LONDON MIDLAND AND SCOTTISH RAILWAY.

Ministry of Transport,
4, Whitehall Gardens,
London, S.W.1.
10th December, 1934.

Sir,

I have the honour to report, for the information of the Minister of Transport, in accordance with the Order of the 7th September, 1934, the result of my Inquiry into the circumstances of the accident, which occurred at about 5.38 p.m. on the 6th September, at Port Eglington Junction, near Cumberland Street Station, Glasgow, on the London Midland and Scottish Railway.

The 5.35 p.m. up local passenger train, Glasgow (St. Enoch) to Kilmarnock, was crossing from the up Main to the up fast Canal line, when it came into violent collision (head-on) at the diamond crossing of the junction, with the 5.12 p.m. down local passenger train, Paisley to Glasgow (St. Enoch), which was travelling in the opposite direction on the down fast Canal line.

I regret to report that 6 passengers, the driver of the Kilmarnock train, and the fireman of each train, either received fatal injuries or died shortly afterwards. In addition, 10 passengers and the driver of the Paisley train were seriously injured, while 20 others, 15 passengers and the 2 guards, were admitted to Infirmary and discharged the same evening or next day. Subsequent intimation of minor injury was also received from 27 other passengers, who were not treated at any of the Infirmaries, while a Company’s servant was slightly injured during the clearance of the lines, and the guard of the Paisley train had again to leave duty some time later due to internal injury sustained in this accident.

Relief was promptly and efficiently carried out by some 8 Casualty Surgeons from different Police Divisions, and altogether over 20 Doctors were on the scene within a few minutes. Immediately the accident occurred advice was also transmitted through the Railway Company’s Central Control Office, Glasgow, to the St. Andrew’s Ambulance Association, who reported at 5.47 p.m. that 9 ambulances and 21 men had been despatched. The first ambulance arrived at 5.50 p.m. and 15 trips were made conveying 38 patients to the Infirmaries, the last trip leaving at 6.32 p.m.

The Kilmarnock train consisted of six 8-wheeled bogie coaches weighing 134 tons, and was hauled by engine No. 639, 4-4-0 type, with 6-wheeled tender, weighing in working order 95½ tons and travelling engine first. The engine was fitted with the steam brake, operating in conjunction with the vacuum brake on all wheels of the train.

The Paisley train also comprised six 8-wheeled bogie coaches weighing 159 tons, and was hauled by a similar type tender engine, No. 591, running tender first. The driver of this train, David Kerr, has survived, and had a remarkable escape.

The accident took place in daylight, at about the peak of the evening traffic. The Kilmarnock train was apparently equally loaded throughout and carried some 70 passengers, while the Paisley train carried 40.

The weather was fine, with good visibility; there was an easterly breeze, and no question arises of steam or smoke affecting vision.

The Paisley train had stopped at Shields Road and was due to stop at Cumberland Street, the stations on either side of Port Eglington Junction. The passengers who were killed, and most of those who were more seriously injured, were, I understand, travelling in the first two coaches of this train and in the leading three vehicles of the Kilmarnock train. Of these five vehicles, three were completely wrecked.

The Kilmarnock train weighed loaded about 233 tons, and at the moment of collision was travelling at 25 to 30 m.p.h.; the Paisley train weighed 257 tons and was probably travelling at 20 m.p.h. The exceptionally heavy damage to the engines and the wrecking of the leading coaches of each train appeared to indicate impact at a combined speed of at least 45 to 50 m.p.h.

The angle (1 in 9.3 diamond) at which this head-on collision took place accounted for each engine being thrown to one side, while the telescoped coaches piled up behind under and over them. The line was cleared by 7.30 a.m. next morning, and normal working was resumed at 10.15 a.m.

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The engine of the Kilmarnock train came to rest upright but turned round to the left nearly at right angles to the direction of travel; the front carried away a portion of adjacent parapet walling and the tender was on its right side. The bogie was destroyed, both wheels on the leading axle being forced off; the buffer plate, frames and smoke box were buckled beyond repair, the whole cylinder casting was driven back 3 feet, and the boiler itself was shifted about 6 inches. The regulator was closed but workable; the reversing lever had jammed in the running position. The wreckage of the two leading coaches came to rest on top of the tender and engine. The third coach was also telescoped to the extent of three compartments, but it was not derailed; the remaining three coaches of this train suffered little damage.

With regard to the engine of the Paisley train, the rear end of the tender received the impact and was heavily damaged and crushed, the trailing wheels being displaced, the frame buckled, and the tank burst. Both tender and engine were forced over slightly to the right and came to rest at an angle of 30° from the vertical. The tender was raised into the air, the front end being driven into the cab, and the footplate was crumpled. The reversing handle was broken at both ends and jammed in the running position; the regulator was closed but worked freely. The engine bogie was driven in towards the driving wheels, while the frame of the leading coach, with one of its bogies, was forced under the front of the engine which was thus raised 6 feet into the air. This coach was turned over and wrecked, the frame having jammed between the engine and the leading end of the second coach, the first 3 compartments of which were also telescoped. The remaining 4 vehicles were little damaged and were not derailed.

The second coach (wrecked) of the Kilmarnock train and the third coach of the Paisley train were equipped with gas; the lamps were not alight. A gas main was also broken alongside the parapet wall, and as a precautionary measure the Fire Brigade were called out and stood by; fortunately no fire resulted.

Information with regard to the type of construction of the vehicles and the damage sustained is given in the Appendix. Permanent way and signalling equipment and 45 feet of parapet walling required comparatively light repairs.

Report.

1. The attached plan gives all relevant information, and indicates the positions assumed by the engines and coaches.

The Kilmarnock train was in process of traversing the through crossover from the up main to the up fast Canal line, points Nos. 6, 7 and 8 being set. The Paisley train approached along the down fast Canal line, points No. 32 being normal, the collision taking place on the diamond of Nos. 7/8 trailing slip. At the same moment, there was another passenger train (the 4.22 p.m. from Ardrossan to St. Enoch) approaching on the down main, the home signal No. 65 being clear with points Nos. 23 and 26 normal.

From Shields Road Station, the gradient of the down Canal line rises 1 in 200 for 583 yards to the site of the collision, and thence, past Port Eglinton Junction box, at 1 in 86 for 322 yards to the west end of Cumberland Street Station platforms. Approaching from Shields Station, there is also heavy reverse curvature, firstly left-handed for 262 yards on radius of 21 chains, followed by tangent for 110 yards, and secondly right-handed for 258 yards on radius of 125 chains to the site of collision.

It will be noted that the down Canal home signals Nos. 73/75 are 147 yards from the site, and the following distances from Port Eglinton box are relevant:—

<table>
<thead>
<tr>
<th>Shields Box Down Canal Advanced Starter No. 15, with Port Eglinton fixed distant below it</th>
<th>815 yards West</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Eglinton Up Canal Starters Nos. 46/48</td>
<td>671</td>
</tr>
<tr>
<td>Port Eglinton Down Canal Homes Nos. 73/75</td>
<td>387</td>
</tr>
<tr>
<td>No. 32 facing points</td>
<td>169</td>
</tr>
<tr>
<td>Site of collision</td>
<td>111</td>
</tr>
<tr>
<td>Port Eglinton Down Main Home Signals Nos. 65/67</td>
<td>102</td>
</tr>
</tbody>
</table>
2. Owing to the above-mentioned reverse curvature, somewhat unusual conditions prevail with regard to the view which a driver obtains of signals when approaching the junction from Shields Road Station over the down fast Canal line. For the purpose of noting these conditions, I travelled on two occasions on the footplate of a similar engine, running tender first. The driver's position is on the right-hand side of the footplate in the direction of travel, viz., on the side on which are located the down homes Nos. 78/75, and the up starters Nos. 46/48.

At a point 35 yards in advance of the Shields down advanced starter, No. 15, these 4 signals come into view more or less simultaneously with the down main homes Nos. 65/67; and, surprisingly, the last named when approaching the junction from Shields Road Station over the down fast electric detectors, and, when operated, release the mechanical locking on further on, viz., 214 yards before reaching up signals Nos. 46/48, the diamond-shaped Rule 55 plates on the post of these signals passed across the line of vision of Nos. 78/75; and it was not until after travelling a further 152 yards that these plates, which were so prominently displayed, cleared the line of vision of signals Nos. 73/75.

Briefly, the line of vision of signals Nos. 73/75 was more or less affected while traversing a distance of about 152 yards between points 343 yards and 191 yards before reaching them. Thereafter, the view of these signals is quite uninterrupted, viz., over a distance in rear of them of 191 yards, though, curiously enough, the down main homes Nos. 65/67, which are 156 yards ahead of Nos. 73/75, do not assume their true relative position to the left until after a point only 62 yards before reaching Nos. 73/75 is passed.

Over the distance, therefore, of 316 yards up to this point (62 yards before reaching signals Nos. 73/75), it is a fact that the view of the signals on the occasion in question, as presented to the driver of the Paisley train, was that on the right there was the main line bracket post carrying signals Nos. 65/67, and on the left the nearer bracket post carrying signals Nos. 73/75 which controlled his movement. When these signals first come into view, I noted some difficulty in realising which post was the nearer of the two, particularly as post Nos. 46/48 is nearer than both.

3. Port Eglinton Junction box is carried on overhead girders spanning the up and down main lines; the frame faces the Canal lines, and consists of 71 working levers and slides with 9 keyholes for freeing treadle back-locks on 16 signals. All signals are electrically operated by the slides, and to simplify the connections between the manual point levers and the slides, 8 manual route levers are used to prove and hold the point levers concerned. These route levers, of which No. 21 is the one concerned in this case, are proved electrically through the electric detectors, and, when operated, release the mechanical locking on the signal slides. Separate levers are not provided for the facing point locks, and depression bars are used instead of facing point locking bars, which, when operated, lock the point levers normal and reverse.

With the introduction of the new colour-light signalling, train-describers were brought into use between Port Eglinton and St. Enoch. There is no locking between the describer and the signal slides. The description of each train is set up manually by the signalman at St. Enoch, and is transmitted by push button when the train is leaving St. Enoch platform. This indication shows on the describer in Port Eglinton box in the *Train in Section* column, the transfer to the *Train Arrived* column occurring when a track circuit is occupied just ahead of the up main starter at Gorbals Junction, 1093 yards East of Port Eglinton box.

Sykes' lock and block is in operation between Port Eglinton and Shields boxes, trains being accepted on the fast and slow lines in both directions on Plunge levers. Before signals Nos. 46/48 can be cleared, a plunge has to be received from Shields box, and similarly Shields starting signal, No. 15, is released by plunge from Port Eglinton. The usual treadle locking is in operation, and when Shields box is in circuit all such locking and the down fast plunger can be cancelled by the use of the key in Port Eglinton box. I under-
stand that such cancellation takes place here two or three times a day, particularly in connection with signals No. 75 and No. 69 (from the down slow line).

On the main line, between Port Eglinton and Pollok Junction to the west, Tyers type (Caledonian pattern) 2-position block instruments are in operation, fitted with controls similar to those of the Sykes' plunging instruments; that is to say, Port Eglinton up main and Pollok Junction down main starting signals are released by a block plunge, and a second plunge cannot be made on the Port Eglinton down plunge until the first train has cleared the treadle beyond the starting signal, and the home signal slide has been restored to normal, or alternatively, the treadle locking has been cancelled by the use of the key and the home signal slide has been restored. All plunger and treadle locking in connection with the up and down main lines can be cancelled by key.

Further, No. 23 point lever, when reversed, locks the down, main, plunger, and, conversely, when a train has been accepted from Pollok Junction on the down main, No. 23 lever is locked normal. As already stated, the 4.22 p.m. train from Ardrossan was approaching on the down main at the time of the accident. Point lever No. 28 precedes No. 30, which precedes No. 31 or No. 32. With regard to the other points concerned, No. 8 precedes No. 7, and No. 7 precedes No. 6, while No. 32 requires Nos. 6 and 7.

4. The following are the relevant instructions which applied to the acceptance of trains at Port Eglinton Junction:—

Sykes' Lock and Block Regulations.

Regulation 4.

When the Down Main or Down Canal line is clear to this Box and the "Train out of Section" signal has been given for the preceding train, the "Is Line Clear" signal may be acknowledged for the following train.

A Down freight train must not be accepted from Shields Box while a train is being crossed from the Up Main to the Up Canal Line.

Down trains must not be accepted from Pollok Junction when a crossing movement is being made or about to be made between the Down Canal Line or Shields Bank sidings and the Down Main Line. The Junction points and the block instrument to Pollok Junction are interlocked.

When a crossing movement is being made to or from the Canal and Main Lines via the Junction immediately West of Cumberland Street Platforms the Up Main Line Rear Home Signal must not be cleared to allow a train to draw forward to the Inner Home Signal.

From the first paragraph it appears that acceptance under Regulation 4 is only authorised if the down lines are "clear to this box"; but I was informed that since the introduction of the Sykes' system here, 30 years ago, the term has in practice been used collectively, namely, as covering the area between the junction home signals in each direction. Operation on, for instance, the down fast Canal line has therefore permitted of full line-clear acceptance up to signals Nos. 73/75, even though the road may be set for a fouling movement in rear of what appears to have been the intended clearing point. It will also be noted that exception to this has been made in respect of down freight trains, which have not been so accepted since April, 1928, due to the occurrence of an over-run.

Indeed, it appears that the working here has always been looked upon as that of a station yard, a speed restriction being relied upon of 15 m.p.h. on all lines between Clyde Bridge and Port Eglinton Junction; distant signals did not even exist till May, 1938, when fixed semaphores were provided on the down Canal and main lines in connection with the new colour-light scheme.

5. The following typical figures for 5th September show the number of trains passing Port Eglinton Junction on each line during the peak periods:

<table>
<thead>
<tr>
<th>Time</th>
<th>Up Canal</th>
<th>Up Main</th>
<th>Down Canal</th>
<th>Down Main</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0 a.m.</td>
<td>15</td>
<td>17</td>
<td>19</td>
<td>23</td>
<td>74</td>
</tr>
</tbody>
</table>

5th September
4.30 p.m. till 5.30 p.m.—
Up Canal
Up Main
Down Canal
Down Main
Total

5.30 p.m. till 6.30 p.m.—
Up Canal
Up Main
Down Canal
Down Main
Total

On the occasion in question, the Kilmarnock train left St. Enoch via the main line, owing to the Canal line at Clyde Junction being occupied by carriages to form another train. In such circumstances, it is the practice to transfer the Kilmarnock train from the main to the Canal line at Gorbals Junction; but this was prevented by the running of a Special train from the Barrhead line, and the crossing was therefore being effected at Port Eglington instead. The following information summarises the average number of crossing movements per week-day (end of August and beginning of September) at this junction:

- Up Main to Up Canal
- Up Canal to Up Main
- Down Main to Down Canal
- Down Canal to Down Main

It will be observed that the crossovers to the west of the box are more used than those to the east, and that the path taken by the Kilmarnock train, Up Main to Up Canal, though unusual for this train, is more used than the others. I understand that the two trains in question usually pass each other on the Canal lines in Cumberland Street Station, at about the same time as the 4.22 p.m. down train from Ardrossan passes on the down main.

Evidence.

6. With regard to the Kilmarnock train, Porter Guard W. Kydd said that, before leaving St. Enoch, he passed a friendly greeting with Driver R. Balmer and Fireman W. White, the deceased Enginemen. The vacuum gauge registered 20 ins.; the run was normal, and, according to Kydd’s assumption, under clear signals, as he felt no brake application and speed gradually increased until the collision occurred. He was travelling in the rear vehicle, and was seated at the time; he received facial injury which, however, did not prevent him carrying out his protective duties. He estimated that speed increased to 25 m.p.h. Port Eglington box is about 1 mile from St. Enoch, and the rising gradient will be noted from the plan.

With regard to the Paisley train, Guard W. Walker also said that he had spoken to Driver Kerr, and to the deceased fireman, R. Goldie; before leaving St. Enoch on the previous outward journey; he had tested the brake before leaving Paisley, 20 to 21 ins. of vacuum being registered. He was riding in the rear compartment; but was not looking out, as he was standing at the table tying up letters, which had been handed to him at Bellahouston. He realised that an emergency brake application was being made, and a moment later the collision occurred; he described it as "just a swish and a bang, that was all". He had been working as a guard for 20 years and judged that speed at the time was 15 to 20 m.p.h.

The enginemen of the 4.22 p.m. down train from Ardrossan were unable to give evidence of specific value, as this train was brought to a stand at home signal No. 65, in consequence of, and just after, the collision.
Signalman J. Anderson, of Cook Street box (Caledonian Section), actually observed the collision, and estimated the speed of the Paisley train as 10 m.p.h.; but his view of the down Canal home signals was obscured at the moment. According to his statement, he did not move his position or try to observe these signals till a minute or two later, as he had work to attend to; but he was able to note that the down main home was clear at the time. His Bookmarker, L. Thomson, was also occupied, and unable to give any useful information.

7. At Shields Road box, the register is only maintained as a record of duties and of emergency signals. Signalman H. King said that nothing unusual transpired until he suddenly received the *Obstruction Danger* signal from Port Eglinton; he made an entry accordingly at 5.30 p.m., and replaced to danger the up home and starting signals which had been lowered for the Kilmaurnock train. A minute later, he was informed by the Port Eglinton signalman of the accident.

The previous down train had passed at about 5.30 p.m., and King's operation had been normal; he had accepted the Paisley train from Bellahouston No. 1 at about 5.38 p.m., and when he received the *Train Entering Section* signal for it, he obtained acceptance from Port Eglinton, when the signalman there pressed his plunger and released the down starting signal lever. This signal (motor worked) with the Port Eglinton fixed distant under it, is situated 144 yards to the east of the box, as shown on the plan, and there is a repeater (also motor worked) 158 yards in rear at the east end of the platform.

As the Paisley train was due to stop at the station, King did not, in accordance with practice, lower his distant signal, nor, for the same reason, was the *Train Approaching* signal transmitted to Port Eglinton on receipt of the *Train Entering Section* signal from Bellahouston. Neither point is of importance, but the practice is mentioned as showing the difference made in the importance, but the practice is mentioned as showing the difference made in operating fast and stopping trains. King also stated that occasionally Port Eglinton Junction had refused to accept a goods train; but he could not remember the refusal of a passenger train.

Men had been working here during the afternoon in connection with a rearrangement of signalling which had been in progress for some months; they had not been working in the box and had left before the accident happened. The scheme concerned includes the elimination of this box for economic reasons, and will, I understand, be completed before the end of this year.

So far as the down Canal line is concerned, the repeater signal, referred to above, will become the Port Eglinton down outer home, and the existing Shields starter will be eliminated. A warning signal is also to be provided below the outer home to control movement up to the existing home signals when a crossing movement is being made from the up main to the up Canal line.

8. Driver D. Kerr, who was in charge of the Paisley train, was employed in the "spare" or "on call" link, stationed at Hurlford, near Kilmarnock. Though still suffering seriously from the effects of the accident, he was able to give evidence on the 25th September, and answered certain further questions which were put to him, at my request, by the Company's officers on the 2nd October.

Kerr stated that he knew all lines at Port Eglinton Junction very well; the accident occurred on Thursday, and he had been performing the same duty throughout the week, viz., driving a local train Kilmarnock to Glasgow via Barrhead; turning the engine; driving another local train, the 3.25 p.m. to Paisley; and returning tender-first with the 5.12 p.m. train from Paisley.

On the day in question, as before, running tender-first, Kerr's position being on the right-hand side of the footplate in the direction of travel, he stopped at Shields Road Station. Fireman Goldie (deceased) told him that the starter at the end of the platform was clear; after leaving the platform he "turned the reverser up in expansion, and then I saw that the Shields starter was clear and Port Eglinton distant at caution. After that I gave the engine another notch up and, being tender-first, I had a good view over the tender and I saw Port Eglinton down home Canal signal (No. 75) standing clear. Then to get me over the incline into Cumberland Street I turned and opened the second regulator valve and gave the engine a little bit up in the reverse. By this time I would be an
engine length from the signal, and when I looked up at it it was at danger and, naturally, I put on the brakes and my first intention was to look over the side and then everything after that was blank".

Kerr said that when he realised that the home signal was at danger, speed was "rather over 20 m.p.h.", he thought that the brake was applied before the engine passed it. He did not see the signal return to danger. He was standing on the stool in his position on the footplate, in accordance with his custom when running tender-first. He knew there were the two home signals, Nos. 73/75, on a bracket post, and he thought they came into view "more than a train length" after passing the post carrying the Shields advanced starter No. 15 and the fixed distance for Port Eglington; he also said that these signals could be seen "more than a train length" before reaching the up starters Nos. 46/49, and that the latter did not, so far as he knew, interrupt their view.

Kerr also stated that he knew the down main line home signals Nos. 65/67, and was certain that he did not mistake them for Nos. 73/75; in fact, he said he did not see Nos. 65/67, which he referred to as being "a good distance away and very high". He had done all his firing over this road and knew these signals "thoroughly well". He had signed the Route Card as recently as the 10th July, as a repetition and revision of previous signatures; there is no pressure to do this, and he explained that "if we are not sure of the road we do not sign it".

With regard to his actions immediately before passing the home signals at danger, Kerr explained that, when notching up and giving more steam, he had to turn his back to the direction of travel, in order to open the regulator with both hands, and that when he turned round again he observed the signal at danger: "When I notched up the engine I was a good distance off and when I finished I was an engine length from the signal". Kerr added that he then shouted to fireman Goldie (deceased) "That signal was off, Bob" and received the reply "Aye", though Goldie had just previously been firing after leaving Shields Station, Kerr's impression was that he had also previously observed the signal No. 75 in its clear position.

Kerr said there was nothing to distract his attention beyond his turn round to open the regulator and notch up the engine, and that he was "concentrating on my ordinary work"; nor was his view restricted in any way over the coal which was levelled down on the tender. His height is 5 feet 11½ inches; he could stand upright and retain a good view.

On subsequent cross-examination, Kerr estimated that the down home signals, Nos. 73/75, come into view 2 or 3 engine lengths after passing Shields starter; this is correct and when asked to describe the view obtained from this position of these signals relative to the main line home signals, Nos. 65/67, and the up Canal starters, Nos. 46/48, he replied "I have a good working knowledge of the signals at this place and know that with the curves the relative view of these varies. I have a difficulty in describing their positions but know them perfectly well on the ground". He added that he had "no recollection of having seen the main line home signals (Nos. 65/67) and therefore this had no effect on my view of the down Canal signal. I, however, know both these signals well".

9. Signalmen R. Murphy and J. Mackay were on duty in Port Eglington box with Bookmarker J. Gracie. Murphy was in charge and was working at the Shields end of the frame dealing with incoming traffic, while Mackay was at the other end handling outgoing trains. Murphy had served in the box for 12 years, and Mackay for over 10 years.

In brief, their evidence was to the effect that nothing unusual in operation happened until, to their dismay, they both observed the Paisley train passing the home signals Nos. 79/75 at danger, the signals for the Kilmarnoch train, up main to up Canal, and for the Ardrossan train on the down main, being clear at the time. Gracie, with 3½ years experience of the box, also had his attention drawn to the Paisley train when he heard Murphy call out immediately before the collision occurred: "There's that fellow coming through that signal".

Murphy and Mackay emphatically denied the allegation of Driver Kerr that signal No. 75 was first lowered for the Paisley train and then replaced to danger previous to the road being set and signals lowered for the Kilmarnoch train. They explained, in accordance with Gracie's entries in the register, that the
Paisley train was accepted at 5.32 p.m., and the Ardrossan train at 5.34 p.m., while in respect of the Kilmarnock train the indication \textit{Train in Section} appeared on the describer at 5.36 p.m.

In accordance with their practice of many years in respect of acceptance, points were not necessarily set pending the receipt of the \textit{Entering Section} signal; as already explained, however, the acceptance of the Ardrossan train at 5.34 p.m. required and locked points No. 23, and therefore also points No. 32, in their normal position. According to Murphy, the \textit{Entering Section} signals for the Paisley and Ardrossan trains were received at about the same moment, 5.36 p.m., the latter probably just before the former. In any case the Ardrossan train would have been given preference; otherwise alteration of the order would have involved the use of the key and cancellation.

At this time therefore, 5.36 p.m., the situation, so far as Murphy and Mackay were concerned, was that they were advised visually on the describer that the Kilmarnock train was approaching on the up Main line, and they were notified by bell-signal that the Paisley train at Ardrossan had also entered the sections on the down Canal and Main lines respectively.

It appears that up to that time, for 4 minutes since the acceptance of the Paisley train at 5.32 p.m., Murphy had left route lever No. 21 in its pulled position in preparation for lowering signals Nos. 64 and 75 (the latter being led by the former). According to his repeated assertion, however, confirmed by Mackay, he did not lower these signals and no change of mind or alteration of road took place. He stated that he "waited to see how the two trains were running. By that I mean, waiting the departure of the Paisley and also waiting for the 5.35 p.m. coming on the track." According to the entry in the register, the describer for the Kilmarnock train changed to \textit{Train Arrived} at 5.37 p.m., viz., when the train was 1,144 yards from the point of collision. It was probably a few seconds before that time when, according to Murphy, "it was then that the route lever was placed to the centre position to allow Mackay to draw 8, 7, and 6 and the signals (Nos. 42, 44, and 48) for the 5.35 p.m. train." He explained that they "both looked over their shoulders to see how the Paisley was faring," and he summed up his impressions of the position briefly by saying that, although the \textit{Entering Section} signal had been transmitted, the train was in Shields Road Station when the signals were lowered for the Kilmarnock train. He could not see it owing to the curvature and a bridge, but he could see its smoke.

Mackay entirely confirmed Murphy's account, though he could not recollect the acceptance of the Paisley train, nor Murphy's replacement of the route lever to normal. He said that before he set the road, on receiving the train arrived indication, he glanced, as usual, in the direction of Shields Road Station, to see where the Paisley train was, and, as he came to the conclusion that the train was not in sight and as Murphy had not suggested that it should precede, he decided to give the preference to the Kilmarnock train. Moreover, he had in mind the fact that the 5.39 p.m., 5.42 p.m., and 5.45 p.m. trains were following in quick succession.

Mackay was equally emphatic that Murphy had not previously lowered the signals for the Paisley train, nor had he in consequence had to use the key to release the locking before returning route lever No. 21 to normal; such a thing had never happened in his experience, and he would not have hesitated to admit the fact had this change been made. He added that the Kilmarnock train had not been slowed by him and he was satisfied that it received green colour-light indications; it passed at the usual speed. He was just about to transmit the \textit{Entering Section} signal for it when he heard Murphy shout. He said that the only unusual incident was that the train arrived on the up Main line and not on the up Canal line; but this made not the least difference with regard to his operation, which was in accordance with the practice of many years.

\textbf{Conclusion.}

10. There is therefore definite contradiction in evidence in this case. The signalmen affirm that they waited to see how the trains were running before deciding which was to take precedence over the junction, and, therefore, before the signals were cleared. Driver Kerr, on the other hand, alleges that at a point about 380 yards from home signals Nos. 73/75 (at which they first come
into view) he observed No. 75 in the clear position, and that, thereafter, he did not observe the signal again till he reached a point some 20 yards from it, when he realised that it was at danger and made an emergency brake application.

In effect, Kerr alleges that signals were reversed and the road changed in front of him, and that therefore he was misled. He certainly had no time to touch the reversing gear, and judged he was travelling at little more than 20 m.p.h. when he realised the situation. The engine was then, say, 165 yards from the point of collision, and yet, having regard to the resulting damage and to the positions assumed by the engines and stock, impact can hardly have taken place at much less than 20 m.p.h.

Kerr’s suggestion means that, while traversing the distance of 530 yards to this point, at 20 m.p.h., about 53 seconds at a maximum (making every allowance in his favour) were available in which to allow for cancellation by key, the reversal of signals Nos. 75 and 64, the replacement of route lever No. 21, the setting of points Nos. 8, 7 and 6, the lowering of signals Nos. 42, 44 and 48, and the arrival of the Kilmarnock train at the site of the collision at a speed of 25-30 m.p.h.

Signalman Murphy carried out this change in my presence in 33 seconds, but I considered that slow, and subsequent test by the Company’s officers indicated that under working conditions it could be made in 29 seconds. Actual running of the daily Paisley train, starting from rest at Shields Road Station, has also been noted, and the results indicate that 40 seconds are occupied in reaching the point where signals Nos. 73/75 are first sighted, 1 minute 11 seconds in reaching these signals, and 1 minute 34 seconds in reaching the point of collision. The calculated period, 53 seconds, mentioned above, as being the maximum time available, therefore compares with the actual test of 1 minute 34 seconds less 40 seconds, viz., 54 seconds.

While, therefore, the alleged change of road could easily have been made in this time, it is necessary to consider whether, in such circumstances, the Kilmarnock train could actually have reached the point of collision without check. For this purpose, the average timing of this train, at normal speed, has also been tested, at my request, before reaching the point of collision, as follows:—

| Appearance of train arrived on the describer | 1 minute 27 seconds. |
| Train indicated on track circuit diagram in box | 1 minute 16 seconds. |
| Passing outer home signal No. 42 | 48 seconds. |
| Passing home signal repeater | 35 seconds. |
| Passing home signal No. 44 | 22 seconds. |
| Passing box | 7 seconds. |
| Point of collision | |

The positions of the trains can now be compared. If the time of 40 seconds (which it may be assumed the Paisley train took to reach the point 380 yards from home signals Nos. 73/75) be added to the time of 29 seconds (the shortest possible in which the change could have been effected) it is clear that only 25 seconds are left as running time for the Paisley train to have reached the point of collision. This, however, places the Kilmarnock train only 3 seconds in rear of the up home signal No. 44, and it is obvious that the train would have passed the outer home No. 42 at yellow and the repeater at “On”, with the result that it would have been almost, if not quite, at a standstill before No. 44 was cleared, and the collision would not have occurred.

Apart, therefore, from the entirely trustworthy evidence of signalmen Murphy and Mackay, and the fact that the Kilmarnock train was not checked and was evidently running under clear signals, there is not the slightest doubt that there was no change of road in this case, and that the cause of this accident was driver Kerr’s unfortunate failure to observe and obey home signals Nos. 73/75 at danger.

For the trains to have met when they did, and at the speeds at which they were running, signal No. 75 could not have been clear when viewed by Kerr 40 seconds after leaving Shields Road Station; it is evident that Mackay set the road and lowered the signals for the Kilmarnock train a few seconds after the Train Arrived indication appeared on the describer (perhaps 80 seconds before
the collision), the Paisley train at that moment having started from the station by no more than, say, 15 seconds and being still out of sight.

Driver David Kerr is therefore responsible for this serious collision, and notwithstanding his evidence, which was obviously given with sincerity, I feel that he was over-confident with regard to his knowledge of the positions of the signals concerned, and that when they came into view for the first time, with the down main line boxes on the right, as already described, he jumped to the conclusion that No. 69, which was clear, applied to his movement. I noted myself how deceptive these signals might be, and, as stated, there was some unnecessary obscuration of Nos. 73/75, which I understand has since been dealt with.

This, however, affords no excuse for a man of experience; nor should Kerr's duties have necessitated taking his eye off the signals concerned for so long a period as perhaps 36 seconds while traversing the distance of no less than 360 yards. It is also difficult to understand why he failed to bring his train to a stand clear of the Kilmarnock train, or why he did not at any rate materially reduce its speed, if he realised the situation as soon as he suggested. The train was travelling at, say 25 m.p.h., and a stop within perhaps 150 yards, occupying 25 seconds, would have prevented the collision. Having regard to Guard Walker's description of the brake application, this feature also causes doubt as to the reliability of Kerr's account; but perhaps it is not surprising in view of the shock which he must have sustained.

While apparently Kerr is a man of somewhat nervous disposition, he is a good engineman with an excellent record. He is 46 years of age with nearly 50 years' service, for the last 14 of which he has acted as a driver.

The question of Guard W. Walker's responsibility also arises. I should not have expected a man of his experience to have been merely tying up letters when approaching an important junction, and particularly the one in question, in view of the curvature of approach; had he been on the alert and fully appreciative of the responsibilities of a passenger guard in such circumstances, I do not think he would have failed to have made himself aware, as soon as curvature permitted it, of the aspect of the home signals. Had he been trying to observe these signals he might have been instrumental in preventing this collision. It seems questionable whether guards, particularly of suburban passenger trains, should be permitted to allow anything to deflect them from the duty of observing signals when approaching junctions and terminals. I think it is for the Company's consideration whether it might not be desirable again to draw the attention of all concerned to this aspect of their duties.

11. The circumstances of this collision illustrate the necessity for safeguarding the fallibility of drivers in respect of junction operation. There also appear to have been certain previous instances of over-running of the down Canal home signals, and I think it not unlikely that the contributory cause, as I have suggested in this instance, may have been failure on the part of the drivers concerned—after having observed a clear down main home signal—to concentrate their attention upon the unusual development of the "pattern" of signals relative to their movements on the down Canal line.

With the semaphore installation, as it exists, I doubt whether conditions of view can be materially improved; but had the St. Enoch colour-light installation been extended to cover this junction, I presume there would have been no chance of misinterpretation, such as I have attributed to Driver Kerr.

With regard to the fact that Kerr was driving tender leading at the time, this does not appear to have had any bearing upon the accident; if he had been handling a tank engine (which is to be preferred; in the absence of turning facilities) the manipulation of the regulator and the reversing handle would still have involved the corresponding turn away from the direction of travel.

The fundamental weakness in this case was the method of operation. As described in paragraph 4, the practice had existed for many years of down Canal line trains, whether stopping or not at Shields Road Station (except goods trains), being accepted under Regulation 4 up to the home signals Nos. 73/75, while crossing movements were taking place, either up main to up Canal (e.g., the Kilmarnock train), or down main to down Canal.

Though it appears, therefore, by the qualification "clear to this house" in the existing Special Instructions, that such operation was not authorised, I
do not think that signalmen Murphy and Mackay are to be criticised in the circumstances; both gave their evidence particularly well under cross-examination with regard to the alleged change of road.

But the procedure which they should have followed is clear. They had accepted three trains, and all were in section and approaching the junction at the same time; as the Paisley train was the first to be dealt with and was routed along the Canal line, the points should have been left normal for the Kilmarnock train, just as they were locked normal for the Paisley and Ardrossan trains after acceptance of the latter. All three trains would then have approached the junction safely and the Kilmarnock train should not have been permitted to cross the path of the Paisley train until the latter had come to a stand.

While signalman Murphy agreed that it would not be difficult to operate the junction in this manner, he considered that delay would result, particularly at certain other times of the day when similar conditions prevail. After my Inquiry, however, arrangements were made to cancel the Special Instructions in connection with Regulation 4, and to apply standard Instructions for junction block working. I was also informed that an investigation with regard to the methods of operation at all junctions in Scotland would be put in hand with a view to uniformity.

At the same time, in connection with the re-arrangement of signalling which is in hand here, as described in paragraph 7, unless it is proposed to make an early extension of the colour-light installation, I think it would also be well to re-consider the sighting of the existing down home signals, though, as I have said, I am doubtful whether improvement can be effected.

Another feature, which I suggest should not be overlooked in modernising the signalling and operation of this junction, is the retention of so low a speed limit, which it appears drivers may not be strictly obeying. The present restriction of 15 m.p.h. is imposed on all lines in both directions “Between North end of Clyde Bridge and Port Eglinton Junction”. The latter point also seems ill-defined.

Remarks.

12. This serious collision occurred after a period of nearly a year’s immunity from passenger fatality in train accidents. This is one of the longest periods so recorded in the history of British Railways, but, nevertheless, discussion has arisen again with regard to the suitability of rolling stock construction for minimising the results of such occurrences.

The views which have been formed by the Inspecting Officers, after full consideration, have already been expressed in the Report upon the accident at Winwick Junction which unfortunately followed so closely that at Port Eglinton. The progress which this Company is making in construction of new rolling stock was also mentioned, and it is appropriate to record the improvement which has been made on this system in recent years in respect of the provision of electric lighting instead of gas. The proportion of the electrically lighted passenger stock (steam hauled) has risen from 52 per cent. at the end of 1928 to 79 per cent. at the end of 1933.

It may be noted that to carry 420 million passengers annually over their system of nearly 7,000 route miles, the Company operates more than 3 million trains, marshalled from their stock of some 18,000 passenger vehicles, containing over 1 million seats.

Evidently all these vehicles cannot be of the same age and type of construction, nor equally suitable for all services, and it is as essential to obtain the maximum economic use of each vehicle as of the locomotives which haul them. Further, the policy of giving preference to the renewal of main line stock is adopted to a substantial extent, as the most efficient procedure, and it is impossible to avoid altogether the practice of transferring to less important services the main line stock displaced.

For these reasons the two local trains concerned in this collision (of the same composition, each including one gas-lit coach, with similar engines) were largely composed of stock of older type; particularly was this the case in respect of the Kilmarnock train. It appears that the majority of the more serious casualties to passengers occurred in the three leading coaches which were wrecked; but it will be noted that the leading vehicle of the Paisley train, which was overturned, was only 6 years old and of modern type with shock-absorbing buffers.
This illustrates the fortuitous nature of the results which attend such accidents, particularly in the rare event of head-on collision, when, as in this case, tremendous forces are exerted through very short stopping distances, and when the engines, even though becoming badly damaged, afford comparatively little protection in the transference of the blow to the stock in rear of them.

Rough calculation indicates that, when the collision occurred, the combined energy stored in these two trains was at least 10,000 foot-tons; it is evidently impracticable to provide any type of rolling stock to resist forces of the magnitude involved on impact under such conditions.

I have already referred to the Company's prompt action to prevent recurrence of such accidents, in this case by the issue of instructions as to modification of procedure at this and other junctions.

I have the honour to be,

Sir,
Your obedient Servant,

A. H. L. MOUNT.
Lieut.-Colonel.

The Secretary,
Ministry of Transport.

Note.—Driver David Kerr's trial on a charge of culpable homicide took place on the 28th, 29th and 30th January, 1935, before a Sheriff and Jury at Glasgow. The Jury returned a unanimous verdict of "Not Guilty" and Kerr was acquitted.
Appendix.

5.35 P.M. Train, Glasgow to Kilmarnock.

Type of construction. Damage.

No. 24350—Third Brake.
Built Kilmarnock 1900.
Body and underframe of wood.
Plated solebars.
Bogies of wood and steel.
Laminated spring buffers.
Weight 21 tons.
43 feet by 8 feet 1 inch.
Electric lighting.
Completely wrecked.

No. 17453—Third class.
Built Kilmarnock 1904.
Body and underframe of wood.
Plated solebars.
Bogies of wood and steel.
Laminated spring buffers.
Weight 21 tons.
43 feet by 8 feet 7 inches.
Gas lighting.
Completely wrecked.

No. 15759—Third class.
Built Kilmarnock 1912.
Body and underframe of wood.
Plated solebars.
Bogies of wood and steel.
Laminated spring buffers.
Weight 21 tons.
43 feet by 8 feet 7 inches.
Electric lighting.
3 Compartments at leading end wrecked.
1 Bogie Bolster Beam broken.
1 Headstock (wood) broken.
1 Axlebox broken.
A.V. Pipe broken.
2 Buffer rods bent.
2 Brake Triangular Bars bent.

No. 10654—First class.
Built Kilmarnock 1920.
Body and underframe of wood.
Solebars of steel.
Bogies of pressed steel.
Laminated spring buffers.
Weight 25 tons.
44 feet 3 inches by 9 feet 1 inch.
Electric lighting.
2 Headstocks (wood) broken.
1 Solebar bent.

No. 18719—Third class.
Built Kilmarnock 1907.
Body and underframe of wood.
Plated solebars.
Bogies of wood and steel.
Laminated spring buffers.
Weight 21 tons.
43 feet by 8 feet 7 inches.
Electric lighting.
2 Headstocks (wood) broken.

No. 24366—Third Brake.
Built Kilmarnock 1914.
Body and underframe of wood.
Solebars of steel.
Bogies of pressed steel.
Laminated spring buffers.
Weight 22 tons.
44 feet 3 inches by 9 feet 3 inches.
Electric lighting.
2 Headstocks (wood) broken.
2 Channel Steel Soles bent.
1 Partition Class in Guard's Van smashed.

5.12 P.M. Train, Paisley to Glasgow.

Type of construction. Damage.

No. 1113—Third class.
Built Wolverton 1928.
Body of wood.
Underframe and bogies of steel.
Standard double acting buffers.
Weight 37 tons.
57 feet by 9 feet 3 inches.
Electric lighting.
Completely wrecked.
Type of construction.

No. 15532—Third Class.
Built Cobbinskaw 1921.
Body of wood.
Underframe of steel.
Bogies of pressed steel.
Single action buffers (rubber).
Weight 20 tons.
57 feet by 9 feet 4 inches.
Electric lighting.

No. 15945—Third Class.
Built St. Rollox 1900.
Body and underframe of wood.
Solebars of steel.
Bogies of pressed steel.
Laminated spring buffers.
Weight 22 tons.
48 feet by 9 feet.
Gas lighting.

No. 20172—Third Brake.
Built Newton Heath 1927.
Body of wood.
Underframe and bogies of steel.
Standard double acting buffers.
Weight 27 tons.
57 feet by 9 feet 3 inches.
Electric lighting.

No. 19035—Bogie Compo.
Built Wolverton 1928.
Body of wood.
Underframe and bogies of steel.
Standard double acting buffers.
Weight 27 tons.
57 feet by 9 feet 3 inches.
Electric lighting.

No. 20037—Third Brake.
Built Newton Heath 1928.
Body of wood.
Underframe and bogies of steel.
Standard double acting buffers.
Weight 27 tons.
57 feet by 9 feet 3 inches.
Electric lighting.

Damage.

3 Compartments at leading end wrecked.
A.V. Main Pipe broken.
1 Headstock (steel) bent.
2 Solebars bent.
Buffer rods bent.

2 Solebars bent.
2 Headstocks (wood) broken.

1 Headstock (steel) bent.
1 Solebar bent.
1 Buffer rod bent.

2 Headstocks (steel) bent.
COLLISION AT PORT EGLINTON JUNCTION
6th September 1934

SCALE

NOTE: [Diagram and text not legible due to image quality]