Letters to the Editor

UNIFORM SIGNALING,—A REPLY TO MR. RUDD.

To the Editor of The Signal Engineer:

The arguments set forth in Mr. Rudd's criticism of my Canadian Railway Club paper, which appeared in your issue of April, page 135, are so plausible and so attractive to the reader who has not the time to study and digest them, that I desire to make a brief reply in order to assist those interested in arriving at a true understanding of the actual conditions. Mr. Rudd cites three conditions or cases in which the minority's recommended scheme of signaling is held to be insufficient and inadequate. These criticisms are considered worthy of fuller explanation. The first reads as follows:

"In view of the change in operating methods in the 12 years since Mr. Rhea first promulgated the proposal the minority is now advocating, while granting for the sake of argument that the proposal was sound and adequate for our needs 12 years ago, some of us feel that it is not sufficient for present day requirements. To cite examples: First, given a dense, slow, heavy freight traffic, interspersed with a number of high-class, high-speed passenger trains scheduled for a stretch of perhaps 15 miles at 75 to 80 miles per hour. A safe braking distance, allowing for all foreseen contingencies, is, say, 1½ miles, but blocks of this length are too long for the operation of the freights, as it would certainly tie up traffic to require the slow freight to reduce speed to the rate required if it were to take a No. 10 crossover and move into an occupied yard at the signal 1½ miles from the point of obstruction. But if the first signal indicated 'Pass next signal at medium speed,' and the second signal indicated 'Prepare to stop at next signal,' the requisite information would be given and the blockade avoided."

The schedule speeds named are considerably faster than have previously come to my notice. There is substantial reason for belief that a mile is sufficient braking distance on level track for all speeds that it is *necessary* for passenger trains to run to meet their schedules. However, this is, perhaps, aside from the point.

It is stated that "it would certainly tie up traffic to require the slow freight to reduce speed" at a caution signal 1½ miles from the interlocking where the train is to leave the main track and enter an occupied yard, to such speed that it could enter this same yard at this same caution signal; and, further, to require it to run for the 1½ miles at such reduced speed. If this were necessary, the statement might represent the facts. The question is, would the minority's simple scheme of signaling require such operation of freight trains? We say, No—that such handling is not necessary, and was not contemplated by the minority's plan.

We hold that a train finding a signal in the caution position must run with such caution as the conditions require. Mr. Rudd seems to hold that a train finding a caution signal located under the most *favorable* conditions must run with the same degree of caution and restriction of speed required by the caution signal located under the most *unfavorable* conditions on the division. We feel that this interpretation of the caution signal is incorrect and indicates a lack of confidence in our enginemen and trainmen. If our enginemen and trainmen can be trusted to run trains at all, they certainly can be trusted to run with the necessary caution when they find a caution signal. This is subject, of course, to proper education, instruction, and discipline which must be had for safe operation with any system. It seems idle to say, because the conditions at one caution signal require a reduction of train speed to, say, 4 or 5 miles per hour, and unusually careful handling, that trains must be similarly handled at every other caution signal on the division, regardless of much more favorable conditions existing. If this statement is true (and every practical railway man will agree that it is), the blockade of traffic that Mr. Rudd refers to is unlikely to occur. Summing up the situation referred to, we feel that the freight trains can be handled under the conditions outlined as fast as safe operation and terminal facilities will permit, regardless of whether fast passenger trains are operated over the same tracks or not.

The second case specified reads as follows:

"Given a road in which permissive block is used for freights and absolute for passenger trains, either class of trains may accept, as per rule, the caution (distant) indication, but the passenger train cannot pass the caution (permissive) signal and enter an occupied block. Should the engineman be required to remember all the points at which the caution signal is located which he cannot accept, or is it preferable to designate it so that he can tell what it is by looking at it? Which practice lends itself better to the enforcement of discipline and which to the promotion of misunderstanding?

"Further, with the minority scheme, if the interlocking plant is in permissive manual block territory, advance signals are compulsory, as otherwise the caution position may indicate either block occupied, on one or two tracks; a movement against traffic; into a yard; or to a branch, and while a passenger train would be permitted to accept it for the latter purposes, it could not accept it for the former. How would the engineer differentiate without stopping and examining the position of switches, etc.? Is this a good way to facilitate traffic?"

I take it that this refers to operation in manual block territory. We feel that no confusion will arise at the ordinary block station because passenger trains are operated only on positive block and freight trains on both positive and permissive block. This is a common practice over the country, and no bad results seem to arise from the practice. Both the block operator and the train crews in charge of passenger trains are fully conversant with the practice, and no difficulty is met to-day with this manner of operation.

At interlocking plants, which are also block stations, the situation is a little different. At such points we may desire to give passenger trains a caution signal for diverging movements, but not for entering an occupied block section. This is easily taken care of by the location of a signal for block and train order purposes at some point beyond or in advance of the diverging switches. As a rule, this will not increase the number of signals employed as it is common practice to install and use at such points, for block and train order purposes, signals located either in advance of the switches or in front of the tower. Further, it should be borne in mind that such advance signals are required only on lines of heavy traffic, where it is desired to clear the block in the rear as soon as possible after the arrival of the train at the interlocking plant. To simplify the apparently difficult problem propounded, I may say, without hesitation, that the conditions can be met with the minority's simple plan, and are now being met without the use of the complicated scheme of signaling advocated by the majority.

The third case quoted immediately below is rather formidable on first reading:

"Given a four-track railway handling all classes of traffic and the problem of weaving fast expresses in and out to pass local passenger and freight trains on the outside tracks and tonnage trains on the inside tracks, these expresses scheduled 77 miles in 89 minutes, with two or three slow-downs for water and one, and sometimes two, station stops. Place interlocking plants about five miles apart with No. 20 crossovers maintained for a speed of at least 50 miles an hour without danger or discomfort to passengers. Is it good signaling or good railroading to give no advance information to the engineer of the conditions at the interlocking, but to require him when he comes in sight of a signal located perhaps a mile from the home signal, to immediately reduce speed, examine his track for obstruction ahead, misplaced switch, train in block or bad track, moving at this rate to the interlocking signal, passing it prepared to stop if he is diverted over against traffic or into a yard; and to crawl along at this rate for 2,000 ft. more until he reaches the advance signal, if there is one, and in its absence, so run clear through the next block? Or is it better to tell him definitely the condition of the interlocking signals and switches and let him run, especially when he may be crossed in and out three or four times on the 77-mile run?

"If the minority standpoint is correct, why make a distinction between the main, or high-speed route, and the low-speed, when you make no distinction between the medium-speed route (good for 45 m. p. h.) and the low-speed?

"Is the providing of these long crossovers a waste of money? If it is bad practice to so signal that they may be taken at speed, why put them in? They certainly cost more than the shorter ones, No. 8's or No. 10's. Or is it intended that the engineman shall 'use his judgment,' and, having received the low-speed signal, run then at medium speed, having decided that because that is usually the route set up, it always will be right, and having good luck until some day he is sent into a yard by mistake?"

A brief study will show that the difficulties are, perhaps, overestimated. For example, the taking of water two or three times in 77 miles is, I believe, now generally considered unnecessary. It is common practice at the present time to run 75 to 100 miles between water stations. Since reading the criticism by Mr. Rudd, some consideration has been given to the schedules on the division of which I have charge. This has resulted in further confirming and reinforcing my previous opinion that the schedule described in case 3 is not unusual, and not especially difficult to meet, with the use of the simple scheme of signaling—"stop," "caution" and "proceed," advocated

by the minority. If time is taken to translate the description of conditions in case 3 into ordinary language, used by operating men of the day, it is probable that many will find that they are, with a very simple system of signals, obtaining results which the language in case 3 would indicate could not be obtained without the use of the complicated scheme of signals recommended by the majority. The results of long experience have been to show that it is unnecessary, if not undesirable, to require or permit trains to run at excessive speeds over diverging routes at interlocking plants. To make such excessive speeds possible requires, in the first instance, the installation of adjuncts and additions to a simple system of signals, which must be accompanied by expensive and complicated electric locking circuits, approach locking, annunciators, releases, time locks, etc., to check and guarantee the more or less specific information which it is aimed to give the enginemen.

These adjuncts and complicated automatic checking devices are expensive to install, maintain and operate. They are subject to failure and do fail, in common with all automatic devices.

L. R. CLAUSEN,
Division Superintendent, Chicago, Milwaukee & St. Paul.

Chicago, Ill., April 29, 1911.

A DIFFERENCE OF OPINION.

To the Editor of the Signal Engineer:

The crossing-bell circuit using a 1/10 ohm relay, as shown on page 157 of *The Signal Engineer* for April, 1911, is unsafe, and any road attempting to use it may expect a crossing accident. A 1/10 ohm relay circuit in series with the track battery is unreliable and cannot be kept in adjustment. Wet-weather adjustment requires greater tension on the armature than that of dry weather. The most important criticism, however, lies in the fact that if a train has passed the crossing, but is still in the block, possibly a mile beyond the crossing, a following train will not cause the bell to ring, for the reason that the one-tenth-ohm relay circuit is opened by the four-ohm relay contact in the advance section.

G. H. DRYDEN,
Assistant Engineer, Signal Department, Baltimore & Ohio.

Baltimore, Md., April 21, 1911.

Editor's Note.—Mr. Dryden's letter was referred to Mr. Baxter, and he answered it as follows:

Replying to Mr. Dryden's criticism of the double-track bell circuit, published in the April issue of *The Signal Engineer*, page 157, I wish to say that circuits similar to that one, using the 1/10-ohm relay and involving the same principles, are in service at several points in the West. One near Sacramento, Cal., has been in operation for about three years, and is not giving any trouble.

It will be seen that the 1/10-ohm relay is made to release its armature by the breaking of the circuit at a point near the battery, which completely de-energizes the coils of this instrument, and permits of a low drop-away point. This allows the pick-up point, which is of the most importance, to be placed where it will give the best service; and, as the pick-up occurs when the battery is practically on short circuit, and a current of approximately one ampere is flowing, it may be placed at 600 milli-amperes. This is low enough to insure the pick-up when the four ohms ars cut out of the circuit, and is still high enough to prevent a pick-up due to excess leakage unless the ballast resistance gets considerably lower than three ohms. Any failure that might occur on account of low ballast resistance would be on the side of safety.

As for the criticism that if a train has passed the crossing, but is still in the block, a following train will not cause the bell to ring, this is met in part by the fact that the bell is necessarily located well within the block, in order to give sufficient ringing distance, and it is hardly probable that a train, after being stopped by the signal, waiting the required time and then proceeding slowly, would still reach the crossing before the preceding one had cleared the block. This condition is, of course, to be avoided as much as possible, but the fact remains that these circuits are being operated where the blocks are approximately one mile in length and the rules require trains finding a signal at stop to wait one minute and proceed under control.

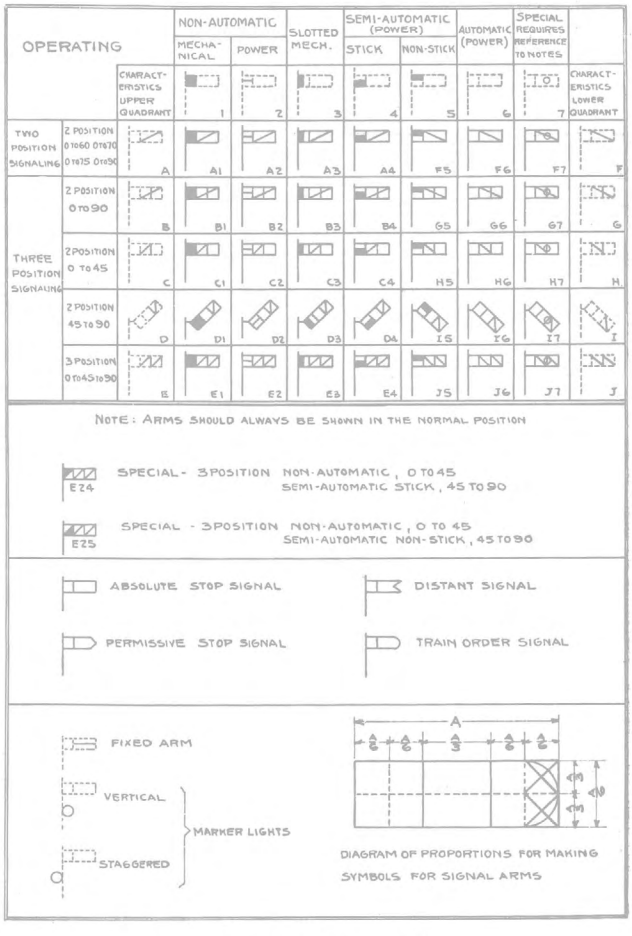
Sacramento, Cal., April 30, 1911. S. L. BAXTER.

SUGGESTIONS AS TO THE STANDARD SYMBOLS.

To the Editor of the Signal Engineer:

There are some points in the criticism of and suggested changes in the Railway Signal Association's proposed standard signal symbols in the April issue of *The Signal Engineer* which do not entirely meet with the approval of the writer. This is particularly true in regard to the circle shown with every signal blade. It has always been the contention that whenever a signal symbol was shown with no circle it indicated that the lights for all arms on this particular signal were located in a vertical line, while signals having staggered lights would have the location of these lights indicated in the symbol by circles. This is good practice, as it simplifies an interlocking plan, where, as a rule, all signals have vertical lights, by leaving out all lights (circles), and the Railway Signal Association has followed this practice in its proposed symbols to good advantage.

The great advantage of leaving out all unnecessary circles will be plainly evident to any draftsman who has had experience



Suggested Standard Symbols.

on interlocking plans drawn to a scale of 12 in. to 100 ft.—the standard scale in most signal departments. The tracks are drawn to such a small scale as to leave very little space for the signals. In fact, the size of a signal arm on an interlocking plan at this scale is $\frac{1}{16}$ in. wide by $\frac{3}{16}$ in. long. Thus the circle will be $\frac{1}{16}$ in. in diameter, and the hole made by the bow-pen in the tracing cloth will interfere with the placing of any lines or shaded quadrants inside of it, as suggested in the April number, page 131.

Even if a draftsman is successful in making a circle of this