

requirement that each insulator have a mark indicating the year of manufacture. He said that such information was of no value and would delay shipments as the manufacture would not stock up on insulators. The committee agreed to consider the elimination of this requirement and the specification as revised was accepted for presentation at the annual meeting.

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## Report of Committee I— Economics of Signaling

### COMMITTEE PERSONNEL

J. E. Saunders (D. L. & W.), chairman	
B. J. Schwendt (N. Y. C.), vice-chairman	
J. J. Brinkworth (N. Y. C.)	G. A. Rodger (Wab.)
E. B. DeMeritt (C. of G.)	L. R. Stahl (L. & N.)
W. F. Follett (N. Y. N. H. & H.)	R. A. Sheets (C. & N. W.)
J. S. Gensheimer (Penna.)	W. S. Storms (Erie)
E. Hanson (A. T. & S. F.)	C. A. Taylor (C. & O.)
R. B. Jones (C. P.)	O. R. Teague (S. A. L.)
C. A. Mitchell (N. Y. N. H. & H.)	L. C. Walters (Sou.)
F. W. Pfleging (U. P.)	L. S. Werthmuller (M. P.)

**B.** J. SCHWENDT, assistant signal engineer of the New York Central, as vice-chairman, presented the report of the Committee on Economics of Railway Signaling, which included data on four installations where train movements are directed by signal indication, and three papers on interlocking economics, as well as one paper comparing operating results before and after improvements were made in signaling facilities.

### Train Operation by Signal Indication on N. Y. C.

The New York Central, on July 25, 1927, placed a centralized traffic control system for train operation by signal indication in service on a 40-mile section of track between Berwick, Ohio, and Stanley. The installation covers 37 miles of single track and 3 miles of double track, all tracks being signaled in both directions, making the equivalent of 43 miles of single-track signaling. The daily traffic in this territory consists principally of the movement of coal northward and of empties southward, in addition to 10 to 12 high-speed passenger trains and 2 local passenger trains. The movement totals about 18 to 20 freight and 12 to 14 passenger trains per day. Of the 20 freight trains, approximately 15 are loads northbound and 5 are empties southbound. This section of road is used for northbound trains of different divisions owing to its 0.2 per cent descending grade, and empties are returned by other routes.

The centralized traffic control system permitted the elimination of a large number of train stops, which contributes to the reduction in running time and the ability to establish or change meeting points quickly, thereby reducing delays. As the grade is practically 0.2 per cent against southbound trains over the entire district, the elimination of stops on the grade made it possible to increase the tonnage of these trains, although there has been no change in the class of power. The economic statement concerning this installation, which was included in the report, explained that there had been a 26 per cent decrease in the freight train hours per trip, a 36 per cent increase in freight train speed, and a 39 per cent increase in the gross tons per train hour. The net annual saving is \$128,518 which is equivalent to 24 per cent on the investment, over and above interest charges. When consideration is given to the deferred

investment for second track the saving is increased to 65 per cent.

### A Recent Study on the P. M.

The centralized traffic control system on the Pere Marquette between Mt. Morris, Mich., and Bridgeport was installed to provide additional capacity on a 20-mile section of single track between two sections of double track, and on which there are three intermediate passing sidings. The double-track junctions and ends of sidings are controlled by the system, switches as well as signals being operated by means of a control machine at McGrew yard. This system was placed in service on June 30, 1928. A full description of the installation and characteristics of traffic appeared in *Railway Signaling* for October, 1928.

Recently a study was made to determine: (1) What the actual time savings in operation have been with the various densities of traffic; and the total time savings for the year. (2) How closely these results could have been predicted from an analysis of train records, and by graphic re-dispatching for



The six Bender children had several new songs for luncheon entertainment and Paul Gault presented them with a 105-lb. Arkansas watermelon to carry back to Jersey

periods before the installation. (3) The financial savings of the centralized traffic control system. (4) Financial comparison with other methods of operation. A brief outline of the methods used, the results obtained, and the conclusion drawn from the study is given below.

### FIRST—ACTUAL TIME SAVED IN OPERATION

In determining the actual time saved for the year and with the various densities of traffic, a study was made of 61 days in each of the two years preceding the installation and in the year following the installation. In order to secure days with light and heavy traffic, as well as an equal number of days in the same season of each year, every sixth day in each of the three years was chosen. Two years preceding the installation were used to determine the relation that existed between them and to test the accuracy of the method.

As meets, which are the cause of most avoidable delays, are approximately proportional to the square of the total number of trains, it was necessary to calculate the train time consumed between Mt. Morris and Bridgeport at the various densities of traffic (trains per day) and apply this time consumed to the number of days for the year on which each





