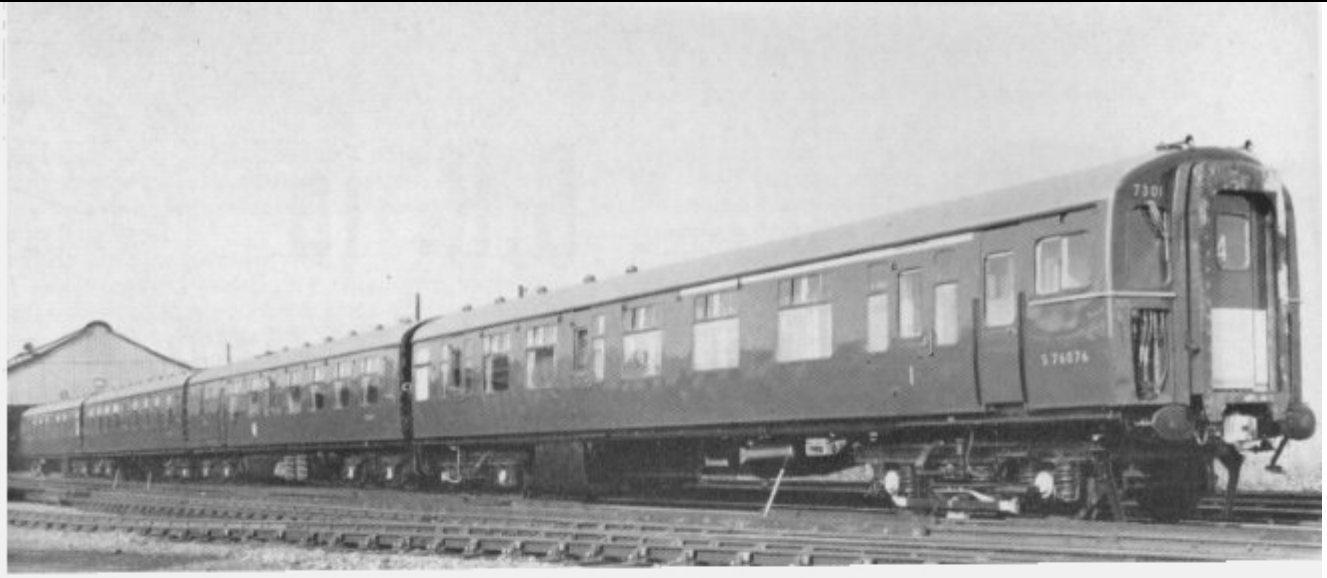

Four-car multiple-unit electric set built at York Carriage Works for Brighton line fast services of the Southern Region

For BRIGHTON LINE EXPRESSES

Fleet of 54 four-car electric train sets to replace 30-year-old stock on British Railways, Southern Region, services between London and the South Coast

EXTENSIVE trials of the first of 54 express electric multiple-unit sets being built for the Brighton line have been in progress in the Southern Region of British Railways for the past two months. Any modifications which result from the tests will be applied to the rest of the order under construction at York Carriage Works. Altogether 216 new coaches are being built in four-car sets, which will normally form 12- or 8-car trains; they will be brought into service gradually, as proving trials are completed.

The new stock will replace a fleet of six-car multiple-unit sets ("6-PUL" and "6-PAN") which have been in continuous service for 30 years, during which time each has travelled about 3,000,000 miles. Although electrification of the main line had been the ultimate intention of the London, Brighton & South Coast Railway, it was not until ten years after grouping, on January 1, 1933, that the first public electric train left Victoria for Brighton. The Southern third-rail system reached Eastbourne and Hastings three years later. For both services virtually identical designs of six-coach express sets were devised, with the essential difference that the Brighton trains incorporated a Pullman car and the Eastbourne trains a pantry car.

Each of the new sets is made up of two driving trailer composite coaches, with a motor brake second-class and trailer second-class (or buffet car) between. The motor coach has all four axles driven by 250-h.p. English Electric traction motors, to give a balancing speed of 72 m.p.h.

The two driving trailer coaches in a set have eight compartments, of which seven are first-class, giving 42 first-class seats in each set; the rest of the accommodation comprises second-class saloons. (If experience shows that the proportion of first-class seats is not correct, this number can be varied by changing the seat cushions, as the compartments are otherwise identical.)

There are 192 second-class seats in the complete set, most of which are in the motor coach and non-driving trailer, but where a part of the saloon trailer is given over to the buffet, 32 of the 72 seats are lost. There are 56 second-class seats in the motor coach, which also has guard's and luggage compartments. A normal 12-coach train thus has 670 seats, of which 126 are first-class. Each of the driving trailers has two lavatories at the inner end, so that there are four lavatories in every four-car set.

Attention has been given by the Director of Industrial Design, British Railways Board, to the difficulty of producing a pleasing front-end design where there is a corridor gangway. The Pullman-type gangways are shrouded by metal aprons which conceal and protect the moulded rubber gangway diaphragms, and the gangway doors have been brought well away from the body to reduce the gangway cavity. These doors are of resin-bonded fibreglass to a new design which incorporates the standard four-digit route indicator. Cavities have been provided in the bodywork for the air hoses and electrical jumpers.

The bodies are constructed on standard British Railways underframes to the standard dimensions. The floors are laid on corrugated-steel sheeting sprayed on both sides with asbestos to provide thermal and acoustic insulation, the lower insulation being panelled in sheet steel as protection. The inside of the roof is sprayed with a $\frac{3}{4}$-in. layer of asbestos, and the cavity between the inner and outer skin on the sides and ends is completely filled with glass fibre. All concealed parts of the

Interior of second-class trailer, which seats 72 passengers. Luggage-rack lights replace the usual shoulder lamp fittings

body are painted with a bituminous solution to resist corrosion.

The external doors are resin-bonded fibreglass, and the droplight windows are designed to close slowly automatically so as to conserve heat in the winter. Double-glazed hermetically sealed window panes are used throughout, with opening top quarter lights. The glass is bedded in a rubber moulding and clamped to the surround by an aluminium frame. Linoleum ¼-in. thick is provided on all floors, with the addition of carpets in the first-class, and curtains for all windows adjacent to seats. Interior décor of the vehicles is similar to that of the Kent Coast units, with extensive use of plastic panelling of various hues.

The lack of a corridor between sets in the 1933 stock meant that separate catering facilities were necessary for each portion—generally a Pullman car in one set and a pantry from which refreshments were served in the other. A buffet car is to be provided in 18 of the new sets, so that 18 12-coach trains each with a buffet in the centre unit can be made up. Initially, "borrowed" buffet sets are likely to be used among the new stock. The buffet is fitted into the space occupied by four seating bays on the other sets.

There is a counter with a back-bar display for serving refreshments direct to the passengers, and also a serving hatch for use by staff serving passengers at their seats. A bottle-cooling cabinet and refrigerator are provided at the counter, and in the kitchen section there is a hot cupboard, a griddle plate and other simple cooking facilities.

The driver's controller has three positions, and each serves both for electro-pneumatic and automatic air brakes. The automatic air brake is normally held off by a solenoid, but should the supply to the electro-pneumatic brake fail, the solenoid will fall and bring the automatic air brake into operation without any action on the part of the driver. The brake controller is self-lapping for both systems of operation. An electrically controlled hand brake is available, switched from the driver's cab to brake the whole train, but a hand brake wheel is also fitted in each cab to apply the brakes on the motor coach only.

The motor coaches run on Mark IV motor bogies which are interchangeable (as is much of the traction equipment) with those used for the Kent Coast electrification. The trailer bogies are a modified version of the B4 design used on British Railways locomotive-hauled stock, and some bogies have been fitted with collector shoe gear. The bolster springs have two rubber blocks which provide extra stiffness under overload to the four nests of coil springs. Vertical swing links provide lateral movement against rubber stops, and both vertical and lateral oscillations are hydraulically damped.

The body of each coach is 64 ft. 9½ in. long and 9 ft. 3 in. wide; length of a four-car set, over couplers raised, is 265 ft. 4¼ in., and 4 in. more overall with buffers extended. The tare weight is 35 tons.