Colour-Light Signalling in the Norwood Triangle

The new all-electric signalbox at Norwood Junction, which has replaced two manually-operated boxes

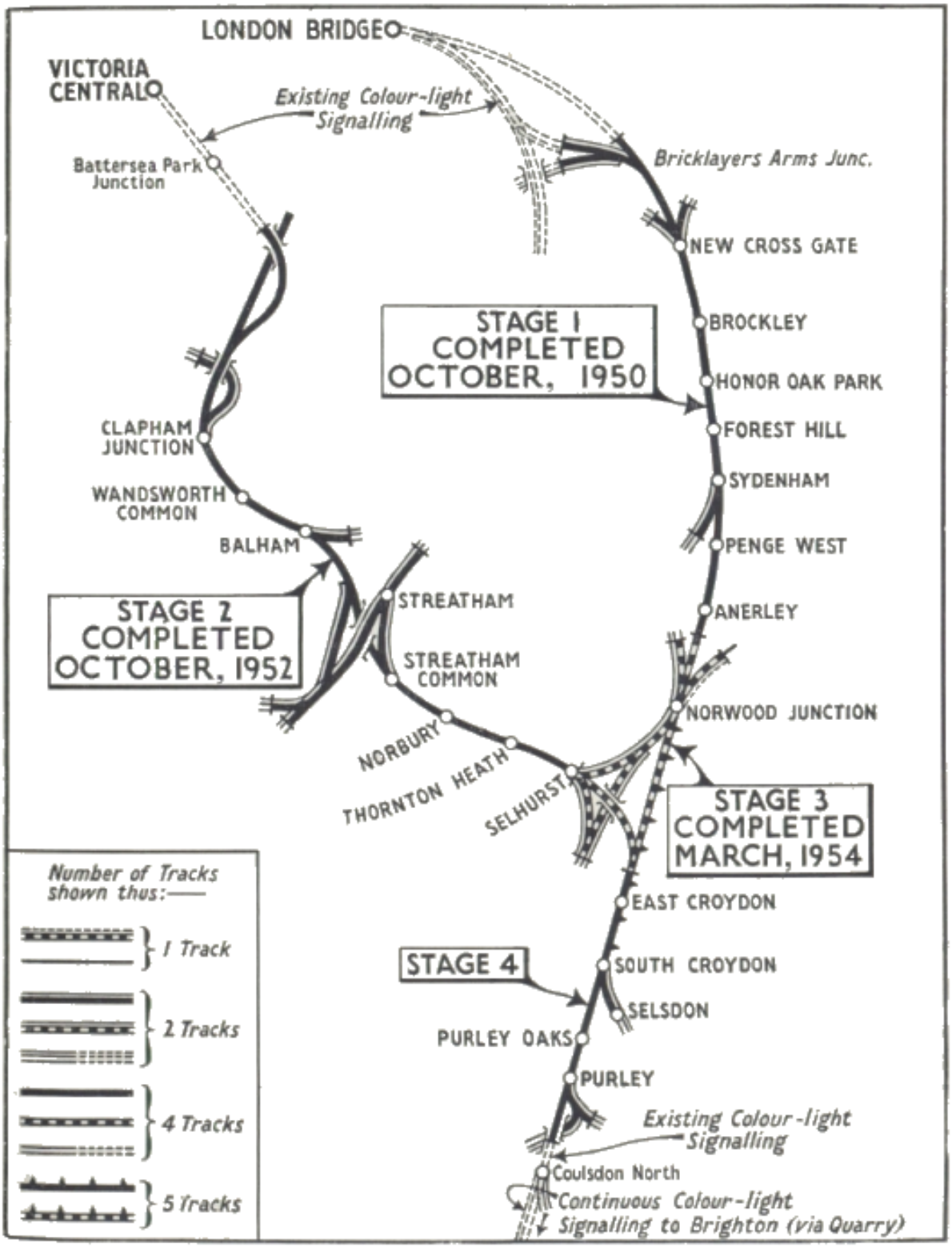
THE third stage in the programme for improving the signalling on the main line from London to Brighton was completed on Sunday, March 21, when colour-light signals were brought into use between Selhurst, and Norwood Junction, and the northern approaches to East Croydon Station. This installation links the first stage of the scheme, from Bricklayers Arms Junction to Norwood Junction, completed in 1950, with the second stage, from Battersea Park to Selhurst, completed in 1952, and covers an area complicated by several junctions and connecting lines.

Two new all-electric signalboxes have been provided, one at Norwood Junction, and the other at Gloucester Road Junction, in the triangle of lines between Norwood Junction, Selhurst, and Croydon. Through this area pass the main-line trains between London Bridge and Victoria and the South Coast, and heavy suburban traffic. Four manually-operated signalboxes, with a total of 235 levers, were required to control the traffic in the Gloucester Road area, and their replacement by one box, containing a frame with 131 levers, will facilitate the movement of trains with the minimum of delay.

The new signalbox at Norwood Junction has a frame with 107 levers, and replaces two manually-operated boxes with a total of 155 levers. Because of the frequency of the junctions, the layout is not conducive to the use of automatic signals ; there are only six in the whole area, which covers $4\frac{3}{4}$ route miles and $17\frac{1}{4}$ track miles. A new all-electric signalbox will be provideed at East Croydon under stage 4 of the scheme. This structure has already been built to house part of the final relay room equipment, which has been brought into use under stage 3 to control signalling functions operated from the existing manual box at East Croydon North. This will facilitate the final conversion to colour-light signalling under stage 4 of the scheme, when the north and south signalboxes at East Croydon will be abolished.

The new signalboxes at Norwood Junction and Gloucester Road Junction conform to the familiar Southern Region design, incorporating the relay room immediately below the signalling floor, and with the accumulator room, stores room, and staff accommodation in the winged extensions. To reduce the length of the structure, and to enable the signalmen to see over the up and down through lines, which are about 8 ft above ground level, the signalbox at Gloucester Road Junction is a three-storey building.

The lever frames in both boxes are of Southern Region pattern, with miniature type individual levers and all-electric interlocking. Each lever has two lock magnets, one for interlocking purposes, and the other for track and indication locking. All the levers have back or normal indication locks, but front or normal selection levers are not provided. Normal and reverse track locks are fitted to all point levers. Behind every signal lever is repeated in minature lights all aspects of the signal it controls. There are 80 signals of the multiple-aspect



Stages in the colour-light signalling scheme on the Central Section of the Southern Region

long-range type, and 23 junction indicators in the area. The signal spacing provides for a 2½-min. headway for stopping trains. Shunting movements are controlled by 36 solencid-operated floodlit disc type signals.

Running and shunt signals have an "F" light indication behind the lever which, when illuminated, shows that the signal can be cleared by reversing the lever. Behind each point lever is an illuminated "N" or "R" indicating the position of the points it controls.

receiving instruments with associated equipment. Each signalbox is in telephone communication with signals, adjacent signalboxes, and traffic control; telephone positions are duplicated as necessary, to enable the booking lad to deal with calls.

There 110 point machines, mostly operated from 120-volt accumulator batteries at the new signalboxes; the batteries are trickle-charged by rectifiers. Stand-by rectifiers are provided for direct operation if necessary. The

The 131-lever power frame, with illuminated diagrams and train describers, at Gloucester Road Junction Signalbox

Above the lever frame is a large illuminated diagram of the area controlled by the signalbox, showing all signals, points and track circuits, together with their identification numbers and letters. When a train occupies any track circuit, its presence is indicated on the illuminated diagram, so that signalmen are continuously aware of the position and movement of trains.

Magazine train describers are provided in the signalboxes. These enable the signalman to give a full description of a train to 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 train passes. There are 16 sending and

installation includes 175 condenser-fed track circuits, single and double rail, incorporating 114 impedance bonds. As far as possible, the track relays are located in the signalbox relay rooms, local controller rooms, or the apparatus cases of automatic signal locations.

Multicore vulcanised insulated rubber lead-sheathed cables are used for signalling, the number of conductors varying from 10 to 40. There are approximately 750 core-miles of signalling cable, 80 pair-miles of telephone cable, and seven miles of twin feeder cables for current distribution at 480 and 110 volts. Almost the whole of the cable route is in surface concrete troughing, of which there is approximately ten miles.

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The signalling changeover was carried out within a 6½-hr. possession of all lines throughout the whole area affected. It entailed the abolition of over 160 signal arms and fittings and a number of signal dolls and posts; 110 sets of points were disconnected from the redundant signalboxes and reconnected to the new electric point machines previously installed and tested. Nearly 600 men of the Signal & Telecommunications Engineer's staff, drawn from all over the London area, were required to bring the new installation into service, and to carry out essential demolition. They were augmented by about 60 men of the Operating, Civil Engineer's, and Mechanical & Electrical Engineer's Departments. The whole of the signalling installation was designed and carried out by the Signal & Telecommunications Engineer's Department.

It is of interest to recall that the Southern Railway inaugurated its first colour-light signalling installation between Holborn Viaduct and Elephant & Castle on March 21, 1926, exactly 28 years before the third stage of the present programme was brought into use. The final stage of the Brighton line improvement scheme, from East Croydon to Coulsdon North, is due for completion next year. At Coulsdon, it will link up with the existing colour-light installation which extends, *via* Quarry, to Brighton.