

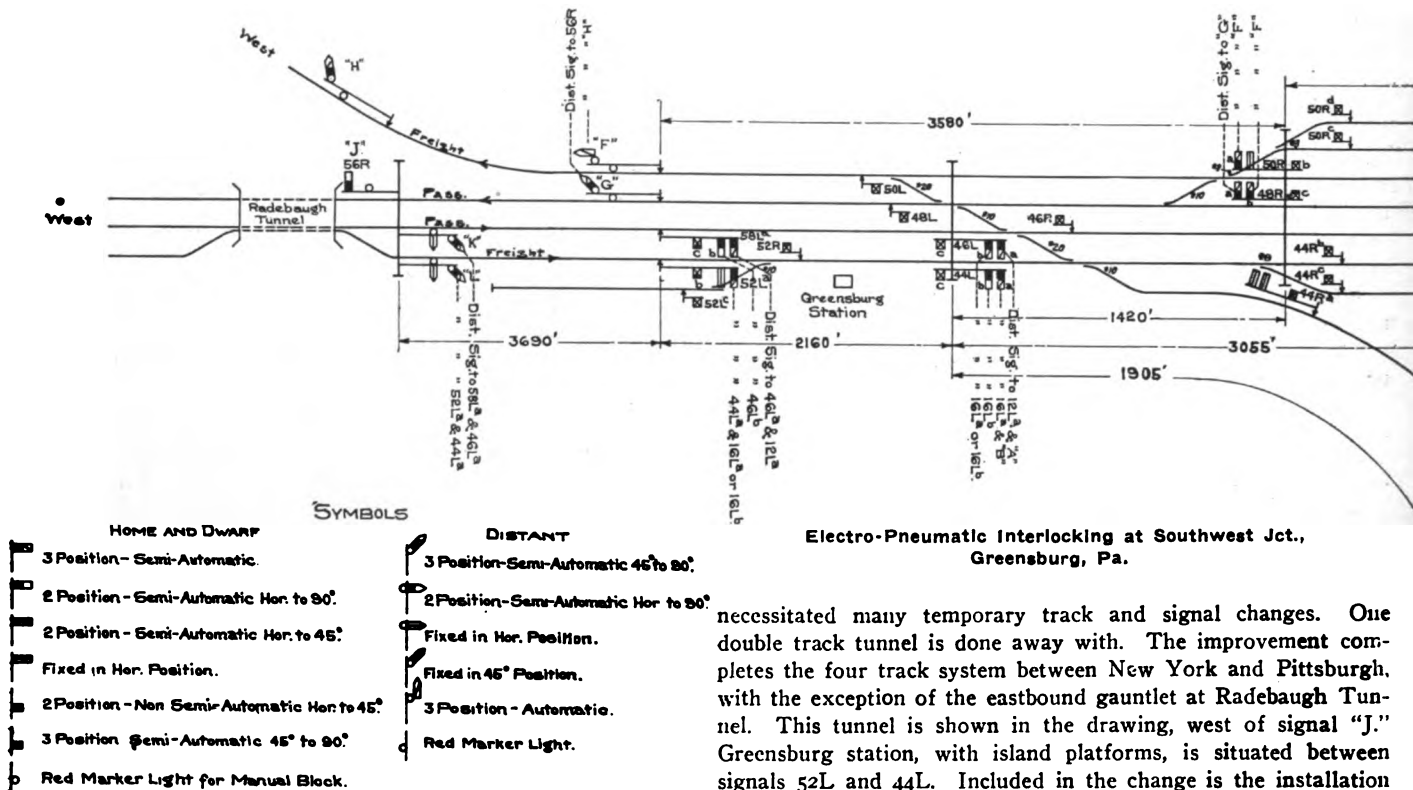
65.' And I am afraid that that is the trouble with too many of us. You see most of us only know how to be different. It takes genius to be original.

"Now about that extra stock. Maybe it isn't due to your department, and maybe you have only helped a little unbeknown to yourself. One time on my old road we were going to lay some new rail, and I told everyone to get ready so that everything would go smoothly. So the chief ordered switches, frogs and joints, and the signal engineer ordered bond wires and pins, and the division men got ready to do the job. Now I had done all the telling and hadn't thought to recommend any extra cooperation. So when we got through we found that we had enough switch rods, tie plates, joints, bond wires and pins left to do the job all over again. You see the division people hadn't given anyone else credit for being ready, and the departments had passed the compliment along, not wishing to be outdone in

to make an inspection of the Southern division. When I get back, you can report on your recommendations for the new work. We should push it as fast as possible. I have just signed an authority for some extra help for you, so you won't be hampered in getting ready. Good-day, sir, and good luck!"

INTERLOCKING AT SOUTH WEST JUNCTION.

The extensive electro-pneumatic interlocking at South West Junction, Greensburg, Pa., on the Pittsburgh division of the Pennsylvania, 31 miles east of Pittsburgh, was recently put in service, establishing one of the largest interlockings ever constructed outside a large city terminal. This work, carried out in connection with some changes in alinement of tracks, has



politeness. Likewise the chief had ordered switches complete and the signal engineer had ordered the insulated parts. We were still paying interest on most of that stuff when I left, and it hadn't earned a cent. And that reminds me of one of the stunts my young friend I was telling you about pulled off with my assistance when we were trying to organize a new department. Of course we had to insulate our switches where we had automatics, so it was up to him to design the fittings. I had to go away for a while, and, as we were in a hurry, I told him to go ahead. He thought he would make a good job of it, and he designed a rod to go with the insulation. And the first thing I knew we were carrying two kinds of rods in stock,—one for the chief engineer and one for the signal department. Now I don't say that the new rod wasn't a dandy, but thereafter when something was to be designed we had a general consultation, and I acted the part of supreme court. It's human nature unless we watch ourselves closely, to imitate unconsciously a certain famous philosopher. This man kept a cat, and he had made a hole in the door so she should come and go without bothering him to open it. In due time there were kittens; and as he thought the kittens should also have a means of exit, he made a smaller hole in the door beside the old one. It's possible, you see, to be so intent on your work that you forget to look at it from all sides.

"I have to go now to meet our vice-president at Sommerville

necessitated many temporary track and signal changes. One double track tunnel is done away with. The improvement completes the four track system between New York and Pittsburgh, with the exception of the eastbound gauntlet at Radebaugh Tunnel. This tunnel is shown in the drawing, west of signal "J." Greensburg station, with island platforms, is situated between signals 52L and 44L. Included in the change is the installation of a "duck-under" of the east leg of the "Y" leading to the South West Branch. This track connects with the west bound tracks of the main line and is used principally by coal trains. The west leg of the "Y" carries a considerable local passenger traffic to and from Pittsburgh.

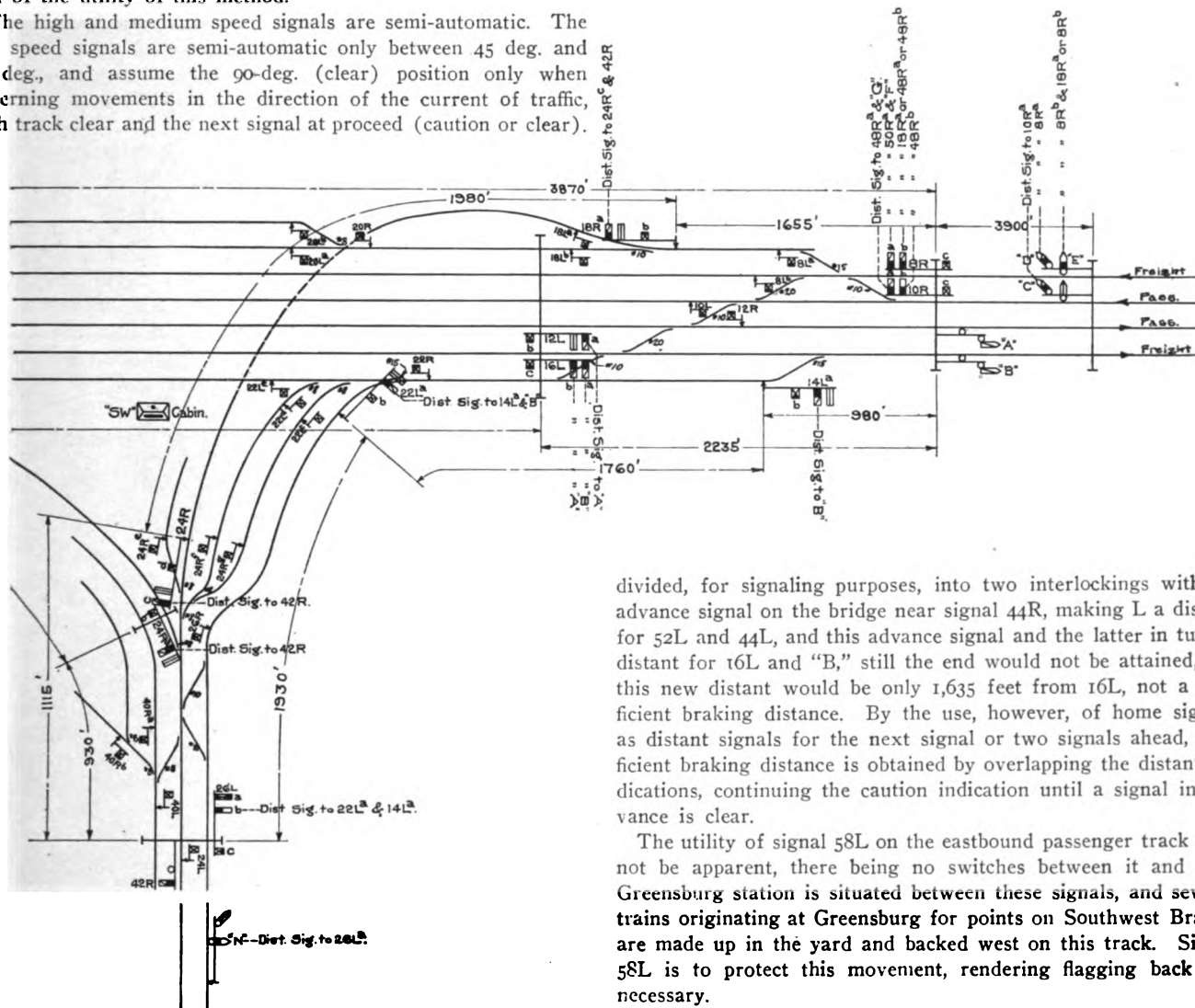
This interlocking is noteworthy in several respects. As before observed it is one of the extensive plants, in territory covered, ever installed outside a city terminal. It has 19 switch levers operating 42 functions, and 29 signal levers operating 113 functions; a 59-lever machine with 48 working levers, operating 155 functions. The distance between the easternmost and the westernmost distant signals on the main line is nearly three miles, i. e., 15,040 ft., and between home signals over two miles, i. e., 11,140 ft.; while between the extreme switches it is about 7,350 ft. All functions are operated by compressed air (electro-pneumatic), the signals being three-position, upper quadrant. The "stop and proceed" signals (automatic) have two lights staggered, and pointed arm or arms; the "stop and stay" signals have lights arranged vertically and square end arms. Alternating current track circuits are used throughout. Circuits are arranged for approach and route locking, so that after signals are cleared the route over which they govern cannot be changed until the train has passed over it, except that to give the elasticity necessary (which can only be attained by allowing routes to be changed quickly after movements have been made) this route locking is so arranged that any switch may be moved after the signals have been restored

to stop, and the train has passed entirely over it and beyond its fouling point.

The electric circuits which control the home and dwarf signals and switches are direct current supplied from a storage battery in the cabin; while the distant and automatic signals are controlled by alternating current. All of the signals are electrically lighted.

This plant is one of the finest examples yet installed of "speed signaling" as recommended by Committee No. 1, of the Railway Signal Association, and Committee No. 1, of the American Railway Engineering Association, and affords an excellent demonstration of the utility of this method.

The high and medium speed signals are semi-automatic. The low speed signals are semi-automatic only between 45 deg. and 90 deg., and assume the 90-deg. (clear) position only when governing movements in the direction of the current of traffic, with track clear and the next signal at proceed (caution or clear).



Electro-Pneumatic Interlocking at Southwest Junction.

In the 45-deg. position they govern to any route, either with or against traffic, and with the next signal at stop or with track occupied. Thus they can be used to advance trains in case of failure of the semi-automatic feature of the high signals. The value of this is apparent from the obvious fact that on account of the great distances from the cabin, the issue of clearance cards under such circumstances would cause serious delay. The low-speed signals are used also for shifting movements which otherwise would have to be made against stop signals. Dwarf signals are provided with the same method of control as the low speed arms of the high signals. Each high signal at proceed (caution or clear) indicates not only clear track, but also the position of the next signal.

The safe distance at this point to ensure stoppage of the fastest trains between the distant and the home signals is established as 3,600 ft.; obviously any shorter distance than this would be insufficient.

Referring to the diagram, it will be noted that the distance

from signal L to 52L is 3,690 ft., but that 52L to 44L is 2,160 ft., 44L to 16L is 3,055 ft., and 16L to "B" is 2,235 ft. Therefore there is not full braking distance for the highest speed train between these latter signals, although in some cases the distance is sufficient if two signals in the rear show caution. It would not give the needed facility if signal L were made a distant for signals 52L, 44L, 16L and "B"—showing caution if any one of these signals were at stop, as, if "B" were at stop, it would greatly reduce the track capacity to show "caution" at a point over two miles away, when 3,600 ft. is sufficient. If the territory were

divided, for signaling purposes, into two interlockings with an advance signal on the bridge near signal 44R, making L a distant for 52L and 44L, and this advance signal and the latter in turn a distant for 16L and "B," still the end would not be attained, for this new distant would be only 1,635 feet from 16L, not a sufficient braking distance. By the use, however, of home signals as distant signals for the next signal or two signals ahead, sufficient braking distance is obtained by overlapping the distant indications, continuing the caution indication until a signal in advance is clear.

The utility of signal 58L on the eastbound passenger track may not be apparent, there being no switches between it and 46L. Greensburg station is situated between these signals, and several trains originating at Greensburg for points on Southwest Branch are made up in the yard and backed west on this track. Signal 58L is to protect this movement, rendering flagging back unnecessary.

It will be noticed that signal "J" governing the westbound passenger track through Radebaugh Tunnel is a "stop and stay" signal. Absolute block is maintained through this and the eastbound tunnel. The conditions at this point are and have been peculiar for years. Although the tunnel is dry, a coating of insulating material will form on the rails in a very short time to such an extent that a train will not shunt the direct current circuit; and though the circuit is maintained, it cannot be depended upon. There appears also to be more or less foreign current present from the coal workings near the tunnel.

If the installation of A. C. track circuits, which has now been made, proves absolutely reliable after a year or two of service, signal "J" will doubtless be made automatic, like signal "H," and another point of congestion will be removed. Signal "J" is operated from South West Junction cabin on advice from "RG," Radebaugh, situated west of the tunnel. The signals for eastbound movements through the tunnel, not shown on the diagram, are operated by "RG" on advice from "SW," and are cleared when track indicators show that the preceding train has passed 52L or 58L.