LONDON MIDLAND AND SCOTTISH RAILWAY.

MINISTRY OF TRANSPORT,
Metropole Buildings,
Northumberland Avenue,
London, W.C.2.

20th January, 1938.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Appointment dated the 17th November, 1937, the result of my Inquiry into the collision which occurred at about 4.25 a.m. on the 16th November, 1937, approximately one mile north of Crewe Station, on the main line of the London Midland and Scottish Railway.

The 8.30 p.m. sleeping car express from Perth, running at moderate speed in dense fog, passed the up fast inner home and starting signals of Coppenhall Junction signal box at danger and, after running 1½ miles through the block section, collided at about 15 m.p.h. with the rear of the 10.30 p.m. sleeping car express from Glasgow, which had just restarted from the home signal of the Coal Yard signal box.

Ten passengers in the Glasgow train and seven in the Perth train suffered injuries of a comparatively minor nature and shock; one was taken to hospital, but was not detained. The only serious injury necessitating detention in hospital was to Guard F. Redmond, who was riding in the last vehicle of the Glasgow train. Fireman H. Evening of the Perth train and Train Attendant C. A. Bryant of the Glasgow train were also slightly injured; they were taken to hospital, but not detained.

Description of Trains, Effects of Collision, etc.

1. Each train was hauled by an engine of the "Royal Scot" class, 4-6-0, driven from the left-hand side and weighing in working order with tender 139½ tons. The Glasgow train consisted of four first-class 12-wheeled sleeping cars with an 8-wheeled corridor bogie brake van at each end. The total weight, including the engine, was 354½ tons and the total length 152 yards.

The Perth train was marshalled with a 4-wheeled loaded horse box (12 ft. wheelbase) next the engine, followed by a corridor bogie brake van, five bogie passenger vehicles, including three sleeping cars, two bogie corridor brake vans, and two 4-wheeled fish trucks (20 ft. wheelbase). The total weight, including the engine, was 424½ tons and the total length 215 yards. The leading brake van of the Glasgow train and the rear brake van of the Perth train were of all-steel construction. The remaining vehicles of both trains had steel underframes; the bodies were either steel panelled on wood frames or entirely of wood.

The Glasgow train, all the vehicles of which were fitted with shock absorbing buffers, was driven bodily forward about ten yards. There was no derailment, telescoping, or buffer locking, but all six vehicles were considerably damaged in almost equal degree. All the bogies were shifted (maximum 1 ft. 6 ins.), the headstocks of four vehicles were bent, and the solebars of the front and rear vans buckled; both bogie centre castings were also broken of three of the four sleeping cars. Considerable damage was also caused to undergear generally and brake work. Damage to the bodywork was not serious, and was mainly confined to interior fittings (broken wash basins, mirrors, etc.); three sleeping car beds were displaced, and partitions and door frames were distorted. The buffer beam of the tender was bent and one buffer was knocked off; the intermediate buffing gear between the tender and engine was also damaged.

The engine of the Perth train was not derailed but one main frame and the front buffer beam were slightly bent; there was also damage to intermediate buffing and brake gear, exterior platework, sand pipes, etc. Telescoping to the extent of 12 ft. took place between the leading horsebox and the following bogie brake van, which were the only vehicles in the train not fitted with shock absorbing buffers (except for the two fish trucks at the rear which were undamaged). The under-frame of the brake van was driven under that of the

horsebox, which was derailed and tilted forward at about 30°; the trailing end, including the unoccupied groom's compartment, was wrecked and penetrated by the roof of the brake van in rear; this narrowly missed the horse, which was uninjured, in the centre compartment.

The telescoping between the two leading vehicles relieved the effect of the collision on the remainder of the train, and there was no further derailment. Damage to the permanent way was trifling and no adjoining lines were blocked.

2. Such relief work as was necessary was promptly carried out, having regard to the difficult weather conditions. First aid was given to Guard Redmond, the only serious casualty, a few minutes after the collision by the tail lampman at the Coal Yard box, A. Walley, who was qualified in ambulance work. Redmond was also attended shortly afterwards by two doctors, passengers, who were both slightly injured; Mr. C. J. Cowley, the Crewe Station-master, arrived 20 minutes after the collision, and two railway servants, qualified in ambulance work, 20 minutes later.

Unfortunately, some time elapsed before the Glasgow train could be drawn forward to the station. An attempt was made at 5.18 a.m., but the shifted bogies had jammed the brake blocks against the wheels and much of the brake gear had to be disconnected before the train could be moved, so that it could not be brought to the platform until 6.38 a.m. The Perth train was drawn back at 5.47 a.m. to Coppenhall Junction and crossed to the up slow line, which was congested with goods trains delayed by the fog. In consequence, it did not arrive at the platform until 7.23 a.m. Two doctors and additional ambulance-trained staff met both trains at the station, and a special train left Crewe at 7.51 a.m. to take the passengers forward.

Description of Site.

3. The main line from the North is straight and practically level for some miles north of Crewe. The general direction is north and south, and there are four tracks, Up Slow, Up Fast, Down Fast, and Down Slow, in order from east to west. Approaching Coppenhall Junction from the north, and for some distance past it, the country is flat with few line-side features to serve as location marks in fog. The signal boxes concerned are, from north to south, Minshull Vernon, Coppenhall Junction, Crewe Coal Yard, and Crewe North Junction; the attached diagram shows their position with reference to the point of collision, and that of the relevant signals and track circuits.

Coppenhall Junction box, which controls facing junctions between the fast and slow lines, is of ordinary height and is east of the line on the left-hand side for up trains; the distance of the front window from the nearer rail of the up fast line is approximately 24 ft. There are 32 working levers, and sequential locking prevents a signal being lowered unless the lever of the next signal ahead is normal. There are single-shot detonator placers on all four lines, worked by levers in the frame; each of these levers locks, and is locked by, the lever of the next signal in rear. The up fast inner home is a bracket signal, directing for the facing crossover to the up slow.

The three track circuits are separately indicated and exercise the usual control on signals in rear; those in rear of the inner and outer home signals place or maintain the block at "Train-on-Line." The lever of the up fast starting signal is released by "Line-Clear" from the Coal Yard box; although modernisation of the block controls at this box was in hand, at the time of the accident this release was not for one pull only, and "Line-Clear" to Minshull Vernon did not prove the up outer and inner home signal levers normal. These additional controls have since been applied.

The Coal Yard box is a high one, built over an up goods line immediately to the west of the four main lines; the ladder is at the south, or Crewe end of the box. For through running on the up fast line there is only one stop signal, the home, at which the Glasgow train was standing; the lever is released (for one pull only) by "Line Clear" from Crewe North Junction box. This signal, with others, is on a gantry spanning the up fast and slow lines, 221 yards north of the box, and has the up fast distant signal for Crewe North Junction below it. There is a track circuit in rear which operates an annunciator, but exercises no control on the block.

4. On the night in question the fog in the neighbourhood of Crewe was unusually dense, and visibility was restricted to a few yards; fogmen had been at their posts for several hours.

The two trains concerned had been running a block apart, with several checks, for the 36 miles from Wigan, up to which point the weather had been clear. For the last 18 miles approaching Crewe the 2.30 a.m. train from Liverpool had been close ahead. The Glasgow train passed Coppenhall Junction box at 4.3 a.m., having been brought momentarily to a stand at the up fast outer home signal; it was again stopped at the Coal Yard home signal to wait until the Liverpool train had cleared the section ahead to Crewe North Junction. The Driver, T. Consterdine, said that he saw the lights of all the Coppenhall Junction signals, and that the signalmen shouted "Right away to the Coal Yard" as he passed the box.

5. Signalman A. Fleet had been six hours on duty at Coppenhall Junction box. He gave "Train-out-of-Section" to Minshull Vernon for the Glasgow train at 4.5 a.m., and was at once offered the Perth train, which he accepted, receiving "Train-Entering-Section" at 4.14 a.m. According to his statement, he maintained his signals at danger as he had not yet received "Train-out-of-Section" for the Glasgow train; as soon as he received the "Train-Entering-Section" signal for the Perth train from Minshull Vernon he placed a detonator (by means of the lever) on the up fast line opposite his box. He waited until the track circuit in rear of his outer home signal had been occupied for 30 to 40 seconds before lowering this signal to draw the train forward to the inner home, and subsequently to the box, to warn the driver, in accordance with the Rules, that the starting signal was at danger. (The lowering of the outer home signal proved, by the sequential locking, that the inner home had been replaced behind the previous train.) Very shortly after this, as he was in the act of sending "Train-Entering-Section" to Minshull Vernon for a goods train that was passing on the down slow line, he saw the headlights of the Perth train approaching the box and only a few yards away, and realised that it had passed the inner home signal at danger. He thought its speed was about 15-20 m.p.h.

Fleet then rushed to the open front window at the north end of the box and shouted to the driver to stop, holding both his arms above his head. Almost simultaneously the detonator exploded under the leading wheels of the engine; he was certain that there was a good report, and that he saw the flash. He just saw the driver in his cab, but received no acknowledgment of his warning shout. He did not send the "Train-Running-Away" signal immediately, as he felt quite sure that after exploding a detonator at the box the driver would stop at the starting signal. He therefore waited until the track circuit in rear of the starting signal had been occupied and cleared before sending forward (at 4.20 a.m.) the "Train-Running-Away" signal to the Coal Yard box. He received the "Obstruction-Danger" signal at 4.27 a.m.

Fleet said that there was no time to pick up his lighted handlamp, which was on the floor close by, turn the shade to red, and show it to the driver. He admitted, however, that it did not occur to him, although there would have been plenty of time, to show the red light to the guard, whom he never saw, although he watched for and saw the tail light of the train.

D. Walley had been on duty as tail lamp man at Coppenhall Junction box for about four hours when Fleet told him that there were trains coming on the up fast and down slow lines. He therefore stationed himself opposite the north end of the box in the 10 ft. space between the up and down fast lines so that he could observe both the tail lamps. He said that immediately the (goods) train on the down slow line had passed he turned to inform the signalman that he had seen the tail lamp, and saw the headlights of the Perth train about five or six yards away on the up fast; he estimated the speed at about 25 m.p.h. although he did not think the engine was steaming.

He stated that a detonator exploded at the front of the engine with a good report; he was, in fact, quite startled, as he was unaware that Fleet had not lowered his signals for the train. He was very surprised that the train did not stop. After the train had gone he spoke to Fleet who seemed very upset and

told him that the section ahead was not clear. He then went to the signal box to obtain a fresh detonator to place in the machine; Fleet asked him to bring back the exploded case and he did so a little later.

He added that this was the only detonator exploded at the box since he had been on duty; he thought that it was the practice of signalmen at this box, in fog, to place the detonator on the line as soon as the "Train-Entering-Section" signal was received, if the line ahead was not clear.

The detonators on hand at Coppenhall Junction box were of standard duplex type, dated September, 1935; twelve of these were tested subsequently to the accident and exploded satisfactorily.

6. W. J. Nicholson of Carlisle Shed was the driver of the Perth train. He stated that he was thoroughly acquainted with the road between Carlisle and Crewe, over which he had been working regularly for about seven years. He did not appear, however, to be quite certain as to the number of stop signals at Coppenhall Junction box, for he stated at the Company's Inquiry that there were two only, whereas in fact there are three. At my Inquiry he admitted that his previous statement on this point had been incorrect.

Describing his journey on the night of the accident, he recollected that after running into the fog at Wigan he was checked at least three times at distant signals, exploding detonators, but was only once brought to a stand, viz. at the Minshull Vernon home signal where the train was kept for several minutes. His fireman carried out Rule 55 at Minshull Vernon box, and when the fireman returned the signal was lowered and he went forward quite slowly to Coppenhall Junction. He remembered exploding a detonator at the Coppenhall Junction distant signal, and said that he continued forward slowly to "the home signal," which he found in the clear position. He said that he only saw one signal before reaching Coppenhall Junction box; it was showing a green light and he saw no red light to the left of it. He could not say whether it was the outer or the inner home.

Nicholson was quite sure that he heard no detonator as he passed the box. He shouted to the signalman "Are we right away?", but heard no reply. He saw the signalman standing at the open window, who seemed to be waving one arm, and took this to be an intimation that all signals were clear for him to proceed. He said that his speed passing the box was not much more than 10 m.p.h., and he could have stopped at or a little beyond it if he had heard a detonator explode. He looked for, but did not see, the starting signal and said that although he had understood from the signalman that the line was clear ahead, he was "not certain and would rather have seen a fixed signal." He remembered exploding a detonator at the Coal Yard distant signal, and was preparing to stop at the home when his fireman called to him that there was a red tail lamp close ahead. He applied the brake and "almost instantaneously" struck the rear of the Glasgow train.

Fireman H. Evening generally confirmed Nicholson's statement. He was not well acquainted with the road south of Preston, and said that Nicholson had told him when the train had arrived at Minshull Vernon. He heard no detonator at Coppenhall Junction box, although he heard the detonators explode at the Coppenhall Junction and Coal Yard distant signals. He saw none of the Coppenhall Junction signals, and said that as the engine passed the box Nicholson told him that they were "right away"; he then started firing. Both the enginemen said that the engine was not blowing off as they passed the box.

The guard of the Perth train, A. J. Washington, who knew the road well, was riding in the eighth vehicle from the engine. He said that the train was stopped at Minshull Vernon for about ten minutes, and then went forward quite slowly. He was certain of his location and was standing at the open window on the left-hand side of the van as the train approached Coppenhall Junction box. He saw the signalman standing at the window and was confident that he would also have seen a red light if one had been displayed. He heard no detonator as the train passed the box, nor had he heard any other detonators during the journey; he did not think it likely that he would hear them so far back along the train.

Immediately after the collision he went forward, met the driver about halfway along the train, and when he returned again to his van made a note in his journal that the time was 4.25 a.m.; he said that his watch was 1½ minutes fast on leaving Carlisle, but could not recollect whether he allowed for this.

He then walked back to Coppenhall Junction box, where the signalman told him "that he had shot the train at the box." He met Driver Nicholson again a little later and repeated the signalman's words, which Nicholson contradicted.

7. Signalman A. Moores, of the Coal Yard box, received the "Train-Running-Away" signal at 4.20 a.m.; the Glasgow train had been standing at the home signal for some minutes waiting for the Liverpool train to clear the section ahead, and the fireman, G. S. Evanson, was in the box. Moores, according to his statement, at once sent the fireman back to tell the driver to draw forward to the box; he also despatched the tail-lampman, A. Walley, to tell the fog-signalman at the Crewe North Junction up fast distant signal to try to stop the following train. At 4.21 a.m. he received "Train-out-of-Section" from Crewe North Junction and at once offered forward the Glasgow train which was accepted; he lowered his home signal, and shouted to Evanson, who was halfway down the ladder, that he had done so. Moores said that an appreciable time then elapsed before he heard the sound of the collision, after which he sent the "Obstruction-Danger" signal for all four lines, booking the time as 4.27 a.m.

Evanson and Walley arrived almost simultaneously at the engine of the Glasgow train. Walley gave his message to the fog-signalman, T. A. Dobell, just as the latter had informed the driver that the home signal had been lowered. Dobell shouted a warning to Driver Consterdine, who said that he immediately opened the regulator (the brakes were off). The train was just moving forward when the collision took place.

Conclusion.

8. I conclude that the major responsibility for this collision must rest with Driver W. J. Nicholson of the Perth train, who entered the section in advance of Coppenhall Junction without adequate assurance that the signals were clear for him to do so. I have little doubt that the emergency detonator at the box was exploded under the leading wheels of the engine, for the evidence in this connection of Signalman Fleet and of the tail-lampman, Walley, impressed me as reliable and consistent with probability. It is unfortunate that the explosion was not heard on the footplate, which is admittedly difficult to understand, but I also have no reason to doubt that the statements of both the enginemen on this point were given in good faith.

This does not, however, excuse Driver Nicholson. He was aware of his location, having stopped for some minutes at Minshull Vernon; he thus knew that a train was close ahead, of which he again received confirmation by the check at the Coppenhall Junction distant signal. By his own admission he had seen only one of the two stop signals in the rear of the box; it was showing a green light and he was not certain whether it was the outer or the inner home. From Fleet's evidence it is clear that it was the outer home, and, having regard to the distance of this signal from the box (572 yards), I think that Nicholson should have realised the possibility, if not the probability, that he had missed the inner home signal. In such circumstances a dead stop is prescribed by the Rules, and there is no doubt that he should have stopped at the box to obtain a verbal assurance as to the position. He relied instead, quite unjustifiably, on a fleeting glance of the signalman's upraised arm as he passed the box, as an intimation that the section ahead was clear. This type of signal must always be liable to misinterpretation, and more so under the prevailing conditions; I am sure that Fleet, by raising both his arms above his head, was endeavouring to stop the train and it is likely that one arm was concealed by a portion of the window framing.

Driver Nicholson is 52 years of age and has been a driver for 18 years. In spite however of his seven years' experience, I am not convinced that his detailed knowledge of the road was altogether satisfactory. He has a fairly good record.

9. Although Signalman Fleet's account of his actions was given with commendable frankness, he was slow to appreciate the situation, and his failure to display a red light to the guard is difficult to explain in any other way. I have no reason to doubt Guard Washington's statement that he was watching the box as his van passed it.

Fleet accounted for his delay in sending forward the "Train Running Away" signal by his assumption that the driver would stop at the starting signal. This assumption was not reasonable; a detonator exploded at a signal box requires nothing less than an immediate stop, and he should have realised that the driver, having passed the inner home signal at danger and ignored the detonator, was likely to miss the starting signal also. The train probably passed the box at about 20 m.p.h. At this speed nearly 1½ minutes would have elapsed before the train cleared the track circuit in rear of the starting signal. If the "Running Away" signal had been sent this much earlier, it is likely that the accident would have been averted, for the Glasgow train had already begun to move when the collision took place.

Although it appears that Fleet, by watching the track circuit indicator, endeavoured to carry out Rule 39 (*a*) at the outer home, it is also to be regretted that he did not wait a little longer and make sure that the Perth train had come to a stand before lowering the signal, having regard to the extremely short view of it that was obtainable in the circumstances. He is 37 years of age and has 21 years' service with the Company, but has been a signalman for four years only; his record is good.

10. Although the time of the "Obstruction Danger" signal from the Coal Yard box was booked as 4.27 a.m., I think it likely that the collision may have occurred appreciably earlier, perhaps at 4.25 a.m. or a little before. Barely five minutes were available in which to act, after the receipt of the "Running Away" signal at the Coal Yard box, and I am satisfied that Signalman Moores and Fireman Evanson (of the Glasgow train), and the staff on the ground, were alert and made every effort to bring the Glasgow train within the protection of the home signal. That they were unsuccessful may be attributed to the density of the fog which must have seriously hampered any movement over the ballast on foot.

Remarks and Recommendations.

11. The outstanding feature of this case was the failure of the enginemen of the Perth train to hear the emergency detonator at Coppenhall Junction box although both men heard detonators explode at the distant signals shortly before and after. I have little doubt, however, that the detonator was exploded under the leading wheels of the engine, and that the sound was not less than usual.

It is not easy to understand why, in a succession of detonator explosions, one should be heard and another missed. Nevertheless, under the trying conditions of train working in fog, when detonators are being exploded at comparatively frequent intervals, not only by the train immediately concerned, but by other trains on adjacent lines, it is possible that enginemen may, on rare occasions, fail to notice an audible signal.

With semaphore signalling the safety of operation in fog depends on the detonator; on the whole, the system works well in practice, and that it does so is a tribute to the vigilance of enginemen generally and to their detailed knowledge of the road. Failure to act on the explosion of a detonator is fortunately rare, but such cases have not been unknown; as heard from the footplate of a modern express engine, with long wheelbase, the sound is not necessarily startling, and the modern enclosed cab may tend to obscure external sounds and to accentuate the ordinary noises on the footplate.

The provision of detonator placing apparatus worked from inside the signal box is a safety measure of great value, especially where sections are short and traffic is frequent, and the explosion of such a detonator is of special emergency significance; unlike that exploded at a distant signal, it requires an immediate stop, but, with a single-shot machine, the sound heard on the footplate is no different. In one form of emergency procedure, viz. the protection of a train stopped in section, reliance is not placed on the efficacy of a single detonator.

Similarly, it is the Company's latest practice to provide two-shot detonator placing machines at signal boxes, where such are newly installed; the two detonators are 24 ins. apart, and, although the two explosions will be merged except at the lowest speeds, the increased volume of sound should materially lessen the risk of missing the emergency signal.

This accident has shown that such risk cannot be regarded as negligible. I think that, in addition to accelerating the provision of detonator placing machines at signal boxes generally, the Company should be asked to consider the re-equipment with two-shot machines of such boxes where these are still of the single-shot type.

I have the honour to be,

Sir,

Your obedient Servant,

G. R. S. WILSON,

Major.

The Secretary,

Ministry of Transport.

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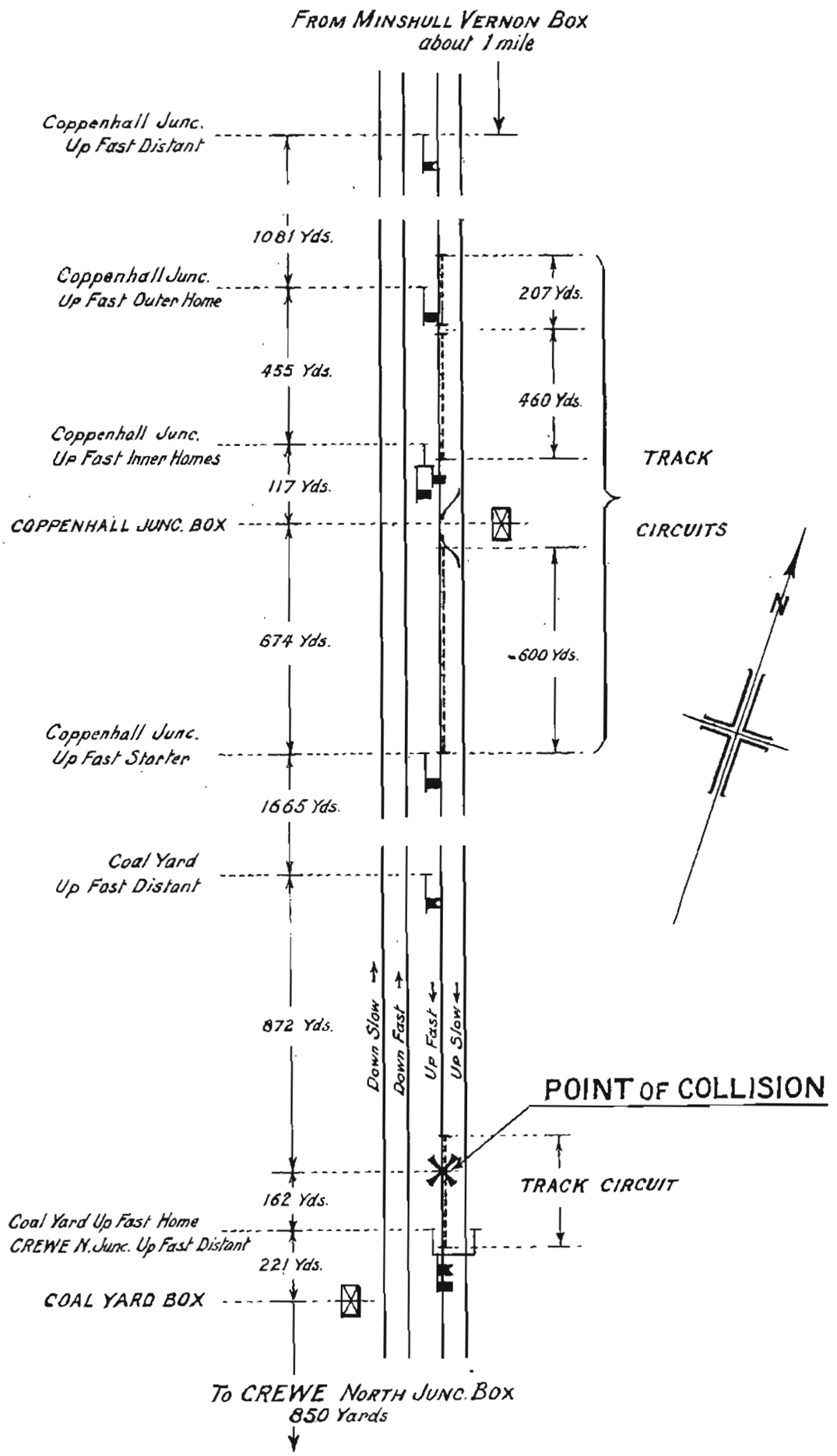
LONDON MIDLAND & SCOTTISH RAILWAY

COLLISION NEAR CREWE ON 16TH NOVEMBER 1937.



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