

Southern Electric Coaching Stock

By H. C. HUGHES



Four-coach stopping main-line train, composed of 2-Hal sets, with wartime modifications

ON January 1, 1923, 467 electric vehicles came under the control of the newly-constituted Southern Railway. These had worked on three different systems—the Waterloo & City Railway (owned by the L.S.W.R.) a tube line operating on 600 volts d.c. with a centre third rail; part of the L.B.S.C.R. suburban lines, working on 6,600 volts a.c. with overhead bow collectors; and the L.S.W.R. suburban lines, operating on 600 volts d.c. with an outside third rail.

The original Waterloo & City stock (built in 1898) consisted of five four-coach trains with motor coaches at each end, and two spare motor coaches. The electrical equipment was supplied by Siemens, and each motor coach had one driving bogie with two 60 h.p. motors, the armatures being mounted directly on the axles. The bodies were built by Jackson & Sharp, of Wilmington, U.S.A. Five single motor coaches, with nose-suspended motors, were built by the Electric Tramway Company, of Preston,

in 1900, for use during slack periods, and the same makers supplied two additional trailer coaches in 1904. Four more trailers were built at Eastleigh in 1922, and five-coach trains were then run during peak hours. In October, 1940, all these vehicles were replaced by modern stock, with 190 h.p. motors, built by the English Electric Co. Ltd., and the third rail was altered to the outside position.

For the electrification of the L.B.S.C.R. South London line in 1909, eight three-car trains were built by the Metropolitan Amalgamated Carriage & Wagon Co. Ltd., each consisting of two third-class motor coaches, with a first-class trailer between them. Each motor coach had four Winter-Eichberg 115 h.p. motors, one driving each axle, and two bow collectors mounted at the driving end. The main transformers were mounted on the underframes, necessitating heavy plate frames, which also were provided on the trailer coaches. To encourage an even distribution of passengers, each coach had a gangway half way along

each side; the body width was 9 ft. It soon became apparent that there was an excess of first-class accommodation, and from October, 1910, the trailers were transferred to steam working. To replace them, some third-class brakes were converted at Lancing into composite driving trailers and these were coupled to the original motor coaches to form two-coach units. Four-coach trains were used during peak hours until the early 1920s, when the number of coaches was increased to six, but four-coach trains appeared again after the strike of 1926. It is interesting to note that a parcels van for Portsmouth was attached regularly to the 5.30 a.m. from Victoria to London Bridge.

The Crystal Palace Tunnel restricted the size of the stock for the extensions of 1911 and 1912, and 8 ft-wide compartment coaches were provided. Altogether 34 third-class motor coaches, and 34 composite driving trailers were built by the Metropolitan Carriage & Wagon Co. Ltd., and 36 similar trailers were built at Lancing. Each motor coach had four 150 h.p. motors and deep plate frames. Train formations varied from two coaches up to eight, but the usual practice was to have a three-car train with the motor coach in the centre, two such units being used during peak hours.

In readiness for further extensions, 40 additional composite trailers were built, but at the grouping all these were working in steam trains, pending completion of the electrification. Twenty of them, together with stock built in 1923 and 1924, were used for the Coulsdon North and Sutton extensions, opened in 1925. The trains appeared partly in L.B.S.C.R. colours, and partly in Southern Railway livery. Motive power was provided by twenty-one 62-ton bogie motor-vans built by the Metropolitan Carriage & Wagon Co. Ltd. and popularly known as "milkvans". Each vehicle had four 250 h.p. G.E.C. motors. Normal practice was to have the motor van in the centre with a composite trailer on each side, and a third-class trailer at each end, making five vehicles in all. Two such units were used in peak hours. Most of the 80 trailers were constructed at Lancing, the rest being built at Saltley, and all except 20 of the composite vehicles had a driving compartment at one end.

In 1915, the L.S.W.R. had introduced

84 three-coach trains, with a motor coach at each end, for its suburban electrification. These were numbered E1 to E84 (S.R. 1201 to 1284) and all the vehicles were converted at Eastleigh from a series of four-coach close coupled suburban trains, built from 1903 onwards. The original frames were retained, and the bodies suitably modified. Each motor coach had one motor bogie with a 275 h.p. Metropolitan Vickers motor driving each axle. The motorman's compartment had a distinctive pointed front, and the control gear and auxiliary equipment were mounted between this compartment and the luggage space. Most of the motor coaches were converted from the old third brakes but some composite vehicles were also used, resulting in motor coaches with three first-class compartments, and two isolated thirds next to the luggage space. Most of the trailers were eight-compartment composites, but some, which originally had been tri-composite vehicles, had three ex-second class compartments converted into a first-class saloon, to make up the requisite accommodation. The vehicles were close-coupled with the disc-shaped cast-iron centre coupler from the steam trains, and two three-car sets were used during the peak periods. Between 1920 and 1922, twenty-four two-car third-class trailer sets were converted from the same type of steam stock, and these, sandwiched between three-car sets, made up eight-coach trains. This 3-2-3 formation was adopted as standard by the Southern Railway for suburban traffic.

For the extensions to Guildford and Dorking in 1925, 26 new three-car sets (Nos. 1285-1310) were provided. The motor coaches were built by the Metropolitan Carriage & Wagon Co. Ltd., and the trailers by the Midland Railway Carriage & Wagon Co. Ltd. They had pointed ends and similar equipment to the earlier sets, but the coaches had steel-panelled sides and were wider and longer. Side look-outs for the guard originally were provided, but these were replaced in the early 1930s by periscopes in the roof.

The year 1925 also saw the inauguration of electric services on the Eastern Section, a project which had been in hand at the time of the grouping under the auspices of the South Eastern & Chatham Construction & Power Company. During 1925 and 1926, 134 three-car sets (Nos. 1401-1534) were put into service, of which 29

(Nos. 1496-1524) were new, and the remainder conversions from steam stock. The new sets were steel-panelled, but were longer than the Western Section units, and did not have pointed ends. Each vehicle had a 62-ft. underframe, a length introduced by the S.E.C.R. in some 1921 Continental stock, and this has remained the standard length for new underframes for Southern Electric stock ever since. The only exceptions are the Pullman cars, which are longer, and some

compartments, the driving end being new. To form the composite trailers, the bodies of two four-wheel composites (or six-wheel seconds) were mounted on a new underframe, one at each end, the intervening space being filled by the requisite number of new compartments. The six-wheeled stock had been built in the 1890s for main line use and the four-wheeled stock between 1899 and 1904, for close-coupled suburban trains.

Eighty two-car trailer sets were added

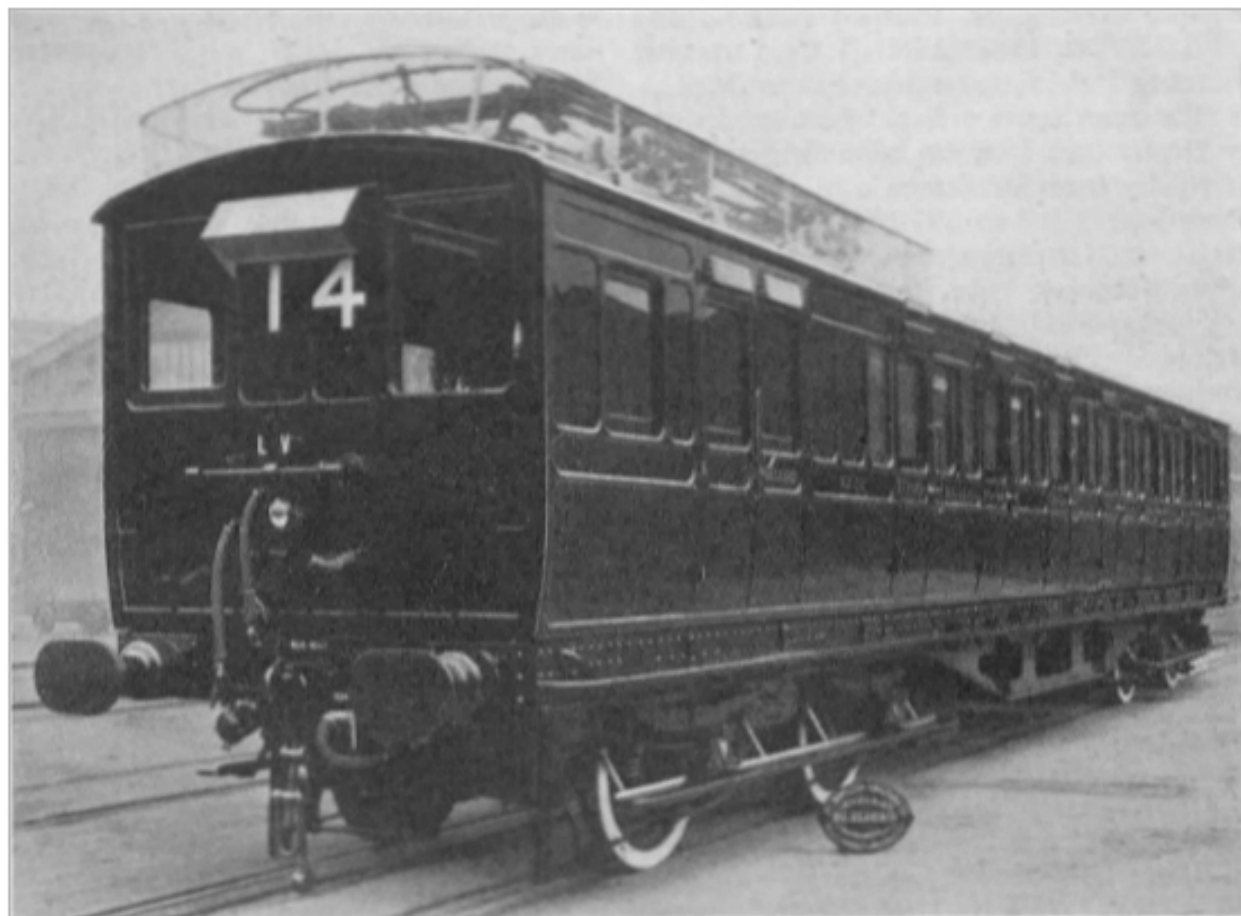


Photo courtesy]

[Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Motor coach built for the L.B.S.C.R. overhead electrification to the Crystal Palace in 1911 and 1912

shorter first-class main-line stock. The motor-coaches were built by the Metropolitan Carriage & Wagon Co. Ltd., and the trailers by the Birmingham Carriage Co. Ltd. The former have Dick Kerr 300 h.p. motors. The vehicles were close-coupled with a centre knuckle-coupler, later discarded in favour of the centre buffer type.

The converted stock had wooden bodies with characteristic South Eastern paneling and fittings. For the motor coaches, the bodies of 1½ six-wheel (or 2 four-wheel) thirds were spliced together and mounted on a new underframe, to provide eight

during 1925 and 1926, using a series of L.B.S.C.R. nine-compartment thirds. Those for the Eastern Section were not available until after the summer traffic was over, and from July to September, 1925, a number of the motor sets were run as four-car units with two composite coaches in each set.

Between 1928 and 1937, 222 more three-car units were converted from steam stock. The coaches were close-coupled, and had a centre buffer rubbing against a buffing plate, with a bar type of coupling rod (altered later to a link coupling). Sets Nos. 1601 to 1630 (1928) incorporated

the bodies of further S.E.C.R. four- and six-wheel coaches, but Nos. 1631 to 1657 and 1702 to 1716 (1928-9), and 1797 to 1801 of 1932 (1801 later became 1600), were converted from a series of Brighton bogie suburban trains built around 1900. These had the distinction of providing the Southern Electric with its narrowest (5 ft. 2½ in.) third-class compartments. The circular arc of the Brighton roof made these coaches appear low in comparison with the others, but the height at the centre was practically the same. Sets Nos. 1658 to 1701 (1928-9) and 1773 to 1785 (1930-1) used up the remaining L.S.W.R. bogie suburban stock, but this time there was no pointed front, and the bodies had to be lengthened to suit the new underframes.

Sets Nos. 1717 to 1772 (1929-30) were, with a few exceptions, converted from a.c. trailer vehicles. In fact, all the a.c. stock was used again in one form or another. The South London motors were converted into two-coach d.c. sets (now Nos. 1801 to 1808) in 1929. They remained on the South London line, and retained the low roof section at the ends, where the overhead collectors had been placed. The original South London first-class trailers were retrieved from their steam workings, and converted to similar two-car sets (now Nos. 1809 to 1812) in 1930, for use on the Wimbledon-West Croydon line. The Crystal Palace motors became third-class trailers, retaining their heavy underframes, and the "milk vans" eventually were converted into brake vans for heavy goods trains.

Sets Nos. 1786 to 1796 (1931-2) used the bodies of L.S.W.R. six-wheel suburban stock of 1901. Nos. 1595 to 1599 (1934-5) incorporated the bodies of L.S.W.R. main-line thirds and first introduced in 1895, and the extra width of the third class compartments resulted in a half-compartment next to the luggage space. The last batch, Nos. 1575 to 1584 of 1937, were converted from similar stock, but these units had underslung electro-pneumatic control gear instead of the electro-magnetic type of contactors previously used on all suburban sets. The extra room available enabled the full eight compartments to be provided on the motor coaches. All these sets had 275 h.p. Metrovick motors, and Nos. 1658 to 1785 incorporated a composite motor coach at one end. Each set,

except for Nos. 1585 to 1599, seated 56 first- and 180 third-class passengers.

Various vehicles were used for the 108 two-car trailer sets introduced during this period. Fifty-four of them consisted of a 46 ft. S.E.C.R. eight-compartment vehicle coupled to an 11-compartment coach of L.S.W.R. origin, the body having been lengthened to fit a new 62-ft. underframe. From 1935 onwards, the vehicles used were L.S.W.R. eight-compartment thirds, lengthened to fit new underframes by the addition of two generous 6 ft. 11 in. compartments. These were used with L.B.S.C.R. nine-compartment vehicles from the earlier sets.

Starting in 1934, the original L.S.W.R. sets were rebuilt with standard underframes, and the bodies lengthened. At the same time, the first-class saloons were reduced in size, and similar saloons appeared in some of the other trailer coaches. Following these alterations, the "pointed-nose" sets, which had remained almost exclusively in the Western Section, began to travel further afield, and were used indiscriminately in conjunction with the later sets.

Turning now to main line stock, two experimental third-class motor coaches were built in 1931, No. 11001 at the Birmingham Carriage Works, and No. 11002 by Metropolitan-Cammell, in preparation for the Brighton line electrification. Each motor coach had two driving bogies with four B.T.H. 225 h.p. motors, one driving each axle, and underslung electro-pneumatic control gear. The bodies were of the open saloon type with centre gangway. After extensive trials, the same two firms built a further 44 motor coaches in 1932, and in these a larger luggage space was provided, which slightly reduced the seating capacity. Certain modifications also were made to the bogies. A six-car formation was adopted, each set including a Pullman car built by Metropolitan-Cammell, and three corridor vehicles built at Eastleigh and Lancing. The set numbers were 2001 to 2020, and 2041 to 2043 (later 3001, etc.); Nos. 2041 to 2043 were special sets with a high proportion of first class accommodation for the "City Limited" trains. In addition, three five-car Pullman sets (now 3051 to 3053) were built by Metropolitan-Cammell for the "Southern Belle," renamed the "Brighton Belle" in 1934. The Pullman motor coaches,

which are still the only vehicles of their type, had the same electrical equipment as the others, and weighed 62 tons, and had an overall length of 69 ft. 5½ in. They were the heaviest and longest coaches ever to run on the Southern Electric.

For the semi-fast and stopping trains, 33 close-coupled four-car sets (now Nos. 2921 to 2953) were built at Lancing and Eastleigh. One of the trailers in each set had a side corridor with lavatory facilities. The electrical equipment was of standard suburban type, but the bodies were of main-line construction. Two further sets (Nos. 2954 and 2955) were built in 1940. For local trains in the Brighton area, three-car suburban sets originally were used, but these were later replaced by two-car units of the 2-Nol (no lavatory) and 2-Bil (bi-lavatory) types.

For the Eastbourne and Hastings scheme of 1935, seventeen further six-car sets were built (now Nos. 3021 to 3037) but in these there were no Pullman cars, and the accommodation was rearranged, refreshment facilities being provided by a pantry in one of the trailers in each set. The motor coaches were built by the same two firms as before, and were similar to the previous series, except for small modifications to the bogies, and the provision of "air-stream" ventilators at the top of the windows. The Brighton Pullman sets worked to a large extent on these new services, and the pantry sets normally were used to bring the trains to Brighton and Eastbourne up to 12 coaches. For the coastal services, a series of two-car compartment sets were introduced, later known as the 2-Nol type, converted from L.S.W.R. steam stock. Altogether 78 of these sets (Nos. 1813 to 1890) were put into service between 1934 and 1936, and during recent years, several have had the luggage space extended at the expense of the half-compartment previously provided. Ten steel-panelled two-car sets of a new design, later known as 2-Bil and now numbered 2001 to 2010, were also built at Eastleigh in 1935 for the Eastbourne services. Both vehicles had a side corridor and lavatory, although there was no connection between the coaches. This became the standard type of set for main-line semi-fast and stopping trains, and 142 more (now Nos. 2011 to

2152) were built between 1936 and 1938. These later sets had more luggage accommodation, which reduced the seating capacity by four. They displaced some of the 2-Nols on the coastal services, and the latter began to gravitate towards the London suburban area.

For the electrifications of 1937 and 1938, four-car corridor sets, numbered 3054 to 3085, and 3101 to 3155, were provided for the fast trains. Nos. 3054 to 3072 were restaurant car sets for the Portsmouth trains, and Nos. 3073 to 3085 incorporated a buffet car for the Bognor and Littlehampton services. The design of motor coach was generally similar to that of the Eastbourne stock, except that only one driving bogie was used, giving a total of four 225 h.p. motors per set. Moreover, a corridor connection was provided at the driving end to give continuous communication throughout an 8 or 12-coach train. A new type of two-car unit designated 2-Hal (half-lavatory) was introduced for the Gillingham and Maidstone electrifications, differing from the 2-Bil series in that only the trailer coaches had lavatory and corridor. Altogether 92 of these sets, Nos. 2601 to 2692, were built during 1939 and 1940.

By the end of 1938, the Southern electric stock had risen to over 3,000 vehicles. Moreover, it was hard at work. One daily schedule for a three-car set will illustrate this. Starting at 5 a.m., and finishing at 12.45 a.m. next morning, it involved 27 journeys, covering 402 miles, stopping at 279 stations, and yet maintaining an average speed of 25 m.p.h. These suburban sets also were regularly used on special week-end trains, such as the 12.5 p.m. National Sunday League Excursion from Victoria to Brighton, comprising three three-car sets and a two-car trailer unit, which did the journey non-stop in 63 minutes.

By this time a large number of vehicles were due for replacement, particularly some of the third-class trailers, and it was decided to abolish the trailer units, and adopt a four-car formation as the standard suburban unit. Thirty new sets of a modern design were ordered, 9 ft. 3 in. in overall width, and seating 12 passengers in each third-class compartment. The war upset these plans, and, at first, only one set was completed. This was No. 4101 (popularly known as the

"Queen of Sheba") put into service on the Orpington line in 1941.

The war caused considerable disruption of the services and stock workings. From October 6, 1941, first-class was abolished on suburban trains, and from May 22, 1942, all buffet cars and Pullman vehicles were withdrawn, and catering facilities removed from the pantry and restaurant vehicles. The "City Limited" sets had the seating arrangements modified and are now similar to the 3001 to 3020 series. More than 2,000 electric vehicles were damaged through enemy action at one time or another, many beyond repair, resulting in a considerable interchange of vehicles between sets. Moreover, a number of L.S.W.R.-type sets were made up to the new standard four-car formation by the addition of vehicles from withdrawn trailer sets.

In 1944 and 1945, a further nine "Queen of Sheba" type sets were built (Nos. 4102 to 4110). On one occasion, three of these sets were used on a relief train to Brighton, providing a record seating capacity of 1404 for a 12-coach train. The policy had been to give the maximum possible number of seats with the standard underframe, but rush hour traffic was such that at times a considerable number of standing passengers had also to be carried, and the 5 ft. 6 in. compartments were not really wide enough for this. To increase the minimum width to 6 ft. 1½ in., all later sets had one compartment less in every coach. These sets had steel roofs, which altered the external appearance, particularly at the leading end of the motor coach. Sets Nos. 4111 to 4120 (1946), and 4355 to 4377 (1947-48), were of the normal compartment type (except for one experimental open vehicle in set No. 4377), but in Nos. 4121 to 4130 (1946-47) three of the four coaches were of the open saloon type, with partitions separating the smoking and non-smoking portions. Further sets, numbered 4378 to 4387 (1948), 4277 to 4299 (1949), and 4621 to 4666 (1949-50), were of the open type without partitions, but each set still contained one compartment vehicle. The latest sets Nos. 4601 to 4607, and 4667 upwards, incorporate some compartment trailers formerly used in some of the reformed sets. The open saloon vehicles encourage a more even distribution of passengers, and, as they have

the same number of doors as the compartment type, loading and unloading is facilitated. Sets Nos. 4130, 4277 to 4299, 4601 to 4607, and 4650 upwards incorporate a new standard type of lightweight 185 h.p. motor, which reduces the tare weight of each motor coach by approximately 4 tons.

Meanwhile, the older suburban stock has been withdrawn, or reformed into four-car sets by the addition of new steel coaches or old trailer vehicles. In general the series Nos. 4131 to 4250, and 4401 to 4431 are of L.S.W.R. origin; Nos. 4251 to 4255 are "oddments"; Nos. 4432 to 4516 are S.E.C.R. type; Nos. 4300 to 4354 are from the steel-panelled 1925-6 sets; and Nos. 4517 to 4594 are mostly vehicles of a.c. origin. There are, however, exceptions, due to withdrawals and interchange of coaches. All vehicles converted from Brighton steam stock have now been withdrawn, although some are still in use as service vehicles.

Changes in main-line and semi-fast stock have been less numerous. The buffet and Pullman cars and other catering facilities were restored in 1946 and 1947, and a number of the four-car Portsmouth sets, which had been damaged and withdrawn during the war, were restored to service, with new vehicles as required. Seven more 2-Hal sets (Nos. 2693 to 2699) were built in 1948. These are similar in appearance to the current suburban sets.

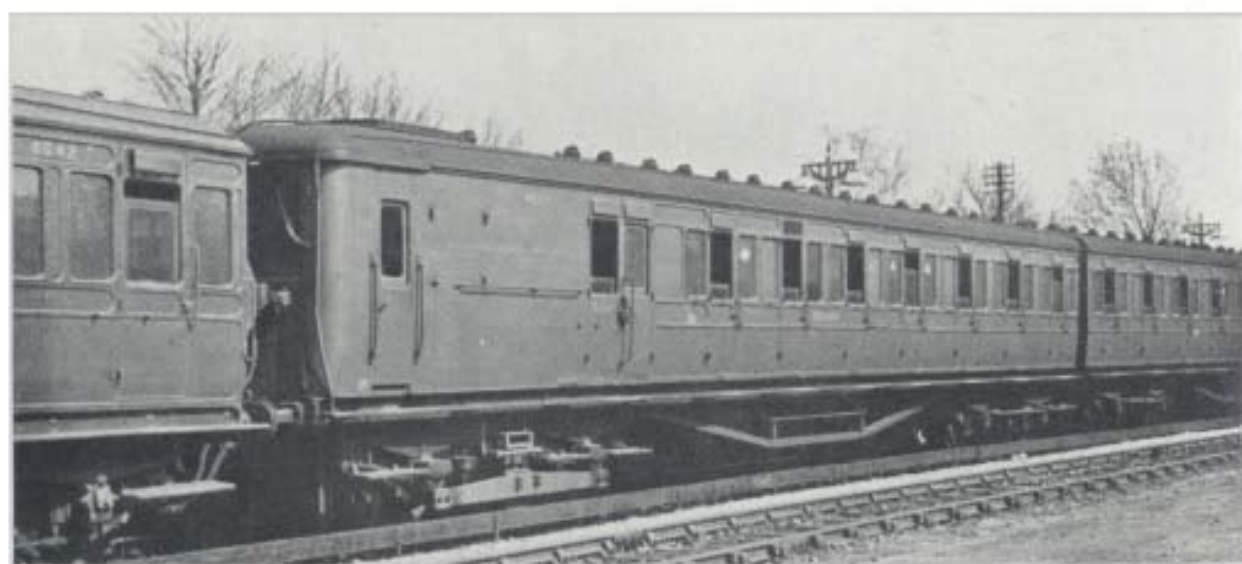
In November, 1949, the double-decker train (sets Nos. 4001 and 4002) went into service. After initial troubles, these sets have been working regularly since January, 1950, and the results are awaited with interest. The Southern Region electric stock now totals approximately 4,000 vehicles; and an extensive programme is in hand, which includes the replacement of all the older suburban stock by new vehicles of the latest design.

Southern Electric Coaching Stock

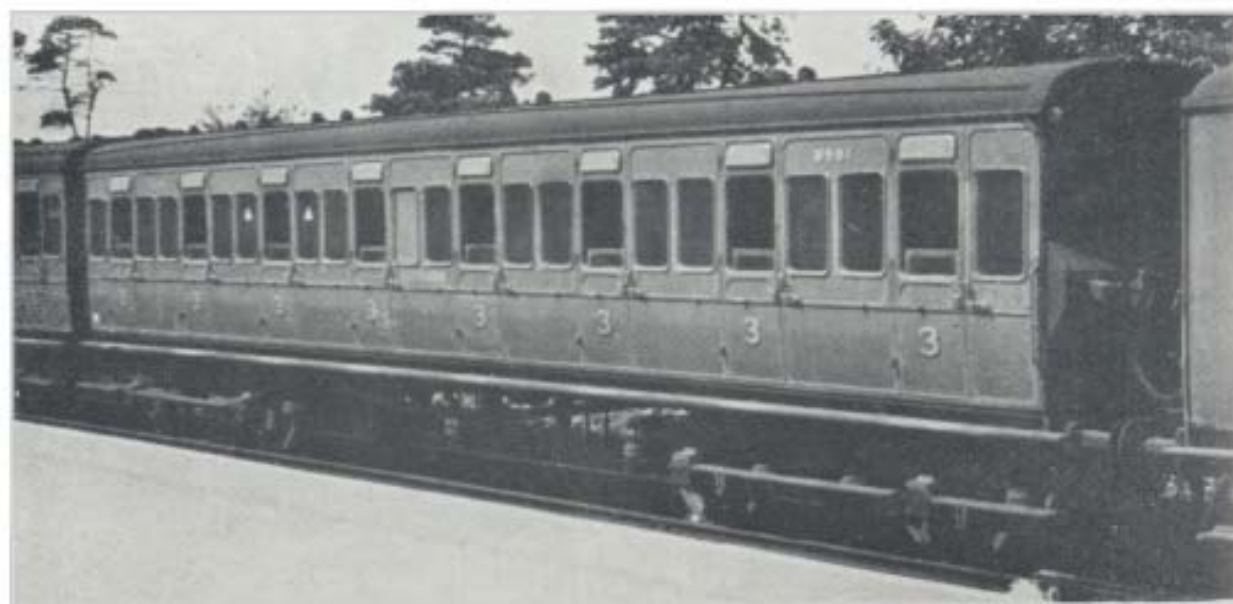
(See article on page 507)



Nine-compartment trailer vehicle, converted from L.B.S.C.R. steam stock



Composite motor coach, converted from L.S.W.R. steam stock



Photos:

[H. C. Hughes

Eight-compartment trailer vehicle, converted from S.E.C.R. steam stock



Photo courtesy]

[Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Steel-panelled motor coach, built for the Western Section in 1925



British Railways all-steel four-coach set, built in 1949



Third class motor coach built for the Portsmouth electrification in 1937