MINISTRY OF TRANSPORT & CIVIL AVIATION

RAILWAY ACCIDENTS

REPORT ON THE COLLISION

which occurred on

30th January 1958

at

DAGENHAM EAST STATION

in the

EASTERN REGION

BRITISH RAILWAYS

LONDON : HER MAJESTY'S STATIONERY OFFICE

FOUR SHILLINGS NET

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PLANS

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Fig. 2. Plan of route—Barking East Junction to Dagenham East.

Fig. 3. Signal diagram of Down Through Line.

Fig. 4. Engine No. 80079—B.R. Standard Class 4.

Fig. 5. Height and position of Down Through Signals.

MINISTRY OF TRANSPORT AND CIVIL AVIATION,
Berkeley Square House,
London, W.1.

16th June, 1958.

SIR,

I have the honour to report for the information of the Minister of Transport and Civil Aviation, in accordance with the Order dated 31st January 1958, the result of my Inquiry into the collision which occurred at about 7.34 p.m. on the previous (Thursday) evening, 30th January, at Dagenham East Station on the Fenchurch Street–Southend line in the Eastern Region, British Railways.

In dense fog, the 6.35 p.m. 11-coach steam passenger train from Fenchurch Street to Shoeburyness, whilst travelling at about 25 m.p.h. on the Down Through line, ran into the rear of the 6.20 p.m. 11-coach steam passenger train from Fenchurch Street to Thorpe Bay which was moving slowly forward towards the Dagenham East Down Home signal.

The engine of the 6.35 p.m. train ploughed through the rear coach of the train ahead and demolished the guard's compartment and the last three of the seven passenger compartments. This coach and the next ahead were derailed, as was the engine and the leading coach of the overtaking train.

Each train was carrying about 500 passengers and I regret to report that 10 of them were killed ; 89 passengers and 4 railway servants were injured, of whom 72 were taken to hospital where 57 were detained.

Some wreckage was thrown on to the Up Local electric line where it was struck by a London Transport train. Fortunately this train was moving slowly and the driver stopped it before any serious damage was done. Prompt steps were taken to protect the Up and Down Through lines and current was cut off the local electric lines within a few minutes.

The noise of the collision was heard by the local residents who sent out 999 calls which reached the Ambulance Control Centre at Ilford and the Information Room at Scotland Yard almost immediately. The pre-arranged emergency plans were put into action at once and the first ambulance arrived on the scene within eight minutes ; it was quickly followed by a stream of others from different centres. Three local hospitals sent mobile medical teams headed by surgeons : fire brigades with special rescue appliances and lighting equipment came from several centres, and a large body of police were soon in attendance.

Valuable assistance was rendered by a number of voluntary organisations, and the people living in the vicinity gave much help and succour to the injured. The concerted efforts of all concerned resulted in the injured passengers receiving prompt aid and they were conveyed to hospital with the minimum of delay.

The railway services were speedily re-organised. Trains were diverted via Tilbury, a shuttle steam service was run between Upminster and Shoeburyness, and bus services were arranged between Barking and Upminster. At 9.35 p.m. electric current was restored on the local lines between Dagenham East and Upminster to enable a limited number of trains to run between these points, and normal working on these lines was resumed at 4.15 a.m. the next morning.

Breakdown trains arrived without delay, and the Up Through line was brought into use at 6.0 a.m. in time for the morning peak service, but when it was over this line was closed again at 10.0 a.m. for a short time to facilitate the clearance of the Down Through which was re-opened for traffic at 12.45 p.m., normal working being resumed on both lines at 2.0 p.m. after a stoppage of just over 18 hours.

It was a dark night and at the time of the accident the fog was so dense that visibility was reduced to between 10 and 20 yards.

I. DESCRIPTION OF THE TRAINS AND THE EFFECTS OF THE COLLISION

The trains

1. The 6.20 p.m. train from Fenchurch Street to Thorpe Bay (the 6.20 p.m. train) was drawn by a Class 4-P tank engine with 2-6-4 wheel arrangement, weighing 92 tons in working order. It was driven from the left hand side and it was running chimney first.

The 11 coaches were non-vestibule screw-coupled bogie stock, and all but two—the seventh and eighth—were of pre-war construction, having been built between 1924 and 1928. These old coaches had wooden bodies on steel underframes : the seventh, which was built in 1948, had a composite body on a steel underframe and the eighth, built in 1954, was of all-steel construction. The weight of the coaches was 291 tons, so that the total weight of the train was 383 tons. Its total length was 226 yards. The train was marshalled with a guard's brake compartment at each end. The steam brake operated on the engine and the vacuum brake on the coaches but they were off at the time of the collision.

2. The 6.35 p.m. from Fenchurch Street to Shoeburyness (the 6.35 p.m. train) was drawn by a B.R. standard Class 4 tank engine with 2-6-4 wheel arrangement, weighing 86½ tons in working order as illustrated by Fig. 4. It was driven from the left hand side and it was running bunker first so that the driving position was on the right hand side in the direction of travel.

The coaches were non-vestibule screw-coupled bogie stock, similar to those on the 6.20 p.m. train, and all of them were of pre-war construction with wooden bodies on steel underframes. The total weight of the engine and coaches was 369 tons, and the total length was 223 yards. This train also was marshalled with brake compartments at each end. The steam brake operated on the coupled wheels of the engines and the vacuum brake on all wheels of the coaches. The total brake pressure available on the train was 268 tons, equivalent to 72½ per cent of the total weight.

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Effects of the collision

3. Serious damage was confined to the last two coaches of the 6.20 p.m. train and to the engine of the 6.35 p.m. train which, as already mentioned, was travelling bunker first. The underframe of the rear coach of the first train was split open and the left hand sole bar pierced the bunker of the colliding engine, ran through the cab, and entered the side tank ; the right hand sole bar was twisted back on itself and the bogies which were torn from the underframe were pushed out towards the Up Local electric line.

Having broken open the underframe, the engine ploughed half way through the coach, demolishing the guard's compartment and the last three passenger compartments ; the next two were badly shattered as was the front of the coach which was driven into the rear of the one ahead, telescoping its last two compartments. The rest of the train suffered little damage, although some of the underframes and bodies were strained and a few axle boxes were broken.

In addition to the damage caused by the sole bar, the main frame of the 6.35 p.m. train engine was badly bent underneath the bunker which was torn on both sides. The buffer beam was broken and both buffers were torn off. There was other superficial damage but the bunker itself withstood the shock of the collision and protected the enginemen from serious injury. The leading coach of this train was derailed and other damage was confined to axle boxes, 18 of which were broken.

4. The Down Through line was destroyed for sixty yards and there was minor damage to signalling equipment. Some wreckage including a door from the guard's compartment was scattered over the Up Local electric line and one of the engine buffers was thrown into the 6 ft. way between this line and the Down Local line.

II. The Site

5. As will be seen from Fig. 1 of the accompanying drawing, the main line from Fenchurch Street to Southend runs generally in an easterly direction.

At Bromley the electric lines carrying London Transport trains converge on the main lines and run parallel to them as far as Upminster. Half a mile to the west of Barking the double line from St. Pancras joins the main line and at the other end of the station the Tilbury line turns off to the south and eventually rejoins the main line at Pitsea. After Barking the Down main line runs through a number of stations including Dagenham East, Hornchurch, Upminster and Pitsea to Southend, Thorpe Bay and Shoeburyness. With reference to Fig. 2, between Barking (7½ miles from Fenchurch Street) and Dagenham East (11½ miles), there are four lines of track known as the Down Local, Up Local, Down Through, and Up Through, in that order from north to south. The local lines are separated from the through lines by a wide space of about 12 to 13 ft. which increases to over 24 ft. near Dagenham East where a siding is accommodated between the Up Local and Down Through lines at the west end of the station. At the point of collision the space was about 17 ft. wide.

6. The local lines which carry the London Transport trains are equipped for operating on the fourth rail electrified system, but the through lines are for steam trains only. They are connected to the local lines at Barking and Dagenham East so that steam trains can be diverted to the local lines when necessary. The stations at Upney and Dagenham Heathway are only served by the local lines.

7. The gradients between Barking and Dagenham East are negligible and the line is practically straight. The country is flat with housing estates and some factories on each side for most of the way, and at the scene of the accident the lines are in a shallow cutting.

III. The Signalling

General

8. Four-aspect colour light signals are in use from Fenchurch Street to Campbell Road Junction (3 miles from Fenchurch Street), after which the through steam lines are equipped with semaphore signals and the Hudd system of automatic train control (A.T.C.) operating at the distant signals. The local electric lines from Bromley to Upminster have two and three-aspect colour light signals with a train stop at every stop signal in accordance with London Transport practice.

9. Traffic is heavy and during a recent 24-hour period the signalman at Barking East handled 701 trains of all descriptions including steam and electric passenger, freight and ballast trains, and during the same period the Dagenham East signalman handled 513 trains. The number of trains dealt with at these boxes during the morning and evening peaks is :—

	Steam		*Electric*	
	Up	*Down*	*Up*	*Down*
Barking East				
Morning, 6.45 a.m. to 9.45 a.m.	37	22	44	37
Evening, 4.15 p.m. to 7.15 p.m.	21	31	35	48
Dagenham East				
Morning, 6.45 a.m. to 9.45 a.m.	26	10	44	37
Evening, 4.15 p.m. to 7.15 p.m.	11	23	35	48

10. Absolute block working is in operation on the Through lines with 3-wire, 3-indication London Midland type block instruments and Class C controls, subject to certain exceptions given below. Under this system " line clear " cannot be given unless the home signal lever is normal, the distant signal arm is at caution and the home berth track circuit is clear ; also the starting signal, or at some boxes the intermediate block home signal, is released electrically by " line clear " from the box ahead for one pull only. Interlocking between successive stop signals worked from the same box ensures that none can be cleared unless the next ahead of it has been restored to danger. Particulars of these and other relevant controls are given in the description of the respective signal boxes.

The Hudd A.T.C. system

11. The Hudd A.T.C. system consists of :—

(*a*) a permanent inductor and an electro-inductor which are installed in the " 4-ft. way " about 10 to 15 yards apart and about 200 yards on the approach side of the distant, but not the inner distant, signal ;

(*b*) the engine equipment, comprising a receiver, horn, brake valve, cancelling device and indicator.

With the distant signal at clear, the horn sounds when the engine receiver passes over the permanent inductor and it stops when the receiver is restored to normal by the energised electro-inductor.

With the distant signal at caution the electro-inductor is not energised ; the horn continues to sound and after about four seconds the brake is applied. Normally, however, the driver acknowledges the warning by pulling the cancelling handle ; this action restores the receiver to normal, stops the horn and re-creates the vacuum, thus releasing the brakes if applied and allowing the driver to take control of the train. An indicator above the cancelling handle displays an all-black aspect which changes to black and yellow when the handle is pulled, thus reminding the driver that he has cancelled a warning indication. It is restored to all-black when the engine passes over the next permanent inductor.

Signalling between Barking East and Dagenham East

12. The signalling on the Down Through line between Barking East and Dagenham East is shown diagrammatically by Fig. 3 and the heights and positions of relevant signals are shown by Fig. 5. Upney and Becontree signal boxes are block posts only and they are switched out when traffic is slack ; the crossover at Becontree is only used in emergency or in connection with the new electrification works. Details of the Down line controls at these boxes and at Dagenham East are given below but the controls at Barking East which are not relevant to this Inquiry are not described.

Upney

13. Upney box is a small ground level cabin with a frame of eight working levers, including two detonator placers. It is alongside the Up Through line and just on the London side of the overbridge.

No. 6 starting signal lever is released electrically, for one pull only, by " line clear " from Becontree, or from Dagenham East when Becontree is switched out. No. 7 home signal lever is locked in the normal position until " line clear " has been received, or until T.C.5511 is occupied and it cannot be released unless No. 6 lever is normal. The track circuit begins at a point 299 yards on the approach side of the home signal and extends up to the starting signal ; when occupied it places and/or maintains the Down Through block at " train on line ". Occupation of this track circuit also sounds an audible warning in the box for 10 seconds if the home signal lever is normal. The home signal lever must be normal and electrically locked before " line clear " can be given to Barking East.

Thus these controls ensure that a train cannot be accepted from Barking East until the previous train has cleared the track circuit and the home signal has been replaced to normal ; also that a second train cannot be allowed up to the starting signal until that signal has been replaced to danger behind the previous train.

The distant signal arm does not control the block but a red light is displayed on the block instrument if the arm is off or not properly at caution when the lever is normal ; the position of the signal arm is also shown on an indicator fixed to the instrument panel.

14. The normal hours of opening of this box are :—

Mondays to Fridays	7.15 a.m. to 9.45 a.m.
	4.15 p.m. to 7.15 p.m.
Saturdays	7.15 a.m. to 9.45 a.m.
	12.15 p.m. to 3.0 p.m.

The work is covered by two porter-signalmen whose normal hours of duty are 6.0 a.m. to 2.0 p.m. and 4.0 p.m. to midnight ; they are employed on other duties such as attending to signal lamps and working at the station when not in the signal box.

Becontree

15. Becontree box is also a small ground level cabin on the Up side of the line and it has a frame of 10 working levers. There are no independent detonator placers but co-acting detonators work in conjunction with the Down home, Down intermediate block (I.B.) home and Up home signals. The I.B. home is sometimes called the Heathway I.B. home.

No. 5 Down I.B. home signal lever is locked normal until track circuit C is clear and a " line clear " release, for one pull only, has been received from Dagenham East. No. 9 Down home signal lever is locked normal until track circuits F, B and C are clear and either the arms of No. 5 I.B. home and its distant signal No. 6 are normal or a " line clear " has been received from Dagenham East.

Berth track circuit A when occupied places or maintains the Down block instrument at " train on line ", and a " line clear " cannot be given to Upney, or Barking East when Upney is closed, unless No. 9 home signal lever and No. 10 distant signal arm and lever are normal. Occupation of the berth track circuit also sounds an audible warning similar to that at Upney. It will be noted that at this box a " line clear " can be given when the previous train is running up to the I.B. home signal, provided berth track circuit A is clear and Nos. 9 and 10 signals have been restored to normal behind the train.

No. 5 I.B. home signal is equipped with co-acting detonators which are placed on the rail when the lever is normal, and a " train running away " warning bell is sounded in the cabin if track circuit C is occupied with the lever normal.

16. The normal hours of opening of this box are :—

Mondays to Fridays	6.10 a.m. to 11.15 a.m. 4.0 p.m. to 9.50 p.m.
Saturdays	6.10 a.m. to 4.45 p.m.

The work is covered by two porter-signalmen whose hours of duty are 6.0 a.m. to 2.0 p.m. and 2.0 p.m. to 10.0 p.m. ; they are employed like the Upney men on other duties such as attending to signal lamps and working at the station when not in the signal box. On the day of the accident only one man was available and his hours of duty were from 7.0 a.m. to 7.0 p.m.

Dagenham East

17. This box is situated in the middle of the island platform and it contains a frame of 58 working levers including 2 detonator placers, and 17 spares. It controls movements on the local as well as on the through lines. The local line colour light running signals are semi-automatic, and the levers can therefore be left off when trains are running normally and no shunting movements or diversions are required.

The only signals to which reference need be made are those on the Down Through lines, namely :—

No. 34 Down Through ..	I.B. home, known as the River Rom I.B. home.
No. 33 Down Through ..	Starting signal, with the automatic distant signal for No. 34 under it.
No. 31 Down Through ..	Second home signal.
No. 30 Down Through ..	First home signal.
No. 29 Down Through ..	Distant signal, which is on the same post and underneath Becontree No. 5 I.B. home.

No. 34 lever is released by " line clear " from Hornchurch.

No. 33 lever cannot be released until track circuits 5487 and 5489 are clear, No. 34 lever is normal, and either a " line clear " release has been obtained from Hornchurch or else the arms of No. 34 and its distant signal are normal.

No. 31 lever cannot be released unless track circuit 5610 is clear, No. 33 signal lever is normal, and either its arm is normal or the controls on this signal are clear.

No. 30 lever cannot be released unless track circuits A and 5485 are clear, No. 31 lever is normal, and either the controls on Nos. 31 and 33 levers are clear or track circuit 5483 is occupied.

No. 29 distant signal lever is released in the normal way by Nos. 30, 31 and 33 signal levers being reversed.

The Down block instrument is placed or maintained at " train on line " by the occupation of berth track circuit 5483, and a " line clear " cannot be given to Becontree unless this track circuit is clear and No. 30 signal lever is normal ; occupation of the track circuit sounds a warning similar to that at Upney and Becontree. It will be seen from this that although a train can be accepted up to the first home signal whilst the previous train is standing in the station, it cannot be given a clear run with No. 29 distant signal off until the previous train has passed the River Rom I.B. home and Nos. 30, 31 and 33 signals have been replaced and cleared again. A " train running away on right line " warning is operated by a treadle when signal No. 34 is passed at danger. This signal is also equipped with co-acting detonators.

The distant signal arm does not control the block, but, as at Upney, a red light is displayed on the block instrument if the arm is off or not properly at caution when the lever is normal.

This box is open continuously.

Switching-out procedure

18. As already mentioned, both Upney and Becontree boxes are closed for part of each day, and each box is provided with a special switch to enable it to be opened and closed as required. The rules governing the closing procedure, which alone are relevant, are given in Regulation 24(*e*)–(*j*) of the Absolute Block Regulations of the London, Midland and Scottish Railway which remained in force when the London, Tilbury and Southend line was taken on by the Eastern Region in 1949. These rules differ in a marked degree from the rules of the rest of the Eastern Region in that they permit of a box being closed when a train has been accepted from the box in rear or is " on line ", instead of prohibiting closure until there are no trains in the section.

19. At Upney and Becontree the box may be closed

(*a*) when there are no trains in section, *or*

(*b*) when a train is accepted from the box in rear, *provided* that the " is line clear ? " signal is sent to and acknowledged by the signalman in advance who must peg his block instrument to " line clear ", *or*

(*c*) when the train is " on line " from the box in rear, *provided* that in addition to (*b*) the " train entering section " signal is sent to and acknowledged by the signalman in advance who must peg his block instrument to " train on line ".

At these signal boxes, where the starting signal (or I.B. home) is released by " line clear " from the box in advance, the box must not be switched out with a train in the forward section until the " train out of section " signal has been received from the box in advance. Nor in the case of Becontree must the box be closed after a train has cleared the Down home signal.

When there are no trains in section, i.e. case (*a*) above, the signalman in the closing box must where sequential locking is in force, as at Upney and Becontree, take off the home signal and then obtain a line clear release by sending the special bell signal " place block indicator to ' line clear ' to release lock on signal " (3-3-3). When he has taken off the controlling signal (starter or I.B. home) he must send the special bell signal " signal taken off, replace block indicator to normal position " (4-1-3).

As soon as the signals described above or those for case (*b*) or case (*c*) have been sent and acknowledged, the closing signal (7-5-5) is sent to and must be acknowledged by the boxes on either side. After this the signalman at the closing box switches out by turning the switch in a clockwise direction through 180° to the closed position. The signalmen on either side then send to each other the bell signal " testing section switched through " (3-2-1) to ensure that communication has been established between them, and the signalman at the closing box checks this by telephoning to them. Finally he takes off all the remaining running signals and closes the signal box.

20. The turning of the closing switch cuts out of circuit the closing box's block instruments and bells, and connects the block instruments and bells of the box in advance with those of the box in rear. The effect of this is to place the appropriate block instrument of the box in rear in phase with its controlling instrument in the box in advance. Thus if the block instrument in advance is at " line clear " the instrument in rear will also be turned to " line clear " irrespective of the position of its needle. From this it will be appreciated how important it is that the signalman in the closing box repeats to the box in advance the *last* signal received from the box in rear and ensures that both block instruments for that line are showing the same indication before he turns his closing switch.

For example, if the signalman at the closing box having a train " on line " from the box in rear only obtains " line clear " from the box in advance, the block instrument of that box will remain at " line clear " when the middle box is closed, and with the turning of the closing switch the " line clear " indication will be given to the box in rear where the needle on the block instrument will be turned from " train on line " to " line clear " without any action by either signalman. This wrong " line clear " will release the electrical lock on the starting signal of the box in rear and thus allow this signal to be taken off before the train which is " on line " has cleared the section.

Tests carried out in my presence at Becontree on 4th February proved conclusively that this wrong " line clear " could be transferred to Upney from the Dagenham East block instrument, irrespective of the occupation of any of the Becontree track circuits and without the Dagenham East signalman realising that anything was amiss.

Extract from Rules

21. Extracts from the relevant rules for working trains during fog are given in Appendix A and are summarised below :—

(i) A signalman who requires to stop an approaching train must not only keep his signals at danger but where practicable place a detonator on the rail ; where emergency detonator placers are provided they must always be used (Rule 94).

(ii) A signalman must not allow a train to draw forward to a stop signal where it would be out of his sight to await acceptance into the section ahead unless a track circuit or other apparatus is provided, so that he can be reminded of the position of the train (Rule 39(*b*)).

(iii) In no circumstances must a train be allowed to draw forward to await acceptance at the signal controlling the entrance to the section ahead unless the signalman can satisfy himself by repeaters or other means that the signal arm and light are properly at danger. (Rule 39(*b*) and Rule 65).

(iv) When a stop signal is at danger the stop signal next in rear of it and worked from the same box must not be lowered for an approaching train until the train is close to such signal and has been brought quite or nearly to a stand (Rule 39(*a*)). *Note.*—This rule also applies to working in clear weather.

IV. Summary of Events

The weather

22. On the evening of the accident fog covered the area served by the London, Tilbury and Southend line. It was not static, and it was variously described as " moving ", " swirling ", and " rolling ", but the evidence shows that it was more dense at the scene of the accident than elsewhere. Estimates of visibility varied between nil and 50 yards but the consensus of opinion gave a figure of about 10 yards. At Upney and Becontree conditions were not much better and the visibility there was between 10 and 20 yards ; conditions improved a little later in the night and I found that I could see the lights on the Dagenham home signal and the Upney starting signal from a range of 80 yards when I tested them between 1.0 a.m. and 2.0 a.m. in company with Mr. Beirne (see para. 52).

Running of the trains

23. The bad weather adversely affected train running, and the Down trains at the end of the evening peak were leaving Fenchurch Street about ten minutes late. They were running a good deal slower than usual, largely on account of the drivers receiving A.T.C. caution warnings at a number of the distant signals and thereafter " feeling " their way forward to the next stop signals. On the other hand, the indications at the A.T.C. inductors were of great assistance in enabling the enginemen to locate their positions accurately in spite of the weather and drive with more confidence and safety than they would have done otherwise. Consequently the signalmen were managing to get the traffic through without excessive delay.

Some particulars of the last six Down trains on the Southend line are given in Table 1, from which it will be seen that they left Fenchurch Street between 5 and 11 minutes late and they ran very consistently as far as Barking East where they were from 29 to 31 minutes late. After this the 6.15 p.m. train was stopped outside Dagenham East station for several minutes, and the 6.20 p.m. train ran very slowly losing a further 17 minutes on the 3½ mile journey from Barking East to the point of collision. The 6.35 p.m. train, on the other hand, only lost a further eight minutes in spite of being stopped at the Upney home signal for at least a minute.

Table 1

Running of Down steam trains on evening of 30th January

Departure from Fenchurch Street			Actual passing time. Barking East		Actual passing time. Dagenham East	
Booked p.m.	Actual p.m.	Mins. late	p.m.	Mins. late	p.m.	Mins. late
5.52	6.03	11	6.43	30	6.58	38
6.3	6.12	9	6.53	31	7.05	37
6.10	6.21	11	6.59	30	7.14	39
6.15	6.23	8	7.03	29	7.24 (*a*)	44
6.20	6.30	10	7.12	31	7.34 (*b*)	48
6.35	6.40	5	7.21	29	7.34 (*c*)	37

(*a*) Stopped at home signal for about 4 minutes.

(*b*) Time of collision ; passing time would have been about 1 minute later.

(*c*) Time of collision ; passing time would have been about 1 minute later.

24. Table 2 gives a detailed time-table of the movements of the 6.20 p.m. and 6.35 p.m. trains between Barking East and the point of collision. It is based on consideration of the enginemen's evidence and on an analysis of the train registers which give the following key times :—

7.14 p.m. .. .. .. 6.20 p.m. train passed Barking East I.B. home.
7.21 p.m. .. .. .. 6.35 p.m. train passed Barking East I.B. home.
7.24 p.m. .. .. .. 6.20 p.m. train accepted by Dagenham from Becontree.
7.34 p.m. .. .. .. Collision.

Although it is always difficult to achieve a high degree of accuracy in these circumstances, it is thought that the times in this table are correct to about one minute.

Table 2

Approximate time-table of the 6.20 p.m. and 6.35 p.m. trains between Barking East and Dagenham East

Place	Point to Point Distances	6.20 p.m. train		6.35 p.m. train	
	yards	Time p.m.	Av. speed m.p.h.	Time p.m.	Av. speed m.p.h.
Barking East I.B. Home		7.14	8	7.21	8
Upney Home	686	7.17½		arr. 7.24	
			6	dep. 7.25	
Upney Starter passed	378			7.27	
Upney rear of train cleared	224	7.21 (rear of train)	8		6
Becontree Distant A.T.C. inductor	216	7.22		7.29½	
					14
Becontree Distant signal	205			7.30	
Becontree I.B. Distant A.T.C. inductor	495	7.24	12		
Becontree Home / Becontree I.B. Distant	205	7.24½			
Dagenham East Distant A.T.C. inductor	1213	7.28			25
Becontree I.B. Home / Dagenham East Distant	206	7.29			
Collision (engine of 6.35 p.m. train)..	996		8	7.34	
(engine of 6.20 p.m. train)..	224	7.34			

Notes (*a*) Times are approximate passing times of the engine except where otherwise stated.

(*b*) The 6.20 p.m. train had a clear indication at the A.T.C. inductor on the approach to the Becontree Distant signal, and caution indications on the approach to the Becontree I.B. Distant and Dagenham East Distant signals.

(*c*) The 6.35 p.m. train had a clear indication at the A.T.C. inductors on the approach to the Becontree Distant, Becontree I.B. Distant and Dagenham East Distant signals.

The position at the signal boxes

25. Owing to the late running of the trains, Upney box did not close at 7.15 p.m. and Porter Signalman A. Tinson was still in charge. This was quite normal in the circumstances because the box is kept open so long as traffic warrants its use.

At Becontree, only Porter Signalman M. Sass was available for duty because the other man had left ten days previously to take up another appointment and his successor had not yet been appointed. Consequently Sass was booked to work a 12-hour day from 7.0 a.m. to 7.0 p.m. in order to cover the morning and evening peak periods of traffic. He was expected to work in the signal box from 7.0 a.m. to 11.15 a.m. and again from 4.0 p.m. to 6.50 p.m. which normally covered the peak service. During the intervening period of the day he was rostered to attend to the signal lamps and to carry out porter's duties at Becontree station. On the evening of the accident, however, the peak traffic was running late, and Sass was unable to close the box until about 7.24 p.m. during the passage of the 6.20 p.m. train from Upney to Dagenham East.

Barking East and Dagenham East, which are open continuously, were working normally, though at Dagenham East some trouble had been experienced earlier in lowering the Down Through distant signal arm, and Lineman H. McKinlay had been called out to attend to it. He was standing beside the signal post when both the 6.20 p.m. and 6.35 p.m. trains passed.

Train Registers

26. Extracts from the train register books at Barking East, Upney, Becontree and Dagenham East are given in Appendix B. They show the movements of the last six Down Through trains. As will be described later, the entries for the 6.10, 6.15 and 6.20 p.m. trains were not recorded in the Becontree register, but on the morning after the accident Porter Signalman Sass handed in a slip of paper purporting to show the times of the messages exchanged with Upney. There is, however, no record of the signals exchanged between Becontree and Dagenham East regarding these trains.

The entries are generally consistent except that the Becontree timings are on the average about two minutes earlier than those shown at Upney and Dagenham East.

The only Up trains to which reference need be made are the 6.10 p.m. train from Shoeburyness to Fenchurch Street and London Transport train No. 35. It is estimated from the train register timings that the former passed Dagenham East signal box at 7.28 p.m., Becontree box (already closed) at 7.31 p.m., and Upney box at 7.34 p.m. The London Transport train left Dagenham at 7.32 p.m. on the Up Local line and ran into the wreckage from the collision about two minutes later, from which it can be concluded that the accident occurred not later than 7.34 p.m.

V. The Evidence

27. There was a conflict of evidence between the enginemen of the 6.35 p.m. train and the Upney signalman regarding the aspect of the Upney starting signal. The former stated that it was clear when they travelled slowly past it after the delay at the home signal; the latter was equally sure that the signal was at danger. This signal should have been locked at danger by the Upney forward section Down block instrument standing at "train on line" for the 6.20 p.m. train, but as Becontree box was being closed during the passage of this train towards Dagenham East, the possibility of a wrong "line clear" indication having been given to Upney box cannot be ignored. Much of the evidence which follows was elicited in an endeavour to clarify this aspect of the case.

Signalmen's evidence

28. Porter Signalman A. Tinson came on duty at Upney at 4.0 p.m., having signed off duty at midnight, and he opened the signal box at 4.17 p.m. He is 45 years old with 12 years' railway service, and he has been in his present grade for the last 2½ years. He said that the visibility was about 20–25 yards, but it deteriorated after dark until he could scarcely see the electric trains on the Up Local line only 12 yards away; they went by "like a haze of faint lights." The Down home signal arm was not visible from his box and every time a train passed he walked out to see that it had returned properly to danger.

The 6.15 p.m. train went through Upney under clear signals, although Tinson thought that it was checked by the distant signal at caution. He gave "out of section" as soon as the train was off the track circuit and he immediately accepted the 6.20 p.m. at 7.11 p.m. He received the entering signal at 7.14 p.m. and he thought that this train also was checked at the distant signal because he did not get it accepted by Becontree until 7.16 p.m., having first offered it a minute earlier. Tinson thought that the reason for the refusal was that the Becontree signalman, Sass, wished to close the box. Tinson knew that Sass had been on duty over 12 hours and he was therefore expecting him to close, although he (Tinson) denied speaking to him about it.

Tinson said that he gave "train entering section" to Becontree at 7.17 p.m. as soon as the 6.20 p.m. train reached the berth track circuit. It passed his box so slowly that he thought the driver had "lost his way". He watched it go by in order to see that the tail lamp was alight and then he put the home signal back to danger and owing to the fog he pulled the detonator placer lever to give further protection. The 6.20 p.m. train cleared the track circuit at 7.21 p.m. and Tinson immediately replaced the starting signal to danger, gave "train out of section" to Barking East and promptly accepted the 6.35 p.m. train. He thought that this train must have been at the Barking East I.B. home when he accepted it because he got the "train entering section" signal at the same time. Two minutes later the train reached the track circuit, and it stopped at the home signal which he had kept at danger in order to carry out Rule 39 (*a*) because he had not yet been able to obtain "line clear" and hence the starting signal was still at danger. After holding the train for about one to two minutes he took off the home signal to enable the driver to draw up to the starting signal at danger.

29. Meanwhile, Becontree box had closed. First of all Tinson stated that this took place whilst the 6.35 p.m. train was standing at the home signal, but later in his examination he said that the box was switched out before the train arrived at this signal. He described how he had given Sass a " line clear " on the Up line to enable him to clear his Up starter, and when he received the 4-1-3 signal he turned his Up block instrument back to " line blocked ". After receiving the closing signal (7-5-5) he exchanged signals with Signalman Andrews at Dagenham East to check that communication was through correctly and he spoke to both the signalmen in accordance with the regulations. Tinson was quite positive that the needle of the Down block instrument remained at " train on line " the whole time. He booked the time of closing Becontree box at 7.25 p.m.

30. Tinson's attention was drawn to the entry in his train register of the time of arrival of the 6.35 p.m. train. Microscopic examination showed that the figure of 7.23 had been written originally with a Biro type pencil and that it had been changed to 7.25 with the same pencil. The figures were gone over so heavily that the entry stood out from all others. Tinson denied that he had altered the figures but he said that he had made them stand out after he heard about the collision because he attached great importance to that entry which was the arrival time of the train at his home signal, which was the last place where the train had stopped.

31. Continuing his evidence, Tinson said that about a minute after the 6.35 p.m. train started he accepted the 6.10 p.m. Up train from Dagenham East. After this he returned to the door of the signal box and spoke to the guard of the 6.35 p.m. train as the rear coach slowly passed his box. The guard called out " Are all the boxes in ? ", to which Tinson replied " No, Becontree is switched." As soon as the train had passed, he replaced the home signal and again pulled the detonator placer. At 7.29 p.m. he received " train entering section " for the Up train and he at once obtained an acceptance for it from Barking East. He took off all the Up signals, after which he went outside the box to relieve himself.

He did not notice the position of the Down track circuit indicator at that time but when he returned two minutes later he was completely surprised and shocked to see that it was clear. The starting signal arm repeater was showing " on " and the light repeater " in ". He was so taken aback that he did not believe at first that the train could have passed the starter at danger, so instead of sending the " train running away on right line " signal (4-5-5) he telephoned to Andrews at Dagenham East. Tinson was not quite sure what he said but thought it was " *I have good reason to believe this Down train has passed my starter.*" Having given the message he rushed out of the box at about 7.31 or 7.32 p.m. and ran along the Down line in the forlorn hope that he might see the tail light of the train. He said that he ran about 30 or 40 yards down the line, and not seeing anything he returned to the signal box but he was delayed by the passage of the Up train. As soon as it was clear he entered the cabin and sent the 4-5-5 signal to Dagenham East for the runaway train and " train entering section " to Barking East for the Up train. Dagenham East acknowledged his signal by sending " obstruction danger ". Tinson booked the time of the Up train entry as 7.34 p.m. but the 4-5-5 signal as 7.36 p.m. He admitted that he agreed this time with Signalman Andrews.

32. Tinson was examined and cross-examined for several hours about his actions, and his accounts were generally consistent. He admitted his error in accentuating the vital entry for the time of arrival of the 6.35 p.m. train but he said that he did not change the figure from 7.23 to 7.25. He was quite positive that the Down block instrument did not change from " train on line " to " line clear " and he was emphatic that he never made any attempt to obtain a clearance for the 6.35 p.m. train because he had not yet received " out of section " for the 6.20 p.m. train. He " would soon have been on to Dagenham " if he had noticed his instrument change to " line clear ". He agreed that he should have sent the " train running away on right line " signal when he saw that the Down track circuit was clear with the starting signal still at danger.

Finally, he admitted that occasionally the Dagenham East signalman gave him " line clear " without having a train offered, but this only occurred when the signalman wanted to leave the box for a short time. On each occasion he telephoned to Tinson and told him what he was going to do. Tinson said that the last time this had happened was about two years ago.

33. Porter Signalman M. Sass is 36 years old with less than one year's railway service, and he had had five weeks' signalling experience before the accident. He came on duty at Becontree at 7.0 a.m. after having worked a 12-hour shift up till 7.0 p.m. the previous evening. He switched in the signal box at 7.4 a.m., switched out again at 11.15 a.m., and then spent the next few hours attending to lamps and carrying out porter's duties at the station. He switched in the signal box again at 3.33 p.m. He said that visibility was poor, and after dark it dropped to about 10 yards, and the electric trains on the local lines went by like " a blur of lights ".

He was unable to switch out the box at the intended time of 6.50 p.m. because one train was at the Down I.B. signal and he had accepted another from Upney. He had by this time got to the bottom of the page in his train register and he had entered the next day's date on the following page. When he realised that he could not close the box he wrote down the times of the next three trains on a slip of paper instead of entering them correctly in his register. He admitted that he did this because he was in a hurry to get off duty. He only recorded the times of the messages exchanged with Upney and consequently the record of signals exchanged with Dagenham East for the 6.10, 6.15 and 6.20 p.m. trains is missing.

34. Sass said that he accepted the 6.15 p.m. from Upney at 7.2 p.m. and he received " train entering section " at 7.5 p.m. He offered this train to Dagenham East as soon as he received " train out of section " for the 6.10 p.m. train which, according to the Dagenham register, was at 7.14 p.m. Sass stated that he accepted the 6.20 p.m. train at 7.15 p.m. and that he never refused it as suggested by Tinson, but later in his examination he recollected that he did in fact telephone to Tinson and say to him " I am going to try and close on this train, so I won't give out of section for it ", to which Tinson replied " I know that." Tinson, however, denied that he had any such conversation.

Sass also said that he spoke to Andrews at Dagenham East when the 6.15 p.m. train had just passed the I.B. home and he said to him : " *If you give me out of section in time before the 6.20 reaches my box, I will close on this,*" to which Andrews replied, " *Yes, that will be all right.*"

Continuing his evidence, Sass said that as there were no trains on the Up line he obtained a " line clear " release from Upney so that he could take off the Up line signals preparatory to closing. He then stood by the Down block instrument anxiously awaiting " out of section " from Dagenham East for the 6.15 p.m. train. As soon as he received this (at 7.24 p.m. according to the Dagenham book) he offered Andrews the 6.20 p.m. train, which was accepted immediately. Sass pulled No. 5 Down I.B. home signal lever partly out of the frame so as to clear the electrical lock and promptly gave " train entering section " which Andrews acknowledged by turning the block instrument to " train on line ". Sass explained that No. 5 lever was hard to pull (the signal is over 1,200 yards from the box), and to save time he gave " train entering section " before completing the lever movement. He agreed that usually he gave this signal only when a train was at, or close to, the I.B. home, but on this occasion he knew that he must give the " entering " signal to Dagenham East before the 6.20 p.m. train passed his home signal otherwise he would not have been allowed to close the box.

He was closely questioned about his movements to find out whether he might have omitted to send the " entering " signal—two beats on the bell without a " call attention " signal—and thus close his box with the Dagenham East Down block instrument showing " line clear " instead of " train on line ". He could not, however, be shaken about this, though at one time he said that Andrews had accepted the 6.20 p.m. train before Sass had offered it to him. Later he said that he had made a mistake and that this incorrect block working had occurred on another occasion and with another signalman at Dagenham East.

35. In conclusion, Sass stated that having got the 6.20 p.m. " train on line " to Dagenham East, he pulled over No. 5 lever and took off its distant signal No. 6 (Nos. 9 and 10 signals were already off for the train). He placed collars on the two distant signal levers and then sent the closing signals to Dagenham East and Upney. After they were acknowledged, he turned the closing switch and telephoned to the two signalmen to make sure that everything was in order. Finally he closed the box at 7.25 p.m. and walked across to the Down Local platform of Becontree station to catch the train to Hornchurch. Whilst he was standing there a train went by on the Down Through line and he thought it must have been the 6.20 p.m. because he was sure that it had not reached berth track circuit " A " before he closed the signal box. He was surprised when he was told that this train received an A.T.C. caution indication approaching No. 6 I.B. distant signal, which it will be recalled is underneath the home signal and directly opposite the box.

Thus the 6.20 p.m. train must have passed Becontree box while Sass was walking to the Down Local platform, and the train which he heard must have been the 6.35 p.m. which passed through Becontree at about 7.30 p.m.

36. Signalman H. F. Andrews, who is 49 years old, is a Class I signalman with 34 years' railway service. He came on duty at Dagenham East signal box at 2.0 p.m., having signed off at 10.0 p.m. the previous day. He said that visibility was poor and that it deteriorated in the evening to about 10 yards. He accepted the 6.15 p.m. train from Becontree at 7.14 p.m. and it stopped at No. 30 home signal at 7.19 p.m. He could not allow it forward, however, until the previous train cleared the River Rom I.B. home overlap track circuit, No. 5489, at 7.24 p.m. In the meantime the Becontree signalman called him to the telephone, and, according to Andrews, the following conversation took place :—

> Sass : " *I've got another train coming to me now* (meaning the 6.20). *Will it be all right to switch out with train on line ?* "
>
> Andrews : " *That will be all right, lad. When I call you back for this train, you give me the ' train on ' and I'll accept it, and then give me ' train entering section ' ' ".*

Although Sass was 36 years old he had had little railway service, and Andrews described him as " *an inexperienced lad and he kind of leant on my shoulder a bit. He had confidence in me and I had confidence in him.*" He added that he made a point of telling him what to do, because " *It was foggy, and to make sure that the lad made no error.*"

Andrews described the switching out procedure so far as it affected him. He said that he gave " out of section " for the 6.15 p.m. at 7.24 p.m. and he immediately accepted the 6.20 p.m. train. Sass replied with the " entering " signal and Andrews at once turned his block instrument to " train on line ". After this Sass sent the closing signal and Andrews then exchanged signals with Tinson at Upney.

37. Continuing his evidence, Andrews said that when he accepted the 6.20 p.m. train, Nos. 30 and 31 Down home signals were at danger with No. 29 distant signal at caution because the 6.15 p.m. train was running down to the River Rom I.B. home at that time. It was not until 7.29 or 7.30 p.m. that this train cleared the overlap track circuit and enabled him to take off the starter, both the homes, and the distant signal.

Shortly after this, Tinson rang him up and said " *I believe that the Down train has passed my starter at danger.*" Andrews replied, " *What gave you that impression ?* " to which Tinson answered, " *I can't see it, I will go outside and make sure.*"

Andrews said that at 7.36 p.m. he received the " train running away on right line " (4-5-5) signal from Upney, and he immediately sent " obstruction danger " (six bells) in each direction (this was not booked until 7.40 p.m.). He replaced the Up and Down Local and the Up Through signals to danger but he left the Down Through signals off because the 6.20 p.m. train had not yet reached the home berth track circuit. He also telephoned to the lineman in the cabin at the London end of the station and asked him to send somebody out to tell the driver of the 6.20 p.m. train to hurry because all signals were off and there was another train running into the back of him. A minute or two later the lineman told him that there had been an accident.

From this evidence it appeared that the accident had occurred at 7.36 p.m., but later investigations showed that it must have been at about 7.34 p.m. because the last Up electric train left Dagenham East station at 7.32 p.m. and ran into the wreckage some 600–700 yards further on.

38. At 7.40 p.m. the fireman of the 6.35 p.m. train came rushing into the Dagenham East box with a case of detonators and a red flag and told Andrews that his train had run into the back of the one in front and that they were " off the road ". Later on the fireman returned with his driver, and after giving them some tea Andrews said to the driver, " *What happened? Did you pass the Upney signals at danger?* " According to Andrews, the driver replied " *No, of course not. He pulled us up at the starter and pulled it off—you know, the starter alongside the little cabin by the bridge.*" Andrews said that he was not worried to hear this, because he was quite sure that the procedure for closing Becontree had been properly carried out and his block instrument was still standing at " train on line ". Also he had been previously warned by Tinson that the train had passed the Upney starter at danger.

Andrews was quite positive about the driver's statement, and later in his examination he repeated it in that man's presence and explained exactly where all three of them were standing when the conversation took place.

Trainmen's evidence

39. Driver S. A. Church, who was in charge of the 6.15 p.m. train, said that on approaching Upney the fog was very thick and he could only distinguish the signals from a range of a few yards. He had had a clear run through Barking but the Upney distant was at caution. He went slowly past the home and starting signals, both of which were off, but he only saw the starter from a distance of 5 or 6 yards. Both the Becontree stop signals were off but the distant signals including the Dagenham East distant were at caution, and he eventually stopped at the Dagenham East home signal which he did not have much difficulty in finding. When this signal came off he drew into the station and the signalman told him that he was " right away to the River Rom I.B. home."

40. Driver R. Wilson was in charge of the tank engine of the 6.20 p.m. train, travelling chimney first. He said that the visibility was bad and he did not see the semaphore signals until the engine had almost reached them. The train left Fenchurch Street at 6.28 p.m. and they had a very slow journey to Barking with caution signals most of the way. They were booked to stop at this station and on leaving it the Barking East signals were clear but the Upney distant was at caution, so Wilson " crawled " up to the home which cleared for him as he came almost to a stand. The next signal was the Upney starter which Wilson thought was about 100 yards beyond the Upney overbridge, instead of nearly 400 yards. This signal was off and he passed it at about 5 to 10 m.p.h., but on receiving a clear A.T.C. indication approaching the Becontree distant he accelerated to about 20 m.p.h., though not for long, because he got an A.T.C. caution at the I.B. distant.

The I.B. home was clear but the Dagenham East distant under it was at caution, and from here onwards he went forward very cautiously expecting to find the home signal at danger. He was coasting towards this signal at about 4 m.p.h. when he felt a bump in rear, and the vacuum was destroyed by the parting of the train just as he applied the brakes. He sent his fireman back to find out what had happened and while he was away the fireman of the 6.35 p.m. train passed and told him of the collision. This man went forward to the signal box to protect the train.

Wilson was quite positive that he had got an A.T.C. caution approaching the Becontree I.B. distant which is under the home signal and directly opposite the signal box. Having got this warning Wilson thought that Becontree must still be open but he did not see the box.

Wilson, who had been a driver on this line since 1947, said that he travelled over it practically every day and he found the A.T.C. a very great help—" *It lets you know just where your distant signals are—it is as good as a third man. It helps the driver to judge the position of the stop signals.*" On the night of the accident the equipment was working correctly throughout the journey.

41. Fireman T. E. Spicer generally corroborated Driver Wilson's evidence though he had not seen all the signal aspects since he was attending to the fire at times. He remembered the train nearly stopped at Upney home where the signalman called out " Right away, mate ", meaning that the signal was off. After this he did not see any more signals and he did not know how many there were between that box and Dagenham East, but he remembered passing one A.T.C. inductor at caution because the driver did not cancel the horn until the brakes were applied.

The train was travelling very slowly approaching Dagenham East and he thought that the speed was about 5 m.p.h. when the collision occurred. After the accident he went back to protect the train and later in the evening he helped another driver to throw out the fire from the engine of the 6.35 p.m. train.

42. Passed Fireman R. S. Barnes, who was in charge of the tank engine of the 6.35 p.m. train, running hunker first, came on duty at 3.0 p.m. at Tilbury and drove a passenger train to Fenchurch Street before taking charge of the 6.35 p.m. train. He is 25 years old and he joined the railway service in 1949 when he was 16. He was appointed fireman in 1950 and he has been stationed at Tilbury for the whole of his service, except for two years in H.M. Forces. He was promoted to passed fireman in July 1957 after 5½ years' firing experience, during which time he was constantly travelling over the Southend lines. He signed the " knowledge of the road " card for the Southend main line in October and he said that he was quite satisfied that he knew the position of all the signals. Altogether he had driven over the Down line between Barking and Dagenham East on 13 occasions since he became a passed fireman, including the two days prior to the accident and four days in the previous week. He did not recollect, however, having been in charge of the train during a fog.

Barnes was very shocked as a result of the accident and he was still shocked when he gave evidence before me on 6th and 20th February. Mr. J. W. Dedman, the Line Traffic Manager, saw him on 3rd February at his home, and Barnes handed him a statement which he had written out and signed prior to the visit ; a copy is given below.

> " Whilst working the 6.35 ex Fenchurch Street I was stopped at Barking West Outer home and then Barking West Inner home. Barking station starter was off, Barking East home was off, distant at caution. I shut regulator and proceeded with caution to my next signal which was off and distant at caution. I proceeded with caution to Upney home signal which was at danger.
>
> After waiting approximately 2 minutes the signal came off and I proceeded to the starter with caution, the starter was off. I then proceeded towards Becontree distant which was in clear position, Becontree Home being in the off position. Becontree Starter was in off position, Becontree advance starter and Heathways distant both in the clear position, my next signal Heathways I.B.S. and distant signal on the same post was in the clear position, still proceeding at approx. 15 m.p.h. I saw a red light appear from out of the fog. I rushed over to the brake and applied same, emergency application, shut regulator, and braced myself for the impact by grabbing hold of A.T.C. When coming to a stand both my Fireman and myself took immediate steps to protect opposite running roads. I proceeded back to guard to inform him of what had happened my Fireman had gone forward to protect and inform signal man, I was on Fireman side of engine just before I got to Barking station finding Barking East distant against me I went over to my own side and applied my brake in preparation to stop. I stopped at Upney home, after leaving Upney home, I kept on Fireman side owing to fog so that I could see all signals myself.
>
> (*Signed*) R. S. Barnes,
>
> 3.2.58. Passed Fireman Tilbury Motive Power."

43. During his initial examination, Barnes endeavoured to describe the journey. He said that it was very foggy but he was able to pick out the signals with the aid of the A.T.C. He stood on the left hand side in the direction of running for most of the time after leaving Barking, so as to observe the signals more easily. He described correctly the position of the signals through Barking and as far as the Upney home. He said that he received an A.T.C. caution indication approaching Upney distant and he stopped at the home signal at danger. This signal was on the left hand side just in front of a bridge and there was a white board behind it. After stopping for 2 minutes the signal came off and he " crawled up to the next signal " which he thought was on the left hand side about 200 yards ahead. It was off but he continued slowly forward until he received a clear A.T.C. indication on approaching the distant signal when he increased speed to about 15 m.p.h. After a good deal of hesitation he described the next signals correctly and he admitted that his written statement was wrong ; it included two signals which did not exist (Becontree starter and advance starter). He said that he got a clear A.T.C. indication at the approach to the Becontree and Heathway (Becontree I.B.) signals, each of which had a distant arm under it. He maintained a steady speed until he saw the red tail light of the train ahead, when he jumped across to the controls and made an emergency brake application. He clutched the nearest support when the collision occurred (this may have been the handle of the A.T.C. indicator).

After the accident the fireman went forward and Barnes went back to protect the train. Later Barnes made his way to the signal cabin and enquired about his fireman. The signalman gave them both a cup of tea but Barnes could not recollect having had any conversation with Andrews, although this man's statement was read to him (*see* paragraph 38).

44. At the hearing on 20th February when Barnes was less shocked, I again examined him about his knowledge of the signals between Upney and Dagenham. On this occasion he said that after the Upney home was cleared he gave the engine " a breath of steam and crawled up to the next signal ". He thought that he was standing on the right hand side of the footplate when he started, but he moved across to see the Upney starter at clear. After this he got a clear indication at the next A.T.C. inductor but he continued slowly forward and he did not touch the regulator until he actually saw the distant arm at clear when he increased speed to about 15 m.p.h.

Again he was hesitant about the position of the Becontree signals, but after further recollection he described them correctly although he was not sure about the landmarks and forgot that Heathway station was on the local line between the Heathway I.B. and Dagenham. Again he could not remember making any statement to Signalman Andrews, even when confronted by him.

45. Fireman S. G. Fryer, who was working with Passed Fireman Barnes, is 19 years old. He is a very keen young man who takes a great interest in railway working and has a very good knowledge of the names and positions of the signals on the Southend line.

He said that visibility was poor and for most of the way he was observing the signals. He described with great detail and accuracy the signals up to and through Barking and he gave the aspects of all of them. He knew that there was no A.T.C. inductor at the approach to the Barking East inner distant which is under the Barking West starter, and that the Barking East I.B. home and the Upney distant under it had intensified electric lights.

He said that they were stopped at nearly all the signals between Bromley and Barking West, after which the stop signals were clear with the distant signals at caution as far as Upney, where they stopped at the home signal. After about two minutes the signal came off and the train moved forward slowly. Fryer said that he looked across to the cabin and saw the signalman speaking on the telephone. He even noticed correctly that he was wearing a red jersey. The driver gave the engine " a breath of steam " and then came over to the fireman's side. Fryer said that they were both looking out for signals with the driver standing in front of him while he looked out through the side window. After travelling for about 150 yards Fryer saw the starter at Green, " *It was on a single post, one arm fairly high* ", and he saw it at a range of about an engine length.

Just after passing this signal, he commented to his driver that this was the first time they had had a Green one. It was pointed out to Fryer that according to his evidence several of the stop signals had been at Green but the distant signals had all been at Yellow, and it was suggested to him that his remarks referred to a distant signal at Green. He was closely questioned, but although he insisted that he was referring to the Upney starter, he could produce no satisfactory explanation, and in reply to one question he gave this significant answer : " *I mean it was the first time that we had a Green right away, sort of thing. More so when we got the Becontree distant off.*"

Continuing his evidence, Fryer said that the driver opened the regulator on passing the Upney starter and after this they received a clear A.T.C. indication approaching the Becontree distant. They also got clear A.T.C. indications at the approach to the next two pairs of signals which were showing double Greens. Shortly afterwards he heard his driver shout " Red light ahead " and he felt the brakes applied. He estimated that the speed at the moment of collision was between 15 and 20 m.p.h.

Although cut and shaken, Fryer immediately collected his detonators and flag, climbed with difficulty out of the cab and ran forward to protect the train. He put down detonators and then went into the signal box and told the signalman to block all lines. He signed the train register book at 7.40 p.m. Barnes arrived some time afterwards and both men were given a cup of tea, but Fryer denied hearing any conversation between Andrews and Barnes about the position of the Upney signals.

46. Guard W. T. Pryde was in charge of the 6.35 p.m. train and he was travelling in the guard's compartment at the rear. He said that the train left Fenchurch Street at 6.41 p.m. and that they had a very slow journey as far as Barking where they were 27 minutes late. The train stopped at the Upney home signal at about 7.24 p.m. and after standing there for 2 or 3 minutes it moved forward slowly. On passing the signal box Pryde asked the signalman what was the matter, and he replied that the trains were running " block to block ". About two minutes later, Pryde felt a jerk and the train began to gather speed, He looked out for the Upney starter but he did not see it nor did he see any other signals but he was not looking out all the time. On passing through Heathway at about 7.32 or 7.33 p.m. he felt a check as if the brake had been applied slightly and two minutes later the collision occurred. Pryde thought that the speed from the Upney starter onwards was only about 10 to 15 m.p.h. After the accident he went forward and met the driver who was very upset, and then he went back three-quarters of a mile to protect the train.

Other evidence

47. Driver A. W. Lancaster, a railwayman with 23 years' service, was travelling as a passenger in the front compartment of the 3rd coach of the 6.35 p.m. train. He said that it stopped at Upney home signal for about two minutes and then went forward very slowly at about 5 to 7 m.p.h. After travelling for about a quarter of a mile the train increased speed to about 20 m.p.h., which was maintained until just before the accident when he thought that the driver closed the regulator.

After the accident Lancaster spoke to the driver who was upset and was worried about the water in the boiler. He said nothing about the cause of the accident. Lancaster said that he checked that the brake was full on, the regulator was closed, and the reverser was notched up to between 40 and 45 per cent. He helped to damp down the fire and then left the engine.

In answer to further questions he stated that he had been driving for nine years and he could not remember when he was last checked at Upney, nor could he recollect having been allowed forward from the home to the starter at danger. He agreed that this starter was a difficult signal to pick out in fog.

48. Mechanical Lineman H. McKinlay said that he was called to attend to the Dagenham East Down distant signal, the arm of which had not been coming off, and that he arrived there at 6.40 p.m. on the night of the accident. The signal was at caution and he did not have a chance of testing it because a series of trains went by, but directly after the 6.20 p.m. train had passed it came off correctly. This train passed very slowly as if the driver was trying to pick out signals. Some minutes later the 6.35 p.m. train passed at about 25 to 30 m.p.h. with the distant signal still clear.

49. Mr. R. Richardson, a local resident, in a letter to the Line Traffic Manager, said that on the night of the accident he arrived at Upney station at or shortly after 7.0 p.m. and he walked towards Becontree along the wide space between the Up Local and the Down Through lines in order to reach his home in Lansbury Avenue. He had just reached a signal on his right when he was overtaken by a steam train on the Down Through line and when it had passed he heard the signal arm drop. He thought that the time was between 7.5 and 7.10 p.m. (the noise which Mr. Richardson heard was undoubtedly the arm of the Upney upper quadrant starting signal returning to danger after the passage of the 6.15 p.m. train).

50. Fireman D. Monk of the 6.10 p.m. Up train from Shoeburyness to Fenchurch Street said that on approaching Upney the distant signal was at caution and speed was reduced to between 10 and 15 m.p.h. As the engine approached the Upney box he saw the signalman running along the Down line with a torch in his hand.

51. Chief Inspector T. W. J. Dolder said that he was the first member of the Signalling Department to inspect the signals at Upney and he arrived there at about 10.5 p.m. All signals were at danger and all four block instruments were showing " train on line ".

52. Mr. F. J. Beirne, Assistant to the Signal Engineer, said that he arrived at Dagenham East at 10.0 p.m. and arranged for a thorough test of all the signalling equipment including block controls, signal arms and lights, and A.T.C. inductors. After testing the block controls at Dagenham East, he walked through to Upney with members of his staff testing the lights and the working of all arms and slots of the Down Through signals. Everything was in order and the lights were shining brightly. The block controls at Becontree and at Upney were correct.

The fog was clearing gradually and he was able to view the stop signal lights from a distance of about 50 yards and the distant signal lights from a distance of about 70 yards. He checked the Upney Down starter in my presence as already described in paragraph 22, and he found that the arm was working freely and the light was visible from 80 yards.

Tests on the following day showed that all relevant Down line circuits and the A.T.C. ground equipment, including contact settings of the distant signals, were functioning correctly.

53. After the accident the A.T.C. equipment on the engine of the 6.35 p.m. train was thoroughly examined under the supervision of Mr. J. H. Currey, Signal and Communications Development Engineer of the British Transport Commission. It was found to be in good order except for a fractured vacuum pipe connection which had been damaged when the receiver under the cab had been struck during the collision. The indicator was showing black and yellow, but in view of the evidence that the last distant signal was at clear, Mr. Currey was quite sure that either the cancelling handle had been operated when the driver was flung back on the controls or the shock of the collision had turned it. In view of the enginemen's evidence the first cause is the more probable.

VI. Conclusions

54. Having regard to the condition of the damaged stock, I estimate that the speed of impact was about 20 m.p.h. Since the 6.20 p.m. train was moving at about 5 m.p.h. the 6.35 p.m. train must have been travelling at about 25 m.p.h.

55. I am satisfied that the signalling was in good order and that the Automatic Train Control equipment both on the engines and on the ground was working correctly. The trouble with the Down distant signal at Dagenham East had no bearing on the accident, but the presence of the lineman there gave valuable supporting evidence about its aspect during the passage of the trains involved. With Automatic Train Control in operation at the distant signals, fogsignalmen were not necessary.

56. The chief question is the aspect of the Upney starting signal when the 6.35 p.m .train passed it. Evidence on this score is conflicting. It is highly improbable that the signal arm stuck in the " off " position after the passage of the 6.20 p.m. train because this signal was working freely when checked in my presence shortly after the accident, and the evidence of Mr. Richardson, a local resident, indicates that it returned to danger correctly after the passage of the 6.15 p.m. train. Nor could the signal have been left off after the passage of the 6.20 p.m. train because the sequential locking ensured its return to normal before the 6.35 p.m. train was accepted. Accordingly this signal must have stood at danger when the 6.35 p.m. train was approaching Upney home signal and it could not have been released until a " line clear " had been received from Becontree, or Dagenham East when Becontree was switched out. Although there is no question that an irregular " line clear " had been given by the Becontree or Dagenham signalman yet the possibility cannot be overlooked that an accidental clearance may have been transmitted during the closing of the Becontree box.

57. As explained in paragraph 20, a wrong " line clear " would have been transmitted accidentally to Upney when the Becontree closing switch was turned had the Becontree signalman failed to send the " train entering section " signal for the 6.20 p.m. train after Dagenham East had accepted it. Sass, the Becontree signalman, normally sent " train entering section " to Dagenham East when the train was at or near the I.B. home signal, but on this occasion he closed the box before the 6.20 p.m. train had reached berth track circuit A. Did Sass carry out his normal routine but obtain only " line clear " for the 6.20 p.m. train before he turned the closing switch ? This possibility cannot be disregarded because Sass, a junior signalman, having had a prolonged spell of duty may have been anxious to close his box as soon as possible : the enginemen of the 6.35 p.m. train also insisted that the Upney starter was clear for them.

On the other hand, both Sass and Andrews, of the Dagenham East box, said that they discussed the closing procedure, and if their statements are accepted Andrews certainly knew that the 6.20 p.m. train was " on line" to Becontree and that he also must receive that signal before the box was closed. Although their evidence differed in some respects their account of the telephone conversation was substantially the same.

58. By altering the record of the arrival time of the 6.35 p.m. train from 7.23 to 7.25 p.m. and by overwriting this entry Tinson, the Upney signalman, was immediately suspect, for these two minutes covered the vital time when the Becontree box was closed. I conclude, however, that there is no special significance in this alteration, and I accept Tinson's statement that he emphasised the figure because it was the last entry concerning the colliding train, although I believe that the revised entry refers to the departure and not to the arrival of the train. It will be seen from Table 2 that the train probably arrived before and left just after Becontree closed at 7.25 p.m. On this basis the rear guard's compartment would have passed the box at about 7.26 p.m. which time corresponds with Tinson's statement that he spoke to the guard directly after accepting the Up train at 7.26 p.m.

Why, having detained the 6.35 p.m. train for more than a minute at the home signal, did Tinson allow it down to the starting signal to await acceptance? The present rules permit this at Upney even during fog, but a wrong " line clear " transmitted during the closing of Becontree might have induced him to pull off both the home and starting signals supposing that Andrews had given him this clearance in anticipation, as another signalman had done in the past. Were Tinson's further actions consistent with this theory? On returning to the box at 7.31 p.m. he telephoned to Andrews that the train had passed the starting signal and he attempted to stop it by running down the line; both actions suggest panic, possibly arising from his realisation of a grievous mistake. On the other hand his frank statement that he " could not believe his eyes " when he saw the track circuit clear could equally well account for his actions and for his failure to send immediately the " train running away on right line " (4-5-5) signal. Whilst agreeing that he had lost his head, he was adamant that the Down block instrument had never changed from " train on line " and that he never took off the starting signal for the 6.35 p.m. train.

59 Thus, although some of the circumstances suggest that a wrong " line clear " might have been given to Upney, this presupposes collaboration and untruthfulness on the part of all three signalmen which seems hardly likely as, until my demonstration on 4th February, they were apparently unaware that a wrong " line clear " could be transmitted. The three men were very closely questioned for many hours and, although some minor inconsistencies arose, they gave their evidence clearly and I believe honestly. This evidence shows that a wrong " line clear " was not transmitted to Upney during the closing of the Becontree box and that the Upney starter was never off for the 6.35 p.m. train, but before reaching a final decision the evidence of the driver and fireman of the 6.35 p.m. train must be examined.

60. Passed Fireman Barnes, who was in charge of the 6.35 p.m. train engine, is a young and relatively inexperienced driver who qualified only six months before the accident, but during his 4½ years service as a fireman he travelled constantly over this line and should have acquired a thoroughly sound knowledge of the signalling. He had been in charge of a train on the Barking-Dagenham East line on 13 previous occasions, but never in fog, and I doubt whether his knowledge of the signals was sufficient to ensure that he would not miss one in such conditions.

61. The fireman of this train, S. G. Fryer, is a particularly intelligent young man who showed an excellent knowledge of the signalling on the Southend line, and for most of the time he gave his evidence in a very confident manner. He made, however, the significant statement that on passing the Upney starter he commented to his driver that this was the first time they had had " a green one ". This remark would have been appropriate if applied to the Becontree distant signal which was the first clear distant, but it did not appear applicable to a stop signal which was by no means the first to be seen in the clear position. Although he stated emphatically that he was referring to the Upney starter, Fryer's explanation was not convincing, and his remark, " I meant it was the first time that we had a green right away sort of thing, more so when we got the Becontree distant off " suggests that his comment to the driver referred to the latter signal.

62. The evidence of Guard Pryde of the 6.35 p.m. train and Driver Lancaster, a passenger in it, regarding the point at which the train began to gather speed after leaving Upney is not conclusive, but it does show that the train travelled very slowly for a considerable distance, thereby indicating that the driver was moving forward cautiously, looking for a signal, and that he did not accelerate until he had seen or heard something which satisfied him that the line ahead was clear.

63. After full consideration of all the evidence, I conclude that Passed Fireman R. S. Barnes of the 6.35 p.m. train passed the Upney starter at danger. I believe that he and his fireman were looking for this signal but they were uncertain of its position and missed it in the fog. Although it stands out very clearly in daylight there are no nearby landmarks by which it can be located in fog, and the red signal light, which is 21 feet above rail level, would have been difficult to see in the prevailing conditions with visibility down to 10 yards when it would have been in view only as a small red glow for two to three seconds.

It seems probable that the train did not accelerate until the clear A.T.C. indication of the Becontree distant signal inductor (only 440 yards beyond the Upney starter) reassured the driver and led him and his fireman to assume that the Upney starter had been clear, believing that the Becontree box was manned. A speed of 25 m.p.h. from this point onwards was not excessive, considering the clear A.T.C. indications which the driver received on approaching the next two distant signals at clear. Becontree box was closed by then and all its signals were off, and Dagenham East distant signal was still off for the 6.20 p.m. train.

64. Signalman Andrews, of Dagenham East box, could not be expected to take action on receiving Tinson's vague telephone message at 7.31 p.m., and he was correct in leaving all the signals off for the 6.20 p.m. train when at 7.34 p.m. he eventually received from Upney the " train running away on right line " signal (4-5-5). In accordance with his duty he was waiting for the train to occupy the home berth track circuit and so locate its position before returning the distant signal to caution. Premature action might have resulted in this signal's being put back in the face of the driver.

65. As already mentioned, the Rules allowed Tinson to send trains to the Upney starter during fog because the berth track circuit extended as far as this signal and its light and arm were repeated in the box. His clearance of the home signal for the 6.35 p.m. train was therefore in order, but Rule 39(a) did not require him to hold the train there for over a minute.

No objection need be raised to his leaving the box for a minute or two after he had seen the tail light and replaced the home signal, but instead of telephoning to Andrews he should have sent the 4-5-5 bell code immediately when, on his return, he saw the Down track circuit clear with the starting signal at danger.

66. Had the Becontree box remained open this accident might not have occurred because Sass would surely have replaced No. 9 home and No. 10 distant signal behind the 6.20 p.m. train when it passed his box at about 7.25 p.m., and Barnes could hardly have ignored the A.T.C. caution warning and failed to stop at the Becontree home signal, reinforced as it is by co-acting detonators.

The closing of the Becontree box with the 6.20 p.m. train " on line " from Upney was, however, permitted by the London Midland and Scottish Railway Rules which were still in force on the London, Tilbury and Southend line ; consequently no responsibility rests with Signalman Sass. I am also satisfied that he carried out the closing procedure correctly but in his anxiety to get the box closed quickly he failed to complete his train register.

VII. Remarks and Recommendations

67. The Fenchurch Street–Southend line is equipped with the warning type of Automatic Train Control, yet it could not have prevented this accident because it operates only at the distant signal. As already pointed out, this equipment was working correctly, and it carried out its two-fold function of indicating to drivers the location of the distant signals and of giving them advance warning of their aspects. Passed Fireman Barnes responded correctly to the Upney distant signal at caution and he stopped his train without difficulty at the home signal. Thereafter he lost himself in the dense fog with visibility reduced to a few yards and ran past the starter without noticing it.

A train stop or similar apparatus which makes an irrevocable brake application in the event of an overrun would have stopped the train, but I do not recommend its adoption because the advantages of this system would not justify its cost and complications for the reasons given in my report on the collision at St. Johns, Lewisham, on 4th December 1957.

68. If the 6.35 p.m. train had been held at Upney home signal to await acceptance from Dagenham, the circumstances leading to its overrunning the starter would not have arisen, but with the line covered by a track circuit and the starter properly repeated, the signalman was under no obligation to do this. It is for consideration, however, that the Rules governing train working in fog or falling snow be revised so as to minimise the chance of similar accidents.

69. The difficulties associated with working trains in poor visibility have long been recognised, and the Rule Book contains many special instructions on this subject ; extracts from some of these are given in Appendix A and they are summarised in paragraph 21. For example, Rule 39(b) is framed to prevent a signalman from holding a train to await acceptance at a signal where its presence might be overlooked in fog, and he must also satisfy himself that the signal is working properly.

Rule 94 requires that in such weather conditions a signalman should use the emergency detonator placers, where provided, to reinforce the danger signal to stop an approaching train. It is also interesting to note that many L.B. home semaphore signals, which are virtually outlying starting signals, are provided with co-acting detonators as well as with berth and overlap track circuits ; colour lights without co-acting detonators have been used elsewhere.

70. On the other hand there are no special aids to help a driver in fog at a starting signal. In the present case the Upney starter was a semaphore 21 ft. above rail level and the red light from the oil signal lamp could not have penetrated far through the dense fog. A colour light at the driver's eye-level, however, would have given a glow which Barnes could scarcely have missed at close range. Alternatively the explosion of co-acting detonators working with a semaphore signal would have given him an unmistakable warning to which he surely would have responded.

I therefore recommend that consideration be given to extending Rule 39(b) so that during fog or falling snow a signalman may not send a train forward to a stop signal to await acceptance into the section ahead unless the signal is a colour light, or if a semaphore, is fitted with co-acting detonators, the explosion of which is indicated in the signal box.

71. On the London, Tilbury and Southend line colour light signalling is being installed in connection with the forthcoming electrification, and when it is brought into use the conditions which contributed to this accident will no longer exist.

72. Tests of the closing procedure at Becontree showed how easily a wrong " line clear " could be transmitted to the box in rear without the knowledge of the signalman in advance. I am satisfied there was no wrong " line clear " on this occasion but the danger exists and it can be obviated by prohibiting closure when a train is in section or has been accepted. This restriction is already in force in some Regions, and I recommend that it be made universal and that any exceptional requirements be covered by special instructions.

73. As in the case of the Lewisham accident, to which I have already referred, it has been suggested that a powerful tail light on the rear of the stationary train might have prevented the accident. The fog, however, was so dense that even a colour light was not visible except at short range, and I doubt whether the driver of the 6.35 p.m. train would have seen a brighter tail light in time to take effective action. The improvement of these lights is not being overlooked, and the British Transport Commission will shortly be carrying out further trials with improved types of lamp.

74. Most of the steam coaching stock in use on the London, Tilbury and Southend line was built before the war with wooden framed bodies on steel underframes. On electrification this stock will be replaced by all-welded coaches capable of withstanding much greater shocks. The energy to be absorbed in a collision even at a comparatively low speed is so great, however, that some damage is inevitable, and trains are normally marshalled with guards' compartments at the front and rear where damage usually is greatest. The casualties in this accident were reduced because instead of a crowd of passengers the only occupant of the rear compartment of the 6.20 p.m. train was the guard, and he was seriously injured.

Some correspondents have suggested the provision of a specially designed collision coach at each end of the train, but apart from the difficulty of designing such a vehicle, restrictions in train length and difficulties in marshalling make this impracticable. In any case it is better to use the available resources on safeguards for the prevention of accidents, than to dissipate them on devices which may contribute relatively less to the safety of the travelling public.

I have the honour to be,

Sir,

Your obedient Servant,

C. A. LANGLEY,

Brigadier.

The Secretary,

Ministry of Transport and Civil Aviation.

Extract from Rules

The relevant rules governing the movement of trains during fog are given in the following extracts from the 1950 Rule Book.

Operation of signals.

39. (*a*) When a stop signal is at Danger the stop signal next in rear of it and worked from the same signal box must not be lowered for an approaching train until the train is close to such signal and has been brought quite or nearly, to a stand.

Note. The above paragraph does not apply to multiple-aspect signals.

Where, however, the Signalman is unable to satisfy himself, in accordance with Rule 65, that the stop signal controlling the entrance to the section ahead is at Danger, the stop signal next in rear must not be lowered for a train to draw towards such signal . . . .

Use of signal controlling entrance to section ahead during fog or falling snow.

(*b*) During fog or falling snow, a train must not be allowed to draw forward to the stop signal controlling the entrance to the section ahead to await acceptance from the signal box in advance, unless track circuit or other apparatus is provided to avoid the necessity for trainmen going to the signal box to carry out Rule 55, or the Signalman is satisfied that a train standing at such signal will be within his view. A train may, however, be allowed to draw forward towards this signal in the absence of track circuit or other apparatus where special instructions to this effect are issued, or for station duties or shunting purposes.

In no circumstances, however, must a train be allowed to draw towards the signal controlling the entrance to the section ahead unless the Signalman can comply with the second paragraph of clause (*a*) of this Rule . . . .

Driver to draw slowly forward when signal is lowered but not to pass out of sight of Signalman.

(*c*) The Driver of any train which has been stopped or brought nearly to a stand in accordance with clause (*a*) must, after the signal has been lowered, draw slowly forward to the next signal and be prepared to stop at the signal box if necessary. When proceeding towards a signal controlling the entrance to the section ahead at Danger, he must (except for station duties or shunting purposes, or as shown below) only proceed as far as is necessary to leave the last vehicle well clear of junction points and junction crossings, and, as far as practicable, within sight of the Signalman.

Where there are no junction points or junction crossings the Driver must bring his train to a stand in a convenient position for the carrying out of Rule 55.

Where track circuit or other apparatus is provided in connection with the signal controlling the entrance to the section ahead, to avoid the necessity for trainmen having to go to the signal box to carry out Rule 55, the Driver must draw forward to such signal.

Signalman to be reminded.

55. (*a*) When a train has been brought to a stand owing to a stop signal being at Danger, the Driver must sound the engine whistle, and, if still detained, the Guard, Shunter or Fireman must (except as shown in the following paragraph, or where printed instructions are given to the contrary) go to the signal box and remind the Signalman of the position of the train . . . . In clear weather a train must not stand more than two minutes at a stop signal before the man goes to the signal box. During fog or falling snow, unless the stop signal is lowered immediately after the engine whistle has been sounded, the man must at once proceed to the signal box.

Track circuits or other appliances.

Where track circuits or electric depression bars are provided, as indicated on or near the signal posts, or in respect to which printed instructions are issued, and the train is standing on such track circuits or bars, it will not be necessary for the Guard, Shunter or Fireman to go to the signal box to remind the Signalman of the position of the train, but the engine whistle must be sounded . . . .

Care in operating signals.

65. When a Signalman operates a signal lever he must watch the signal to ascertain that it goes fully to the required position or aspect. Where a fixed signal is out of the Signalman's sight and its working is indicated by a repeater in the signal box, he must satisfy himself by means of the repeater that the signal is working properly, and if a signal light repeater or indicator is also provided ascertain therefrom that the light is burning . . . .

Fogsignalling at signal boxes.

94. If for any purpose the Signalman requires to stop an approaching train during fog or falling snow and a Fogsignalman is not on duty, he must keep his signals at Danger and must also, when practicable, place one detonator on the rail of the line to which the signals apply.

At signal boxes where emergency detonator placers are provided, the provisions of this Rule must always be carried out during fog or falling snow whether a Fogsignalman is on duty or not.

Extract from Train Register Books

Down Through line. 30th January, 1958

Train ex Fenchurch Street	Bell Signal Describ-ing	Accepted Reg. 3	Train Entering Section Received	Arrived	Train Out of Section Given	Is Line Clear: Offered but not Accepted	Is Line Clear: Accepted Reg. 3	Train Entering Section Forward-ed	Train Out of Section Received	Remarks
BARKING EAST										
p.m.		p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	
5.52	3.1	6.38	6.40	6.42	6.44		6.41	6.43	6.46	
6.3	3.1	6.50	6.52		6.54		6.51	6.53	6.57	
6.10	4	6.54	6.54	6.57	7.0		6.57	6.59	7.2	Stopped in Station
								.57		
6.15	4	7.0	7.0		7.4		7.2	7.3	7.11	
6.20	3.1	7.4	7.9	7.11	7.14		7.11	7.12	7.21	
6.35	3.1	7.17	7.17		7.21		7.21	7.21		Checked
UPNEY										
5.52	3.1	6.41	6.44		6.46		6.43	6.46	6.52	
6.3	3.1	6.52	6.54		6.57		6.52	6.56	6.59	
6.10	4	6.57	6.57		7.3		6.59	7.2	7.5	
6.15	4	7.3	7.4		7.11		7.5	7.7	7.15	Checked
6.20	3.1	7.11	7.14		7.21	7.15	7.16	7.17		Checked
6.35	3.1	7.21	7.21	7.25						
				7.5/5 Becontree 7.25 p.m.			4.5.5 sent to Dagenham East 7.36 p.m. Obstruction Danger received from Dagenham East 7.36 p.m.			
BECONTREE										
5.52	3.1	6.40	6.44		6.48		6.48	6.48	6.55	
6.3	3.1	6.50	6.54		6.55		6.55	6.55	7.2	
6.10	4	6.55	7.0							
6.15	4	7.2	7.5							
6.20	3.1	7.15	7.16							
				Switched out at 7.25 p.m. Note : Bookings not completed by Porter Signalman Sass						
DAGENHAM EAST										
5.52	3.1	6.50	6.50	6.54	6.58		6.58	6.58	7.6	
6.3	3.1	6.58	6.58		7.5		7.6	7.6	7.17	
6.10	4	7.5	7.5	7.11	7.14		7.17	7.17	7.24	
6.15	4	7.14	7.14	7.19	7.24		7.24	7.24	7.33	
6.20	3.1	7.24	7.24				7.33	7.33		
					Becontree closed 7.24 p.m. 4.5.5 received from Upney 7.36 p.m. Obstruction Danger 7.40 p.m.					

(73583) Wt. 2171/V.139 K20. 7/58 Hw.

EASTERN REGION

COLLISION AT DAGENHAM EAST

30th. JANUARY, 1958

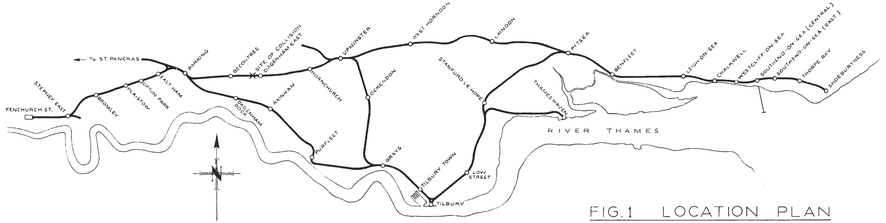


FIG.1 LOCATION PLAN

FIG. 2 PLAN OF ROUTE — BARKING EAST JUNC. TO DAGENHAM EAST

LONGITUDINAL SCALE : 600 FEET TO 1 INCH

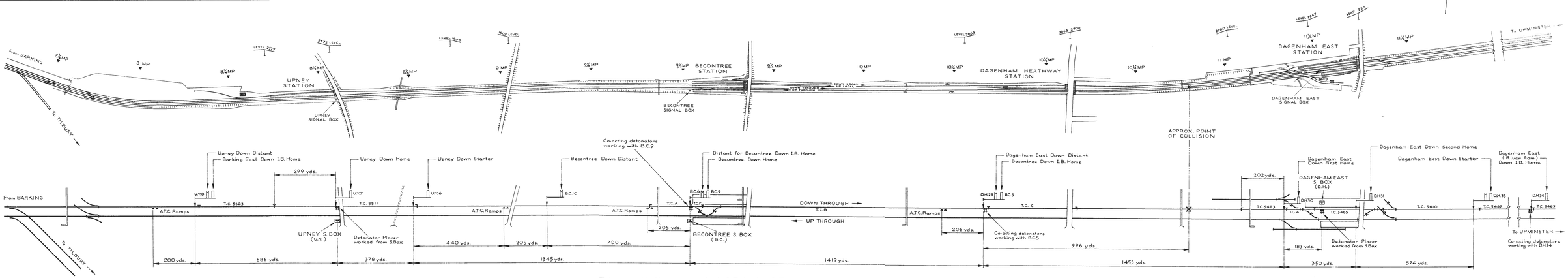
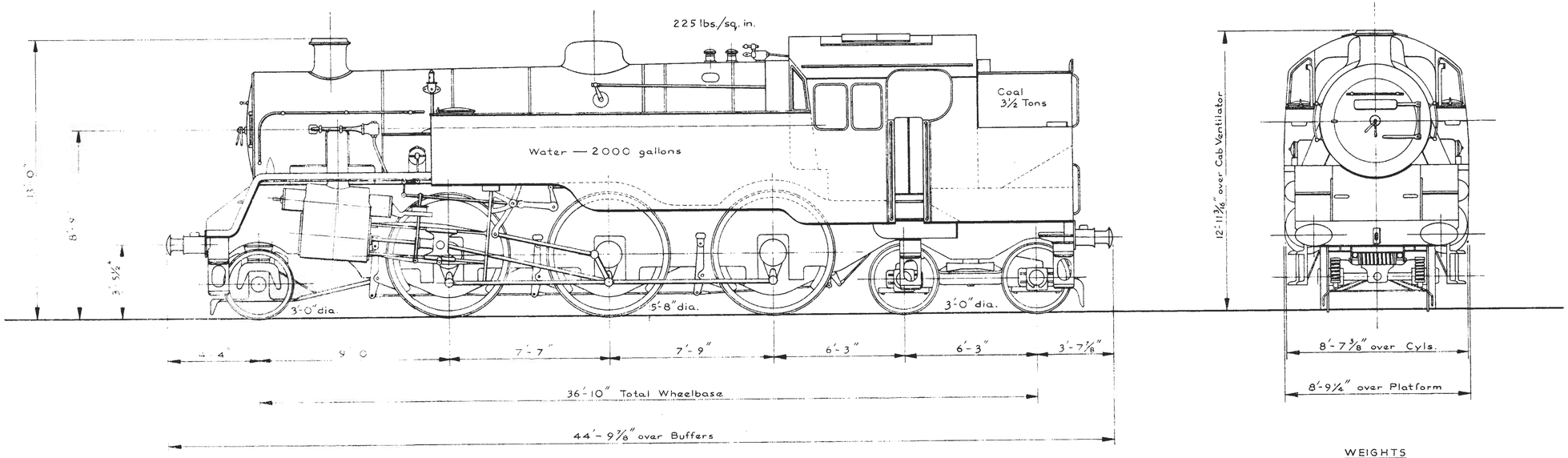


FIG.3 SIGNAL DIAGRAM OF DOWN THROUGH LINE

FIG. 4 ENGINE No. 80079 —— B. R. STANDARD CLASS 4

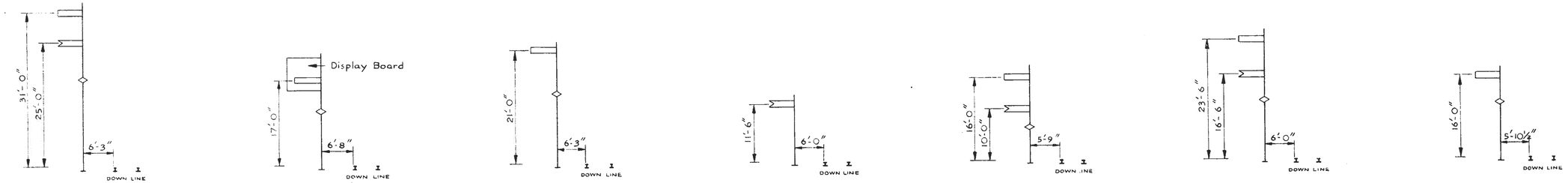


Weights in working order	T. C.	T. C.	T. C.	T. C.	T. C.
	13 - 2	17 - 7	17 - 19	17 - 15	20 - 10

WEIGHTS

FULL	EMPTY
T. C.	T. C.
86 - 13	69 - 8

FIG. 5 HEIGHT AND POSITION OF DOWN THROUGH SIGNALS



BARKING EAST
DOWN I.B. STARTER
UPNEY
DOWN DISTANT

UPNEY
DOWN HOME

UPNEY
DOWN STARTER

BECONTREE
DOWN DISTANT

BECONTREE
DOWN HOME
I.B. DISTANT

BECONTREE
I.B. DOWN HOME
DAGENHAM EAST
DOWN DISTANT

DAGENHAM EAST
DOWN FIRST HOME

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