

*Railway Department, Board of Trade,  
Whitehall, April 23, 1853.*

SIR,

I HAVE been directed by the Lords of the Committee of Privy Council for Trade, to acknowledge the receipt of your letter of the 22nd instant, and to inform you that my Lords have requested Captain Wynne, Royal Engineers, to examine the mode of communication between the various guards and drivers of trains, which the Great Western Railway Company propose to adopt, so soon as it shall have been put in operation and a sufficient time shall have elapsed to test its efficiency.

Great Western  
Railway.

I have, &amp;c.

*The Secretary of the  
Great Western Railway Company.*

*J. L. A. SIMMONS,  
Capt. Royal Engineers.*

## LANCASHIRE AND YORKSHIRE RAILWAY.

*Railway Department, Board of Trade,  
Whitehall, April 14, 1853.*

SIR,

I AM directed by the Lords of the Committee of Privy Council for Trade, to transmit to you the enclosed copy of the report made to them by their inspecting officer on the accident which occurred on the 4th March, to a passenger train on the Manchester and Bolton section of the Lancashire and Yorkshire Railway.

Lancashire  
and Yorkshire  
Railway.

My Lords direct me to observe, that it appears that this accident is entirely to be attributed to the defective state of the permanent way upon that section of the lines of the Lancashire and Yorkshire Railway Company upon which it happened, and that they cannot but attribute very great negligence to the system in operation upon the railways belonging to the Lancashire and Yorkshire Railway Company, when it is possible for a line of such heavy traffic as that between Bolton and Manchester, and which is daily traversed by express trains, to get into such a condition as to be positively dangerous for the passage of those trains; and it does not appear to my Lords in any degree to exonerate the Company from responsibility, that they had placed the maintenance of the permanent way in the hands of contractors of respectability.

My Lords desire me to observe that the first duty of a Railway Company is to take every precaution to maintain their lines in an efficient state, and to conduct the traffic over them with safety and regularity, and at such speeds as the public have a reasonable right to expect; and that it appears to them that a great degree of culpability must attach to the management of any Company which allows any part of its lines to get into a state such as that described in the report of the inspecting officer herewith forwarded.

My Lords desire me to express their hope that the Directors of the Lancashire and Yorkshire Railway Company will take immediate steps to have this line placed in a fitting state of repair, and that in the meanwhile they will cause the speed of their trains to be reduced, so that passengers may travel over the line by them without unnecessary risk.

My Lords direct me also to request, that the attention of the Directors may be directed to the observations in the concluding part of the report, as to the position in the train of the guard's van, and as to the practice of running engines tender foremost, and to observe, that a very great degree of responsibility must attach to the Directors if they continue to run trains over their lines, without adopting every reasonable precaution to secure their safety.

Both of these subjects have been frequently brought under the notice of Railway Companies, in communications from this Department, and in reports to Parliament; and it is therefore with extreme regret that my Lords are informed that the practices are permitted upon the lines of the Lancashire and Yorkshire Railway Company, of running engines with trains, tender foremost, and of sending trains along the Railway unaccompanied by a guard, with a break under his control, on the last carriage.

My Lords again advert to the frequency with which they have been compelled to address to the Lancashire and Yorkshire Company observations of the same kind, and express an earnest hope that the Directors may now be able to

report to them, that the most careful measures have been adopted for remedying upon so important a line the great evils to which their Lordships' attention has of late been so painfully directed.

I am, &c.,

J. L. A. SIMMONS,

*Captain Royal Engineers.*

*The Secretary of the*

*Lancashire and Yorkshire Railway Company.*

*Railway Department. Board of Trade,  
Whitehall, 29th March 1853.*

SIR,

I HAVE the honour to acquaint you for the information of the Lords of the Committee of Privy Council for Trade, that in pursuance of their instructions conveyed to me in your letter of the 7th instant, directing me to inquire and report upon the accident that occurred at Dixon Fold, on the Bolton and Manchester Railway—that I proceeded to Manchester on the 11th instant, and that I there attended an adjourned inquest on the bodies of the persons killed in the accident; and the coroner having requested me to give the jury my opinion of the state in which the road then was, I made a careful inspection of the line between Bolton and a point about one mile east of the Clifton Junction, extending over a distance of six miles of railway, and which included the part of the line where the accident occurred. I did not think it necessary to extend my investigation farther, as the remaining four miles of the line into Manchester is of more recent construction, and of sufficient strength to meet the traffic which now passes over it.

Before entering on the state of the permanent way, I will, for their Lordships information, describe the nature of the accident and the circumstances under which it happened; and to assist my explanation, I annex a sketch which the officers of the Company had made, of the state of things immediately after the accident, which shows the condition of the road and the relative position of the carriages, both before and after the occurrence.

Bolton is the point where the express trains from the north and from Liverpool proceeding to Manchester meet. They are timed to arrive within five minutes of each other and to depart at 5.45 p. m. The departure on the occasion in question is stated to have been 5.48; the train consisted, besides the engine and tender, of the eight following carriages, arranged in the order of enumeration:—

- 1 Composite carriage.
- 1 First class ditto.
- 1 Second class ditto.
- 1 Guard's van.
- 1 Composite carriage.
- 1 Guard's van.
- 1 Second class carriage.
- 1 First class carriage.

The distance between Bolton and the place where the accident occurred is five miles; the line descends the whole way from Bolton at an inclination of about 1 in 200. The train made one stoppage after leaving Bolton, and the time that elapsed from its departure until the accident, has been variously stated at from eight to ten minutes. Making therefore an allowance for the one stop and recovering speed, the probable velocity of the train at the time of the accident may be taken to have been between forty and fifty miles an hour. The engine appears to have left the rails towards the right, and to have run some short distance with the left wheels between the rails, and the right ones between the middle space, without materially damaging the line; but for the remainder of the distance (some sixty or seventy yards) the line of rails on which it had been travelling was completely torn up. The engine finally upset on the down line of rails turning completely round in the act, so that the back end of the engine faced towards Manchester; the left hand driving wheel was found lying within a few yards of the engine, the axle having broken off in the middle of the axle box, leaving about three inches of the axle attached to the wheel.

The tender at the time the engine upset became detached, and was turned upside down and thrown to the left; the drawing which I have annexed is so fully explanatory of the subsequent position and state of the carriages, that

any further description would rather tend to confuse than explain the circumstances.

Much discussion took place at the time of the inquest as to the spot where the engine first left the line. At about ninety yards from the place where the climax of the accident occurred, there were indubitable marks of the engine having got off the rails, the ground being ploughed up by both wheels of the engine; but for a distance of thirty yards farther back, there were slight marks along the longitudinal timber on the left side within the rails, while no marks appeared on the timber or ballast on the right side, which led to the supposition that the axle had fractured where this first mark was found; and the single trace was accounted for, by supposing that the wheel on the side of the fracture had been thrown off the rail by bending inwards; and so allowing the opposite (right hand) wheel still to remain on the rail. One inevitable consequence of such a supposition would be, that the sharp edges of the broken part of the axle revolving in the axle box would leave the marks of its rotation on the inside of the axle box. Another consequence, not quite so inevitable but more than probable, would be, that the surfaces of the fracture rubbing on each other would exhibit concentric marks, due to the differential velocities of the parts. When the engine had been taken to the workshops and the axle box removed, neither the inside of it, nor the fractured surfaces of the axle were found to exhibit these appearances; but on the contrary, the upper surface of the inside of the axle box showed only through half its length deep scores slightly inclined to the direction of the axis, such as would necessarily be produced by the broken part of the axle attached to the wheel being forcibly and suddenly wrenched out of the axle box—and there was no appearance of any rubbing on the surfaces of the fracture. There can be no question, therefore, that the failure of the axle was from the effect of the accident, and was not the cause of it.

I will now proceed to describe the portion of the line lying between Bolton and one mile east of the Clifton Junction, which I inspected; on that part there are several different descriptions of permanent way laid, alternating with each other. For a certain length, one line has been recently laid with new longitudinal timbers and bridge rails; while on the other line the longitudinal timbers date from the original construction of the line, and the rail is of this section. Then comes an alternation of a cross sleeper line, and then again the original construction, and so on; but the greater part of the permanent way of both lines is laid with the old longitudinal timbers, and the rail whose section I have given above. It is to the permanent way thus laid that I shall confine my report, the other descriptions being of modern construction, and adapted to the traffic. This portion of the line is laid on longitudinal timbers (half baulks not exceeding twelve inches in width, and from five to six inches in depth), which have been down fifteen years; they rest at nine feet intervals on cross sleepers, which are dovetailed into them. In 1846 the original rail being worn out, a new set of rails was laid down on the old timbers; this rail is of the section I have already given, and weighs sixty-eight lbs. to the yard; it is secured to the timbers at the joints by chairs of an obsolete pattern, and intermediately by spikes driven into the timber. The chairs, which from the form of the rail, have to be counter-sunk in the wood, are secured in their place by two bolts, which screw into fang nuts underneath the timber, and the rail is made tight in the chair by means of a wooden key on one side, and by a washer attached to the bolt on the other. It will be readily understood, that in drawing the spikes that secured the old rail to the timbers, and driving in a fresh set with the new rails, the timbers have suffered great deterioration; some of them are split throughout their length, and in all, the rail has buried itself in the wood to the depth of its flange. From these causes, added to the long exposure of the timber to the effects of weather, its bearing strength must be very materially impaired.

The mode here adopted of laying longitudinal timbers on cross sleepers placed at short intervals, is one which, I believe, is now never practised, it has the disadvantage of producing a number of points of unequal bearing underneath the timber, instead of allowing it to rest on an uniform bed of ballast, and this renders the line more difficult to be maintained in good order. I found the majority of the chairs loose in their beds from want of packing underneath, where they had worn away the timber, and from being insufficiently screwed down (the latter defect arose, in many instances, from the nuts or bolts being worn

out), and the wooden keys I found very generally required renewing. I should say that, from one or other of the above causes, full seventy-five per cent. of the chairs were in an inefficient state, and the whole line required beating up underneath the timbers. In fact, to sum up, I would say, that the maintenance of the line was most carelessly performed; there were but two men to a mile employed on the part that I went over, a number hardly sufficient to screw up and pack the chairs, and place them in an efficient state. The season has, undoubtedly, been very unfavourable to railways; but on this line there is less excuse than on many others; the ballast is in abundance, near at hand, and of the best description; and the line having a continued fall of 1 in 200 for several miles, there is every facility for drainage, and a line well drained and well ballasted can be kept in good order in any weather.

I now come to the consideration of speed. I believe that the motion of a train on an uneven road will be found to consist of a series of bounds in passing over bad joints, and resisting parts of the road. As the speed increases so will these leaps increase, both in magnitude and frequency, till at a certain speed the motion will become highly dangerous; the converse will be found equally true, so that when the speed is reduced a bad road may be travelled over with comparative safety. On a well constructed road, which is kept in such order as to defy deterioration from weather, I believe that very high speeds may be maintained with a certain amount of safety, provided due attention is paid to the rolling stock; but Companies who have suffered their lines to become deteriorated from insufficient ballast, drainage, and other causes, and still maintain high speeds, place themselves, in my opinion, in a very culpable position, and I have reason to fear that a survey of many of the leading lines would shew them to be in a state ill adapted for the speeds that are maintained on them.

In the state in which I found the road between Bolton and one mile east of the Clifton junction, I am satisfied that speeds exceeding twenty or twenty-five miles an hour cannot be considered safe.

A very important consideration, as an element of safety, is the rapid deterioration to which the rolling stock is subjected, in passing at high speeds over roads in the condition I have indicated. There have recently been reported several cases of broken tyres, and, I have reason to believe, many more have occurred, which, having been happily unattended with personal injury, have not come under their Lordships' notice; these, I have no doubt, have been mainly due to the severe concussions they have sustained in passing over bad roads. From the same cause result the broken axles which so frequently occur, so that, even in an economic point of view alone, it ought to be a matter of serious consideration to Railway Companies to maintain their permanent way in thorough working order.

With regard to the originating cause of the accident, I believe it to be due to the high velocity at which the train was travelling over a permanent way which had been suffered to fall into such a state of deterioration as to render it unsafe for trains to pass over, except at very reduced speeds.

The Lancashire and Yorkshire Railway Company do not keep their lines in repair by their own workmen, but let out the maintenance of it to a contractor. This is not an unusual practice with Railway Companies, but whether it is a wise policy to entrust to other hands a matter on which so much depends as the efficient repair of the permanent way, is another question. My own opinion and experience is that it is not. Contractors can undoubtedly be made, by proper vigilance to perform their work; but it must be recollected that they have to make their profits out of the sum which is allowed for the maintenance—which the Company's own servants would not have to do; if, therefore, a Company elect to keep their line in order by such an arrangement, it is undoubtedly their duty to establish such a system of control and supervision as will secure the efficient performance of the contract, in a case like this, where the negligent execution of the work may be attended with such serious results, it might be supposed that a respectable contractor would not, for the sake of increasing his profits, perform inefficiently the work; this appears to have been the view the Company took, they paid what they considered a liberal price for the maintenance of the permanent way, and employed a contractor of the first eminence, but the work was, notwithstanding, performed in a most inefficient manner. The number of men employed on the line was totally inadequate to the work to be performed; and

the keys, bolts, nuts, and packing, which the contractor was bound to supply as they became worn out, were not renewed, but however discreditable this may be to the contractor, it in no way relieves the Company from their responsibility; their superintendents of permanent way neglected their duty, and the line fell into its present deteriorated state.

Lancashire  
and Yorkshire  
Railway.

Not very long since, on a line of great traffic, where an engine got off the rail, owing, it was supposed, to a somewhat similar state of the permanent way, the wretched state of the line was ascribed to me by the engineer as having arisen from the maintenance being only just taken out of the hands of a contractor. Nearly at the same time I had another instance on an Irish railway, where a similar accident occurred from the same cause, and in this instance also the line was in the hands of a contractor; all these accidents were attended with fatal results. It may be said that the abuse of a system is no argument against its use. Certainly not; but attention should be directed to it, which is all that I desire.

The only further observation I have to make is on the position which the break carriages (of which there were two in the train) occupied. The first one stood fourth in the train, and the second sixth. It is one of the original recommendations of the Board of Trade that an empty carriage or guard's van should always be placed next to the tender, and more recently the attention of Companies has been called to the advisability of a guard being always in the rear of a train. It is supposed that greater damage occurred than would otherwise have happened to the carriages in front, from the weight of the first van coming on them. Whether this was so or not, there is no doubt but that the two vans occupied places in the train where they could be of the least possible service.

It was stated by a gentleman at the inquest, that the Lancashire and Yorkshire Company were in the habit of running some of the trains from Bolton with the tender of the engine foremost. I have only to observe that such a practice on this line, owing to the probability of the train having to pull up suddenly on approaching the Clifton Junction, renders the practice more than usually dangerous, and I would recommend its being immediately discontinued.

I have, &c.,

Captain Simmons, R.E.  
&c. &c.

GEORGE WYNNE,  
Capt. Royal Engineers.

## LANCASHIRE AND YORKSHIRE RAILWAY.

Railway Department, Board of Trade,  
Whitehall, June 20, 1853.

SIR,

I AM directed by the Lords of the Committee of Privy Council for Trade, to transmit to you for the information of the Directors of the Lancashire and Yorkshire Railway Company, a copy of the report made to their Lordships, by the officer appointed to inquire into the circumstances attending an accident on the 5th April last, from the breaking of an axle of the engine of a goodstrain.

I am, &c.,

The Secretary of the  
Lancashire and Yorkshire Railway Company.

J. L. A. SIMMONS,  
Captain, Royal Engineers.

Railway Department, Board of Trade,  
Whitehall, June 9, 1853.

SIR,

In reference to an accident which lately occurred on the Lancashire and Yorkshire Railway, caused by the breaking of an axle of a four wheeled coupled engine, and to which the attention of this department was drawn by the general manager of the Company, not on account of its being attended with personal injury, as happily no one was hurt, but because he thought the circumstances attending it were calculated to throw some light on the late fatal accident that occurred at Dixon Fold, near the Clifton Junction.