

APPENDIX VIII

DARTMOOR RAILROADS

IN Devon and Cornwall, as elsewhere throughout the country, most of the earlier rail- and tramways were subsidiary to canals. The first form of tramway of which we have record in the north of England was employed for the carriage of coal from the pit mouth to the canal, and in the west the earlier ways were auxiliaries either to canals or harbours.

THE HEYTOR RAILWAY¹

The Heytor railway was three years later in date than the Morwellham incline, but of a more primitive character, resembling, in fact, an Egyptian quarry-road almost as much as a modern tram-line.

In 1792 Mr. James Templar obtained an Act for the construction of a canal from Bovey Tracey to Newton to communicate with the river Teign, and made it at his own expense, completing it in 1794 to Stover. This canal, known as the Stover Canal, is six and a half miles long.

The same Mr. Templar also completed, and likewise at his own expense, a tramroad from Heytor to Stover to communicate with the canal. This tramway, opened in 1820, was made with the intention of developing the Heytor granite quarries; and at the same time workmen's dwellings were erected in a sheltered position on the flank of the tor. These dwellings are now known as 'The Buildings'.

The way itself consists of two parallel lines of granite blocks, each line having a rebate worked along its outer half. The gauge, or distance between the rebates, is exactly 4 ft. The depth of the rebate varies in places from 3 to 6 in., and the

¹ For further details and illustrations, see Amery Adams' article (*T.D.A.*, Vol. 78, 1946, pp. 153-60). See also *The Haytor Granite Tramway and Stover Canal* by M. C. Ewans (1966).

action is precisely similar to that of the Coalbrookdale cast-iron rails, and very like that of the check or guard rail now fitted to lines on sharp curves or at crossings. The horizontal portion of the rebate carried the weight, while the vertical portion bore against the inner circumference of the wheel, and kept it in its place.

At one place at Bovey rails of iron almost precisely similar to the Coalbrookdale pattern have been used, where the line crosses a stream by means of a wooden bridge. At curves the stones do not seem to have been dressed to form, but short, straight stones were worked in, which by the constant friction of the wheels soon wore down to a sufficiently accurate shape. The stones vary much in all dimensions, but perhaps an average block would be 4 ft long and 1 ft 6 in. square; many of them are as long as 7 ft. Points and crossings were formed in large blocks by working grooves 6 in. wide and 2 or 3 in. deep. At no place was any serious cutting or embankment attempted, for the greater part both being only such as were necessary to carry the road along the inclined face of a hill. No attempt was anywhere made to bond together or connect the stones.

The reason for the substitution of granite for iron in this tramway is of course evident. Where granite was to be had for the cost of production, it is not surprising that as a material it should have been adopted. And it does not follow that because the material was cheaper it was necessarily inferior. The cast-iron rails at that time in vogue were a constant source of annoyance and expense, invariably giving way at the wrong moment, and being very uncertain in their general behaviour when heavily laden. Now the Heytor granite is an exceptionally good material, and the granite-way as laid was far superior in many respects to the cast-iron rail. This tramway was thoroughly efficient, and quite up to its work; for the two large blocks of granite having the city arms upon them, at either end of London Bridge, came from the Heytor quarries over this line to Stover, and were thence shipped to London. The Waithman monument, in Ludgate Circus, was also quarried at Heytor, and brought down over this tram-line.

I have already alluded to the Heytor granite as an exceptionally good stone. It is a fine-grained porphyritic rock which can be obtained in blocks of almost any desired size; but owing to the lie of the jointing it involves a large expenditure of labour to quarry out, and from this reason has now ceased to be extensively worked. The quarry has not, however, been altogether deserted, as a few men were employed there when last I visited it, on which occasion Mr. Barry, C.E., of Newton (to whom I must express my indebtedness), very kindly walked over the railway with me. Besides the principal quarry at Heytor, branch lines were also run to neighbouring quarries, but the whole tramway has now fallen into disuse. As to the trucks, they were merely modified road waggons. The wheels, as in all the earlier rolling stock, ran free on the axles, and I am informed by Mr. Barry that the leading truck of a train usually had shafts.

PLYMOUTH AND DARTMOOR RAILWAY

We now come to the Plymouth and Dartmoor Railway, the first idea of which originated with Sir Thomas Tyrwhitt. This gentleman's statement, made at Plymouth to the Chamber of Commerce, is of considerable interest. Briefly stated, the following prospects were held forth.

The barren slopes of Dartmoor were to be reclaimed, to which end lime and sea-sand were to be imported as manures. Pauperism was to be decreased, and a flourishing colony of agriculturists was to be planted on the moor. By this means Plymouth would acquire a valuable back-country, which would materially increase her prosperity as a port. It was in fact to be an undertaking profitable alike both to the nation and to the shareholders, the latter apparently expecting an 18 % return on their capital. As the subject is of such local interest, I think it may be well to give an abstract of Sir Thomas Tyrwhitt's statement, which is also a good example of the early railway prospectus. Sir Thomas said:

"To reclaim, and clothe with grain and grasses a spacious tract of land now lying barren, desolate, and neglected; to fill this unoccupied region with an industrious and hardy population; to create a profitable interchange of useful commodities between an improvable and extensive line of back-country, and a commercial seaport of the first capabilities, both natural and artificial; to provide employment for the poor of several parishes; and to alleviate the pressure of parochial burdens by a method, at once simply ingenious, and comparatively inexpensive, form altogether such a stimulus to adventure, and such a scope for exertion, especially to a wealthy company, as must dilate the benevolent heart of the patriot, whilst it emboldens the capitalist gladly to lend his assistance in carrying the plan into execution."

The last sentence evidently implies a doubt that the "benevolent heart of the patriot" counted for much unless the security was good. Continuing his statement, Sir Thomas Tyrwhitt divides his subject into five heads; viz., I. Plan; II. Expense; III. Funds; IV. Income; V. Benefits.

I. *Plan.* The road will commence at Dartmoor Prison, which lies about twelve hundred and fifty feet above the sea, and thence traverse the Moor and Roborough Down in a south-westerly direction, to the Laira at Crabtree, by a gradual fall of half an inch in three feet. The distance between the two places will not, in all probability, exceed twenty miles, according to the line marked out in the plan; and the road ought to be an ascending and descending one, or what is technically called a "double road".

In a footnote to this last clause, it is explained that a double road occupies 18 ft of land in width.

II. *Expense.* It is calculated that the present road may cost £2000 per mile.

III. *Funds.* To meet the charges, both direct and contingent, it will be necessary perhaps to raise £45,000 by subscription, in shares of £25 each.

A somewhat encouraging footnote is here appended, with a view probably to future financing operations. "Experience has proved in Scotland that not less than 18 % may be derived from railroads."

IV. *Income.* The principal part of this, at first, will arise from the tonnage of importable and exportable commodities.

Importable Commodities

Lime. In cultivating the moor and other unimproved parts on both sides of the road, this must be esteemed an indispensable article, not merely in the onset but during the long course of successive years.

Sea Sand. Many assigning much importance to this article prefer it to lime as a manure.

Timber. In proportion as buildings accumulate around the road, as population

increases, and as the wants of culture diffuse themselves, will be the want of this valuable article, to which in fact hardly any limit can be placed in a region so denuded of wood as Dartmoor.

Coal. Next to timber justly ranks this essential of domestic life.

Culm.

Groceries. *Tea* and *sugar* are become absolute necessities in the present day, and these, added to *wine, spirits, beer, porter,* and other *household requisites,* would be sure to give birth to a productive tonnage.

Furniture. The *colonisation* of Dartmoor will carry in its train a necessity not only for the importable commodities before spoken of, but for many others, which, though of comparatively inferior consequence, will be more or less wanted by the colonists. Amongst them is furniture.

The use of this term [*colonisation*] the author hopes will not be objected to; it being equally applicable, in his opinion, to the improvements contemplated on Dartmoor as to like designs in Canada.

Planting. In the progress of *colonisation* the formation of plantations will become essentially requisite, as much for the sake of rural embellishment as to protect the newly-enclosed grounds and buildings.

Exportable Commodities

Granite. Beside the weightier stone for government or private uses, the Company would be enabled to supply, with the same ease and profusion, curbs and paving stones, gate-posts, highway stones, and gravel, at a rate which, it is presumed, would undersell those procurable in any other quarter.

Peat. It is impossible to view the face of Dartmoor without feeling sensible of the numerous uses to which the superabundance of peat in this district may be applied. Amongst others, the heat given by a combination of peat with coal is allowed to be exceedingly powerful; and the author has reason to believe that iron, fused with this admixture, is less liable to crack than when coal alone is employed in the process.

Mining Products. Mr. Mawes, the celebrated mineralogist, who has investigated the forest of Dartmoor with much attention, is of the opinion that the latter contains the mineralogical productions of almost every clime, with but few exceptions. If iron, copper, and tin could be raised and smelted on the spot, without the necessity of resorting elsewhere, the saving of expense, both to Government and the public, might be decidedly pronounced incalculable.

Flax. This next article, unlike the preceding ones, is not indigenous; but experiments have proved that it may be naturalized on the soil of Dartmoor, and perhaps to an extent which will ultimately render unnecessary all foreign importations of it—for the port of Plymouth, at least, and its neighbourhood.

Hemp. If hemp can be reared on the bogs of Russia, it is without doubt equally capable of cultivation on Dartmoor and Roborough Down.

Travelling Vehicles and Parcels are also included among the sources of income, as also is the *Transfer of Convicts to Dartmoor Prison.*

Such being the benefits which, in all good faith, were stated to be derivable from the construction of this line, it is not surprising that the matter should have been taken up by a company, and accordingly we find a Plymouth paper indulging in the following somewhat high-flown language:

“The time is at length arrived so long, and yet whether in good report or

evil report, so invariably anticipated by us, when the benefits of this measure are to be thrown open to the public. To Sir Thomas Tyrwhitt, as the original projector of this railway, and his able coadjutors in this part and other places, who have advanced cautiously but steadily to their object, may be assigned a praise which future generations will gratefully rejoice to perpetuate. It is not simply for themselves, but for posterity that they have devoted their time, their talent, and their capitals to the realization of a plan which not only reflects the greatest honour on the county of Devon, but will prove on the whole of this neighbourhood an inexhaustible source of advantage. Whether nationally or locally considered, it is a theme of proud congratulation. Whilst the region around, once apparently condemned to sterility, by the use of proper manures, will take its merited rank in British agriculture."

Sir Thomas Tyrwhitt was an eminently practical and thorough-going man, but events have shown that his estimate of the agricultural value of Dartmoor was fortunately wrong. Although Plymouth has lost the valuable back-country promised her, and Dartmoor is still apparently condemned to what is called sterility, it must not be lost sight of that its value as an unenclosed space, where the public may trespass off the roads without being taken for amateur poachers, and where they can wander unfettered by hedges, or fear of damaging crops—its value, in fact, as a public park, similar to though smaller than the great American national parks, will grow and increase year by year; while it is probable that as a sheep run and cattle pasture of the first order it is of much greater value than it ever could be as very inferior arable land.

A tender for the ironwork of the line was accepted on terms much below the estimate, and two hundred men were set to work quarrying and dressing granite on the moor, a lease of stone on Walkhampton Common having been granted by Sir M. M. Lopes.

The road as constructed consists of a single line only, and this doubtless accounts for the capital raised under the first Act, passed 2nd July 1819, amounting only to £27,783, instead of £45,000, as estimated by Sir Thomas in his statement. On 20th September 1819, the first general meeting of the proprietors took place, when a managing committee was elected: Mr. William Stuart, superintendent of the Plymouth Breakwater works, being engineer; Mr. Hugh Mackintosh of London, contractor for forming the road; and Messrs. Bailey and Co., also of London, contractors for the ironwork. It being found necessary to continue the line from Crabtree to Sutton Pool, so as to obtain better shipping facilities, an Act was passed (8th July 1820) authorizing this extension, the estimate for which amounted to £7,200. A further Act was obtained (2nd July 1821) authorizing certain deviations, including a tunnel at Leigham, the estimated expenditure for the tunnel and other extra works being £5,000. The total estimate was by these means brought up to £39,983.

The total length of line from Princetown to Sutton Pool is 25 m. 2 qr. 6 ch., of which in 1826 over 23 miles had been completed. In this year the contractors, both for road and ironwork, were Messrs. Johnson and Brice of London, and Mr. Roger Hopkins had succeeded Mr. Stuart as engineer.¹

¹ On the 13th of October of this same year an advertisement appeared in the *Plymouth Telegraph and Chronicle*, asking tenders for the excavating and completing of the tunnel at Leigham, and also the making of certain cuttings and

The tunnel at Leigham, in the twentieth mile from Princetown, is 620 yards long, 9ft 6 in. high, 8 ft 6 in. broad, and its greatest depth below ground is 109 ft. It has no lining, but is left as cut through the rock.

The completed portion of the line was opened for public use on 26th September 1823. I take the following description of the proceedings on that occasion from *The Telegraph and Chronicle*, under date Plymouth, Saturday, 27th September 1823:

“Plymouth and Dartmoor Railway. Our various readers, both local and distant, will learn with the sincerest pleasure that this great work, so long the object of our hopes and fears, and well designated by a worthy nobleman as the glory of the county, is now happily open for general trade. Yesterday was devoted to the celebration of the joyous event, and its festivities commenced with a public breakfast, liberally given by Sir Thomas Tyrwhitt, the original projector of the undertaking, at his Wharf on Roborough Down, where three marquees were erected, and every elegant species of viand provided for the reception and gratification of the company, which comprised much of the respectability and worth of the port and its neighbourhood.

“The South Devon Band enlivened the scene with its choicest airs; but unhappily the weather was unfavourable, which drove many away ere the departure of the procession through the tunnel could be arranged. A long file of cars partly laden with granite, and partly with stewards and other individuals, accompanied by the band, and ornamented with flags, after the breakfast set off for Plymouth. on their arrival at which place they were heartily greeted by the huzzas of a large concourse of people, anxiously waiting their arrival, being saluted on their way by some petards at Hoo Meavy, and attended throughout the progress by a numerous cavalcade on horse and foot.

“About fifty gentlemen then sat down to a handsome dinner at the Royal Hotel, who did not separate until a late hour.”

In the same paper are also notices of a last and final call of 10 % per share, signed by William Burt, clerk to the Company, and also a notice of a general meeting of proprietors of the Plymouth and Dartmoor Company, signed: Morley, Masseh Lopes, Edmund Lockyer, William Elford, and John Pridham.

The line, as originally laid, consisted of parabolic edge-rails¹ set in cast-iron chairs, and these fastened down to stones averaging 2 ft 6 in. long by 1 ft 6 in. wide, and of varying depths. Some of these rails had lap-joints, and others butt-joints; two different forms of chairs being used to suit the different joints. The gauge of the line was 4 ft 6 in.

Short sidings, and other portions not subjected to much wear, were laid in

embankments from thence to Crabtree and Sutton Harbour. Application to be made to Mr. Roger Hopkins, engineer and mineral surveyor, 6 Tavistock Street, Plymouth.

¹ With reference to these cast-iron edge-rails, I may mention, as a curious fact, that in excavating in the fourth cylinder for the new Laira Bridge, on the Plymouth and Dartmoor Extension Railway, one of these rails was brought up from the bed of the Laira. The depth to which it had sunk below the surface of the mud could not be ascertained; but owing to the hard layer of clay and stones which Mr. Rendel placed over that portion of the river, it was probably lying very near the surface.

granite stones, averaging 4 ft long by 1 ft broad. These stones were arranged differently to those used at Heytor. The wheels ran on them precisely as on the iron rails, the inner edges of the granite being dressed to take them, and the outer portion of the stone being rough-picked to below the level of the dressed portion, forming in fact a granite in place of an iron rail.

The points and crossings were made in cast-iron, and the one feature noticeable is that the crossings had a movable tongue 1 ft 5 in. long, similar to the points.

As the old rails wore out, and when the manufacture and use of rolled-iron rails became more general, these took the place of the old cast-iron edge-rail. They were used in lengths of from 10 to 18 ft, and being all flat-footed, were not secured to the stones by chairs, but were spiked down. The joints between two rails were made with a clasp, which gripped the flanges of both, the whole being usually secured to a stone. The rails were spiked to the same stones to which the original chairs had been fastened. Besides these, other stones were packed under the rails so as to, as far as possible, ensure a continuous solid bed. The rolled-rails were of various patterns; the four more especially used being: (1) an ordinary bridge rail weighing 45 lb. per yard; (2) a solid rail of similar form weighing 60 lb. per yard; (3) a Vignoles flange rail weighing $53\frac{1}{4}$ lb. per yard; (4) a similar but smaller rail weighing $38\frac{2}{3}$ lb. per yard.

The traffic over this line gradually decreased until 1880, when the portion between Princetown and the 'Rock' was reconstructed for locomotive purposes, and a connection effected with the Great Western Railway at Yelverton.

The alterations were completed, and the railway opened, in August 1883, the permanent way being the standard Great Western (narrow-gauge).