spring, and the weights on the several wheels were found to be as follows:—

<table>
<thead>
<tr>
<th></th>
<th>Left-hand.</th>
<th>Right-hand.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leading wheels</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Driving</td>
<td>5</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>11</td>
<td>41</td>
</tr>
</tbody>
</table>

It may here be noticed that the total weight of the engine differs nearly a ton to that previously given as its proper weight in good running trim, but that may possibly be explained by its not having the usual quantity of water in the boiler and fuel in the fire-box; but there is another fact very evident also, that the engine is not properly balanced, and it is suggested that the failing partly over on to its side might account for this difference by an alteration in the camber of the springs. I cannot think this would account for the difference. The engine was adjusted at Worcester after coming out of the workshops, and the locomotive foreman there told me that he did this by eye, but did not take any measurements, and they had no weighing machine there to ascertain the weights on the several wheels. The locomotive foreman at Shrewsbury mentioned that when the engine was brought there to be weighed he did not notice any thing particular in the engine to make him think that she was not properly balanced. He also stated that the 6th or 7th plate in the left-hand leading spring was found broken, and the fracture had all the appearance of being an old one. The broken top plate of the left-hand leading spring was repaired so that I had an opportunity of forming any opinion as to the existence of any old fractures on each side of the buckles.

From the whole of the evidence brought before me, I have arrived at the conclusion that the engine got off the rails on the outside of the curve, owing to its not having been properly balanced and with too little weight on the left leading wheel, in passing round a sharp curve of about 13 chains radius. It is also very probable that it was rather tight in its bearings. I think it would be desirable in future that all engines, after coming out of the workshops, before commencing to take regular work, should be tried on a weighing machine to ascertain if they are properly balanced.

I noticed a peculiarity in this engine which I have not met with before, i.e., the distance between the inside of the flanges of the leading wheels is less than that of the other wheels by half an inch, and, I believe, than the standard gauge on the line—4 feet 8½ inches.

The Secretary of the
W. Yolland,
Colonel.
Board of Trade, Railway Department.

LONDON AND NORTH-WESTERN RAILWAY.

Sir,

I have the honour to state for the information of the Lords of the Committee of Privy Council for Trade, in obedience to your minute of the 1st instant, the result of my inquiry into the circumstances which attended the lamentable collision that occurred on the 29th ultimo, at Walton junction, near Warrington station, between a passenger train and a coal train both belonging to the London and North-Western Railway Company, on which occasion five passengers were either almost instantaneously killed or died within an hour, three others have subsequently died of the injuries which they then received, 70 other passengers have sent in claims against the Company as having been injured, and it is certain that many of them were very seriously hurt, in addition to the engine driver, fireman, and second guard of the passenger train.

The Birkenhead, Lancashire, and Cheshire Junction Railway joins the main line of the London and North-Western Railway at Walton junction, about 1 mile 17 chains south of Warrington station, and the Arpley branch of the Warrington and Wirral Railway joins the Birkenhead, Lancashire, and Cheshire Junction Railway about 170 yards to the south of the junction with the London and North-Western Railway. Thus there are two junctions within a very short distance of each other, and it may here suffice to state that the arrangements for the safe working of these junctions were the subject of long and most careful deliberation between the officers of the several railway companies concerned, and the Railway Department of the Board of Trade, from March 1855 to December 1856; and the result of that deliberation was that two double-armed semaphores were erected and placed in the charge of one signalman, stationed in a box in the fork between the London and North-Western and Birkenhead, Lancashire, and Cheshire Junction Railways, with distant signals in each direction, worked from this box, and with indicators connected with the facing points at the

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The Secretary to the
R. G. W. Herbert.
London and North-Western Railway Company.
two junctions, which points, at some distance from the signalman's box, were worked by rods, the indicators being provided to enable the signalman to ascertain whether the points were properly closed when the lever handles were shifted from one side to the other.

The points of the junctions on the London and North-Western Railway are situated at a distance of 103 yards northwards from the signalman's box.

On the morning of the 29th ultimo, an up coal train proceeding to London, and consisting of engine and tender, and a break van, with the rear of the train, was despatched at 11h. 25m. a.m. by the inspector on duty, from Warrington station, with instructions that it was to shunt at Walton junction, so as to be on the way of the 10h. 30m. a.m. up Liverpool passenger train, due at Warrington station at 11h. 21m. but which did not arrive there until 11h. 32m. seven minutes after the coal train had left. The passenger train should have preceded this coal train according to the company's working time tables, but as the passenger train was 11 minutes late the coal train was despatched before it.

The London and North-Western Railway Company are engaged in constructing a new station at Warrington, and in the situation there has been sensibly limited, so that the inspector was justified under these circumstances in sending forward the coal train before its appointed time, 11h. 35m.

It was at about three four or five minutes to run from Warrington station to Walton junction, and before it arrived there the signalman had lowered the junction and distant signals, and pulled over the lever handle that shifts the facing points on the main line for the coal train to enter upon the Birkenhead, Lancashire, and Cheshire Junction Railway, and the whole coal train passed over the facing points and stopped with the break van somewhat more than 40 yards from the points, but quite clear of the London and North-Western up line.

The Liverpool passenger train, which consisted of an engine and tender, break van, and the following vehicles, viz., composite, third class, third class, fish truck, luggage van, third class, third class, horse box, horse box, fish truck, first class, second class, and break van, together making 14 vehicles arranged in the order in which they are here written (with two guards) left Warrington station at 11.35 a.m., or 10 minutes after the coal train, and the driver of the passenger train, a driver of 20 years' experience, states, that when about 100 yards from the up distant signal, which stood at "danger," and which is 477 yards from the junction, he observed to the usual position of the signalman at the junction that he was going to Crewe on the London and North-Western line, and the signals for that line were immediately taken off for him to proceed, and he was travelling at the rate at which he was in the habit of passing that junction, which he estimated at about 15 or 20 miles an hour, and did not notice the coal train on the Cheshire junction line until he was "on to it," or 14 or 15 yards from it, and it was then "too late" for him to reverse his engine, and "he had only time to shut the regulator and fasten himself to the wheel." He could tell no more, as he, as well as the fireman, who was engaged in filtering coal, had been frightened somewhat seriously.

The effect of the collision was to smash the body of the break van at the tail of the coal train; but strange to say, the fireman, who was in it, escaped unhurt; five of the coal trucks were damaged, two of the number to a considerable extent. The shock threw the engine and tender of the passenger train off the rails, breaking the buffer planks and buffers, bending the framing at the leading end, carrying away the life guards, but not doing near so much damage as might have been expected;—throw the passenger train break van off the rails and partly on its side which was burst open; the composite carriage was forced off the rails and thrown entirely over on its right side, greatly damaged as regarded the passengers; the three third-class carriages were smashed to pieces and leaning over to the left side; and two third class and one first-class carriage were slightly damaged. The front wheels of the fish truck stood on the rails, and the points leading to the Cheshire junction line, and the hind wheels on the London and North-Western line; none of the after vehicles were damaged or thrown off the main line, the whole shock of the collision appears to have taken effect mainly on the break van of the coal train, and the engine and tender and four leading vehicles of the passenger train. It is supposed that the engine, No. 17, and some passengers in the train.

It appears from the evidence that the facing points at the junction with the London and North-Western Railway were observed by the shunter employed at the Walton junction to be open to the Cheshire line immediately before the up passenger train reached them, as he had gone to the signalman's box just after the coal train had arrived, and he called out to the signalman on duty (John Rowson): "Oh my God, Rowson, there points." He did not hear whether Rowson made any reply to his remark, and he says there was "not sufficient time for the signalman to alter the points, as the passenger train was then close upon the junction, four or five yards off." The points were partly open to either, but as the engines had been moved off them and found to work properly.

I should explain, that, on examining the junction signal box and arrangements on the 8th instant, I found no material change which had been made since the accident when it was opened in 1856, was that the north indicator then put up to show the signalman in the box whether the points were closed to the one line or the other, and that not partly open to either at the junctions with the London and North-Western line had been removed. I have not been enabled to ascertain for certain when this was done, but I believe it was carried away when a collision between two goods trains occurred in 1862.

The superintendent of police having control of the signalmen did not consider that it was of any use. I observed also that the signalmen made use of two pieces of stick to fasten the lever handles that move the points open to the main line or to the Cheshire junction line as might be required.

The signalman on duty, John Rowson, informed me that he had lowered the signals for the coal train, pulled over the points, and put in the stick to keep the points open for the coal train to pass on to the Cheshire junction line, and when it had got clear of the train line that he had taken out the stick, pushed the lever handle over, and put in the stick again to stop the train, so as to enable him to start the passengers up the North-Western up line, and lowered the signals for the Liverpool train to pass, when the whistle was sounded. But the whole of this statement cannot be correct, as I ascertained by trial that if a piece of coal or any other substance had fallen between the points to prevent their being pushed over and opened to the London and North-Western line, it would not have been possible to shift the handle sufficiently far to enable the stick to be put in; and it is highly probable, in direct contradiction to the shunter's explanation as to the points.

I do not consider that there is the least doubt but that the signalman Rowson omitted to shift the points after the coal train had passed the Cheshire junction line, and that he was thus, from negligence or forgetfulness, the whole and sole cause that led to this lamentable collision. He has been employed for 30 years in the service, and very few mistakes have been made at this junction from the time it was opened some 17 years since, and is spoken of as being a well conducted good man. He has been committed for trial at the next assizes at Chester by the magistrates, on a charge of manslaughter, and various witnesses showing the manslaughter have been brought in against him at two coroner's inquests that have been held on the bodies of the passengers who have been killed.

The London and North-Western Railway Company, which has already received the points at facing points have been very numerous, and the dangers attendant.
on them had caused railway companies to entertain grave objections to their use, and in some instances to resort to expedients which are more or less objectionable, and in some cases inconvenient to the public. They divided into three classes.

1st. Where the points are only partially closed by the signalman to the line on which a passing train is proceeding.

2nd. Where the points are actually moved by the signalman while a train is passing over them.

In both these cases the train, or a portion of it, is almost certain to be thrown off the rails, and the consequences are more or less serious, dependent on the locality, speed of the train, and many other circumstances.

3rd. Where the points are opened to the wrong line by the signalman, through negligence or mistake, and the train is thus suddenly diverted from its proper course along a clear road into one on which another train may be standing close to the facing points, and the consequences may, as in this instance, be very dreadful.

In the report to the Board of Trade for the year 1861, Colonel, then Captain Simmons, Royal Engineers, Assistant Secretary to the Railway Department, in calling attention to the accidents which had occurred at facing points, remarked: "It is worthy of note that some means have not been provided, by which all meeting or facing points which are passed over constantly by passenger trains shall be fixed at all times, the means provided being such that the fastening could not be applied before the points are completely closed. It is believed that means for this purpose might be provided of a very simple and inexpensive nature.

As far as I am aware, nothing was done towards carrying out Colonel Simmons' suggestion. In January 1866, when reporting on a collision which had occurred on the 7th December preceding, between a passenger train and a pilot engine at the junction of the Eielseteys' Arms branch with the North Kent Railway, owing to the signalman having made use of a block of wood to prop open the points to the branch line for the pilot engine to pass, and then forgotten to remove the block of wood when the engine had passed and to set the points right for the following passenger train to pass, I remarked: "I beg to express a very decided opinion against the occasional use of a block of wood, as the very responsible duty of a switchman at facing points means too delicate and important a matter to be left to the memory, however tried as possible; but I should not object to the use of mechanical means for securing the points in certain positions at junctions, provided such means are connected with the signals by which the passing train is controlled, so that the act of securing the points must be made to precede the lowering of the signal, and thus no train could be signalled to pass over a certain line until the points had previously been fixed open to that line. I do not think there can be any mechanical difficulty in effecting such an arrangement."

In the month of September of the same year, Mr. Saxby, now of the firm of Saxby and Farmer, called on me at Eastbourne, said he had read my report, and showed me a model of an apparatus by which he proposed to carry out my suggestion, and he took out the first patent, for what is now known as the apparatus for the locking of signals and points, during the same year. By 1860 many improvements had been made by different persons in the locking apparatus, and the Inspecting Officers began to insist on the locking of the signals and points by the means described in my report. And when the Victoria and North-Western Railway Company received it, they stated that it would be a most important one, as tending to diminish the danger of facing points at junctions; and the officers of the London and North-Western Railway Company were convinced of the advantages attendant on its adoption on their system, and it has since been extensively introduced on it.

To revert to Walton junction, I have already stated that a collision between two goods trains occurred on the 1st of January 1862, on which occasion two servants of the company were injured, one of whom subsequently died of the injuries he received. It was inquired into by Captain Tyler, and in his report he recommended that the position of the device signals generally known as the Singer machine, and that they should be lit with gas instead of oil. He proceeded to remark that "this junction requires improvement also in other respects. On the opening of the Arpley branch in 1855, the questions as to the number of junction signals to be employed and the mode to be adopted in working the two junctions under one signalman were decided on, after much discussion and careful deliberation on the part of the officers of the four companies concerned and the Inspecting Officer, but since that time the improved method of working junction points and signals in partial connexion with one another has come into general use, by which a third semaphore post with two arms, it is intended, in consequence of the employment of that branch as a siding on which vehicles are constantly standing. Under these circumstances it is now desirable, with a view to the future safety of the traffic, that extra siding accommodation should be provided, and that one siding should be laid in between the Arpley branch and the London and North-Western Line towards Warrington; that a third semaphore post with two arms, if "should be erected at the junction cabin; and that the most improved apparatus should be applied for working the points and signals in connexion with one another."

The points should be free to move when the signals are all at danger; the signalman should be unable to lower his signal for any train to pass until he has first set his points right for that train; after having lowered his signal for a train to pass, he should not be able to turn his points in the wrong direction for that train as to cause a collision; and he should not be able to make any mistake in the working of his signals that can lead to a collision between two trains. All these improvements will necessarily lead to some alterations in the cabin itself, and the opportunities will be afforded in carrying them out of giving the signalman larger windows, that he may have a better view in each direction, and of providing him with telegraphic instruments and telegraphic communication, by means of which he may at least be warned of the approach of the trains upon the different lines which are under his control."

"This being an arduous and important post, and one at which considerable complication and a very heavy traffic over two junctions are combined, I think it would be wise to employ three men to do the duty, and thus to reduce the period of labour from twelve hours to eight for each man." That there may be no mistake on the subject, I have thought it desirable to quote Captain Tyler's remarks at length: a copy of the report was forwarded to the London and North-Western Railway Company, and acknowledged by the Secretary.

Nothing whatever appears to have been done towards the adoption of any Captain Tyler's recommendations, and no explanation is forthcoming why it was not deemed expedient to adopt them. This is the more remarkable, inasmuch as the
London and North-Western Railway Company had, a short time before the opening of the Arpley branch was sanctioned, protested against the dangerous nature of the junction and the arrangements for working it, which had been approved by two of the Inspecting Officers of the Board of Trade, Colonel Wynne and myself; and it is perhaps still more strange that they failed, after the collision in 1862, to replace the junction in the condition in which it was when its design was authorized in 1856, if they did not then choose to incur the expense of adopting Captain Tyler's suggestion.

If Captain Tyler's recommendations had been adopted, the recent collision at Walton junction certain would not have happened. But I do maintain that they are not impossible under such circumstances, unless the signals are disobeyed by the engineers, or the points are wilfully shifted by a signalman as a train is in the act of passing over the points.

This accident brings prominently into notice a serious condition of things in reference to the safety of the public travelling on railways. There are a very large number of junctions of nearly the same construction, where the neglect or mistake, no matter which, of a signalman may at any moment produce a similar result to that at Walton.

These junctions, it may be assumed, have mostly been constructed in the best manner, and according to the knowledge and experience which existed at the time they were put up. But they are open to the same objections as that at Walton. It is true also that in some instances the efforts of the Inspecting Officers in this direction have been strenuously opposed and successfully resisted by important railway companies objecting to comply with their requirements. It is to be hoped that this will not occur again, now that this sad accident has proved the Inspecting Officers to be fully justified in stipulating that the points should be locked by the signals.

Again, in the case of branch lines only used for goods traffic, junctions are made with the main passenger line which are not even submitted for the inspection of an officer of the Board of Trade, before they are opened, as the sanction of the Board of Trade is not required to the opening of goods lines, and new stations are opened, and extensive and important alterations are frequently made on lines of railway long since opened, containing the very objectionable junctions to which I have more particularly referred. Similar accidents are also liable to and do frequently happen at facing points leading into sidings, when those facing points are not connected with a signal that locks them open to the main line when the signal is at danger, and I have recently been engaged in inquiring into such an accident by which two men were killed on the North London Railway on the 17th instant.

An important question also arises where a railway company is induced to introduce the improved apparatus required to prevent this class of accident from happening. The junction may have been made to suit the purposes of a competing company in abstracting traffic from the main line, and, as is usual, the special Act will have provided that the expense of constructing the junction and putting up the signals must be defrayed by the company requiring the junction, and this will long since have been done. But the question that will arise is, which company should bear the further expense of introducing the improved apparatus? The competing company may be one of the few that strongly object to its use, and decline to bear the expense, although they will receive the full benefit of such alteration in preventing a collision on their line.

Their Lordships have no control whatever over railways after they are once opened for traffic, however defective and dangerous the structures and permanent way may be, and the construction of junctions will not take place where the locking apparatus has been introduced and is kept in proper order, but I do maintain that they are impossible under such circumstances, unless the signals are disobeyed by the engine drivers, or the points are wilfully shifted by a signalman as a train is in the act of passing over the points.

Sir, I am directed by the Lords of the Committee of Privy Council for Trade to transmit to you, to be laid before the directors of the London, Chatham, and Dover Railway Company, the enclosed copy of a report by Captain Tyler, the officer who was appointed by their Lordships to inquire into the circumstances which attended the accident that occurred on the 10th July at the Battersea Pier junction on the London, Chatham, and Dover Railway.

In compliance with the instructions contained in your Minute of the 11th instant, I have the honour to report, for the information of the Lords of the Committee of Privy Council for Trade, the result of my inquiry into the circumstances which attended the accident that occurred on the 10th instant at the