

THE INLAND NAVIGATIONS OF THE DERBYSHIRE AND NOTTINGHAMSHIRE COALFIELD 1777-1856.

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As a generalisation, it may be said that, during the first three-quarters of the 18th century, the most important mining areas in the Yorkshire, Derbyshire and Nottinghamshire Coalfield were at places where a navigable river crossed the basset of the seams. In West Yorkshire, the largest amount of coal was raised around Leeds on the Aire and near Wakefield on the Calder. In South Yorkshire, the biggest collieries were at Parkgate on the Don. In the southern section of the coalfield, the greatest production was probably at Wollaton Colliery, worked by Lord Middleton, where the Top Hard, a 5 ft. seam of excellent house coal, outcropped near the Trent. Here, after a capital investment of £2,043 between 1761 and 1766 for sinking pits and putting in a sough drained by a Newcomen engine, a profit of £24,024 was earned between 1769 and 1777. Lord Middleton also owned another colliery at Trowell Field, within easy striking distance of the Trent, mining both hard and soft coal at comparatively small depths, where in 1722 coal worth £3,347 was sold. In 1733, drainage problems led to the installation of a Newcomen engine by an engineer named Hathern. Three years later, after the pits had been flooded when the colliers struck into old workings, Hathern put in another atmospheric engine, made by Richard Ford of Coalbrookdale, and by the end of the year, the colliery was once again in production. From 1758 to 1763, it made for its owner a profit of £14,717.¹

Further away from the River Trent, mining operations were on a much smaller scale, as may be seen from the

¹ Trowell Field Coal Accounts 1720-37, 1737-49; Fire Engine and Coal Accounts 1732-49; Trowell Reckoning Book 1757-63. University of Nottingham, Middleton MSS.

activities of the coalmasters, Robert and John Fletcher. These two men were mining coal in the central part of the Derbyshire Coalfield in 1713 on a very small scale at Butterley, Ripley and Pentrich. In that year, they began to sink pits at Denby, near the southern outcrop of the field, and in the following year sold coal worth £274 there. In 1715, they leased the old Zouch coal royalty at Heanor from William Stanhope at a rent of £120 a year. Two years later, their sales there amounted to £488. In 1724, they took a third share in Shipley Colliery and in the next year sold hard coal worth about £250. Ten years later, they became partners in Smalley Colliery, where coal worth £910 was sold in 1736. During the next few years, they opened collieries at Morley, Dale, Hartsay, Longhill, Horsley and Openwood Gate, but at none of these were substantial amounts of coal raised. From 1746 to 1749, they began production of coal at Owlgreaves, Awworth and Langley in the Erewash valley and at Bilborough on the Edge estate outside Nottingham; from these and their other collieries, coal worth some £2,600 was sold in 1750.² The view that there were no pits of any size in this part of the coalfield is borne out by the earliest Derbyshire Land Tax records, those for the year 1779, in which collieries are mentioned only at Shipley and Stanton.

Apart from local sales, the mines in Central Derbyshire and Southern Nottinghamshire supplied other markets. The collieries between Trowell and Nottingham sold coal downstream along the Trent as far as Newark and over that river in the countryside as far as Grantham. The pits in the Erewash valley marketed their output in the adjacent parts of Nottinghamshire and those around Pinxton, Somercotes and Swanwick in the Hundred of Wirksworth.³ Communications between the coalfield and its markets were, however, poor. Roads in bad repair made it difficult to transport coal, except for a short period during summer. The high cost of road transport, even on turnpikes, raised the cost of coal considerably,

² John Fletcher *v.* Francis Barber. Accounts for sale of coal 1713-55. Derby Borough Library, Bemrose Collection, parcel CXC.V.

³ *JHC*, XXIV, 146, 160; XXXI, 71, 143.

thereby restricting its sale. The Trent itself, circuitous, lacking halting paths and with navigation hindered by the 67 shallows and 12 fords between Wilden Ferry and Gainsborough, over which barges could not carry a cargo greater than ten tons, offered poor transport facilities between the coalfield and the lower part of its valley. Obviously, any expansion in coal output in this section of the coalfield was dependent upon an improvement in its communications, both within its own boundaries and with its markets, to the standard already enjoyed by the collieries in South and West Yorkshire.

The first canal to be constructed followed the natural route offered by the River Erewash from its junction with the River Trent at Sawley to Langley Mill.⁴ This was built, under contract, by James and John Pinkerton of North Cave in the East Riding of Yorkshire with John Varley, who had recently retired from a similar position on the Chesterfield Canal, as Clerk of the Works. With few topographical difficulties to be faced, progress was rapid. By April 1777, nine miles of the canal, with all its cuttings and embankments, had been completed. Two years later, the waterway was navigable as far as Ilkeston Common and the remaining section cut to Langley Bridge. The whole route was opened on 10 December 1779, when a "grand regatta" was held to celebrate the occasion, with the proprietors travelling along the canal in a "handsomely decorated" barge displaying "the most lively colours", watched by thousands along the banks, to Langley Mill where they, the contractors and their workmen, headed by a band marched off to dinner.⁵ After the official opening, few engineering works remained to be completed. A dock was made at Ilkeston Common in 1780. Two years later the weir at Langley Mill was raised to hold more water and in 1783 a cut to Lord Middleton's pits at Cossall was excavated.

During the next decade, a coal shortage occurred in the lower Trent valley, largely as a result of a falling off in shipments from the mines along the Aire and Calder

⁴ *Plan of the Intended Canal from the River Trent to Langley Bridge in the Counties of Derby and Nottingham 1777.*

See vol. lvi for a map of the canals of this coalfield.

⁵ *Derby Journal*, 23 December 1779.

and Don Navigations. To enable more coal to be marketed in the Trent valley, three new canals were planned through the Derbyshire and Nottinghamshire Coalfield. In 1778, a committee was set up to obtain an Act to authorise the building of a waterway from the Erewash Canal at Langley Mill to Cromford Green with a collateral cut to Pinxton Mill.⁶ Despite the fact that much of the coal likely to be mined alongside this projected canal must inevitably pass down the Erewash Canal, its committee showed the greatest possible hostility to this scheme, as it did to another navigation, planned in 1790 to join the Trent near Nottingham with the Cromford Canal at Eastwood. The reason for this attitude was the fear that the water supply in the district was insufficient for three waterways, the Erewash itself at this time being able to float full cargoes only in summer.⁷ The third scheme, the Derby Canal, a navigation projected in 1792 from Swarkestone Bridge on the Trent to Sandiacre on the Erewash Canal, with a branch from Derby to within striking distance of the southern outcrop of the coalfield at Little Eaton, was, however, strongly supported by the Erewash Canal Committee, as a considerable part of the traffic on the Derby Canal would pass through its waterway.⁸

The three canals were engineered by William Jessop, assisted by Benjamin Outram. The former, a pupil of Smeaton's, already had a considerable experience of canal construction, having served as engineer to the Aire and Calder Navigation and built the Greasborough Canal for the Marquis of Rockingham to open up the coal on his Wentworth property. Outram had some reputation, locally, as a surveyor. In the case of the Cromford Canal, they were to supervise its construction at salaries of £350 and £200 respectively, Jessop undertaking to give a third of his time to the scheme. The project was divided into three contracts, totalling £37,113, awarded to Thomas

⁶ E. G. Fletcher, *A Plan of the Intended Canal from Cromford to Langley Bridge* 1789.

⁷ *JHC*. XLIV, 276; XLVII, 527. Cromford Canal Bill Minutes of Evidence (Lords and Commons) 1789. British Transport Commission.

⁸ B. Outram, *A Plan of the Intended Derby Canals and Railways with a Sketch of the adjacent Canals, Rivers and Roads showing their relative situations and connections* (1792).

Skeasley of Tamworth and Thomas Roundford of Cole-ridge in Staffordshire, who undertook to construct the Pinxton arm and the branch to the eastern end of the deep cutting at Butterley in eighteen months, the section from the western end of the deep cutting to Cromford in two years and the tunnel at Butterley in three. After quarrelling with the committee, the contractors absconded, leaving Outram to complete the work with direct labour. This proved to be comparatively easy, except for the failure of the aqueduct over the Amber in 1791 and the fracturing of another aqueduct over the Derwent in 1793, both caused by the poor quality materials used as a mistaken economy. In both cases, Jessop bore the cost of reconstruction himself, declaring, "Painful as it is to me to lose the good opinions of my Friends, I would receive their censure for the faults of my head rather than of my heart".

The line of the Nottingham Canal was determined by Jessop's desire to avoid "the ridge of high country extending up to Sherwood Forest" from Bramcote Hills, a route which would have necessitated a tunnel 1,800 yards in length at Trowell Moor. The line he advocated began 100 yards from Langley Bridge on the Cromford Canal. It then continued on the west side of Eastwood Common and through Greasley to the west side of Cossall Common. The canal was then to pass over the north end of Bramcote Moor and to the south of Wollaton new fire engine before entering the river near Trent Bridge. Water for the navigation was to be supplied from a ninety acres reservoir at Greasley, six miles out of Nottingham on the Alfreton Turnpike.⁹ This route, in addition to tapping a large volume of coal traffic from already existing pits, had the merit of being carried on a dead level to Bramcote Hill, thereby saving the expense of cuttings. In answer to the protests of the Erewash Committee that the Nottingham Canal would run more or less parallel to their waterway for its first six miles, Jessop asserted that another navigation was essential in that valley, as traffic already taxed the facilities offered by the Erewash Canal.

⁹ James Green, *A Plan showing the Lines of the Relative Situation of the intended Nottingham Canal* (1791).

The Nottingham Canal Act also authorised colliery owners at Bilborough, Nuttall and Basford to make a cut from their mines to the canal, a clause inserted largely as a result of pressure brought to bear by Thomas Webb Edge of Strelley and Messrs. Barber and Walker, who mined the coal on this property.¹⁰ Another clause empowered the Nottingham Canal Committee to construct a railway from the mines at Brinsley on the Duke of Newcastle's estate, should it build gangways to any other pits. This was a compromise solution to a problem which had concerned the committee in its negotiations with local landowners and the other canal committees before applying to Parliament for its Act. The Duke of Newcastle's agent had been adamant that that nobleman would use his influence against the Bill, unless it contained a clause empowering the committee to make a cut to Brinsley Colliery, one of the very things it had promised the committee of the Cromford Canal not to do. At one point, in view of his hostility, the committee in despair decided to abandon the scheme but after lobbying Lord Middleton, the Duke of Portland and Lord Stamford, it was agreed to continue with this compromise incorporated in the Bill.

After the Act had been obtained, Jessop was appointed engineer at a salary of three guineas a day and James Green, who had completed the survey during Jessop's illness, was made Clerk of the Works. Although part of the navigation was finished and the first load of coal drawn with due ceremony through the streets of Nottingham on 30 July 1793, the remainder of the canal took far longer to build than had been expected and, in the last week of April 1795, the committee had to report that "notwithstanding the severe and unfavourable weather they were disappointed in finding the works were not so forward as they think might reasonably be expected". The summit level was, however, completed in August and water let in from the Cromford Canal. In the following

¹⁰ Correspondence with Lord Middleton *re* the opening of Gang Ways from Edge's pits to the Nottingham Canal. DDE.35/3, Shire Hall, Nottingham.

An Address to the Proprietors of the Proposed Langley Bridge to Nottingham Canal and the Inhabitants of Nottingham and Neighbourhood (1792).

May, the committee was able to travel the whole length of the completed navigation, inspecting the works with "much satisfaction".

To increase the volume of traffic on these canals, railways were built to link them with neighbouring collieries. In 1778, Messrs. Potter and Bourne, owners of a mine on the Rutland estate at Ilkeston, were authorised to construct a railway from their pits to the canal along a road previously built by the Erewash Canal Committee. This was completed by 1783, as in that year both road and railway were leased to the coalmasters. In 1787, Joseph and Thomas Wilkes and Lord Middleton were empowered to make railways from their mines at Brinsley and Trowell to the canal, as was Lord Melbourne from Beggarlee Colliery in the following year. Five years later, other lines were authorised to be built from the Erewash Canal to Dale Furnace and to Messrs. Barber and Walker's Newthorpe Colliery. On the Nottingham Canal, railways were made to the cut at Greasley from collieries worked by Potter and Bourne in 1800 and Barber and Walker in 1809.

The Derby Canal was authorised by its Act to build railways from its terminus at Little Eaton to Smithy Houses, and from Coxbench to Smalley and to Horsley Colliery on the estate of the Earl of Chesterfield. The Canal Minute Books show that the railway was laid with broad plates cast at Butler's Wingerworth furnace. These were, however, replaced in 1800 by low flanged rails. By 1808, this railway was sadly in need of repair. Although the line had been prepared for a double track, only a single line had been laid at its edge, with the consequence that the abutments had given way in many cases, throwing the rails out of gauge. Poor drainage had caused much of the ground to settle, again throwing the track out of alignment. Trouble, too, had been caused by the rotting of the pegs in the stone blocks holding the rails. Furthermore, traffic had grown to such an extent that the number of passing places for wagons was quite inadequate. Apparently, these defects were rectified at the time.

Proposals were made in 1808 and 1809 to extend this

line, first to the Ripley and Hartsay Collieries worked by John Fletcher and then to an estate owned by John Wright, one of the partners in the Butterley Company, where it was intended to open soft coal pits. The Derby Canal Company turned down both suggestions, alleging in the first case that its Act did not empower it to extend the railway, and in the second that any such action was inexpedient in the then state of the coal trade. In 1826, however, it was agreed to extend the line to a colliery on the Strelley estate at Denby worked by Messrs. Harris, Davenport and Company; three years later, John Ray Hill of Heanor Hall and Elisabeth Sutton of Heanor were authorised to build another short section at Kilburne.

Railways were also built, with Josiah Jessop as engineer, to distribute coal mined along the Cromford Canal. A committee, which included such local land-owners and coalmasters as John Wright, the Rev. D'Ewes Coke of Brookhill Hall and John Coke of Debdale Hall, was formed in 1817 to build a line from Pinxton to Mansfield, at a cost of £22,800. Seven years later, another committee which included the two cotton spinners Samuel Oldknow and Peter Arkwright, supported by the Duke of Devonshire and the Gells of Hopton Hall, was at work on a scheme to construct a railway from Cromford to Bugsworth, at a cost of £150,000, to distribute 60,000 tons of coal a year in the district between the Cromford and High Peak Canals.

The increased volume of traffic on the River Trent, caused by the opening of the various canals entering it, necessitated improvements on the river. Jessop, after a survey made in 1782, recommended that it should be constricted at various points, to speed up the current so as to scour away the shoals. In addition, he advocated that cuts should be made to avoid the shallows at Holme and Milford and the dangerous Trent Bridge.¹¹ An Act was obtained in that year to raise £13,000 to construct halting paths along the banks and to deepen the river so as to give 2 ft. of water between Wilden Ferry and Gainsborough. These improvements were carried out

¹¹ *Report of William Jessop engineer on a Survey of the River Trent in the Months of August and September 1782.*

under Jessop's supervision by 1787. Nevertheless, it is not difficult to agree with the assertion that this Act was "partial and mutilated", in that, on account of the opposition of local landowners, afraid that the value of their property would be diminished by severances, the Trent Navigation was prohibited from making any side cuts. In addition, its capital was insufficient to carry out a comprehensive scheme of improvements, as £6,000 was expended in legal charges before the Act was passed. As a consequence, in 1792 the river was only 18 ins. deep in places, capable of carrying only eighteen-ton undecked flats, the cargoes of which were unprotected from the weather.¹² After Jessop and Whitworth had made another survey of the river, an Act was obtained in 1794, which empowered the Navigation to make such improvements as would enable forty-ton boats to navigate the river, and to make cuts at Adbolton and Bassingfield and through Beeston Meadows. By 1801, Jessop had completed these projects.

The pattern of finance in the case of these waterways was similar to that of other navigations constructed at the same time in other parts of the coalfield, in that, although their most important shareholders were local landowners, the bulk of their capital was subscribed by merchants, industrialists, clergy and lawyers, some directly interested in the improvement of communications for business reasons, all seeking a good investment. Some of the biggest holders of stock in the Erewash Canal were landowners such as the Duke of Rutland, who owned property in Ilkeston, John Plumtree, a landowner in Eastwood, Thomas Charlton of Chilwell, who had an estate in Heanor, and Luke Jackson, who held land at Greasley. Control of this navigation, however, rested in Loughborough, as the major part of its capital had been raised in Leicestershire. The most important shareholders in the Cromford Canal, again, were landowners such as the Duke of Newcastle, the Rev. D'Ewes Coke of Brookhill Hall, George Morewood of Alfreton Hall, John Musters of Colwick and the Beresford family of Ash-

¹² *A State of the Depths of the Water upon the Shallows in the River Trent between Cavendish Bridge and Gainsborough 1792.*

bourne. Other leading shareholders were the cotton spinner, Sir Richard Arkwright, the Hurt family of Alderwasley, who owned a lead rolling mill, iron furnace and a slitting mill on the Derwent, Joseph Outram and Josiah Jessop, coal and ironmasters at Butterley, clergymen such as the Rev. William Thompson of West Bridgeford and the Rev. Owen Dimsdale of Wilford, and lawyers such as Francis Evans of Nottingham, Job Brough of Newark and Micah Hall of Castleton. Again, landowners such as the Duke of Rutland, Lord Middleton, the Hon. Henry Sedley, John Musters, John Plumtree, Edward Willoughby and Charles Pierrepont were all investors in the Nottingham Canal. Philip, Earl of Chesterfield, of Bretby Park, Charles, Earl of Harrington, of Elvaston, Sir Henry Harpur of Caulke, Sir Robert Wilmot of Elvaston and William Drury Lowe of Lockoe were amongst the largest holders of stock in the Derby Canal. Other important shareholders in this navigation were William Cox and Francis Agard, corn merchants in the county town, Thomas and E. W. Cox, wine-merchants there, William Duesbury, the manufacturer of Crown Derby, Edward Fox, a Derby cotton spinner, William Evans, the owner of the corn and copper mills at the Holmes, Derby and of the red lead, paper, fulling and cotton mills at Darley, and Joseph Wilkes of Overseal, banker and coalmaster. The same pattern was repeated in the case of the Trent Navigation, many of its shareholders, indeed, holding stock in the various canals feeding the river with traffic.

The Cromford, Nottingham and Derby Canals all cost more to make than had been originally estimated, largely as a result of the increase in the cost of land, materials and labour due to wartime inflation. After the proprietors of the Cromford Canal had each subscribed an additional £35 on each share, a loan of £20,000 was raised in 1792 to complete the project. The committee of the Nottingham Canal, after calling up another £50 on each share, was compelled to raise loans, both from shareholders and from the Nottingham banking house of Smith, to meet the cost of a waterway which had exceeded Jessop's original estimate by some £32,000. The Derby Canal, planned

during wartime, cost only £9,000 more than its estimate.

Coal was expected to provide the largest volume of traffic on all these waterways. In framing its schedule of tolls, each committee naturally aimed at earning the biggest possible revenue. Tolls on coal, however, had to be fixed in relation to a number of factors. The coal trade in the lower Trent valley was, normally, highly competitive as this area was supplied, not only with coal mined in Derbyshire and Nottinghamshire but also with coal landed at Gainsborough from ships haling from the North-East Coast and from barges plying between that area and the collieries along the Aire and Calder and Don Navigations. Competition from the South Yorkshire Coalfield increased after the opening of the Stainforth and Keadby Navigation, projected in 1793, which enabled coal mined at the pits along the Barnsley and the Dearne and Dove Canals to reach the Trent basin by a much shorter route than that previously used along the Dutch River. Again, coal transported along the Derby and Cromford Canals to markets in the Midlands had further to travel than that mined at collieries on the Erewash and Nottingham Canals. As a result, the various canal committees were compelled to give concessionary rates to coal destined for these markets in an attempt to maintain the competitive position of coal mines adjacent to these navigations.

The Erewash Canal Act empowered it to charge a toll of 1s. 6d. per ton on coal transported on the waterway. In 1781, however, a drawback of sixpence a ton was introduced on coal to be sold in Gainsborough. In the following year, drawbacks of fourpence and threepence a ton were given on coal to be forwarded up the River Soar or down the Trent to Newark. In 1798, to aid the collieries along the Cromford Canal in their struggle to establish themselves in the coal market in the Midlands, the Erewash Canal Committee agreed to reduce the toll on coal originating in the Cromford Canal to sixpence a ton, when carried in barges which had already brought a cargo from the Trent through the Erewash Canal. The Cromford Canal also operated a system of concessionary rates. From 1796 to 1806, the toll on slack coal, used to

burn lime at the kilns west of Buckland Hollow, was reduced by a shilling a ton. In 1797, a preferential toll of a penny per ton mile was given to Messrs. Barber and Walker on coal mined at Beggarlee Colliery; three years later, the Butterley Company was allowed to count 23 cwts. as a ton on coal shipped along the Cromford arm of the canal, provided that their tolls amounted to over £800 in the year. In 1806, a drawback of a shilling a ton was instituted on coal used at Hurt's ironworks in Crich Chase.

The committee of the Nottingham Canal was subjected to considerable pressure from local landowners and coalmasters in fixing its rates. Originally, the toll had been agreed upon at $4\frac{1}{2}d.$ tonnage on coal with an additional halfpenny per ton mile. As the canal had cost much more to build than had been estimated, its committee in 1796 and 1799 decided to promote Bills to increase its dues. In both cases, the Bills had to be withdrawn in face of opposition from the coalmasters. The opening of the Nottingham Canal also led to a rate war with the Erewash Canal, which feared that some part of its traffic into the lower Trent valley might be diverted through the former navigation to avoid the Trent shoals. Hence, in 1796, the Erewash Committee reduced the toll on coal entering above its fourteenth lock or from the north and north-east side of the Nottingham Canal to be sold in the Trent valley by sixpence a ton with a further drawback of threepence a ton on coal sold in Nottingham itself. In the following year, further reductions were made. A drawback of twopence a ton was given on coal mined at the new collieries sunk at Beggarlee by Barber and Walker and at Brinsley by Joseph and Thomas Wilkes. Dues on coal transported from the Nutbrook Canal into the Erewash and through to the Trent were lowered, and special rates introduced on coal and slack for lime burning. The Nottingham Canal retaliated by accepting the coalowners' weigh tickets, usually lower than the actual tonnage, as the basis for its charges, thereby in effect lowering its tolls. Such a rate war could benefit neither canal. Therefore, in 1797, the two committees signed an agreement whereby dues were to be charged only on the true weight

carried; the rate war was to cease; the district between the two canals was to be regarded as neutral ground in which no attempt should be made to poach traffic; and neither canal was to make cuts or build railways into the other's hinterland.

The Derby Canal was in a much more difficult position than the other canals for building up a traffic in coal, as the only collieries it tapped lay, not along the waterway, but at the end of its railway to Denby. Hence, its drawbacks on coal were on a much larger scale than those given by the Erewash, Cromford and Nottingham Canals. In 1798, a schedule of dues was instituted by which coal transported on this line was to pay 1s. 5*d.* a ton to Little Eaton and no toll at all on the waterway. In addition, William Drury Lowe secured further drawbacks on Denby coal shipped to the Erewash Canal in 1801 and to the Trent and Mersey in 1810. These drawbacks were cancelled in 1811, although that on coal transported into the Erewash Canal was restored in the following year. The post-Waterloo depression, with its severe fall in the price of coal, compelled the committee of the Derby Canal to reintroduce drawbacks on Denby soft coal, dues on the railway being decreased by a shilling a ton between 1815 and 1819. Angered by demands for even greater reductions by Lowe, the committee ended all drawbacks on the railway in 1820, only to find that coal traffic made its way into Derby by turnpike instead of by rail and canal. Consequently, four years later, another drawback of fivepence a ton on soft coal was introduced.

The Derby Canal, unlike other waterways in the area, operated drawbacks on other commodities. In 1797, the rate on limestone transported from Swarkestone to Little Eaton was lowered to threepence a ton. In 1801, the same toll was to be paid on plaster passing between Chellaston and the Grand Trunk Canal. In 1826, Gabriel Brittain, who claimed to have shipped 7,000 tons of stone along the Cromford Canal in the previous three years, was given a drawback on stone quarried at Little Eaton; two years later, Smallwood and Company received a drawback on timber to be sold in Lichfield and Birmingham, provided that their traffic amounted to over 1,000 tons a year.

It is unfortunate that, in no case, is there a complete series of traffic statistics for this system of inland waterways during the period in which the canals had almost a monopoly of the transport of heavy goods. On the Erewash Canal, coal traffic was slow to develop until after 1782, when newly sunk pits began to come into production. By 1788, coal from this valley, transported along the River Soar, had captured much of the market in Leicestershire from the mines at Coleorton, Swannington and Staunton Harold, which were handicapped by the high cost of land transport.¹³ The extension of inland waterways to Leicester and Melton Mowbray led to a further increase in the sales of Derbyshire coal in the Midlands. Coal transported on the Derby Canal was mainly sold in the county town, whereas coal mined at the pits alongside the Cromford and Nottingham Canals supplied the area adjacent to the Trent down river to Newark.

Although the Erewash Canal Minute Books contain no traffic statistics, it is known that in 1792 the navigation was carrying 70,000 tons of coal¹⁴ and that by 1829, this had increased to 170,229 tons. Traffic on the Cromford Canal increased from 150,391 tons in 1803-4 to 289,217 tons in 1830-1. In both cases, two-thirds of this tonnage was coal. The only figures for coal traffic in the Minute Books of the Nottingham Canal are for the years 1798 to 1801, during which period it increased from 49,559 to 101,222 tons. By 1829, 165,485 tons of coal were shipped along this waterway. On the Derby Canal, too, coal traffic was slow to develop, as it was necessary to sink pits at Denby, before coal was available for sale in any quantity. The amount transported grew from 28,571 tons in 1797-8 to 50,374 tons in 1802-3. Unfortunately, the figures for the canal's revenues end in 1826, but as between 1803 and that year income increased by 50%, some similar increase in coal traffic may well be looked for. Statistics of traffic on the two pre-locomotive railways, unfortunately, are sparse, the only information

¹³ *JHC*, XL, 363.

¹⁴ Joseph Smith, engineer of the Erewash Canal in evidence before *S.C. on the Cromford Canal Bill*, 1789. British Transport Commission.

being that the Mansfield to Pinxton line carried 27,758 tons of coal in 1832.

The Erewash Canal, along which so much of the coal mined in this part of the coalfield was carried, was financially the most successful of this group of canals. Its dividend grew from $2\frac{1}{2}\%$ to 10% in 1782-4, from 12% to 16% in 1795-6 and from 20% to 30% in 1787-93. During the wars, its dividend fluctuated, reaching its lowest point in 1804 when $12\frac{1}{2}\%$ was paid. Even during a trough of the post-war depression, it could still pay 58% in 1819, a level more than maintained during the 'twenties. In 1828, its shares were selling at £1,400. The Cromford Canal Minute Books fail to record dividend payments. The market value of its shares in 1824 was £550. The Nottingham Canal paid no dividend until 1806, earnings being earmarked for the repayment of loans. By its Act, it was limited to a maximum dividend of 8% , and £6 was paid on each share regularly after that date. The Derby Canal had a somewhat chequered dividend history. During the wars, it averaged $4\frac{1}{2}\%$; after 1815, its payments steadily increased to $13\frac{1}{2}\%$ in the boom year of 1825, but then decreased to an average of $3\frac{1}{2}\%$ in the troubled trading years later in this decade. The Trent Navigation, limited by its Act to a maximum dividend of 7% , generally managed to pay this amount. The Mansfield to Pinxton Railway was relatively much less successful financially, paying some 4% as dividend in the late 'twenties.

The opening of the Leicester and Swannington Railway in 1830 threatened the Nottinghamshire and Derbyshire collieries with the loss of much of their Midland market. To meet this competition, the canals reduced their tolls on coal marketed in that area. In 1831, the Cromford Canal halved its dues; the Derby Canal decreased its toll on the Sandiacre branch, and the Erewash made a reduction in its rate on coal passing from the Derby Canal into the Trent. For the remaining years of the decade, it was the Erewash Canal which bore the brunt of a series of reductions in tolls, made at the demand of the coalmasters, apprehensive of the loss of their most valuable market. In 1832, after a meeting at which Barber, Jessop

and Potter represented the coalowners, the committees of the Erewash Canal and the Soar Navigation agreed to lower the dues on coal sold between Loughborough and Leicester. In 1834, after E. Miller Mundy, the Shipley coalmaster, had appealed for another reduction in rates, the Erewash and Soar Committees instituted further drawbacks on Derbyshire coal sold in Leicestershire. These were, however, withdrawn in 1836 when the coalmasters seized the opportunity to raise the price of coal. Finally, in 1839 after another meeting between the coalmasters, represented by Mundy, Potter and Pickering, and deputations from the Erewash, Leicester, Union, Grand Union and Grand Junction Canals, a general reduction in dues on coal to be forwarded to the last-named canal was agreed upon. From the standpoint of traffic, these decreased tolls not only prevented the Derbyshire collieries from losing their hold on the Midland market for coal, but actually led to a steady growth in the quantity of coal carried on the Erewash Canal during the 'thirties. The increase from 166,506 tons in 1830 to 390,524 tons in 1840 more than compensated for any reduction in dues, with the result that the Erewash Canal was able to maintain its record of high dividends, paying, for example, 61% in 1837.

With the opening of the Railway Age in Derbyshire and Nottinghamshire, inaugurated by the opening of the North Midland and the Midland Counties lines in 1840, the canals encountered a competition which they found it difficult to meet. It was not only that the new method of transport was much cheaper. It was much more reliable. All the evidence before the various Select Committees on Railway Bills during the 'forties points to considerable dissatisfaction by the users of these inland waterways on the score of unreliability.¹⁵ Transport between the Midlands and the coalfield was, for instance, stopped by frost for lengthy periods in the winters of 1813-14, 1819-20 and 1830-1. In anticipation of such occurrences, coal had to be heavily stocked along the

¹⁵ S.C. on the Nottingham and Lincoln Railway Bill, 1845; S.C. on the Newark and Sheffield Railway Bill, 1845; S.C. on the Erewash Valley Railway Bill, 1845; S.C. on the Ambergate, Nottingham and Buxton Railway Bill, 1846.

canals. At Melton Mowbray, for example, it was usual for the merchants to hold 10,000 tons of coal for the winter, a practice which must have seriously strained their finances.

In summer, the navigations often suffered from a shortage of water, which seriously hampered transport. The Trent, despite the improvements made by Jessop, rarely had sufficient depth of water below Nottingham to float boats of any size. It was not unknown in a dry summer for traffic on this river below Newark to be completely stopped with 100 boats aground. Barges on the Nottingham Canal could often carry only twenty tons of cargo instead of the normal forty-five tons, as the supply of water from Butterley reservoir was insufficient to replace that lost by evaporation and lockage. Worst hit was the Cromford Canal, which drew supplies of water from the coal mines at Butterley Park, from a colliery sough at Hartsay and from the Cromford Sough, draining the lead mines to the west of the canal. In addition, it was allowed to divert one twenty-eighth of the water from the Derwent at Cromford Bridge for twenty-four hours each week-end and store it in the deepened arm of the navigation. Large amounts, however, escaped as a result of subsidence at Butterley Tunnel into the neighbouring coal mines. In 1844, two-thirds of the supply from Cromford Sough ceased when the lead mines began to be worked below sough level, making it impossible for boats to carry more than ten tons of cargo. The result of these all the year round difficulties was that it was almost impossible to keep the pits on a normal working week, colliers being either on short time or overtime, a situation which almost inevitably brought labour troubles in its train.

The coalmasters, too, were profoundly dissatisfied with two of the pre-locomotive railways as means of transport. The line connecting Mansfield and Pinxton was condemned by William Jessop II as "an imperfect Railway" on account of its severe gradients and wide curves and the users of the railway between Denby and Little Eaton complained bitterly in 1846, not only of its high charges but of the disruption of traffic brought about

by the breakage of its old, short rails fixed on small stone blocks.

To meet the competition of the North Midland and Midland Counties Railways, which linked the new collieries at Staveley, Wingerworth and Clay Cross with the Midlands, the canals were once more compelled to reduce their rates. In 1840, the committee of the Erewash Canal reduced its dues on all classes of cargo. Two years later, the Cromford Canal lowered its toll on coal shipped to the Grand Junction Canal to a farthing a ton-mile and in 1844 reduced its dues on coal forwarded to the Leicester Canal, except for coal sold in Melton Mowbray, where as yet there was no competition from railborne coal. In 1847, after the opening of the Midland branch connecting Nottingham and Lincoln, the Cromford and Nottingham Canals jointly introduced a rate of a half-penny a ton-mile on coal. In the following year, after a piteous appeal from the clerk of the Melton Canal, who said that with the opening of the Syston to Peterborough branch of the Midland Railway traffic receipts had so fallen that it would be impossible to keep the waterway open in the future, the Erewash and Leicester Canals and the Soar Navigation all reduced their dues on coal to be sold in Melton Mowbray. In 1850, with the opening of the railway linking Ambergate and Rowsley, the Derby, Cromford and Erewash Canals all cut their rates in a hopeless attempt to retain for the waterways traffic between the Peak and Derby. In the same year, the Cromford Canal halved its tolls on all commodities to be forwarded by the Cromford and High Peak Railway, whilst the Nottingham Canal lowered its dues on coal shipped to the Trent and on flour carried the whole length of the navigation. In 1851, in conjunction with the Cromford Canal, the Nottingham Canal further reduced its toll on coal sold along the Grantham Canal.

These various cuts in dues could not prevent a reduction in traffic. The total amount of coal shipped on all the canals in this district fell from 420,418 tons in 1840 to 380,641 tons ten years later.¹⁶ Traffic on the Cromford

¹⁶ A statement of the total sales of coal (by canal) from the collieries of the Erewash Valley. *R.C. on the Coal Trade*, 1871, Appendix 26.

Canal fell from 322,724 tons to 284,693 tons, and the income of the Nottingham Canal declined by a third in the same decade. Where no reductions in tolls were made, however, the decrease in income was even more serious. The revenue of both the Derby Canal and the Trent Navigation fell by a half during these years. Dividends, naturally, fell with this decline in traffic. Payments by the Erewash Canal fell from 55% to 28% and by the Derby Canal from ten guineas to £5. 10s. between 1840 and 1850.

Attempts were made in 1845 to increase the efficiency of this group of canals and their Midland partners by amalgamation. When this failed, the Grand Junction Canal offered in 1847 to lease the others and work them as a unit. Nothing, however, came of this proposal. To the more far-sighted of the Canal Boards, the only way out of their predicament of falling receipts and decreased dividends was to sell out to a Railway Company. The Cromford Canal was bought by the Manchester, Buxton and Midland Junction Railway in 1851, its shareholders receiving £220 in cash or eleven £20 railway shares for each canal share. The Nottingham Canal was eventually merged with the Nottingham, Erewash Valley, Ambergate and Manchester Railway Company in 1856, its unfortunate shareholders being compelled to accept £50 in cash and £175 in 4% debentures on each share. In the meantime, the Board of the Mansfield to Pinxton Railway, apprehensive that their line would be ruined by the projected railways from Clay Cross to Newark and Nottingham to Mansfield, sold out in 1846 to the Midland Railway, which promptly made the line part of its Nottingham to Mansfield branch. The Erewash and Derby Canals were, thus, left in isolation, their feeders and outlets controlled by Railway Companies, with no interest in developing their traffic.

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