DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 11th December 1981 near Seer Green

IN THE

LONDON MIDLAND REGION

OF BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE

£3.70 net

DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 11th December 1981 near Seer Green

IN THE

LONDON MIDLAND REGION

OF BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE

First published 1983

ISBN 0 11 550593 8

View looking towards Seer Green showing the two trains and the overhanging branches

Railway Inspectorate
Department of Transport
2 Marsham Street
London SW1P 3EB
31st January 1983

Sir,

I have the honour to report for the information of the Secretary of State, in accordance with the Direction dated 14th December 1981, the result of my Inquiry into the collision between a passenger train and an empty stock train that occurred at about 08.14 on Friday, 11th December 1981, between Gerrards Cross and Seer Green in the London Midland Region of British Railways.

Commencing on Tuesday, 8th December 1981 the weather in southern England became exceptionally wintery, with temperatures well below zero and frequent heavy falls of snow. With the first heavy snow on the Tuesday, the branches of trees in the railway cutting near Seer Green, on the London (Marylebone) to Banbury line, became weighed down by snow and some overhung the line and were brushed by trains. This was reported by drivers and subsequent trains were cautioned by the signalmen on either side. Conditions improved slightly on the Wednesday and Thursday, with no further reports of overhanging trees, but during the early hours of Friday, 11th December there were further heavy falls of snow and around 08.00 the snow was still falling, driven by a strong north wind, and with ground temperatures well below zero. At about this time, the 07.25 Marylebone to Princes Risborough, a special empty stock train formed of four diesel multiple-unit vehicles, came to a stand on the Down line in the cutting when the driver saw what he took to be a substantial tree branch obstructing the line. He telephoned the signalman at High Wycombe and said that he would clear the obstruction and that this would take a few minutes. Neither he nor his guard took any other action to protect the train.

Meanwhile, the following train, the 07.31 Marylebone to Banbury passenger train, had arrived at Gerrards Cross where the signalman, who although qualified was inexperienced, had just arrived and opened the signal box. After telling the driver about the reports of overhanging trees in the cutting, the signalman tried to clear the signal controlling entry to the signal section ahead but was unable to do so. The signal lever was in fact locked electrically by the occupation of track circuits in the section by the empty stock train but the signalman, misreading or failing to comprehend the indications shown on his signal box diagram, assumed that the signal mechanism had frozen and authorised the driver to pass the signal at Danger. It was only a matter of minutes before he realised that he had made a mistake but it was already too late to stop the train.

The driver of the passenger train should have proceeded with caution but drove too fast for the conditions. Entering the cutting, he must have caught sight of the stationary train ahead and applied his brakes, but his train was still travelling at about 30 mile/h when it hit the back of the other one. The leading vehicle of the passenger train forced its way under the bodywork of the rear vehicle of the empty stock train, lifting it into the air, and came to rest having over-ridden the buffers of the rear vehicle by about seven yards and having pushed the entire empty stock train, which had its brakes applied, forward some 75 yards. The impacting of the two trains crushed the forward part of the leading coach of the passenger train, trapping the driver and a number of passengers. I much regret to report that the driver and three of the passengers, a young man of 17 and two schoolboys, received fatal injuries. Four other passengers and the guard of the passenger train were injured and were taken to Wexham Park Hospital, Slough.

The first call for the emergency services was made within a minute of the accident's occurring. Road conditions were extremely difficult, with ice and driving snow, and it took the Fire Brigade, closely followed by ambulances, about twenty minutes to reach the site. In the meantime a lady doctor and other passengers with medical training were doing what they could, using the first aid equipment carried on the trains. It was necessary to provide ropes to enable the fire and ambulance men to get up and down the steep sides of the cutting and arrangements were made for a train on the Up line to ferry the injured passengers back to Seer Green Station where they were transferred to ambulances. Other passengers were taken to a nearby golf club which was used as an emergency centre until road transport could be provided to High Wycombe and Gerrards Cross. The railway breakdown train arrived at 12.30 and cleared the damaged trains by early the next morning, but the lines between West Ruislip and High Wycombe remained closed to traffic until the afternoon of Sunday, 13th December, by which time the overhanging trees had been removed.

DESCRIPTION

The Site and Signalling

1. The collision occurred between Gerrards Cross and Seer Green Stations on the Marylebone/Paddington to Banbury line. Mileages on this section of the line are related to Northolt Junction, where the lines from Marylebone and Paddington converge, and the point of collision was at 9 miles 621 yards. The line is not electrified and in the area concerned consists of double track with platform loops at Gerrards Cross. From Gerrards Cross Signal Box, which is situated on the Down side of the line adjacent to the loop exit and approximately 240 yards north of the station, the line curves right-handed and then runs straight for about a mile and a half before curving again to the right at a radius of 1,660 yards to enter a steep-sided cutting. At the time of the accident the sides of this cutting were covered in thick vegetation, amongst which were numbers of silver birch trees, some of considerable height.

2. Gerrards Cross Signal Box is not continuously manned and when it is closed Absolute Block working applies on the Up and Down lines between West Ruislip and High Wycombe, the signal boxes to the south and north respectively. With Gerrards Cross Signal Box in operation, Absolute Block working applies between West Ruislip and Gerrards Cross, and between Gerrards Cross and High Wycombe. On the Down line, between the latter two signal boxes, there is an Intermediate Block section which extends from the automatic Signal GC 202 to the 1B Home Signal GC 34, and to the rear of this section there are two other signal sections the entrances to which are controlled by Gerrards Cross Starting signal (27) and semi-automatic Signal GC 201; the whole of the area being under the control of the Gerrards Cross signalman. There are similar sections on the Up line under the control of the signalman at High Wycombe. The Down line is continuously track-circuited from West Ruislip as far as the overlap of Signal GC 34, apart from a short gap between Signals 28/30 and Signal 27 at Gerrards Cross. Standard BR AWS is fitted on both lines. All the Stop signals are provided with telephones, those on the Down line communicating with Gerrards Cross and those on the Up line with High Wycombe. Figure 1 at the back of the report shows the line between Gerrards Cross and High Wycombe in diagrammatic form together with the location of the signals, track circuits, etc. Figure 2 shows the detailed layout in the area of the collision.

3. The object of having the additional signal sections up to and including the 1B Home Signal GC 34 is to enable trains to proceed towards them before the 'Train out of section' signal has been received from the box in advance for the previous train. Where such signals are provided, the regulations for train signalling on double lines by the Absolute Block System apply but are modified by supplementary regulations.

4. Gerrards Cross Signal Box has a former GWR mechanical stud frame converted to vertical tappet locking. There are 33 levers, of which 29 are working. Standard WR pegging block is provided on the Up and Down lines and there is a block switch. An illuminated track-circuit diagram is provided, mounted above the block shelf. At the time of the accident, the lights showing track circuit occupation were situated as shown in Figure 1.

5. The Down Platform Home Signal (28) and the Down Main Home Signal (30) are respectively 37 yards and 49 yards on the approach side of the signal box. The Down Starting Signal (27) is 352 yards beyond the box. All three signals are positioned to the left of the line to which they refer and are semaphore signals of Western Region lower quadrant pattern. Signal 27 is not block released but, once it has been returned to Danger after the passage of a train, it is locked electrically and cannot be cleared again whilst a train is occupying any of the track circuits between it and the overlap of Signal GC 201.

6. A further 2 miles 1,525 yards to the north of Gerrards Cross Signal Box is the Seer Green Down Auto Home Signal (GC 201), a 3-aspect colour-light signal situated on the left of the line 524 yards to the north of Seer Green Station. Its associated Distant Signal (GC 201R), a 2-aspect colour-light, is situated 1,551 yards on the approach side of Signal GC 201, which places it 1,027 yards to the south of Seer Green and in the cutting. Signal GC 201 also acts as the Distant Signal for Beaconsfield Down Auto Home Signal (GC 202), 2,284 yards further north. From Signal GC 202 it is a further 3,701 yards to Signal GC 34, the Whitehouse Down 1B Home, which also serves as the Block-controlled Section Signal for the Absolute Block Section to High Wycombe.

7. Approaching Signal GC 201R in the cutting, and assuming there is nothing else in the way, the driver of a DMU train on the Down line first sights it as he comes round the curve from a distance of approximately 545 yards. With a 4-car DMU train standing at the signal, the view of the signal is restricted by the train and an approaching driver would first see its yellow aspect from 406 yards, or its green aspect from 437 yards. However, the left-hand tail lamp of the standing train would be seen from 555 yards, and the right-hand tail lamp from 528 yards. All these sighting distances pre-suppose adequate visibility over the distances quoted.

The Trains

8. The Class 115 diesel multiple units (DMUs) operating on the Marylebone to Banbury services are formed of 4-car units consisting of a Driving Power Car (MBS), a Trailer Car (TSO), a Trailer Car (TCL), and a Driving Power Car (MBS). The MBS cars are fitted with two 230 HP Leyland Albion diesel engines, weigh 40 tons and have

a seating capacity of 78. The TSO cars seat 106 and weigh 29 tons, and the TCL cars seat 70 and weigh 30 tons. The Class 115 units were introduced in 1960. They are not fitted with AWS equipment.

9. The 07.25 Marylebone to Princes Risborough (the empty stock train) was marshalled MBS-TCL-TSO-MBS in direction of travel. The 07.31 Marylebone to Banbury passenger train was marshalled MBS-TSO-TCL-MBS in direction of travel.

EVIDENCE

10. The summary of evidence is based on the statements made at the public hearing of evidence and at the Coroner's Inquest, at which I acted as an Assessor, and on subsequent re-examination of several of the witnesses. It also includes information communicated to me by various members of the public. My separate report, as the Coroner's Assessor, is at Appendix 1.

11. On the day of the accident, *Driver P. S. Spice*, based at Marylebone, drove the 06.03 passenger train from Marylebone to High Wycombe. The journey as far as Gerrards Cross was without incident although snow was falling and becoming thick as he approached Gerrards Cross. The train was travelling at about 45 mile/h as he passed Signal GC 201R in the cutting beyond Gerrards Cross, and between the signal and the road bridge something struck the left-hand side of his cab. Although it was still dark, he could see trees weighed down with snow leaning towards the track, and he assumed that the train had struck one of these. He stopped and used a signal post telephone to try to speak to the Gerrards Cross signalman, but there was no reply. He continued to High Wycombe, where he reported the facts to the signalman and advised him to caution trains over the Down line. Conditions had been bad on the previous Tuesday and his train had struck an overhanging branch on the Up line, although this had not been in the Seer Green cutting.

12. The empty stock train was driven by *Driver D. Trotter*, based at Marylebone. He had been a railwayman since 1959 and a qualified driver since 1974. He had spent most of his time as a driver on the Marylebone line. On the day of the accident he booked on duty, at Marylebone, at 05.40. The previous day had been his rest day. His first train should have been the 06.50 Marylebone to Princes Risborough but on examing the train he found that the heating system was defective, and in view of the weather conditions he refused to drive it. Another unit was provided but too late to run as the 06.50. This service was, therefore, cancelled and he was instructed to work the train as empty stock to Princes Risborough, from where it would return in passenger service to Marylebone. He prepared this train and in doing so noted that the tail lamps were alight.

13. He left Marylebone with the empty stock train at 07.25. The weather was bad but the run as far as West Ruislip was without incident. At West Ruislip he was stopped at the signal box and the signalman told him that there were trees down on the other side of Gerrards Cross, that the driver of a previous train had reported hitting a tree, and that he was to proceed at extreme caution. Approaching Gerrards Cross, he was signalled into the Platform line and stopped short of Signal 28, which was at Danger. The signalman then lowered the signal and held a red flag out of the window of the signal box, which required him to draw forward and stop at the box. He stopped the train level with the window, at the end nearest to the platform, and the signalman told him that the driver of the previous train had reported striking a tree and that he was to proceed at extreme caution, to examine the track, and to report any obstruction. Trotter said that he then asked the signalman "Am I going through to examine the line, and if I do I don't want anything to come through until I get to the other end". to which the signalman replied "Nothing is moving until you get to the other end and tell me whether it is clear or not".

14. Driver Trotter's evidence as to his departure from Gerrards Cross was not consistent. He told the Railway's own Inquiry soon after the accident that the signalman cleared Signal 27 for him to proceed. He told me at my Inquiry that this signal was at Danger when he passed it, and that he had been authorised to pass it at Danger by the signalman displaying a green flag. Subsequently, in answer to questions that I put to him at the Inquest, he said that the signal had been cleared. Having left Gerrards Cross, he claimed that he had not exceeded 5 mile/h until stopping at Signal GC 201R in the cutting. However, when it was pointed out to him that at 5 mile/h it would have taken him 24 minutes to cover the distance from Signal 27 to Signal GC 201R, and that on the available timings the collision occurred in less than this time following his departure from Gerrards Cross, he agreed that his speed could have been more than 5 mile/h but he insisted that it was less than 10 mile/h.

15. Between Gerrards Cross and Signal GC 201R visibility was poor due to the driving snow but, on entering the cutting, he got a clear view of the signal, which was at Green. Approaching the signal he saw the top 4 or 5 ft of a tree lying across the Down line about 3 to 6 yards on the Gerrards Cross side of the signal. The tree, he told me, had actually uprooted from the embankment. It was only obstructing the Down line but although he thought that the train might be able to pass over it, he did not like to risk this. He therefore stopped the train short of the obstruction, applied the brakes including the hand brake, and went to Signal HW 12 on the Up line and telephoned the signalman at High Wycombe. He told the signalman about the tree and said that he would be able to move it

within about five minutes. At the Railway's domestic Inquiry, Driver Trotter said that he then contacted his guard, who was in the rear brake compartment, and asked him to come to the front of the train and that the guard was actually climbing up into the front cab when the collision occurred. However, he subsequently changed his evidence and admitted that the guard had travelled with him in the front cab throughout the journey and had remained there whilst he went to the telephone. According to his revised evidence, he returned to the cab after speaking to the signalman, told the guard to stay where he was, and went into the front brake compartment to get an axe and a saw, and was there when the collision occurred.

16. Trotter then ran to the back of the train and saw that there had been a serious collision. He made his way to the telephone at Signal HW 12 and, on the way, met Guard Charles and instructed him to go to the rear of the trains and put down detonators. After informing the High Wycombe signalman of the accident, he returned to the cab, collected track circuit clips and detonators, applied the clips to the Up line and placed detonators on both lines about 300 yards ahead of his train, towards Seer Green. He claimed that the time interval between his stopping the train at the obstruction and the collision was about five minutes.

17. Driver Trotter confirmed that on the previous Tuesday he had driven a passenger train on the Down line in similar weather conditions and that tree branches weighed down with snow were overhanging the track; on this occasion his train had brushed them aside or snapped off the ends. He had reported the overhanging trees on his arrival at High Wycombe.

18. The guard of the empty stock train was *Guard D. Williams*, based at Marylebone. At the time of the accident he had been a guard for ten years. He claimed at first to have been in the rear brake van when the train arrived at Gerrards Cross and to have remained there until the train stopped near Signal GC 201R. Subsequently, he admitted that he had been with Driver Trotter in the front cab since leaving Marylebone. He said that he had accompanied the driver to assist him in sighting signals and observing any possible obstructions in view of the difficult weather conditions. At West Ruislip he heard the signalman say that they should proceed with extreme caution between Gerrards Cross and Seer Green because the driver of the previous train had reported striking trees on the line. He confirmed Trotter's evidence as to their arrival at Gerrards Cross and said that the signalman had instructed them to "Proceed forward and report the state of the line". He confirmed his driver's evidence as to the arrival at Signal GC 201R and said that he remained in the cab whilst Trotter went to telephone the signalman. On returning from the telephone Trotter told him that he had informed the signalman about the fallen tree and that he was going back to the brake compartment to get an axe. Williams claimed that at this stage he asked Trotter whether he should go back to protect the train and that Trotter had said that he would only be a few minutes clearing the tree. Williams remained in the cab and moments later he was thrown forward by the force of the collision. Glancing back out of the window, he saw Trotter jump out of the brake compartment and run over to the telephone at Signal HW 12 where he spoke to the signalman and then said that he was going back to see what had happened. Williams remained in the cab until Trotter returned and told him that another train had run into the back of them and that passengers had been hurt. Williams asked him what he should do and Trotter told him to stay where he was. After a short while, he saw a train approaching slowly on the Up line so he leaned out of the cab holding his hands above his head as an indication to the driver to stop. The train stopped with its front opposite Williams' cab and he told the driver what had happened. Passengers on the train offered to help but Williams told them that only those with medical training should go forward. He remained at the front of his train until after the emergency services had arrived, which he estimated was about twenty minutes after the collision.

19. *Relief Signalman F. W. Brooks* was the signalman on duty at West Ruislip Signal Box. He had been a railwayman since 1949 and a signalman on London Midland Region since 1966. Soon after starting duty, at 06.45, he was told by the High Wycombe signalman that the driver of the 06.03 passenger train from Marylebone had reported striking a tree between Gerrards Cross and Seer Green. Gerrards Cross Signal Box was switched out and he was working to High Wycombe on the Down line. He therefore cautioned the drivers of the next two trains, the 06.33 and the 07.04 services from Marylebone, telling them about the possible obstructions and advising them to proceed with caution. He received 'Train Out of Section' for these two trains, which indicated to him that they had passed safely through the section, but he received no further report from High Wycombe as to the state of the line. He therefore cautioned the driver of the next train, which was the 07.25 empty coaching stock train from Marylebone. Shortly after this, at about 07.50, the Gerrards Cross signalman, Signalman Axtell, switched in and Brooks advised him of the reports of obstructions between Gerrards Cross and Seer Green and requested him to take over the cautioning of trains. Brooks did not, therefore, stop and caution the next train on the Down line, which was the 07.31 from Marylebone. He confirmed that he had worked on previous occasions at West Ruislip when Signalman Axtell had been on duty at Gerrards Cross and that Axtell had impressed him with the efficient way in which he carried out his duties.

20. *Signalman R. B. Lee* was on duty in High Wycombe Signal Box. He had been a railwayman since 1952 and a signalman since 1972. He started duty at 06.00 working to West Ruislip on the Down line because Gerrards Green Signal Box had not yet switched in. At 06.30 the guard of a Down train telephoned to say that trees were

overhanging the Down line in the Seer Green cutting so Lee immediately sent the 'Obstruction Danger' bell signals to West Ruislip. A short while later the guard telephoned again to say that the line was not badly obstructed, but Lee decided to maintain the 'Obstruction Danger'. When the train arrived at High Wycombe the guard confirmed that the overhanging branches did not prevent trains getting through, so Lee sent the 'Obstruction Removed' bell signals to West Ruislip but advised the signalman there that he should caution all trains on the Down line. He himself undertook to caution trains on the Up line.

21. At 07.50 Signalman Axtell opened the Gerrards Cross Signal Box using the correct procedures. Lee knew that the 07.25 empty stock train had passed West Ruislip, under caution, but he did not know its exact location since he had no track circuit indications on his signal box panel for Down line trains between his box and West Ruislip. He was offered the empty stock train by Signalman Axtell at 08.09 and accepted it. Shortly afterwards its driver telephoned from Signal HW 12 and said that some branches were lying across the line in front of his train and that he was going to get an axe from the brake van and clear them out of the way. Lee did not send the 'Obstruction Danger' signal to Gerrards Cross but waited for what he estimated to be about two minutes. He was then about to telephone Signalman Axtell to tell him what was happening when Axtell telephoned and said that he had got two trains in the section. He seemed confused and agitated and it took Lee a few moments to be sure that the two trains concerned were on the Down line. Axtell did not say how he had allowed two trains to be in the section. Lee had just finished speaking when the driver of the empty stock train telephoned from Signal HW 12 to say that the following train had run into the back of his train and that people had been hurt. Lee immediately carried out the emergency procedures, putting the Block instrument to 'Train on Line' and sending the 'Obstruction Danger' signal to Gerrards Cross before dialing 999 for the emergency services. He next telephoned Signalman Axtell, as required by Regulation 12, and informed him of what had happened. Axtell tried to explain what he had done but he seemed completely confused and shocked. Shortly afterwards, Lee realised that Axtell had not sent him the 'Obstruction Danger' bell signal for the Up line, as he should have done, so he telephoned to remind him to do so. Later, after the emergency services had arrived, a person who identified himself as a senior Engineer from BR HQ telephoned from the the site of the accident and made arrangements with Lee for the use of a train on the Up line to convey injured people from the site to Seer Green Station where they were transferred to ambulances.

22. Lee said that he had worked for about two weeks with Signalman Axtell since the latter had arrived at Gerrards Cross. He knew that Axtell had only just qualified as a signalman. During the first week all had gone well and Lee considered that he had the makings of a good signalman. During the second week, the weather turned bad and on Tuesday, 8th December, Lee had occasion to send the 'Obstruction Danger' signal to Gerrards Cross following reports of trees overhanging the line. He spoke to Axtell and said that he wanted the line examined under Regulation 15. Thereafter, Axtell did not follow the laid down procedures and seemed somewhat unsure of exactly what he was required to do; Lee had to guide him. Lee did not consider this satisfactory so he spoke to Movements Inspector Kimm, who asked for full details and arranged to visit Axtell the next day, Wednesday. On the Thursday, Axtell worked exactly according to the rules and regulations, and similarly on the Friday morning until the events that led to the accident. Finally, Lee confirmed that he had received no reports of obstruction on either the Wednesday or the Thursday before the accident and had no occasion on these days to caution trains.

23. *Signalman D. C. Axtell* was 25 years old at the time of the accident. He joined the railway on 6th June 1981 and qualified as a signalman on 10th November 1981. As part of his training he had worked under instruction in Gerrards Cross Signal Box and, on qualifying as a signalman, he took charge of the box, working the 06.00-14.00 and 14.00-22.00 shifts in rotation with another signalman. He lived in Aylesbury, about 24 miles by road from Gerrards Cross, and normally travelled to work by motor cycle. On the day of the accident he was due on duty at 06.00 and left home, on his motor cycle, soon after 04.30 but was unable to get further than Wendover due to the heavy snow. He therefore returned to Aylesbury where he arranged to travel with a freight train and be set down at Gerrards Cross. He arrived there just before 07.50, just as a passenger train was leaving the station on the Down line. He switched in the signal box and replaced all his signals to Danger. The levers were stiff in the frame but the signals appeared to respond correctly. Visibility was limited to about 250 yards; he could see signals 28 and 30 clearly and could just make out Signals 2 and 4 on the Up line but Signal 27, for which no repeater was provided in the signal box, was completely invisible.

24. On switching in the signal box the West Ruislip signalman told him that he had been cautioning trains on the Down line because of reports of overhanging branches in the cutting near Seer Green. Axtell agreed to take on the cautioning. The first Down train he dealt with was the empty stock train which was offered to him at 07.54 and for which he received 'Train Entering Section' at 07.56. He signalled this train into the loop and, after it had come to a stand at Signal 28, lowered the signal and brought the train up to the signal box with a red flag. He spoke to the driver, Driver Trotter, from the window of the signal box and told him about the overhanging trees and that he was to proceed with caution and the prepared to stop short of any obstruction. At this time the guard was in the passenger compartment, behind the driver. He did not ask Trotter to report the situation in the cutting because he knew that he would be able to follow the train's progress to beyond Whitehouse Tunnel on his signal box diagram and that, if the train got that far, it would mean that there was no serious obstable at Seer Green. He was quite

clear that, in cautioning the driver, he was not implementing Regulation 15. He instructed Trotter to proceed and cleared Signal 27. The signal lever was hard to pull over but he managed to reverse it fully in the frame. The train left and he noted that the tail lamps were lit. He then dealt with a train on the Up line.

25. When he saw from the diagram, by the illumination of the two red lights at Seer Green, that the train had passed Signal 27, he replaced this signal to Danger. The lever went back easily in the frame, with a good tension in the wire, which indicated that the signal had been properly cleared. He gave 'Train Out of Section' to West Ruislip and was immediately offered another Down train, which he accepted. Because trains were running out of sequence, he telephoned the West Ruislip signalman who confirmed that the train was the 07.31 Marylebone to Banbury service. The train was signalled into the loop and stopped in the station. Axtell maintained Signal 28 at Danger and, after leaving the station, the train arrived at the signal, the driver sounding his horn to remind the signalman that he was there. It remained at the signal for perhaps a couple of minutes whilst Axtell dealt with an Up line train. He then cleared the signal and displayed a red flag from the window at the Gerrards Cross end so that the driver would stop at the box. The train stopped with its cab opposite the open window and he told the driver, Driver Shaw, that there had been reports of trees down near Seer Green and that he was to proceed cautiously. He said that he would clear Signal 27, but when he tried to do so the lever would not move. He could not hear the lock release because of the noise of the train and, with his hand on the lever, he glanced up at the diagram to check the track circuit indications. The indications at or near Seer Green Station – either A201 or B201 – were illuminated but in addition he thought that one of the pairs of lights indicating track circuit 202 towards Beaconsfield was also alight. It did not occur to him that the signal lever might be held by the electric lock and he assumed that, since it had been stiff earlier, it might now be frozen. At the same time, he concluded that the continuing illumination of TC 201 must be due to a failure of the track circuit to clear behind the empty stock train, possibly due to branches brought down by the departing train lying across the rails. Axtell therefore told Driver Shaw that he had a track circuit failure and that he would authorise him to pass Signal 27 at Danger. He mentioned the empty stock train that had preceded him and Shaw asked where this train was. Axtell replied that it was running down towards Beaconsfield. In view of the (supposed) track circuit failure and the possibility that this was due to some obstruction, Axtell advised Shaw to proceed at extreme caution and suggested a speed of between 10 and 20 mile/h. Shaw's answer was slightly derisory, something like "Okay, mate, if you insist". He had earlier seemed anxious to get on and had made remarks about running late and not wanting to mess around any longer.

26 The train than started, making what seemed a normal departure. Axtell closed the window and glanced up at the diagram. He knew at once that something was wrong: the track circuit near Beaconsfield that he thought had been illuminated was out and only the indication for A201 was showing. He knew that the empty stock train had not had time to clear all the track circuits to beyond Whitehouse Tunnel and he realised that this train must, therefore, still be somewhere between Signal 27 and Seer Green; he could not be sure where, since there was only one track circuit indication for the whole section from Signal 27 to Signal GC 201. He ran back to the window just as the second of the four cars in the train was passing and trid to attract attention by shouting, but no-one heard and the train continued until it was lost to sight. Axtell pulled No.23 lever, the release for Beaconsfield ground frame. Operation of this lever places Signal GC 201 to Danger and GC 201R to Caution and he hoped that, if the empty train was ahead of Signal GC 201R, at least Driver Shaw would see this signal at Caution. He then tried to telephone Seer Green Station and get someone to run down the line, but the telephone was first engaged and then he got no answer, so he telephoned Signalman Lee at High Wycombe and told him that he had allowed two trains into one section. A short while afterwards Lee called him and told him that there had been a collision.

27. On the subject of his training, Axtell said that he joined the railway with the object of becoming a signalman and started his training as a signalman two weeks after joining. From the beginning of his training he knew that, provided he passed the course, he would be allotted to Gerrards Cross. The basic course was of eight weeks duration but his course actually lasted nine weeks. Most of the training was theoretical, dealing in detail with the Absolute Block regulations, including Intermediate Block working. He managed to spend some time in Princes Risborough Signal Box, but only one day at Gerrards Cross. He thought the fact that he was sent for practical training to Princes Risborough rather than to Gerrards Cross may have been influenced by the fact that Signalman Lee, at High Wycombe, was known to dislike trainee signalmen. After passing the examination at the end of the course, he worked for some six weeks under instruction in Gerrards Cross Signal Box, spending alternate weeks on the morning and the evening shifts. At the end of this period, Movements Inspector Kimm asked him if he felt ready to take his passing out test, and he said that he was. The test consisted of an examination in rules and regulations and a two-hour practical examination in the signal box. Having passed this, he went for an interview with the Area Operating Manager, Mr. Crocombe, and was passed as a qualified signalman. He started shift work at Gerrards Cross on 10th November, working the box on his own. From then until the day of the accident he received visits from supervisors on average about once a week. They appeared satisfied with the way he was operating the box and keeping the train register. He agreed that on the Tuesday before the accident, when the weather was bad and trains were running out of course, he had telephoned Signalman Lee before giving him the 'Train Entering Section' bell and that Lee had corrected him. Inspector Kimm visited him the next day and emphasised the importance of working strictly to the laid down procedures.

28. The guard of the 07.31 passenger train was *Guard J. Charles*. He had been a railwayman since 1960 and a guard since 1968. He had spent most of his time as a guard on the Marylebone line. On the day of the accident he booked on duty, at Marylebone, at 00.01 and worked the 04.25 empty stock train from Marylebone to High Wycombe. The journey was without incident, with only light snow falling. The snow was getting thicker as he left Marylebone in charge of the 07.31 train, but there were no problems as far as Gerrards Cross, with the train running to time. Before leaving Marylebone he had talked with his driver, Driver Shaw, whom he knew well and who seemed quite normal and his usual self. There were about 150 passengers on the train, including numbers of school children. With station duties complete at Gerrards Cross, he gave the 'Train Ready to Start' signal to the driver and the train left the platform. Charles was in the rear brake compartment, in the fourth coach. The train stopped at Signal 28 and when this cleared the driver drew forward to the signal box. Charles saw the signalman talking to the driver but he could not hear their conversation. The train then started, making what seemed a normal departure and, Charles said, he continued looking out of the nearside window of his brake van until he had passed the signal box. The signal box windows were closed and he saw nothing of the signalman.

29. Having passed the signal box, Charles closed the window and Driver Shaw then spoke to him on the train intercom. Shaw said that he had been told by the signalman that there were trees on the line and he asked Charles to keep a look-out. Charles went to the offside window and looked out for some three or four minutes. He told me that, before he had closed the nearside window, he had looked ahead and seen Signal 27 and that this signal was in the cleared position. It was pointed out to him that the signal was then over 300 yards away with visibility down to about 250 yards in what he himself had described as "blinding snow", and that the electrical locking was such that, provided the signal had been replaced to Danger behind the train ahead, it could not have been cleared for his train. But he remained adamant that he had seen the signal and that it was off. The train continued at a steady speed, he thought between 15 and 20 mile/h, until about five or six minutes later he felt a sudden deceleration and was then thrown violently forward out of his seat. Thinking about it afterwards, he thought that there had been a brief application of the brakes, for not more than a second or two, before the heavy impact of the collision. Having picked himself up, he left the train, taking detonators but not the track circuit operating clips, and after seeing that there had been a serious collision he telephoned the High Wycombe signalman from Signal HW 12. He then went towards Gerrards Cross, placing detonators on the line before climbing up to the road, where he stopped two passing cars and asked the drivers to call for assistance. He continued on to Gerrards Cross where he described to Axtell what had happened. Axtell was extremely distraught and blamed himself for what had happened. On his way back to the signal box Charles had passed Signal 27 but had not noticed whether it was on or off.

30. *Mr. F. F. Hicks*, a British Railways employee, was waiting on the Up platform at Gerrards Cross and observed Guard Charles's train leave the Down platform and move slowly towards the signal box. Shortly afterwards the train began to accelerate away and as the last coach passed the signal box, and the box itself came into his view, he heard what he described as "loud and urgent shouting" coming from the direction of the signal box. The train continued on its way.

31. Detailed investigations to determine the probable speed of the passenger train at the moment of collision were made by *Mr. M. McLoughlin*, a Principal Scientific Officer in the Field Trials and Services Section, the part of British Railway's Research Division responsible for investigating accidents. Mr. McLoughlin examined the site of the collision and obtained measurements of the distance the empty stock train was moved as a result of the collision. He examined the damage caused to the two trains and studied photographs of the trains taken soon after the collision. He arranged for exact measurements to be made of the gradient of the line approaching the site of the accident. He then made calculations equating the moving energy of the passenger train to the total energy dissipated before the two trains came to rest. In making his calculations, he had to make assumptions as to the limiting adhesion between wheel and rail and adopted a low value based on the known weather conditions and test results available within the Research Division. He found it necessary to ignore the energy dissipated in structural damage to the trains. His estimate of the moving energy of the colliding train, and hence its speed, were likely, therefore, to be on the low side. His calculations indicated a speed at the moment of collision of 30 mile/h, with a margin of error of not more than one or two mile/h plus or minus.

32. Mr. McLoughlin had assumed that, immediately before or after the impact, the brakes were applied on the passenger train. This assumption was based on the evidence of witnesses, which suggested that a brake application was made immediately before the collision, and the technical evidence on the examination of the trains after the accident which made it virtually certain that the brakes had been applied. However, if all this evidence was ignored and it was assumed that no brake application at all had been made on the colliding train, the calculations gave a speed of collision of just over 20 mile/h. This is less than the speed of 30 mile/h quoted in the previous paragraph because, if no brake application is made, no energy is lost before the moment of impact and, therefore, a lower speed is sufficient to push the stationary train forward a similar distance.

33. During the public hearing of evidence I appealed to any member of the public who had been a passenger on the train and who was able to give an estimate of the train speed and to say whether a brake application had

been made before the collision, to get in touch with me. A number, to whom I am very grateful, responded. All said that the train appeared to slow down shortly before the collision, and most thought that the train was travelling at between 25 and 30 mile/h. Another passenger, in his evidence at the Coroner's Inquest, said that he felt the brakes applied in the final seconds before the collision, and that the train had travelled from Gerrards Cross at its normal speed.

34. *Movements Inspector T. M. Kimm* arrived at Gerrards Cross Signal Box about one and a half hours after the accident. Signalman Axtell was still on duty but was in a distressed condition. The snowfall had diminished and Signal 27 was just visible from the box. It was at Danger and the lever was Normal in the frame. Only one track circuit was showing Occupied on the Down line, this being A201 in advance of Signal 27. Axtell described what had happened and said that he had attempted to clear Signal 27 before authorising the driver of the passenger train to pass it at Danger. Inspector Kimm confirmed that the signal lever was correctly locked by the occupation of track circuit A201 and that it could not be reversed. He then relieved Axtell and himself took charge of the signal box.

35. It was part of Mr. Kimm's duties to visit signal boxes on the Marylebone to Banbury line and he had been doing this for about two years before the accident. He visited Gerrards Cross Signal Box at least once every two weeks. Apart from one or two minor discrepancies in the booking of trains, he had never found any irregularity in the signalling or recording of trains; specifically, he had never seen or heard anything to suggest that signalmen at Gerrards Cross were in the habit of clearing signals and not replacing them to Danger until another train was closely approaching. During his visits before the accident he had seen Signalman Axtell at work and was entirely satisfied as to his general competence. He had had to go to the signal box on the Wednesday two days before the accident to point out to Axtell that he had not followed exactly the laid down procedures when dealing with the 'Obstruction Danger' signal sent by Signalman Lee, but this had not altered his view as to Axtell's competence.

36. *Mr. D. S. Froome,* a resident of Gerrards Cross and a regular traveller by rail to Marylebone, normally caught the 07.22 or 07.38 trains from Gerrards Cross. He had noticed that signals, on both the Up and Down lines, were often cleared for a train and then left in the Clear position until a following train was due, when they would be momentarily replaced to Danger before being once again cleared. He had found this pattern of operation so consistent that on arrival at the station he would wait in his car until the signal at the country end of the Up platform was replaced to Danger before going on to the platform. Having at one stage been employed by BR as a graduate trainee engineer in the Signals and Telecommunications Department on Southern Region, he was puzzled by this method of working although he had not considered it sufficiently serious to be worth reporting to the railway authorities. On the day of the accident, he had been on the Up platform when the empty stock train passed through but he was unable to recall the operation of the Down line signals associated with it.

37. Since Mr. Froome's normal time of departure from Gerrards Cross, in the weeks immediately preceding the accident, had often coincided with the opening of the signal box, I examined the possibility that he had seen the signals clear (as they would be with the signal box closed) on his arrival and had then seen them replaced to Danger when the signalman opened the box. But Mr. Froome assured me that he had observed the practice for at least a year before the accident and at times when the box was clearly in normal operation and not being opened up. Since the accident he had noticed that the signals were always returned promptly to Danger after the passage of a train.

38. *Signals and Telecommunications Supervisor F. Geach* was the supervisor in charge of the signalling equipment between Marylebone, High Wycombe and Aylesbury. On the day of the accident he arrived at Gerrards Cross Signal Box at about 10.30. Having confirmed that the lever for Signal 27 was Normal in the frame and could not be reversed, he examined the indication of Track Circuit A201 on the signal box diagram. The two red lights were clearly seen from all positions in front of the frame and he did not think that a signalman should have had any doubts as to their proper indication of the occupation of Track Circuit A201. Mr. Geach confirmed that there had been no reports of trouble with any of the signalling equipment at Gerrards Cross in the weeks preceding the accident. The equipment had been thoroughly tested since the accident and had been found to be working correctly.

39. The two trains were examined on site soon after the accident by *Mr. D. Miller*, BR's Area Maintenance Engineer at Bletchley with responsibility for the diesel multiple-unit trains operating from Marylebone. In the leading cab of the passenger train he found that the gears were in neutral and that the throttle had been in the idling position. The brake handle had been bent and wrenched off as a result of the collision but, by comparing it with marks on the controller, he was able to say with confidence that the brakes had been applied at the moment of impact. This tied in with the presence of skid marks on the rails about a coach length behind the back of the train, although the fact that no flats were found on any of the passenger train's wheels indicated that the brake application had not been a prolonged one and that the train had not skidded far. The speedometer was unbroken and the needle was indicating zero. Before the train was moved a brake test was made on the three rear coaches and this showed that the braking system was in proper working order. An examination of the rear end of the empty

stock train established that the electric rear lights had been present, with bulbs fitted and with the correct covers, but the damage was such that it was not possible to say positively whether or not the lamps had been alight before the collision. Similarly, it was not possible to say with certainty whether the windscreen wipers had been working at the moment of impact. Mr. Miller had found four windscreen wiper motors, some with arms and blades still attached, in the wreckage of the front end of the passenger train, but he could not tell which had come from the passenger train and which from the rear cab of the empty train. However, one of the wiper valves was on and it seemed probable that this would have come from the passenger train since it was unlikely that wipers would have been working in the rear cab of the empty train. Before leaving the site, Mr. Miller had observed that there was little or no build-up of snow on the rear of the passenger train since the snow was being driven from the north. This suggested that the yellow painted rear end of the empty train, including its rear lights, was unlikely to have been obscured by snow sticking to it. Asked to give his estimate of the speed of the passenger train at the moment of impact, Mr. Miller said that, based on his experience of other collisions and the extent of damage in this case, he would have estimated a speed of about 40 mile/h.

40. A further detailed examination of the brakes on the passenger train was carried out by *Mr. G. Morphet*, an Assistant Engineer with special responsibility for diesel multiple-units. This confirmed that the braking system had been in good working order before the collision. Mr. Morphet had also made computer-assisted calculations of stopping distances based on the known site conditions and the state of the train's brakes. He had found that a full brake application would have brought the train to rest in 13 yards from 10 mile/h, in 28 yards from 15 mile/h, and in 48 yards from 20 mile/h. Assuming a visibility of 250 yards and a brake application made at this distance, a train travelling at 43 mile/h would just have been able to stop within the 250 yard distance. Further calculations showed that the passenger train, if driven at maximum possible speed from a stand at Gerrards Cross Signal Box, would have reached a speed of 48 mile/h approaching the point of collision. From this speed a full brake application would bring it to a stop in approximately 300 yards.

41. *Mr. D. McKeever*, the London Divisional Operating Superintendent, gave evidence on tests carried out in clear weather after the accident. A train of similar composition to the empty stock train was positioned with its front end 4 yards from Signal GC 201R and another train was then driven slowly towards it from Gerrards Cross. From the driver's position in the approaching train, the left-hand tail lamp of the stationary train became visible at a distance of 555 yards and the right-hand tail lamp at 528 yards. A green aspect in Signal 201R became visible at a distance of 437 yards (from the signal) and a yellow aspect at 406 yards. With no train standing at the signal, the green aspect was first seen from a distance of 545 yards.

42. Evidence on the vegetation growing in the Seer Green cutting was given by *Mr. G. Collins*, a Principal Technical Officer at the Divisional Engineer's Office at Watford. One of his duties was to deal with complaints concerning vegetation; such complaints came from the permanent way maintenance staff, from the Electric Traction Department when trees or shrubs began to grow too close to the overhead line equipment, from the Operating or Signals Departments when vegetation interfered with the sighting of signals, and from members of the public with property adjoining the railway. Within the Division there was a set budget to deal with this work; during 1981 the sum allotted had been £38,000, a sum he considered to be totally inadequate for the amount of work required. Priority was given to guaranteeing proper signal sighting and to dealing with complaints from the public, and this took most of the available money. There was no systematic programme for clearing vegetation and work was done in response to requests for clearance, subject to the availability of money. Where a choice was possible, priority was usually given to the main lines rather than to secondary and branch lines. Minor work was usually carried out by the local permanent way staff, but contractors were normally employed for any major clearance.

43. So far as the Marylebone to Banbury line was concerned, Mr. Collins knew that it was becoming overgrown but, apart from the occasional complaint about signal sighting, no particular problems had been reported before the accident. He had walked through the Seer Green cutting in July 1981 and noted the silver birch trees but had not considered that they were a potential threat to trains; the general state of the vegetation was no worse than in many other locations. During his 13 years railway service he had never seen trees become weighed down with snow to the extent that they had at the time of the accident.

44. *Mr. R. J. Coon*, the Chief Civil Engineer of London Midland Region, said that in 1981 the Region's budget for minor earthworks, sea and river defence works and tree cutting amounted to £420,000. Of this, £130,000 was actually spent on tree cutting, £38,000 of it on the London Division. The relatively small sum of money allocated had meant that the amount of work that could be done was severely restricted and only work of high priority could be undertaken. As far as the Seer Green cutting was concerned, the trees had not been considered to be of high priority since under normal conditions they were straight and tall and well clear of the line. It had been the exceptional weather conditions, and the fact that the snow had built up on the branches, that had caused some to lean towards the line or to become uprooted. The snow had begun to be a problem on the Tuesday before the accident and drivers had reported branches striking their trains. Some limited clearance and trimming had been

done by the local permanent way staff during the Wednesday and Thursday. Following the accident, contractors had been brought in to remove most of the trees from the cutting.

45. Evidence on Signalman Axtell's recruitment, training, and qualification as a signalman was given by *Mr. W. E. Crocombe*, the Area Operating and Train Crew Manager at Marylebone, *Divisional Movements Inspector G. Morgan*, and *Movements Inspector T. M. Kimm*. Mr. Crocombe explained that when staff were needed for training as signalmen the posts were first advertised within the Railway. If no suitable people came forward, Job Centres were asked to nominate suitable candidates. Mr. Axtell had been sent for interview in this way together with one or two others and had impressed Mr. Crocombe as having a quick mind and a sense of responsibility. He had, therefore, been selected in preference to the others for training as a signalman. The vacancy was specifically for Gerrards Cross Signal Box, and at the time of this initial interview Mr. Crocombe knew that, provided he completed his training successfully, he would be going to this box. When Axtell had completed his training and was ready to take charge of the signal box, Mr. Crocombe had seen him briefly. The reports on his training, including his practical work in the box, had been very good and Mr. Crocombe considered that he was competent to work the box on his own. In answer to my questions, he said that he had some reservations about the recruitment of a person from outside the Railway and his progression directly to be in charge of a signal box, but said that it was a system that had to be accepted.

46. Inspector Morgan had been an instructor at the Regional Signalling School for over ten years at the time that Axtell had done his training there. The basic signalman's course was of eight weeks' duration, although Axtell had in fact completed nine weeks of instruction. The syllabus included Railway rules, signalling rules and regulations, and failure conditions as well as practical training in signal box working. Axtell had been an above-average student throughout the course, obtaining excellent marks in all his tests, and at the end of his training Mr. Morgan regarded him as a very promising signalman.

47. At the end of his basic training Axtell went for practical training in Gerrards Cross Signal Box. No set time was fixed for this phase of his training; in some cases trainee signalmen would contact the appropriate Inspector when they themselves felt competent to take charge on their own, but in this case Axtell was asked by Inspector Kimm, some six weeks after the end of his initial training, whether he felt himself ready to be passed out as a qualified signalman. He said that he was, and Mr. Kimm went to Gerrards Cross on 6th November. He watched Axtell work the box on his own from 07.50 until 09.00 and then took him back to Marylebone where from 11.00 until 15.00 he questioned him on rules and regulations, including the special instructions for Gerrards Cross Signal Box. At the end of this examination he was entirely satisfied that Axtell was competent to take charge of the signal box and to work it on his own, and he certified him accordingly.

CONCLUSIONS

48. The accident happened because the 07.31 ex Marylebone passenger train was wrongly allowed to proceed into a section of line still occupied by the preceding, empty stock, train. For allowing the train to enter the occupied section, Signalman Axtell must accept the main, although not the sole, responsibility for the accident.

49. Axtell had arrived in the signal box, nearly two hours after he was due on duty, after a difficult journey from home that had taken him nearly three and a half hours instead of the usual forty minutes. It is ironic that a less conscientious man might have given up and returned home, in which case the signal box would have remained closed and the accident would probably not have occurred. On arrival, he was told that the drivers of trains on the Down line were being cautioned because of reports that trees were overhanging the line in the Seer Green cutting. There was no suggestion that trains were unable to get through. The first Down train that he dealt with was the empty stock train and the evidence is convincing that he dealt correctly with this train. Axtell claimed that he cleared Signal 27 and replaced it to Danger as soon as the train had passed it. The next train to arrive was the passenger train and it is clear that Axtell held it for a short while at the platform signal (28) before drawing it forward to the signal box. What was said there to the driver, Driver Shaw, is vital but the only surviving witness to their conversation, and to his actions, is Axtell himself. However his evidence, given at the Railways' own Inquiry, at my Inquiry, and before the Coroner, was consistent and convincing. I believe that, as he said, he looked at the illuminated diagram but somehow failed to interpret correctly what he saw there. I believe that he expected the empty stock train to have already passed beyond Signal GC 201 and therefore took the red lights on the diagram to be beyond this signal: at the time, the lights indicating the occupation of Track Circuits 202, B201, and A201 were spaced closely together on the diagram and, in spite of Inspector Geach's evidence (paragraph 38), I consider it possible that a signalman under pressure, as Axtell undoubtedly was, could have been misled. I believe that he then cautioned Driver Shaw, telling him about the reports of overhanging trees, and tried to clear Signal 27. It was when he found that he could not clear this signal that I believe his inexperience showed and he began to lose control of the situation. An experienced signalman would have paused to consider why he could not clear the signal and,

knowing that it would be locked by the occupation of any of the track circuits between it and Signal 201, would have checked carefully the indication of these track circuits and the reason for their showing Occupied. I do not think that Axtell did this. He assumed too readily that the signal lever was frozen and authorised Shaw to pass the signal at Danger. To compound his error, I believe that he probably gave Shaw to understand that the empty stock train was already some way past Signal 201 and that the trouble ahead was no more than a failed track circuit or the overhanging trees. In the circumstances, his suggestion that Shaw should drive at between 10 and 20 mile/h perhaps invited the somewhat derisory answer that he apparently got. It was only after the train had started that all he had been taught during his training as a signalman reasserted itself; it clearly took him only moments to realise the implications of what he had done. As the evidence shows, his subsequent attempts to avert the accident were of no avail.

50. In giving my view of Axtell's actions, I have assumed that Signal 27 was at Danger. Evidence to the contrary was given by Guard Charles, but I believe him to be wrong. I am prepared to believe that Charles kept his head out of his brake compartment window until he had drawn level with the signal box, but I can see no reason why, with a blizzard blowing, he should have continued to keep looking out beyond this point, as he would have needed to do if he was to get a proper sight of Signal 27, some 350 yards beyond the box. The evidence of Mr. Hicks (paragraph 30) confirms that Axtell was shouting loudly by the time that the rear end of the train was passing the signal box and, had Charles been still looking out as he claimed, it is hard to see how he could have failed to hear Axtell's shouts.

51. There is also Mr. Froome's evidence (paragraphs 36 and 37) about the late replacement of signals at Gerrards Cross. I have little doubt that the slack practices that he described had been occurring over a considerable period at Gerrards Cross and this does not reflect well on the signalmen responsible or on the level of supervision. But I doubt whether Axtell, fresh from the Signalling School, had picked up these bad habits and I do not believe that he failed to replace Signal 27 properly after the passage of the empty stock train.

52. Another consideration is whether Signalman Lee at High Wycombe should have immediately passed on to Axtell the telephone message he received from Driver Trotter. In his evidence Lee said that, about two minutes after receiving the message, he was about to telephone Axtell when Axtell telephoned him to say that an accident had occurred. Nothing in the Rules or Regulations required Lee to notify Axtell immediately, although it would have been normal practice for him to pass on the message. It is not possible, for example from the train register, to say with any certainty whether Lee would have been occupied with other duties during this two minutes, or indeed whether the time interval might have been somewhat longer than the two minutes quoted. It is uncertain, therefore, whether Axtell would have received the message before or after the passenger train had departed, had Lee telephoned at once.

53. Having accepted that Driver Shaw was cautioned by Axtell and that he was authorised to pass the section signal at Danger, one must examine the way in which he then drove his train. Any driver of Shaw's experience would have known that in passing the signal at Danger he had lost the effective guarantee of a clear section that is given by a clear signal. In such cases it is fundamental that a driver should so control his train that, should there be an obstruction in the section, he can stop short of it. To some degree he can be guided by the information given to him by the signalman, but the fundamental responsibility remains his. In this case it is clear that Shaw drove his train between Gerrards Cross and the Seer Green cutting at not much less than the normal speed for this section. Based on the probable sighting distance available to him as he entered the cutting, the fact that he undoubtedly made a brake application before the collision, and the technical evidence as to the probable speed of the train at the moment of impact, I conclude that his speed as he entered the cutting must have been not less than 35 mile/h. In my view, this was an excessive speed in the circumstances, even if he believed that the worst obstruction he was likely to meet was an overhanging branch or two. Had he driven his train with the caution proper to the circumstances, I believe that the collision might have been avoided or its effects much reduced.

54. There remains the question of whether Driver Shaw should have received more immediate warning of the presence of the empty train ahead. It is difficult to establish exactly for how long the empty train had been at a stand before the collision, but my best estimate is between three and five minutes. Section M.3.1. of the BR Rule Book states that "If a train is stopped by an accident, failure, obstruction or other exceptional cause and any other line is obstructed or there is any other reason to believe that this is likely, the first duty of the trainmen is to protect such line, including advice to a signalman by the quickest possible means". In this case, there is no evidence that the Up line was obstructed other than by overhanging branches and this section does not, therefore, apply. Where only one line is obstructed, the Rule Book differentiates between Track Circuit Block lines and other lines. In the case of TC Block lines, Section 3.2.1 states "Detonator protection is not necessary but where the approach view of the rear of the train may be less than 300 yards, the guard must place three detonators on the line, 300 yards in rear of the disabled train. During darkness or other conditions of poor visibility the guard must check that the tail lamp is alight". For all other lines, Section 3.2.2 states "The guard must go back and carry out detonator protection".

55. The signal sections between Gerrards Cross and the 1B Home Signal GC 34 are worked in accordance with the principles of the Absolute Block System, even though the line is fully track-circuited. Section 3.2.2. therefore applies and according to it Guard Williams should have gone back to protect the rear of his train with detonators, the first at a quarter of a mile from the obstruction, the second at half a mile and three, 20 yards apart, at one mile. It would still have been his duty to go back had section 3.2.1 applied, either to check the tail lamp or to place detonators if the visibility was less than 300 yards, which it probably was. The only question is whether the rule allows any latitude in cases where the train is unlikely to be delayed for more than a few minutes. As written, it clearly does not, although in practice I have no doubt that train crews often use their discretion in such cases; where, for example, the train is delayed by the presence of a few sheep on the line and it is clear that the time it would take the guard to cover even the first quarter of a mile is greatly in excess of the time needed to clear the obstruction. In the case of Driver Trotter and Guard Williams, they obviously made no attempt to protect their train and I doubt whether they even discussed or considered the need to protect. They thus disregarded the requirements of Rule M.3.2.2. Whether it would have made any difference had they obeyed the letter of the rule is doubtful. Allowing about half a minute for the two of them to confer, Williams would have had at most some 4½ minutes in which to warn the approaching train. In the conditions, I doubt whether anyone could have walked at more than about 3 mile/h, and the maximum distance covered would thus have been just under 400 yards, that is about 300 yards past the rear of the train. Had the time interval between the empty train coming to a stand and the collision been as little as 3 minutes, and this is possible, or the rate of progress been less than 3 mile/h, Williams would have been less than 200 yards beyond the rear of his train when the passenger train appeared. At the very best, then, Driver Shaw might have received an additional few seconds warning of the obstruction, but not enough to have enabled him to stop.

56. The last question is whether the obstruction should have been there at all. The Civil Engineers made it clear that the old system of regular clearing of vegetation along the lineside, a necessity in the days of steam, had been replaced by a system of selective clearing within a tightly restricted budget. As Mr. Collins explained, this entailed working to priorities and, until the week of the accident, the vegetation in the Seer Green cutting was not considered to pose any threat to trains and was not, therefore, given any priority in terms of clearance or trimming. The first indication that this view might have been wrong came on the Tuesday, with the first reports of branches striking trains, but I could find no evidence that this was reported to anyone in authority in the Divisional Engineer's office (nor in the circumstances appertaining on the Tuesday would I have expected it to be) although the local permanent way staff were alerted and carried out some limited clearance on the Wednesday and Thursday. With hindsight it is easy to argue that the possibility of the normally straight birch trees becoming so snow laden that they leaned towards the line should have been foreseen, but Mr. Collins was probably right when he said that never before had he seen conditions like those in the cutting on the day of the accident. The fact that other places on the line where the vegetation was not dissimilar to that in the Seer Green cutting produced no comparable problems shows that conditions at Seer Green must have been exceptional. Given the system in force for dealing with vegetation, I think it would be unjust to blame any individual for failing to anticipate what eventually happened.

REMARKS AND RECOMMENDATIONS

57. My Conclusions show that, in my view, the accident was caused by a combination of the exceptional weather conditions and various errors and misjudgements on the part of a number of individual railwaymen rather than by any fundamental weakness in the way the railway was being operated. Nevertheless, the circumstances of the accident raise a number of important issues and I discuss these in the following paragraphs.

58. In the days and weeks immediately following the accident, BR took a number of quick measures designed to prevent a possible recurrence. Signalman Axtell was relieved of his duties as a signalman; alterations were made to the indication of track circuits on the illuminated diagram in Gerrards Cross Signal Box in order to reduce the possibility of confusion by the signalmen; most of the vegetation was removed from the slopes of the Seer Green cutting, taking advantage of the closure of the line whilst the damaged trains were removed; and train drivers and signalmen throughout London Midland Region were given special printed reminders of the action required when drivers are instructed to pass signals at Danger. Possible longer-term measures have been the subject of much inquiry and discussion and I group these under sub headings.

Passing Signals at Danger

59. The British Railways signalling system, as it has developed over many years, has steadily reduced the incidence of collisions. During the past 40 years, for example, the rate of significant * collisions on passenger lines has been reduced from over 0.4 per million train miles to around 0.1. But accidents continue to occur when drivers are required to pass signals at Danger. The reason for such a requirement is usually some failure of the signalling

*A 'significant' accident, as defined in the Department's Annual Reports on Railway Safety, is one which is potentially dangerous whether or not casualties are actually caused.

equipment, either a faulty signal or, more commonly, a track circuit showing 'Occupied' when no train is present - a safety-side failure. Another occasion is when a train has failed in a section and a second train or locomotive is required to go to its assistance. A full list of the conditions under which Stop signals may be passed at Danger is given in Section C.6 of the Rule Book. The duties of a driver in such cases are governed by Section E.8.1 of the Rule Book which requires him to "proceed cautiously in accordance with the signalman's instructions". Where his route takes him over facing points, switch diamonds or swing nose crossings he is required to restrict his speed to 10 mile/h when passing over such points or crossings. The signalman, in authorising a driver to pass a signal at Danger, is required to "advise the driver of the circumstances and instruct him to travel cautiously to the next Stop signal or as far as the line is clear towards the next Stop signal". In addition to these general cases, there is one specific case where a train is used to examine the line, usually following a report of some obstruction. In this case, Regulation 15 of the 'Regualtions for Train Signalling' applies and requires the signalman to explain the circumstances to the driver and to instruct him to pass the section signal at Danger and to "proceed cautiously through the section *prepared to stop short of any obstruction*". This is the only part of the Rules and Regulations which uses the phrase in italics and, perhaps significantly, I can find no recent case of a collision occurring to a train engaged in examining the line under Regulation 15.

60. The accidents that have occurred have all been caused by drivers driving too fast and being unable to stop when suddenly confronted with an obstruction. In some cases the driver has failed to make proper allowance for reduced visibility, the effects of a falling gradient, or the state of the rails; in others he has mistakenly assumed (or been told by the signalman) that the obstruction is at a certain place whereas it has turned out to be somewhere else. (The fatal collision at Lunan Bay, Scottish Region, in 1975 was a classic example of this kind of misunderstanding.) In my discussions with the Railway Officers I explored the possibility of setting a maximum speed for trains required to pass signals at Danger and of requiring signalmen to issue a standard caution in such cases without telling the driver why he is being required to pass the signal, merely that he is entering an 'Occupied' section. I concluded that, in regard to the first, it would be impractical to lay down a standard speed in view of the vast range of conditions that can arise, both in the nature of the possible obstruction and the length of the section, and that whilst the second proposal, if observed, might reduce the possibility of misunderstanding, it would be asking too much of human nature to expect signalmen not to give some indication to drivers of the reason for having to pass the signal at Danger. The Railway Officers have, however agreed, to the following changes in rules and procedures. The first is the issue of a new instruction in the General Appendix which will read as follows:

"SPEED OF TRAINS WHEN TRAVELLING CAUTIOUSLY THROUGH SECTIONS

When a Signalman instructs a Driver to pass a signal at Danger and travel cautiously through a section in any of the circumstances listed in the Rule Book, Section 'C', Clause 6.1, or when a Driver passes an automatic signal at Danger or an intermediate block home signal at Danger in accordance with the provisions of the Rule Book, Section 'K', Clause 3.3.1, the Driver must travel at such a reduced speed as will enable him to stop safely and well clear of any train or other obstruction which may be on the line ahead. In determining the safe speed at which he may travel the Driver must be guided by the braking capability of his train and his view of the line ahead, due regard being paid to darkness, fog or falling snow, or where curvature of the line restricts the view of the line ahead, or any other adverse circumstances. THE DRIVER MUST ALWAYS BE ABLE TO STOP WITHIN THE DISTANCE HE CAN SEE THE LINE TO BE CLEAR."

The second includes alterations to the Rule Book which will require a signalman, when authorising a driver to pass a signal at Danger, to give such instructions to the driver directly and not via another member of the train crew; and an amendment to Section E.8.1 which will require a driver, after being authorised to pass a signal at Danger, to proceed "at low speed prepared to stop short of any train or other obstruction on the line ahead". The third is that during their basic training, and during visits to signal boxes by supervisors, signalmen will be specially instructed not to make assumptions as to the causes of a signal being held at Danger unless these can be verified and not to pass on to drivers any information as to why the signal cannot be cleared unless they are quite certain of the reason.

Cautioning of Trains

61. The evidence in this Inquiry shows that, at one stage, the signalman at High Wycombe correctly applied signalling Regulation 12 (Obstruction Danger) when he received reports of trees obstructing the line, followed by Regulation 15 (Examination of Line). The information he received following an examination of the line was that, whilst trees were overhanging the line, trains could in fact get through. He therefore removed the 'Obstruction Danger', but instructed the signalman at the entrance to the section to caution the drivers of subsequent trains. Now, there is no Rule or Regulation which defines what this means or what action is required of a driver when so cautioned. The Railway Officers consider that it is a matter of common sense; that the signalman will tell the driver why he is being cautioned and that the driver will subsequently drive accordingly. But the evidence of some of the drivers in this case showed differences of opinion as to what "caution" actually means; Driver Trotter, for example, spoke of "extreme caution" which he said meant a maximum speed of 5 mile/h as if this was a definite category.

I recommend that the Railway Officers examine the possibility of referring to the cautioning of trains in the appropriate Rules and Regulations so that drivers and signalmen can be quite clear as to what is required when trains have to be cautioned in circumstances other than those covered by Regulation 15.

Protection of Trains

62. In my Conclusions (paragraph 54) I quoted the rules for the protection of trains and pointed out that the rule that applied in the case of the empty stock train allowed no discretion whatsoever to the train crew. At the same time I indicated that in practice train crews often exercise such discretion when confronted with an event that is unlikely to delay the train for more than a short period and where no other line is obstructed. In discussion with the Railway Officers I got the impression that, whilst there was a clear view that obedience to the letter of the rules is necessary to ensure the safe operation of the railway, this was one rule which, if applied meticulously, could lead to unacceptable delays in the running of trains. In other words a driver or guard found to have knowingly disobeyed the rule on the grounds that the delay to his train was of strictly limited duration, might be disciplined but would be most unlikely to be 'convicted'. Taking the specific case of Driver Trotter and Guard Williams, none of the evidence suggests that the obstruction was a major one and, in spite of the patent unreliability of parts of their evidence, I believe them when they say that they should have been able to clear it within a matter of minutes. Trotter had informed the signalman of the situation and they were entitled to assume that the train was protected by the signalling system, detonator protection being thus a second line of defence. In the circumstances, would it have made sense for Williams to have set out on a round journey of some two miles, a journey which would have taken him at least 40 minutes and more likely an hour or so? I do not believe it would and I would have been reluctant to criticise Trotter and Williams had they told me that they had made a conscious decision not to protect their train. If I am right, it suggests that the reality of the situation should be recognised and the Rules altered to allow some discretion when only one line is obstructed and when the delay is unlikely to be of long duration. There is a real difficulty, of course, in that guidance would have to be given as to what sort of delay would be acceptable and in what circumstances, and of the action necessary if it became obvious that the delay was likely to be longer than originally anticipated. But I consider that it would be preferable to face the problem rather than to accept a situation where the rules are known to be interpreted flexibly at present. An alternative might be to review the need for full detonator protection, on lines other than those operated under Track Circuit Block, when only one line is obstructed. As I have said, detonator protection in such a case is a second line of defence and the train should normally be protected by signals. The special circumstances listed in Section C.6.1 of the Rule Book, such as a second train or locomotive required to enter a section to assist a failed train, are each covered by appropriate rules and in no case should a train enter an occupied section unless under caution. In my view, when only one line is obstructed, detonator protection (on lines other than those operated under the Track Circuit Block Regulations) is not necessary for the full distances specified in Section M.2.1.2 of the Rule Book. Adequate protection should be afforded by detonators at, say, a quarter of a mile from the obstruction. Such a limited requirement for protection would reduce the lengthy delays which would arise from a rigid observance of the present Rules whilst giving warning to a train approaching under caution. I have invited the Railway Officers to consider these alternative proposals.

Radio

63. Many members of the public wrote to me during the course of the Inquiry and many pointed out that radio communication between the passenger train and the signal box would have prevented the accident. I agree, and said as much during the public hearing of evidence. It would be simple to recommend that BR should proceed to equip all trains, locomotives, and signal boxes with radio; the Netherlands Railways has just announced such a programme designed to cover their 2,880 kilometre network with train to signal box radio over the next five years, using 160 radio base stations and 2,200 on-train radio sets. In Britain, proportionately more equipment would be needed to cover the 17,000 kilometre network because of the more hilly terrain, and it would therefore require a multi-million pound investment. From a strictly safety point of view, I have to say that I do not believe that this would be the best way to use scarce investment resources. I would much prefer to see the Board's current Automatic Warning System (AWS) programme completed and more lines converted from semaphore to modern colour-light signalling; these are the measures that have made possible the dramatic reduction in significant collisions mentioned in paragraph 59, and further investment on these lines would appear to be more cost effective than a major programme to install radio. The one exception I would make is where radio is itself an integral part of the train control or signalling system; such systems are being developed, as I mention in the next paragraph.

64. Nevertheless, the Railways Board recognise that train to signal box radio must come. Some areas already have such cover; the Great Northern electrified lines out of Kings Cross, the Midland Suburban electrified lines out of St Pancras, and the lines north of Inverness. The two former are linked with proposals for the one-man operation of trains and, pending the resolution of the associated industrial relations problems, the radio is not being used. In addition, the Board is making progress with plans to use radio as part of a low-cost train control system on lightly-used lines (a trial installation will be in operation this year) and also with its national radio plan, designed to provide radio communication between signal boxes and mobile sets used by Civil and Signal & Telecommunications engineering staff; by the end of 1983, approximately 20 per cent of the total railway mileage will have this radio cover.

I have discussed with the Board's Officers the possibility of a change in policy so far as future multiple-aspect signalling schemes are concerned, installing radio in place of the present signal post telephones. I understand that the difference in cost might not be great, the main difficulty being that all trains traversing the resignalled area would have to be equipped with radio. The Board is considering whether progress might be made in this direction.

Fog Lights

65. Another point raised by members of the public was the possibility of equipping trains with some form of fog light, such as the motorway fog lights now available for road vehicles. The Railways Board recognise the need to improve the conspicuity of train tail lights and point out that progress has been made - from single oil lamps to the more powerful battery lamps now fitted to freight trains and loco-hauled stock, the conversion to electric tail lamps of DMU stock, and more recently the use of twin tail lamps of higher wattage on modern rolling stock. Experiments were conducted some years ago on various designs of flashing tail lamp but the Board has not been convinced that this is a satisfactory solution. My own view is that the problem is not such as to justify costly retrospective action, but that the Board should continue their policy of equipping all new stock with improved tail lamps, much as they are doing with train head lamps.

Selection and Training of Signalmen

66. As part of the Inquiry, I studied the recruitment and training of signalmen. It was quickly apparent that in many areas there are problems caused by the spread of modern signalling, where many miles of line are controlled from a single large signal box instead of from a number of mechanical boxes. In the past, a signalman would normally progress from a yard signal box to one on a branch line before taking charge of a main line box. Nowadays there are few small boxes in which to start a new signalman, and this is especially true of the railways around London. The spread of modern signalling has also made railwaymen, especially the younger ones, reluctant to train as mechanical signalmen; they have seen hundreds of the old signal boxes closed as semaphore signalling gives way to modern centralised signalling. It is against this background that Mr. Crocombe made his remarks about having to accept recruitment from outside the railway (paragraph 45).

67. I have studied the selection procedures for potential signalmen and the syllabus for their basic training and I have no doubt that together they should ensure that the right kind of man is trained and that his basic knowledge is adequate. My only criticism of the basic training is that more emphasis could be given to the handling of emergency situations - failure of signalling equipment, accidents, obstructions on the line, etc. This is, of course, covered at present but much of the training is theoretical and I believe that only exposure to 'real' conditions, with the need for a rapid response, will give a trainee signalman confidence in dealing with such situations, or expose weaknesses in his knowledge or ability. I have discussed this at length with the Railway Officers and they accept the need for a greater emphasis on these aspects and are examining whether this could best be done by using a form of simulator, perhaps one or more centralised ones where trainee signalmen from all Regions could be trained, or by carrying out the training in actual working boxes.

68. Even with this additional training, I doubt whether a new signalman, even one as intelligent as Signalman Axtell, and however competent he appeared to be, would have gained sufficient experience to take charge of a box such as Gerrards Cross after only some 20 weeks of railway service. 'Experience' is difficult to define but it includes the kind of general knowledge of and feel for the railway environment which cannot be imparted in a training school. If potential signalmen have to be recruited from outside the railway, as I am told they will continue to be, then I recommend that they should spend some time, even if only a month or six weeks, receiving basic instruction in railway matters including, if possible, work in a signal box or at a station or depot before starting their formal signalling training. Having passed the basic signalling course, they should then spend sufficient time in the signal box in which they will be acting as signalmen, before being tested and authorised to take charge. The decision as to how long is 'sufficient' will vary with the signal box and with the individual trainee, but the decision should be taken formally by the Area Manager or his equivalent, based on reports by supervisors and his own knowledge and observation of the trainee at work under all conditions, including real or simulated emergency situations. The time spent under instruction in a signal box such as Gerrards Cross would, on this basis, probably need to be significantly longer than the six weeks spent there by Signalman Axtell.

Tree Cutting

69. In the light of the evidence given by the Regional Chief Civil Engineer and his representative, I discussed the allocation of resources to tree cutting and trimming with BR's Director of Civil Engineering. He confirmed that resources did not allow for any systematic or programmed clearing of vegetation on BR's 11,000 miles of railway and that this entailed a system of priorities, with the top priority always given to work required to ensure the safety of the line. It was his view that Regional Civil Engineers had sufficient money and resources to cover these priority tasks. Some of the tasks are obvious, such as trees obstructing the proper sighting of signals, whilst others demand a degree of foresight in anticipating the likely effects of extreme weather conditions or of continued growth. The trees in the Seer Green cutting came in this second category and events have shown that the potential danger in this case was not seen, and could probably not have been foreseen.

70. A factor which does not make the Engineer's task any easier is the outcry from preservationists which sometimes follows the clearing of vegetation from railway embankments. An example was the adverse press publicity given in local newspapers when trees, which were obstructing the signals and growing near the line, were cut back in the Portsmouth area during August 1982. A spokeswoman for the 'Friends of the Earth' was quoted as saying "Embankments are a valuable habitat for many species on the edge of extinction. This action (the clearing of trees by BR) is irresponsible".

Plans for the West Ruislip-High Wycombe area

71. The Railways Board have no plans for major resignalling or other alterations to the Marylebone to Banbury line. However, London Midland Region are developing plans which will simplify the track and signalling at Gerrards Cross. This, if approved by the Railways Board, will lead to the closure of Gerrards Cross Signal Box and the provision of additional track-circuiting and colour-light signals, mostly automatically operated, in place of the present semaphore signals. The line would be controlled from the existing signal boxes at West Ruislip and High Wycombe. I would welcome a scheme on these lines, especially if it enabled the Track Circuit Block system to be applied between West Ruislip and High Wycombe and thus remove the need for the present mixture of automatic and IB signalling.

Final Remarks

72. This was a tragic accident, involving as it did the deaths of a still-young driver and three promising young people, as well as serious injury to others and the mental anguish of relatives and friends and of those responsible for the accident. It was made more poignant by the fact that such accidents are now rare events. On average, over two million passenger journeys are made each day on British Railways and in four out of the past seven years not a single passenger died in a train accident. Rail travel is now safer than it has ever been and it is by a long way the safest form of land transport. This is not to say that there can be any complacency; accidents such as that at Seer Green can still happen and this Inquiry has shown some lack of proper supervision and the need for a tightening of some of BR's rules and procedures. But I do not believe that it has demonstrated any lack of a proper attention to safety on the part of BR's Management or has indicated any area, other than the continued replacement of outworn semaphore signalling by centralised colour-light signalling, where large additional investment in safety measures would be justified or cost effective.

I have the honour to be,

Sir,

Your obedient Servant,

C. F. ROSE

Major

The Permanent Secretary
Department of Transport

APPENDIX 1

Railway Inspectorate
Department of Transport
2 Marsham Street
London SW1P 3EB
31st January 1983

Sir,

I have the honour to report, for the information of the Secretary of State, that, in accordance with the Appointment dated 10th March 1982, I acted as Assessor to Her Majesty's Coroner for the County of Buckingham, South Buckinghamshire District, at the resumed Inquest into the deaths of the four persons who lost their lives as a result of the railway accident that occurred near Seer Green on 11th December 1981.

The resumed Inquest was held on 20th and 21st May 1982 and the Jury returned a verdict of Accidental Death in each case, a finding with which I was in full agreement.

I have the honour to be,

Sir,

Your obedient Servant

C. F. ROSE

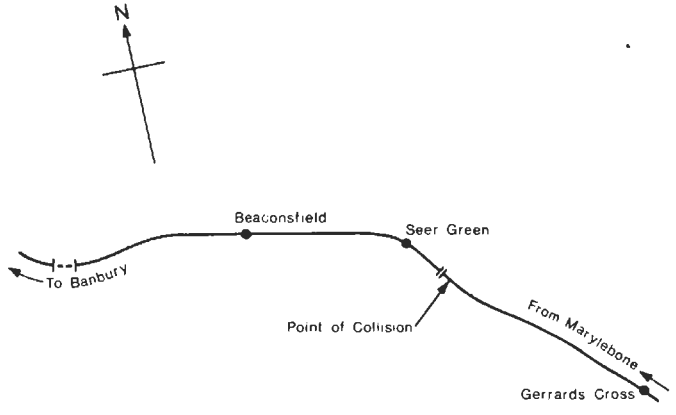
Major

The Permanent Secretary
Department of Transport

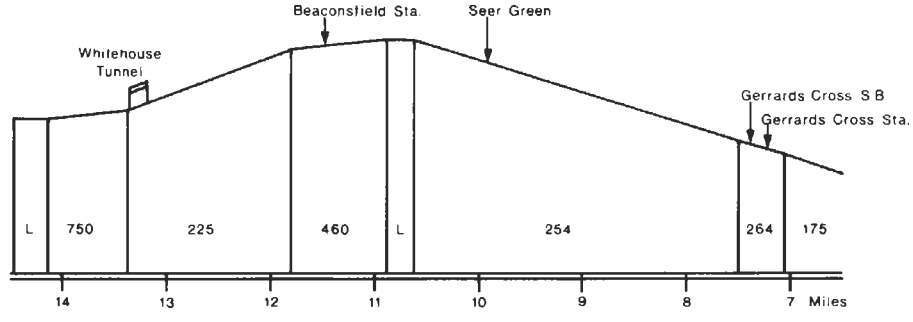
Printed in England for Her Majesty's Stationery Office
by Multiplex Techniques Ltd, St Mary Cray, Kent.
Dd 0736317 C10 2/83 398/1

FIGURE 1

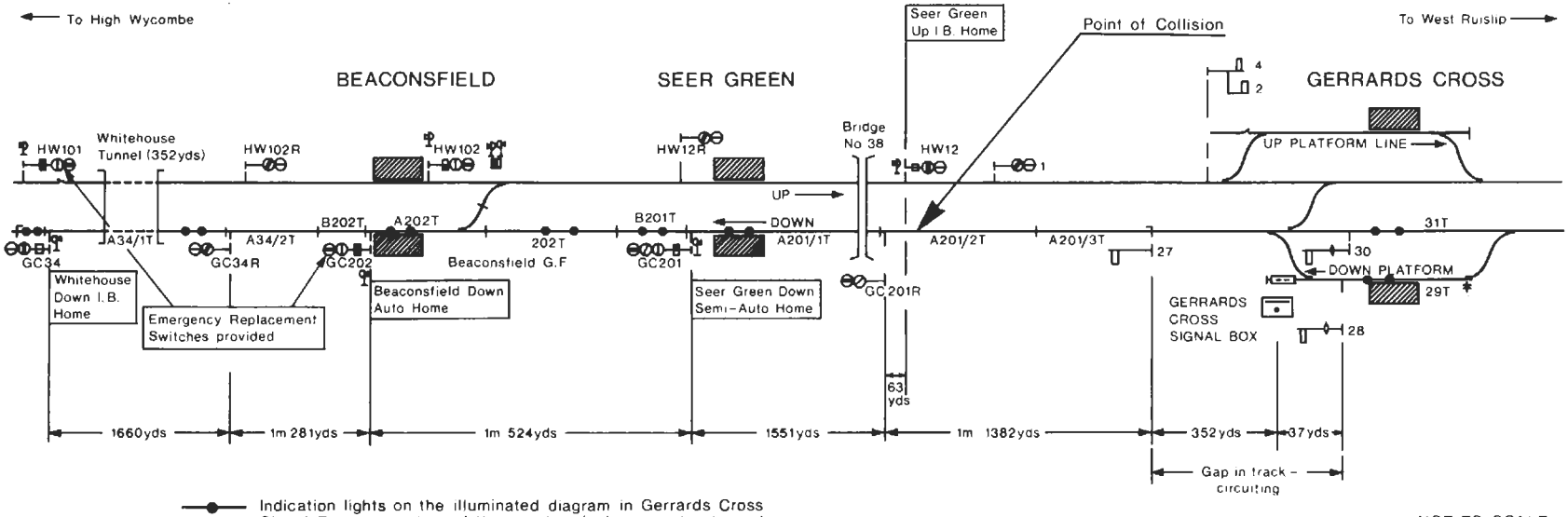
SEER GREEN: 5B61 0725 MARYLEBONE TO PRINCES RISBOROUGH AND 2B64 0731 MARYLEBONE TO BANBURY IN COLLISION: 11 DECEMBER 1981



LOCATION DIAGRAM



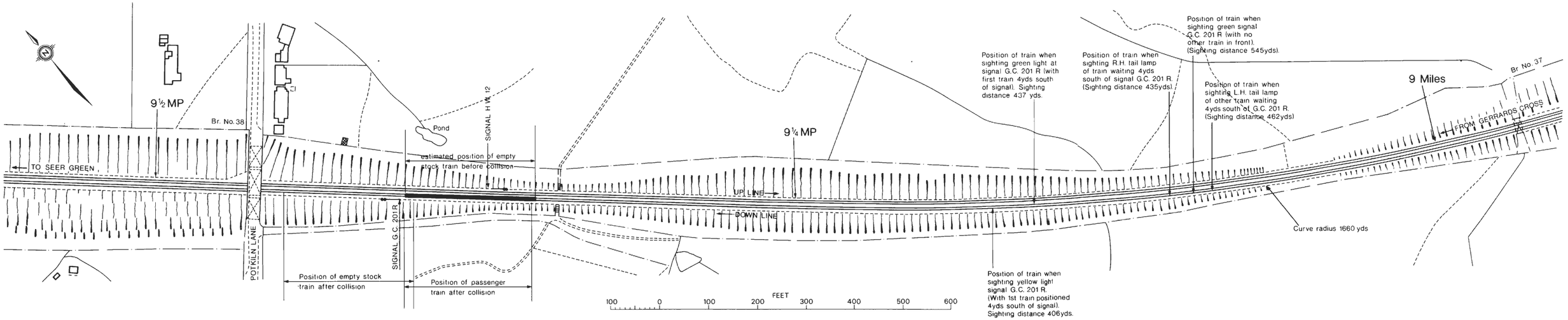
GRADIENT DIAGRAM



NOT TO SCALE

COLLISION NEAR SEER GREEN (LONDON MIDLAND REGION) ON 11 DECEMBER 1981

FIGURE 2



PLAN SHOWING THE POSITION OF THE TRAINS BEFORE AND AFTER THE COLLISION