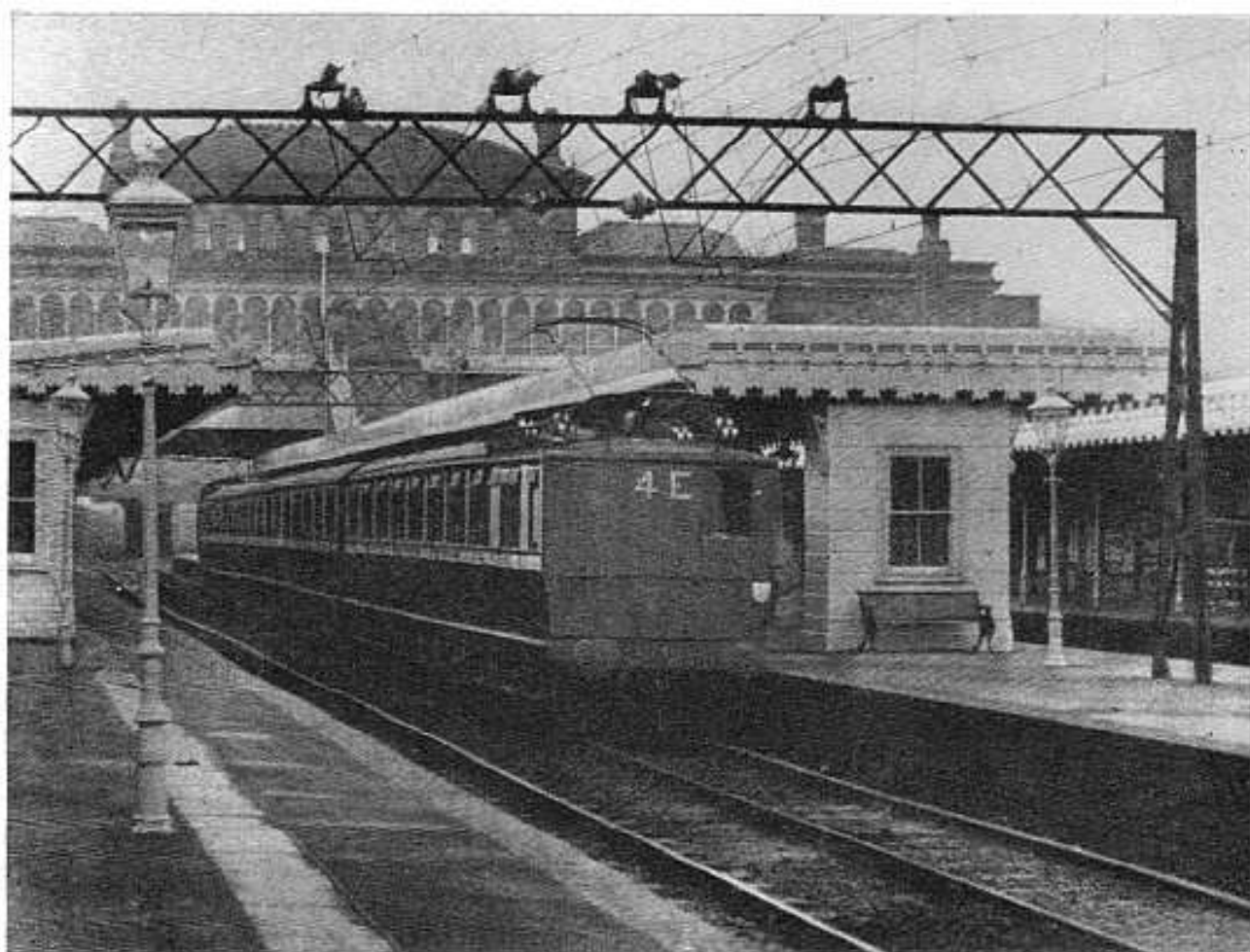


# London's "Elevated Electric"

By CHARLES E. LEE



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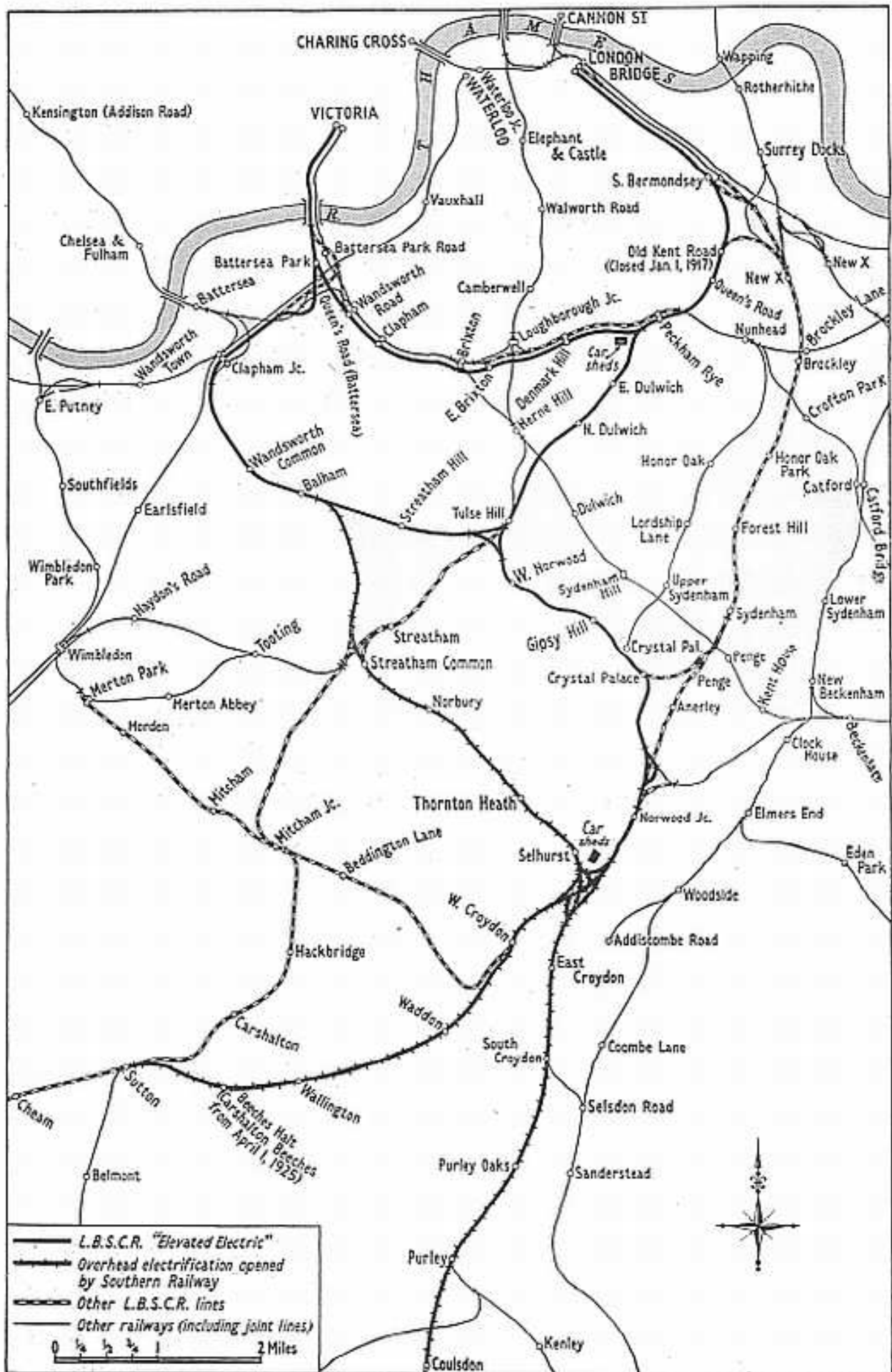
[C. McAuliffe

South London Line train in the original three-coach formation and livery of the L.B.S.C.R. at Denmark Hill Station

**A**T the beginning of the present century, there were various schemes by independent promoters to build an entirely new railway between London and Brighton, achieving high speed by the use of electric traction. A 60-min. steam schedule had been introduced by the London, Brighton & South Coast Railway for the first time on October 2, 1898, but it applied to "The Pullman Limited Express" on Sundays only. An intended new electric line, of conventional type, was proposed to run regularly between Victoria and Brighton in 50 min. over a route length of 47 miles, to be achieved by 19 $\frac{3}{4}$  miles of tunnel and 7 $\frac{1}{4}$  miles on viaduct at a cost of about £12 million. There was also a proposal for a "monorail" on the principles of Fritz Bernhard Behr, which envisaged 150 m.p.h. and a London-Brighton journey time of 20 min.

In view of these competitive threats (which then were regarded more seriously than is now generally realised), Mr. (later Sir) Charles L. Morgan, the Chief Engineer of the L.B.S.C.R., visited electric railways in Italy, and presented a report to his directors in January, 1902, which was entirely in favour of overhead conductors, and against the third rail, mainly on civil engineering grounds.

Major Philip Cardew, R.E., for eleven years Electrical Adviser attached to the Railway Department of the Board of Trade, was invited to join the directorate of the L.B.S.C.R., and was duly elected on January 29, 1902. The Brighton Railway sought Parliamentary powers to adopt electric traction, and these were granted by Act of July 21, 1903. With the defeat of the competitive Brighton schemes, however, the whole aspect changed, and main-line conversion pro-



L.B.S.C.R. suburban railways after the first world war, showing the "Elevated Electric" system, and lines electrified subsequently with overhead conductors

posals receded into the background.

In a noteworthy paper presented to the Institution of Civil Engineers on March 14, 1911, Mr. (later Sir) Philip Dawson said: "Early in 1903 the directors of the L.B.S.C.R., having obtained parliamentary powers for the electrification of that line, instructed the author to report to them on the conversion of the suburban system. He was to consider whether this would enable them more effectively to meet the severe competition which they were experiencing from the ever-increasing electric tramways in the particular area served; and in the first instance, they wished him particularly to look into the question of the advisability of electrifying the line between Victoria and London Bridge, which had suffered especially since the introduction of electric traction on the County Council tramways, a competition that was beginning to affect very seriously the receipts of the line."

This statement, often quoted subsequently, is incorrect in material particulars, and it must be assumed that the rapid march of events between 1903 and 1911 had dimmed Philip Dawson's recollections of chronological sequence. Early in 1903, the L.B.S.C.R. had not obtained electrification powers, but was seeking them, as we have seen. Also, no portion of the L.C.C. tramways was open with electric traction. Its first electric services were opened on May 15, 1903, and comprised the lines from Tooting to the south side of Westminster, Waterloo, and Blackfriars Bridges. None competed very closely with the L.B.S.C.R. suburban lines, and, in fact, underground electric traction over much of the tramway route had been provided by the City & South London Railway since 1900.

Further electric tramway services were brought into use on June 25, 1903, between Camberwell Green and Kennington Gate; on August 2, 1903, between Kennington and Vauxhall; and on January 17, 1904, between Elephant & Castle and Greenwich. It was not until August 5, 1906, that the Victoria Station to Vauxhall electric tramway link was opened, and first provided a service approximately parallel with a substantial portion of the South London Line.

Dawson's report was submitted to the L.B.S.C.R. in July, 1904, and was concerned with technical designs and recom-

mendations for a system of electric traction suitable for both main line and suburban operation. As previously noted, the company's Chief Engineer had already favoured overhead traction. Dawson recommended a high-tension a.c. single-phase system, at 6,700 volts, and this was accepted. He was then instructed to prepare specifications and call for tenders for the electrification of the portion of the South London Line between Peckham Rye and Battersea Park, namely, that section which was independent of any other route, and was regarded, therefore, as eminently suitable for experimental work.

Tenders were received in April, 1905, and the contract was awarded to the Allgemeine Elektrizitäts Gesellschaft of Berlin. Both then and later, the decision was the subject of considerable criticism, partly because the system was relatively untried, whereas the third-rail d.c. low voltage system was already in use in many parts of the world. It was afterwards decided to extend the electrified section to Victoria and London Bridge, and the contract for the work associated with this undertaking was signed on March 30, 1906. Although the A.E.G. was the contractor for the complete equipment, the whole of the overhead line work, including feeders, switch cabins, and so forth, was sub-contracted to Robert W. Blackwell & Co. Ltd. This overhead construction was of double catenary form, of novel design. The coaches were built by the Metropolitan Amalgamated Carriage & Wagon Co. Ltd., at Saltley Works, Birmingham.

Work was begun in the latter part of 1906. Two years later the company's report of January 20, 1909, said: "The electrical equipment . . . between Battersea Park and Peckham Rye stations is complete, and experimental working is in progress. So far the result is very satisfactory." The first experimental train ran between Battersea Park and East Brixton on January 17. On Sunday night, January 31, a trial run was made between Battersea Park and East Brixton, to which the Press was invited. It was then stated that the Battersea Park to Peckham Rye section would be opened "very shortly," and that it was hoped to establish the full service throughout the South London Line by June.

The company's report dated July 21

1909, said: "a public service of electrically worked trains will be running on the South London Railway between Victoria and Peckham Rye, in a few days." The Earl of Bessborough, presiding at the company's half-yearly meeting on August 4, said that it was intended to open the public service between Victoria and Peckham Rye by the end of August, and the full service through to London Bridge on October 1. A fortnight later the company confirmed the opening on Friday, October 1, but ignored the intended interim opening announced by the Chairman. Even then there was a last minute postponement. To assist in coping with the expected increase in traffic with electric working, the middle of the three tracks between London Bridge and South Bermondsey was signalled for reversible working, and this was brought into use on October 19, 1909.

Eventually, public electric traction was inaugurated successfully between London Bridge and Victoria on Wednesday, December 1, 1909, exactly 50 years ago. The first train left London Bridge for Victoria at 7.42 a.m., and a quarter-hourly service was maintained throughout

the day. Everything went without a hitch, and the new rolling stock was much admired. The present writer was a passenger on the opening day. The quarter-hourly service was basically the same as had been given by steam for some 40 years, but the journey time for the 8 miles 51 ch. was reduced from 36 min. to 24 min. A 10-min. frequency had been intended earlier, but never materialised. The total track electrified was 25 miles 5 ch.

The distinctive name "Elevated Electric" was adopted from the outset, and was displayed at all stations in white letters on a green background. In part, the name was doubtless inspired by the fact that much of the line was on viaduct, but it also was an obvious variant of the idea the London underground railways had adopted in 1908, using the symbol "Underground" with large initial and final letters.

The original electric rolling stock for the South London Line comprised eight three-coach trains of distinctive type. The end cars were equipped with motor and guard's compartments, and eight third class passenger compartments seating a total of 66. The centre (trailer)



Photo]

[Claude Sibley

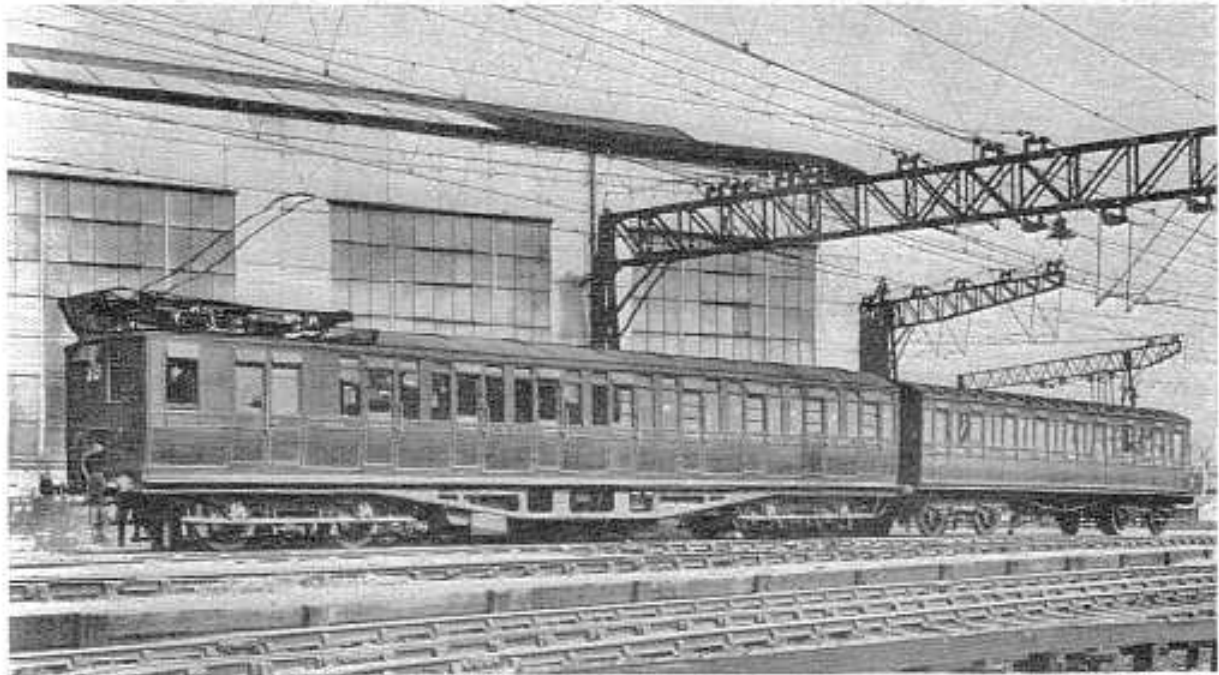
Forecourt of Victoria Station, L.B.S.C.R., about 1911, showing the distinctive "Elevated Electric" sign

coach was first class only, with nine compartments accommodating 56 passengers. The total seating of the three-coach train was thus 188, of which 132 was third class and 56 first class. The coaches were 63 ft. 7 in. long, and 9 ft. 3 in. wide overall. They were of compartment type (unlike other electric railways of the period) with a side gangway to facilitate distribution, but no communication between the coaches. The original livery was umber lower panels and cream upper, with the class indicated in words.

No provision was made for second class

operated lines. The revised trains consisted of two-car units, one of which was the original motor coach, and the other a control trailer with two first-class and six third class compartments. The new unit seated 16 first and 132 third. These units were worked singly in slack hours, and in threes (six coaches in all) during the peak.

As has been stated, the first half of 1903 was far too early for railway traffic decline to be attributable to tramway electrification, but by July 18, 1905, the directors were reporting a general decrease



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[O. J. Morris

South London Line two-coach train in L.B.S.C.R. livery at Peckham Rye car sheds in March, 1927

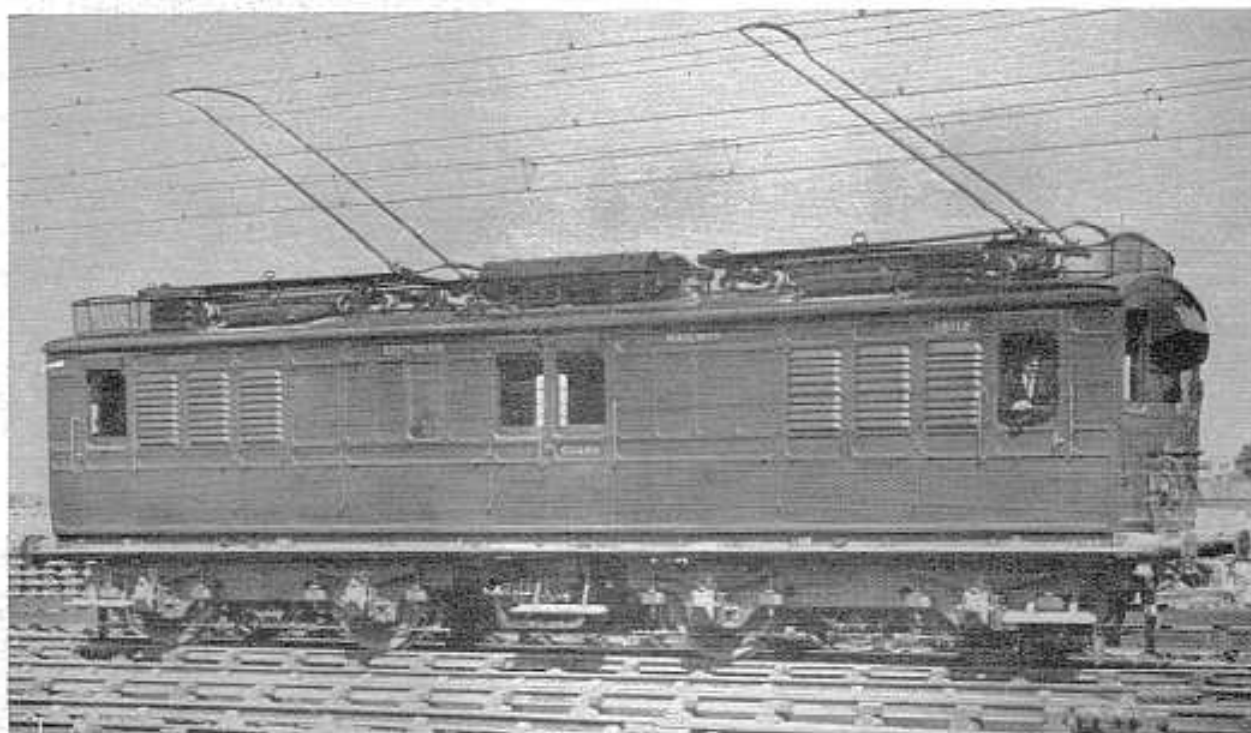
passengers, although all three classes were accommodated at the time throughout the L.B.S.C.R. system. The introduction of electric traction was regarded here, as elsewhere, as a convenient opportunity to simplify the fare structure and reduce the unproductive weight of trains. Second class was abolished on all L.B.S.C.R. suburban services as from June 1, 1911, and throughout the system (excepting on Newhaven boat trains) on June 1, 1912.

Shortly after the opening, the standard three-car train was found to be unsatisfactory. It was excessive for slack hours, inadequate for peak traffic, and contained too high a proportion of first class accommodation. The trains were therefore split up, and the first class trailers withdrawn for other use on steam-

in coaching receipts and assigning three reasons. These were tramway competition in suburban areas; inclement weather; and a general decrease of travelling. The L.C.C. electric trams were extended on December 15, 1906, from St. Thomas's Hospital across Westminster Bridge and along the Embankment to Blackfriars, and competition assumed a more intensive form. By July 17, 1907, the reasons given for the continued shrinkage were tramway and motor competition, cold and wet weather, and a marked lack of spending power by the public generally. It may be recalled here that retail prices were rising, and in consequence the purchasing power of money fell steadily from 1900, but, in general, wages were not increased, and in some industries were reduced.

During the calendar year 1902, passengers booked at Peckham Rye totalled 1,213,281. For the twelve months ended November 30, 1909 (the last year of steam trains on the South London Line) the total had fallen to 526,373. Electric traction rapidly reversed the trend, and the passengers booked at this station in the first year of electric trains (to November 30, 1910) numbered 1,051,263. On the whole South London Line, the passengers dropped from roundly 8,000,000 in 1903 to 3,500,000 in 1908, but rose to 8,000,000 in 1910, and by 1920 had increased to 12,000,000. Major Cardew

Norwood Junction towards Selhurst was electrified, to give access to the new Selhurst car sheds and depot, but only a few electric trains, working into or out of traffic, served Norwood Junction. From Balham to Victoria, the main line was also electrified, between Balham and Clapham Junction in 1911, and the remainder on June 1, 1912, thus permitting two electric trains to arrive at and depart from Victoria simultaneously. Loading gauge restrictions through the Crystal Palace tunnel precluded the use of wide coaches of the South London type, and ordinary compartment stock was



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[O. J. Morris

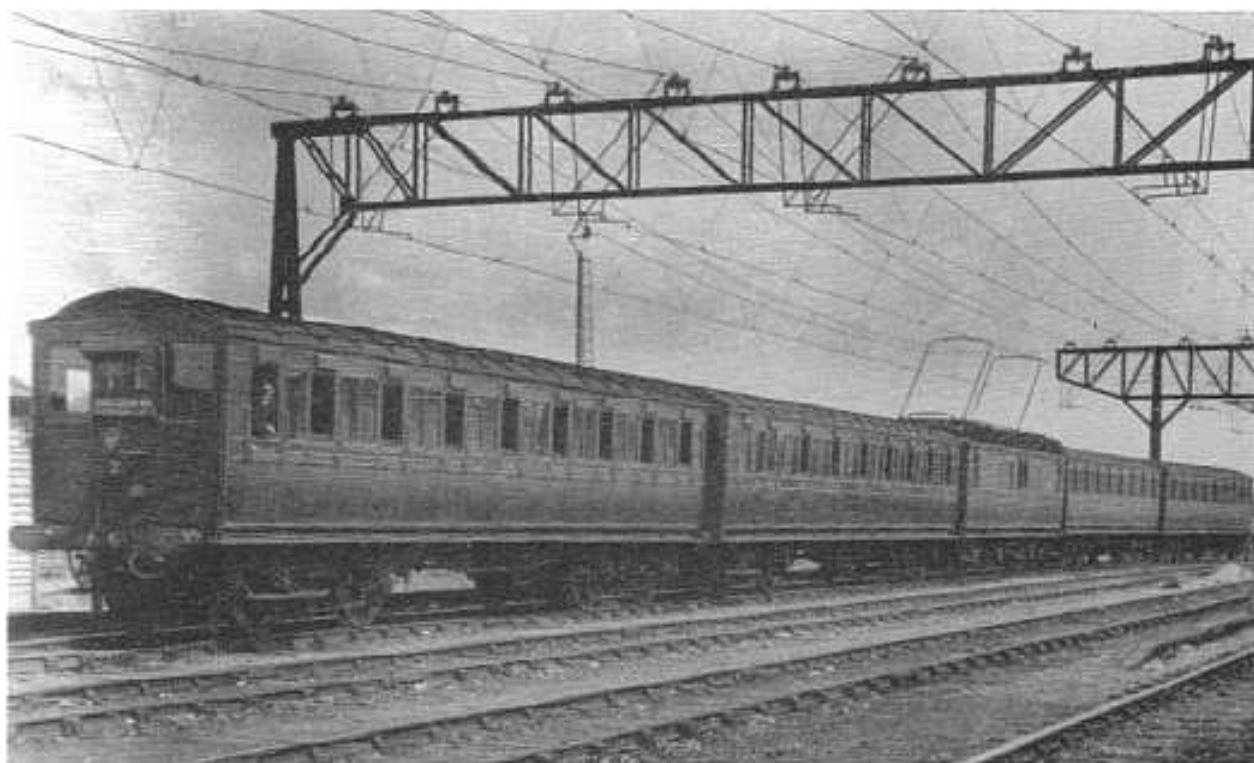
**One of the electric bogie power vans used for the overhead electrification to Coulsdon North and Sutton**

lived to see the turn of the tide, but died on May 17, 1910.

Electrification to Brighton, using electric locomotives for the express service, was still very much in mind in 1910, but immediate priority was given to suburban lines. Conversion of routes to the Crystal Palace, from both Victoria and London Bridge, was decided upon in July, 1910. The electrified line between Victoria and the Crystal Palace (10 miles 14 ch. of route) was brought into use on May 12, 1911, and coincided with the visit of King George V to the Palace to open the Festival of Empire, held to celebrate his Coronation year, but the full electric service was not inaugurated until June 1. At the same time, the extension through

provided. It was 57 ft. 7 in. over buffers, with bodies 8 ft. wide.

The third and last section of the Elevated Electric opened under the auspices of the L.B.S.C.R., was from Peckham Rye to Tulse Hill, a route length of 3 miles 43 ch. (including the links from Tulse Hill to Streatham Hill and to West Norwood). This enabled two new electric services to be run, namely, London Bridge to Victoria, *via* Tulse Hill, and London Bridge to Crystal Palace. In view of the coal strike that started on March 1, electric trains began working on this section on Sunday, March 3, 1912, so as to conserve locomotive coal. Full electric services were begun on Monday, June 3, 1912. The



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[O. J. Morris

Four-coach train of L.B.S.C.R. stock with an electric bogie power van at Coulsdon North in July, 1928

total electrified line opened by the L.B.S.C.R. was 22 miles 28 ch. of route mileage, involving 69 miles 27 ch. of track (including sidings).

In January, 1913, the L.B.S.C.R. announced the decision to equip the whole of its suburban railways as far as Coulsdon and Cheam. The work was expected to be completed in four years, but with sections opened for electric traction as finished. The principal lines involved were London Bridge to New Cross, Norwood Junction, East Croydon, and Coulsdon; Balham to Selhurst; Norwood Junction to West Croydon, Wallington, Sutton, and Cheam; and Tulse Hill to Mitcham Junction and Sutton. Also, various spurs were included, such as Sydenham to Crystal Palace, and even Old Kent Road to New Cross. The last-named has never carried a regular passenger service.

The first section put in hand was Balham to Wallington, *via* Selhurst and West Croydon. In April, 1914, it was announced that the opening was expected to be in the summer of 1915, but, with the outbreak of war, it became necessary to cancel the main contracts. Some portion of the work was continued during the war and immediate post-war periods. In October, 1921, the company announced that it hoped to open the Balham to

West Croydon *via* Norbury section during 1922; to complete the 1913 suburban programme, with some additions; and to follow this with main line electrification to Brighton, together with the Brighton-Worthing, Wivelsfield-Eastbourne, and Brighton-Lewes-Seaford sections. The opening to West Croydon was not achieved, partly because of delays with the supply of electrical equipment, but during 1922 the company placed new contracts for the West Croydon to Wallington and the Selhurst to Coulsdon lines.

In its final report before the grouping, dated February 7, 1923, the L.B.S.C.R. expressed its conviction as to the advisability of the general extension of electrification, and said that its new contracts were also a response to a request by the Government that every possible step should be taken to proceed with works of this kind to relieve unemployment.

Shortly after grouping, the new Southern Railway decided to adopt as standard the 600-volt d.c. system used by the L.S.W.R., on the grounds of ease of installation and low cost of construction and maintenance. The Elevated Electric was therefore doomed, but the nearly-completed sections from Balham to Coulsdon North (as Coulsdon & Smitham

Downs became on August 1, 1923) and from Norwood Junction to Sutton (to which the Wallington electrification was extended) were opened on April 1, 1925, a month later than announced, by reason of difficulties with power supply. For the new trains, the whole of the driving equipment was concentrated in one vehicle designed to run with trailer coaches fore and aft. Although not so described, these motor coaches were capable of being used as locomotives. They were designed, however, to run with various combinations of trailer coaches, many adapted for control purposes, as one occupied the leading position in most compositions.

All regular rail services were suspended during the General Strike from May 4 to 14 (inclusive) in 1926. The section of the original South London Line between Peckham Rye and Battersea Park was again closed from May 19 to September 20, 1926, during the more lengthy coal dispute, which lasted until November 27. In this period the impending conversion of the a.c. system was announced, in August, 1926. Eventual replacement was already foreseen, but this decision only 16 months after some 82 new track miles had been electrified was sooner than many expected. The first a.c. sections to be converted were the South London Line (the original Elevated Electric of the L.B.S.C.R.) and the sections from Peckham Rye to Crystal Palace and Streatham

Hill, and from Tulse Hill to Streatham Common. On these, d.c. third rail traction replaced a.c. on Sunday, June 17, 1928. Other a.c. lines to Sutton and Croydon were also equipped for d.c. traction, so that all London Bridge services could be maintained by d.c., although a.c. remained in use from Victoria. The Victoria lines were opened for d.c. working on March 3, 1929, but some a.c. trains continued to run until sufficient new rolling stock was available.

On the South London Line the change-over was marked by a reduction in the service, heretofore every 15 min. on weekdays. It became three trains an hour in peak periods, and half-hourly at other times. The distinctive rolling stock was removed for conversion and replaced by standard Southern Railway three-car electric sets. These worked the line until May, 1929, when the original motor coaches returned. The last "overhead electric" train left Victoria for Coulsdon North officially on Saturday, September 21, 1929, but actually, at 12.30 a.m. on the Sunday morning. Between Battersea Park and Peckham Rye, the overhead wires were retained for some months after regular a.c. services ceased, so that rolling stock could be worked to the Peckham Rye shops for conversion. Thus passed the pioneer a.c. electrification which served South London for a few weeks short of two decades.