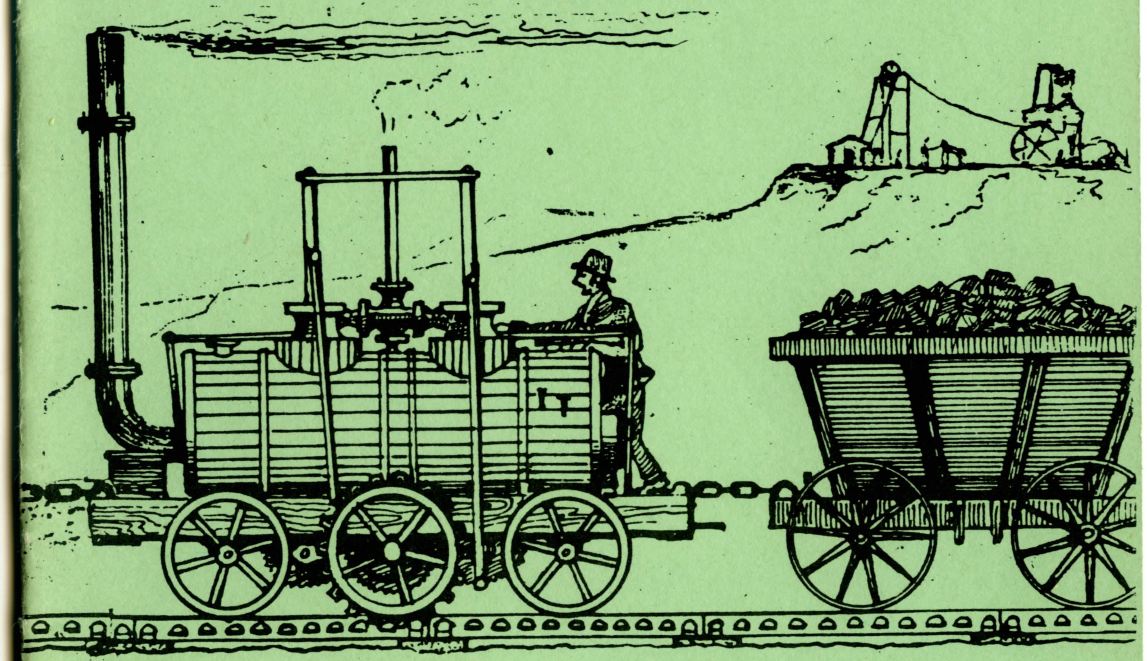
John BlenKinsop of Middleton.



John Blenkinsop

by John Bushell.

JOHN BLENKINSOP

On 22nd January, 1831, John Blenkinsop died at the early age of 48. That fateful Saturday, ended what was described as a 'long and tedious illness'. It was said locally that he had never really recovered from the effects of the disaster at Gosforth Pit six years earlier. The most serious accident in the history of coal mining in the Middleton area, took place at between 6 p.m. and 7 p.m. on the 12th January, 1825. Gosforth Pit, doubtlessly named after the Northumberland home of the Brandlings (Coal Owners), was 80 yards in depth, and at the end of a tunnel, 1400 yards long. This was said to be because 'the estate did not belong to the owner of the coal'. Access was from the Day Hole by a tunnel, said to be large enough to accommodate a pony and trap. Two shafts were provided, Gosforth and Woodstar, on land owned by Mr Armitage to provide ventilation.

It was at Gosforth that a foolish miner removed the top from a safety lamp, devised by John Blenkinsop. His craving for a pipe of tobacco cost twenty four lives. As the viewer, John felt it to be his responsibility to lead the party to the scene of devastation as soon as it was safe to do so. There were distressing scenes as family after family received the sad news. The dead included a boy aged five, (whose task was probably the opening and closing of safety doors), two of eight, three aged ten, and two twelve years of age. Child labour was common in those days. 'In future', said Blenkinsop, 'We will provide a lock for the top of every safety lamp'.

In a letter from George Hill, dated 11th December 1830, it was said that 'he is much worse, and the medical men entertain faint hopes of his recovery'. After considering 'practical arrangements for the running of the mines in the event of his death,' he says, 'Mr Blenkinsop may recover his health, and for this I pray most earnestly, both for his sake and Mrs Blenkinsop'.

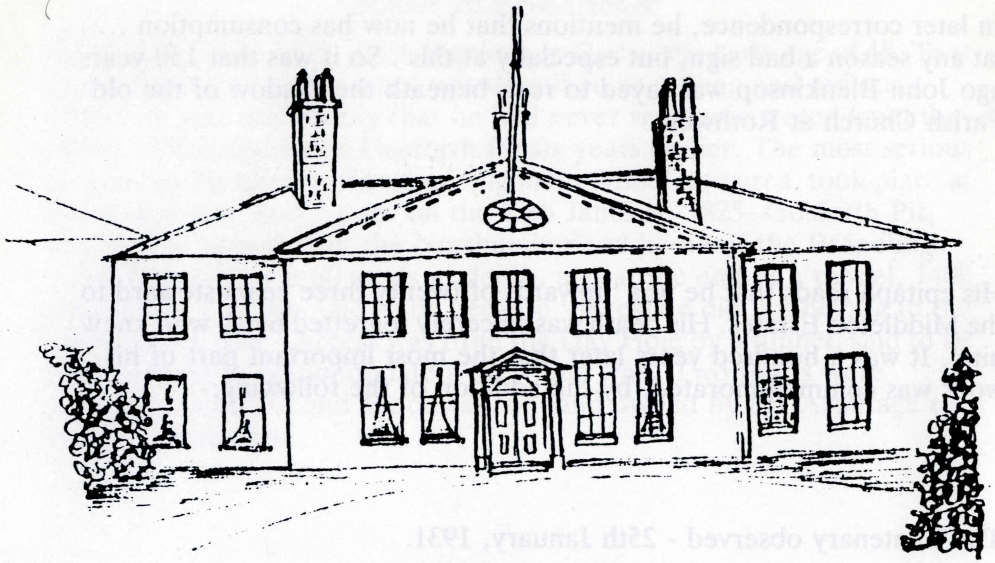
In later correspondence, he mentions that he now has consumption ..... 'at any season a bad sign, but especially at this'. So it was that 150 years ago John Blenkinsop was layed to rest, beneath the shadow of the old Parish Church at Rothwell.

His epitaph reads that he was 'upwards of twenty three years steward to the Middleton Estates. His death was sincerely regretted by all who knew him'. It was a hundred years later that the most important part of his work was commemmorated, by the addition of the following:-

The Centenary observed - 25th January, 1931.

> John Blenkinsop invented the rack railway in 1811, and on a line he built between Leeds and Middleton, 4 Matthew Murray locomotives ran from 1812 to 1835. His system was adopted at Newcastle on Tyne in 1813 and at Wigan in 1814 - These railways were the first on which steam locomotion was a commercial success.

John Blenkinsop had been appointed as Viewer or Steward of the Middleton Estate in 1808, having previously gained experience at the Tyneside Collieries of the Brandlings. This was an important position to be entrusted to a young twenty-five year old, involving responsibility for several pits, and hundreds of men, at a time when the whole operation was under considerable financial strain. The 'house with the job' was the commodious Middleton Hall.



Middleton Hall
Home of John Blenkinsop

(This fine eighteenth century house was situated close to Middleton Park on Town Street, until destroyed by fire in 1962).

It is recorded that he received £15 12s 6d (£15.62½) for furniture. This 'agency' income was said to be £400 a year, and this is recorded as a loan until 1812, when the £1600 was 'written off' and he thereafter received an annual income. This seems to suggest that the Bradlings were unsure of the revolutionary but expensive ideas of their Viewer, and preferred to pay by results. The salary of £400 compares with an annual income of about £50 for a skilled craftsman.

Whilst the demand for coal was buoyant, (the expanding city of Leeds being three miles north of Middleton) the method of transporting coal left the Mines at a disadvantage compared to their competitors. It is said that one horse that can haul 1 ton of coal on a road cart, can pull 9 tons on a waggonway, or, hauling a barge, as much as 27 tons. In 1755, Middleton had been linked to the River Aire at Thwaite Gate by waggonway. In 1758, the first Parliamentary Act authorising the construction of a railway, had resulted in a link directly to Cassons Close, near the Great Bridge at Leeds. Due to the Napoleonic Wars, and the necessary diversion of horse feed to the Army, the cost of feeding the many horses involved in the transport of coal from Middleton to Leeds had rocketted. The Brandling Mines were unsuitable for the construction of a canal link, as Middleton is at the top of a steep hill. Many of their competitors had the advantage of close proximity to Water Transport. Furthermore, the Middleton Collieries had a statutory obligation to deliver coals at a fixed price.

HIS LOCOMOTIVES

Richard Trevithick had demonstrated the possibility of steam traction on his experimental track in Euston Square, London in 1808. When he had tried earlier in 1804 to get a locomotive to pull a commercial load on the Penydarren Tramroad, Merthyr, the single cylinder locomotive proved to be too heavy for the tracks. The genius of Blenkinsop is seen in his patent No. 3431 of 1811. His claim was that the use of a rack rail and pinion wheel would enable a light five ton locomotive to haul a pay load of ninety tons. The patent is worded, 'for certain means mechanical means whereby which the conveyance of coals, minerals are facilitated, and the expense is rendered less than hitherto'. Beyond saying, 'I do greatly declare that a steam engine is to be prefered' there is no reference to the details of the locomotive engine.

The locomotives were built by Matthew Murray, the famous local engineer at the Round Foundry, Water Lane, Holbeck. The firm Fenton, Murray and Wood was already well known for the building of stationary engines, textile machinery etc. and was the obvious choice for a builder.

A payment of thirty pounds was made to Trevithick for the use of his patent high pressure steam, and, whilst the locos were generally similar to the Cornishman's prototypes, Murray introduced several important innovations. The most significant was the use of two cylinders, thus eliminating the need for a fly wheel.

The following account of the first trial appeared in the Leeds Mercury, 27th June, 1812:-

> On Wednesday last a highly interesting experiment was made with a Machine constructed by Messrs. Fenton, Murray & Wood, of this place under the direction of Mr Blenkinsop, the Patentee for the purpose of substituting the agency of steam for the use of horses in conveyance of coals on the iron railway from the mines of J.C. Brandling Esq. at Middleton to Leeds. This machine is in fact, a steam engine of four horse power, which, with the assistance of cranks turning a cog wheel, and iron cogs placed at one side of the railway, is capable of moving, when lightly loaded, at the speed of ten miles an hour. At four o'clock in the afternoon the machine ran from the coal-staith to the top of Hunslet Moor, where six and afterwards eight waggons of coal, each weighing 3¼ tons were hooked to the back part. With this immense weight, to which as it approached the town was super - added 50 of the spectators mounted upon the waggons, it set off on its return to coal-staith, and performed the journey, a distance of about a mile and a half, principally on a dead level, in 23 minutes, without the slightest accident. The experiment which was witnessed by thousands of spectators, was crowned with complete success; and when it is considered that this invention is applicable to all railroads, and that upon the works of Mr Brandling alone the use of fifty horses will be dispensed with, and the corn necessary for the consumption of at least 200 men saved, we cannot forbear to hail the invention as of vast public utility, and to rank the inventor amongst the benefactors of his country'.

It is difficult to divide the credit between the patentee and the engineer who actually built the locomotive. Perhaps the following assessment is fair. Blenkinsop patented the device that led to the World's first commercially successful steam locomotive. It was the first locomotive to be built with flanged wheels for railway service. (Penydarren was a plateway with L shaped rails, and the Wylam line was laid with similar plates in 1808). Blenkinsop was responsible for the relaying of the Middleton Railway. Stone blocks were used as sleepers, and these were purchased from the Quarries of the Bramley Fall Co., and Thomas Wade of Kirkstall. The rack rails were obviously more expensive and stronger than those formerly used.

In a letter dated 22nd February, 1813, to a would be locomotive user, Mr Bevan of Morriston, Swansea, he deals with the cost of relaying:-

Expenditure

Cast Iron, 56 lbs per yard (average) 1760 cwt at 12/11d at cwt a mile on 1¾m.	£1838
Sleeper stone 212″ square and 10″ thick 6160 @ 1/11d	£308
Laying the road, 3080 yards at 1/11d	£154
Preparing the road surface for the road etc say 6d	£77
Two steam engines	£700
	£3077

Credit

By old way say 2 miles including the sidings at 28lbs foot (double) will be 132 tons @ £6 a ton	£790
Sale of thirty horses with gear at £40	£1200
Suppose the present stones by worth half price (if they are large enough they will answer again) 3520 at 6d	£88
	£2078

Money to be advanced to make the alteration £999.

The responsibility for the changeover at Middleton was John Blenkinsop's. Furthermore much of the advocacy was in the hands of him as well. In his letter of 25th January, 1813 to Mr Bevan he writes of 'his pleasure in informing him of the complete success of his patent steam carriage which is performing daily the work of 16 horses and 8 men'. The financial implications are to be found expressed in this way:-

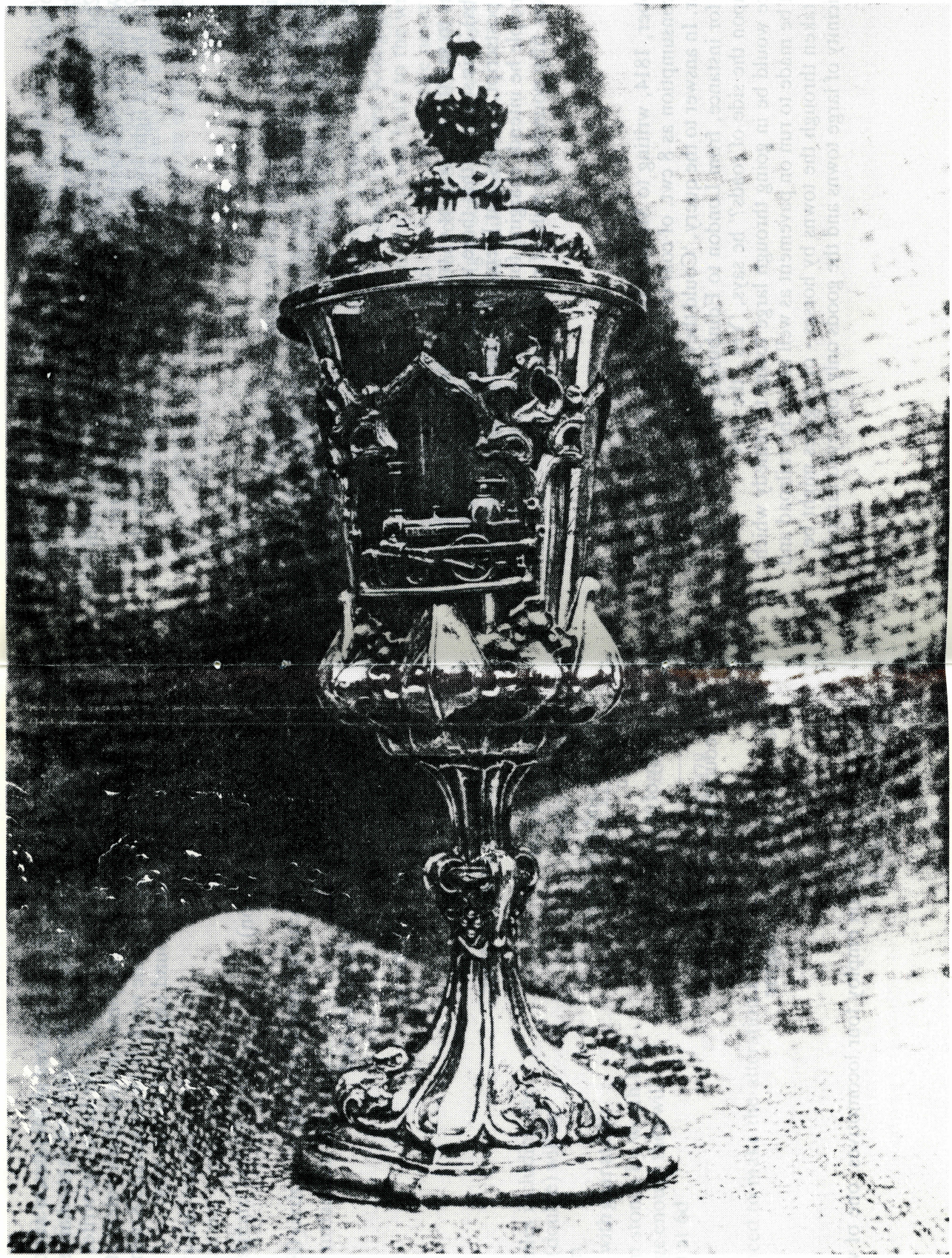
(refering to Middleton)

Keep of 16 horses including gears, shoeing etc. each £60 a year	£960
Eight mens wages with fire coals and house rents £50	£400
Expence with horses	£1360

Expence with steam carriage

The man a year	£60
Inferior coals	£40
Wheels and grate bars	£30
Oils etc.	£10
Decay of engines	£30
	£170
Deduct for old metals	£10
	£160
Saving in a year for one engine	£1200

(Note that Middleton employ four locomotives, one of which was probably 'spare').



Chalice with locomotive built by Blenkinsop used on Braunschweig Railway, Germany.

Further locomotives, built by Murray and weighing five tons, entered service on the Kenton and Coxlodge Waggonway, Newcastle on September 2nd, 1813, with a projected saving of £3,000 a year. John Watson of Willington, Newcastle, illustrates the fact that the main concern was to build a light locomotive to handle a heavy load in the following:-

> 'You will readily conceive that as the engine is of the greatest weight that will be at any time upon one rail, it will be necessary to have the rail of such strength as will resist its' stength without any risk of breaking'.

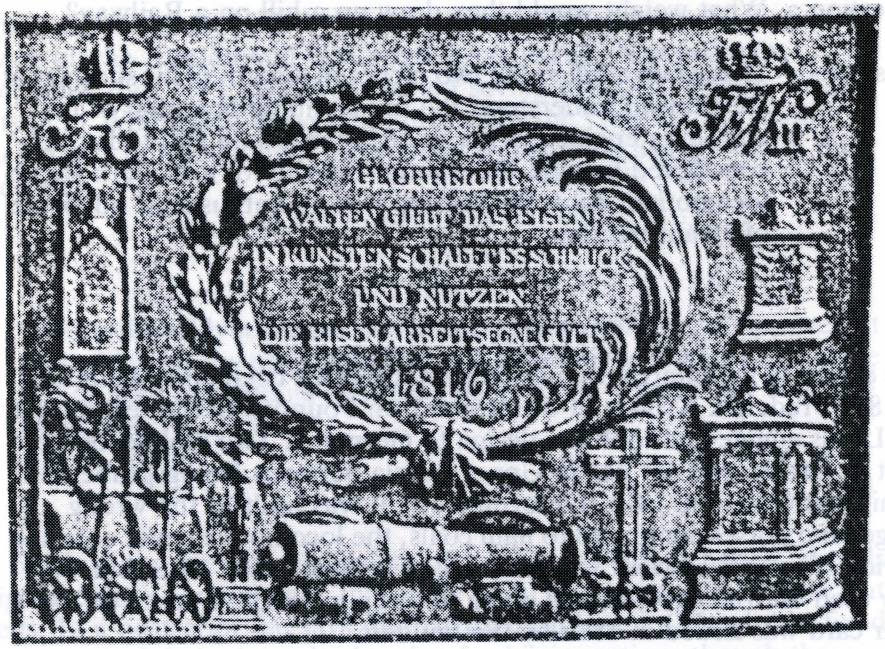
He continues to say that his weight of track was 60lbs per yard. (Leeds weighed 56lbs) This suggests that there were problems with the track at Leeds. In a postscript, he says that Blenkinsop had not altogether fixed on what principle he intends charging for his invention, though the suggestion was fifty pounds per mile of rack railway.

On 5th October, 1814, writing to Mr Sinclair of Newcastle, Blenkinsop quotes coal consumption as 8 cwt. of coal in 12 hours and 50 gallons of water an hour. In answer to the query, 'Could they be made applicable to public roads for instance, from London to Edinburgh, if iron railways were made upon the side of roads?' he says, 'Yes - the only inconvenience would be in going through large towns to remedy which wheels might be made to run on pavement as well as on the railroad and the machine taken through the towns by horses - or engines might be kept in the vicinity of large towns and the goods only conveyed through.

Question :- What weight would they draw up a hill on a Railway?

Answer:- 15 tons up a hill rising two inches in a yard. (This shows that Blenkinsop understood the hill climbing potential of his travelling engines). One in eighteen would still today be considered beyond the normal capacity of a modern steam locomotive. John Blenkinsop was an enthusiastic advocate of steam traction.

The extent of the interest that he created has often been underestimated. In 1815 Frederick Krigar, of the Royal Iron Foundry Berlin, examined the Leeds engine and took the design to Germany. Two rack locos were built in Berlin, one for use in Upper Silesia between Konigsgrube and Konigshutte in June 1816. Unfortunately, it was built to the wrong gauge, and horses continued to haul coals, the locomotive never entering service! The second went to Saarbrucken in September 1818, but was only used on trial trips, before going to scrap in 1835. A 'cast iron' New Year card was issued in 1816 by the builders.



Cast-iron greeting 'card' issued by a German foundry in 1816 and showing the only extant view of the early German-built Blenkinsop-type rack rail locomotive.

The name of Blenkinsop was however, carried by a German locomotive on the Braunschweig Railway, in the 1840's. John Stanley Blenkinsop son of John Blenkinsop, had become Engineer to the German concern, after having been involved in the assembly of a British locomotive on the Continent. He was employed by Forester of Liverpool.

A Pinion Wheel of the Blenkinsop patent is on display at the Deutches Museum Munich. A model of a Blenkinsop loco is to be found in the Austrian National Railway Museum, Vienna.

No-one knows what happened to the model engine sent to Russia, after the visit of the Grand Duke Nicholas, afterwards the Czar of Russia, in 1816. The significance of the Blenkinsop experiment attracted worldwide attention. In October 1825, Gray wrote in the Gentlemans Magazine:-

> 'The man who can now hesitate to recommend steam engines instead of horse power must be pitied for his ignorance or despised for his obstinacy .... after the demonstration of their utility proved by Mr Blenkinsop these fourteen years'.

What then of the early work of George Stephenson? Firstly, he was well aware of the Murray - Blenkinsop locomotives, having visited Middleton in 1813. According to S Smiles, his comment on the locos on the neighbouring Kenton and Coxlodge system was that 'he thought he could make a better engine than that to go on legs', possibly alluding to the experiment of Brunton. Nevertheless it is of the greatest significance that his own first loco for the Killingworth Colliery bore a close resemblance to the Leeds product. (For a comparison of dimensions see 'Worlds Oldest Railway'). The main difference was that instead of cogs engaging in a rack rail, a system was devised by which through further cogs power was transmitted to all four wheels, thus creating the first adhesion loco to run on a flanged rail. Otherwise the engines were so similar to raise the question of industrial espionage.

What of comparative performance? In a letter of John Blackwell of Hungerford, to the Kennet and Avon Company dated 17th January, 1825, we have a fascinating survey of a number of early railways. Here are his results:-

Middleton - Gradient 1 in 100

Length	Speed	Load
3½ m.	3-3¼ m.p.h. 4 m.p.h. on level	60 tons of coal 90 tons gross

Comments:- At 'Wilton Hill' Collieries.
"Blenkinsops Locos" (Sic!)

Killingworth

Length	Speed	Load
5 mile	3½ m.p.h. small loco 4 m.p.h. large loco	23 tons 17 cwt. of coal 23 tons 17 cwt. of coal

Comments:- 'They have a furnace about the middle of the road to heat the water for these engines.

The results speak for themselves. Even 13 years later, Stephenson had not even equalled the productivity of the 'Murray-Blenkinsop travelling engine'. Further evidence:-

> On 16th January, 1829, James Walker and John Rastrick visited Middleton, in connection with a report to the Directors of the Liverpool and Manchester Railway, on the Comparative Merits of Locomotives and Fixed Engines as a Moving Power. They saw a load of 85½ tons of coal in thirty eight waggons (140 tons gross) being hauled at a speed of 2 - 3½ m.p.h. This was probably the maximum performance of the Murray-Blenkinsop engines.

There was, however, a significant improvement in the manufacture of rails, the old cast iron being replaced by the new malleable iron. Rails of about half the weight were strong enough to support the heavier machine, thus relegating rack and pinion to the realms of mountain railways, where, using modified systems they continue in service to this day.

We salute the memory of John Blenkinsop, pioneer of the first commercialy successful steam locomotives in the World, patentee of rack and pinion.

THE END - OR THE BEGINNING

The MURRAY-BLENKINSOP LOCOMOTIVES continued in service until 1835. By this time, horse feed was plentiful and inexpensive, and the financial state of the Collieries difficult. The last of the four 2-1-2 locomotives was exhibited in a shed at Belle Isle until about 1860. A set of wheels is preserved in the Railway Museum, York.

The ROUND FOUNDRY of Fenton, Murray and Wood was the first to undertake the commercial manufacture of locomotives, amongst a wide range of engineering products. Before closure in 1843, locomotives had been built for many railways including the Leeds and Selby and Great Western. Round Foundry trained engineers were responsible for the establishment of the loco-building industry in Leeds. Todd, who joined partners Kitson and Laird, built in 1838 the 'Lion' for the Liverpool and Manchester Railway. This took part in the Rocket 150 celebrations of 1980 and is the oldest working locomotive in Britain.

The MIDDLETON RAILWAY survives in a truncated form, operating goods trains between Balm Road (B.R.) and local industry. A passenger service runs between Easter and the end of September. Steam Locomotives are still normally used. It is operated by the Charitable:-

Middleton Railway Trust Limited,
The Station, Moor Road
LEEDS LS10 2JQ

To whom all enquiries should be addressed.

For further study:-

The Middleton Railway Guide - gives details of historic sites associated with the railway.

The Middleton Railway Stockbook - gives full details of all locos and stock.

The Worlds Oldest Railway by John Bushell - a fuller description of our railway history £1.00

SOURCES

The Birkbeck Papers.

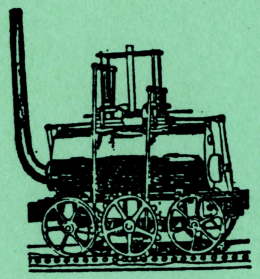
Blenkinsop Report Books (and general colliery papers) (Leeds City Archives)

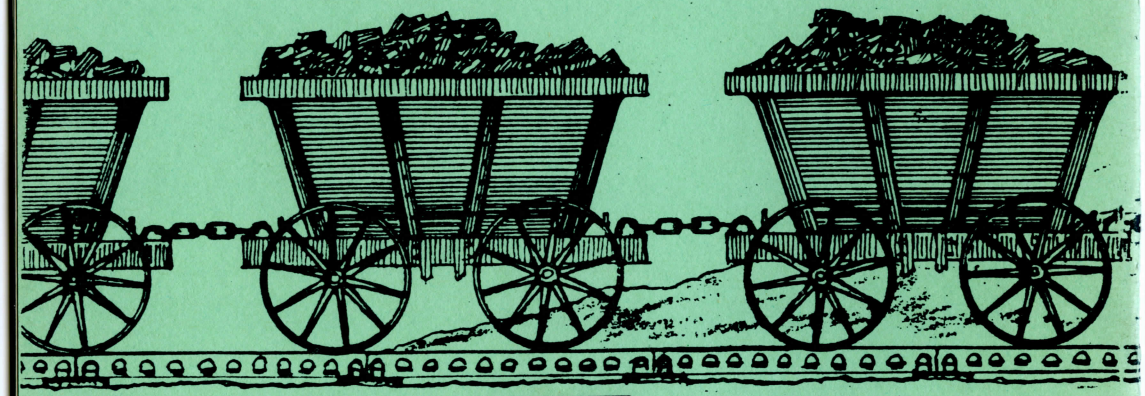
The Railway Magazine (esp. December 1937, June 1962).

The First Locomotive Engineers. L.G. Charlton.

The Stockton and Darlington Railway.

engaged in railway preservation for 21½years





The World's Oldest Railway

MIDDLETON RAILWAY
LEEDS