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The Permanent Way of the 1805 Congleton Railway: New Evidence from Fieldwork

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ABSTRACT
The Congleton Railway was opened in 1805, traversing the Staffordshire/Cheshire border. Fieldwork carried out on the route in 2018 resulted in the discovery of numerous components of its early cast-iron trackwork, allowing the construction of this short colliery railway to be understood in significantly more depth than has previously been possible. Examples of two types of cast-iron rail, two types of supporting saddle, stone sleepers, track spikes and wagon wheels are described. The Congleton trackwork was based upon that used on the 1801 Penrhyn Quarry Railway, and gives an insight into some of the weaknesses of that design. Documentary research has also been undertaken, which helps to place these artefacts in context. With some notable exceptions, the permanent way utilised on early railways has seen little detailed analysis, yet the importance of recording this artefactual evidence has recently been emphasised in a report for Historic England.

KEYWORDS
early railway; permanent way; edge rail; Congleton Coal Company; Stonetrough Colliery; Penrhyn Quarry Railway

Introduction

Dr David Gwyn and Sir Neil Cossons, in their 2017 report for Historic England entitled *Early Railways in England*, provided a significant review of research into this important topic.[1] The report efficiently summarised the present understanding of the subject, highlighting the extent of current knowledge, and made important suggestions regarding the protection of remains relating to early railways. It was suggested that a comprehensive survey should be made of traces remaining of pre-1830 railways. Only after surveying can these features be afforded the protection they rightly deserve. Another of the main recommendations of the report was that a book-length publication should be commissioned on early iron railways. This would continue the history of the early railway, picking up the strands where Dr Michael Lewis' pioneering *Early Wooden Railways* left off in 1970. Indeed, such a book, synthesising all available documentary and archaeological evidence, could add incalculably to the current knowledge of the first iron railways.

A book such as this by necessity cannot focus in detail on individual lines, for its broad scope requires generalisation. However, the task of writing such a book could be informed by detailed local studies. Geographically widespread local case studies provide a foundation upon which generalisations can be formed. The remains of early railways are spread across the English landscape, and current recording of these dispersed features is uneven. The country-wide survey of remains proposed by Gwyn and Cossons could therefore provide valuable archaeological evidence on early iron railways, whilst ensuring comprehensive coverage.

An especially significant area of early railway studies is that of the track itself — the permanent way, that crucial load-bearing surface from which a railway is formed. In a study of the first iron railways, an understanding of the early development and subsequent evolution of iron rails is one of crucial importance. Gwyn and Cossons stated that the track offers 'a material contribution to understanding of the early railway', whilst also noting that much of the early trackwork existing in museum collections forms 'a body of archaeological evidence that has not hitherto been assessed or subjected to co-ordinated scholarly research'.[2]

In this respect all early iron rails should be recorded, in order to assemble the data from which research into early permanent way can be carried out. This is especially prudent for rails that were unique to a single line or group of lines. In these cases, surviving artefacts might be scarce, hence they should be put on record whenever the opportunity arises. The importance of recording early rails is highlighted in Helen Gomersall and Andy Guy's 'Research Agenda for the Early British Railway', an important publication that emphasises the areas in this field that require further investigation. The authors stated that iron track components offer 'unequalled insight into technical, economic and regional development'.[3]

Gomersall and Guy concluded that the 'dimensions, weight, exact provenance, known or inferred date, and if possible designer and manufacturer of all permanent way components of the period' should be recorded.[4] That valuable suggestion was made in 2008, although a decade later little progress seems to have been made. It is bearing these facts in mind that this paper has been prepared as a small contribution to the recording of early iron trackwork.

This paper provides a description and analysis of a rare type of cast-iron track dating from 1805. It drew its inspiration from similar rails utilised elsewhere, but in this exact form it was used at only one location near Congleton on the Staffordshire/Cheshire border. Field investigations on the route in 2018 yielded a wealth of permanent way artefacts, over 20 in total. These artefacts have enabled the Congleton trackwork to be recorded and scrutinised in a level of detail that was hitherto impossible.

Historical summary

Early use of the railway: 1805–10

The railway was a horse-drawn colliery line, 5.25km in length, built to supply coal from Stonetrough Colliery to the town of Congleton (Figure 1). Previous accounts have never established its exact opening date, except to place it in the period 1805–7. However, the opening of the line was reported in the *Manchester Mercury* and this account shows the line to have come into use on 13 November 1805, for it states that 'On Wednesday last a colliery and a new iron rail-way three miles and a quarter in length, were opened at Congleton, in Cheshire amidst a great concoarse [*sic*] of spectators, who testified the utmost joy upon the occasion'. The newspaper goes on to describe that 'a procession of ladies and gentlemen took place at noon from the town to the rail-way, attended by Colonel Hanson and his brass band, and from thence proceeded in waggons up the rail-way to the colliery'.[5] It is perhaps of note that passengers appear to have been carried

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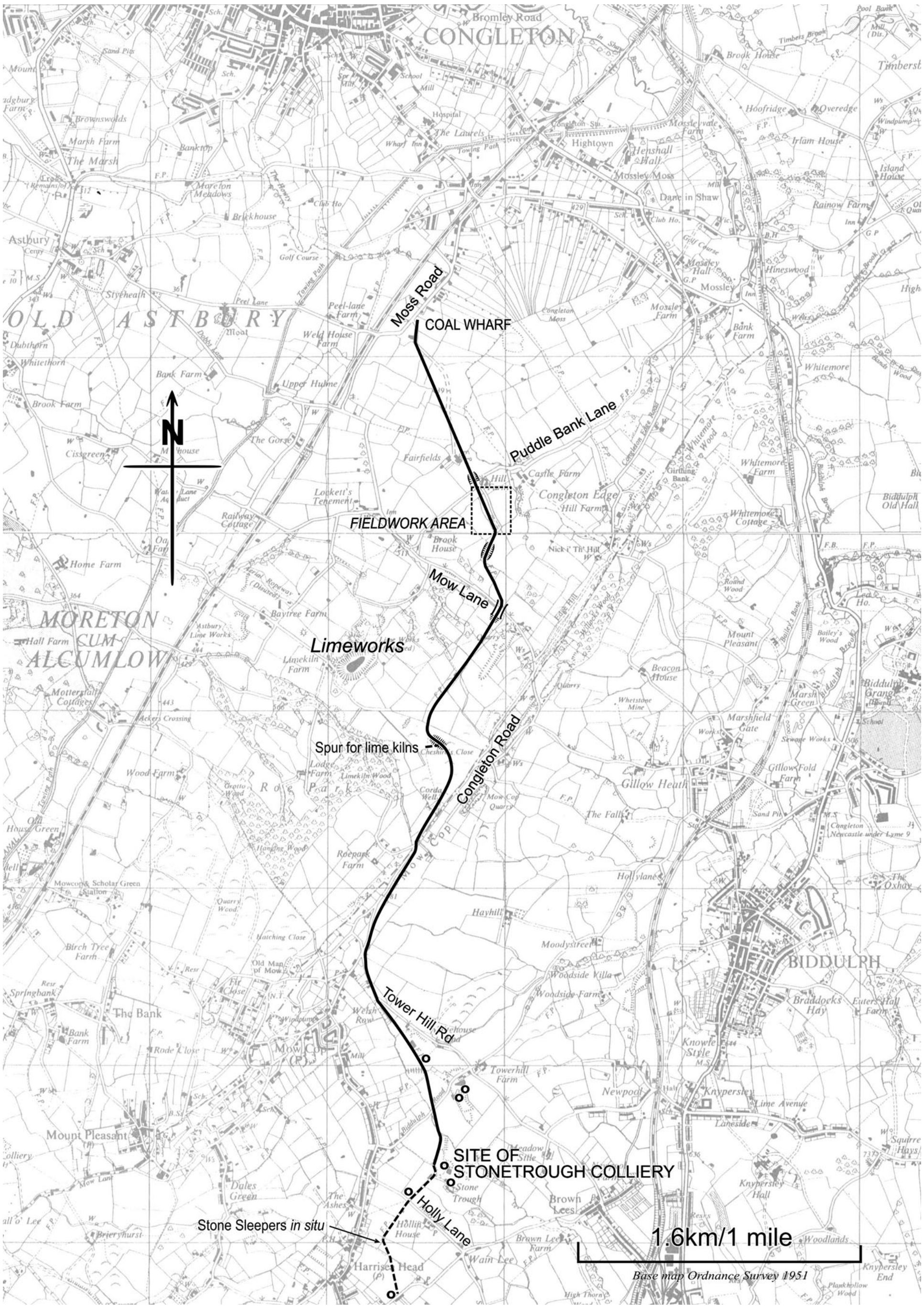

Figure 1. The route of the Congleton Railway, showing the location of the earthworks mentioned and marking the area where fieldwork was undertaken. Circles in the vicinity of Stonetrough Colliery represent coal shafts. The dashed section at the southern end of the route is the extension, as marked on the 1832 survey of Phillips and Hutchings. Courtesy of and drawn by Richard Dean.

on the opening day. Opening ceremonies are known to have sometimes featured early passenger carriage,[6] and, whilst a comprehensive list of such events has never been compiled, it is possible that this was the first instance of passenger rail transport in Cheshire.

Further early evidence of the Congleton Railway is provided some weeks later, in December 1805, by a letter to the editor of the *Staffordshire Advertiser*. The author proposed that a 'gigantic obelisk' should be raised on the Mow Cop ridge, to commemorate Nelson's naval victory. He commented that in practical terms 'lime might be conveyed, along a neighbouring Rail Road, from Newbold-Astbury, a distance of only a few miles'.[7] Construction of the Congleton Railway, together with the working of Stonetrough Colliery, was a venture undertaken by the Congleton Coal Company. No record of this company has been discovered before July 1807, at which point the partners were Thomas Boothman, George Peel, Jonathan Peel and William Williams.[8]

Men named George Peel and William Williams were also the owners of the Manchester iron founders Peel, Williams & Company. Established around 1800, this firm was one of the largest Manchester foundries of the early 1800s. George Peel's brother, Jonathan, was also involved in the foundry.[9] The partners in the Congleton Coal Company must be the same men who ran the iron foundry, Manchester being only 40km north of Congleton. Given these men were partners less than two years after the Congleton Railway was opened, it seems likely that they were in fact the founding partners of the company. By extension, it seems reasonable to assume that Peel, Williams & Company cast the rails for the Congleton line. An association with a large foundry would certainly explain the use of rails at Congleton that were unlike those utilised anywhere else. The construction of the route and casting of the rails must largely have been undertaken in 1805, although preliminary work might have begun in 1804.

Construction of the Congleton line was a considerable undertaking. Whoever surveyed the route had to skilfully negotiate Congleton Edge, which even today appears unlikely terrain to be crossed by a railway. As a business venture the line must have represented a substantial investment, but presumably the local demand for coal was sufficient that the Congleton Coal Company envisaged a good financial return. The financial risk in building the railway can only have been heightened by use of the unusual trackwork later described. Unfortunately for those who built it, the line does not seem to have been a success in its early years.

The partnership operating as the Congleton Coal Company was dissolved in July 1807, and the working of Stonetrough Colliery was taken over by John Johnson, Ann Johnson, Eliza Harrison and William Kirkby, who also inherited all debts owed by the concern.[10] By November 1807 John Johnson, one of the new partners, had been declared bankrupt, and Stonetrough Colliery seems to have played a part in his financial misfortune.[11] The following month another partner, William Kirkby, was also bankrupted. It could be that he had sought a wider market for Stonetrough coals. His involvement at the colliery was with John William Page, with whom he worked other collieries, alongside being a coal retailer in Manchester.[12]

The colliery and surrounding estate was advertised for sale in January 1809, with application to view to be made to William Handley. Mention was made of the railway that crossed lands occupied by James Whitehurst — 'That part of the estate in the occupation of Whitehurst, has the convenience of a Rail-road to the Moss, near Congleton, passing through it'. The sale of the estate was later postponed, but it was advertised again in March, the sale to be held in April 1809.[13] The colliery was not sold on this occasion, but was leased subsequently to William Glover in May 1810 for a period of 25 years. Derek Wheelhouse and Paul Blurton have suggested that Stonetrough Colliery did not work from 1807 to 1810,[14] which aligns with John Farey's observation that 'when I saw this Rail-way in July 1809, it seemed to be almost or quite disused, the reason of which I did not happen to learn'.[15]

Later use of the railway: 1810–42

The financial turbulence that defined the first five years of the Congleton Railway and Stonetrough Colliery suggests they were a commercial failure. However, despite its initial years being beset by difficulties, the railway seems to have continued in use for several decades. Hanshall's *History* of Cheshire, written between 1817 and 1823, comments that 'the Coal Wharf on Congleton Moss […] is well supplied with coals at 14s. per ton', implying that the railway was still supplying the wharf.[16]

A lease of Stonetrough Colliery, with seven years remaining, was advertised in 1828. The railway was also mentioned, with the colliery said to be 'now in full work, with Steam Engines, having the necessary apparatus for working the same, and the Cast Iron Railway leading from the said Colliery to Congleton Moss, a distance of three miles'.[17] This advert tends to back up Hanshall's statement by showing that the Congleton Railway was probably being used in 1828. That seven years remained of this lease in 1828 shows it to have been the 25-year lease granted in 1810.

It is not known whether Stonetrough Colliery was worked continuously throughout the period 1810–28. A third share in the colliery's lease was also advertised in 1818, but no mention was made of the railway.[18] It has been suggested that the colliery stopped working in 1828, at which point a memorandum recorded that the 'present lease is to expire 1 January 1829 because of the deficiency of coal in the present area which can be gotten by the new engine'.[19] In 1831 the colliery was once again advertised to those looking to take out a new lease. It was said that 'The Colliery is stocked with Engines, Waggons, &c., with a line of Rail-road nearly all the way to Congleton Moss […] Engines, Waggons, &c. to be taken at a valuation'.[20] The fact that the railway was mentioned in the advertisement suggests that it was either operational, or at least capable of being used, although the colliery may not have been worked at this point since 1828.

The Congleton line is shown and marked 'Railway' on Christopher Greenwood's map of Cheshire dated 1819 (Figure 2), and as 'Private Rail Road' on Andrew Bryant's map of 1831 (Figure 3). That the line was marked again implies that it was at least in a usable state. Possibly it was actively being used, for a letter of 1831–2 regarding outstanding rent mentions the terminal coal wharf.[21] There is no firm evidence to suggest the railway was working after 1831, although it does still feature on a number of maps. On the 1836 plan for the proposed Manchester South

Figure 2. The Cheshire portion of the Congleton Railway as shown on Christopher Greenwood's survey of 1819. The limekilns marked are those suggested to have been served by a short spur embankment off the main railway. Reproduced courtesy of Cheshire Archives and Local Studies.

Figure 3. Extract from Andrew Bryant's plan of Cheshire of 1831, marking the section of the Congleton Railway crossing Cheshire.

Union Railway, that railway crosses the Congleton Railway, which is shown simply as a black line.[22] However, Philips and Hutchings' map of Staffordshire, surveyed in 1831–2, marks the Congleton line beginning on the east side of Tower Hill Road, before continuing over the ridge into Cheshire; there is no indication of the stretch of line starting at Stonetrough Colliery.[23] The implication is that this trackwork had perhaps already been lifted, and with no connection to the colliery maybe the entire line was then disused.

The tithe map of Newbold Astbury township dated *c.* 1839 shows the Cheshire portion of the route as a faint dotted line, but does not mark it as a railway.[24] Finally, the first edition one-inch Ordnance Survey map of 1842 marks just part of the route. This is especially intriguing, as around 2.4km of trackwork is shown running along Congleton Edge, but nothing is shown of the rest of the route. At its northern end the track splits into two, with both lines then terminating at Mow Lane (NGR SJ 86960 59580). The Congleton line was not shown at all on the manuscript survey for this map, but was added to the published sheet, presumably on the basis of final fieldwork by the surveyors.[25] The purpose of this limited length of track, connected to neither the colliery nor Congleton town, is unknown. Maybe it was marked simply because the rails here remained *in situ*, or perhaps part of the Congleton railway did see some use into the 1840s.

Description of the route

The route of the railway has been described by previous researchers.[26] It can still largely be traced on the ground and is now accessible as public footpaths almost throughout its length. The starting point was at Stonetrough Colliery, now represented by Stonetrough Farm on Holly Lane, Harriseahead (NGR SJ 86655 56385), and situated in the Staffordshire parish of Wollstanton. The elevation at the colliery was some 230m and the route is represented by a footpath that runs north from the farm. The railway has left earthworks on this section, in the form of a slight embankment crossing pastoral fields. The footpath next reaches Tower Hill Road and the line here most likely ran parallel to this road until Congleton Road was reached.

This next road runs along Congleton Edge, a prominent ridge forming the boundary between Staffordshire and Cheshire. The Congleton Railway ran parallel to the road on its eastern, Staffordshire side, where a slight cutting can be discerned in places. The drystone walls alongside this road contain several of the railway's stone sleepers. Having run to a point near Corda Well Farm (NGR SJ 86597 58382) at an altitude of 275m, the railway crossed to the Cheshire side of the ridge, where it began a steep descent to Congleton, situated some 2.8km to the north. The average downwards gradient of the line on this side of the ridge was around 1:20.

Having passed into Cheshire, the route descended steeply from Congleton Edge, and its course can be seen in marshy fields beneath the ridge, where the railway's embankment forms a prominent feature. There is also a spur embankment here, which curves off the main alignment, only to terminate abruptly after some 35m. It has been suggested that this was used to transfer coal, destined for lime kilns situated to the north-west.[27] Continuing to the north-east, the next section of the trackbed has been disturbed and the exact line of the railway seems to have been destroyed, but it probably coincided with the footpath.

The alignment becomes obvious again at Mow Lane, where a truncated embankment ends with its cross-section exposed, lying approximately 3.5m above the level of the road (Figure 4). This embankment must have formed the southern approach to an

Figure 4. Prior to running alongside the stream, on its route toward the coal yard, the Congleton Railway must once have crossed Mow Lane. The crossing is thought to have been upon a wooden bridge. On the south side of the road this embankment forms a conspicuous feature and must once have formed the approach to the road crossing.

over-bridge, which is suggested to have been a trestle bridge, probably of wooden construction.[28] No trace of an embankment can be seen to the north of Mow Lane, but a substantial railway cutting is reached by proceeding across fields to the north (Figure 5). This varies in width from 3m to 4.5m. From this cutting the railway dropped into a wooded stream valley, where its trackbed forms a prominent embankment, running down the valley and parallel to the watercourse for approximately 280m (Figure 6). This is the main area where the fieldwork discussed below was carried out.

Leaving the stream valley, the Congleton line reached Puddle Bank Lane. The railway is shown intersecting this thoroughfare on Greenwood's 1819 map and is assumed to have crossed the road via a level crossing. Traces of the railway's course can be seen on the north side of the road in the form of a shallow cutting (Figure 7). The route from here ran past Fairfields Farm,

Figure 5. This substantial cutting, seen looking south in April 2018, runs through the fields to the north of Mow Lane and formed the approach of the railway to a crossing over the stream. After this it ran alongside the watercourse on an embankment.

Figure 6. Facing north on the public footpath that follows the alignment of the Congleton Railway in April 2019. The route forms a slight embankment and the stream mentioned lies to the right of the path.

Figure 7. Seen in April 2018, a slight depression in these fields that adjoin the north side of Puddle Bank Lane is all that remains of the cutting through which the railway once passed.

and then followed the farm's driveway, which seems to have utilised what was previously the railway formation. The course diverged at the point the farm drive turns to the north-east, from where the railway continued straight across the fields to reach Moss Road, where the maps of both Bryant and Greenwood mark the northern terminus as a 'coal wharf' to the south of Congleton (Figures 2 and 3).[29] This railway was unusual, for, when many contemporary lines formed adjuncts to canals, this was an independent concern unconnected to any waterway, and terminating on a road.

The site of the wharf is now in the vicinity of Congleton Garden Centre, at a final elevation of 130m. In front of the garden centre lies a relatively modern residence, the intriguingly named 'Machine House', and it has been suggested that this shows the exact site of the wharf.[30] This wharf was on the southern outskirts of Congleton and, to reach the town proper, horses and carts must have been used to convey the coal, which was presumably for both domestic and industrial use. The terminus of the line was later to lie within 550m of a canal, following the opening of Macclesfield Canal in 1831. Subsequent to the canal's opening, a new railway was constructed to connect Stonetrough Colliery to the waterway. This ran on an entirely new alignment, suggesting that the original Congleton Railway was then deemed to be beyond revival.[31]

The 1801 Penrhyn Quarry Railway

The Congleton Railway was constructed during a short-lived period in railway history, less than 40 years in duration, where cast iron was the main material used for rails. There were two principal types of rail in use by railway builders of that day: the edge rail for use with flanged wheels, predecessor of modern rails; and the angled plate rail for use with flangeless wheels, now obsolete. Cast-iron plate rails were first used on the surface at Wingerworth in 1788, and edge rails in south Wales, also in the 1780s.[32] The first iron railways built in the vicinity of the Congleton Railway all seem to have been plateways. A plateway system was in use at Kidsgrove in south Cheshire by 1797, inspired by Shropshire plateways of that era; the design had been brought to the north Staffordshire coalfield by Thomas Gilbert. A more substantial design of plateway was the type pioneered by Benjamin Outram, perhaps from 1793. These reached north Staffordshire by 1803, when John Rennie constructed Outram-type plateways for the Trent & Mersey Canal.[33]

Iron edge rails are known to have been used at many locations in England and Wales by 1805, but not in the counties of Staffordshire or Cheshire, where the plateway was the rule and the cast-iron edge rail was a novelty. The Congleton Railway was constructed with edge rails, and it may have been the first use of that form of iron rail in these counties. The Congleton trackwork was inspired by a north Wales edge railway, the Penrhyn Quarry line of 1801. By this date the plateway had proliferated around the country. Despite its drawbacks, it provided a system for the transport of heavy loads, vastly superior to most early 19th-century roads. However, the plateway's flaws had also become clear by 1801, and the Penrhyn Quarry Railway was based on a unique style of edge rail, designed to overcome these shortcomings.

A description of the rails used at Penrhyn was published as early as 1803 in the *Reparatory of Arts, Manufactures and Agriculture*. The author was Benjamin Wyatt, the agent to Lord Penrhyn who owned the railway, and Wyatt claimed to be the inventor of this pattern of rail. It is interesting to note, in light of the subsequent use of similar rails at Congleton, that Wyatt's description was also published in the *Chester Courant* in September 1803.[34] The Congleton line opened only just over two years later. Wyatt's description makes it clear that his rail was designed to be superior to plate rails, and his system must have appealed to the builders of the Congleton Railway. He stated that:

> 'The rail hitherto made use of in most railways is a flat one, three feet in length, with a rib on one edge to give it strength, and to prevent the wheels (which have a flat rim) from running off. Observing that these rails were frequently obstructed by stones and dirt lodging upon them; that they were obliged to be fastened to single stones or blocks on account of their not rising sufficiently high above the sills, to admit the gravelling of the horse-path; that the sharp rib standing up was dangerous for the horses; that the strength of the rail was applied the wrong way; and that less surface would create less friction; led me to consider if some better form of rail could not be applied: the oval presented itself as the best adapted to correct all of the faults of the flat rail, and I have the satisfaction to say that it has completely answered that purpose in a railway lately executed for Lord Penrhyn, from his lordship's slate-quarries, in Carnarvonshire [*sic*], to Port Penrhyn.[35]

Wyatt's argument for the use of his rails certainly sounds compelling. A variety of specimens of cast-iron rail have been discovered on the Penrhyn line. Those of particular interest are the very earliest examples, which served as the inspiration for the Congleton rails. The rails described by Wyatt in 1803 were 4.5ft (1.37m) long and weighed 24lb/yd. The cross-section of the rails was a symmetrical oval, 2in. (51mm) high and 1.5in. (38mm) wide. The ends of each rail had dovetailed projections cast upon them, such that the rails could be slotted into wooden sleepers. These wooden sleepers were later replaced by cast-iron sills. Also in use were castings of a rail chair-like appearance; these are most appropriately termed saddles. They supported longer rails at the mid-point, but the rails were not affixed to them, simply resting upon them. Their date of introduction is unknown, and Wyatt did not mention them in 1803. A typical example measured 5¼in. by 3in. (133mm × 76mm) and stood 2½in. (64mm) high.[36]

The closest parallel to these Penrhyn saddles is those utilised in south Wales for the intermediate support of some of the earliest all-iron edge rails.[37] It has been suggested that the intermediary who likely brought the design to north Wales was Thomas Dadford Senior, who was involved in a survey of the Penrhyn route in *c.* 1799 in addition to working in south Wales.[38] Rails of Penrhyn-type first saw use on other lines in north Wales from 1808, when some were used at Traeth Mawr embankment. Examples were also to be found at both Diffwys and Dinorwig quarries by 1811.[39] Wyatt claimed in 1803 to have had many enquiries about the exact form of the Penrhyn track, hence one might expect it to have been emulated sooner. However, there are no known sites in north Wales where it was imitated at an earlier date.

Oval rails similar to the Penrhyn rails, however, were used at Congleton. The Congleton Railway is therefore notable: firstly, as the first known line after Penrhyn to use rails of the kind described by Wyatt; and secondly as the only place Penrhyn-type rails were ever used outside of Wales. This peculiar circumstance suggests that there must be some connection between the Penrhyn and Congleton lines. The link between the two railways seems to be Daniel Vawdrey, who was Benjamin Wyatt's son-in-law, having married Anne Wyatt in 1804.[40] He was of a Cheshire family and is believed to have been associated with the Congleton Coal Company, although his exact role has not been determined.

Field investigations

The author first examined the route of the Congleton Railway in 2013, which resulted in the discovery of a length of rail, longer than any others previously recorded from the line, and from one of the final sections of the railway on its route to Congleton.[41] The line was inspected throughout its length during further field investigations in 2018. Several more pieces of rail were found in the same general area as the 2013 find (centred at NGR SJ 86912 60110).

It was mentioned when discussing the route of the railway that a cutting can still be seen, in fields to the north of Mow Lane (Figure 5). From here, the line dropped into a wooded valley and crossed a small, unnamed stream. Having crossed this stream the railway ran parallel to it and the course here forms a prominent embankment, running above and alongside the watercourse. This section of the route falls with a pronounced gradient, finally leaving the stream when Puddle Bank Lane is reached. The route described now forms a public footpath throughout.

This part of the route in particular contains much of industrial archaeological interest. It is this stream where the rails mentioned were found, lying within the watercourse. The stream dried up almost entirely during the unusually hot summer of 2018, providing an opportunity to examine the contents of the stream bed in detail. Numerous other items of permanent way were identified amongst the shingle, including two fragments of wagon wheel (Figure 8).

These artefacts allow for a complete reconstruction of the Congleton trackwork, and reveal several interesting points that were not known previously. This stream has provided an ideal environment for the preservation of these cast-iron artefacts. The stream bed is formed of shingle and the flow of water is minimal. The

Figure 8. Double-flanged wagon wheel fragments showing the inside of the rim (above) and the outside of the rim (below).

stream conditions do not lend themselves to a build up of silt, hence artefacts had not been buried.

This part of the railway is not shown on the one-inch Ordnance Survey map of 1842, the last map to suggest any use here being Bryant's map of 1831 (Figure 3). In the latter years of its life it seems unlikely that there was any investment in the line other than to keep it working. The artefacts found probably date to the 1820s at the latest, but some could easily date from 1805.

The permanent way

The permanent way of the Congleton Railway was first investigated by John Hopkins, who described a fragment of rail that he had discovered in 1967, near to the Congleton terminus of the line.[42] No subsequent account has added any further details to build upon Hopkins' description of the track, but information can now be offered to supplement his findings.

Note: These artefacts were designed and manufactured using imperial measurements. For that reason the dimensions of all items have been expressed using imperial units, with the metric equivalent given in brackets. This follows recommended practice for reporting on early railway track components.[43] A summary of all the artefacts is presented in the *Appendix*.

Rails

A contemporary account of the Congleton rails was provided by John Farey, who examined the Congleton Railway in 1809. Farey stated that 'on a […] Rail-way near Congleton […] the bars were oval or egg-shaped, according to Mr. Benjamin Wyatt's plan', whilst elsewhere he described the line as 'laid with oval bars of iron'.[44] Egg-shaped is indeed a good description of the cross-section of these rails. Whilst the Penrhyn rails were of symmetrical oval section, those at Congleton were rounded on top but terminated in a point underneath, forming an inverted teardrop shape (Figure 9).

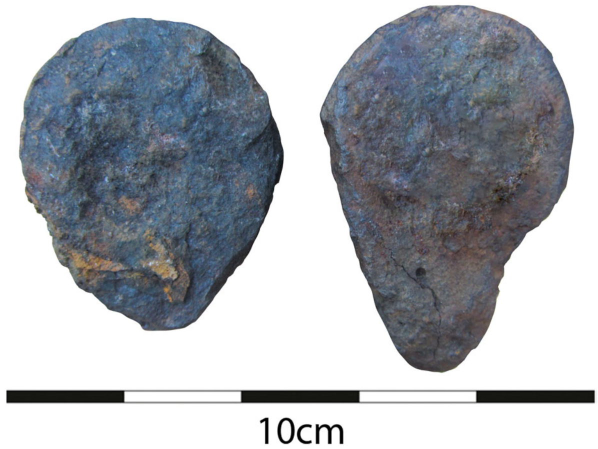

Figure 9. The 'egg-shaped' cross-section of the Congleton rails. Both of these rails broke at a similar length, comparing shallow-belly (left) and deep-belly (right).

Although the Congleton rails were based upon those used for the Penrhyn Railway, they showed some pronounced differences. The depth of the Penrhyn rails was constant throughout their length, whilst the Congleton rails were fish-bellied. Rails of fish-bellied form are deeper in the centre, thus increasing their strength at the point furthest from the supporting sleepers. The first fish-belly rails are attested in 1798 at Walker Colliery near Newcastle. Thereafter the design propagated around north-east England where it was much utilised.[45] No Penrhyn-type oval rails are known to have been of fish-belly form, other than those at Congleton, nor are any other fish-bellied rails known in this area of the country before these examples.

Previous accounts have suggested that the length of these rails was 3ft (0.91m).[46] However, this assessment is based upon the rail fragment discovered by Hopkins in 1967, which was only 16¾in. (425mm) long. The discovery of several longer pieces of rail, the longest 29¾in. (0.76m), shows that the length of a complete rail must have been more than 3ft (0.91m). This is proven by the fish-belly profile, which continues to increase in depth at a distance above 1½ft (0.46m) from the rail-end. Detailed measurement of rail specimens has allowed the rail length to be accurately determined as 4ft (1.22m).

Whilst the Penrhyn rails were dovetailed into wooden sleepers, the Congleton rails were spiked to stone blocks. Rail lengths were joined together via a complex foot cast at either end of each rail.

This foot projects from either side of the rail and measures 3½in. by 1⅝in. (89mm × 41mm). The feet incorporate a male lug cast at one end of a rail, and a corresponding female inset at the other end (Figure 10). This lug is semi-cylindrical in form, ¾in. (19mm) in diameter and 2¼in. (57mm) tall. It allowed consecutive rail lengths to be joined together and inhibited lateral movement.

The foot also included two semicircular notches measuring ½in. by ¼in. (13mm by 6mm) and cast on either side of the lug. When consecutive rail lengths were butted together two holes were formed, through which the rails were nailed down to the stone sleepers. The inspiration for this method of affixing the rails was very clearly Benjamin Outram's pattern of plateway. Outram cast notches in the ends of plate rails from 1796 at the latest.[47] Spiking rails to stone blocks was common practice by 1805, especially in this area of the Midlands.

Most interestingly, two distinct types of rail have been found, the difference being the depth of the fish-belly. The first design of rail has only a very slight fish-belly. These shallow-belly rails have a depth of 1¾in. (44mm) at the end, increasing to 2in. (51mm) in the centre and weigh approximately 18lb/yd. The fish-belly of the second variant is much more pronounced. These rails are 2in. (51mm) deep at the end, increasing to 2½in. (64mm) in the centre (Figure 11). Their weight is 21lb/yd. John Hopkins' 1967 rail was of this deep-belly type. All other dimensions of

Figure 10. Details of the feet cast at either end of the Congleton rails, showing the lugs and the holes used for spiking them down.

Figure 11. The side profile of rails showing the fish-bellied form, with two shallow-belly rails above and two deep-belly rails below.

these two styles of rail are identical, including the feet (Figure 12). The oval of both rails is 1½in. (38mm) wide, exactly the same as the Penrhyn rails.

These two types of rail were obviously designed to be interchangeable and could be used alongside each other. The shallow-belly rails seem likely to be of the type originally used in 1805. The section of these is very insubstantial and they must have proved too weak for reliable service. The deep-belly rail seems to be a redesigned version. The rail's strength has been increased whilst still being compatible with the shallow-belly rails. The only way to strengthen these rails, whilst ensuring they could be used in conjunction with the shallow-belly pattern, was to increase their depth.

The relative quantities of rail specimens found, six shallow-belly versus two deep-belly, implies the line was never re-laid entirely with deep-belly rails. It is also unknown when the deep-belly design dates from. It seems unlikely to date from the period 1805–10, when the railway was plagued by financial issues, and thus the design presumably dates from the 1810s–20s. The shallow and deep-belly variants are so similar as to suggest they might even have been produced by the same foundry. All of the eight rail specimens found incorporate the foot section. They are of various lengths and every example has fractured straight through the rail. Rail breakages must have been a problem on this line, certainly when using the shallow-belly rails, but even the deep-belly rails were capable of snapping. These artefacts also suggest that the original Penrhyn rails must have been susceptible to breakage, for their dimensions were very similar to the shallow-belly Congleton rails.

Saddles

The Congleton Railway used saddles for the intermediate support of rails at their mid-point. These are similar to those from Penrhyn, suggesting that saddles were used there at an early date, possibly from the start. Two different designs of saddle have been found (Figures 13 and 14). The first type is a plain saddle standing 2in. (51mm) high, and incorporating a 'V'-shaped groove that houses the pointed underside of the rails. These comprise a square iron block with sides 2¾in. (70mm) long. Upon the sides of this block, lobes are cast 1in. (25mm) long, such that the overall length is 4¾in. (121mm). These lobes each have ⅜in. (10mm) holes passing through them, 3½in. (89mm) apart, through which the saddles were nailed down. An example of one of these saddles was discovered by Hopkins, after the publication of his *Transport History* article, and three more specimens have been found by the author.[48]

The second type of saddle is altogether more complex. This is a lugged saddle, based upon a rectangular block 3¾in. (95mm) long, 2⅜in. (60mm) wide and standing 1⅝in. (41mm) high. Either cheek of the saddle contains a tiny pinhole just ¼in. (6mm) diameter. The saddles were spiked down through these holes, for three examples have been found in which a wrought-iron spike remains rusted in place. Hopkins found and photographed an example of one of these saddles *in situ* upon a stone block.[49]

Cast in the middle upon both sides of these saddles are the same lugs as are found at the ends of the Congleton rails, a male lug on one side and a female inset on the other. The saddles also include two notches on either side of each lug/inset. These

Figure 12. Rail specimens as viewed from above. The upper four examples are shallow-belly rails, and the lower two are deep-belly rails.

Figure 13. Saddle specimens, showing the plain version (left) and the lugged version (right).

Figure 14. Saddles in use for supporting rails, with a plain saddle (above) and a lugged saddle (below).

Figure 15. The underside of a lugged saddle (bottom left), as compared to the underside of rail feet — female foot (right) and male foot (left).

match those notches cast in the feet of each rail exactly (Figure 15). The clear implication is that these saddles had two uses. Firstly, they could be spiked down via the holes in each cheek, allowing them to be used as an intermediate rail support. Alternatively, it was possible to mate the saddle with the lug/inset in either end of a rail and spike it down in that position via the holes formed.

What the reason would be for directly adjoining a rail and a lugged saddle is not known. The lugged saddles are a significantly more complex casting than the plain saddles. That this complex design was produced suggests that it cannot have been without reason. However, it is not at all clear why the lug/inset would be needed upon the saddle. The design is evidently dual purpose and in the main these saddles probably simply provided support, as their plain counterparts did. Their secondary purpose remains a mystery; of various explanations that have been considered, none is satisfactory.

The lugged saddles were a weak design and often broke in use. Of the examples found, only one is complete. The other specimens are all broken halves, six in total. Compared to the plain saddles, the lugged saddles do not stand so tall and have a lower profile. The thickness of metal in the bottom of the 'V' is only ½in. (13mm, lugged) compared to ⅞in. (22mm, plain), meaning that the strength of the lugged saddles was insufficient. The way they have broken is consistent with their being used to support rails. The bottom of the rail tended to wear the saddles, and the tremendous pressure exerted by the rail's pointed underside upon the thinnest section of the casting forced the lugged saddles to snap in two.

It seems likely that these two types of saddle date from different periods, as do the two types of rail. If that is so, then it is most probable that the plain saddle design dates to 1805, and is the earliest saddle type for use with the shallow-belly rail. The lugged saddles are more likely to be contemporary with the deep-belly rail. The cross-sections of the two types of rail are slightly different. The deep-belly rail is more sharply pointed underneath due to its greater depth, whilst the 'V'-shaped groove in the lugged saddles is at a smaller angle than that in the plain saddles. This 'V' fits the underside of the deep-belly rail perfectly, but does not match the section of the shallow-belly rail nearly so precisely.

Deep-belly rails could not have been used in conjunction with plain saddles, without lowering the height of sleepers upon which they rested. The depth of the belly in conjunction with the height of a plain saddle leads to an elevated rail surface. Lugged saddles probably have a thin base because, when the depth of the rail was increased to create the deep-belly rail, the height of the new saddle was reduced a comparable amount. It was only by doing this that the new rails remained at a compatible height with the original shallow-belly rails and plain saddles. Therefore, the strength of the supporting saddles seems to have been sacrificed when stronger deep-bellied rails were introduced.

Sleepers

The sleepers used were blocks of stone, probably inspired by the stone sleepers that, from 1796, proliferated around the Midlands in conjunction with Outram's pattern of plateway. The examples examined are made of a coarse, locally quarried gritstone. The blocks are roughly rectangular, although their exact dimensions can vary significantly, whilst their sides can be very uneven. More sleepers are likely to have been visible along the route in 1971, when Hopkins described them as 'measuring about 9in × 14in × 8in deep' (229mm × 356mm × 203mm).[50]

Within the area where fieldwork for this paper was carried out, there is one sleeper seemingly *in situ*, just north of the point where the line crossed the stream. This is largely buried, and other examples on this section of trackbed may well be entirely covered over. Hopkins specifically mentioned that sleepers were to be seen in position upon this embankment.[51] A further example to the south of the stream and lying alongside the footpath measures 21in. by 11in. by 6in. deep (533mm × 279mm × 152mm), but a sleeper seen built into a wall elsewhere on the line was a mere 13in. by 12in. by 9in. deep (330mm × 305mm × 229mm).

The blocks contain two circular holes of ¾in. to 1in. (19–25mm) diameter, corresponding with the two holes formed by adjoining rails (Figure 16). Wooden plugs were inserted into these holes, to which the rails were spiked down. The holes are not necessarily centred on the middle of a block, for sometimes they were drilled

Figure 16. A demonstration of the form of a rail joint upon a sleeper.

near to one end. The holes in the various items of permanent way have slightly different spacing — rails (2¼in., 57mm), lugged saddles (2½in., 64mm) and plain saddles (3½in., 89mm). The holes in the sleepers were wide enough to accommodate some variation, although the plain saddles are sufficiently different that the blocks that bore these may have needed drilling with a wider spacing.

Two sleepers were discovered in the stream. One is only a partial sleeper, cleaved off a full block to form a thin slab measuring 16in. by 11in. (406mm × 279mm). It contains two 1in. (25mm) diameter holes set 2½in. (64mm) apart, and provides a good illustration of the form of the Congleton sleepers. The second sleeper is a fine specimen, measuring 22in. × 10in. × 7in. (559mm × 254mm × 178mm). It exhibits rectangular depressions upon the surface, worn by the feet at the end of each rail. There is also a narrow groove between the spike holes, worn by the fish-bellied span of a rail, in likelihood a rail of the deep-belly type. One of the holes also contains a spike, rusted in place (Figure 17). The holes in this sleeper have been drilled close to one end. It is assumed that the sleeper was laid with the long side facing outwards, so as to keep the area between the rails clear for a ballasted horse path.

The sleeper spacing can be deduced from the rails found, along with their known use in conjunction with intermediate saddles. Since the rails were 4ft (1.22m) long, and supported at the midpoint, the sleeper spacing must have been 2ft (0.61m). No *in situ* pairs of sleepers have been found to verify this interval. However, Michael Lewis measured a sleeper spacing of 4ft 1in. (1.24m) in the 1960s, which does suggest a rail length of 4ft, with one block missing between his measured sleepers.[52]

Track gauge

Hopkins' pioneering article on the Congleton Railway suggested in terms of its gauge that 'something in the range 2 to 3ft is suggested by the dimensions of the cuttings and embankments'.[53] Fieldwork by Len Kirkham challenged this opinion subsequently, concluding that both the 'Waggon size and rail gauge' had previously been underestimated. In 2002 Kirkham determined the gauge to be 4ft (1.22m) between rail centres, by measuring sleepers that were then visibly *in situ*, but are now hidden beneath turf.[54]

This is a significantly wider gauge than is known to have been used on any other line where rails of the Penrhyn-type were employed. At Penrhyn itself the original gauge was around 2ft (0.61m) between rail centres. Wyatt stated that the rails were 'two feet apart' in 1811, whilst Boyd measured a gauge between rail centres of 2ft ½in. (0.62m) from a sill discovered on the route.[55] Similarly narrow gauges were used on all other lines in north Wales that adopted rails of this type.[56] In considering the possible reasons for the use of a comparatively wide gauge at Congleton, it seems most likely that Benjamin Outram's designs were influential here. Indeed, most other instances where the Congleton line differed from the Penrhyn Quarry Railway bear the hallmark of Outram, for example the use of stone sleepers and the method of spiking the rails down to those sleepers. Outram was recommending a gauge of 4ft 2in. (1.27m) for plateways by 1799,[57] and this gauge was certainly used on many plateways in the Midlands from this time onwards.

It seems probable that other lines in the Midland counties, with stone blocks and relatively wide gauges, led the proprietors of the Congleton Coal Company to make changes to the Penrhyn design and adopt a 4ft (1.22m) gauge. The Congleton line therefore had a gauge around twice as wide as that at Penrhyn, although its shallow-belly rails were of very similar dimensions. When the significantly larger mass of any wagon passing down a 4ft (1.22m) gauge line versus a 2ft (0.61m) gauge line is considered, it seems likely that rail breakages at Congleton must have been more common than at Penrhyn. Indeed, to optimistically double the

Figure 17. This sleeper lies in the stream near to the point where it is crossed by a public footpath. It exhibits wear marks consistent with being used at a rail joint. These include the depression of both adjoining rail ends and a narrow groove worn by the fish-bellied span.

gauge, whilst hardly altering the weight of the rails, shows a lack of foresight that probably contributed to the ultimate decline of this railway.

Track spikes

Wrought-iron spikes were used to affix the rails and saddles to the stone blocks. In 2013, a stone sleeper was seen built into the drystone wall running along Congleton Road, in which the corroded remnants of both spikes remained *in situ*. The size of the holes in both types of saddle demonstrates that the spikes used with saddles must have been smaller than those used for rails. Indeed, fragmentary spikes remaining within the holes of some lugged saddles show these to have been of wrought iron, ¼in. (6mm) in diameter and with a rectangular head measuring ⅝in. by ⅜in. (16mm × 10mm), and ¼in. (6mm) tall.

An unrecognisable mass of rust recovered from the stream was later revealed by careful cleaning to comprise 41 wrought-iron spikes encrusted together. These are unused, for none show any evidence of having ever been hammered. Presumably they formed a pile of spare spikes alongside the track, or were contained in a bag or box that was dropped into the watercourse, leading the spikes to become fused together with corrosion.

These wrought-iron spikes are machine cut. Their width perfectly matches the notches cast into the feet on each rail. They are wedged in form, ⅜in. (10mm) square at the top; one side retains this width whilst the other tapers to a point (Figure 18). Their length varies between about 4 to 4½in. (101mm to 114mm). The heads vary from 1 to ¼in. (25mm to 32mm) wide and 3/16in. to 5/16in. (5mm to 8mm) tall. If these formed a cache of spares in the railway's latter days they would date from the early 1830s at the latest, although they are likely to be earlier.

Wagon wheels

For horse-drawn lines, the rolling stock was the most significant aspect of the railway after the trackwork itself, yet nothing is known about the form of the wagons used on the Congleton line, except for their wheels. These were double-flanged, with a concave form matching the curved upper surface of the rail, similar to those used at Penrhyn. Farey mentioned that the Congleton wagons had 'pulley-formed wheels'.[58]

An 11in. (279mm) fragment of wheel rim has been found on the route previously, which nicely demonstrates the double-flanged profile. Wheelhouse and Blurton suggested on the basis of this artefact that the wheels had 'a diameter of about 20in [508mm] with no more than six spokes'.[59] Two further pieces of wheel found by the author are small fragments of rim measuring 9½in. (241mm) and 8in. (203mm) long (Figure 8). The thickness of the wheel casting was ⅜in. (10mm) and one of the fragments includes the stub of a spoke ¼in. (6mm) thick.

The rails and wheels originally used at Penrhyn were unsatisfactory, a flaw that Wyatt described in 1811:

> we find the oval rail to wear the concave rim of the wheel very fast into a hollow, fitting so tight upon the rail as to create a good deal of friction, and obliges us to change the wheels very often.[60]

Both of the fragments of wheel found are very interesting, since they prove that just the same problem was encountered on the Congleton line.

Both of these pieces of wheel are a single flange, from a double-flanged wheel that has split down the centre (Figure 19). Ordinarily, this would be a very peculiar defect in a railway wagon wheel, but in this case the issue is exactly as Wyatt described, and the excessive wear can be seen clearly in the broken cross-section. The edge of the wheel shows little wear, but the iron becomes progressively thinner closer to the centre of the wheel rim. At the wheel's centre, the casting has worn so thin in both instances that the wheels have split in half, straight down the middle of the rim.

That both of the pieces of wheel rim found exhibit the same phenomenon shows that this was a common problem on the Congleton line. Wheels wore so badly upon the rounded rails that they eventually wore through to the point of breaking, and they could remain in use right up until this happened. Wyatt introduced a revised style of rail at Penrhyn with a flattened top, in an attempt to combat this problem.[61] He published his alternative design in 1811, and it is interesting to note that the deep-belly rails at Congleton do not take Wyatt's revision into account.

Figure 18. Wrought-iron track spikes of the type used to nail rails to sleepers.

Figure 19. A single flange from a double-flanged wheel, resting upon a rail and showing the split down the rim's centre.

An extension of the Congleton Railway

Bertram Baxter suggested that there was once a railway linking Stonetrough Colliery with Trubshaw Colliery, which lay 1.6km to the south-west.[62] Furthermore, although Philips and Hutchings' survey of 1832 does not show the Congleton Railway beginning at Stonetrough Colliery, it does depict a very short railway, starting in the vicinity of Stonetrough and running south-west to the other side of Holly Lane, where there was another colliery.[63] The total length of this line was around 750m.

There is no known documentary evidence, cartographic or otherwise, to support Baxter's claim that a railway continued on a similar alignment all the way to Trubshaw Colliery. However, there is little doubt that the short railway shown by Philips and Hutchings existed. This has been proved by an important discovery in the field made by Matt Pointon. At Stonetrough Farm, where the route description of the Congleton line began, a footpath continues to the south-west, crossing Holly Lane at NGR SJ 86586 56137. This continues the alignment of the Congleton

Railway for a short distance to a point where Pointon discovered stone sleepers in 2012. Seemingly *in situ*, these are indisputably of the same type as those used on the Congleton Railway, and seem to be compatible with the permanent way described in this paper.[64]

The implication of this discovery is that this extension could have been very early, like the Congleton Railway itself. If it used the same trackwork this railway could also have been physically connected to the Congleton line, the alignment of which it continues. Indeed, this seems likely, for it would then have allowed coal mined on the south side of Holly Lane to be transported to Congleton, together with that from Stonetrough. Interestingly, the spacing measured between sleepers is some 3ft (0.91m), which suggests that, although the line used the same sleepers, the permanent way may have been a further variation on that previously described. This sleeper spacing implies a rail length of 3ft (0.91m), with no need for intermediate saddles. If so, this would suggest a similar sequence of development as on the Penrhyn Quarry line. The first rails there were 4ft 5in. (1.37m) long, later reduced to 3ft (0.91m).[65]

The use of shorter rails also implies that the construction of this extension may post-date the introduction of deep-bellied rails on the main Congleton route. Taking this extension into account, the full length of the Congleton system would have been some 6km. Other than the sleepers described, there is currently no proof, yet potentially this extension could once have continued towards Trubshaw Colliery. One day further field evidence might be discovered to validate this possibility.

Significance

The importance of recording and analysing the permanent way of early railways has been emphasised in a recent report for Historic England, and also in a national 'Research Agenda' set out over a decade ago. The unique nature of the Congleton trackwork makes it especially worth documenting. Here we have a type of edge rail, dating from less than 20 years after cast-iron edge rails were developed in the ironworks of south Wales. The Congleton trackwork represents the only known use of Wyatt's oval rails outside of north Wales. It was, so far as is known, also the first iron edge rail and the first fish-bellied rail to exist in this area of the Midlands.

Interpretation of the iron trackwork of early railways can significantly increase our understanding of individual lines. In a more general sense, this study highlights the potential for the permanent way of early railways to be discovered in the field. Doubtless much permanent way remains to be found by excavation, but basic fieldwork of the type described can also yield extremely useful results. Watercourses alongside the routes of early lines clearly offer much scope in this respect.

A significant amount of archaeological investigation on early railways has been carried out commercially during the 21st century, as a necessary requirement of modern building developments. A substantial amount of literature exists relating to such investigations, and the contribution made by this work up to 2016 has been reviewed and assessed. Although items of permanent way are occasionally found during such commercial archaeology, it is notable that none of the sites reviewed yielded the wealth and variety of artefacts that were discovered at Congleton.[66]

Conclusion

Through a combination of archaeological fieldwork and documentary research, this paper has offered a description of the Congleton Railway that builds significantly upon what was previously known about this unique early line. The colliery railway came into use on 13 November 1805. Its first four years of working were beset by many difficulties, with several changes of ownership, and it does not seem to have met the expectations of the original partners in the Congleton Coal Company. Despite these initial shortcomings, the line remained in use certainly in the 1820s and perhaps also into the 1830s. The derelict trackwork remained in place to be recorded on maps, even after the line had stopped working.

The original rails, in likelihood cast by Peel, Williams & Company of Manchester, were 4ft (1.22m) long and very slightly fish-bellied. These were supported by a plain saddle, a simple grooved block of iron, affixed to every other sleeper. The original rails were weak and liable to break, hence the introduction of a second type of rail, the stronger deep-bellied variant. A new type of saddle was introduced in conjunction with these, to allow use of the deep-belly rails alongside the original shallow-belly trackwork. The complexity of the design of these lugged saddles is unprecedented and suggests a secondary function alongside intermediate support of rails. The nature of this use and the reason for the lugged design, however, remains a mystery.

The Congleton trackwork was based upon Benjamin Wyatt's system as utilised on the 1801 Penrhyn Quarry Railway. The Congleton example, however, appears to have been of the wider 4ft (1.22m) gauge, and showed other differences to Penrhyn, seemingly inspired by the designs of Benjamin Outram. The consequent increase in wagon size resulting from the wider gauge was probably a contributing factor in the line's early failure. The double-flanged wheels used at Congleton suffered from the same problems encountered at Penrhyn. The profile of the rail wore the wheels very badly and the rim was liable to fracture through the centre. This difficulty was a contributing factor for a complete re-laying of the Penrhyn line in the early 1830s.[67] Since the Congleton line was never re-laid, this issue must have persisted throughout its lifetime. There also seems to have been a short, unrecorded extension, to the main Congleton route, going at least as far as a colliery on the opposite side of Holly Lane.

Early permanent way, its analysis and interpretation, has great potential for furthering our knowledge of early railways. On a local scale, it can allow for a greater understanding of individual lines, as demonstrated here. Its capabilities go further, however, for on a national scale widespread analysis of the first iron trackwork can provide a unique perspective on the early evolution of iron rails, those same rails which in a highly evolved form are now used across the globe.

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63. Philips and Hutchings, *A Map of the County of Stafford*; One-inch Ordnance Survey map, Sheet 72: Stafford, 1st ed., 1834.
64. Matt Pointon, pers. comm. (M. Pointon, 'Trubshaw to Stonetrough Tramroad', unpublished notes; photographs of sleepers taken in 2012).
65. Michael Lewis, pers. comm.; Boyd, *Narrow Gauge Railways in North Caernarvonshire*, 80–3.
66. Gomersall, 'When to Stop Digging', 244–58.
67. Boyd, *Narrow Gauge Railways in North Caernarvonshire*, 84–5.

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Notes on contributor

Rowan Patel has long-standing research interests in the history and archaeology of many periods, and has developed a special enthusiasm for industrial archaeology. His research has resulted in the publication of numerous articles on the subject, alongside two books, *The Windmills and Watermills of Wirral: A Historical Survey* (2016) and *The Lane End Plateway: An Early Railway in the Staffordshire Potteries* (2019). He received a MChem in Chemistry from the University of York in 2014, working subsequently in the ceramic materials industry in Stoke-on-Trent. He has now returned to York, where he is currently studying for an MA in Field Archaeology.

Appendix: Summary of the Artefacts

A large element of this paper has focused on the evidence provided by artefacts. Table 1 catalogues all of the iron artefacts found during fieldwork on the Congleton line. Multiple examples were found for every category of artefact. Such a wide range of artefacts, 61 in total, including the 41 track spikes, was essential for analysing the Congleton Railway in a new level of detail.

Table 1. A summary of all the iron artefacts that were used to analyse the Congleton trackwork

Artefact Type	Examples
Shallow-belly rail	6 specimens (29¾in./75.6cm long — female end, 25in./63.5cm long — male end, 19¼in./48.9cm long — female end, 18¾in./47.6cm long — male end, 11in./27.9cm long — female end, 8in./20.3cm long — male end)
Deep-belly rail	2 specimens (28in./71.1cm long — female end, 10¾in./27.3cm long — male end)
Plain saddle	3 complete
Lugged saddle	1 complete, 6 broken halves
Wagon wheel	2 fragments (9½in./24.1cm long and 8in./20.3cm long)
Track spike	41 specimens