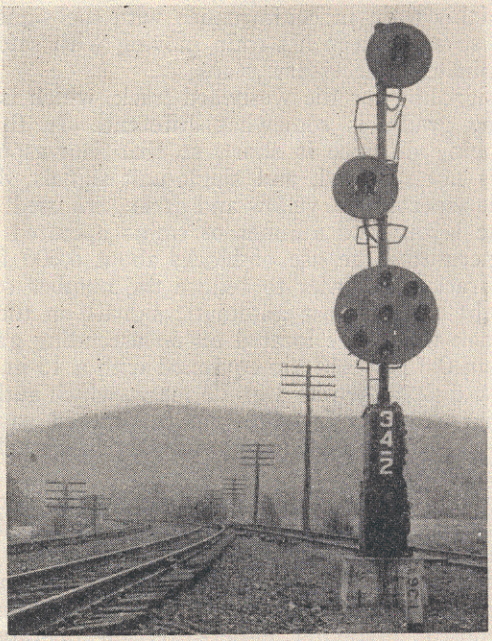
Signaling Eliminates "Bottle Neck"

Congestion on 14-mile double-track section in four-track line relieved by rehabilitating automatic block system



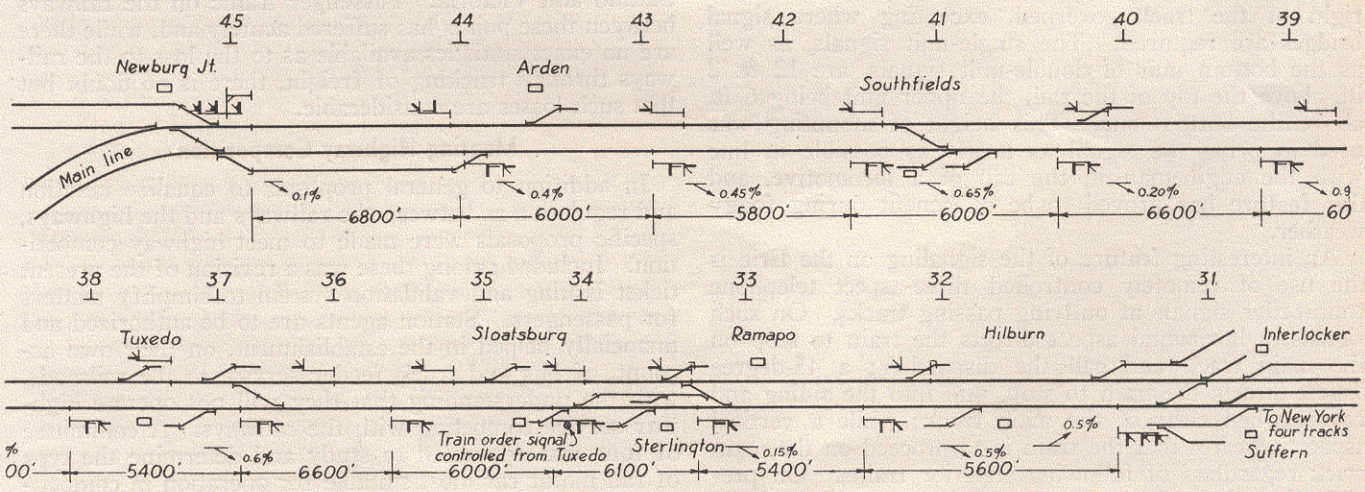
Two-arm Automatic Signal with Position-light Train-Order Unit

TO provide increased capacity on a two-track section between four-track lines, the Erie has installed searchlight-type automatic signals, using four aspects, to replace old semaphore signaling between Suffern, N. Y., and Newburgh Junction, a distance of 14 miles. This section lies between Jersey City, N. J., and Port Jervis, N. Y., with four main tracks extending eastward from Suffern to Jersey City, 31 miles, and westward from Newburgh Junction to Graham, and with three tracks beyond that point for 7.6 miles to Port Jervis. Between Suffern and Newburgh Junction the line follows the Ramapo River through a mountainous territory which would involve a heavy expenditure for the construction of additional tracks.

The problem of handling 18 passenger trains and 12 freight trains each way daily over this section of double track is complicated by the fact that the trains are bunched in certain periods, as, for example, between 6 and 8 a. m., when six passenger trains and two freight trains are scheduled eastbound. The grade in this territory is another obstacle, descending eastward at rates varying from 0.04 per cent to 1.14 per cent with an average rate of 0.32 per cent. This grade increases the stopping distance of heavy fast trains to such an extent that they could not be spaced closely with the old signaling arrangement. In view of the fact that three and four main tracks were available on the remainder of the division, this 14-mile section of double track was a "bottle neck."

In order to increase the track capacity and improve the safety of train operation on this section of double track, it was decided to replace the old semaphore signaling with new color-light signaling located on an entirely new arrangement. The old signaling was of the lower-quadrant semaphore type, installed in 1909. Each automatic block was about two miles long, with a distant signal 2,800 ft. in the approach to each home signal. With this arrangement, following trains could not be spaced closer than 2.5 miles, and, even with this minimum spacing, there was not proper stopping distance on the descending grade on the eastward track.

The solution devised for this situation was to locate the new eastward signals to afford blocks 5,800 ft. long and to use signals with two units, displaying four aspects to indicate track occupancy three blocks in approach. These aspects are in accordance with the standard code; being red over red staggered for "stop and proceed"; yellow over red for "approach"; yellow over green for "approach medium"; and green over red for



Track and Signal Plan of the 14-Mile Section Suffern to Newburgh Junction

"clear." This system of automatic block signaling not only allows adequate stopping distance with minimum spacing between following trains but affords the engineman of a freight train adequate warning to control the speed of his train in conformance with the signal indications, so as to keep his train moving with safety and yet eliminate unnecessary stops.

The signaling for the westward track, which is on an ascending grade, is somewhat different. In this case the stopping distance is short, so that four-aspect signaling is not required, and single-unit signals, displaying three aspects, red, yellow and green, are used. Likewise, the layout and number of trains operated in any period permitted the use of blocks about 6,000 ft. long on this track. In order to reduce the number of stops for freight trains, those automatic signals on the westward track which are located on an ascending grade of more than 0.3 per cent are equipped with a 15-in. circular yelow disk known as a grade mark, which authorizes the engineman of a freight train to proceed past such a signal at slow speed without stopping in case the signal is displaying red.

So far, the new signaling arrangement has permitted the present traffic of 60 trains daily to be handled without delays and is, therefore, highly satisfactory. However, with a view to future increased traffic, the new signals were so located as to fit in with a centralized traffic control involving either-direction operation on each track. In such a proposed improvement a set of two crossovers would be located at Tuxedo, midway between the two ends of the double track, so as to make it possible to direct trains from one track to the other when making run-around movements.

Details of Construction

This 14-mile double-track signaling installation involves 12 two-unit signals on the eastward track, and 11 single-unit signals and 1 two-unit signal on the westward track. The automatic block signals are of the searchlight color-light type, mounted on masts at the right of the track governed, excepting where signal bridges are required. The single-unit signals, as well as the bottom unit of double-unit signals, are 12 ft. 2 in. above the top of the rail, the upper unit being 6 ft. above the bottom one. This height of mounting was used to bring the signal as nearly as possible in line with the engineman in the cab of a locomotive, and this feature has proved to be of benefit during foggy weather.

An interesting feature of the signaling on the Erie is the use of remotely controlled three-aspect telephone train-order signals at outlying passing tracks. On such signals, a horizontal aspect directs the train to stop on the main track and call the dispatcher; a 45-degree aspect directs the train to stop, pull into the siding and report when clear of the main track; while a vertical aspect indicates that the train is to proceed on the main track regardless of following superior trains. On previous installations, a semaphore or a color-light signal has been used to display these telephone train order signal aspects. However, in the new Suffern-to-Newburgh Junction installation a position-light signal was used for the first time for the train order signal, this position-light unit being mounted below the other signal units, as shown in the illustration on the preceding page.

The design and construction of this automatic signaling installation was handled by the signal department forces of the Erie, the signals, relays, etc., being furnished by the Union Switch & Signal Company.

Mexican Operating Men Hold Annual Convention

WITH an attendance of 130 members and numerous guests, the sixth annual convention of the Mexican Association of Railroad Officials met in Mexico City on May 21, and was greeted by Mariano Cabrera, executive president of the National Railways of Mexico.

A great deal of time was taken at this convention in discussing highway competition, which, although somewhat later in reaching Mexico than the United States, has in the past few years made great inroads in the revenues of the Mexican railways. The situation in regard to highway competition in the United States, together with measures taken by the United States railroads to counteract this competition, were gone into in great detail. While there is no Interstate Commerce Commission in Mexico, the situation as regard to the railways being under definite and even rigid control while their highway competitors are uncontrolled, has its parallel in Mexico in view of the fact that the Mexican railways are subjected to federal regulation under the law of communications, which covers the granting of concessions, inspection of construction and maintenance materials, timetables, tariffs, and rules in general. Thus the Mexican railways are subjected to control as are those in the United States and they are also heavily taxed.

Motor competition in Mexico is not subject to governmental control and has no regulation other than the private interests of the car owners or drivers, who charge whatever rates they please, have no requirements as to the publishing of timetables and tariffs or the keeping of an adequate accounting and whose taxes are entirely out of proportion, considering the use that they make of the highways. Highway competition is particularly acute in Mexico City and its surrounding districts, as well as between such centers as Laredo and Monterrey, Saltillo and Victoria. Passenger traffic on the railways between these points has suffered acutely and, while there are no exact statistics available as to the loss to the railways through trucking of freight, there is no doubt but that such losses are considerable.

Meeting Highway Competition

In addition to general proposals to equalize taxation and regulation as between the railways and the highways, specific proposals were made to meet highway competition. Included among these was a revision of the present ticket issuing and validation system to simplify matters for passengers. Station agents are to be authorized and financially helped in the establishment, on their own account, of bus and truck feeder service to the railroads, with the understanding that they will not operate highway service competing with the railways. A committee of four was appointed to study and determine the type of rail motor car most suitable for operation in competition with motor coaches on the highways and during the discussion it was mentioned that the vice-president of the National Railways of Mexico is already in touch with American manufacturers for the purchase of such motor cars.

Maintenance Matters Considered

A campaign of education among section foremen as to proper track drainage was recommended by the committee on maintenance. It was devoloped that in most instances the foremen simply make repairs to track that goes out of line and surface because of bad drainage with-