

GREAT EASTERN RAILWAY.

*Board of Trade,
(Railway Department),
Whitehall, 8th July 1871.*

SIR, I HAVE the honour to report, for the information of the Board of Trade, in obedience to your minute of the 27th ultimo, the result of my inquiry into the circumstances which attended an accident to a passenger train from Epping to Fenchurch Street at the Bow junction of the Great Eastern Railway, between Stratford and Bishopsgate Street station, on the 23rd ultimo. About 12 passengers have complained of injuries received on that occasion.

From the evidence it appears that at the 6.50 p.m. up train from Epping, consisting of an engine and tender, running with the tender in front, ten carriages, and two break-vans, one at each end of the train, with two guards, was passing over the facing points at the Bow junction, where trains for Fenchurch Street leave the main line, the tender, engine, front break-van, and seven carriages got off the rails, when the train was travelling at a speed estimated by different persons at from 10 to 15 miles an hour. This occurred about 7.45 p.m.

When the train was brought to a stand, the tender stopped at about 88 yards from the facing points; the whole train remained coupled up together; and the rear break-van, and the two carriages next to it, stood on the rails of the main line, on the Stratford or east side of the facing points, according to the statements of the engine-driver of the train, of the night superintendent of the goods department at Brick Lane, (Mr. Hester,) of an inspector in the traffic department, (Greenfield,) and of the ganger of the platelayers (Thompson) of the portion of line where the accident occurred.

The ganger of the platelayers, Thompson, appears to have been one of the first persons, in the employment of the company, who got to the facing points after the accident, and he informed me that the signalman who had charge of the junction and telegraphic instruments for working the traffic on the block system, and who is placed in an elevated signal box, opposite the points, and on the north side of the railway, asked him to look at the points, and he states most distinctly that when he then examined them he found that nothing was wrong with the points; that the first connecting rod (or that nearest to Stratford), for connecting the two switches or points together was all right and properly connected to the two switches; that the second connecting rod, that nearest to Bishopsgate Street, was also all right, and properly connected to the two switches; and that the connecting rod between the locking switch bar and the left switch or point was also all right; that he found the fourth vehicle from the rear of the train stood over the points or switches, the left trailing wheel of this carriage being on the left rail of the Fenchurch Street line which branches off to the left, and the left switch or point stood away from the left stock rail of the Fenchurch Street line, and the right trailing wheel of this carriage was standing on the right switch, in fact the wheels were in their proper position, to travel to Fenchurch Street. He also states that the leading wheels of this carriage were in their proper positions on the Fenchurch Street rails.

When he had ascertained that the points were all right, he says he went to the next telegraph station eastwards, the bridge box, for his tools, some keys, &c. Thompson returned to the scene of the accident on a light engine, brought forward by Mr. Hester from the Stratford side, and which engine was stopped about a carriage length from the vehicle at the rear end of the 6.50 p.m. train.

Mr. Hester gives a very different account from Thompson's of the condition of affairs at the points. He states that the leading wheels of the fourth vehicle from the rear were both off the rails between the metals of the Fenchurch Street and Bishopsgate Street lines; that the second connecting rod between the switches or points was out of its socket in the left point rail; and that both ends of the cotter for fastening it to this point rail had both been sheared off, and the left end of this connecting rod was down on the ground; that he could not speak positively as to the first connecting rod (that nearest to Stratford), but he thinks Thompson had it in his hand, and was doing something to it; that he proposed to bring up the light engine to draw back the carriages, and Thompson said, "Let's see to these points first;" that he answered, as the carriages was standing right over the points, "You can do no harm by pulling the carriage towards Stratford;" and this was agreed to; that the engine was brought up hooked on, and the four vehicles, including the last one then standing over the points, of which the leading wheels only were off the rails, were drawn back, but previous to their being moved he put in some packing of wooden keys under the two leading wheels at the heel of the points on each side; that he was standing on the south side of the line when these vehicles were drawn back, after the fourth vehicle had been uncoupled from the fifth; that the right switch point was closed to the right stock rail, and some one called out to the signalman, who never left his box, to let his lever have some play, in other words, to take it out of the notch. He says, that in drawing the carriages back towards Stratford the flanges of the right leading wheel never mounted the rails, and he observed it force the right switch rail open, and that as soon as the carriages had been pulled clear of the points he saw that the first connecting rod was out of its socket in the left switch or point rail, as well as the other one, which he had noticed before these four vehicles were moved. At the request of Thompson for some one to assist him, he held the second connecting rod fair for its socket, while Thompson held the first one nearest to Stratford, who then called out to the signalman above to push his lever over; that something was then said, "Where are the cotters;" and an inspector in uniform, who was standing there, said, "I have one."

Mr. Hester was then called away to attend to a female who had been slightly injured, and when he returned he found that the fifth and sixth vehicles were so tightly connected together that they could not separate them, and the four last vehicles were backed to them, the points being then in perfect working order. He says that the fifth vehicle had all its wheels on the main line rails, while the sixth had all its wheels off the rails, between the main line and the Fenchurch Street metals; that in trying to pull them on the leading wheels of the sixth carriage mounted the rails, and dropped off on the right side of the rails, about 10 or 12 feet on the London side of the second connecting rod of the switches; that they attempted to get them on by screw jack, and while doing this, the accident break arrived, and he left; but up to that time he says that no wheel had been off the rails within eight feet of the connecting rods.

It is impossible to have a clearer statement. It is supported by the engine-driver (Peckett), who distinctly speaks to the connecting rods being out of their sockets in the left switch or point rail, in five or six minutes after the accident happened; and so says the guard of the train, who rode in the front break-van, and he thinks the ends of the connecting rods were resting on the sole of the left switch or point rail.

Inspector Greenfield got to the scene of the accident

about five minutes after 8 o'clock, at which time all the carriages remained coupled together, none had been moved, and one was still standing over the points. He noticed that the engine and tender and eight vehicles were off the rails, seven consecutively from the tender; the eighth was on the rails of the main line, and the ninth had the leading wheels off the rails; the trailing wheels were on the rails, standing partly over the points, but he could not say on which line; the right switch or point rail was close to the stock rail, in the proper position to go to Fenchurch Street; the left switch or point rail was out of position altogether, as it stood rather nearer to the left stock rail of the Fenchurch Street line than to its proper position. Both connecting rods were out of their sockets, and the two ends were resting on the lower flange of the left switch or point rail; both cotters were out; the cotter of the second connecting rod appeared to have been broken short off in the slot, with a portion of the cotter still remaining in the slot; the upper end appeared quite bright, as if newly broken.

He also says that there was no cotter at all, nor any remains of one, at the first connecting rod; but close to and under it, he picked up a cotter, much bent, with one arm broken off; that arm appeared to have been broken off a considerable time; it was quite an old fracture. He handed it to one of the platelayers, when they were connecting the rod to the left switch or point rail, as the platelayers were inquiring for a cotter, and one of them commenced to straighten it with a hammer, and as he was straightening it some one handed him a new cotter, which was driven in, and this was done before any of the carriages which were off the line were moved.

He states that he was not close to them when the first carriage was pulled on to the line, but he called out to the signalman to put his lever out of gear, to slip the catch out of the quadrant notch, and he believes he did it. He could not say whether the wheel forced open the right switch point or mounted it (as the carriage was drawn back), and then dropped inside of it, but he thinks the points were free to be moved by the wheel as it passed through.

It is right to give platelayer Thompson's explanation of what occurred after he returned on the light engine to the scene of the accident with Mr. Hester.

It will have been noticed already that he had described the fourth vehicle from the rear as having all its wheels on the rails, while Mr. Hester and the other witnesses speak to the leading wheels only of the carriage being off the rails.

Thompson says that when he got back with the light engine, the carriages which were off the line were uncoupled from those that remained on the rails, the engine was hooked on, and then the four vehicles at the rear of the train were drawn back clear of the points, and he asked the signalman to work the points, and he did as he was requested, and they worked as well as they did when they were first put in. Mr. Hester then backed the engine and carriages to the one that was off the road, hooked it on to the first one, and drew two of them ahead towards Stratford, as the second could not be uncoupled from the first. This second carriage had all four wheels off the rails; the first carriage only had the leading wheels off the rails; that they pulled these carriages on to the points, burst the cotters out, and broke the switch lock connecting bar; and as soon as he could get at them he put another cotter in, in the front connecting rod; the second connecting rod was not meddled with until Mr. Davis (the engineer of the line) came, about 10 o'clock at night.

He admits that he did not find any cotter, or the pieces of any cotter, at the front or first connecting rod; and says that the first connecting rod dropped out of its socket, but the second one did not, when the points were forced open by the wheels of the carriage that was off the rails; that he brought a cotter with him when he fetched his tools, and took it out of his pocket, and put it into the front connecting rod.

I need only remark on this statement, that the forcing of the carriages backwards through the points would not have the effect of drawing out the connecting rods from their sockets in the left switch or point rail; it might bend or break them.

Another ganger of platelayers, Wm. Sutton, gives a different statement from either of the preceding ones, but he did not arrive at the scene of the accident until after the first set of carriages had been pulled back from over the points. He is not certain of their number. He says that nothing was being done to the points when he got there, that the signalman pulled the points over, and they worked all right at that time. The connecting rods were all right, and the switchlock bar connecting rod was also sound; that he and some others went and got some pieces of wood to lay between the metals, in order to pull the carriages which were off on to the rails; that they pulled two carriages on which had been uncoupled from those next in front; that the pair of wheels next London of the first carriage were off the rails, he believes, of the Fenchurch Street line, and they pulled them towards Stratford; that the pair of wheels of the carriage nearest to Stratford got off the rails at the heel of the points; that the points were closed right for the Fenchurch Street line, but the signalman had his lever out of the notch, and the wheel of this carriage ran over both connecting rods, and ran off to the left looking towards Stratford, and bent both connecting rods down to the ground. He believes these wheels got off from there being too much packing. He did not see the cotters of the connecting rods, and noticed that it was the right wheel of the carriage looking towards Stratford which passed over the connecting rods.

The signalman on duty states that after the accident, and before any carriages were moved, he asked platelayer Thompson to examine the points. Saw him go under the train to do so, and when he came out he said the points are all correct and the rods also. He also asked one of the guards to examine the points, and he went and looked at them, and came back and told him they were right.

He says, Mr. Hester went in between the fourth and fifth vehicle from the rear, and uncoupled, and he called out to him that the front wheel (next London) of the fourth vehicle was off the road between the metals of the main line and Fenchurch Street branch. Mr. Hester then went round the other side of the train, and the four vehicles were pulled back; and he believes, but is not certain, that inspector Greenfield called out to him to take the lever out of the notch before these vehicles were moved. To the best of his belief, the first connecting rod was out of its socket in the left switch or point rail after the four vehicles had been pulled back, and before any others were drawn on to the rails. He saw it out of its socket, but is uncertain when he saw it. He did not see any cotter put in.

I should explain that the main line to Bishopsgate Street station is on an easy curve bending to the right, in approaching London, while the Fenchurch Street up line is on a curve bending to the left. The points and signals at this junction are properly constructed and interlocked, there being also a locking switch bar to prevent the points being shifted while a train is passing over them. The facing points are steel points 15 feet in length, fastened to the stock rails at the heels of the points, by fish plates, bolts, and nuts; and the centre of the next chairs, in which the stock rails rest is about 15 inches from the joints, the first connecting rod is 2½ feet from the end of the points, and the second one 5½ feet; 15 feet forward from the chair next the heel of the points a chair was found broken under the left rail of the up main line, and another one on the opposite side under the right rail of the up Fenchurch Street line, and from thence onwards the chairs were broken under these rails.

At 26 yards from the heel chair, a rail had been torn out of the right rail of the Fenchurch Street line, and after that the permanent way was a good deal damaged.

The first mark that could be traced at the facing

points was a slight mark inside the right rail of the Fenchurch Street line, 2 feet 10 inches on the London side of the heel of the facing points, as if some wheel had there mounted the rail.

The engine and tender which drew this train is quite a new engine, which had only run 6,525 miles up to the day of the accident. It is described as being in first-rate order. It is a six-wheeled engine, with four wheels coupled, leading wheels of 3 feet 6 inches in diameter, and the driving and trailing wheels of 5 feet 6 inches in diameter; the distance between the centre of the leading and driving wheels being 6 feet 11 inches, and that between the driving and trailing wheels 7 feet 1 inch. The cylinders are 16 inches in diameter; the stroke is 22 inches. The total weight of the engine is 28 tons 15 cwt., nearly equally placed on the three sets of wheels.

The tender has four wheels of 3 feet 6 inches in diameter, the distance between the centres of the pairs of wheels being 9 feet. The weight when loaded is 15 tons 17 cwt.

On examining the engine and tender, I found that all the wheels were true to gauge, and that no springs had been broken, so that the cause of the accident must not be attributed in any way to the rolling stock.

Very little damage had been done to the engine and tender; but the carriages had been damaged to the estimated amount of about 80*l.* by scratches on the panels, bent rods, buffer rods, and drawbars, &c.

Although the accounts are conflicting, as I have shown, I do not think there is the shadow of a doubt as to the true cause of the accident, viz., the absence of any cotter connecting the first or front connecting rod with the left switch or point rail, which when the points were set right by the signalman for the Fenchurch Street line, thus allowed the left switch or point rail to stand sufficiently near to the left rail to admit the left wheel of the first vehicle that passed over it, the tender, to pass on the wrong side of this left switch, and then with the engine to sheer off the cotter in the second connecting rod, and thus permit

the ends of the connecting rods to drop out of their socket in the left switch rail on to the lower flange or on to the ground, as stated by the various witnesses.

In proof of this opinion, I should state that as an experiment the cotter of this first connecting rod was taken out, and when the signalman put the points right for the Fenchurch Street line, the left end of the first connecting rod slipped out of its socket, and rested against the side of the point rail, thus having a tendency to bend it, and push the left switch or point rail closer to the left rail than if it had actually dropped on to the ground. This was tried some half a dozen times, and sometimes the connecting rod did not get out of its socket at all, but worked to and fro, and remained loose in it.

With respect to the fracture of the rod connecting the locking switch bar with the left switch or point rail, which does not appear to have been observed until after 9 p.m., I think this was probably done in getting some of the carriages on to the line.

It is somewhat curious that a similar accident occurred on this line from a similar cause at Stratford in 1855, the only one of the kind that I recollect, but in that case there was only one connecting rod; and that accident led to the general adoption of double connecting rods at facing points, and to this being inserted among the requirements of the inspecting officers. This accident clearly points out the necessity for the connecting rods not being so far apart from each other, as in this instance three feet; one foot would be quite enough; and the working of these points also showed, as may be seen at many other points, that it is desirable to have the first or front connecting rod much nearer to the ends of the point rails, than in this case, where it is 2½ feet from them.

I have, &c.

W. YOLLAND,
Colonel.

The Secretary,
(*Railway Department,*)
Board of Trade.

Copies of the above report were sent to the company on the 28th July.

GREAT SOUTHERN AND WESTERN RAILWAY OF IRELAND.

Sir, *Dublin, 30th May 1871.*

In compliance with the instructions contained in your minute of the 24th inst., I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the accident that occurred on the 15th inst., near Carrigaline station, on the Cork and Queenstown section, of the Great Southern and Western Railway of Ireland. No persons are reported to have been injured.

On the day in question, the 8.5 a.m. train from Cork to Queenstown left Cork at the proper time. It consisted of a tank engine, a guard's van with a guard, a second-class, two first-class, two third-class carriages and a mail van. Four waggons loaded with goods were put on to the end of the train, at Queenstown junction. The vehicles, on leaving Queenstown junction, were coupled together in the order in which they are given.

The train was timed to stop at Carrigaline station, which is three and a quarter miles beyond Queenstown junction. As it was approaching the Carrigaline down distant signal, at a speed of 18 or 20 miles an hour, a cow jumped from the side of the line, right in front of the engine.

The railway at this place, runs between two high wooded rocks, and is on a curve of 30 chains radius; so that the driver could not see the cow, until his engine was close to the animal. He shut off steam, whistled for the guard's breaks, reversed, and his fireman applied the break; but the buffer beam of the engine struck the cow, doubled her up, and the engine and the whole of the train went over her. The engine and guard's van, and some of the vehicles, were more or less

lifted, in passing over the cow, but the second-class carriage, the hindermost third-class carriage and the first of the four waggons, were the only vehicles that left the rails. The train was brought to a stand, about 136 yards from the spot where the engine struck the cow. All the couplings held on, and none of the vehicles were capsized. The blocks and hanging irons of one carriage, the box bolts of another, the top and two bottom boxes of a third, and the two bottom boxes and bolts of a fourth carriage were broken. The permanent way was not broken, and none of the passengers appear to have suffered.

The permanent way consists of a Vignoles pattern rail, that weighs 65 lbs. per lineal yard. It is fished and fixed, with fang bolts and wrought-iron spikes, to wooden sleepers, which are laid transversely at intervals somewhat less than 3 ft. apart. The sleepers at the place where the accident happened, and generally along the line, are well bedded in ballast, and consequently there could be very little jolting or jumping of the vehicles that left the rails. The holding on of the couplings, and the little damage that resulted from the accident, may be attributed to this fact, and to the happy circumstance that the body of the cow does not appear to have got between the rails and the wheels of the vehicles. The gradient of the line at the place where the accident happened is a rising gradient of 1 in 155.

About 16 chains back from the place where the accident happened, the railway enters Mr. French's domain. Before it does so, it is bounded by a sloping sea wall at one side, and by the high road at the other side. About 24 chains back from where the accident happened, there is a private level crossing which leads from the high road to the beach, and is used for carting