GREAT WESTERN RAILWAY

Ministry of War Transport,
Berkeley Square House,
Berkeley Square,
London, W.1.

10th February, 1943.

Sir,

I have the honour to report for the information of the Minister of War Transport, in accordance with the Order dated the 13th November 1942, the result of my Inquiry into the accident, which occurred at about 1.45 a.m. on that day at the outlet from the Appleford Down Goods Loop, about one mile from Didcot, on the Didcot - Oxford Main line of the Great Western Railway.

The 2.30 p.m. freight train from Swindon to Bordesley, travelling at about 25 m.p.h. on the goods loop, overran the outlet signal at "Danger". The engine was derailed at the facing trap points and overturned clear, but the leading wagons piled up behind it and fouled the adjacent Down Main Line, on which the 12.0 midnight express passenger train from Paddington to Birkenhead was passing at about 45 m.p.h., under clear signals. The engine and the two leading vehicles of the passenger train fortunately got through before the Down Main was fouled, but the 9 following vehicles struck the derailed wagons; the resulting wreckage was exceptional, and blocked the two main lines and the Up Goods Loop, as well as the Down Goods Loop on which the freight train was running.

The leading 5 vehicles of the passenger train were vans, but there were some 200 passengers in the remaining 6 coaches, and I regret to report that a porter travelling on duty was killed, and one passenger died of his injuries later. Driver C.G. Forse and Fireman R.A. Jarvis of the freight train received fatal injuries when their engine overturned. In addition 16 passengers were injured and taken to hospital, of whom 5 were discharged the same day, and a further 3 subsequently complained of shock.

The first call for assistance was sent by the Appleford Crossing Signalman, who witnessed the accident. Rescue operations were promptly taken in hand by the Company's staff who arrived from Didcot within a few minutes, and much useful work was done by soldiers and airmen who were passengers in the express. Although the site is isolated, more than sufficient ambulances and medical staff from Didcot, Abingdon, Oxford, and Wallingford arrived between 2.30 and 3.0 a.m. and, with the exception of two passengers who were badly trapped, there was very little delay in removing the injured to hospital. It was a cold night, and mobile canteens of the Y.M.C.A. and the W.V.S. rendered valuable service in providing hot drinks.

The freight train comprised 72 wagons, unbraked and loose coupled, and a 16-ton brake van; the total weight behind the tender was approximately 770 tons. The engine was No. 3975 of the 4-6-0 two-cylinder passenger type; it was fitted with the vacuum brake on the coupled and tender wheels, and its weight in working order with tender was 112 tons. The total weight of the engine and train was thus about 882 tons, and the engine brake power was approximately 7½% of that weight. The total length was about 511 yards.

The 11 bogie vehicles of the express passenger train were all of modern construction with heavy steel underframes and bodies

framed in hard wood; their total weight was 330½ tons. The engine was No. 4088 of the Company's four-cylinder 4-6-0 "Castle" class, weighing 126½ tons in working order with tender. The combined weight was thus 457 tons, and the total length was 250 yards.

The engine of the freight train came to rest on its left hand side clear of the Down Main line, about 25 yards ahead of the trap point switches; it overturned on to fairly soft ground and, apart from the bogie frames and the cab superstructure, was not very seriously damaged. The sudden stoppage of the engine caused the leading wagons to pile up above and behind it in a compact mass of wreckage, with which 3 vans and 5 coaches of the passenger train came into violent sidelong collision; one wagon was actually thrown over the passenger train and came to rest upside down almost clear of the Up Main line. Altogether 17 wagons of the freight train were derailed, 13 of which were smashed beyond repair, and a further 10 suffered varying degrees of damage.

The driver of the passenger train was unaware of the collision until he felt the brake application which resulted from the parting of the train between the 5th and 6th vehicles. The engine and the 5 vans attached to it travelled about 300 yards after the collision, and were not derailed, but the bodies of the 3rd and 4th vehicles were severely damaged and that of the 5th was demolished. A gap of about 150 yards separated the front portion from the 6 passenger coaches, the first of which came to rest opposite to Appleford Crossing signal box, about 60 yards ahead of the trailing connection of the Down Goods Loop. The first 5 were derailed, but they remained coupled and practically in line, and there was no telescoping, although one was wholly and another partially overturned to the right. There was extensive damage to their bodywork, mainly on the left hand side, as well as to the bogies and under gear, but the 6th stopped almost clear, and was neither derailed nor seriously damaged.

There was considerable damage to the permanent way, and the task of clearing the lines was protracted on account of the extent and complexity of the wreckage. The Didcot breakdown vans started work about three hours after the accident at 4.40 a.m. and the heavy cranes from Banbury and Old Oak Common arrived at 6.30 a.m. and 6.50 a.m. respectively; they were supplemented at 9.50 p.m. by the heavy crane from Swindon. The breakdown gangs were organised in reliefs and the work proceeded continuously, with the result that the Up Main line was cleared for traffic at 2.50 p.m. on the following day, the 14th November, and the Down Main and the Up and Down loops were available two hours later. Normal working was then resumed on the two main lines after a lapse of 39 hours, but both the loops were occupied for some time afterwards for loading salvaged goods and wreckage.

The night of the accident was dark with no moon; the visibility was exceptionally good.

D E S C R I P T I O N

1. With reference to the attached line diagram, the Appleford Down Goods Loop lies immediately to the left of the Down Main line just beyond the northern apex of the Didcot triangular junction, and is approximately 1,250 yards long between fouling points. It was constructed (together with the Up Loop) as a work to facilitate wartime traffic, and was brought into use in October 1941, about 13 months before the accident.

2. Permissive working is in force over the loop between Didcot North Junction signal box in the apex of the triangle and Appleford Crossing box at the outlet; on this occasion, the loop

was clear. In accordance with the Company's Permissive Block Regulations goods running loops are subject to a general speed restriction of 10 m.p.h.; it is also laid down that "In all cases, irrespective of the state of the weather, Enginemen must regard the lowering of the signal to enter the loop only as an indication that the points are in a proper position, and must not expect that the road will be clear through the loop, and they will be held responsible for stopping their trains short of any obstruction which may be in front of them."

3. Didcot North Junction box controls the facing points and signals at the entrance to the loop, and the trailing connection and signals at the exit are worked by Appleford Crossing; the layout is such that a train from the Swindon direction can be admitted to the loop and proceed as far as the outlet signal, at the same time as a train from the London direction is signalled through on the Down Main, as occurred in this case. The facing trap points, at which the freight train was derailed, consist of a pair of switches and turnout rails; the lead rail in the four foot way terminates in a wood block covered with a steel plate, level with the inside of the cess rail. Owing to the level crossing 70 yards ahead of the trap point switches, there is no room for an effective sand drag.

In the construction of the Down Loop special care was taken to provide sufficient clearance for the Down Main and the Down Loop signals to be sited to the left of their respective lines. The curvature, however, for a train proceeding along the loop from the Swindon direction is continuously left-handed, which adversely affects the view of the signals from the driver's position on the right-hand side of the footplate, as is standard on the G.W.R.

4. With reference to the diagram, the engine of the freight train started from the point B, as nearly as can be determined, after attaching some wagons from the yard. The next signal applying to this train was the bracket signal C which controls the entrance to the loop, and whose left hand arm was lowered. I travelled on the footplate of a similar engine, and observed that, from the starting point, signal C was barely visible through the right hand cab window, clear of the front corner of the engine firebox, and from the fireman's side was masked by the twin posts of some nearby Up line signals. Onwards from the starting point, signal C is screened from the driver's view by the boiler, but is clearly visible from the fireman's side until it is passed.

Thereafter there are no further signals applicable to the loop until reaching the outlet signal D, which was at "Danger", but the bracket signal E, which controls the entrance to the loop from the Down Main, would come into the view of a driver proceeding into the loop from the Swindon direction, at about the same time as he lost sight of signal C, or a little after; he would subsequently see signal F, and then signal G, each at a range of about 500 yards. Owing to the left hand curvature, the loop outlet signal D is not visible from the driver's side of the footplate until the engine is about 220 yards from it, but it can be seen for about 1,000 yards from the fireman's side, although it is obscured from time to time by a heavy telegraph pole route on the left.

The left hand arm of signal C, for entering the loop, has a 4 ins. lens in its lamp, compared to the standard 6 ins. lens for main line signals. The outlet signal D also has a 4 ins. lens, and its arm carries a ring.

5. The gradient in the Down direction falls at 1 in 250 along the western side of the triangle as far as the entrance to the loop and a little beyond, thence easing to 1 in 327 (500 yards) and 1 in 2015 (600 yards) to the site of the accident.

6. The freight train, which was running several hours late, arrived at the Didcot North Junction West Curve home signal (signal A) at 12.56 a.m., according to the clock at the latter box, which was correct. The engine and 2 wagons were detached, went forward after signal A was lowered, and backed into the yard; after attaching 11 wagons and setting back on to its train, the engine was standing at point B on the diagram, approximately 80 yards ahead of signal A, and 400 yards in rear of signal C.

As soon as the train was ready to proceed, Signalman G.E. Membury, of Didcot North Junction box, decided to send it forward along the Down Loop so that it could be held at Appleford Crossing to await the passage of the 12.0 midnight Paddington - Birkenhead express. The latter train, which was running a few minutes late, was already due when Membury obtained "Line Clear" for the freight train along the Down Loop at 1.34 a.m., and lowered the left hand arm of signal C.

According to Membury, the freight train drew away slowly while the driver was exchanging hand signals with the guard, and began to accelerate in the normal way when the engine reached the loop facing points, about 100 yards ahead of the box. As the train entered the Loop he sent "Train Entering Section" at 1.39 a.m.; in the meantime he had lowered the Down Main signals for the express which had been accepted by Appleford Crossing at 1.38 a.m., and he was quite definite that the Down Main signal E had been lowered about a minute before the freight train passed it. He recorded 1.44 a.m. as the time at which the express passed his box, running at about 40 m.p.h. The above mentioned times are consistent with those recorded by Signalman W.J. Gough at Appleford Crossing, where the clock was 1 minute fast, and it may be concluded that the accident took place at approximately 1.45 a.m.

7. Gough had been on duty for about 3½ hours, during which time no previous train had been signalled along the Down Loop. After accepting the freight train, he maintained the outlet signal D at "Danger", intending to hold this train in the loop until the express had passed. He accepted the latter at 1.38 a.m. (booked 1.39) received "Line Clear" from the box ahead immediately after, and lowered all the Down Main signals, including the two distants. With regard to the few moments before the derailment and collision, Gough stated at the Company's inquiry:-

"I could see the headlights of a train approaching my box which to my mind should have been the goods train, but because of the rate it was approaching I thought it must be the passenger train. The headlights of the engine appeared to be too close together for "A" headlights, and I opened the window as I thought the glass might be deceiving me. I could then see it was the goods train and almost at the same time I saw the lights of the passenger train approaching on the Down Main line.

I realised the goods train would run through the catchpoints, when the crash took place, I immediately placed my signals to danger and sent the "Obstruction Danger" signal in both directions at 1.46 a.m."

He also said that he made a practice of verifying that the light of the outlet signal was burning properly before accepting a train on the loop, and he did so by observing the back light on this occasion. Evidence was also given by two independent witnesses that the lights of all the signals concerned were burning properly less than an hour after the accident.

Gough did not notice whether the freight train was running under steam, but the regulator of the overturned engine was found closed, with the vacuum brake fully applied; the reversing screw was in forward gear, at the 45% cut off position. There was no indication that sand had been used.

8. It appears that the express train was recovering speed after the 40 m.p.h. restriction at Didcot East Junction, and Driver P.G. Matthews' estimate of 45 m.p.h. at the time of the accident was probably fairly correct. Neither he nor his fireman, however, were able to give any further information beyond the fact that they remembered passing the goods train in the loop. Passenger Guard F. Davies, who is 65 years of age, with 51 years' service, had a narrow escape when his brake compartment was wrecked, and had some difficulty in extricating himself. In spite of this he arranged at once for the protection of the Down lines and telephoned to the Control Office; he subsequently performed much other useful work. The protection of the Up Main was also promptly dealt with.

9. The crew of the Bordesley freight train were Driver C.G. Forse, Fireman R.A. Jarvis, both of whom lost their lives in the accident, and Goods Guard L. Walker, who was uninjured. All three men were stationed at Didcot, and had previously worked a freight train from Didcot as far as Challow on the main line to Swindon. They arrived at Challow at 9.35 p.m. where they changed over with the crew of the Bordesley train and left Challow in the reverse direction at 10.40 p.m. Owing to signal delays, some 2¼ hours were occupied in covering the 11 miles to the Didcot West Curve, where the train was brought to a stand at the North Junction home signal at 12.56 a.m., as previously described.

10. Guard Walker was familiar with the route, and had often worked through the loop. After attaching the wagons from the yard he coupled them to the rest of the train and went back to his van, the verandah of which was at the rear. According to his statement, he was looking out from the left-hand side as the train started; he exchanged hand signals with the engine crew as the latter passed Didcot North Junction box, and he noted that the signal (C) was "off" to enter the loop, but paid no attention to any of the main line signals. Owing to the falling gradient he kept his hand brake on from the start in accordance with his normal practice, and screwed it on a little harder as the van entered the loop, where he thought the train was going slightly faster than usual.

Walker did not anticipate that there would be another train in the loop, as he could not see any tail lights ahead; he concluded that the driver would stop at the outlet signal, in which case he would have expected to feel a check from the engine brake application soon after the van had entered the loop. On this occasion, however, he did not notice any brake application from the engine until the van was midway along the loop, when he experienced quite an ordinary check, but it was followed by a surge forward and then a very sudden stop, which threw him from one end of the van to the other. Walker gave a clear description of the check, the forward surge and the final stop, all of which occupied some 3 or 4 seconds, and said that, so far as he could recollect, the express had just passed him. He did not see the outlet signal, which he suggested might have been obscured by steam from the engine, but he could not say whether the driver kept steam on all the way along the loop.

Walker had worked with Driver Forse once or twice before, although he did not know him well, and said that Forse appeared to be in good health on the night in question. He last spoke to him just before the start from Didcot North Junction when he gave him the load of the train.

11. Driver Forse and Fireman Jarvis had been 5¼ hours on duty at the time of the accident. Forse had been transferred to Didcot from Newport on his promotion to Driver in December 1941. He worked on shunting turns for some months and then proceeded to learn the road for main line duties in the Didcot area. He signed the "Knowledge of the Road" book on June 8th 1942, for working between Reading and Swindon via Didcot, and for the Didcot-Oxford line on July 28th 1942.

Since that date he had been allocated to "Zone Relief" duties, working freight trains from point to point as required within the area for whose knowledge he had signed. Previous to the accident he had worked freight trains from Didcot to Oxford in sole charge on ten occasions, and had twice been through the Appleford Down Goods Loop, viz. on the 8th August by day, and on the 17th September by night. He was 45 years of age, his general record of health was good, and he appeared to be normal in every way when he booked on duty. His sight was last tested 12 months before the accident and was found to be normal, including his colour vision.

12. With regard to the speed of the freight train, the wreckage of the Reading wagons suggested that this was not likely to have been much less than 25 m.p.h. at the point of derailment, which was nearly a mile from the start. A theoretical calculation showed that this degree of acceleration should have been well within the capacity of the engine, having regard to the falling gradient.

13. The driver and fireman whom Forse and Jarvis had relieved stated that engine No. 2976 was in good order throughout, and that the vacuum and hand brakes were working satisfactorily. Subsequent examination disclosed no defect which might have had any bearing on the accident.

C O N C L U S I O N

14. I am satisfied from the evidence that the loop outlet signal was at "Danger", and that its light was burning properly. There can be no doubt, therefore, that the sole cause of this regrettable accident was the failure of Driver Forse to obey this signal. Although the fact that he and Fireman Jarvis were killed precludes any direct evidence as to what happened on the footplate, it is possible to suggest a partial explanation of his failure.

In the majority of cases a train is admitted to a goods running loop in order to make way for traffic on the main line, and especially when the loop is comparatively short, as in this case, a driver may expect to be stopped at the outlet signal, if not behind a preceding train. For this reason the Permissive Regulations emphasize the necessity for caution, and prescribe a low limit of speed. Apart, however, from the Regulations, the speed which the Bordesley freight train had developed was quite inconsistent with the cautious approach to a signal at "Danger" which is ordinarily required with a heavy unbraked train, especially on a falling gradient. In these circumstances, it appears reasonable to assume that Forse must have been under the impression that he was running on the Down Main line, and that he accepted the Didcot North Junction and Appleford Crossing signals, which had been lowered for the Birkenhead express. It is more difficult to understand how he came to be mistaken in the first instance, for the simple directional indication which was displayed by signal C at the loop facing points admits of no confusion, and was correctly interpreted by Guard Walker.

From the actual starting point the view of this signal from the engine was not good, but about 50 yards further on it was

clearly visible from the left hand side of the footplate and remained so for more than 300 yards. It appears, however, that Forse, from momentary lack of concentration, or for other reasons which must remain unexplained, may have been satisfied, either from personal observation or from his fireman's assurance, that signal C was "off", without appreciating its directional significance. If this was the case, his unobstructed view of the Down Main bracket signal E a little later, with two full size green lights to the right and a subsidiary red light (for the loop) to the left, may have led him to suppose that there was a clear path for his train on the Down Main.

Once he had such an impression fixed in his mind, the clear Down Main signals F. & G. might well have confirmed it, despite the fact that they were on his wrong side and that he received no "clear" bell signal from the A.T.C. ramp. The position in which the engine controls were found suggests that he may have realised his disastrous mistake at the very last moment, as he was overtaken by the express train on his right hand side.

15. Forse was spoken of by his superiors as a reliable and trustworthy driver, and methodical in his ways. Some confirmation of this is afforded by his Engineman's Daily Record for the turn in question, in which the time of the departure of his train from Didcot North Junction, and its load, had already been entered neatly. He had a clear record, and his appointment to driver at the rather late age of 44 was accounted for by the fact that he left the Service in 1913, less than 2 years after his first appointment as cleaner, and did not rejoin it till 6 years later.

16. Jarvis was only just 18. Although he was described as one of the smarter of the young firemen stationed at Didcot, Forse could not expect from him the same degree of assistance in the observation of signals to which he would be entitled from a more experienced man.

REMARKS

17. I have no recommendation. The operating layout at the entrance to the loop is simple, flexible, and convenient, and all the Down Main and Down Loop signals are logically sited to the left of their respective lines; with the care in observation which is required by the continuous left hand curvature, their view from the footplate is satisfactory. The accident was clearly due to an unexplained and unusual failure of the human element under quite favourable conditions; it has some points of resemblance to those at Tiverton Junction in 1933, Langley in 1937, and Norton Fitzwarren in 1940, in all of which capable drivers appear to have misread simple signal indications at night.

18. I have no reason to doubt that Driver Forse had satisfied himself conscientiously as to his experience of this route from all its aspects when he signed for it on July 28th; since that date he had further opportunities of confirming his knowledge in daylight and darkness. The accident, however, is a reminder of the additional personal vigilance which is required of drivers by the present unavoidable shortage of experienced firemen, especially when the driver's position on the footplate is on the opposite side to that on which the signals are normally placed.

I have the honour to be,
Sir,
Your obedient Servant,

G.R.S. WILSON,

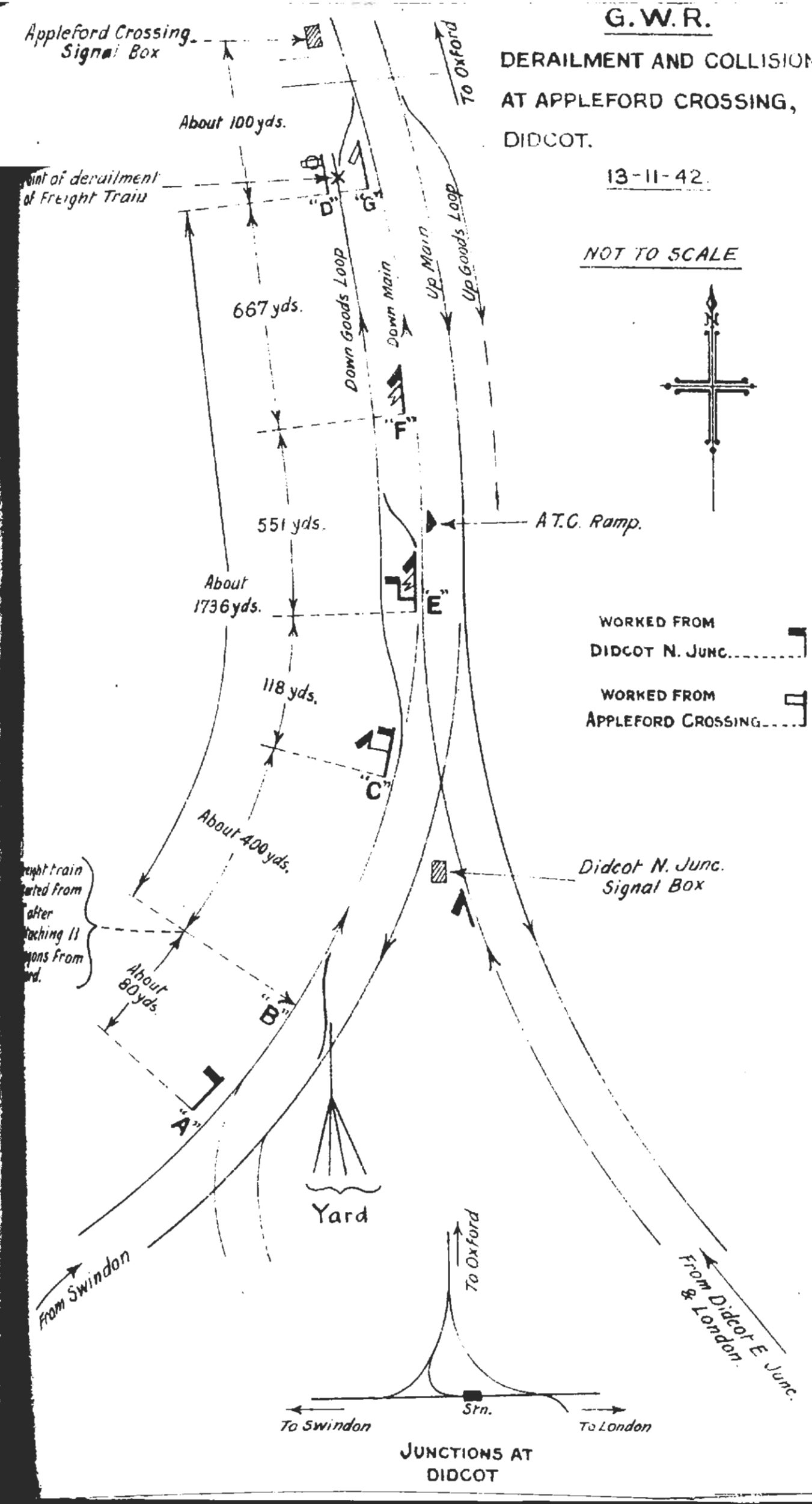
Major.

The Director General,
Ministry of War Transport.

G.W.R.

DERAILMENT AND COLLISION AT APPLEFORD CROSSING, DIDCOT.

13-11-42.



JUNCTIONS AT DIDCOT