not having carried out his threat, the works turned the tide, and the final figure is one of gross profit for the year ending March 1810. Sales amounted to £9,723 9s. 1½d. and the total expenditure in the works was £9,133 4s. If we forget about the change in the figure for stock, which Balcarres' queries to the manager reveal to have been in a chaotic state, there was thus a profit of £590 odd.

This rather unsatisfactory statement of the ironworks affairs goes, unfortunately, as far as the surviving accounts will allow; however, a word may be added about the period when the works were producing armaments for the Napoleonic wars. This stimulus was, as has been shown, not turned to good account as it was with so many other firms. The subsequent inquest, with family acrimony aroused because of attempts to impute responsibility, is of interest because the chief reasons for the relative failure of the concern were recognized and stated by the disputants. Once more Robert Lindsay was brought in. His upon the inefficiency of its management (28 February 1797). "After breakfast Harris Jnr. accompanied me to Lord Bellcarras [sic] Iron Works—about two miles from Wigan; they were most excellently situated and every material very convenient; but they are very improperly conducted. His Lordship knows nothing of the business and his agents almost as little. Many a thousand pound has been expended to no purpose. If these works were in the hands of people who could conduct them with propriety, they might make a fortune" (*Diary of Thomas Butler 1795-99*, edited by A. E., B. F. and H. M. Butler. Privately printed, 1906).

letter to Balcarres indicates the course of events. The control of the business had been left in the hands of a relative, but his hands had been tied because he only had responsibility in time of emergency. "The Ordnance concern was then going on briskly—but advances from Carstairs were up by £14,000." The average product, however, was very small; only 11½ tons weekly. Contributing to the failure of the concern, some of the coal seams had been drowned out—the coal which was obtainable was "fit for nothing but country sale—it was therefore time to blow out . . .".¹ The works, nevertheless, were not blown out and in the blast department seem to have been fairly prosperous. A note records a profit of "2,000 and odd pounds" in 1793 and 1794. It was on the newly expanded part of the business to manufacture shot and shell (which entailed advances from Carstairs of up to £10,000—£8,082 7s. 1d. of which was spent on the buildings) where the business sustained its most serious loss. According to Carstairs,² about one-fifth of the total output of shell and shot had been rejected. A rough sort of Balance Sheet drawn up in 1796 gives some idea of the position of the works during this crisis.

BALANCE SHEET

<i>Liabilities</i>	£ s. d.	<i>Assets</i>	£ s. d.
Debts due to works on Jan. 1793. (Less bad debts and debts due by works.)	2,612 9 7	Goods to London	1,400 0 0
Balance of Mr. Carstairs when shot and shell concern is real- ized	7,175 4 4½	2 Bills	650 0 0
(for buildings & improvements since 1793)		Book debts	1,500 0 0
Balance to Lord Balcarres for cannel & rent	825 0 0	Goods in hand	5,000 0 0
Timber sold	2,228 0 0		
	£12,840 13 11½		£8,550 0 0

Thus there was a deficiency of at least £4,290. It is small wonder that the works were reported by Lindsay in 1796 as

¹ Robert Lindsay—Earl of Balcarres, 13 August 1796.

² There is no precise indication in the manuscript as to who Carstairs was, but it seems likely that he was a London banker.

being at a stand and the shot and shell concern wound up. Yet Balcarres was assured that "you have as complete a set of works in Great Britain with every requisite to start afresh to advantage"; all that was required was a new engine costing £1,200 and "fresh capital must be produced of at least £3,000 for one furnace and double that sum for two".¹ The last part of Lindsay's advice was, by far, the most realistic when he gave his opinion: "that the propr. of these works by residing on the spot and being up to the business in all its subordinate detail may make a livelyhood, but that it would never, I say never, answer conducted by a Manager".

Nevertheless, there was associated with the firm one engineer who must have brought some profit to the concern. This was Robert Daglish (1777-1865), who settled with a relative at Wigan in 1804² as engineer to the works. Perhaps under his management the engineering side of the business flourished. Certainly the elder Daglish³ showed considerable skill as a mechanic. It was at Haigh foundry that the first Lancashire locomotive was constructed, this being "The Walking Horse", made on the model of Blenkinsop's "Yorkshire Horse" which worked at the Middleton Colliery near Leeds.⁴ This was the beginning, it appears, of a successful venture in locomotive building, which continued until 1856, when the firm concentrated on the manufacture of mining machinery. Mention has been made earlier of the financial losses resulting from the export of sugar-mill machinery to Mauritius. However, technically the firm had mastered the production of steam engines and rolling mills, for in 1818 a sugar-mill unit consisting of "boiler, condensing engine and mill made by James Lindsay of Haigh Ironworks, Liverpool, was imported by Lt. Hannibal Price, R.N." into Haiti.⁵ In the following year there was drawn up

¹ Robert Lindsay—Earl of Balcarres, 13 Aug. 1796.

² I am indebted to Dr. T. C. Barker for this information.

³ His son, also Robert, left Wigan about 1830 for St. Helens, where he was prominent in industry and engineering. (See G. H. Tupling, *op. cit.* p. 28 and n.)

⁴ J. H. M. Banks, "Records of Mining in Winstanley & Orrell, near Wigan", *Trans. L. & C. Ant. Soc.* vol. liv, pp. 57-60.

⁵ *Trans. Newcomen Society*, vol. xxi. p. 16. A photograph of this plant, as it stood in 1930, was reproduced as an Appendix (Pl. VIII).

a price list of engines, ranging from £300 for a 4 h.p. to a 50 h.p. engine costing £1,870, delivered in Liverpool.

Although this history of the firm is sketchy, the documents throw some light on other aspects of industrial development, in particular the vital question of labour. Already we have seen how Robert Lindsay dealt with the problems of recruiting an efficient labour force. One factor which is sometimes overlooked—the competition of agriculture at this early stage in the Industrial Revolution as an alternative means of getting a living—is illustrated by the following remark of Robert Lindsay's: "the hay harvest having begun, many of our day labourers have left us." This was in June 1790, and perhaps this way of escape from industrialization did not remain open for very much longer. At any rate there was always the bottle. Drunkenness was a perennial source of complaint by the captains of industry, and the Haigh ironworks was no exception—"a set of the most drunken rascals I have ever met with", so Lindsay described his employees.

As to wages, the records are fragmentary. In 1808 the complement of the works included 13 Moulders (the highest wage of whom was 25s. a week), 9 Blacksmiths, 3 Boiler Makers, 8 Carpenters and Engineers. Earlier, in 1803, the list of work-people and their wages is fuller :

1803	<i>Wages per fortnight</i>	<i>No. 1 furnace</i>			<i>No. 2 furnace</i>		
		£	s.	d.	£	s.	d.
Engine attendants	5	5	4	4	0	0
Wheeling ashes	1	15	0	1	15	0
Limestone breaker	1	16	0	1	16	0
Ironstone burner	1	12	0	1	12	0
Cokers	6	0	0	6	0	0
2 furnace fillers	3	10	0	3	10	0
2 keepers	5	0	0	5	0	0
1 stock taker (half-time)	0	15	0	0	0	0
1 labourer	1	10	0	1	10	0
Clerk in charge	1	10	0	0	0	0
Overlooker	2	2	0	0	0	0
		<hr/>			<hr/>		
		£30	15	4	£25	3	0
		<hr/>			<hr/>		

It would be a unique firm which avoided labour troubles altogether, and Haigh was no exception. This time the evidence is for a much later period—1844, when much of the paternal relationship, if it ever existed, between master and man, had worn thin. Hence it is surprising to come across a petition signed by the Moulders of Haigh humbly “hoping you will not deem it a presumption by us in addressing you” and asking for a rise of 2s. a week. We do not know if this was granted.¹

The later history of the firm, as an engineering concern, may be briefly summarized here. The furnaces were finally blown out sometime before 1815, and were finally demolished in 1828.² Thus the Haigh ironworks developed as a foundry and engineering firm making such products as paddle shafts for steam boats, wrought iron work for churches and, of greatest importance, locomotives.³ It is said that the partnership which took over from the Earl in 1835 (consisting of Messrs. Evans, Ryley and Burrows) on a twenty-one years' lease, made 114 locomotives at Haigh in that period. When the lease expired in 1856 the decline from its period of greatest prosperity set in. The works, then in the hands of another partnership, Birley and Thompson, were concentrated upon the production of mining machinery, the locomotive business being given up.

¹ *Wigan Examiner*, 28 January and 4 February 1949. (An article by J. A. Melling, *The Engineering Industry in Wigan*).

² *Wigan Examiner*, 2 May 1856. Alexander, 6th Earl of Balcarres had died by this time (27 March 1825) and had been succeeded by his son James Lindsay (1783-1869). Haliburton left the partnership in 1829 (Haigh MSS.).

E. Baines, *History, Directory and Gazetteer of the County Palatine of Lancaster*, etc. (Liverpool, 1825), vol. ii, p. 611, states: “The late noble proprietor of Haigh rendered productive the iron and coal strata of his estate by commencing a foundry upon it in the year 1787, and after contending with many difficulties, he at length succeeded in establishing works for the construction of steam and other mechanical engines upon an extensive scale. . . . About 16 years ago the smelting of iron ore at these works was discontinued on account of the low price of metal, but from the recent advance in the price of iron, the intention is said to exist of re-erecting smelting furnaces at Haigh.” In the *Directory of Wigan* the name of the ironworks is given as: “Jas. Lindsay & Co.” (steam engines, millworks, etc.).

³ The famous Laxey Wheel, on the Isle of Man, was also built at Haigh (*Manchester Guardian*, 10 October 1946).

Here, there was more competition to be met, which Haigh could not face, and in 1884 the works were closed down.¹

¹ J. A. Melling, *op. cit.* This writer, who had intimate connections with Haigh, gives a divergent account of its origin and development. He suggests that the Earl of Balcarres' estate workshop outgrew its functions and that there was continual expansion from that time. The surviving manuscripts, however, do not substantiate this view, particularly for the early period of the firm's history.