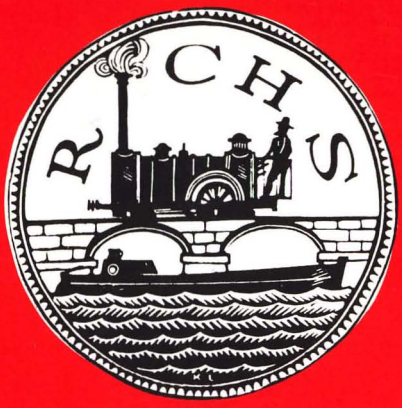
ISSN 0033 8834



Journal

of the

Railway and Canal Historical Society

VOLUME XXVIII No. 1 MARCH 1984

JOURNAL OF THE RAILWAY & CANAL HISTORICAL SOCIETY

VOLUME XXVIII No. 1 MARCH 1984

CONTENTS

Obituary—Lynton J. Smith

A funeral service for Lynton Julius Smith was conducted on 20 September 1983 at St. Peter's Church, Newton-le-Willows. He was aged 50 and had died at Blackburn College of Technology, where he was head of Management and Business Studies. He was interred at Newton Cemetery. He was a graduate of London University and became a senior lecturer in business studies at St Helens Technical College. In 1975 he moved to Exeter College of Technology where he was head of Business Studies. While he was there he built up a first-class department and was also a member of the college's Business Adviser's Panel. He was active in sport in the City of Exeter while he was there. He came back North to Blackburn in 1981, living with his mother at Newton-le-Willows until her death. He was an active member of the Newton Historical Society and in 1960 he published a paper on St Peter's Church. In the early days of the North West Group of the RCHS he gave a talk on the Wagon Works in Earlestown and then arranged a visit by the Group to the works. His last published work was in 1979 in the Proceedings of the Historical Society of Lancashire and Cheshire on the Impact of the Liverpool and Manchester Railway on a South Lancashire town (Newton-le-Willows 1821 to 1851). His wedding to Miss Anne Sutcliffe took place in St Peter's Church in March 1983. (*From Peter Norton*)

The Listowel & Ballybunion Railway. Some revisions and additions to its story

BY D. GORDON TUCKER

The approximately-10-mile-long Listowel & Ballybunion Railway in the south-west of Ireland, which ran from 1888 to 1924, has always attracted interest because of its peculiar construction. There have been numerous publications on the subject, and I shall be referring to many of them; but they contain many contradictions and errors, and it is my hope that I can put the record right and expand it in many respects without introducing fresh errors.

The line was built on the so-called Lartigue monorail system, in which the rolling stock straddled the single running rail, being built like panniers on a pack-horse – each vehicle of double construction, one narrow half on each side of the track. It is certain that Lartigue (Christian names: Charles François Marie Thérèse) did not invent the 'straddle' monorail system; however, his antecedents and rivals will not be discussed here as they will be dealt with in another paper.[1] His patent of 1882[2] showed a true monorail, the single rail being supported some distance above the ground on a light triangular trestle; there were no stabilizing rails, although the wheel-frames of the vehicles could have stabilizing rollers which ran on the web of the carrying rail. Even these were dispensed with in Lartigue's early practical applications.[3,4] The system was intended for light temporary goods lines. Figure 1 shows the system; it is taken from the 1882 patent. The vehicles in this drawing are pannier frameworks on which containers or bundles may be laid. The L&BR, however, had a stabilizing rail along each side of the braced A-frames on which the running rail was supported, and although claimed to be much cheaper than a conventional narrow-gauge light railway, was a permanent installation of much more substantial construction than any previous Lartigue lines. Indeed, Lartigue did not patent the new rail system (i.e. the 3-rail system) until 1886[5] and had apparently had no practical experience of it except on short exhibition lines before making the plan to build the L&BR of about 10 miles in length. So the L&BR was certainly a remarkable undertaking.

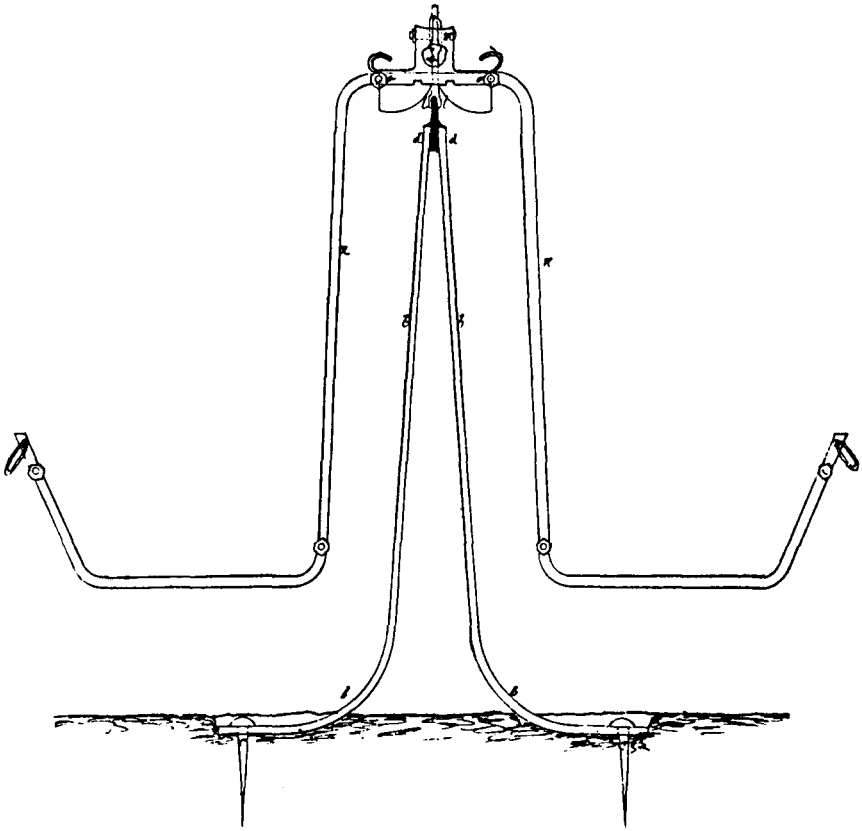


Fig. 1 Lartigue's Monorail System as shewn in his Patent of 1882

The system used on the L&BR is shown most clearly by the transverse cross-sectional diagram in Figure 2, which is taken from Lartigue's 1886 patent. W is a wheel with double flanges running on the single rail R, which is supported on the A-frame or trestle S. G, G are the guide rails on which the rollers B, B run. The vehicle (in this case a coach) is in two sections C, C. The central girder structure which joins the two parts of the vehicle to the wheels contains springs to smooth the motion of the coach bodies, and, if desired, the rollers B, B may have sprung bearings in order to maintain a sprung pressure of the guide rails.

Of the various published accounts of the L&BR the most important and most nearly definitive is that by Newham.[6] It is with the greatest respect that I offer some small but interesting corrections to his account, together with some amplification and some new material. Of the new material, the most significant by far are the two reports dated 2 March 1888 and 31 December 1888 made by Major General Hutchinson, Inspecting Officer of the Board of Trade,[7] which are so interesting that they are reproduced as Appendix 1 to this article. Newham mentions 'the inspection', but had evidently not seen the reports, nor realised that there had been two inspections. The system of Lartigue companies was also more complex than Newham indicates.

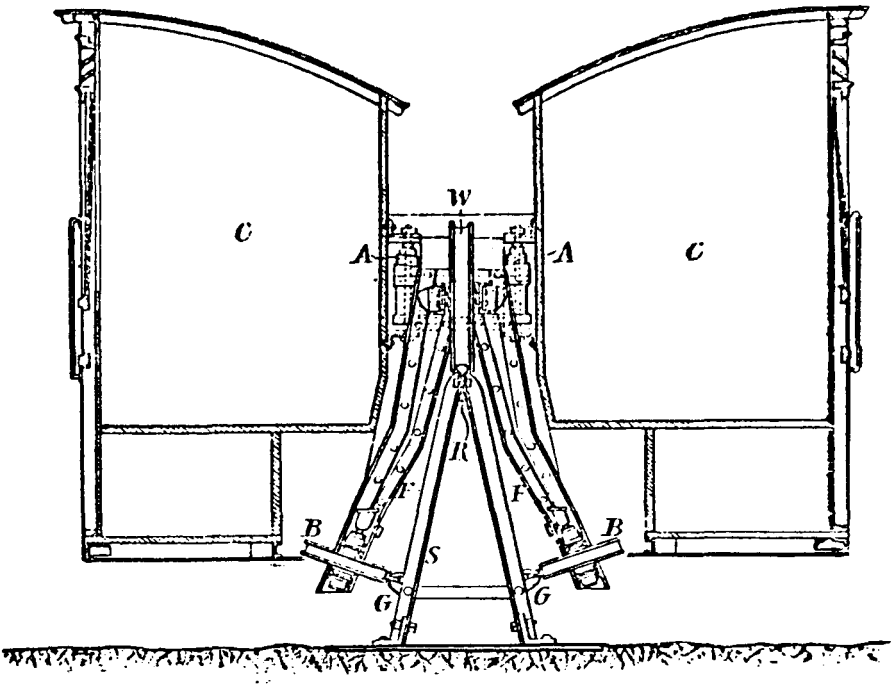


Fig. 2 Transverse cross-section of track and double carriage as shewn in Lartigue's Patent of 1886 and as used on the Listowel and Ballybunion Railway

The first British Lartigue company was the Lartigue Railway Co. Ltd,[8] registered on 2 December 1885, shortly after notice was given of the intention to introduce at Bill in Parliament for the railway between Listowel and Ballybunion on the Lartigue system. It was this company which set out the demonstration tracks and train at Tothill Fields, Westminster,[9] in September 1886, and it was its locomotive with two small vertical boilers (one on each side of the track) which was, after the Westminster demonstration, used in the construction of the L&BR in Ireland. Newham illustrates its surviving owner's plate (L.R.C.L^{D}. MALLET'S PATENT LOCOMOTIVE N^{O}. 1) without explaining what L.R.C.Ld. stood for. The association with the great French locomotive engineer Anatole Mallet is interesting; his name is well-known for the introduction of compound working to locomotives in 1876 and for the introduction of the single-bogie type of articulated locomotive on ordinary railways in 1887. The Mallet's Patent referred to on the plate is dated 1886,[10] and is devoted to the design of locomotives for Lartigue-type track; it includes compound working (which was not adopted on the demonstration locomotive nor on the L&BR) and various forms of articulated drive, one of which – the powered tender or coupled vehicle – was adopted on all these locomotives. It is interesting that the powered-front-bogie form of articulated drive, which by application to massive American locomotives made Mallet almost a household name, was also described in this patent in its application to the Lartigue system. It seems possible that it was Mallet's work for Lartigue that, while not particularly successful in itself, nevertheless paved the way for his subsequent success with articulated locomotives.

The leading technical and managerial figure in the LR Co. was Fritz Bernhard Behr, who was also Managing Director of the L&BR and later the promoter of the high-speed electric Lartigue system; he was an experienced railway engineer. It must have been his drive, rather than Lartigue's, which got the work proceeded with. The LR Co. was only a small one, however, with only £2,000 capital, formed primarily to acquire patents, and it was wound up voluntarily at the end of 1886 after the Westminster demonstrations, although not dissolved until 20 March 1906. It was bought by a new company, The Lartigue Railway Construction Co. Ltd[11] which was registered on 4 November 1886, and of which Behr was Managing Director. This company was much larger, as was necessary to cope with the construction of the L&BR, having an authorised capital of £200,000; but much of this was issued as paid-up shares to the various inventors and others who had agreements with the previous company, and insufficient fresh money was received. At the Extraordinary General Meeting of 29 August 1890 it was found desirable to reconstruct the company and it was decided to wind it up voluntarily. (It was not formally dissolved until 10 July 1906.)

The new, reconstructed Lartigue Railway Construction Co. Ltd was registered on 26 August 1890;[12] again Behr was the leading figure. Authorised capital was £125,000, and by 30 November 1892 about three-quarters of this had been raised in cash. However, on 8 June 1896 it was reported to the High Court that the company could not meet its debt to the Thames Iron Works & Shipbuilding Co. Ltd, and the court ordered it to be wound up. It was formally dissolved on 21 June 1907. Its dealings with the Thames Iron W&S Co. related to Behr's experimental high-speed electric Lartigue line and had nothing to do with the L&BR.

The Listowel & Ballybunion Railway Bill[13] passed its Second Reading on 22 March 1886 (not 2 April as stated by Newham) and received the Royal Assent on 16 April 1886. The L&BR Company had been incorporated on that day, and again Behr was Managing Director. I have not been able to investigate how its capital was subscribed, and Newham does not discuss it. Day and Wilson[14] state that the 'Lartigue Co.' put up the whole of the capital, but the official company records do not indicate that it had the necessary amount of available money to do this before 1890. Mackay,[15] writing in 1896, stated that 'the line was opened in 1888 with a capital of £11,000 5 per cent debenture stock, and £22,000 ordinary stock. Last year the line paid the interest on the debenture stock, and earned ½ per cent on the ordinary stock.' He also stated that the cost of construction was £3,666 per mile including rolling stock, which conflicts with the 'under £3000 per mile including rolling stock' stated both by the Inspecting Officer and by Newham. Newham stated that the LRC Co. had undertaken to construct the railway for the capital authorised by Parliament, namely £33,000, and if in fact Mackay was right about the actual cost (3,666 x 10, say about £37,000) this might help to account for some of the Construction Co.'s financial troubles.

The railway, as completed, was described by the Inspecting Officer of the Board of Trade in his report of 2 March 1888 (see Appendix 1). Newham was wrong in saying that he advised the fitting of Westinghouse brakes; such brakes were already fitted, and indeed had been fitted to the demonstration train at Westminster in 1886. Perhaps the misunderstanding arose because on the second inspection much later in the year it was found that the Westinghouse brakes had been removed when the carriages had been converted from 3-wheeled to double-bogie form, and the Inspecting Officer advised their restoration.

It is interesting that the vehicles had originally been 3-wheeled, as this is not mentioned in previous publications. However, Lartigue's patent of 1886[16]

describes his proposed carriages as 3-wheeled, the centre wheel being 'a broad drum' to allow for the passage of sharp curves. Nevertheless, difficulty had been found in getting the 3-wheeled vehicles round sharp curves. According to the Inspecting Officer's report of 2 March 1888 the sharpest curve was of 7 chains radius, and this would have given little trouble; assuming the fixed wheelbase of the vehicles was about 9 feet, this would have given a lateral displacement at the centre wheel of only about one-quarter of an inch, and assuming that the wheels were about 2-foot diameter, the angular error on the outer wheels would have been only 0.5° giving a misalignment of only plus-or-minus one-tenth of an inch for the double-flanged wheels to cope with.

It is clear from the report of 31 December 1888 that the difficulty arose on the points and sidings. The 'sharpest curve' of 7 chains (462 ft) radius must have referred only to the main line of the railway. On the points (the design of which is discussed below) the radius was stated in an article to be only 98 ft.[17] This really would have given trouble with the 3-wheeled vehicles: a lateral displacement at the centre wheel of nearly 1¼ inches, and an angular error on the outer wheels of about 2½° giving a misalignment of plus-or-minus half-an-inch for the double flanges to cope with. The fitting of the coaches with bogies would still leave the 3-wheeled locomotives in trouble, although their short wheelbase of 5 ft 8 in. and extra tread width on the centre wheel (2½ in. as against the 1½ in. on the outer wheels) would reduce the difficulty. (The makers' drawings — Hunslet Engine Co., order No. 9900 — confirm the figure of 5 ft 8 in.; this was the figure given by Benedict[18] and Sekon[19] although Newham said 8 ft 10 in. The figure of 2½ in. tread on the centre wheel is a correction, based on the makers' drawings, of the 2 in. given by Newham. Mallet's patent, on which the design of the locomotives was largely based, made provision for sharp curves by giving a design for a sort of spherical bearing on the outer wheels, enabling them to swivel and slide laterally whilst still being driven by coupling rods on cranks outside the frames; however, this system was not applied to the L&BR locomotives.)

Junction points for this unusual track clearly had to be of a very different design from those on ordinary railways. A turntable principle was used, but curiously this has usually been quite incorrectly described, even in the contemporary article in *The Engineer* (ref. 17) which has probably been the cause of some writers, even G. A. Sekon (ref. 19), saying that trains had to be uncoupled and vehicles turned individually in order to get them on to sidings. Even Newham's diagram is wrong in respect of the actual geometry, although not in the principle of operation. The correct kind of arrangement, along with some other schemes which were not adopted, is described in the patent specification[20] although the design requirements are not given, and in the event it was a simpler arrangement than that patented which was actually adopted. In Appendix 2 I have set out my understanding of the principles, and it will be seen that the arrangement gives true switched junctions. That the method of working there specified is the correct one is confirmed by a ciné film dating from c.1920 which is now owned by the Revd E. Boston of Cadeby in Leicestershire, and which he was kind enough to show me. However, if the curvature of the track is to be limited, the diameter of the turntable must be large and the cost therefore very large. If the curvature had to be improved from the actual radius of 98 ft to the 7 chains mentioned by the Inspecting Officer, the diameter of the turntable would have to be increased from its actual value of about 25 ft to about 53 ft — no doubt more than quadrupling the cost.

There are some surprising minor discrepancies between Newham's account and the Inspecting Officer's reports. The former does not mention the two-span river bridge and lists only two overbridges instead of five. It is hard to believe that the Inspecting Officer could have been wrong in this matter so closely

related to his inspecting responsibility. There is also a difference regarding the level crossings; Newham says there were 11, the Inspecting Officer says 26. (Examination of the 25-inch OS maps of 1898 (Sheet Nos. KERRY 4/11, 4/12, 5/13, 5/14, 10/7, 10/8, and 10/12) confirm the five overbridges but indicate only 19 'Level Crossings' by the use of those words. It is possible, however, that there were other level crossings not so labelled where minor paths crossed the track, and it is also possible that some were abandoned between the opening of the railway and the survey for the map in 1897.) There is a further discrepancy in the accounts of the way the two types of crossing were used. The Inspecting Officer is clear that the pivoted section of track was used at three public road crossings and three out of the 23 accommodation crossings. The bascule-type of flap, used to form a roadway *over* the rail, is used at the other 20 accommodation crossings. This agrees with the description (with drawings) published at the time (ref. 17), but is completely contrary to the statement made by Sekon (ref. 19) and by Day and Wilson (ref. 14); and Newham's account seems rather unclear.

There is a curious uncertainty over the number of passengers which could be carried in each coach; *The Engineer* of 1888 and Newham agree on 20 to 24 (for first and third class respectively), the Inspecting Officer says 36, and Mackay (ref. 15) compromises with 28. As each half of a coach was about 16 ft long by 3 ft 5 in. wide, the lowest figures certainly seem the most likely, and the evident error on the part of the Inspecting Officer is hard to explain.

An uncertainty over the numbers and types of vehicles is even more remarkable. The Inspecting Officer does not go into this matter, and Newham is very vague. *The Engineer* in 1888, Goodman in 1900,[21] and Sekon (ref. 19) 1924 give a detailed listing, as follows:—

	The Engineer	*Goodman and Sekon*
First-class passenger coach	3	1
Third-class passenger coach	4	7
Guard's van/3rd-class composite	2	4 'composites'
Horse-box/3rd-class composite	1	2 'brake vans'
Covered goods	2	
Cattle trucks	2	4 'goods wagons'
Open goods	2	
Step wagons	2	—
Sand wagons	20	20
Total	38	38

A curious feature of Sekon's article is that he makes no mention of the step wagons, . . . yet includes a photograph of one marshalled into a passenger train. (The steps, forming a double staircase providing a means for passengers to cross from one side of the line to the other, were essential on this system.) It is likely that *The Engineer* had the correct information, although it is quite possible that some alterations were made after opening. For instance, it would have been quite simple to convert two first-class coaches to third class.

The Inspecting Officer's reports do not mention the motion of the train, but there are conflicting statements in published work. Newham quotes Fayle as mentioning that 'there was an uneasy pitching . . . . ', but in another article (ref. 18) it is claimed that 'the running is smooth but noisy . . . There is little oscillation, the guide rollers being pressed against the rails by strong spiral springs . . . '. This matter was evidently important in view of Behr's proposal to use the Lartigue system for a high-speed railway. Indeed, Behr's demonstration of an electric train travelling on a sharply-curved Lartigue track at three times the maximum speed of the L&BR (i.e. at perhaps 75 miles an hour) in 1897 showed that lateral

stability could be attained.[22] Yet during the proceedings of the Select Committee of the House of Commons which, in July 1901, was considering the application for a Bill for the Liverpool-Manchester electric high-speed monorail line, W. P. O'Neill, chief engineer of the MGW Railway of Ireland, said he visited the L&BR in 1898 and 'the oscillation and noise in the cars was enormous'.[23] He also added that 'the main difficulty was due to the subsidence of the permanent way', a matter that otherwise seems to have escaped record.

As a final point, a discrepancy between the station track layouts as given by Newham and as given on the 25-inch OS maps surveyed in 1897 should be noted. Newham shows an extra junction-point at both Listowel and Ballybunion, but these could be later additions or the OS could be wrong. But he also shows the line to the beach at Ballybunion on the east of the line to the locomotive turntable, whereas the OS shows it on the other side between the turntable line and the loco-shed, leaving Ballybunion in quite a different direction. In this case, it is hard to believe the OS is wrong

APPENDIX 1

LISTOWEL & BALLYBUNION RAILWAY

Inspecting Officer's Report, 2 March 1888

Sir, I have the honor to report for the information of the Board of Trade that in compliance with the instructions contained in your minute of the 25th January I have inspected the Listowel and Ballybunion Railway.

The railway which is a single line of 1 mile [a curious clerical error for 10 mile?] in length has been constructed on the Lartigue monorail system. It is the first railway of the kind which has been constructed in the UK, though it has been used on the Continent for the transport of mineral traffic.

The permanent way consists of a double-headed steel rail weighing . . . . per yard fished at the joints and riveted to the tops of the legged steel trestles. The trestles are placed at . . . . intervals of about 3.25 ft, are generally 3.25 feet high (though on one part of the line they are higher for a short distance) and are riveted to transverse steel sleepers 3.25 ft in length, the steel sleeper being again fastened to rectangular transverse wooden sleepers 6 ft by 6 in by 2 in where the ground is soft longitudinal sleepers being employed on bogs. The ballast is of gravel.

Longitudinal guide rails are riveted at each side of each trestle at about 2.25 feet below rail level. The steepest gradient has an inclination of 1 in 50 and the sharpest curve a radius of 7 chains. The vertical limits of deviation in several cases and the horizontal limits in one case have been departed from without any objection having been raised by the owner or occupier.

The works are very light comprising

(1) 5 overbridges widest span 17 feet constructed with stone abutments and rolled steel beams with . . . . . between them.

(2) river bridge with 2 spans of 34 ft each the abutments and pier being of masonry and the top trussed timber beams.
(3) 15 culverts widest span 11 feet constructed in masonry and concrete with timber . . . . . or flagged.

These works appear to have been substantially constructed and to be standing well. The girders have sufficient theoretical strength and those under the line showed moderate deflection under test.

There are three authorised level crossings of public roads provided with proper gates . . . . . and 23 occupation crossings.

These crossings have been the cause of considerable difficulty owing to the level of the rail being 3¼ ft above the ground. In the case of the public road crossings and 3 of the occupation crossings the rail has been cut and the cut portion revolves on a pivot the joints of the cut being securely locked when the line is unbroken and signals being exhibited before the line is broken. In the other 20 occupation crossings revolving flaps are provided on each side of the rail secured to upright frames connected by a wooded beam at the top. In their normal positions these flaps stand in a vertical position and act as gates the chain by which they are worked being locked by a key in possession of the recognised crossing user. When the crossing is to be used the chains are unlocked and the flaps (which are hinged at the bottom) revolve until they rest on brackets attached to the rail, a signal fastened to the crosshead being put to danger directly the flaps begin to move.

The fencing is of post and wire.

A portion of the line is through bog which appears to have been successfully treated.

The stations are at Listowel (adjoining the Listowel station of the Kerry Railway), Lisselton and Ballybunion where the necessary accommodation is provided and at Listowel and Ballybunion means of turning the engines. Lisselton is not for the present to be used as a passing place. The siding junctions are made on much the same principle as the arrangements at those level crossings where the rails are cut.

The rolling stock consists of engines and tenders 1st and 3rd class carriages, brake van cattle and horse trucks goods wagons and sand wagons. The engines have three coupled wheels and two horizontal boilers one on each side of the rail. The tenders have two coupled wheels which by an arrangement for turning steam into a special cylinder can be used for haulage on steep inclines. The weight of the engines is 6½ tons and of the tenders 4½ tons. The carriages will accommodate 36 passengers and weigh about 3 tons each.

The rolling stock is all carried like the panniers on an ass's back the main wheels running along the raised rail with guide wheels on each side near the bottom running along the guide rails to check oscillation.

The whole of the rolling stock (except the sand wagons) is fitted with the Westinghouse automatic brake.

The line is well finished and the only requirements I observed are as follows

1. Mileposts are required and gradient boards for the more important gradients.
2. A handrail and platform should be provided at the river bridge.
3. The signals at the occupation crossings should be made larger.
4. At the public road level crossings and at the siding junctions at Listowel, Lisselton and Ballybunion the first operation connected with breaking the main line should put a signal to danger.

5. The sides of the abutments of the overbridges at 4½ and 8½ miles require turning off.
6. No unnecessary time should be lost in erecting a footbridge for communicating between platforms at the Old Listowel station.

I enclose a satisfactory undertaking as to the mode of working the line.

Looking to the nature and novelty of the arrangements the speed should be restricted to a maximum of 15 miles an hour and to 5 miles an hour at the public road level crossings and siding junctions until the additional precautions of requirements No. 4 have been carried out. Considering also the novelty of the arrangements an inspection of the line should I think be made about 6 months hence in order that an opportunity may be afforded of seeing what alterations or improvements (if any) may be required.

Subject to the above requirements of the completion of which the Board of Trade should be informed so that an inspection may be ordered undertaking and conditions I can see no reason why the Listowel and Ballybunion Railway should not be opened for passenger traffic.

I am informed that the whole cost of the line and rolling stock will not exceed £3000 a mile.

I have &c. .... Hutchinson, Major General R.E.

Further Report, 31 December 1888

Sir, I have the honor to report for the information of the Board of Trade that, in compliance with the instructions contained in your Minute of the 25th August last, I have reinspected the Listowel and Ballybunion Railway.

I made the reinspection some time ago, but waited to hear from the General Manager – which I have only just done – as to the completion of certain requirements before sending in my report.

The requirements noted in the inspection report of the 2nd March last have now been complied with, and I found that the line was in good order and working satisfactorily so far as passenger traffic was concerned; as regards goods traffic, I was informed that this had not yet been much developed.

The great source of danger on the line will always be the occupation level crossings and the utmost care and attention will be required in keeping the machinery connected with them in good working order and in seeing that the chains securing the flaps are kept duly locked by the users of the crossings.

It was found necessary (in order to facilitate the getting round sharp siding curves) to alter the whole of the carriages and to substitute bogie wheels at each end for the three wheels which had been first provided. In doing this the Westinghouse Automatic brake has been removed from the carriage wheels, and this should in my opinion be restored with the least practicable delay as the power of the driver to be able to stop the trains with the utmost possible rapidity is an essential element in the safe working of the line.

Subject to the remarks as to the occupation crossings and carriage brakes, I can recommend the Board of Trade to confirm their sanction for the use of the Listowel and Ballybunion Railway for passenger traffic.

I have, etc. .... Hutchinson, Major General R.E.

(Note: where a series of dots .... has been inserted in the above transcriptions, it indicates either that a blank occurred in the original or that the work was illegible. The manuscript available at the Public Record Office is a chemical copy of the original letter, and is not always easy to read.)

APPENDIX 2

THE JUNCTION-POINTS

The design of points adopted on the L&BR was that based on a turntable carrying a curved section of track, as shown in Fig. 3. By use of a shunting spur it could cope with a more complex junction or system of sidings, but the simple junction shown adequately demonstrates the principles. One line meets the turntable radially at A; the requirement is to connect it at choice to one or other of the two lines meeting the turntable radially at B and C. This is done by swinging the turntable on its axis at O either into the position shown or round into position shown by the dotted line. The minimum spacing between B and C is dictated by the width of the vehicles or loading gauge g. At a first approximation the minimum value of this spacing (g_1) may be taken as equal to g. The diameter of the turntable, d (=2r), dictates the angle θ (measured in radians); to a first approximation $\theta = g/2r$. The radius of curvature (R) of the track on the turntable is also dictated by the geometry already defined, for to a first approximation we also have $2r/R = \theta$. Thus approximately

$$2r/R = g/2r$$

giving $R = 4r^2/g$ if the size of the turntable is given, or $d\ (=2r) = \sqrt{(Rg)}$ if the radius of curvature is given. These are rough formulae, but adequate to show the order of dimensions.

If this design basis gives too expensive a turntable, the size may be cut by reducing the requirement for g_1 to equal or exceed g — i.e. by specifying that trains may not stand close to the turntable on both lines at once. Obviously, however, the vehicles on one line must clear the *track* of the other, so that g_1 cannot be reduced below about 2g/3. With this provision the formula for the minimum diameter of turntable become $d = \sqrt{(2Rg/3)}$.

It was stated in contemporary accounts that the radius of curvature of the track on the points was about 98 ft — say approximately 100 ft. The width of the widest vehicle was about 9 ft. Thus by our first formula the diameter of the turntable should have been $\sqrt{900} = 30$ ft. By our second formula, the absolute minimum diameter was $\sqrt{600}$ or about 25 ft. The diameter stated by *The Engineer* was 'about 25 ft'; so clearly the L&BR had adopted the minimum-cost specification. It is apparent from the photographs available that the spacing between lines at the turntables was less than the vehicle-width.

REFERENCES

1 D. G. Tucker, 'The Lartigue monorail: country crawler to electric express', *Trans. Newcomen Soc., 55,* 1983–4
2 French Patent No. 149301 of 31 May 1882; British Patent No. 2764 of 12 June 1882. Two later patents of addition were attached to the French patent, both in the name of Henri Carpentier, who was clearly an associate of Lartigue's.
3 *Mem. et C.R. de la Soc. des Ingénieurs civils* (Paris), 1884 (2nd vol.), pp. 16–25
4 'Single-rail railway', *Scientific American Supplement, 17,* 1884, pp. 6695–6
5 Brit. Pat. No. 7809 of 10 June 1886. I have been unable to trace any earlier French patent for this design of track.
6 A. T. Newham, *The Listowel and Ballybunnion Railway,* Oakwood Press, Lingfield, 1967
7 Public Record Office(PRO), MT29/49
8 PRO BT31/3567/21855.
9 'The Lartigue Railway', *The Engineer, 62,* 1886, pp. 223 & 225
10 As far as Britain was concerned, the patent referred to on the plate must have been Brit. Pat. No. 7810 of 10 June 1886.
11 PRO BT31/3753/23402
12 PRO BT31/4863/32287
13 *Journal of the House of Commons, 141*
14 J. R. Day and B. G. Wilson, *Unusual Railways,* Muller, London, 1957
15 J. C. Mackay, *Light Railways,* Crosby Lockwood, London, 1896, pp. 104–5
16 Brit. Pat. No. 7809 of 10 June 1886
17 'Listowel and Ballybunion Railway, County Kerry, Ireland', *The Engineer, 65,* 1888, pp. 174–6
18 'The mono-rail or elevated single-rail railway', *The Indian Engineer,* Special Supplement to Vol. 20, 2 June 1894; author believed to be E. Benedict
19 G. A. Sekon, 'The Listowel and Ballybunion Railway', *Railway Magazine, 55,* 1924, pp. 353–9
20 Brit. Pat. No. 7809 of 10 June 1886. Newham appears to be in error in attributing the invention to Behr, for the patent clearly states that Lartigue was the originator, Behr merely filing the British patent on his behalf. The simplified scheme used on the L&BR was patented in France (Brevet No. 189911 of 12 April 1888) by Lartigue after the opening of the L&BR.
21 F. Goodman, 'The Listowel and Ballybunion Railway', *Railway Magazine, 7,* 1900, pp. 163–8
22 *Engineering, 64,* 1897, pp. 40–41; *Electrical Engineer, 20,* 1897, pp. 262–4
23 *Electrician, 47,* 1901, pp. 534–5

Other works which are useful, particularly for photographs:–

(a) 'Listowel & Ballybunnion Railway', *Journal of the Irish Railway Record Society, 4,* 1956, pp. 19–23, 111, and 134–6
(b) H. Fayle, *The Narrow Gauge Railways of Ireland,* Greenlake Publications Ltd., London, 1946: Chaper 2, pp. 69–73 with photographs on pp. 56, 61, 62. (Note that Fayle states that 'the carriages . . . . were all suspended on two axles', but this can at no time have been correct.)
(c) A. Garner, 'Listowel and Ballybunion Railway', *Narrow Gauge,* No. 50, March 1969, pp. 2–4 plus 3 photographs and 3 pages accurate drawings of locomotive

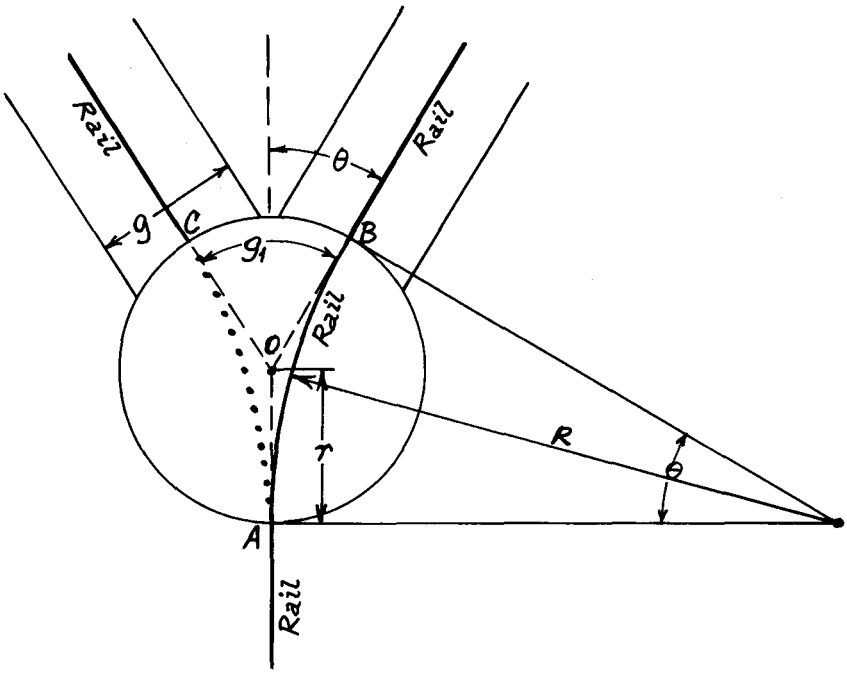


Fig. 3 Diagram to illustrate the principle of the junction points and to serve the calculation in Appendix 2

ACKNOWLEDGEMENTS

I would like to acknowledge the use I have made of the facilities, and the help given by the staff, of the Public Record Office, the Science Museum Library, and the Library of the University of Birmingham. I am very grateful to Mr David Tew, the Revd Edwin Boston, and Mr Donald Boreham for taking a lot of trouble to supply me with information and for giving me photographs and documents from their own collections. Their help has been indispensable.

'A passenger by the South Eastern Company's line at Rochester has just been sentenced at Quarter Sessions to one month's imprisonment, and two weeks' solitary confinement for 'stealing a railway ticket'.'

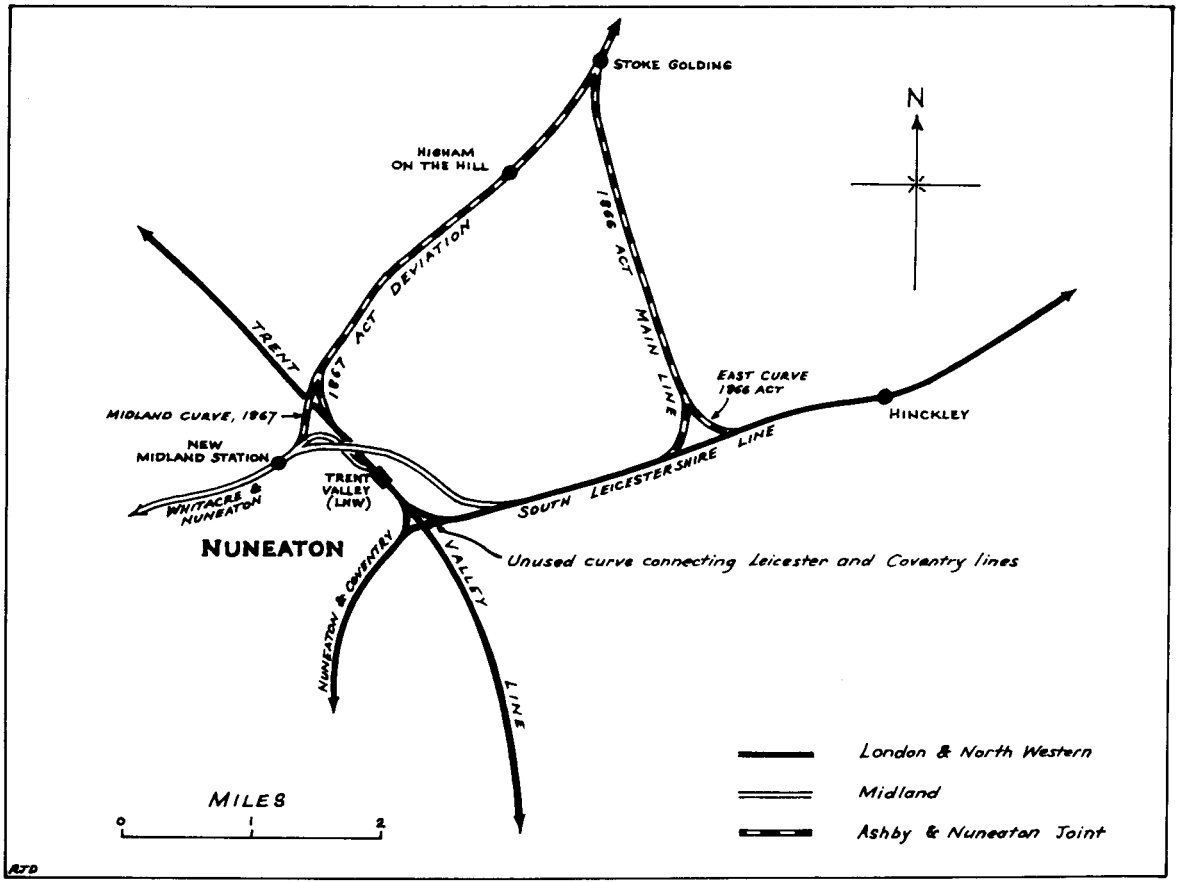
(*Worcester Herald* 26 Nov 1853) (*From Ronald Thomas*)

An Unused Railway: Hinckley to Stoke Golding

BY JOHN GOUGH

Plans for a railway between Nuneaton and the Burton-on-Trent or Ashby-de-la-Zouch area appeared early, for the Leicestershire coalfield was of natural interest to promoters.[1] In the fighting days of 1846 the Midland Company obtained powers to purchase the Ashby Canal and build a railway, but although the canal was purchased, this turned out to be one of the lines authorized to the company in that Session which remained unmade.[2] Interest in the area stirred again in the 1860s, still on account of the coal, and once more the Midland was in the field, accompanied this time by the London & North Western. Plans for two schemes were deposited in 1862, for an independent line between Desford and Elmesthorpe (the Burton-upon-Trent and South Leicestershire Junction Railway), and by the LNW for a line from a junction with the Trent Valley line at Nuneaton to Ashby-de-la-Zouch. In 1864 the LNW plan came forward again, apparently independently. In 1865 both the Midland and the LNW deposited plans for the 1866 Session.[3] The grandly-titled London and North Western and Midland Counties Coalfields Railway resurrected the plans of 1862 and 1864 for its main line and added a large number of branches. But in the Parliamentary competition with the Midland, which could claim the moral authority of already having had a line in the area authorized, this scheme could not prevail against the Midland one, and that company obtained its Act in 1866,[4] providing for the construction of a main line from a junction just west of Moira station to a junction on the South Leicestershire line facing towards Nuneaton by the second milepost of that line. There was to be a west curve at Moira to allow running towards Burton, and an east curve at the south end, terminating near the third milepost of the South Leicestershire. The Midland had full powers over the LNW South Leicestershire line by virtue of certain sections of the Nuneaton & Hinckley Act of 1860, and it had recently opened its own line from Whitacre (on the Birmingham & Derby line) to a junction with the South Leicestershire just east of Nuneaton.

However, the LNW had naturally opposed the Midland strongly in Parliament, and in the course of the normal machinations that took place on such occasions an agreement had been reached between the two companies that the line should be a joint one, and that an Act should be obtained in the next Session to authorize this and set up a properly-constituted Joint Committee to construct and manage the new railway. The necessary powers were duly obtained under the LNW Ashby & Nuneaton Lines Act of 1867.[5] Very soon the Engineers of the two companies were considering ways of improving the southern junctions, and on 7 November 1867 the new Joint Committee approved plans submitted by the Engineers (Baker of the LNW and Crossley of the Midland) providing for a new section of line from Stoke Golding (a village some three miles north of Hinckley) to the Trent Valley line just north of the LNW Nuneaton station, with a branch to the Midland's Whitacre & Nuneaton line and a consequential re-location of the Nuneaton station. The works would cost an additional £50,000. Abandonment of the portion of the already-authorized Railway No. 1 (the main line) forming the western curve at Hinckley would be possible.[6] It is quite clear that both companies would obtain much better connections in the westbound direction by these means. What is not clear – and seems nowhere to be explained – is just what the purpose of keeping the eastbound curve at Hinckley was. It could have given the LNW better access to Leicester, although the route would have been so


STOKE GOLDING
HIGHAM ON THE HILL
1867 ACT DEVIATION
1866 ACT MAIN LINE
N
TRENT
MIDLAND CURVE, 1867
NEW MIDLAND STATION
EAST CURVE 1866 ACT
HINCKLEY
TRENT VALLEY (LNW)
WITACRE & NUNEATON
SOUTH LEICESTERSHIRE LINE
NUNEATON
Unused curve connecting Leicester and Coventry lines
NUNEATON & COVENTRY
VALLEY LINE
MILES
0
1
2
London & North Western
Midland
Ashby & Nuneaton Joint
RJD

roundabout as not really to be competitive, but it appears to have offered the Midland no benefit at all, as better access was already available over the Leicester & Burton line. Nevertheless, the eastbound curve remained in the scheme, and formed part of the contract for the line, let in due course to Messrs Barnes & Beckett of Rochdale for £171,900.[7]

The lines were duly built, and on 29 May 1873 the Secretary of the Joint Committee, the Midland Estate Agent John Gratton, sent the First Notice to the Board of Trade.[8] The Second Notice followed on 9 July, and Captain Tyler was appointed to inspect. He found fourteen matters requiring attention, and so recommended the postponement of the planned opening. On 31 July the Board of Trade sent the appropriate notice to the companies. Nevertheless, on 1 August the line opened to mineral traffic,[9] as that opening did not require sanction. Tyler reported again on 21 August, by which time the line had also been opened to goods traffic (18 August). His report mentioned specifically the curves at Nuneaton and at Hinckley. Of the first he wrote: 'The (Midland) Whitacre Curve of this junction is not used. Some extensive alterations are to be made with reference to this Junction, which will therefore be subject to re-inspection at a future time.' Of the second he had the following to say: 'At the Hinckley Junction with the L&NW Ry, the telegraph-instruments had to be fixed, and the points to be put in, and some spikes are required in the chairs of the main line.' In itself the comment was not unusual, for companies often left the final completion of new junctions to the very last minute. It does indicate, however, that the line was not being used for the new goods-traffic services.

A week later, on 27 August, John Crossley, in a reply to the Board of Trade, gave the first intimation that the Hinckley line was not to be used. He confirmed that the Nuneaton junction was not part of the inspection, and he went on to write: 'The spikes and switches at the Hinckley junction of the L&NW line remain as seen by you. The officials report that the work will be done on Sunday, but inasmuch as it is not proposed to use this junction at present no inconvenience will result from excluding it from the permission to open the line.' Although there is no further mention of work being done, it does seem reasonable to assume that the work duly took place on the Sunday mentioned, as the Hinckley to Stoke Golding section appears as a line available for traffic for a number of years in John Airey's Railway Clearing House Junction Diagrams, the first entry being in the Supplementary Index of 1874 for a new issue of Sheet No. 76. The 'main' line was duly opened to passenger traffic, after a slightly unusual procedure with the Board of Trade had been followed, on 1 September 1873.

That no passenger service was operated over the Stoke Golding to Hinckley section is clear from a meeting of the Joint Committee on 14 January 1875 to which James Allport submitted a memorial from the local inhabitants together with a letter from a Major Wollaston of Shenton Hall asking for the opening of the line.[10] The matter was referred to the Solicitors for their advice on the liability of the Committee to open, and on 18 March a letter from the Midland Solicitor, Mr Beale, was read, which stated that 'it was not incumbent upon the Railway Companies to run trains upon the Loop line between Stoke Golding and Hinckley'.[11] This advice was presumably based on the fact that although railway companies were obliged to construct lines for which they had obtained powers, they appear not to have had to offer any particular form of service over them. The standard relevant clause appears in the 1866 Act (Clause 27), and it applies if the railway should be 'not completed and opened for public traffic within the period by this Act limited for the completion thereof.' Further memorials were received, and in June the question was referred to the Managers for advice. When they had responded the Committee duly decided on 13 October to do as they

advised and postpone the opening of the line.[12] On 10 April 1878 a report on the condition of the permanent way on the unused branch was considered, and again there was a reference to the Solicitors, this time to consider the position of the Committee with reference to the line and as to the removal of the permanent way materials. A report was considered in August, but consideration was deferred over several months. Finally it was decided on 11 December not to follow up the suggestion of removal, which appears to indicate that the Solicitors had had doubts about the legality of what was being proposed.[13]

The question of the loop line arose again in 1881, when on 21 April the inhabitants of Stoke Golding and its area once more sent a petition to the Board of Trade. The Board of Trade referred the petition to the companies, and they passed the matter over to the Solicitors for a reply to be drafted. The reply was received by the Board of Trade on 27 May, to the effect that the use of the branch for passenger traffic had never been contemplated. A copy of this reply was sent by the Board of Trade to the petitioners, and no further action was taken.[14] If there was really never any intention of running a passenger service then presumably some goods flow must have been in mind as the justification for the line, and it is intriguing for the modern critic to speculate as to what this might have been. A small piece of evidence that the line was soon afterwards not even available for goods traffic is given by the fact that it is omitted from the Ashby & Nuneaton Joint Line section of the LNW Table of Distances issued in November 1884.[15] The 1893 RCH Junction Diagram shows the line as 'dotted' and marks the junctions at both ends as closed.

The next reference to the line does not come until the end of 1888, and it is clear that nothing had happened in the intervening time as the minute relates specifically to the 1881 references. On 19 December the Joint Committee read a minute of the LNW Special Committee:[16] 'The Managers reported a suggestion made by Mr Noble as to propping up and fencing of bridges on the disused portion of the Ashby and Nuneaton Joint Line, and the removal of the Permanent Way Materials, as they can be used for repairs, which was agreed to, and Resolved, that subject to the Midland Company's concurrence, powers be taken at the next opportunity for the abandonment of this piece of Line, and resale of the Land. The matter to be mentioned at the Ashby and Nuneaton Joint Committee.' Consideration of the question took almost a year, for not until 16 October 1889 were decisions taken.[17] At that meeting it was noted that the Midland objected to the abandonment and sale, but agreed to the removal of the materials for use elsewhere on the understanding that if either company wanted the line restored, the work should be done at joint cost. It was also noted that the LNW Solicitor saw no objection to the removal of the materials. It had been agreed that the LNW should pay £3 per ton for the rails, fishplates, bolts, and spikes, and £2 per ton for the chairs. The sleepers were to be disposed of as firewood. The arrangement was approved, and the necessary instructions for the adjustment of the capital account were given.

This should have been the end of the matter. But for an unfathomable reason the Midland decided in early 1892 to request the restoration of the curve, and the Engineers were instructed to prepare the necessary plans and estimates.[18] However, the Midland's enthusiasm waned when it was announced that the cost of restoration would be £14,280 exclusive of signalling, and on 19 April 1893 it was decided that the matter should stand over.[19] Nothing further was done for some years. Then on 12 April 1905 it was necessary to consider a report from the LNW Engineer that the brick abutments of Bridge No. 8 on the disused loop were giving way. If the bridge remained, concrete counterforts would be required. This could be avoided by removing the wrought iron girders and floor

plates and by taking down about six feet of the abutments. As the Midland Engineer was in agreement, the work was approved, the Joint Account to be credited with the value of the girders recovered.[20] So the branch was formally severed thirty-two years after it had been completed. As far as is known no revenue-earning traffic had ever passed over its 3 mile 12 chain length.

On 17 December 1913 the line came up for discussion again. The Committee noted in its minutes that although constructed, the line had never been used for traffic because the Joint Line to Nuneaton had been built instead. The rails had been taken up, but the line had not been formally abandoned, and there was a cost of about £80 a year for the maintenance of fences and so on. The General Managers recommended that in order to avoid this and to allow the land to be disposed of to the best advantage the Midland should seek powers in its 1914 Bill for abandonment, and this was approved.[21] The powers were duly obtained by the Midland Railway Act 1914.

One of the conditions laid down in the Act was that a road deviation should be built where there had been a bridge. This was to be completed by the end of 1915. Authority was given on 16 December 1914 to purchase the necessary land for about £100 and also to sell the site of the old line. Six months later it was reported that the roadworks had been put in hand at an estimated cost of £2,800, and in October the Committee heard that the new section of the Hinckley to Nuneaton road had been opened on 25 August and would probably be taken over by the Leicestershire County Council. But the County Council had other ideas: it had declined to take the road over on the grounds that the work was unsatisfactory and not in the terms of the Act. The matter had gone to arbitration, and the arbitrator had awarded in favour of the companies.[22] So the question was concluded, and in a little squabble about a short piece of road the history of the Hinckley and Stoke Golding line came to its end. It is curious that there were two other lines in the near vicinity, also built at about the same time to provide connections between the Midland and the LNW, which appear not to have been used either. The Tamworth south-west curve was built by the Midland to allow the LNW access from Nuneaton to Burton-on-Trent. It was completed, but appears never even to have been inspected. And at Nuneaton a connection was built by the LNW (after considerable Midland pressure) from the South Leicestershire line to the Nuneaton & Coventry line to allow the Midland to run from Leicester to Coventry. This was completed and inspected, though when the Inspector saw it the facing points had not been put in. These were curves, whilst the Stoke Golding line was a substantial piece of railway. But the three together represent a significant amount of money laid out on which no return was ever achieved.

REFERENCES

1 The railway history of the area is discussed by D. L. FRANKS, *The Ashby & Nuneaton Joint Railway*, Turntable Publications, Sheffield 1975. See also Clement E. STRETTON, *The History of the Midland Railway*, Methuen, 1901, pp. 194–6, Robin LELEUX, *A Regional History of the Railways of Great Britain: Volume 9, The East Midlands*, David & Charles, Newton Abbot 1976, pp. 101–3, and P. Howard ANDERSON, *Forgotten Railways: The East Midlands*, David & Charles, Newton Abbot 1973, pp. 47–53

2 9 & 10 Victoria, c. 203

3 The Deposited Plans are in the County Record Office in Leicester, references QS73/137, 145, 155, 163, and 169.

4 The Midland Railway (Ashby and Nuneaton, &c.) Act 1866, 29 & 30 Vic. c. 315.

5 The London and North Western Railway (Ashby and Nuneaton Lines) Act 1867, 30 & 31 Victoria c. 94
6 Public Record Office, Kew (=PRO), RAIL 11/1 minutes 6 and 9. The alterations were authorized by The Midland and London and North Western Railway Companies (Ashby and Nuneaton Railway) Act 1868, 31 & 2 Vic. c. 49
7 PRO RAIL 11/1 minute 45
8 PRO MT6 106/19 The Ashby & Nuneaton Joint Line 1873
9 The opening dates are from PRO RAIL 11/1 minute 730 and PRO RAIL 1005/266
10 PRO RAIL 11/2 minute 902
11 *Ibid* minute 918
12 *Ibid* minute 976
13 *Ibid* minutes 1192, 1197, 1209, 1220, 1231
14 PRO MT7 89 entries numbered 4403, 4809, 5513
15 PRO RAIL 410/1239 pp. 12–14
16 PRO RAIL 11/2 minute 1863
17 *Ibid* minute 1887
18 PRO RAIL 410/69 No. 81, minute 839
19 PRO RAIL 11/2 minute 1971
20 PRO RAIL 406/1 minute 657
21 *Ibid* minute 1064
22 *Ibid* minutes 1114, 1195, 1345, 1354, 1393

Coaching: Some Questions

BY HARRY HANSON

The dearth of documentary evidence has resulted in academic studies on coaching being relatively rare. In perhaps the best of many 'popular' works, David Mountfield fairly summarised the long-held view that the mail coach of the 1830s 'represented the most efficient system of land transportation the world had yet seen'.[1] With equal justification the phrase might summarise the average Briton's view of the whole coaching scene. 'It was perfection.'

Brian Austen recently questioned the mail coach's revolutionary impact and his modifications are timely (if almost sacriligious!).[2] Perhaps the moment is long overdue when we should query other aspects of British coaching during the so-called 'Golden Age', circa 1820–37. These questions arose during researches for (yet another) 'popular' study.[3] Providing answers might prove more difficult exactly because detailed documentary material is so sparse, although, as Austen points out, some known sources have been neglected.

Such words as 'perfection' and 'efficient', although obviously loosely used, seemed open to qualification. By what criteria was British coaching thought 'perfect' and 'efficient' – in terms of speed, cost, numbers carried (per unit or per unit-cost of traction?), safety – or in style? Or in comparison with contemporary passenger transport systems overseas?

British writers on coaching did occasionally refer to foreign practice and accepted (albeit grudgingly) that the system most nearly approaching the British operated in France, where, as in Britain, there were mails (*malle postes*) and stages (*diligences*). *Bien entendu*, it was a very inferior second – and derisorily Gallic.

The *diligence*, an unwieldly lumbering heavy vehicle, was the 'acme of everything it should not have been'.[4] Stuffed with up to twenty-one passengers, all inside, it was 'something . . . . like a haystack on wheels', commented Nimrod (C. J. Apperley), who spent some years in France, and 'how slow it moves'.[5]

They looked 'unsightly' – rope harness 'so rude'; unblinkered horses appeared 'so wild'. And there was too much bluster and noise – 'in England one would have travelled at nearly twice the rate with one-tenth of the noise'.[6] With little control over the horses ('heavy snorting stallions' only 'one remove from the cart horse'), beyond a heavy pig whip and one pair of reins to five horses, the vehicle wandered all over the road.

'Changes' were too long and noisy for Nimrod, who remarked on the 'good quarter of an hour spent in changing horses [on the Lille *diligence*] and in jaw'. One seventeen-minute delay was caused by the guard's disappearance. He eventually reappeared accompanied by a butcher with a fresh-killed pig![7]

The mail too was a very superior cousin to the *malle poste* of which there were two types – one lighter carrying two passengers, driver and guard; one heavier, resembling a British mail coach without outside seats, carrying four passengers and crew. Both were usually pulled by four horses, the first sometimes by two. Again, although the French were 'exceedingly adroit in the administration of plenty of noise and bustle with neither horses nor whips spared' the result at journey's end proved exertions misapplied. 'There is plenty of galloping and rolling about, plenty of whipping and scolding', a *Times* reporter observed, 'but we miss the care and attention to the horses, the quiet and unobtrusive labour by which the power and energies of the team are reserved for . . . where they can be useful and the cool determination to be in the 'right place' and the 'right time''. There was no comparison between French 'trotting waggon' – 'good enough in its way' – and British mail coach.[8]

The French *cocher* was no coachman but a mere driver and a 'peasant' to boot – a rude fellow, not least in language.[9] He was constantly 'hallooing' and these 'halloos' fell 'so disagreeably' on the ears of travellers.[10] He wore a sort of hunting cap and a blue smock-frock which swelled up with the wind – ' a fair specimen of the *monstrum horrendum*'. The French *postillion* (passenger vehicles were driven by *cocher* on the box or by *postillion*) was equally 'leather lunged', drove like an English waggoner (by voice and whip) and was generally ' a perfect nondescript – half sailor, half soldier – a touch of the waggoner and a good deal of the labourer'. His seven-league boots added the final touch of ridicule for British observers.[11]

In Britain 'a portly, good looking coachman seated on a very high coach-box, well dressed, wearing white gloves, a nosegay in his button hole, and his chin enveloped in an enormous cravat, drives four horses perfectly matched and harnessed, and is carefully groomed'. The horses were changed smoothly and quietly at each 'change'. Nor were passengers interrupted by the coachman's voice (except in polite conversation with his box passenger) or the sound of his whip, which served 'more as a sort of appendage, than a means of correction. . .'.

We need not labour the glory of British coaching (more than adequately detailed over the years) but a Frenchman's assessment does add a certain objectivity to British splendour. De Haussez was equally unstinting in praise of British inns, an integral part of the coaching system. 'In many . . . larger towns they are magnificent, and . . . good and well supplied in the smallest. In the greater part . . . servants are in livery, and in all, their attendance is prompt and respectable' – all in marked contrast to travellers' experience elsewhere in Europe (and the USA).

However, this same Frenchman did have the effrontery to claim that, although roads, horses and harness *were* better in England, 'nonetheless our carriages took no more time in performing a given distance' and the '*malle poste* from Paris to Bordeaux takes no longer to perform the journey than the English mail from London to Edinburgh' – the same distance.

Apperley was quick to condemn the 'absurd comparison drawn between English and French travelling by Baron d'Haussez' – but noticeably counters the Frenchman's claims with scathing anecdotes about *diligences*, whereas on relative merits of *malle poste* and mail he is significantly silent.[13] And anecdotes equally unfavourable to *British* coaching experience are not in short supply (just rarely used).[14]

Much later, in 1862, the French General Morin claimed that the mails, of which the English 'had long boasted the speed, were at that time far surpassed by ours. and travelled at the utmost from twelve to fourteen kilometres per hour [7½ – 8¾ mph]' and could not resist adding 'in spite of the brilliant appearance of their four horses and the unvarying dignity of the coachman'. French *malle postes*, he reckoned, were averaging about 10 mph.

Much poring over 'old books of the London General Post Office' followed to show that the 'public mail service in England was not surpassed by the French and that what is set down as a 'boast' on the part of the English was only a statement of fact'. Further, 'many . . . stage coaches surpassed the mail coaches in speed.[15] But earlier, before the General's heretic words reached them, the old amateur 'whips' had been nostalgically disputing over the fastest coach in Britain. Then, under no pressure to satisfy national honour, 'An Old Stager' (Stanley Harris), freely concluded: 'The average speed of the mails, taking both four-horse and pair horse, was eight miles seven furlongs an hour; and in . . . 1836 there were only six mails which travelled at . . . ten miles and upwards'. (According to Harris the fastest was not the famous Devonport *Quicksilver* (9m 4f) or the Holyhead (10m 4f), but the Liverpool – Preston (10m 5f)).[16] Austen's study of Post Office records gives an average speed of 9.41 mph for sixteen four-horse (i.e. faster) mails in 1836, ranging from the Portsmouth (8.08 mph) to the Bristol (10.3 mph), rather implying that Harris was not far out.

All these British times excluded stoppages for meals and 'business'. They were average speeds of coaches on the move. Austen's average mail times, *including stoppages* (i.e. if total distance is divided by total journey time) was 9.21 mph.[17] Finch Vidler reckoned they averaged 'rather more than nine miles an hour throughout England' in 1835.[18] Clearly most mail coaches were averaging less than 10 mph, whether including stoppages or not, and may were well below that magic figure.

Whether Morin's times included stoppages is unclear (and he probably exaggerated too – coach times are rather like fish that got away!), but the Duke of Beaufort, himself a keen British amateur during the coaching era, did later admit that the *malle poste* 'fully equalled the pace at which ours travelled', including stoppages, and was 'quite up to the Devonport *Quicksilver* Mail, the Exeter *Telegraph*, or the Shrewsbury *Wonder* [day coaches], viz eleven miles an hour'.[19] (More exaggeration here perhaps, since maximum speeds quoted by Harris for the *Quicksilver* were 9.5, the Exeter 9.7 and the *Wonder* 10.3 mph including stoppages).

Whatever the exact ins and outs of British and French mail speeds, it does seem there was little between them and the French may indeed have had the edge – perhaps not necessarily much faster on the move, but possibly stopping less. 'In England', wrote d'Haussez, 'whether it is to satisfy the taste for frequent meals, or to favour the longing of the coachman and guards for beer and strong liquors,

the relays are more frequent.[20] By contrast, *malle postes* 'were inconveniently fast to the traveller', according to the Duke, 'for as these changes of horses were effected in forty-five seconds he had not the time to get out to stretch his legs, excepting at long intervals when at a post office bags had to be taken in or out'. In Britain, in the depths of night, it took much longer to change the mails with only one horsekeeper.

For all they were 'inconveniently fast', the Duke did conclude: 'From Calais through Paris and Lyon to Marseilles by *malle poste* was something like travelling, as good as going from London to Edinburgh or Glasgow by the mail, and in a much more comfortable carriage'. And when he wrote 'it had reached the highest state of perfection to which man and horseflesh could be brought', it was not to the mail, but the *malle poste* that he referred.[21] Again, much depends on the meaning of 'perfection' and obviously we need to know much more about comparative modes of operation, speeds, costs, etc., as between French and British mails.

The British Post Office was obliged to pay out ever higher rates to contractors (i.e. suppliers of horses over the various stages) and significantly in 1832 was seriously considering adopting the French *malle poste* system. Athol Maudslay often wondered 'why it was necessary to employ a coach to carry mail-bags, and why fast and light mail-carts would not have done far better'.[22] But however much the system was looked into the same inevitable conclusion was drawn – it was the best method simply because 'the mail is in fact conveyed without any charge to the public'.

The Post Office paid as much as 8d per (double) mile (i.e. going and returning) on some routes for horsing, but the average rate was 4d. These same contractors were obliged to pay 4d mileage duty to the Stamp Office, an annual licence fee of £5 on each coach and £1.5s each coachman.[23] As Stanley Harris commented: 'so far from the conveyance of letters being an expense to the country, it was a profit of more than two thousand a year for the stamp duty paid by the horse contractors . . . in . . . 1836 . . . amounted to £53,000 . . ., while the amount paid for horsing was £50,000'.[24]

The contractors aimed to make profits from passengers and small parcels. But despite increased payments from the Post Office most mail contractors came, in the 1820s, to run them at a loss. Costs rose with the higher speeds demanded by the Post Office, but the main source of profit, passengers, increasingly found the mails' higher fares too expensive, night schedules too inconvenient, preferring to travel by the growing number of fast day coaches.

In the organisation of coach operation eight men, say, might contract to horse a coach eighty miles, each having ten (double) miles, settling up, often through a settling agent, every twenty-eight days. From the gross receipts would first be deducted certain charges – road tolls (for stage coaches – mails travelled toll free), duty to government, coach hire (3d per double mile per month for mails; around 2½d for stage coaches), coachmen's and guards' wages (the Post Office paid mail guards) and other items. Supposing £480 remained, this was divided among the eight contractors – £60 each. From this they must pay for their horses. Any remainder was profit.

The coach system used and consumed prodigious numbers of 'cattle'. Fast coaches needed a horse a mile – three hundred animals horsed the five daily London–Southampton (60 miles) coaches in 1832[25] – although some easier country stages might get by with eight for a ten mile stage. Horses could be expensive and were replaced every three to four years. London horses averaged

between £35 and £45, falling to around £25 in the provinces and perhaps £23 in northern counties, although there were many 'screws' and variously blemished horses at work (where there was less need for 'show') costing £15 or less.

In 1827 it was reckoned a horse cost 25s per week in maintenance – i.e. £5 per mile per month. Hence contractors were agreed that a mail could not be run at under £5 per mile per month (after the initial deductions) – some London proprietors calculated between £5 and 5 guineas – although country contractors might do it for £4.10s. William Horne claimed the most any contractor earned in 1827 was £4.10s. Charles Johnson, Superintendent of Mail Coaches, admitted 'a majority of our mail-coaches are not earning what is considered the minimum for a public carriage' and 'I wish it was a better business to the contractors . . .; then we should have much less trouble with it'.[26]

Still, despite his troubles, he did generally find contractors and the mail *was* carried regularly and rapidly. But why were these men prepared to work at a loss? Mainly because the mails' prestige, with their reputation for speed and punctuality, for being well done (the Post Office kept tight control), had a spin-off onto their other coaches and business (mainly inns). 'We often horse a mail for nothing at all, because it leads to other advantages', said W. Horne. Mails were 'leading and fashionable things'.[27] 'Royal Mail Coach Office' implied that the best coaches ran from there and attracted more custom. So mail continued to be carried in unnecessarily large, unnecessarily elegant, and increasingly empty unremunerative conveyances. The main question must therefore be put: was the existing system the most efficient way of carrying mails (and passengers) in the 1820s and 30s? Or , was it advancing into a state of glorious ossification (if not already in it) and, in the best traditions of classical tragedy, did its sudden demise spare inevitable disillusionment and leave such tender memories?

In any event, the mails' importance has been exaggerated because they accounted for only about 8% of all coaches in use by the mid 1830s.[28] A few fast day coaches *were* travelling faster, if not always consistently faster, than the mails, which ran mostly at night (although perhaps not faster than most French mails) and, by all accounts (although not proved) most stagecoaches outstripped *diligences*. But even if true, *diligences* had considerable advantages over British coaches. One *Times* correspondent did admit that French public conveyances were 'probably much safer'.[29]

British coach travel was fraught with hazard and, in terms of passenger miles, probably had a higher death and injury rate in the 1820s and 30s than any previous or subsequent form of public transport by land. These accidents have been glossed over almost humourously by coaching writers. The fact remains that official returns show twenty people killed and seventeen injured by railways (only ten killed being actual passengers) out of forty-four million who travelled over those lines in the period 1830–8.[30] There are no statistics for coach accidents. The number of passengers must have been less; those killed and injured during the same period are much higher, even excluding pedestrian casualties. Contemporary newspapers are studded with details of accidents where people died or were gravely injured. And many accidents never appeared in newspapers.

There was a high accident rate partly because the vehicle was badly designed for its role – although it looked 'nice'. It was too high off the ground and liable to upset at the least provocation, even when not over-loaded, which was frequently the case. It was pulled by high-mettled 'cattle', quite likely to bolt for little apparent reason, at speeds it was not built for. Parts were prone to collapse – axle trees and poles broke with alarming frequency, wheels fell off, and the coach was liable to over-run the horses on hills since the only 'brake' was the skid pan

(not always used) which locked one rear wheel. Worst of all there was the 'human element' – drunkenness, carelessness, recklessness – in all quarters of the industry.

Surely the French must have been as bad if not worse? Apparently not so. Human frailty was less evident because of the law. The British judiciary fulminated but rarely backed up words with strong action. The French did.

Poles rarely broke in France because they were encased in iron; wheels rarely came off because they had especially safe linch pins; axle trees were better designed so vehicles would continue upright if they broke. Every *diligence* had a *méchanique* which the guard applied from his position to slow *both* rear wheels on *every* hill. These features could have been redesigned for British coaches, but rarely were. Apperley admitted that the *méchanique* would have saved more than 'three parts of the accidents that occur on our fast coaches', not least through holding back runaway horses.[31]

Why were these safety aids constantly rejected? Ostensibly because of weight and cost, and additionally with the *méchanique*, because it would make horses lazy. Basically it all came down to *style*. They would destroy the aesthetic glory of the ensemble. British coachmen, for example, saw the *méchanique* as a 'cissy' device – as a reflection on their ability. Similarly, breeching, which would have helped wheelers hold back, rarely featured in coach harness, partly because of cost, but mostly because it was considered rather 'namby pamby' and did not look 'natty'.

Whatever question marks hang over the pluses and minuses of each country's public passenger conveyance system about one aspect there can be no disagreement. The British had 'style'.

Why this tremendous emphasis on 'style'? Put simply, it was because the coaching system became the plaything of the 'upper ten thousand'. This class would not normally have travelled by public conveyance but 'posted'. It was the craze for driving four-in-hand, from early in the century, that led many aristocrats and gentry to travel by public mail and stage simply to pick up tips from professeional coachmen or in hopes of getting a drive. Some became so enamoured by coaching mystique that 'heirs to dukedoms, lords, baronets and esquires, not only were driving their [own] four-in-hands, dressed as the servants of the public, but they imitated their manners and customs, and with their own private carriages mimicked . . . public ones, absolutely pulling up at the *White Horse Cellar* and pretending to deliver parcels'.[32] Some went so far as to become full-time coachmen and on almost every route there were countless 'amateurs' ever ready to give the coachman 'a bit of a rest' and 'finger the ribbons'.

All this is well known (although perhaps not the extent of it), but the consequences have been less considered. These were the people who demanded 'style' – a chic coachman on the bench, high-mettled 'cattle', a showy turnout – and could afford to pay for it. It was *they* who dictated the form of the coaching system. But perhaps the British paid dearly for 'style'. As one foreigner concluded: 'The taste for travelling, an expensive taste in any country, is truly a ruinous one in England' and, although in *some* ways it might be more pleasant than in other countries, 'one is steeled against this seductive consolation by the perpetual warning of a speedily drained purse'.

The benefits of English inns did not come cheap. 'Your discontent does not commence till the exorbitant bill proves that such attentions, far from being disinterested, are on the contrary dearly charged for'.[33] For though coach travellers meals were expensive, and quality was not always as one has been led to expect from drooling descriptions of dinner-stop menus.

Lord William Pitt Lennox, one of the more honest amateurs, did remember the huge sirloin of beef, or boiled leg of mutton, but 'with . . . potatoes hot outside and hard within' and arriving as 'a plate of raw beef, or underdone mutton with . . . sauce, the butter of which reminded one of bill-stickers' paste' and little time to eat it. Lord William was quite explicit: 'the dinners, with few exceptions were execrable'.[34] 'English innkeepers', concluded Nimrod, 'are for the most part shamelessly indifferent to the comforts of coach passengers and ought to be shown up oftener than they are'.[35]

Fares varied according to the route and competition, but were generally high. Outside fares were around 2½d–3d; inside 4½d–5d per mile (mails often higher), whereas railway fares in the 1840s were around 3d first class, 2d second class, 1½d third, and 1d parliamentary. Eleven and a half guineas inside, seven and a half outside was the fare for the forty-odd hour journey from London to Edinburgh, according to Edward Corbett; by parliamentary train it took nine hours and cost £2.[36]

Expenses on the road – meals, tips to porters and waiters – boosted costs further. The stylish coachman and polite guard demanded hefty fees as their right – perhaps 2s to each coachman (who changed relatively frequently) and 2/6d to the guard per 100 miles. All these extras brought the London–Edinburgh journey to £14 in and £10 out. The French driver may have lacked British panache, but was 'a civil fellow to his passengers without expecting to be paid for it'. He looked 'healthy and happy'.[37] British coachmen looked healthy too, but far from happy if a passenger refused to be 'kicked'. In truth many were polite and obliging with those it paid to be. Doubtless the reverence of the 'upper crust' gave many elevated presumptions.

Yet, despite the ruinous cost of travel, almost unbelievably, many proprietors, like mail contractors, lost heavily, perhaps even more heavily. As early as 1827 William Chaplin, the great coach magnate, commented: 'I have not a shadow of doubt that, were the coaching account of the nation kept regularly, the whole is decidedly a loss . . . and the public have the turn'.

The economics of fast stagecoaches were much as for mails. Although they could carry more passengers – perhaps fifteen compared with seven – and coach hire was cheaper, they had to pay tolls. Chaplin reckoned £7 per mile per month was needed to break even – £2 for the various collective expenses and £5 for horses. 'I do not think their average [share] is £4'. Peter Mountain agreed. 'I should think . . . very few coaches . . . average £4 take the year round . . .; the thing is over done'.[38]

Competition had increased still further when ten years later Christopher Kemplay, a settling agent, could 'safely and conscientiously say' coach proprietors' business had been unremunerative for some years past.[39] The obvious opulence of Chaplin and other 'town' proprietors implies that *they* were not making losses. The real burden of maintaining this ruinous style fell not only upon passengers but also upon the many 'country' proprietors who 'horsed' coaches over the unremunerative 'middle ground'. London coachmasters had their great inns. Passengers travelling up to London *did* stay at the 'house' of the proprietor in whose coach they came – 'thus the *Old Bell Inn*, Holborn was the resort of the residents in Bucks and adjoining counties, the *King's Arms*, Snow Hill, for Warwickshire and Northamptonshire; the *Spread Eagle* . . . and the *Swan with Two Necks* [both Chaplin's] accommodated the dwellers in Essex . . .'[40] Likewise provincial proprietors, such as William Waddell with his *Hen and Chickens* in Birmingham.[41] Also, 'town' proprietors cynically used 'country' partners.

True, costs were lower in the country and less remunerative stages should not have mattered since the share out was, in theory, equal, according to mileage. It was less equitable than appeared. 'As an old coach proprietor, I must perforce recount a few of the grievances which we country proprietors loved to air', wrote John Fowler, of the *White Hart*, Aylesbury.

> The London firms had many great advantages. Every coach that left any booking office was charged over £1 per month for booking passengers, and as many hundred coaches ran into London, at £12 per annum each, it became a very large sum for the Londoners to pocket, . . . some thousands a year. Each coach was charged 12s 6d a week for washing and greasing; . . . for every parcel or passenger . . . 2d for booking; the coachmen paid their takings into the London end, and thus the London proprietors had thousands always at their bankers.[42]

Often, too, town proprietors negotiated a rate for coach hire and charged partners above it.

Of course, country proprietors had their inns too – most were innkeepers, although coachmen often horsed a stage or two. (Others did try horsing coaches, but not for long, unless they had a considerable fortune. Some even lost this.) Landlords had originally gone into coaching so people would stay the night, then as speeds increased and overnight stops diminished, so they would eat there. But, as speeds increased again, this 'greatly diminished the advantages . . . coaches could produce to an inn', said Kemplay in 1837.[43] Many were making considerable losses by the 1830s and were subsidizing transport activities, including their inn, from farm profits. So why on earth did they continue to do it and for so long?

Partly, of course, man's natural conservatism, inclined them to continue in what they knew and understood; inertia and fear of alternatives leaving them treading the same path. Things might improve – although few proprietors really believed it. But there was more to it than that. William Wimberley, another settling agent, commented on the peculiar situation where 'persons will have coaches going whether they gain or lose; there is . . . that strange system in the coaching interest, that persons will put on coaches merely for the sake of putting them on' and could keep them running unprofitably rather than allow others to take over their route. Kemplay had also noticed, 'very frequently an opposition has been carried on by the old coach masters from a sort of attachment to the road, a desire to keep it to themselves, and a spirit of party against all intruders and they have somtimes lost large sums of money'.[44]

It is even possible, if seemingly unlikely, that town proprietors like the Chaplins, Hornes, Shermans, Mountains, *et al*, were in the same sinking boat long before the railways and that they too lost money on their coaching. Peter Mountain claimed in 1827 that 'there is not a coach out of our yard that averages [£4] . . . one or two of them £4 to 4 guineas'. Could it even be they were not making money (or enough money) on their inns? Chaplin insisted, were he not 'benefited by a sort of agency or warehouse business [note not his inn] attached to an extensive concern', he could not work his coaches. It would be unwise to accept too readily claims of such interested parties. Perhaps 1827 was a bad year. But it bears investigation.[45]

As for the country proprietors, it seems, according to Wimberley and Kemplay, that these otherwise hard-headed businessmen continued mostly because of pride and egotism and a desire to be part of something 'flash'. Perhaps, too, there were small boys inside big men 'playing at coaches'. British coaching was geared to cater for a class that did not really need it. It was men of this milieu

who looked back so nostalgically. Travellers of more limited means (not necessarily poor) were understandably less enamoured. The working class was virtually excluded from travel by coach. Perhaps we might question whether foreign systems, although lacking British style, were not more in tune with the needs (and purses) of their travelling public. One of Apperley's criticisms of the Calais–Boulogne conveyance was its cheapness! – 'the fares are too low to do it well. What can five francs, or four shillings and two pence in, and out, do for twenty-four miles of very severe road'.[46]

Of course, we must hesitate before attempting too rigid comparisons from a few anecdotal accounts, but there are possibilities and probabilities which could be more thoroughly investigated. The possibilities are that the lighter French mails (although noisier) were, on average, faster than British and more comfortable. Can it be established if they were more 'economic?' Stagecoaches were probably faster than *diligences*, but fares (and other costs) were likely to be much more expensive, and there were almost certainly more hidden costs in Britain caused by accidents – replacement costs, burial and medical expenses, loss of earnings, legal expenses, etc. French horses were not much to look at, but were more malleable, lasted a great deal longer than British and cost less to buy and maintain. In fact, British vehicles were so expensive to run that in spite of high fares, profits to many – perhaps most – contractors and proprietors were thin or non-existent from the 1820s. We need details of French proprietors' costs and profits, especially of the French industry's contribution in road tolls and taxes. In Britain these were substantial. Chaplin reckoned tolls accounted for between 12s and 15s per mile per month;[47] each London–Manchester coach paid £5-13-5d per day. Benjamin Horne paid £26,717 per annum in mileage duty alone in 1836. Kemplay reckoned duty on a Leeds–Newcastle coach, £864-10s for one year, came to 13 per cent of gross receipts. In the year ending 5 January 1837 the coaching industry paid £503,742-14-8½d in mileage duty; £20,113-16s in licence fees; and over £3,000 in taxes on coachmen and guards.[48] Even so, a large part of coaching's high costs resulted from the style in which it was operated. For instance, a British stagecoach cost around £140. In Ireland, Bianconi's cars, carrying fifteen passengers at nine miles an hour at 1¼d per passenger per mile cost £60-£70.[49] But like the *diligence* it did not look 'nice'.

The main question which must be put then is this: is it not possible that the French system served the needs of the French economy and people better than the British system the British – in spite of its glory? The fashionable interest taken by high society in coaching forced 'style' upon it. This made the whole system ruinously expensive (and dangerous) and more exclusive than necessary. True, the coaching industry did have something of a multiplier effect and was an important generator of employment, not least in country districts. One could even argue, tongue in cheek, that since the upper echelons (passengers and proprietors) were quite happy to throw away their money and the working class delighted to pick it up in the form of relatively lucrative jobs (coachmen and guards, for instance, were said to average £300 a year from 'fees') coaching redistributed considerable wealth and should be ranked with the Co-op as an early socialist institution! But more slower, cheaper, safer, long-distance vehicles (like *diligences* and Bianconi's system of cars in Ireland) might have served Britain's interests better, and just might have gone some way to alleviating intense working-class poverty in southern rural counties by enabling more people to move to industrial growth areas.

As a Frenchman might have said: *'C'était magnifique; mais [peut être] ce n'était pas économique'.*

REFERENCES

1 David Mountfield, *The Coaching Age*, Robert Hale, 1976, p. 63
2 Brian Austen, 'The impact of the mail coach on public coach services in England and Wales, 1784–1840', *Journal of Transport History*, Vol.II, No.1, 1981, pp. 25–37.
3 Harry Hanson, *The Coaching Life*, Manchester University Press, Manchester 1983
4 Duke of Beaufort, *Driving*, Longmans, 1889; 1894, p. 328
5 Nimrod, *Mr Horse and Other Essays*, edited E. D. Cuming, Blackwood, 1928, p. 230
6 *Times*, 21 January 1834
7 Nimrod, pp. 234, 230, 235, 236
8 *Illustrated London News*, 25 November 1843, p. 340
9 *Land and Water*, 3 April 1875
10 Baron d'Haussez, *Great Britain in 1833*, 1833, p. 75
11 Nimrod, pp. 233, 232
12 D'Haussez, pp. 73–4, 75, 88
13 Nimrod, p. 198
14 See Hanson, *The Coaching Life*
15 *Land and Water*, 3 April 1875, p. 248
16 *Ibid*, 9 January 1875, p. 20
17 Austen, p. 33
18 *Report of the Commissioners for the Management of the Post Office*, 1835, HC 313, xlviii, p. 69 (*Post Office Commission*)
19 Beaufort, p. 327
20 D'Haussez, p. 73
21 Beaufort, pp. 327, 329
22 Athol Maudslay, *Highways and Horses*, Chapman and Hall, 1888, p. 130
23 *Post Office Commission*, 1835, pp. 4–5
24 Stanley Harris, *Old Coaching Days*, John Bentley, 1882, p. 166
25 *SC on Observance of the Sabbath Day*, 1831–2 (697), viii, q. 1959
26 *Post Office Commission*, 1835, pp. 39, 44, 45, 46, 47, 21, 36
27 *Ibid*, pp. 39. 21
28 Austen, p. 28
29 *Times*, 27 August 1828
30 *Railway Times*, 1838, p. 120
31 Nimrod, pp. 148, 172, 186–9
32 G. F. Berkeley, *My Life and Recollections*, Hurst and Blackett, 1865, p. 268
33 D'Haussez, pp. 67, 76
34 Lord William Pitt Lennox, *My Recollections*, 1806–73, Vol. I Hurst and Blackett, 1874, p. 123–5
35 Nimrod, p. 237
36 Edward Corbett, *An Old Coachman's Chatter*, Richard Bentley, 1890, pp. 41–2
37 Nimrod, p. 233
38 *Post Office Commission*, 1835, pp. 44–5
39 *SC on Taxation on Internal Communication*, 1837 (456), xx, q. 455 *(SC on Taxation)*
40 John K. Fowler, *Echoes of Old Country Life*, Arnold, 1892, p. 220
41 Eliezer Edwards, *The Old Taverns of Birmingham*, 1879, pp. 89–90
42 Fowler, pp. 218–9
43 *SC on Taxation*, 1837, q. 481
44 *Ibid*, qq. 467, 481
45 *Post Office Commission*, 1835, pp. 45, 44

46 Nimrod, p. 234
47 *Post Office Commission*, 1835, p. 45; Land and Water, 28 November 1874, p. 410
48 *SC on Taxation*, 1837, q. 54, 475, 350
49 *Illustrated London News*, 5 April 1845; p. 213; *SC on Postage*, 1837–8, HC 658, XX-II, q. 10201. There were no taxes on Irish transport, although road tolls, according to Bianconi, were a greater burden than in Britain.

Review Article: The Development of Boats and Ships in England up to 1600

BY GRAHAME BOYES

Although this article attempts to provide a brief outline of the evolution of the boat in England from earliest times up to 1600, it is primarily a guide to the available literature for those who wish to study the subject in greater depth. It arose out of the writer's need to understand the early types of boat used on English rivers, as background to his researches into the history of inland navigation in medieval England. However, it also covers sea-going vessels (except for the specialized ships developed for the king's navy from the fifteenth century onwards) since, for most of this period, such vessels were small enough to sail considerable distances up the main rivers. Coastal ships came up to York, for example, even before the river was improved in the eighteenth century, albeit with increasing difficulty as they increased in size.

At the start it is necessary to recognise two general points. Firstly, for much of the period under review our knowledge is based on a very small number of archaeological finds. The interpretation of this material can, therefore, vary between different experts and change significantly as new archaeological evidence is discovered. For this reason, the earlier classics on the history of the ship have been disregarded. Nevertheless, in distilling a coherent story from the recent writings of several authorities, the present writer is inevitably guilty of presenting an over-simplified account, which glosses over these differences of interpretation. Secondly, the geographical boundaries of this review are entirely artificial; the technology found in England is largely an amalgam of traditions found elsewhere in Europe and our knowledge of the former is partly based on archaeological work on the Continent. Maritime archaeology is essentially an international discipline, a fact emphasised by the title of the leading journal in this field – the *International Journal of Nautical Archaeology and Underwater Exploration (IJNA)*.

General Surveys

The 10-volume series entitled *The Ship*, published in 1980–1 by the National Maritime Museum under the General Editorship of its Director, Basil Greenhill, undoubtedly deserves its claim to be the most authoritative short history of the ship ever published, and it is an indispensable starting point for the study of ship

design at any period. The two volumes covering the period here reviewed are nos. 1 and 3: Sean McGrail, *Rafts, boats and ships from prehistoric times to the medieval era* and Alan McGowan, *Tiller and whipstaff: the development of the sailing ship, 1400–1700.*

Basil Greenhill, *Archaeology of the boat: a new introductory study* (Black, 1976) provides a more detailed analysis of the technical aspects of boat construction during the whole period from prehistory up to the fifteenth century, comparing them with the traditional boat-building techniques still found in various parts of the world. Another book with a similar theme is Douglas Phillips-Birt, *The building of boats* (Stanford Maritime, 1979).

Many of the books and papers referred to in this article are illustrated with photographs or drawings of archaeological remains or with reproductions of contemporary illustrations, from which it can be difficult to form a clear picture of the original vessels they represent. The main reason, therefore, for including the following two books in this review is that they are profusely illustrated with 'reconstruction' drawings, which interpret – clearly and to scale – this original evidence for us. Bjorn Landstrom, *Sailing ships* (Allen & Unwin, 1969) contains 339 drawings illustrating the development of sailing ships in the western world. *The coastal trade* (Bourton Press, 1975) concentrates on the sailing craft of British waters from 900 to 1900 and comprises 45 large colour plates painted by Lionel Willis, with an introduction and extended notes on each plate by Basil Greenhill.

The Prehistoric Period

Paul Johnstone, *The sea-craft of prehistory* (Routledge & Kegan Paul, 1980) provides a good comprehensive account of the prehistoric period. The first section is a general survey of the various types of prehistoric craft – log rafts, reed boats, bark craft, skin craft, logboats, and the early plank-built boats. This is followed by a geographical survey, of which 20% is devoted to the British Isles.

There seem to have been two separate traditions of boat-building in Britain, derived respectively from the skin-covered coracle and the logboat (or dug-out). The coracle appears to be the older, probably dating back to the Mesolithic period (c. eighth millenium BC), whereas logboats imply the use of Bronze Age tools, or at least the more sophisticated stone tools of the Neolithic period (c. third millenium BC in Britain).

There is definite evidence of sea-going trade around the British shores from the middle of the fourth millenium BC onwards, probably in skin-covered boats rather similar to the Irish fishing curragh of recent times. The distribution of archaeological finds suggests that this type of boat, which was well suited to the rough seas of the Atlantic coast, predominated in Ireland and the west coast of Britain through to the Viking invasion. On the eastern side of Britain, however, Johnstone concludes that skin-covered boats were largely superseded by wooden craft, both for inland waters and the open sea.

The oldest method of propulsion was the paddle. Oars were certainly introduced for both skin and wooden boats at a fairly early stage, but it is uncertain when the sail was introduced to Britain. Hauling with men and ropes was no doubt another very early form of propulsion on rivers.

James Hornell, *British coracles and Irish curraghs* (Society for Nautical Research, 1938) is a survey of the various regional designs of skin-covered craft in use at that date, or within recent memory. It does, however, include a useful introductory section on the historical references to such craft in Britain, from Julius Caesar to the sixteenth century.

Sean McGrail, *Logboats of England and Wales* (2 vols, National Maritime Museum, 1978) is a comprehensive study of all the 179 recorded finds of dug-out craft. It includes a detailed description of each boat, together with many line drawings illustrating the considerable variation in shape and size (from 8 up to 48½ ft long). The largest could have conveyed some 10 tons of dense cargo, such as stone. Of those which have been carbon dated, the oldest is 1570 BC and the most recent 1300 AD, but log boats continued in use throughout the medieval period, being recorded by Leland in Brecon in the early sixteenth century. The regional characteristics of the boats found in the Mersey and Irwell valleys are further examined in Sean McGrail and Roy Switsur, 'Medieval logboats of the River Mersey – a classification study' in Sean McGrail (ed), *The archaeology of medieval ships and harbours in Northern Europe* (National Maritime Museum, 1979).

The next stage of development, after the log boat, was the sewn-plank boat, formed of wooden planks 'sewn' together, edge-to-edge, with bindings of yew. Four boats of this type have been found in England (all in Lincolnshire) dating from 1800–500 BC. They are described in E. V. Wright, *The North Ferriby boats: a guidebook* (National Maritime Museum, 1976) and Sean McGrail (ed), *The Brigg 'raft' and her prehistoric environment* (National Maritime Museum, 1981). (See fig. 1).

The First Millenium AD

The story is taken forward by Peter Marsden, 'Ships of the Roman period and after in Britain' in George F. Bass (ed), *A history of seafaring based on underwater archaeology* (Thames & Hudson, 1972).

The native 'Celtic' style ships found in Britain (and the Low Countries) during the Roman period may have been developed from the sewn-plank boats. They had keel-less flat bottoms and flush planking nailed to strong frame members, with caulking between the planks.

The two specimens of this type found in England, both of the second century AD, are the 55ft-long freighter which capsized in the Thames at Blackfriars with a load of Maidstone stone, and the smaller river barge partially excavated at Bermondsey. They are described more fully in P. R. V. Marsden, *A ship of the Roman period, from Blackfriars, in the City of London* (Guildhall Museum n.d. (1967)) and P. R. V. Marsden, 'A boat of the Roman period discovered on the site of New Guy's House, Bermondsey, 1958', *Trans. London & Middlesex Arch. Soc.* vol. 21 (1963–7) pp. 118–31.

Roman ships were also flush-planked and flat-bottomed, but were of shell construction. The edges of the planks were mortised and joined together with tenons. This form of construction required no caulking and gave a very strong shell which only required final bracing with cross members. It was, however, more expensive and required more skilled labour.

The only ship of Roman construction found in England was also excavated in the Thames. It was built in Britain or North Gaul in about 300 AD, and was 60–70ft long. It is described in Peter Marsden, 'The County Hall ship, London', *IJNA* vol. 3 (1974) pp. 55–65.

The Anglo-Saxon, and later the Danish, settlers brought with them a different style of shell construction developed in Germany and Scandinavia – the style which was so successfully exploited by the Vikings. It was clinker-built (i.e. each plank overlapped the one below) and had a keel which curved upwards at each end to form a nearly continuous curve with the bow and stern posts.

This period has been relatively rich in archaeological finds in England. The Sutton Hoo ship is the most famous; an 89ft-long 40-oar rowing boat of c600 AD, probably built to bring migrants over from Germany. But there have also been three other lesser-known excavations of early seventh-century ship burials in Suffolk; at Ashby Dell, at Snape, and a second, smaller boat at Sutton Hoo. The boat found at Graveney, Kent is later – c900 – and appears to have been a cargo boat of about 45ft length.

Some of these excavations are reported individually in Rupert Bruce-Mitford, *The Sutton Hoo ship burial: a handbook* (British Museum, 1968; 3rd Edition 1979), R. L. S. Bruce-Mitford, 'The Snape boat-grave', *Proc. Suffolk Institute of Archaeology* vol. 26 (1952) pp. 1–26, and Valerie Fenwick (ed), *The Graveney Boat: a tenth century find from Kent* (National Maritime Museum, 1978). They are all included in P. N. Cameron, 'Saxons, sea and sail', *IJNA* vol. 11 (1982) pp. 319–32, a comparative study of all the Saxon ship finds in England and on the Continent.

While rowing was still the main form of propulsion, the sail had been established in Britain by Roman times, as a supplementary source of power. Most, if not all, of these boats had a mast, which would have carried a single square sail. Steering was by means of a steering oar or side rudder, on one or both sides of the stern.

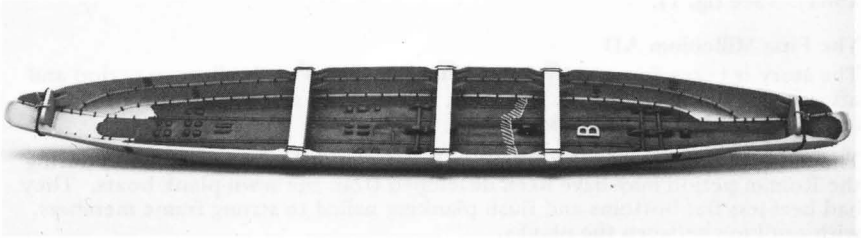


Fig. 1 A reconstruction model of one of the second millenium BC sewn-plank boats excavated from the River Humber foreshore at North Ferriby. Its capacity was about 7½ tons.

National Maritime Museum, London

The Medieval Period

During the medieval period there is an increasing body of written and pictorial records to complement the limited archaeological evidence. Nevertheless, there are still major gaps in our knowledge and the following account of how ship design developed is only tentative, largely following that given in Richard W. Unger, *The ship in the medieval economy 600–1600* (London: Croom Helm, and Montreal: McGill-Queen's University Press, 1980). This is a book which offers a rather different approach to the subject, by setting it in the context of economic developments and the growth of trade. The author treats the ship as 'an instrument for solving the economic problem of scarcity' and shows how changes in ship design were both the result of economic demands and the cause of economic and social progress.

Contemporary records indicate that the common cargo vessel in England during the Anglo-Saxon/early Norman period was of the Scandinavian tradition and was called a *keel.* (See fig. 2.) However, the Frisians, who were the principal North Sea traders at this time, used two types of ship – the *hulc* and the *cog* – which appear to have been developments in the Celtic tradition, but true sailing ships with only a small number of oars for manoeuvring in ports.

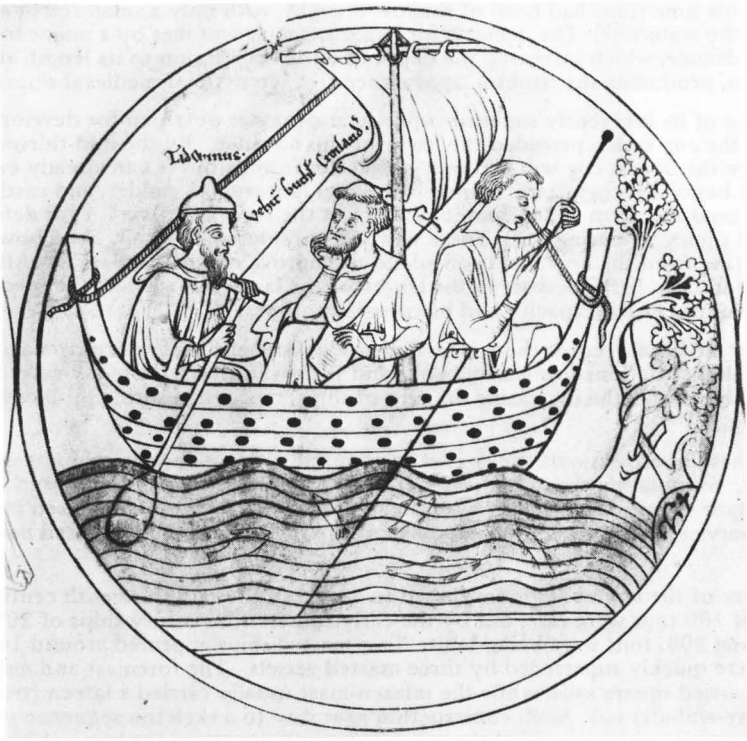


Fig. 2 St. Guthlac being conveyed in a boat of the 'keel' type to Crowland on the Welland. From a twelfth-century roll of eighteen circular pictures of the life of Guthlac – probably designs for stained glass for Crowland Abbey.
By permission of the British Library

The *hulc* was generally similar in shape to the *keel*, but it was keel-less and had no bow or stern posts; all the planks curved upwards to a nose at both the bow and the stern, a characteristic clearly seen in the ship depicted on the twelfth century font in Winchester cathedral.

The shape of the hull of both *keel* and *hulc* was a continuous curve – from bow to stern in the longitudinal direction, and also from side to side in the transverse direction. The *cog*, on the other hand, was more of a box-shaped structure, with both the sides and the bow and stern posts sharply angled to a flat bottom, providing a significantly greater carrying capacity for cargo. However, unlike the *keel* and *hulc*, the *cog's* shape was not so suitable for beaching. (At this time ports generally did not have quays for loading and unloading ships, those built by the Romans having long since fallen into disuse).

The increased political stability of northern Europe after the Norman conquest of England was accompanied by a rapid growth in trade. This led to the demand for increasingly larger ships – with reduced construction and crewing costs per ton of capacity – and for investment in quays and other port improvements and facilities, to cater for the larger ships and to reduce the time spent in port.

Until this time ships had been of shallow draught, with only a small freeboard above the waterline. The demand for larger capacity was met by a major technical advance, which increased the depth of a ship in relation to its length and breadth, producing the 'stubby' appearance characteristic of medieval ships.

Because of its inherently superior capacity and greater potential for development, it was the *cog* which provided the basis for this advance. By the mid-thirteenth century the largest *cog* was still only about 100ft long, but it had already evolved almost beyond recognition. It now had a keel, a sternpost rudder, and castles at the bow and stern – and sometimes also at the top of the mast – for defence against piracy or during war. There was still only one square sail, but a bowsprit projecting from the bow had been added to improve control of the sail. Although there had been little increase in the length of the largest boats over the preceding two hundred years, capacity had increased five times.

In later medieval records there is an increasing number of references to navigational obstructions formed by banks and shelves in rivers. In many cases this probably reflects the increasing draught of ships, more than silting problems. (See fig. 3.)

With these improvements the *cog* was also suitable for use as a warship in times of war. Stimulating the growth of merchant shipping therefore became an important aspect of state policy, so that merchant ships could be pressed into naval service, when needed, to supplement the small fleets of specialised naval ships.

The size of the largest ships continued to grow. In the mid-thirteenth century, *cogs* of 100 tons were rare, but by the early-fourteenth century ships of 200, and even 300, tons were being built. Two-masted ships appeared around 1400, but were quickly superseded by three-masted vessels. The foremast and main-mast carried square sails, while the mizzen-mast usually carried a lateen (triangular, fore-and-aft) sail. Shell construction gave way to a skeleton sequence of construction, which provided the greater strength necessary for larger ships; a strong framework was built first and the external planking then fastened to it. This was also more economical in the use of wood.

Even larger ships appeared in the fifteenth and sixteenth centuries, some with four masts. Sail area was increased by adding a spritsail hung from the bowsprit, and a topsail above the main-sail, and sometimes above the fore-sail also. Naval ships occasionally exceeded 1400 tons, although merchant ships were usually limited to 200–300 tons. These large ships were sometimes referred to as *hulks* and *caravels.*

The story is, however, dominated by the leading maritime and ship-building nations of medieval Europe – Italy, Spain, and the Netherlands – and Unger makes little specific reference to English shipping, particularly in his later chapters. Dorothy Burwash, *English merchant shipping 1460–1540* (University of Toronto Press, 1947; repr. David & Charles, 1969) has not therefore been superseded. The chapters on 'The size and build of English ships' and 'The various types of English ships' are particularly useful.

As the large ships grew larger, there was increasing specialisation in the design of boats and small ships for coastal and river trade. English records refer, for example, to *balingers, barges, barks, crayers, farcosts, hoys, keels, picards, pinnaces, snikkers, spinaces, and trows,* although few illustrations or technical details are available and the distinction between the various types is far from clear.

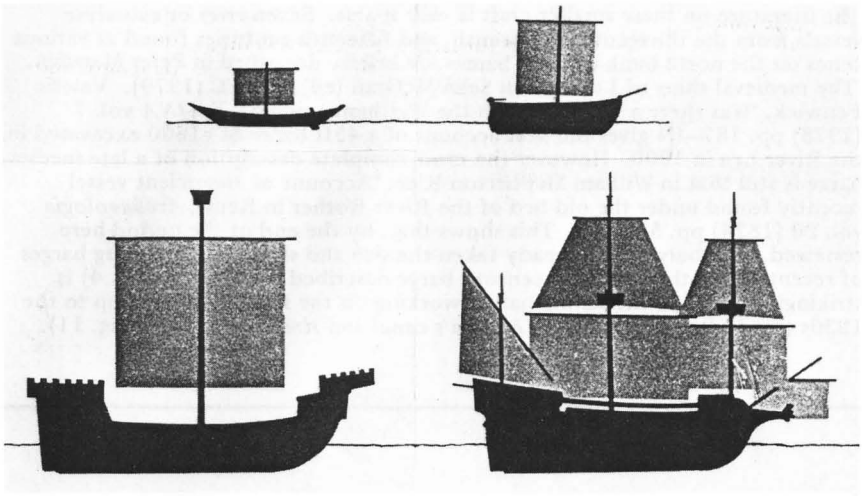


Fig. 3 Profiles, drawn to a common scale, of the tenth-century Graveney boat and typical coastal ships of the thirteenth, early fifteenth and sixteenth centuries. They shew clearly how cargo capacity was increased more by enlarging the cross-sectional dimensions of the hull than by extending its length, which increasingly restricted the distance which coastal vessels could sail up rivers. The improved efficiency achieved through expansion of the total sail area is also very evident. (Reproduced from The Coastal Trade, *with permission of Messrs Trewin Copplestone Publishing Ltd)*

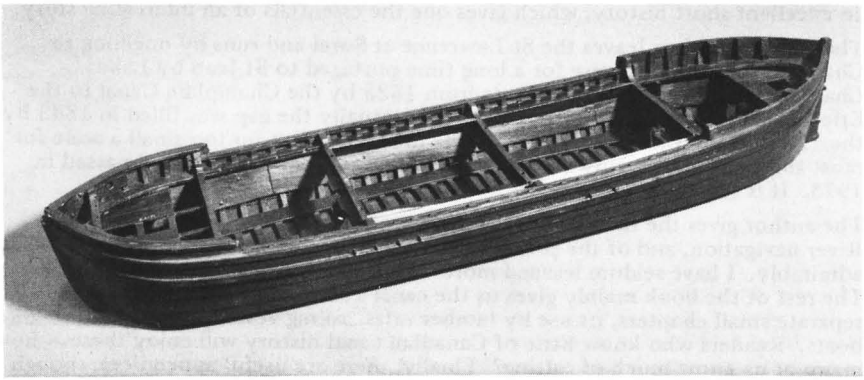


Fig. 4 Model of the sixteenth-century barge excavated in the old course of the eastern River Rother, Kent.

National Maritime Museum, London

The literature on these smaller craft is very sparse. Seven river or estuarine vessels from the thirteenth, fourteenth, and fifteenth centuries found at various times on the north bank of the Thames are briefly described in Peter Marsden, 'The medieval ships of London' in Sean McGrail (ed), *op. cit.* (1979). Valerie Fenwick, 'Was there a body beneath the Walthamstow boat?', *IJNA* vol. 7 (1978) pp. 187–94 gives the best account of a 45ft barge of c1600 excavated in the River Lea in 1900. However the most complete description of a late medieval barge is still that in William McPherson Rice, 'Account of an ancient vessel recently found under the old bed of the River Rother in Kent', *Archaeologia* vol. 20 (1824) pp. 553–65. This shows that, by the end of the period here reviewed, river barges had already taken the size and shape of the sailing barges of recent times; the sixteenth century barge described by Rice (see fig. 4) is strikingly similar to the sailing barges working on the Eastern Rother up to the 1930s (see E. Paget-Tomlinson, *Britain's canal and river craft* (1979) fig. 11).

Book Reviews

TRADE AND NAVIGATION ON THE CHAMBLY CANAL: A HISTORICAL OVERVIEW, by P. André Sévigny. Card covers, 88 pp. 12 photographs, 2 drawings and 3 maps. Parks Canada. Available from Canadian Government Publishing Centre, Supply and Services Canada, Hull, Quebec, Canada KIA 059. Can. $7.20 inc. p&p.

Parks Canada are responsible for the Chambly Canal, and this book has been written by a member of the historical research section of their Quebec Regional Office. Mr Sévigny calls his research 'an initial sounding', but his book is in fact an excellent short history, which gives one the essentials of an interesting story.

The Richelieu River leaves the St Lawrence at Sorel and runs by one lock to Chambly. Here goods were for a long time portaged to St Jean by Lake Champlain, whence they had access from 1823 by the Champlain Canal to the Erie Canal and so to the Hudson River. Eventually the gap was filled in 1843 by the 12-mile long Chambly Canal with its nine locks, but on too small a scale for most through traffic. However it did a modest job until its last load passed in 1973. It is still open for pleasure craft.

The author gives the first third of his book to a brief history of the Richelieu River navigation, and of the preliminaries to the canal's construction. He does it admirably. I have seldom learned more that I need to know from fewer pages. The rest of the book mainly gives us the canal's traffic history, and then, in separate small chapters, its use by lumber rafts, sailing vessels, barges, and steamboats. Readers who know little of Canadian canal history will enjoy these – how many of us know much of rafting? Finally, there are useful appendices, though maybe an over-full bibliography.

As one who has at any rate seen the flight of six locks at Chambly, I am grateful to the unassuming Mr Sévigny. CHARLES HADFIELD

SUMMER SATURDAYS IN THE WEST by David St John Thomas and Simon Brooksborough Smith. 175 pp. 22 illustrations, one map. David & Charles, Newton Abbot 1983. ISBN 0 946537 04 6. £6.95.

This excellent book has now gone into its third impression. Specialized, yes, but the events of 27 July 1957 were noteworthy enough.

Before a survey of passenger train running on that day comes a full introductory essay on the holiday pattern of the 1950s, and on the railways' response. There follows a detailed analysis of train running on the West of England main line, concentrating on the double line section between Taunton and Newton Abbot, and the Torquay branch. The running is then compared with a briefer survey carried out on a July Saturday fourteen years later.

Why is that particular July day of such interest? 1957 was the last year of wholly steam haulage on the Western Region. The last Saturday in July regularly saw the season's heaviest down traffic, but on 27 July 1957 there was a national bus strike and it is estimated that West of England passenger traffic that day reached an all-time peak, involving over half a million passenger journeys.

That day 80 down passenger trains reached Newton Abbot between 8.24 a.m. and 9.37 p.m. at an average of 122 minutes late. Up trains too crawled in interminable procession from block to block, heavily delayed by the late arrivals of the down overnight trains.

Whether railway management was wise in trying to cope with this enormous weekend demand through the use of specially retained elderly coaches and pressing freight locomotives into service is thoughtfully considered. Certainly by July 1971 the lot of remaining passengers was much eased. Fewer, faster trains involved longer headways. But while time-keeping was thus greatly improved there were seven locomotive failures, whilst there had been none on the earlier date with a much more elderly steam fleet.

We shall not see the like again. This book, which contains a selection of well chosen photographs, is a percipient commentary on that remarkable day.

E. R. Ll. DAVIES

THE NEW ROMNEY BRANCH LINE by Peter A. Harding. 32 pp. 36 photographs & drawings, map and station diagrams. Published by the author, Woking, 1983. Card covers. £1.50.

Booklets dealing with a single branch line have a useful place in the literature of railway history. They provide a most useful compilation of facts, local knowledge, recollections and photographic sources. As such their production should be encouraged, even though they cannot all be expected to reach the standard of Mowat's 'Golden Valley Railway'. Here is a useful sample of its kind. Romney Marsh is a world of its own and has brought its influence to bear on this railway outpost. Sheep, military, holiday makers, shingle, and atomic waste have all been carried. The illustrations are well chosen, numerous, evocative, and reasonably well produced. The section on signalling is excellent, but there could be more about the train services, more about the bizarre method of operating the local service in SE&CR days, the troop specials and the heavy holiday trains. But it is a booklet to be recommended as a contribution to branch line history.

H. P. WHITE

LONDON AND ITS RAILWAYS by R. Davies and M. D. Grant. 200 pp. 158 monochrome, 13 colour photographs, 29 maps and diagrams. Published by David & Charles, Newton Abbot, 1983. ISBN 07153 8107 4. £12.50.

This latest addition to books on London's railways may be 'coffee-table' in appearance, but is much more than that in content. It is most generously illustrated and the reproduction is of very high quality. The photographs are well chosen for content and originality. There are very few familiar to your reviewer. Also they come right up to date with one of HSTs at Paddington. Thus preserved within these covers is the contemporary scene of the early 1980s, the recent and the distant past, fascinating to browse over and useful for reference.

The illustrations are accompanied by a text fuller than the norm for a book of this kind. Quite rightly an attempt has been made to plan this around significant themes such as termini, for business, for pleasure and freight.

There is really very little about London, its growth, and the consequences of that growth on the railways. It is really 'London's Railways'. It is notoriously difficult to define London. The authors say 'the area has been defined by the terminus of the outer suburban service on each line . . . . .' and this as good an approach as any. But their idea of this is open to question (map on pp. 9 & 10). Three Bridges has never been a significant frontier on the Brighton line, since 1933 the outer suburban service having terminated at Brighton. To the north Hitchin has no significance either, the basic four electric trains per hour from London all continue to Letchworth (1) or Royston (3).

It is impossible to be comprehensive in a restricted space, but it is a pity the maps were not used to better advantage. For example the one on p. 136 showing goods depots in Central London does not show those reached from the Widened Lines or Inner Circle. But this book makes an excellent introduction to London's railways and must whet appetites which can be led on to more detailed and deeper studies, while the illustrations provide valuable material for the most knowledgeable student. H. P. WHITE

NORTHERN RAIL HERITAGE by Ken Powell and Geoffrey Body. 44 pp. 150 x 210 mm., thin card covers, 45 illus. Avon-Anglia, Weston-super-Mare, and Countywise, Birkenhead, ISBN 0 905466 59 4. £1.95.

To use their own words, the authors have attempted to capture the highlights of the rich variety of railway architecture and the recent dramatic expansion of the preservation of railway locations and equipment. I am not so sure that the two are compatible within so few pages, if at all, and the result is somewhat mixed up. The authors' 'North' is the traditional England north of the Trent and the booklet is divided into seventeen conveniently small geographical areas. A Yorkshireman may wonder why there are separate sections on 'West Yorkshire' and 'West Riding' since one fits into what was the other. 'Chester & North Wales' refers only to Chester station, the Welsh part simply consisting of a list of its preserved lines but no sites. Introductory chapters set the scene competently and concisely, and 'Saving the Railway Heritage' (the booklet is published in conjunction with SAVE Britain's Heritage) acknowledges British Rail's recent contribution on a very limited budget.

There are a number of dubious statements, while space might have been found for some important omissions if demolished structures had been left out. Value for money? Well, it's printed on art paper which no doubt accounts for the price. Nevertheless the booklet is a useful introduction to an aspect of industrial archaeology that is attracting increasing interest. GORDON BIDDLE

THE EAST LANCASHIRE RAILWAY by R. W. Rush. 64 pp. card covers, with 19 plates, several drawings and a map. Oakwood Press (Trowbridge) 1983. ISBN 0 85361 295 1. £3.00.

Incorporated in 1844, the ELR grew swiftly to become a serious rival to the L&YR in mid and south Lancashire (despite its name, ELR trains reached Liverpool, Southport, and Widnes!) but eventually the two companies amalgamated in 1859.

The greater part of this book is concerned with the construction of the various sections of the ELR and its locomotives. Some subsequent developments (e.g. station enlargements and bridge replacements) are also covered, but several stations on the ELR system, especially those provided after the relevant line had opened, are not mentioned in the text. Recent closures take less than a page and are inaccurate. The author lives in Accrington and writes with conviction about the portions of ELR route in this locality. He is less happy in some of the more distant areas: one station photograph is entitled West Derby, which is not on the ELR system, and he seems unaware that at Farington the 1846 link with the North Union closed in 1850 and was on a different site from the curve currently in use, which opened in 1908.

One-third of the text and over half the photographs are devoted to the ELR's complicated locomotive history and its rolling stock, including many line drawings. In addition known details of the locations of ELR engine sheds are given. Also included are gradient profiles and track plans of the layout of major ELR stations, mainly in early days. ALLAN BRACKENBURY

A HISTORY OF THE LMS. Vol. 3. THE WAR YEARS AND NATIONALISATION 1939–1948 by O. S. Nock. 96 pp. 230 x 195 mm. 60 illustrations. George Allen & Unwin 1983. ISBN 0 04 385087 9. £7.50

Mr Nock's book, it may be explained, is in the 'Steam Past' series and at least half the excellent photographs show LMS locomotives and trains of the 1939–48 period. The same subjects come in for much attention in the text although, strangely, little is said of the engines sent overseas during the war and those borrowed from other sources.

C'est magnifique mais ce n'est pas la guerre. These were momentous years in railway history. It used to be said that, in war, the successful nation is the one with the most efficient transport system and with petrol and oil fuel severely rationed, the railways bore the brunt of it. They operated with limited resources, often under frightful conditions, but little could be revealed at the time (it might have helped the enemy) and, with stocks of paper rigidly controlled, there was more than enough to be said on other matters.

Perhaps just a little space might have been found in the book for more aspects of the excellent LMS war record to be briefly mentioned. The efforts to be prepared, if such a war should come, deserve to be remembered: emergency time tables were ready and came into force on 11 September 1939, steps had been taken to restrict lighting, staff had been trained for wartime conditions, and emergency equipment had been purchased. Problems facing the staff might have been stressed; their work increased as their numbers dwindled. They were often called upon to work incredibly long hours, going without meals and without sufficient sleep. Little is said of the risks they ran and it is no longer a secret that a Manchester express was attacked by enemy aircraft in broad daylight and a few days later an up express was involved in a serious accident at Wembley, in 'blackout' conditions with the 'blitz' in progress overhead.

New and extensive sidings handling huge quantities of traffic by unaccustomed routes were surely worthy of a few words.

One looks back to a grim day some forty years ago when military and railway staff met, rather uneasily, to settle some operating problem. A young major, who had railway experience, broke the ice with an allusion to 'those books we are all going to write about the war when it is over'. Sad to say, those who were still around in 1945 were far too busy dealing with new and urgent tasks and the war was something everyone wanted to forget. GEOFFREY O. HOLT

A HISTORY OF THE LNER Vol. 3 – THE LAST YEARS 1939–1948 by Michael R. Bonavia. 104 pp. (hardback), 60 illustrations including 1 map. George Allen & Unwin 1983. ISBN 0 04 285096 0. £7.50.

Dealing basically with the LNER throughout the war years and the period immediately before nationalisation this book fills a major gap. Several books have covered the period in general but there are very few detailed studies.

Writing with inside knowledge of management of the company the author includes much fascinating but little known information which makes the book very readable indeed.

There is an account of the incident which resulted in James Nightfall and Benjamin Grimbert, who are known to many only as names on modern locomotives, being awarded not only the George Cross but also the LNER's own medal.

Particularly worthwhile are the author's accounts of proposals which never materialised – projected tunnels to link the LNER with the SR under London, Gresley designs which never got beyond the drawing board, and proposals to introduce diesel power to the East Coast main line, all dealt with thoroughly in the appendix.

As well as describing traffic during the war the book gives a useful insight into normalisation of services after the cessation of hostilities including re-commencement of work on the Manchester – Sheffield electrification and the restoration of continental services, initially necessary for the repatriation of German prisoners of war.

There is much detail of the company's campaign against nationalisation. William Whitelaw was aware of the problems due to lack of capital on the LNER and was not totally opposed to some form of state intervention. A last ditch attempt at survival was to propose a sort of 'landlord and tenant' agreement, the state owning the lines whilst the companies operated the services.

Michael Bonavia manages to achieve the difficult task of producing a book which is entertaining, provides a valuable historical document, and perhaps implies starting points for further research – it would have been helpful to anyone undertaking such research if references to sources had been included. The price for a comparatively small book will be prohibitive for many but with its excellent illustrations and likely limited market this is probably inevitable.
S. ALASDAIR MUNRO

WALKING THE DARTMOOR RAILROADS by Eric Hemery. 144 pp. 21 photos, 16 maps and 1 line drawing. David & Charles (Newton Abbot) 1983 ISBN 0 7153 8348 5. £4.95.

Each week for the past 17 years my work has taken me over Dartmoor and I have stopped and examined many of the lines described in this book. Without a book such as this my wanderings have been limited and interesting parts missed. Whilst one may have located the SR Tavistock to Okehampton or the Hay Tor tramroad one was unaware of the Rattlebrook Peat Railway or the Zeal Tor Tramroad which could have been seen on the same visit. Mr Hemery's book rectifies such omissions!

Eleven mineral lines and eight passenger lines in the whole of the Dartmoor region are listed with simple maps which, with the use of OS maps for the region covered, are adequate. Illustrations and interesting information culled from a wide range of sources (quoted) are also included. Also included are details of access permission required and where this can be obtained. Mr Hemery has gone to some trouble to approach property owners in this respect on behalf of his readers and it behoves all (especially R&CHS members) to follow such instructions, thus ensuring future access facilities.

My reaction on reading this book was to get up then and go and see the railroads described. Where this has been done the directions given were easily followed and the sites readily located. Access, following instructions given, was readily allowed – possession of a copy of the book no doubt helped!

Two points which could improve an already good book. Firstly a better reproduction of the 1820 route map of the Plymouth & Dartmoor Railway from Laira-side to Sutton Pool on p. 24. Reduction to half a page means it is too small to see the detail thereon and it is even poor value as an illustration. Secondly, this is a book to take with you when exploring: its present size is just too big to go in a jacket pocket for carrying purposes! ALAN P. VOCE

THE STOKE TO MARKET DRAYTON LINE by C. R. Lester. 54 pp. 32 photo illustrations, 3 maps. Gradient profile. Facsimile timetables. Oakwood Press 1983. ISBN 0 85361 293 5. £3.00.

This book, in the well known 'Locomotion Papers' series, has as its sub-title 'and Associated Canals and Mineral Branches'. Its first chapter is entitled 'The Coming of the Canals' and serves as a useful introduction to the development of transport facilities in the area served by the Stoke – Market Drayton line which ran through the southern part of the North Staffordshire coalfield before reaching out into rural Shropshire. Subsequent chapters are devoted to Early Railway Schemes 1825–1852, Development 1852–1865, Westwards from Stoke, The Fruitful Years 1870–1914, and finally Changes and Closures 1914–1976.

Mr Lester gives a good account of the railway politics and inter-company conflicts which characterized the history of railway development in the nineteenth century. He follows the fortunes and vicissitudes of the line down to the present time when all that survives is a BR mineral line from Madeley Chord on the WCML to Apedale Junction on the north side of Newcastle-under-Lyme.

The selection of photographs has resulted in a good balance of new and old illustrations, which being on art paper have reproduced well.

Apart from the reference in the last chapter to the 144th annual general meeting of the NSR (which surely would not have yet been held had the 'Knotty' remained in existence) it would be difficult to fault this book. It is highly recommended to those with an interest in railways (and canals) in Staffordshire and Shropshire. NEIL PITTS

ONE MAN'S RAILWAY by J. B. Snell. David & Charles 1983. 96 pp. 81 b & w Photos 1 line drawing, 1 map. ISBN 0 7153 8325 6. £6.95.

I cannot pretend that I approached this book with any great enthusiasm for, despite the author's 'Introduction – the Place', I've always found Romney Marsh and Dungeness dreary places – an atmosphere which dampens one's appreciation of the RH&DR. So Snell has achieved a worthwhile result in writing a thoroughly entertaining book about a line with a comparatively short history that will give the RH&DR some additional allure as well as contributing to a few legends.

The outstanding feature of this book is that it is full of vibrant, active personalities like Count Louis Zborowski and Henry Greenly, the latter being an invaluable if rather truculent miniature engineer. Over it all presides the determined visionary J. E. P. Howey, the 'One Man' of the title, who devoted much of his wealth to creating the famous main line in miniature. Snell's success in drawing portraits of these personalities is in no small part due to his researches amongst the friends and children of those involved, and one gets the impression that few documents were needed in the research of a history that still lives in many memories.

There are interesting sections on the development of the miniature railway craze and the search for an ideal site; interestingly the Hundred of Manhood and Selsey Tramway was considered, but Colonel Stephens was not to be persuaded. After the war though the history of the RH&DR became more problematical and the rather isolated site chosen for it began to seem less ideal; Snell makes a fair effort to chronicle the resultant economic problems.

There is a number of black and white photographs, of which the most interesting are not of the RH&DR – the most amusing one is of a 'hay train' on a 10¼-inch gauge line in Worcestershire, circa 1913. The mechanical development of steam traction in miniature is handled confidently throughout. ADRIAN GRAY

RAILWAYS OF THE NORTH YORK MOORS: A PICTORIAL HISTORY by K. Hoole. 72 pp. 1 map and 77 illustrations. Dalesman Books, Clapham via Lancaster 1983. ISBN 0 85206 731 3. £2.95.

This book covers the lines from Scarborough to Pickering, Pickering to Coxwold, Battersby to Grosmont and Great Ayton, and Whitby to Pickering, to Scarborough and to Loftus. Rosedale, Grinkle Park and Port Mulgrave, the Cleveland Extension Mineral and the Kepwick Railways, all mineral lines, are included. Mr Hoole states that the book duplicates his 'Railways in Cleveland' (1971) but it contains much additional information and it would be better to describe it as complementary to his 'Railways of Teesside' with which it is of the same format. Each section of the book is followed by appropriate, well chosen and well reproduced photographs, many of them 'then and now': there is also a mileage and closure table.

A good account is given of the many industrial sidings off these lines and the varied privately owned locomotives which worked them. Details of accidents in the area, fortunately not very many, are given. The reviewer, however, is a little surprised that there is no mention of the runaway in 1865 on the Goathland incline, with two fatalities, all the more tragic in that it occurred while the Deviation line was being built. Nor is there any mention of the water tanks which originally powered that incline. But these are small criticisms of an otherwise useful addition to the literature of the North East. A. L. BARNETT

PULLMAN by Julian Morel. 224 pp. 37 illustrations on 16 plates. David & Charles (Newton Abbot), 1983. ISBN 0 7153 8382 5. £7.95.

The author of this book was catering superintendent of the Pullman Car Company for over twenty years following World War II and the treatment of the subject inevitably, and properly, reflects his special interests. The early history, commencing with George Mortimer Pullman's pioneer enterprise on the Chicago & Alton Railroad in 1859, is dealt with somewhat sketchily. However, we learn enough about Pullman himself, Nagelmackers (of the Wagon Lits Company), Lord Dalziel and others to appreciate their considerable achievement in imposing their ideas on the railway companies. It is surely ironic that Nagelmackers died at the early age of 60 worn out by incessant travelling . . . . .

The principal part of the book deals with Pullman operations in Great Britain, particularly post war, with emphasis on the author's special field. At their zenith, for example in 1962, the services comprised twelve regular named all-Pullman trains, a complex of single car operations on the Southern Region, ocean liner specials, charter trains and other specials organized in connection with state occasions, exhibitions etc. After a number of chapters, each dealing with operations on one Region of British Rail, there follow further chapters dealing respectively with the cars, the staff (including their training), the organization of supplies and of trains for special events. Some of this information will be of little interest to outsiders, but even those uninterested in menus and rosters will surely be amused by the felicitous names of senior chef Fry of the Golden Arrow and leading attendant Miss Cover of the Hastings buffet car. Incidentally Stanley Adams, chairman and managing director, 1944–1957, was also a director of the sauce manufacturers, Lea & Perrins.

Two appendices provide valuable reference material on British Pullman cars. The first gives the Company's 1960 Schedule of Cars. Each car built since 1876 is given a schedule number, which does not change even when the running number or car name is changed. This list is thus a sort of stud book of Pullman Cars which have operated in Great Britain, some four hundred in all. The list excludes the thirty-six cars built for the Midland Railway between 1874 and 1876, although one of these seems to have crept in under schedule No. 72. Appendix 2 lists all cars which have been preserved, either as operating vehicles or as static installations. These total approximately one hundred cars, about one quarter of the total number built, an astonishingly high proportion.

B. S. COOPER

THE BRIGHTON LINE by John Eddolls. 48 pp. 37 photo illustrations. 2 maps. David & Charles, Newton Abbot 1983. ISBN 07153 82519. £2.95.

It is easy to be harsh in criticism of books on railways, but at least Mr. Eddolls does not claim to have written a *history* of the Brighton line. It is, however, a little difficult to see exactly what is the subject of the book; perhaps it is just the title that is wrong. His section on Pullmans and the more modern development of rolling stock used is interesting, and one suspects this may have been his reason for writing the book in the first place. When Mr Eddolls writes on the history of the line, it comes over in a rather scrappy way. For such an important line, too much has had to be packed into its 48 pages, and it would have been better if any attempt at history had been omitted. It is of interest that the author has spotted such things as the old telegraphic code IG used for Brighton, but such points can really only be justified by a much fuller book, whereas the drastically modified timetable of May 1978 deserves more than one paragraph and could be of interest to future historians.

There are errors and omissions, and statements which only half explain matters: it was, for instance, in 1888 that Caterham Junction became Purley, not 1880; the Surrey Iron Railway ran to Croydon, beyond there it was the Croydon, Merstham & Godstone. The writing is sometimes infuriatingly flowery, with lines which 'slip gently' away, of nature trails that 'tumble' or a 'handsome' train indicator at Brighton. It is hardly a book for historians, for there is nothing new to be told, and we are left with a good essay on modern conditions, with many good photographs, of which only very few could be recalled as having been seen frequently before. JEOFFRY SPENCE

THE MANCHESTER AND LEEDS RAILWAY by Martin Bairstow. Published by Wyvern Publications, Skipton. 72 pp. 109 photo illustrations. 5 maps. 180 mm. x 220 mm. Glossy card covers. ISBN 0 907941 06 0. £4.95.

This is a worthy addition to the series of historical publications on northern railways produced by Wyvern. The Manchester and Leeds Railway, itself incorporated in 1836, became, with certain amalgamations, the Lancashire and Yorkshire Railway in 1847. The book, which is sub-titled 'The Calder Valley Line', is an illustrated history of the line from Manchester to Leeds via Halifax and Bradford together with branches.

The text is of necessity a little brief, consisting as it does of five short chapters entitled 'A Journey from Manchester to Leeds', 'The Calder Valley Main Line', 'Train Services', 'Branch Lines' and 'Conclusion'. The illustrations consist of more than 100 photographs, taken in L&Y, LMS, and BR days. They have in the main reproduced well and are suitably captioned. Most of them have not been previously published. There are also five useful appendices, 'Opening of lines', 'Closure of lines to passenger traffic', 'Closure of lines to all traffic', 'Passenger stations' and 'Tunnels'. Apart from some confusion regarding the dates of opening and closing of Bowling Junction these cannot be faulted. The maps are better than one frequently finds in present day railway books, consisting of one system map which extends from Manchester to Normanton and four detailed area maps, of which that of Calderdale usefully includes the Halifax Tramways. The last item in the book is a selection of life-size photographic reproductions of tickets, which like the main illustrations are representative of L&Y, LMS, and BR eras.

This is a good book and one looks forward with pleasurable anticipation to the appearance of Martin Bairstow's next contribution to the series, which is to cover the rival Manchester to Leeds route of the LNWR. NEIL PITTS

PLEASURE BOATING IN THE VICTORIAN ERA by P. A. L. Vine. 159 pp. 250 x 185 mm. 84 illustrations. Phillimore (Chichester), 1983, ISBN 0 85033 504 3. £9.95.

The sub-title, 'an anthology of some of the more enterprising voyages made in pleasure boats on inland waterways during the nineteenth century' aptly describes the nature of this book. With the Victorian spirit of high adventure and exploration in mind, the author gives more prominence to travels on continental European rivers and canals than to their British counterparts, summarising and quoting from published logs, most of which are now rarely found outside special libraries.

For the insular British waterway historian there are but three accounts of domestic interest and two of these are readily available. That of Dashwood by an identical presentation in the author's excellent *London's Lost Route to the Sea* and by a recent reprint of the book itself, while J. K. Jerome's *Three Men in a Boat* has never been out of print. The third, the anonymous story of a voyage from Manchester to London in 1868, undertaken by canoe and skiff, is fascinating for the ingenious route including transference from the Llanymynech branch of the Ellesmere Canal to the R. Perry, near the site of the blow-out that closed the branch.

There are brief biographical and literary sketches of other boating authors, while a final chapter is concerned with problems of accommodation, meals, and guide books. The whole is written with evident enthusiasm for the subject and well illustrated by contemporary woodcuts. Substantial bibliographies of works in English relate to voyages made before 1914 in Britain and in Europe, works of reference and biographical material. The criteria adopted have resulted in the inclusion of books concerning post-Victorian aspects of boating and from that company are strange omissions, e.g. Bliss's *Rapid Rivers* and especially Rolt's *Narrow Boat*, more relevant than some of the titles recorded.

EDWIN SHEARING

THE BROOKWOOD NECROPOLIS RAILWAY by John M. Clarke. Card covers. 47 pp. 24 half tone illustrations. 14 line diagrams, maps & plans. 3 reproductions of tickets. Oakwood Press, Trowbridge 1983. ISBN 0 85361 296 X. £3.

One is continually grateful to Oakwood Press for providing valuable specialised railway history studies which might otherwise find no opportunity of publication. Mr Clarke, who discloses in his preface a mild fascination with death, presents a carefully detailed and most readable account of the very special passenger service operated between Waterloo and Brookwood by the London Necropolis Company from 1854 to 1941, with its dedicated stations and rolling stock.

The background to the establishment of the LNC is explained in an opening chapter, setting the operation in its context. It is interesting to note that the LSWR was chosen for the relative ease of access to Waterloo and the 'Comforting scenery' on the way to Woking, then considered to be beyond any possible

future expansion of London. The author explains how the project got off the ground, despite the opposition of the Bishop of London, who considered the idea of railway funerals, with separate parties and coffins on the same train 'most improper'. Other slightly bizarre aspects noted and illustrated are that even the dead were required to have a proper railway ticket of the appropriate class; that the stations at Brookwood were intended only to be temporary yet lasted over 100 years; and that for those who could afford them, there were first class funerals with separate platform accommodation at Waterloo and separate (ornamented) coffin compartments on the train.

The bibliography somewhat curiously mentions Nock's book on the LSWR but not R. A. Williams's history which has some reference to this subject. Apart from this and the usual Oakwood omission of an index there is no fault to be found in this most creditable production. ALAN A. JACKSON

THE MACCLESFIELD, BOLLINGTON & MARPLE RAILWAY (THE GREAT CENTRAL AND NORTH STAFFORDSHIRE JOINT RAILWAY), by Basil Jeuda. 64 pp. DIN A4, with 102 illustrations and 12 diagrams. Cheshire County Council Libraries and Museums Department (91 Hoole Road, Chester CH2 3NG), 1983. ISBN 0 904532 04 6. £4.25 + 50p p&p.

Although the Macclesfield, Bollington & Marple Railway receives coverage in the standard histories of the Great Central and the North Staffordshire companies, it is certainly a line of sufficient interest in itself, in terms of its place in inter-company relationships, and because of the long argument over the location of Macclesfield's stations, to justify a separate history based on a full examination of all the relevant primary materials. Mr Jeuda has done his subject full justice. He deals not merely with the railway itself, but also with the locality through which it passed and the industries it sought to serve. He has used the necessary sources, and he has supplemented his account from the recollections of railway-men who worked on the line. The Cheshire County Council Libraries and Museums Department is to be congratulated on the high standard of this book, its first venture into railway historical publishing.

Mr Jeuda's lucid and interesting account ranges from a quick survey of the pre-history of the railway up to present-day plans for turning much of the disused formation into a public path. There are no serious omissions from the account, which is well supplemented by the illustrations, chosen to shew many different aspects of the railway and its setting – though the quality of reproduction is not always as high as one might wish. Appendices list officers, deal with the locomotives that worked the line, charges, conditions of employment, tickets, and illustrate many facets of operation.

There is a tendency at times to state the obvious, as with the mention that the Deposited Plans did not indicate station sites or the note that the Performance Bond required was £10,400 (it had to be 8% of the estimated cost), and the description of fairly standard clauses of contract. It is noted on p.10 that compulsory purchase powers would expire on 14.7.1869 without comment, even though the Act was passed on 14.7.1864 and the said powers were for *three* years only, the *construction* powers running for the usual *five* years. One or two other similar loose ends remain. Standard of presentation is generally good, though there is clearly something missing at the foot of the left-hand column of p. 20 and checking for style has not been all that it might have been ('the Reverend McAulay' on p. 18, 'all be it' and 'albeit' on p. 39, 'preceeded' on p. 44,

and 'didn't' on p. 54, for example). Doubtless all of us who knew the line will find our favourite omissions. In the case of this particular reviewer mention was sought in vain of the curious strenthening of the High Lane bridge carrying the A6 over the line pending final removal. But all these points are minor ones. This is a very good history, and deserves to find a place on the shelves of all those interested in the GCR, the NSR, the LNWR, or the Greater Manchester area. J. V. GOUGH

Modernisation of a Welsh Tramway Tunnel—A Note

BY NEIL SPRINKS

The narrow bore of the Llanelly Railway's single-track tunnel of 1839 at Pontarddulais has become, in 1983, the first section of railway in Wales to be equipped with BR paved track, made up of continuous welded rail laid on concrete sleepers set in a continuous slab of concrete.

The 88-yard tunnel was used initially by horse-drawn trains of the Llanelly Railway & Dock Company. Today it is used by trains conveying coal from collieries, opencast sites, and washeries in the Ammanford area, and by Central Wales line passenger trains between Swansea and Shrewsbury.

Pontarddulais Tunnel from north end, prior to installation of paved track, shewing the bridge over the River Loughor, into which water from the tunnel is drained

The decision to lay paved track was taken by the engineers in order to overcome difficult drainage conditions in the tunnel, which acts as a sump, attracting surface water draining from the immediate area. The concrete slab has been so shaped that channels can now drain water away to the River Loughor where it is bridged by the line beyond the north end of the tunnel. The slab is altogether 145 metres long, extending to this bridge and, at the south end, for 40 metres beyond the tunnel mouth.

The cost of the job was approximately £90,000, and BR awarded a contract worth £51,000 to Maenex Construction Co. Ltd., of Pontardawe for installing the concrete slab. Western Region engineers laid and connected up the continuous welded track, and carried out ancillary work. Other instances in Britain of paved track are few, and are mainly on new lines such as sections of the Tyne & Wear Metro, or in tunnels on newly-electrified lines.

Taking up the old track in Pontarddulais Tunnel and laying the new took two weeks. The time chosen was the coal industry's holiday fortnight when no coal trains were running. During this time, however, from Monday, 25 July, to Friday, 5 August, Central Wales Line passenger trains ran in two parts: from Swansea and Llanelli to Llangennech station and back, and from Pontarddulais station to Shrewsbury and back, with special buses – and a lorry for luggage – providing a link between Llangennech and Pontarddulais in both directions.

The drainage problems in Pontarddulais tunnel were due to the shallow depth of ballast beneath the track, dating back to the time when the tunnel floor was excavated out many years ago to give clearance for conventional trains. The depth of ballast between the track and hard bedrock was only half an inch. The concrete slab, profiled to take water over its surface into the river, was decided upon to avoid excavating further into the hard bedrock to obtain the required depth for drainage through ballast. By good chance the tunnel could also be closed for the requisite period of time to enable the concrete to set, because for two weeks no coal trains were running, and substitute buses in place of the few passenger trains could minimise inconvenience to travellers. On most lines the railway cannot be out of use for the period of time that concrete takes to set, although paved track has several financial and technical advantages.

All copy for the July *Journal* should be with the Editor by 6 April 1984 and must conform to the style-sheet published in the November 1981 issue. The top copy should be sent, not a carbon or a photocopy.

Published by the Railway & Canal Historical Society at 12 Victoria Gardens, 195 London Road, Leicester LE2 1ZH, and printed by Hobbs the Printers of Southampton.