

DISTRICT ELECTRIC TRAINS

8 – ELECTRIC LOCOMOTIVES

by Piers Connor

STEAM IS OUT

The plans for the electrification of the Circle were largely driven by the desire to exclude steam traction entirely from its tunnels and this included all trains, even those operated by railways not participating directly in the electrification or its financing. To achieve this exclusion, both the Metropolitan and District Railways had to purchase a number of electric locomotives to work trains of other companies who had agreements to run their trains through the Circle Line tunnels. For the District, the locomotives were needed to work the London & North Western Railway (LNWR) trains which operated the Outer Circle service between Broad Street and Mansion House. The service came down the West London Railway through what we now call Olympia (then known as Kensington Addison Road), joined the District main line just west of Earl's Court and ran along the main line to Mansion House. It was decided that, with electrification, the LNWR steam locomotives would be exchanged for District electric locomotives at Earl's Court and these would work the trains to Mansion House and back. The trains ran at about half-hourly intervals throughout the day.



Fig. 1: A pair of District Railway electric locomotives, as new, standing coupled back to back outside the paint shop at Mill Hill Park depot (now Ealing Common). The bodies were mostly steel but they were similar in appearance to the wooden B Stock passenger vehicles. For operation with main line stock, side buffers and screw couplings were provided in addition to the standard Underground Ward couplers. The bodies were just long enough to allow two standard motor bogies to be fitted underneath. All other equipment was inside. I doubt the name DISTRICT RAILWAY lasted beyond the first overhaul.

THE NEW LOCOMOTIVES

To work the LNWR trains, the District bought ten electric locomotives, numbered 1A to 10A. The A suffix was obviously added to distinguish them from the passenger cars with the same numbers. The locomotive bodies were ordered from the Metropolitan Amalgamated Railway Carriage & Wagon Company of Birmingham in September 1904. At the same time, traction equipment for the locos, of the standard type specified for the passenger stock, was ordered from BT-H.

In general outline, the bodies were similar to those of the B Stock cars, but much shorter, being just under 26 feet over headstocks as opposed to the 49 feet of the passenger cars. The clerestory roof, windows and bodyside panelling were all in the B Stock style and the large side doors were the same as on the B Stock motors with luggage compartments. However, unlike the wooden B Stock cars, the loco bodies were steel-framed and panelled, so the body sides were thinner and the ends flatter than the B Stock. Even the roof was steel plated, riveted to the steel frame. They were the first steel-bodied vehicles owned by the Underground group.

The locomotives were originally single-ended, i.e. they had a driving position at one end only. As a result, they normally worked in pairs, coupled back to back. Regardless of that though, from the outside the body was designed symmetrically about the centre line, so that the bodysides looked identical, regardless of which side you looked (Fig. 1). The driving ends had the usual District style marker lights.

I suppose we might wonder why they decided to use two small locomotives instead of one large one but, looking at it from the engineer's point of view, it was the only way they could get the power required to work the trains and maintain a standard equipment design. There was also the restriction of the rather tight curves on parts of the District which would rule out large locomotives with long wheelbases. In fact, with a pair of single-ended locomotives, you effectively had, in a sense, one large articulated one.

Each locomotive was mounted on two standard, cast steel, Type A motor bogies, similar to those used on the B Stock but with stiffer springs to allow for the higher centre of gravity. The locos were long enough to accommodate only the bogies underneath, so all the traction and braking equipment was fitted inside the body. The four motors on each loco were the usual 200hp GE69s, which gave 800hp per loco or 1600hp per pair. This was thought to be more than enough for anything they might have to pull. The original LNW train weight was given as 140 tons, rather less than the all-up weight of a 7-car electric set but to that you have to add the weight of two locos. Individual loco weight was recorded in two separate sources as 28 and 36 tons. Since two motor bogies would have weighed over 10 tons each, to which you must add the weight of the body and equipment, realistically it's got to be 36 tons. Given that, the power/weight ratio works out at about the same for the loco hauled train and the multiple unit.

Needing to couple to both District and main line stock, the locos had to be fitted with the usual Ward coupler used on the District as well as the standard British screw coupler and side buffers. To accommodate the screw coupler, the corrugated central anti-climber adopted for use on the District's electric stock had to be split and the coupler hook placed in its centre.

Initially, I was puzzled as to why the anti-climber was provided. At first I thought it wasn't necessary, since any normal shocks would be absorbed by the buffers and the buffers would not prevent a vehicle overriding the locomotive. However, it became clearer when I considered how the locomotives would be coupled to a standard District electric car. Since the electric cars didn't have side buffers, when the Ward coupler on the loco was coupled to the Ward coupler on the car, the anti-climber could prevent an override in a collision – not that it was ever tested, as far as we know. In addition to the screw and Ward couplers, there were the usual side chains for emergency coupling, hoses for both air and vacuum brakes and twin jumper sockets for power and control, making for a rather cluttered front end.

LOCO BRAKES

Mention of vacuum brakes leads nicely into a review of the locomotives' braking setup. It was rather unusual and because it's probably quite rare, it is worth describing in some detail just to make a record of what was done. The reason for the unusual setup was because of the need to provide air braking (Westinghouse of course) for District trains and the vacuum brake for those main line railways, like the LNWR, which used the vacuum.

To get an idea of why the District's system was unusual, we need to remember certain basics:

- The Westinghouse brake needs a supply of compressed air, so you provide a compressor (or several) to supply it.

- The vacuum brake needs a means of creating a vacuum¹ in the braking system – sucking the air out of it rather than pumping air into it like the Westinghouse brake. The means of creating the vacuum usually takes the form of a steam operated “ejector” on a steam locomotive or an electrically operated “exhauster” on an electric train.
- Because of their differences in operation, you usually have separate driver’s controls, control pipes, valves and brake cylinders for each system.

Now, the easiest way to fit both these brake systems to a locomotive is to double up on the equipment and just use whichever set is appropriate for the train you are working. Certainly that’s what they usually do on certain preserved steam locomotives when they are required to work trains with different braking systems. On the District’s electric locomotives, this was done too but with a difference. There was no separate compressor and exhauster, just a single pump. It was used for both and it was connected to a “main reservoir”. We normally associate a main reservoir with a storage tank used for air brake systems but the District arrangement was to use the reservoir for both air and vacuum brakes.

This arrangement had several innovations. First the pump had to have two 3-way cocks to enable it to be set up to act as either a compressor or as an exhauster. Put simply, you had to set them up to either suck (vacuum) or blow (Westinghouse). The pump had a suction pipe on one side and a compression pipe on the other. The 3-way cocks were used to select the system you wanted and to connect it to the main reservoir. There was a separate driver’s brake valve for each system, so you had to make sure that you connected the correct one to the supply pipe from the main reservoir. Each brake valve had its own isolating cock.

There is no indication on the drawings I have studied of the electrical control system used for the brake pump². Normally, an air compressor

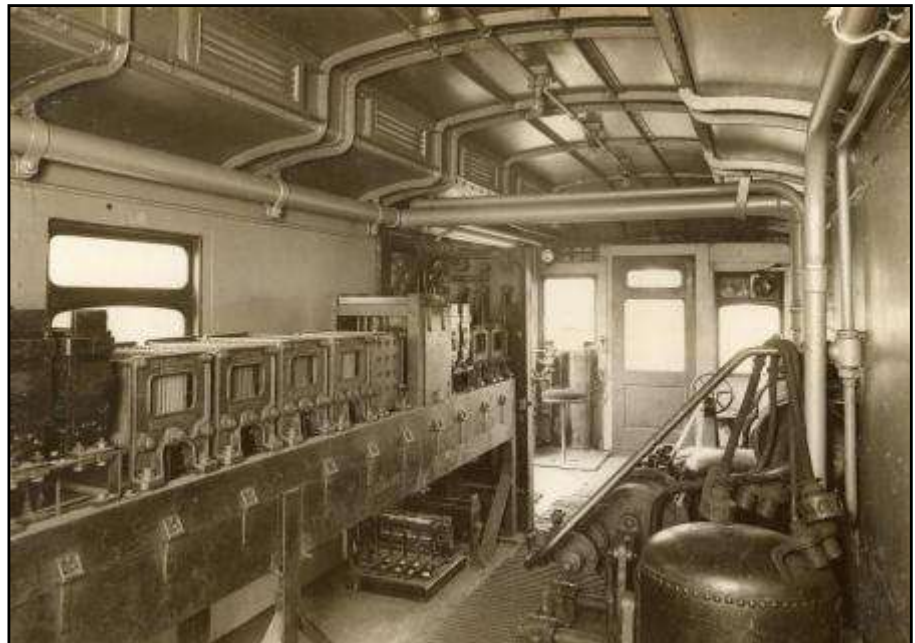


Fig. 2: The interior of one of the District’s electric locomotives, built in 1905, looking towards the driving end. The traction equipment is on the left (the resistor grids can be seen sitting on top of the contactor boxes) and brake equipment on the right. In the right foreground is one of the two vacuum brake cylinders. Immediately above it is a set of jumpers (the twin power jumper plus the control jumper), hanging over the pipe leading to the triple valve controlling the Westinghouse brake cylinder. The very large diameter pipes (4”) you can see, are needed for the vacuum system. The driver’s controls immediately in front of the cab seat show the master controller on the right and the brake valves on the left. This view does not show the loco’s original condition, since the top marker light has been moved to the offside cab window as on passenger cars but little else has changed since the locomotive was built.

¹ The vacuum is usually measured in level required to get a released brake

² I hesitate to call it a compressor, alt the National Brake Co’s standard cor

has a governor (a pressure switch) which automatically switches it on when the air pressure drops to a preset minimum and off when sufficient pressure is obtained, and I imagine this was done here too. For the vacuum brake, since there was a substantial reservoir available for rapid brake release, the pump would probably have been arranged to operate continuously, topping up the vacuum reservoir as required. There is no evidence of a two-speed arrangement, which is what you might expect for a conventional vacuum system.

Another unusual feature of these locos was that there was a main reservoir vacuum pipe as well as a train line vacuum pipe. Normally, vacuum braked trains have only one pipe, whereas Westinghouse braked trains (electric multiple units at least) have two, called the main line and the train line on the Underground³. The purpose of the second vacuum pipe on the District's electric locos was to connect the main reservoirs on the two locomotives of a pair, presumably because they didn't consider

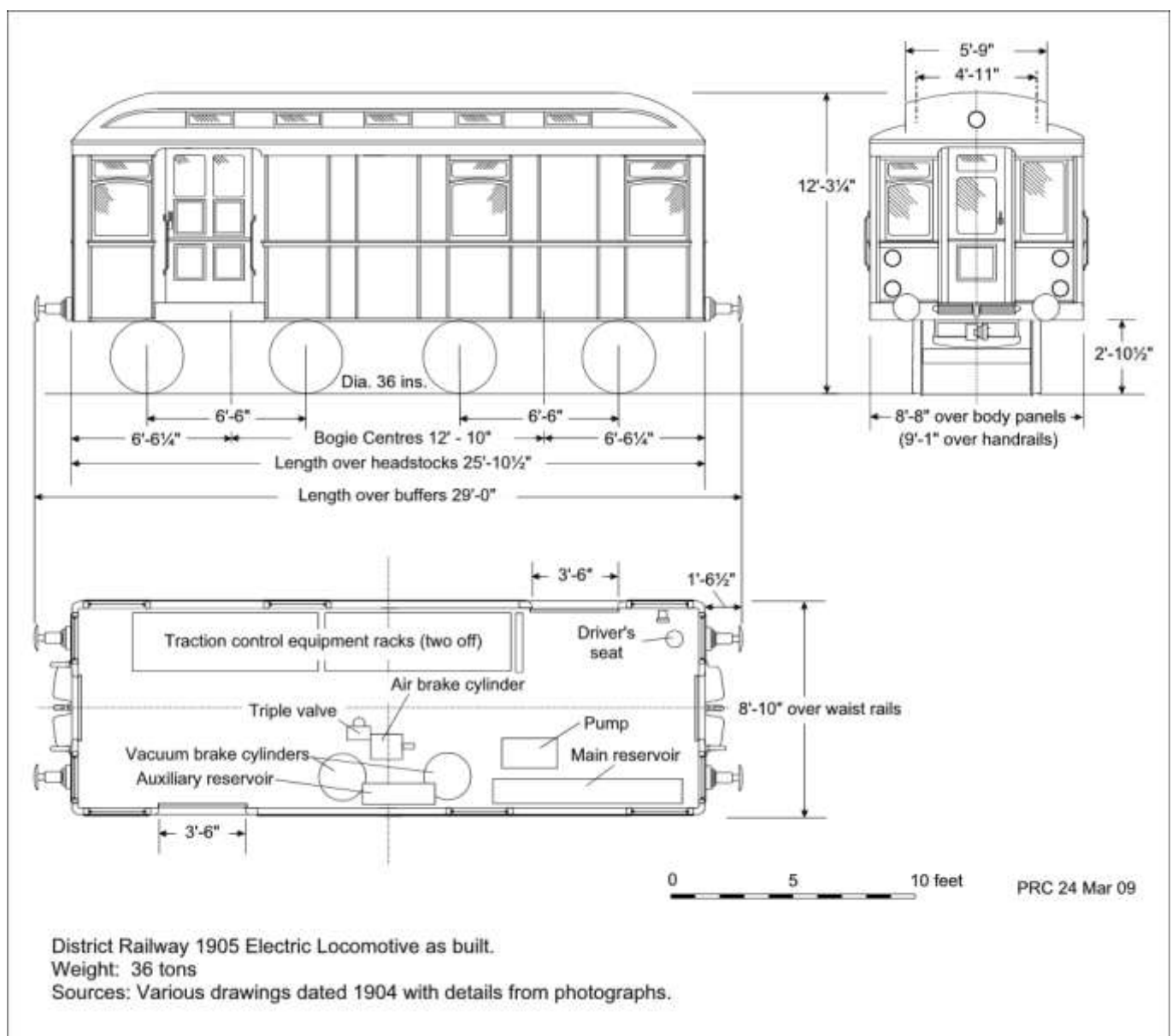


Fig. 3: Scale drawing of District Railway electric locomotive as built in 1905. The original drawings were labelled "LNW Locomotives", which might have been confusing for the unaware. They also used American descriptions like "engineer's valve" for driver's brake valve. The locomotive bodies were designed to be symmetrical on the outside, regardless of where the driving position was.

one reservoir was enough. They were connected by a hose across the coupler between the two of them. The second vacuum pipe was not provided at the outer ends, since it wasn't needed on the train.

The locomotive brake controls were, unlike some locomotives' systems, arranged to work exactly like the train brakes. There was no straight air brake for use when the loco was shunting or working light. Since there was no room under the loco for any equipment, the pump, the main reservoir and the associated pipes, valves, cocks and brake cylinders were all mounted inside the body along the right hand side when looking forward. The traction control equipment racks were mounted on the left hand side. With the brake cylinders inside the loco and the brake blocks outside on the bogies, there was some difficult rigging passing through the floor.

So, the driver preparing a pair of locomotives had quite a bit to do, with ensuring that the cocks were all set in the right positions, hoses were connected and the supply was working properly – on both locos. He had gauges at the driving positions to help him. He also had the tripcocks to see to. A tripcock was provided on the bogie at the driving ends. It worked on either the Westinghouse or vacuum brake. The pipe from the tripcock itself was connected to two isolating cocks, one to isolate the Westinghouse brake, the other the vacuum brake. As if you hadn't got enough to do, you had to select the appropriate connection to whichever brake you were going to use.

TEST RUNS

The locomotives were delivered late. The first bodies didn't arrive until early in June 1905 and they still had to be fitted with their electrical equipment at Mill Hill Park depot. A special team of 40 men were put to work on them but they weren't ready for service until late in November 1905. Before they went into service, the by then usual single test run was set up to try out an electrically-hauled LNWR train during the night of 28/29 November 1905. Two pairs of the locos were dispatched from Mill Hill Park depot to Earls Court at 23.50. At Earl's Court, one pair was placed in "The Yard" to the east of the station to await the arrival of the carriages from Willesden, while the other pair went on to Mansion House to act as turn round locos. The carriages arrived at Earl's Court behind a LNWR locomotive which was uncoupled and then swapped places with the District locos. The District locos took the train to Mansion House. When it arrived, the pair of locos already there was coupled to the west end of the carriages while the arriving locos were uncoupled. The train then returned to Earl's Court and the District's locos swapped with the LNWR steam loco waiting patiently for its carriages to be brought back. Once the LNWR train had cleared Earl's Court, the arriving locos waited for the second pair to come back from Mansion House and the two pairs went home to Mill Hill Park coupled together. It was late at night, 02.00 by the time they got back to depot. It must have been a lively run. You can bet they got a move on. They had a total of 3,200 hp – about the same as the old "Deltic" (Class 55) diesel locomotive – and nothing to pull. The top speed would have been limited by the motor characteristic but you can imagine they gave it some "welly". Anyway, with this test apparently going well, the locomotives began working the LNWR trains from 4 December 1905.

There was another trial run on 23 January 1906 – very early in the morning – when an LNWR train was worked by electric locos from Earl's Court to South Harrow and back. Quite why this was done isn't recorded. Perhaps they were looking at doing

Sunday trips into the Middlesex countryside for LNWR passengers. Nothing came of it though.

The LNWR service through to Mansion House with electric haulage lasted just over three years, until 31 December 1908. From 1 January 1909, the service was reversed at Earl's Court using only LNWR steam locomotives. The electric locos were now surplus to requirements so, to ease the mounting pressure on the existing fleet, they were, as I mentioned in Article No 5 (*Underground News* No. 571, July 2009), used to provide power for Circle trains. Each train was made up with a single loco at the front with four trailer cars behind, including a control trailer at the other end. The trains had to be worked with the locomotive at the front so that the rear guard could look after the doors on the two passenger cars at his end of the train. As some of the trains used on the Circle started or ended the day working a trip or two to Putney, Wimbledon or Mill Hill Park Depot, the locos would have been seen on passenger trains at these places during this period. There would also have been some care to ensure that the loco normally worked at the front of the train but some of these trips off the Circle must have resulted in the loco being at the back. I wonder if this was the earliest example of electric push-pull operation.

As I mentioned earlier, the thought of using the locos with standard District cars made me wonder how the side buffers on the locos would affect the coupling. To couple the loco to a Circle train, the Ward couplers had to be used since the standard District cars did not have screw couplings. Unfortunately the drawings don't show how far the Ward coupler on the locos extended out from under the anti-climber but pictures suggest that it was possible to couple to a standard car, just. I suspect the end car of the 4-car sets used for the trains had buffer pads fitted to their outer end to provide a cushion for the loco's side buffers. Photos survive of a number of later cars with side buffer pads. Although they were done later than the period of loco working on the Circle, at least it proved it was possible.

CHANGING LOCOMOTIVES

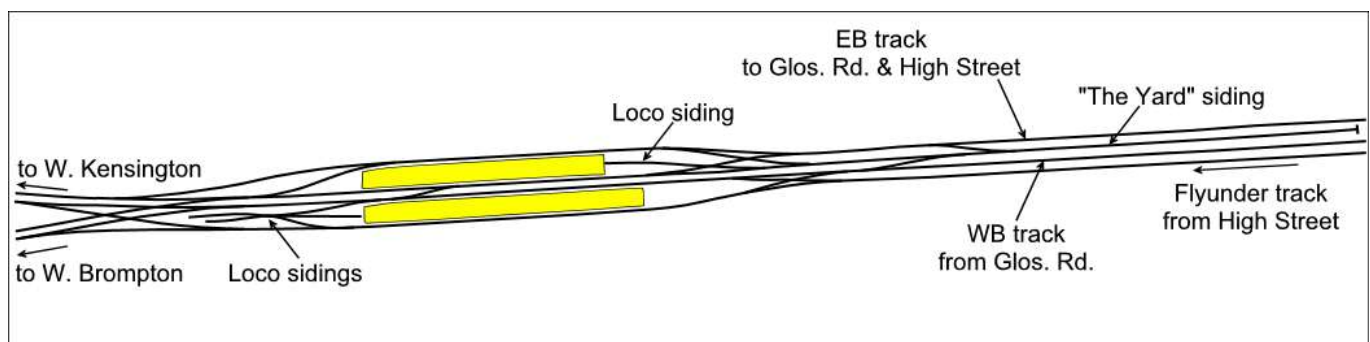


Fig. 4: The track layout at Earl's Court (District) in 1906, as near as possible to scale. Loco sidings were provided at both ends of the station. Those at the west end were removed in January 1909, forcing all loco changes of LNWR trains reversing there to be carried out at the east end. At the east end, there was a long siding called "the Yard" and a loco siding. Connections at both ends of the station were complex and the double flat junction at the west end was a source of conflict until it was replaced by the flyover built in 1914 to grade separate the westbound track to West Kensington and the eastbound track from West Brompton.

Readers who know the layouts in place at Earl's Court and Mansion House today might wonder how they did loco exchanges at these places in 1905-08. Well, the track layouts were more versatile in those days and special short sidings were

available to hold locomotives awaiting trains. At Earl's Court, believe it or not (Fig.4 above), there were loco sidings at the west end of the station as well as a double junction between the ends of Platforms 2 & 3 and the westbound tunnel mouth. At the east end, there was The Yard and a short loco siding between the two eastbound tracks. Loco changes from steam to electric were given 3 minutes in the timetable.

The west end sidings there were lifted in January 1909, just two weeks after the curtailment of the LNWR service to Mansion House. You still needed to change the locomotive during reversal (by using a second loco) but now it could be done by taking the arriving train into The Yard at the east end of the station and doing the business there. They were allowed a minimum of 11 minutes between arrival on the up platform and departure from the down, although it was usually longer.

FROM THE CIRCLE TO SOUTHEND

The District was not fond of the LNWR Mansion House service and they were glad to be rid of it. It was a nuisance – it got in the way. While it was still steam operated, during the period after the main line electrification in July 1905 but before the electric locos went into service in the December of that year, they had to leave a 4-minute gap behind each LNWR train to avoid the following electric train being delayed. Even then, slow acceleration out of stations still sometimes caused delays. Things got a bit better when the electric locos took over but then there was the engine changing at Earl's Court to contend with. If you can imagine the same service frequency we have today through Earl's Court and then stick in two trains every hour which stand in Platform 2 while the locomotives are swapped over, you can see that you would lose at least 3 minutes for every one. Although they still had Platform 1, by this time, traffic was increasing and more paths were stuffed into almost every new timetable. No wonder they were pleased to get the loco changing moved into The Yard.

While the locos were on the Circle service only four were needed for the service at first but six were used regularly, leaving the other four to be laid up. One of the laid up locos had driving controls added at the trailing end in October 1910 so that it became double ended and it was then used for shunting in the yard at Mill Hill Park depot.

With the locos settled into their new duties, it was decided to rationalise the fleet. The three remaining laid up locomotives (Nos. 1A, 9A and 10A) were stripped of their equipment and bogies. This was done late in 1910 so that the bogies and traction equipment could be used on some new passenger cars, part of the C Stock, which was ordered in April that year. The first cars of the new stock arrived at Ealing



Common in December 1910. The three loco bodies were written off in 1911.

The use of the remaining electric locomotives on the Circle lasted only 18 months, at the end of which they were diverted to a new job – a service from Ealing Broadway through to Southend, using trains supplied by the London Tilbury & Southend Railway (LTSR). This started on 1 June 1910. The District's locos worked the trains between Ealing and Barking, where steam locomotives belonging to the LTSR took over. This turned out to be a popular service and, over the years, some of the trains were extended to Shoeburyness. Some only went as far as Pitsea and, for a period, one of the westbound morning trains started from Upminster. The service began with two trains each way per day until 1919 when a third was added and it continued, usually with three trains per day, until it was withdrawn on 1 October 1939.

Once the locos finished working on the LNWR trains at the end of 1908, their vacuum brake equipment was probably never used again. They would have used the Westinghouse brake during their time on the Circle of course and, since the stock used for the Southend trains was owned by the LTSR and this was, like the District, a Westinghouse railway and had been since 1885, the vacuum wouldn't have been needed for this work either. In spite of this, the locos seem to have hung on to their vacuum equipment to the end of their lives.

UPGRADES

As we will see in future articles, the 1920s made for an interesting period on the District, with the first bulk scrapping of electric stock and much of the remaining fleet going through an upgrade programme, which included the electric locomotives. The part of the programme involving the locos, as far as its implementation went, hardly warrants the word "programme". It seems to have been so haphazard that only two of the locos (Nos. 1A and 3A) are recorded as ending up the same. All the others had variations which required the provision of a list showing which locos could work with which. The table below, which was copied from the original list and which was first published in *Underground News* No.256 (April 1983), is shown with additional dates which have survived.

**District Railway Electric Locomotives
Summary Table**

Fig. 5: A pair of District electric locomotives No. 7A and 2A awaiting a return trip to Ealing in what I think is the loco siding at the west end of Barking station between the platforms and the Queens Road bridge. No. 7A, nearest the camera, has the "Underground" name which first appeared on vehicles in 1923; the other loco doesn't, which would put this picture at around the mid-1920s. The original way of writing the number "No 7A" has become just "7A" and the number is moved from the centre of the body to the forward end. But the style remains old compared with the new Johnston "Underground". Note also the lighter colour of the doors, window frames and "letter board" at cant rail level. This is probably the grey introduced at about the same time. Loco 7A was double ended but 2A was single ended.

Original Number	Delivered	Driving positions	Modified	Control equipment	Can only run with	Disposal or Scrap
1A	12.06.05	-				1911
2A	12.06.05	Single End (W)	Aug-27	ex F Stock – centre	4, 6 or 7	01.07.38
3A	29.06.05	Double End	Feb-26	old – side	1 or 5	17.11.39
4A	29.06.05	Double End	Aug-28	old (T) – side	2, 6 or 7	17.11.39
5A	29.06.05	Single End (E)	Sep-25	old – side	1 or 3	16.10.39
6A	29.06.05	Single End (E)	Apr-28	old (T) – centre	2, 4 or 7	16.10.39

7A	29.06.05	Double End	Mar-29	ex F Stock – centre	2, 4 or 6	01.07.38
8A (1A)	29.06.05	Double End	Apr-26	old – side	3 or 5	31.10.39
9A	1905					1911
10A	1905					1911

Note: T = altered for tapped field. 8A was renumbered 1A in 1911. All locos were renumbered L1 to L7 in 1932.

The first thing which this table does is to debunk the idea that the upgrading of the locos involved them all having both their control equipment and traction motors replaced. The perceived wisdom, as offered by the late J. Graeme Bruce in “Steam to Silver” (both editions), was that they were upgraded in 1922, using the traction equipment and type GE260 motors removed from 14 F Stock motor cars, part of an order for 100 vehicles of the stock delivered in 1921. The 14 cars were being de-rated in order to reduce the fleet’s excess power consumption. The de-rating of the 14 cars would have given up 14 sets of equipment, exactly the number required to replace the two sets of old equipment in each of the seven locos. Bruce then goes on to say that, in the New Works upgrading programme of 1938-40, the locos were scrapped and the equipment was recovered so that it could go back to the F Stock fleet. The kit was used, he wrote, to convert 12 control trailers to motor cars as part of a second re-organisation of the fleet. Sadly, none of this ties in with our list. It doesn’t tie in with a traffic notice of September 1923 either. This says that only nine cars of F Stock had had their power reduced by then, so the transfer to the locomotives could not have been completed before this date. Bruce’s 1922 date was too soon. They wouldn’t have had the equipment to do it.

Unfortunately, the table poses more questions than it answers. It gives us an assortment of facts, not all of which quite fit in with each other nor with other information we have. First it shows that all the locos went through some sort of modification programme and that they were in two groups which couldn’t work with each other. Whether the groups existed before the modification programme or it appeared as a result of it isn’t clear but the list does offer a clue that it was as a result of the programme. One group of four locos is shown as having had their traction equipment either modified or replaced, apparently to give more power, while the other group of three locos were recorded as modified but not what was done.

The group of three locos (3A, 5A and 1A) were the first three to be modified. They were done between September 1925 and April 1926. With the lack of any other evidence, my suspicion is that this was when they were fitted with GE260 motors



removed from the downgraded F Stock motor cars. I suspect too that the work was done while the locos were going through their normal 3-yearly mechanical overhaul. I did wonder if all the locos were equipped with the new motors earlier than the dates in the table and this is a possibility. Perhaps the modifications to the other four locos were done later. One thing we do know is that the first three locos retained their original control equipment.

Then, some sixteen months later in August 1927, the traction control equipment on loco No.2A was replaced with F Stock equipment. I think the motors would have been replaced by GE260s at the same time, unless of course, it had already been done as I suggested above. This must have been a trial conversion. They only did one then, the second loco to get F Stock traction control (No.7A) not being converted until March 1929. Seeing as 2A apparently could not work with other locos until they were modified and the next one to be modified to work with it wasn't done until April 1928, 2A must have worked on its own for 8 months, or perhaps it was just used as a test loco.

One other point about this loco is that it is shown as having its traction control equipment moved from its original position along the side of the loco body to a central position. Quite why this was necessary isn't clear to me but then, thinking about it, it could be that the weight distribution was better with the traction equipment positioned centrally. With all the control equipment along one side, there might have been problems with adhesion or suspension. And we should remember that, on the F Stock, the equipment was mounted under the floor so, when it was moved to the loco, there would have been some re-arrangement of the bits to get it to fit. Perhaps that's why it was fitted in the centre and perhaps it's why only two locos were done.

Thinking more about the conversion work, it occurred to me that it would have been quite difficult. The traction control equipment was originally installed on long racks, which would have been too heavy and big to crane into the loco through the doors during assembly. They couldn't get them through the roof, as this was fixed when

Fig. 6: A nice photo of a pair of District electric locos hauling a train up out of Ealing Broadway towards Hanger Lane Junction. The coaches were the "corridor" bogie vehicles bought for the service by the LT&SR in 1912. Previously the stock used ranged from old 4-wheelers and 6-wheelers to conventional compartment bogie vehicles and these still acted as substitutes from time to time. Some trains were short formations of 4 coaches worked by a single loco. These coaches are recorded as having toilets with retention tanks, a very advanced feature still not yet available on all trains with toilets today. The second of the two locos seems to have had a recent overhaul. Close inspection of the original photo indicates that it is double-ended. An interesting feature of these trains was the variety of destination plates used over the years including, "Southend & Ealing Through Train", "Southend Corridor Express" and "Southend Through Train".

the loco bodies were delivered. The subsequent changes to the equipment would have been done piecemeal, with each part being manhandled in or out of the loco through one of the doors. They might have found it easier if they had a small crane available.

Anyway, the next conversion was to No.6A in April 1928. The table suggests that it retained its original traction kit but it was modified to have “tapped field” control. “Tapped field” refers to the system sometimes adopted on electric trains, where the traction motors were forced into producing more speed by varying the field windings. It was provided on the GE260 motors provided for the F Stock but not on the original GE69s. In fact, this was the first and only instance of its use on the Underground. Later attempts to get higher speed out of motors used the field weakening technique instead. The tapped field control on No.6A means this loco had to have GE260 motors taken from F Stock. The odd thing about this loco is the reference to its control equipment being mounted in the centre. Unlike No.2A, it retained its original equipment, so why was it moved? I’ve no idea other than my suggestion about adhesion but it must have been expensive and time consuming and that makes me wonder if the list was in error here.

One other loco retained its original equipment in its original side mounted position but was modified for tapped field control. This was No.4A, done in August 1928. It was followed by the conversion of No.7A in March 1929, which had F Stock equipment fitted like No.2A. This completed the work recorded in the list. They ended up with two groups of locos and with a variety of equipment. There doesn’t seem to have been any pattern to the work – no grand plan – and I have the feeling that they were first worried about the condition of the original motors and hit upon the idea of using the spare GE260s. They might



Fig. 7: A photo of a single District electric loco (believed to be 7A) with a train of old LTSR 4- and 6-wheel coaches. The destination plate shows “Pitsea”. The location is difficult to determine but I could guess that it’s possibly on the approach to either Acton Town or Barking. It could even be Ealing. It is recorded as being taken in 1925 by HGW Household.

have done this earlier than the dates shown in the table and the modifications to the traction control might have come later. I also wonder if the excess traction equipment on the F Stock was removed at same the time the motors were taken off. Perhaps it was done later. It might even have been left in place on some cars until the New Works conversion programme of 1938-40.

Looking forward to the time when the locos were withdrawn and their equipment was supposed to be salvaged for the conversion of twelve F Stock control trailers into motor cars, we discover from the recorded conversion dates for the F Stock that, by the time seven of the cars had been converted, in late September 1939, only two of the locomotives were scrapped. This meant that, assuming all the required motors came from the locos, there were only enough released at that time to equip four

cars. However, another motor car had been reduced to single equipment in about 1928 and there would have been sufficient spare motors around to allow a conversion programme to proceed before all the locos were available.

The table shows the official record as we have it almost 80 years after the events. My interpretation, based on I hope, rational guesses and repeated filtering of the table in an Excel spreadsheet to see what it showed up (not much), is open to question on a number of fronts so I'd be pleased to hear alternative ideas. Obviously, as the table suggests, some modification work was done during the 1920s and, afterwards, the locos carried on working the Southend service until it was withdrawn on 1 October 1939. By this time, the two locos with F Stock control equipment (now carrying the numbers L2 and L7) had been scrapped. The rest were got rid of over the next six weeks.