

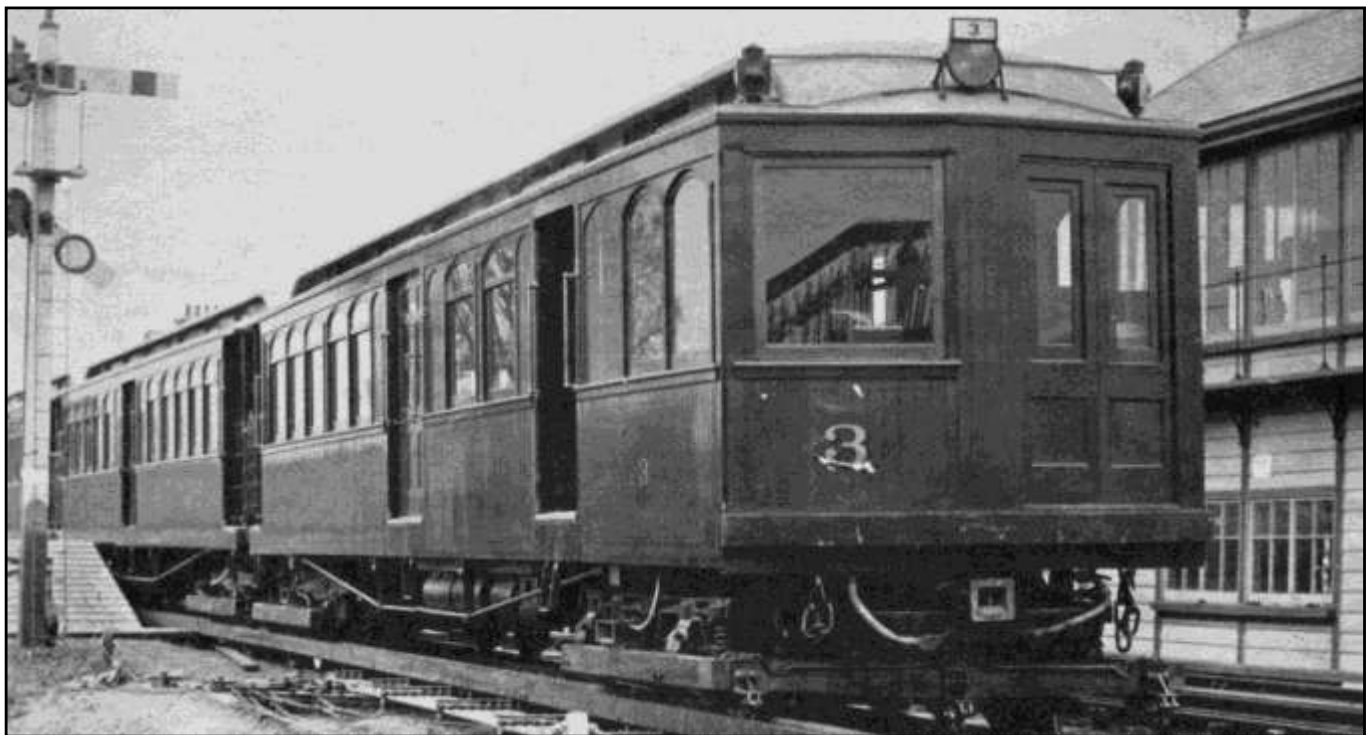
DISTRICT ELECTRIC TRAINS

3 – FROM A TO B

by Piers Connor

TRAIN SYSTEMS

Early photos of the A Stock being tested on the Ealing and South Harrow line (E&SH) in 1903 suggest that the UERL¹ engineers were, not surprisingly, making some of it up as they went along. For example, during the early testing phase, all the cars in the 4-car portion of the B T-H train were fitted with current collection shoes. This is confirmed in at least two photos – one of which we saw last month, the other being below in Fig. 1. You could understand the motor cars needing shoes



– for the traction system, lighting, heating supplies and the air compressor – but why put them on trailers? Well, perhaps the trailers needed their own power supply for

Fig. 1: Photo of 1903, A Stock, B T-H equipped train standing partly in the westbound platform at South Harrow during testing. This picture gives us a number of interesting details. The cab window shows the master controller, a B T-H type, complete with deadman. Next to it is the end door, the narrow half near the centre only opening. Below, in the middle, is the Chicago-designed Van Dorn coupler with the air hoses (one train line and one main line) on either side. Outside those are the safety chains. These were provided in case the coupler broke. This was not uncommon. The wooden beams supporting the original shoe gear can be seen on the front of the bogie. This photo is believed to show the east end of the train shown in Fig. 2 of last month's article. LT Museum Photo.

lighting or heating or both, which means that perhaps no provision was made for them to be supplied from the motor cars. There is another photo which suggests this was the case. It may have been due to the fact that the design was American and

¹ Underground Electric Railways of London Ltd., the company which managed the District's electrification work.

most of their early multiple-unit trains were made up with all motor cars so they all had shoes. Maybe they had forgotten that the trailers wouldn't have shoes and needed a supply for lights and heaters to be jumpered in. Whatever the reason, the shoe gear was soon removed from the trailers and it became standard practice on the District to provide a 600-volt busline² along the train to connect the shoes of all the motor cars. This allowed any car to tap into it for electrical supply requirements. It also helped to reduce the problems of long gaps in the current rails.

One thing which didn't work well was the original current collection system. The arrangement consisted of shoes hung on a wooden frame suspended around the outside of the bogie (Fig. 1 above). The positive shoes were fitted to the outside corners of the frame, at the front only, while the negative shoes were hung from the centre of the cross beam. This gave a total of six shoes per car, just the same as today. However, the shoes were spring loaded, to provide some downward pressure on the current rail, as they had been on the 1900 experimental train. This was, in most respects, the worst of all worlds. Perhaps to avoid the risk of accidental contact with the bogie frame, the shoes were positioned as far from the centre point of the bogie as possible. This meant that, on curves, the shoes tended to drift off-centre from the top of the current rail. This would, given some reasonable tolerances and normal wear and tear on the track and bogies, eventually result in a shoe slipping off the top of the rail and getting trapped under the rail head. The problem would be exacerbated by the downward spring pressure. Loss of the shoe or even overturning of the rail was likely to follow, with all the resulting damage to train and track and, probably, the tripping out of power supply from the sub-station too.

There is no record that this ever happened to the A Stock on the E&SH but something led them to change the shoe gear design for the District's main line fleet. The positive shoes were moved nearer to the centre line of the bogie pivot point and the original wooden frames were removed and replaced with the system still in use today - wooden shoebeams suspended between the axleboxes, with the shoes hanging from them. The spring system was removed, so that the weight of the shoe was the only downward force available. This seemed to be sufficient - see the box on the right. The negative shoes were tucked away under the bogie.

The Metropolitan Railway also adopted the original A Stock shoe gear arrangement but they, being without the benefit of a test train to show up its weaknesses, used it on their first batch of 20 trains. This was, as we shall see, to prove disastrous when the Metropolitan started to run trains round the Circle line over the District's track.

Whatever the original power supply arrangements on the individual cars were, there was no through control along the train for lighting or heating. You couldn't turn the train heaters or lights on from one place, like you can today. Just as you go from

CONTACT

Just how tentative the contact between a collector shoe and the current rail is, was imprinted in my memory after I watched a film made about 1981 of a shoe on a 1959 Tube Stock train running on the Piccadilly Line. The shoe bounced and wobbled along the current rail all the way to Cockfosters, barely making contact for most of the way but it performed perfectly normally.

It wasn't the most riveting film I've ever watched but it was useful in showing how something that, when you look at it, seems it shouldn't work at all but which has actually done a pretty good

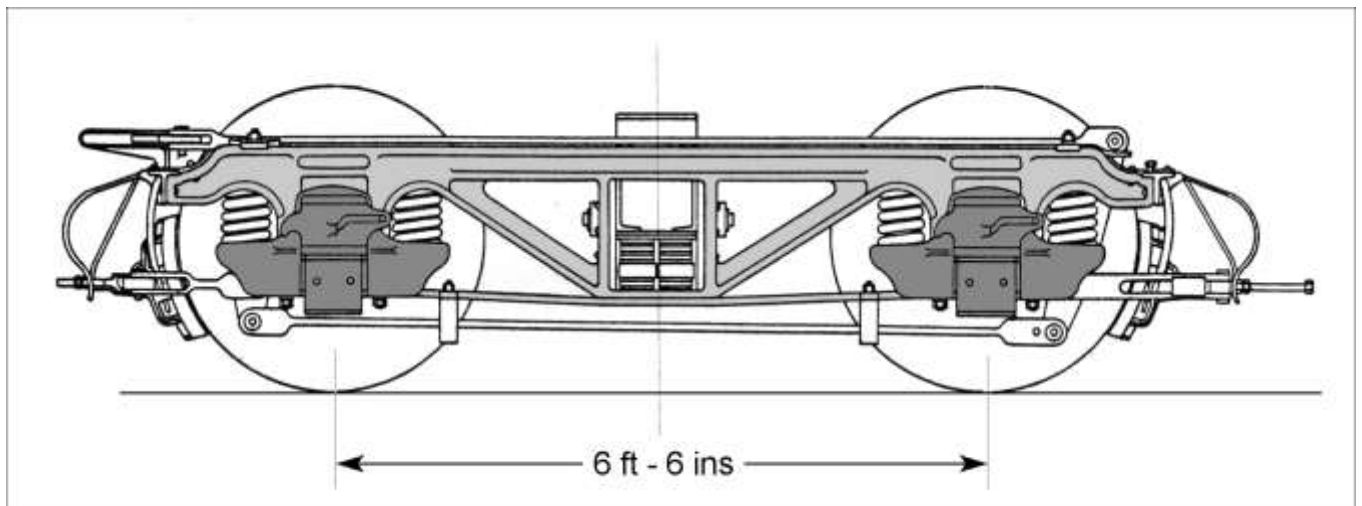
² Busline = as mentioned last month, electrical speak for common conductor cable providing power to different systems.

room to room in your house to turn on the lights, you had to go from car to car along the train to turn on the lights and heaters. The switches were mounted in a box above the bench seat inside the end partition separating the saloon from the entrance platform. Since they were expecting to have a gateman attending each pair of adjoining platforms, this was not considered a problem.

The cars were coupled to each other using an American link and pin system developed by the Van Dorn Coupler Company of Chicago. The coupler consisted of a bell-mouth opening on the end of the drawbar into which the link was inserted. Two slots in the receiving end allowed the pin to be dropped into a hole at the end of the link. There were two to make it easier – you could use either. It was normal to leave the link permanently fitted to one of the couplers. Following custom in the US, British-style side buffers were not provided, so the shocks of traction and braking between vehicles were dampened by springs fitted integrally with the drawbars. If you don't keep the springs and drawbars in very good nick, this can soon lead to some rough riding.

BOGIES FOR THE A STOCK

Two types of bogies were provided for the A Stock, a motor bogie and a trailer bogie.



for the main GERE tube and carriage rods. It had 8 ft 6 in diameter wheels. It was later known on the District as the Type A bogie. The frame was cast steel, then fashionable in the US but not in the UK. Cast steel is now the standard for most modern bogies. This drawing is a scanned and cleaned up version of one by the late Stuart Harris. My thanks to Andy Barr who dug out a set of Stuart's drawings and sent me a copy.

Both were designed by Frank Hedley, General Superintendent of the Interborough Rapid Transit (IRT) subway of New York City³. Hedley was formerly one of Yerkes staff in Chicago, where he had been Motive Power Superintendent for the Lake Street Elevated Railroad. He was, probably, one of the best engineers they ever had there. Amongst other things, he designed bogies for that railway and for the North Western Elevated in the same city. He was the typical Victorian multi-disciplinary engineer, being involved with Sprague on electrification, in mechanical design for rolling stock and even producing station designs.

Research suggests that Hedley was born in south east England in 1864. He had a family connection with railways in that his grandfather was half-brother to William

³ Then under construction. It opened in 1904.

Hedley⁴, one of the designers of the steam locomotive “Puffing Billy”. There is evidence that young Frank started working for the South Eastern Railway as a cleaner but emigrated to the US in 1882 and found work as a machinist with the Erie RR. He rose rapidly through the industry to become motive power superintendent with Chicago Lake Street Elevated RR in 1893 and then superintendent for the combined North Western and Lake Street systems. He went to New York in 1902 and stayed there, eventually becoming head of the IRT until his retirement in the late 1920s. He is recorded as being one of the official pallbearers at Sprague’s funeral in 1932. He died in 1955 aged 91 years. An example of his work survives today in that the “anti-climber” – the corrugated steel buffing plate we have on the D Stock and later trains – was originally designed by him for the New York IRT system.

Hedley’s District bogies were very similar to designs he prepared for the Chicago Elevateds. The trailer bogie was used on a number of lines in Chicago but it only appeared in London on the District’s 1903 A Stock. The motor bogie was much more widely adopted in London. It began life as a trailer bogie under cars of Chicago’s North Western Elevated in 1898 and was then, after its trial on the A Stock as a motor bogie, adopted as the standard motor bogie for the UERL. It was used by the District and the three Yerkes tube lines.

Both designs had cast steel frames (the preferred American solution), steel coil primary suspension and laminated plate secondary suspension. As I’ve described elsewhere⁵, the reason for this was that coil springs tend to be soft and bouncy while laminated steel springs are harder in response and help to counteract the bounciness of the coils. The combination of the two compensates for most of the varieties of movement and vibration generated by the track and vehicle dynamics. The motor bogies had the two traction motors driving the axles through a pinion/gear arrangement. A 7-car train thus had three motor bogies, one at the leading end of each motor car, providing a total of 1050 h.p. or 150 h.p. per car. The trailer bogie design was a “one off” and never appeared under any other Underground stock⁶.

DRAWINGS

Apart from the motor bogie drawing above, this month I have included two scale drawings of the 1903 (A) Stock. Drawings of the 1903 Stock are difficult to find. With willing assistance from the LT Museum, I tracked down a few but they are

LINE OF PROMOTION

Following the withdrawal of steam on the District and the loss of the usual promotional route of cleaner – fireman – driver, electric trainmen progressed through a line of promotion from Gateman – Rear Conductor – Front Conductor to Motorman.

Front Conductors were trained to drive the train in emergency, in case the driver became incapacitated. If a failure required the train to be driven from another cab, the Front Conductor would do the driving from there and the driver would remain at the front to brake.

In 1909, a Traffic Notice reminded Front Conductors that they were allowed to get driving trips to keep their hand in when riding as passenger from the start or finish of a duty away from the normal booking on point. They would just go to the cab and present themselves to the driver to request a trip “on the handle”. Can you imagine the reaction of “the bruvvers” to this today or it even being allowed in a “safety management system”?

⁴ William Hedley (1779-1843) was actually illegitimate. relationship between his father (also William) and his death. His wife had died in 1778 and it was illegal in the in-law.

⁵ For a description of basic bogie suspension, see “The Underground Electric Train”, Article No.1, *Underground News* No.523, July 2005.

⁶ There is an outline sketch of Hedley’s 1903 trailer bogie in “The Underground Electric Train”, Article No.15, *Underground News* No.537, September 2006.

obviously not the originals and were poorly drawn, probably by the drawing office junior. They do show some dimensions and, where possible, I have included these on the drawings.

The first drawing is of a 1903 end motor car in original condition (page 296). The second is of a trailer after conversion to a control trailer, the fitting of footboards and the addition of strengthening panels on the body (page 297). As part of its conversion to a control trailer, an enclosed cab was added in one corner of an end platform but the gate remained on the other side. Marker lights were also added.

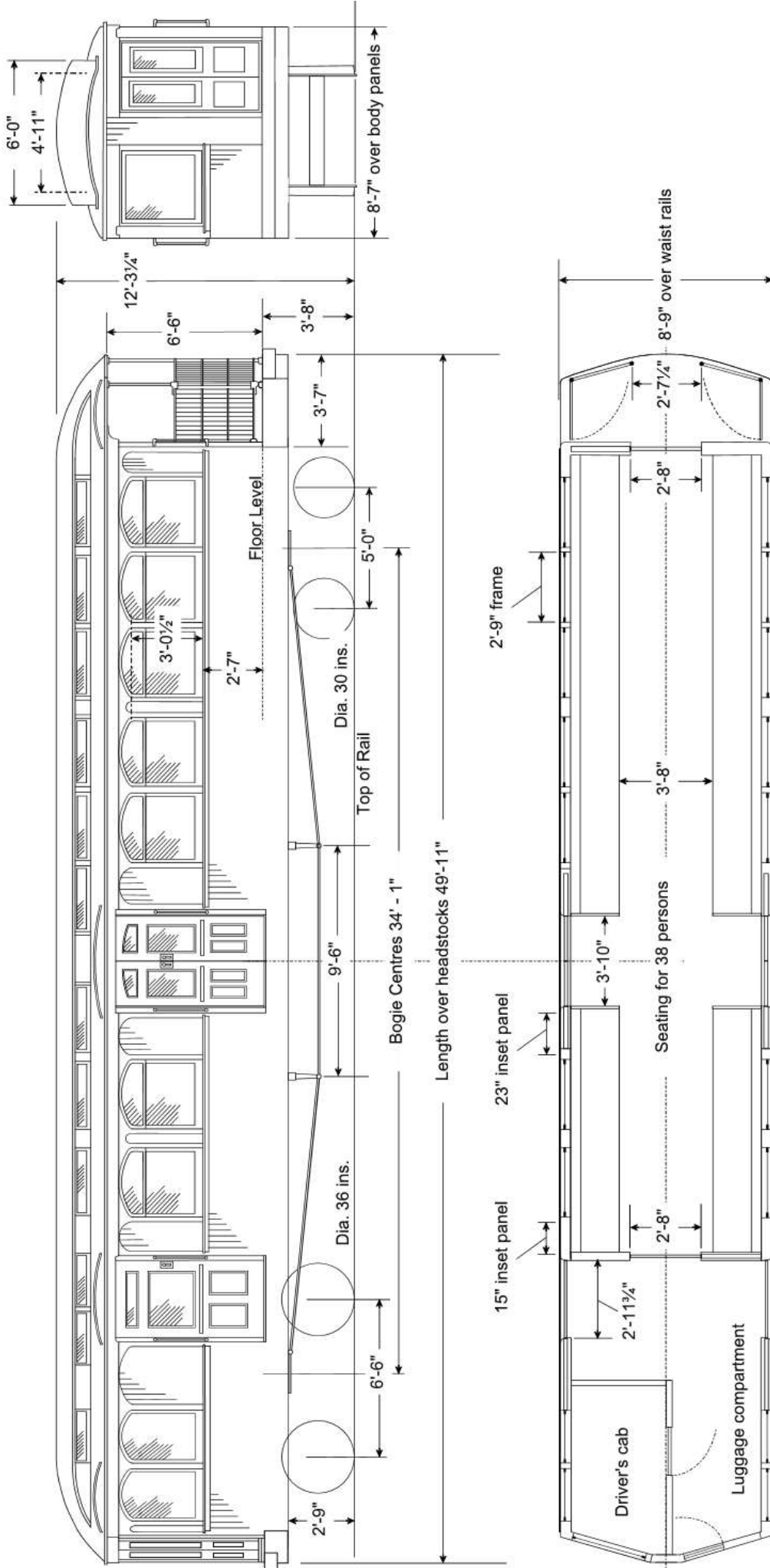
TRAINING

For the electrification of the District and UERL tube lines, training would have been a huge job. Electric traction was new technology and about as far removed from steam locomotive operation as you could get in those days – and today for that matter. They already had a pool of staff – drivers, firemen, cleaners and guards – but they all needed training in the new systems. With a medium term plan to double the train service, they would need even more people. I calculate that they needed to train around 300 staff just to start the main line electric service between Ealing and Whitechapel and this excludes the depot staff. There was another 300+ working in the new rolling stock depot at Ealing Common.

Operational training started on the E&SH line in the spring of 1903, with the arrival of “motormen”, as the Americans called electric train drivers⁷. Apparently, these men were new to the District. The conversion for the District’s existing locomotive drivers started in March 1904.

The training period was variable, allowing some extra time for the less readily adaptable men, lasting for 10 to 15 days. Many of the firemen became conductors and it became the policy of the railway to promote suitable station staff to “gateman” to work on the trains and to replace the station staff with new recruits.

⁷ This title stuck on the Underground and was still the official name for the grade when I became a driver in February 1966. It was only finally abandoned with the introduction of one-person operation in the late 1980s.



District Railway 1903-built (A Stock) end motor car in original condition.

Source: Various drawings dated 1908 to 1913 with details from photographs.



The leader of the training movement seems to have been a certain Mr. Agnew. William Alexander Agnew was recruited by the District for the post of "Rolling Stock Superintendent" early in 1904. He had previously worked for the Glasgow tramways and he was known as a champion of good training in an era when training was at the bottom of most companies priority lists. He was responsible for the introduction into service of the District's main line electric fleet. He later became Chief Mechanical Engineer for all the UERL lines and remained in the post until he retired in 1936. He is best known today as the author of "Electric Trains", published by Virtue in 1937. He also, in 1909, recruited one William Sebastian Graff-Baker as a junior electrical fitter, aged 20, for his workshop at Ealing Common.

The E&SH appears to have been used to train some of the staff intended for the UERL tube lines as well as those on the District. Early in 1904, an agreement was negotiated between the UERL and the District whereby the UERL was to "work the Harrow route" to facilitate training of staff. A group of men were trained as instructors in electric traction and these were used to train the new staff en masse. This is exactly how it is done for new stock today. To help out, some new people were brought into the organisation who had previous experience on the Central London. The CLR depot at Wood Lane was not too far from the District line to Ealing and the new depot at Ealing Common. Transfers to the new electric railway would have been seen as an opportunity for those living in the area who were anxious to promote themselves with their previous electric traction experience. And, there were

doubtless going to be attractions in running trains on the long open sections of the District for men who had worked for two or three years in the confined tunnels of the Central London tube. I am sure too that some "poaching" of staff went on.

A driver's training room was provided at Mill Hill Park station, at least until March 1908 when it was moved to the eastbound platform at West Brompton to allow for the start of rebuilding work at Mill Hill Park. For static technical training, a motor car chassis with a complete set of electric traction kit was provided in the shed at South Harrow. It was even arranged so that the wheels turned when current was applied.

MILL HILL PARK, ACTON TOWN OR EALING COMMON?

To service its new fleet of electric trains, the District built a new depot on a piece of land just to the north of their line to Ealing Broadway between the stations at Mill Hill Park and Ealing Common.

The depot was connected to the line at both stations – east of Ealing Common and west of Mill Hill Park, so you could get trains in and out at either end. The Ealing Common end quickly became known as "the Ealing end". It still is today.

The depot itself consisted of a 9-road shed and a 2-road workshop, with 9 additional outside stabling roads. This could only accommodate about half the fleet and 10 additional sidings were provided east of Mill Hill Park station. More stabling was provided at Cromwell Road and Parsons Green and later at East Ham and Barking.

In typical railway fashion, there was, for many years, no consistency in naming the depot. It started out being called Mill Hill Park depot. There was also Mill Hill Park "yard", which normally meant the sidings east of the station but the open sidings next to the depot sheds were also referred to as a yard. Then were some references, before 1910, to "Ealing Common Works".

On 1 March 1910, after a 2-year rebuilding project, Mill Hill Park station was renamed Acton Town and the depot was then known as Acton Town Depot. The yard east of the station was Acton Town Yard. Gradually, over the next 10 years or so, the depot was referred to as Ealing Common Depot more and more often to avoid confusion with Acton Town yard. During this period, at least one timetable referred to both Acton Town Depot and Ealing Common Depot at the whim of the compiler, even when referring to the same train. Careful scrutiny was needed to be sure where the train was supposed to end up.

The shed was built, together with a couple of sidings, as a temporary workshop for the experimental electrification. It was later dismantled and is said to have been removed to Lillie Bridge for re-erection in the depot there.

New tube stock didn't arrive until 1906, so the first new UERL tube instructors could have been trained on the District stock. It didn't matter too much, the equipment was the broadly the same on all the UERL lines. However, from late 1906, much of the Piccadilly Line stock was equipped at Mill Hill Park depot, so it's likely that training trips or test runs of tube stock took place occasionally around this time. Also, the traffic notices from 1906 onwards record a number of trips of tube stock being transferred between the Piccadilly Line depot at Lillie Bridge and the sidings at South Harrow for storage there. The stock was obviously not fully equipped as these moves were made with a steam locomotive providing traction. Later, Piccadilly stock transfers were arranged between Lillie Bridge and Mill Hill Park to allow maintenance work on the Piccadilly cars to be done at the District's depot.

SOUTH HARROW SERVICES

As mentioned last month, the first electric trains began passenger operations over the E&SH on Tuesday 23 June 1903 but, for this first week, they only worked between Mill Hill Park and Park Royal. There was, apparently, a land slip further up the line. A 15-minute service was provided, in connection with the Royal Agricultural Show being held near Park Royal. Since no record survives of a crossover being available at Park Royal, one can safely assume that trains were worked up there on the westbound road and then had to come back "bang road"⁸ from there to North Ealing where they could use the crossover to get on to the eastbound road. The working timetable (WTT) for the week shows there was six minutes at North Ealing between the arrival of a train from Park Royal and the departure of the next one to Park Royal – so there was plenty of time to get a train to Park Royal, fill up your tea can with hot water and milk, split it with your guard and get back with room to spare.

This setup only lasted for five days. On Sunday 28 June, an hourly off-peak service ran to and from South Harrow using one train. In the evening, a second train provided a half-hourly service between 17.00 and 20.30. On the following weekday mornings, there were three trips per hour between 06.00 and 09.00 but the original, type-written timetable they produced for this shows it could not have been done with the two trains they had. Indeed, they do not seem to have had all the 14 cars available all the time⁹. They would have to have run three short trains. They could have done so if they used all motor car trains. I doubt they ever actually did it this way because the timetable was quickly adjusted to give a 2-minute turnround at South Harrow and a 3-minute one at Mill Hill Park, which needed only two trains in service. Mind you, tea making was out.

Some evidence suggests that they started the passenger service with 3-car trains, each with a pair of motor cars. Two weeks later, on 11 July, the situation was complicated by a notice informing staff that trains on Saturdays after midday and Sundays after 10:30 am would be 4-car sets. They could only have achieved this by

⁸ "Bang road" is railway jargon for "the opposite direction from normal", in this case eastbound along the westbound road.

⁹ On Sunday 16 August 1903, seven weeks after the service to South Harrow started, three "electric cars" were moved by a steam locomotive from Lillie Bridge to South Harrow. This move doubled as the staff train, normally consisting of a steam locomotive and single coach, which did this trip every morning.

swapping the first 3-cars set with one made up of four cars. The 3-car would have been taken into the yard and had the fourth car added in time for it to be swapped with the second 3-car set in service. They didn't have the time, the space nor the stock to do coupling in service. This lasted until November, when they decided that 4-car lengthening of trains was unnecessary now the excursion¹⁰ traffic had died away. The lengthening of trains on the branch on summer weekends was to become the custom for the next 30 years but it was normally from 1-car to 2-car sets.

MAIN LINE ELECTRIFICATION

In the mid-summer of 1903, while they were having fun with their new toys on the E&SH, installation work on the main line electrification was advancing rapidly. They had already taken one of the 1903 cars along the line from Lillie Bridge to Whitechapel and back, hauled by a steam locomotive for gauging purposes, as early as 13 February 1903. The power station at Lots Road was at the roofing stage, construction of the depot at Mill Hill Park was well under way, electrical distribution cables and ducting were going in and the line between Hammersmith and West Kensington was being widened and rearranged to allow access by the new "Great Northern & Piccadilly Circus Railway" as the District described it in one reference, soon to become known as the Piccadilly Line. This work included a new station at Barons Court and conversion of the old District steam locomotive and carriage depot at Lillie Bridge to take the new Piccadilly trains. So much work was going on that there weren't enough locomotives to run all the engineer's trains needed and, during 1904, the District had to make arrangements to hire engines from the Midland Railway on a day-to-day basis.

NEW (B) STOCK ORDERED

It was originally estimated that the electric services for the District's main lines would require a total of 60 new trains, including spares, each in the 7-car formation EM-T-T-MM-T-T-EM adopted for the 1903 A Stock. The new fleet was to become known, many years later, as the B Stock. A simple arithmetical exercise shows that the fleet would require 120 EM (end motor) cars, 240 trailers and 60 MM (middle motor) cars, a total of 420 cars. The actual cars built did total 420 but the distribution was different, with 120 EM cars as planned but with 72 MM cars (+12) and only 228 trailers (-12). One suggestion for this imbalance was the expectation that some trains would be formed EM-T-T-MM + MM-T-EM so that a train could divide at Mill Hill Park with one train going to Hounslow and the other to South Harrow. I suppose this is possible but it didn't happen until December 1907 and even then the trains were only 5-car sets with the front three cars going on to Hounslow and the rear two cars to South Harrow. Two other factors could have had an influence. First, the length of Circle trains was originally restricted to 6-cars because of some short platform lengths and second, the equipment of motor cars was more extensive and

How Much?

Here are some sample prices from the 1905 B Stock order:

Traction motors:	
	£225 each
Traction Controls:	£360/train
Brakes:	
	£161/train
Compressor	£82 each
Wheelset	£15
each	
(motored axle)	

¹⁰ It was common at this time for people to take "trips into the country" by bus or train. Various tea gardens and the like were scattered around the open countryside beyond Ealing and out towards Harrow and Uxbridge, which people visited on Saturday afternoons and Sundays during the summer. They represented a considerable traffic for the District.

technical than trailers and would have required more maintenance attention, so more spares were needed. As an aside, I noticed in one UERL meeting minute that it was thought that spare cars should be around 25% of the total. For a fleet of 60 trains today, we would consider this to be excessive and we would allow for about 10% spares. Interestingly, Sprague originally thought 10% was adequate since that was what they started with in Chicago. They soon ordered more cars.

The new car design seems to have been settled very early on because the procurement process for equipment started as early as January 1903, when an agreement was signed with a supplier for internal fixtures and fittings for 280 cars. This must have been a commercial opportunity grabbed in passing because it was over a year before the bodies were ordered and it wasn't enough for the whole fleet. In September 1903, as I mentioned last month, British Thomson-Houston (B T-H) were given the order to supply what was described as 60 "train controls" – the traction equipment. Following that, car bodies, bogie frames, wheelsets, brakes, compressors and even seats and backs were all ordered separately by the UERL and, in some cases, sent to the car body builders for inclusion on the car as it was built. For other items, like the electric traction equipment, lighting and wiring, the kit was delivered to Ealing Common and was fitted there by the UERL staff assisted by B T-H¹¹. What is interesting in the details is the prices paid for things (see box, right) and how this compares with what we pay today.

One thing which comes out clearly is the difference in brake system prices. The Christensen system was priced at £472.10s (£472.50p) for the equipment of one 7-car train. The Westinghouse equipment for a train worked out at £407, including compressors. This may have been part of the reason why the Christensen system was not adopted for the main fleet. Looking at the prices, all the bits and pieces add up to a price per 7-car train of about £11,000 in 1904 money. In trying to figure out what this is worth today, I found there are wide variations in methods of calculating the present day worth of old money but, taking an average I estimate it works out at about £1.1 million or a factor of 100. This is a lot less than a 7-car S Stock today, which would be about £6million, with all its extra equipment and computer management systems, not to mention huge safety and project management costs. In reality, the District trains would have cost more because I have not been able to include the cost of the labour used to do the assembly work at Ealing Common and the cost of training, testing and commissioning. This would be included in modern train costs.

The orders for the 1905 Stock car bodies were spread over a number of manufacturers in Britain and France. In Britain, Brush of Loughborough and the Metropolitan Amalgamated Railway Carriage & Wagon Co. in Birmingham both got orders and, in France, the work was taken on by "Les Ateliers du Construction de Nord de la France", translated by the UERL as "The Construction Co. of the North of France". They eventually became better known as ANF and used various subcontracted factories around the area of northern France.¹² There was much press criticism of the foreign purchases by the UERL, who also got many of the bogie frames and wheel sets from France and Germany, their Piccadilly tube stock

¹¹ This rolling stock procurement system was maintained on the Underground up until the late 1980s, when it was thought that contractors could be trusted to supply rolling stock to a "performance specification". It doesn't often work.

¹² ANF was originally formed in 1882 by a group of French and Belgian businessmen as a subsidiary of a company called La Métallurgique. ANF also built steam locomotives at Blanc Misseron.

cars from France and Hungary and the Bakerloo and Hampstead cars from the American Car & Foundry. There wasn't really much justification for the criticism, since the majority of British companies were already fully occupied building cars for tramways and other railways, including the Metropolitan.

For the record, the following table shows the distribution of the District's B Stock builders and car numbering. The orders were divided into one third for Britain and two thirds for France.

Car	Builder	Car Numbers	Total Vehicles
End Motor (Luggage)	Brush	5, 10, 15, 20 and so on to 100	20
End Motor	Met. Amalgamated	6-9, 11-14, 16-19, 21-24, 26-29.	20
End Motor	de Dietrich & Company, Luneville	31-34, 36-39, 41-44, 46-49, 51-54.	20
End Motor	ANF, Blanc Misseron	56-59, 61-64, 66-69, 71-74, 76-79, 81-84, 86-89, 91-94, 96-99, 101-104, 106-109, 111-114, 116-119, 121-124, 126-129	60
Middle Motor	Brush	203-214	12
Middle Motor	Met. Amalgamated	215-220, 222-226, 264	12
Middle Motor	de Dietrich & Company, Luneville	221, 227-263, 265-274	48
Trailer	Brush	309-346	38
Trailer	Met. Amalgamated	347-384	38
Trailer	Désouches David & Cie, Pantin	385-404, 470-480, 526-536	42
Trailer	Cie. Française de Material Chemin de Fer, Ivry Port	405-425, 481-501	42
Trailer	Cie. General de Construction, Saint-Denis	426-469, 502-525	68

The numbering system was simply a continuation of the scheme used for the A Stock. Thus the B Stock end motors started at No. 5, the middle motors at 203 and the trailers at 309. The end motors with luggage compartments were numbered 5, 10, 15 etc. and always operated at the west end of the train. Only 20 out of the total of 120 End Motor cars had luggage compartments, whereas all four of the A Stock End Motors had them. In fact, they were not intended for passengers' luggage, certainly not on a railway which, in a traffic notice of April 1907, was urging staff to ensure that trains were not detained at stations for longer than 20 seconds. They were already learning the meaning of "rapid transit". Back in October 1902, the District had got itself into an arrangement with a company called Lavington Bros., who supplied a van service for parcels traffic. It is interesting that there was some discussion at board level about the responsibilities of the District's station staff in

relation to this contract¹³. The scheme was doubtless linked to the decision to provide space for the parcels on the electric trains in the form of the luggage compartments.

I have found nothing in the records to say which trains ran with luggage compartments or even that they were actually used as such. There were regular notices, throughout the life of the District, reminding staff that it was forbidden to deliver parcels, newspaper bundles, ticket bags and similar objects by throwing them onto platforms from moving trains. Some of these notices suggest that passengers occasionally got in the way of this form of express delivery. The luggage compartments didn't last long though and the ones on the A Stock were converted, in the spring of 1910, to provide eight more first class seats. At the same time, the twenty B Stock end motors with luggage compartments had them removed and replaced by standard 3rd class seats. In the process, they ended up looking just like the other end motor cars.

DELIVERY

The first new B Stock cars to arrive came from Brush. They were brought down from Loughborough by a Midland Railway steam locomotive and match wagons to Mill Hill Park via the newly opened connection from South Acton. The deliveries usually arrived in the afternoon. The normal procedure was to shunt them back into one of the sidings east of Mill Hill Park station on the afternoon of their arrival and then transfer them to Mill Hill Park Depot at night. The cars built in France were delivered by sea to Tilbury docks. Before they were allowed to be moved over the route between Tilbury and Mill Hill Park Depot, a test run was organised. This involved taking a train of Brush vehicles that had already been delivered and hauling it by steam locomotive from the depot over the route to Tilbury and back to ensure they didn't hit anything on the way. The test was carried out on 12 March 1905 and it must have gone OK because the first train was transferred from Tilbury docks on 30 March. Regular transfers took place approximately weekly from that time until November 1905.

ENGINE BATTLE

The District seems to have had a steam locomotive called "Battle". Several references in traffic notices of 1905 refer to the use of this engine to move new cars from the sidings to the depot at Mill Hill Park. I've never heard of it before and I wondered what sort of locomotive it was. Was it one of the company's 4-4-0s given a special name or was it

¹³ You can imagine the same happening today, over 100 years later. Some things never change!