Extension of Colour-Light Signalling, Southern Region

The new all-electric signalbox at Bricklayers Arms Junction. The existing signal box, on the left, is to be demolished

IN 1946, the Southern Railway decided to complete the installation of multiple-aspect colour-light signalling on the main line from London to Brighton by replacing semaphore signals with colour-light signals between Battersea Park and Coulsdon North, and Bricklayers Arms Junction and Croydon. The scheme, which is estimated to cost £1¾ million, is divided into four stages, and is planned for completion in 1955. The whole area covers 98 track miles, and will be provided with continuous track circuiting.

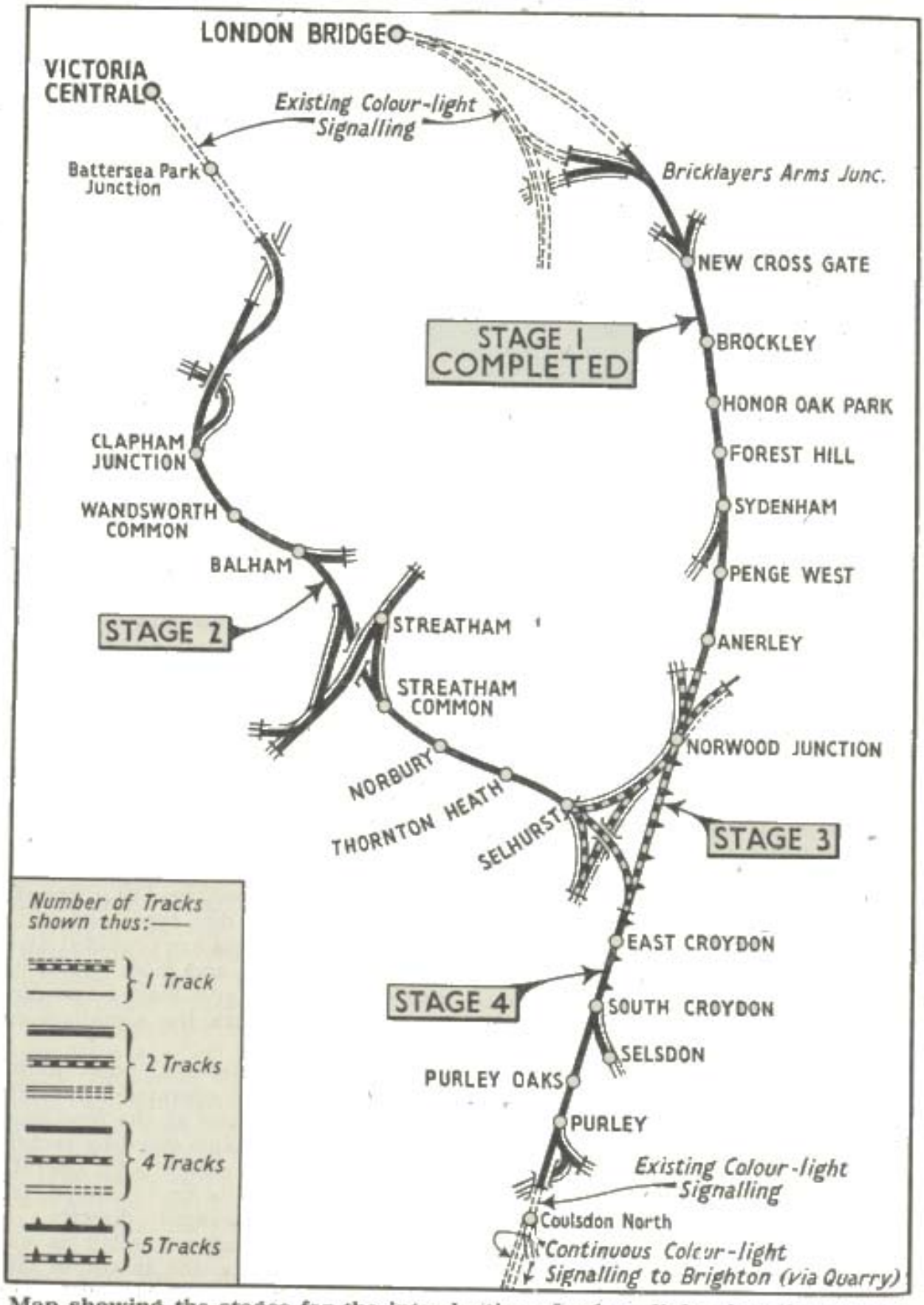
The first stage, the 6½ miles of quadruple track from Bricklayers Arms Junction to Norwood Junction North, was brought into use on the night of Saturday-Sunday, October 7-8, when eight signalboxes, representing 279 working levers, were replaced by three new all-electric boxes, and 38 automatic signals. There are also seven multiple-lamp indicators, and 13 junction indicators, which are mounted on top of their respective signals without additional support. The signal spacing provides for a 2½-min. headway for stopping trains.

The new signalboxes are at Bricklayers Arms Junction (55 levers), New Cross Gate (71 levers), and Forest Hill (47 levers). Included in the signalbox structures are maintenance staff accommodation, relay apparatus rooms, accumulator rooms, stores and working accommodation. Equipment associated with the main signalling supply system also is housed at the signalboxes. There are 96 main and subsidiary colour-light signals of the multi-aspect long range type, the castings of which are in aluminium alloy. The signals are fitted with side lights, and have 12 V 25 W double filament lamps. Separate transformers, housed in the signal castings, are used to reduce the voltage, which for general distributive purposes is 110. Shunting signals are of the disc type, and can be floodlit. Telephones are provided at the automatic signals, and most of the controlled signals, to give train crews direct communication with the signalbox concerned.

There are 76 electrical point motors, most of which are operated from 120 V accumulator batteries at the new signalboxes. There are also stand-by rectifiers at these boxes for direct point operation if necessary. Points up to 500 yd. from the box are operated directly, but beyond that distance a relay is used, and the supply for the motor is taken from a local rectifier. The installation includes 140 condenser-fed a.c. single

and double rail track circuits, incorporating 150 auto and resonated impedance bonds.

The new signalboxes have individual levers of the miniature type with all-electric interlocking. Every lever has two lock magnets, one for interlocking, and the other for track and indication locking. All signal levers are fitted with back or normal indication locks, but



Map showing the stages for the introduction of colour-light signalling in the suburban area of the London-Brighton main line

front or normal selection locks are not used. Normal and reverse track locks are fitted to all point levers.

Behind every signal lever is repeated in miniature lights the aspects of the signal which it controls. Running and shunt signals also have a light indication which, when illuminated, shows that the signal can be cleared by reversing the lever. Behind every point lever is an illuminated "N" or "R" indicating the position of the points.

to give orthodox track circuit indications, so that experience can be gained.

Magazine train describers are provided in the signalboxes. These enable the signalman to give a full description of a train to the adjacent boxes by pressing a button. The receiving instrument in the box ahead indicates the first, second and third trains, and the indication automatically steps up one place as each "first" train is cancelled on passing.

To provide power for the new signalling,

Bricklayers Arms Junction down spur inner home signal. Colour-light signals have now replaced the semaphore arms in the background

An illuminated diagram of the area controlled by the signalbox shows all signals, points and track circuits, together with their identification numbers and letters, so that signalmen are continuously aware of the position and movements of trains. The diagram at Forest Hill differs from the others in that use is made of the properties of perspex to provide a smaller and clearer diagram, the general illumination of which is under the signalman's control, but it has been installed at Forest Hill only

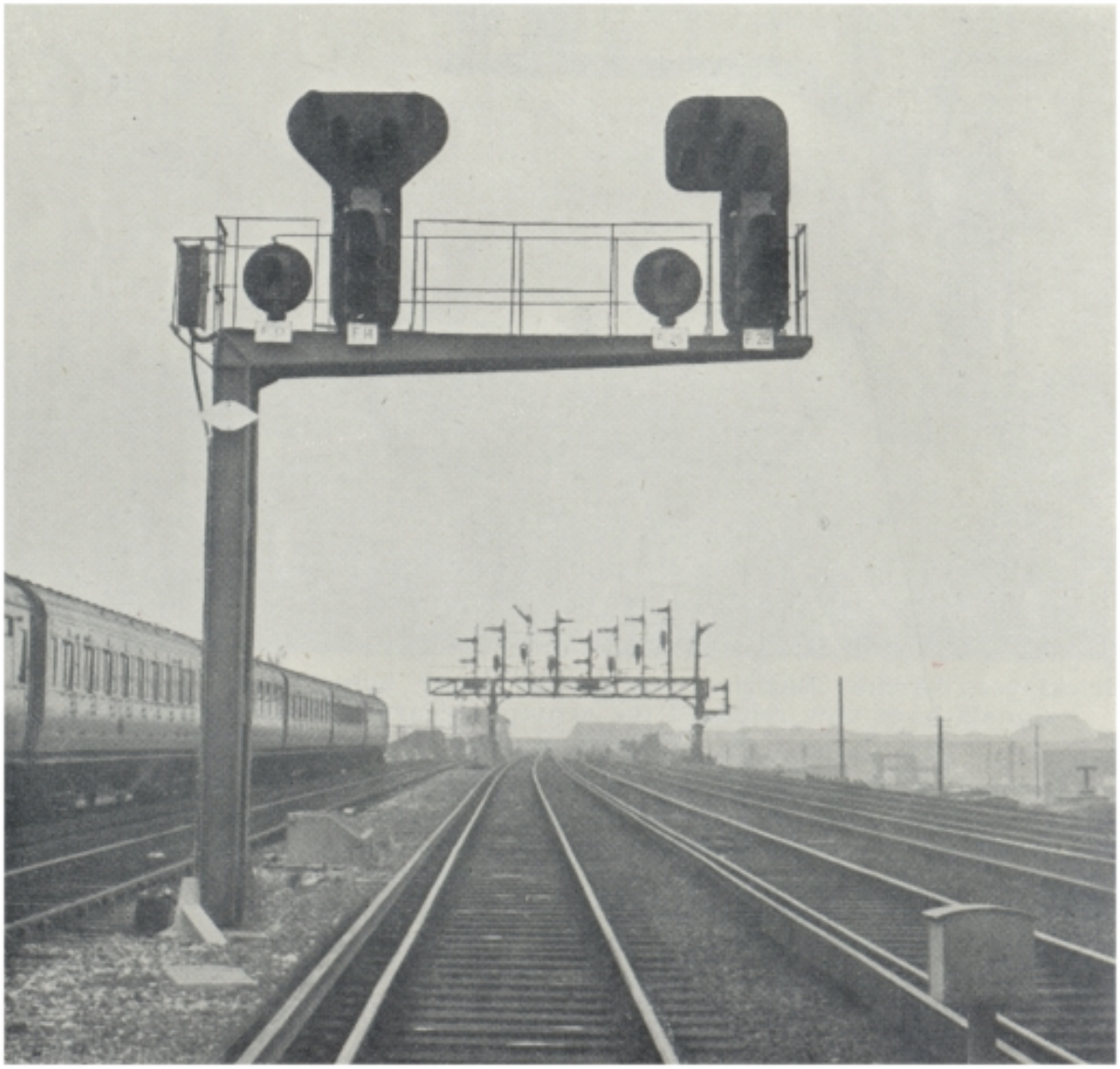
a three-phase distribution system is being installed. The first section, from Waterloo to Croydon, is now in use, and when the system is complete, it will form a ring main between Waterloo and Croydon *via* Forest Hill and *via* Streatham. The whole of this distribution system is arranged for supervisory control from a central control room at Waterloo, and provision is made for the equipment to be operated by remote or local control as required. Power is taken at Waterloo from the public supply

mains, and transformed for distribution to the signal boxes.

In the construction of the signalboxes, different foundation problems were encountered at each site. At New Cross Gate, a reinforced concrete raft was used; piles 30 ft. long were required at Bricklayers Arms Junction; and at Forest Hill, mass concrete piers were built in pits excavated down to a gravel stratum. The superstructures of the signalboxes are built in 13½-in. brickwork, to give adequate insulation against damp and temperature changes. The floors and roofs are of reinforced concrete, with cavity ceilings and ashphalt roof coverings.

On the first stage of the scheme, the structures supporting the signals are all of the cantilever type. Most of them are of precast reinforced concrete, and consist of one large unit weighing about 4¼ tons. They were made in the Southern Region Concrete Works, at Exeter, and transported by rail for erection by crane on previously prepared reinforced concrete bases. Welded steelwork, metal-sprayed for weather protection, was used for the longer cantilevers, with an overhang of 16 to 30 ft. These structures were supplied in two units, and are anchored to their concrete bases by heavy bolts.

The second stage of the scheme, from Battersea Park to Selhurst, is planned for completion in 1952; stage 3, from Norwood Junction and Selhurst to Gloucester Road Junction (Croydon), in 1954; and the final stage, from East Croydon to Coulsdon North, in 1955.



Bricklayers Arms Junction up through and local home signals, showing the up home signals and approach lights of the former signalling system in the background