

Tunnel Protection is Furnished by Signals

## New Signals on Burlington Expedite Traffic

Delays Reduced From 15 Minutes to an Hour by Replacing Positive Block with Automatics

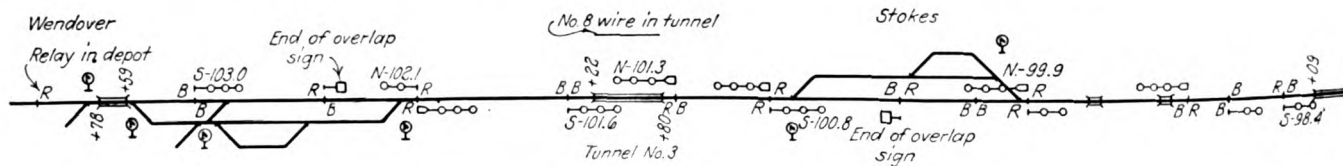
A COLOR-LIGHT automatic signal installation was recently completed and placed in service on the Chicago, Burlington & Quincy between Guernsey, Wyo., and Wendover, a distance of 8.3 miles, to supercede the positive manual block system which was formerly in use between these points, and to speed up and facilitate operation. The installation is on that line of the Burlington running from Alliance, Nebr., through Northport to Guernsey, Wyo., Wendover, Casper, Thermopolis and Billings, Mont. The Colorado & Southern line, from Denver north, connects with the Burlington at Wendover and has trackage rights to Guernsey where the Burlington has a yard and roundhouse facilities.

The need for this stretch of A. P. B. single track signaling is readily apparent from the fact that, in addition to the Burlington's heavy freight movements of oil and coal over this line, the Colorado & Wyoming railroad delivers iron ore from Sunrise, Wyo., to the yard at Guernsey where the C. & S. picks it up and hauls it to the smelters at Pueblo, Colo., via Wendover and Denver. Between Guernsey and

hour. Under the positive block formerly in use trains were frequently delayed at Guernsey or Wendover from 20 min. to an hour or more by trains ahead before the block was cleared. After the installation of the automatic signals, the delay to following trains has been reduced to about five minutes. This has relieved the congestion at either end considerably and speeded up train operation decidedly.

From Wendover to Guernsey, the line follows along the south bank of the North Platte river with considerable curvature. There are three tunnels in this 8.3 mi. stretch, as this is in the foothills of the Big Horn mountains. There is one siding with a capacity of 96 cars at Stokes, 5.1 mi. west of Guernsey and 3.2 mi. east of Wendover, but this could not be used to advantage as a meeting point under the positive manual block since there is no office at that place, but only a telephone connected to the dispatcher's line.

There are six telephone locations in this territory, five of which were formerly in service, while one was added at the west end of Stokes passing track when the signals were installed. These telephones are connected to the dispatcher's



Track Diagram Showing the Location of Signals, Tunnels and Other Characteristics

Wendover about 8 C. & S. trains are operated daily when business is light, which number increases to approximately 15 when business is heavy. The Burlington has an average of 13 trains a day during periods of light traffic and about 25 when business is heavy. This gives an average movement of from 21 to 40 trains or more a day over this territory, depending on traffic conditions. The average running time of passenger trains between Guernsey and Wendover is 20 min. while that of freight trains is from 50 min. to one

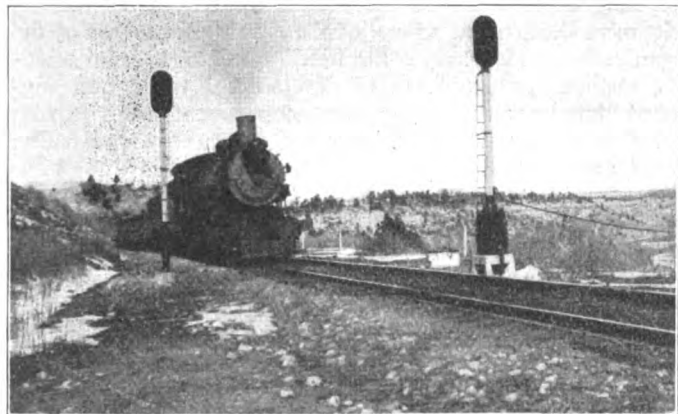
circuit and are located at the west end of Guernsey yard; at the west end of tunnel No. 1; at the west end of tunnel No. 2; at the east end of Stokes passing track; at the west end of Stokes passing track and at the east end of Wendover yard.

### Tunnel Protection

The home signal control wires have been carried through all tunnels and are mounted on brackets attached to the side walls. Knife switches are located at each end of each

tunnel and the control wires are broken through them so that, in cases of emergency, trainmen, section men or others can open the switches and put the home signals at red on each side of the tunnel. If a train should be stopped for any cause in a tunnel at some distance from the knife switches, all that is necessary is for the train crew to cut the wires alongside and this will serve the same purpose as the opening of the knife switches. The signal control circuits are carried through the tunnels with No. 8 Okonite copper wire having 3/64 in. wall insulation.

Two and three-position Federal Signal Company's color-light signals are used throughout this installation. The



Double Signal Location at the West End of Stokes Siding

Burlington's standard signaling scheme is followed in that separate home and distant signals are used, which practice is in line with the two-position lower quadrant, home and distant signals in service on other parts of the system. A 220-volt power line extends from Guernsey to Wendover with power furnished from a generating unit located in the Guernsey roundhouse. The storage batteries at signal, cut and track locations are on floating charge across Valley rectifiers.

#### The Power Plant and Pole Line

The system of power distribution is unique in that instead of power being purchased from commercial companies, the Burlington installed a Delco lighting unit in the roundhouse at Guernsey. In this part of Wyoming there are few commercial power company lines near the railroad right-of-way from which power can be purchased for the operation of a signal system, and this made it necessary for the company to provide its own source of power.

The unit is self-contained and in connection with its power

signal wires are carried on the bottom cross arm which is a 10-ft., 10 pin arm. The power wires are located on the field and track pins, and the signal wires are placed on the intermediate pins between the two power wires. In this territory, the Western Union line goes over the tunnels and across country instead of following the track. As a consequence, it has been necessary to build stub lines in from the main lead to certain signal and other locations. These stub lines were carried to a point where the main telegraph line would ordinarily be located, and cable was used from this point to the signal locations. The regular open line wire construction was employed on the stub lines.

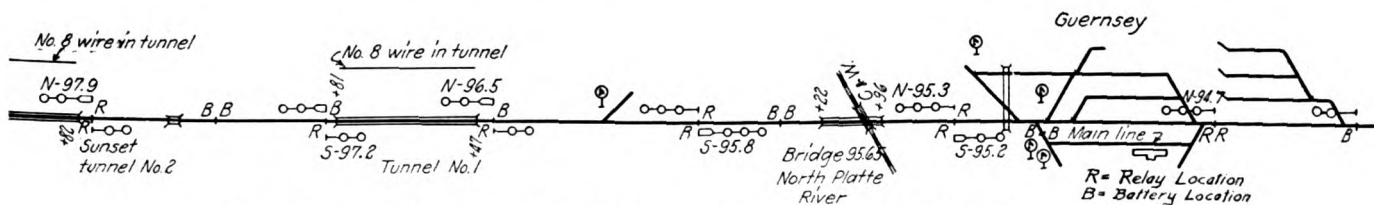
As an emergency source of power, arrangements were made with the local power company at Guernsey to furnish current at night. The local company generates current at 60 cycles, 115 volts and for the emergency source of power, leads are taken off the station meter, wires being carried to the telegraph pole nearest to the station where the current is stepped up to 220 volts for transmission on the line. Current is generated in Guernsey from dusk to daylight except on Wednesdays when it is on until noon. There is a telephone line between the roundhouse and the station and in case of a breakdown of the regular power plant, the roundhouse attendant can telephone the railway station to cut in the emergency power; this, the operator at the station can do by throwing a switch located in the depot for this purpose.

#### Signal Arrangement

The track layout shows the location of the signals. The signals are 18 ft. high, and are equipped with 8-volt, 18-watt lamps. The lenses are 8 3/4 in. in diameter and have a spread of approximately 10 ft. in 1,000 ft. The signals are mounted on Burlington standard signal foundations. The signal poles on the line side of the track are supported on standard mechanism cases with doors on the two sides and with the case divided in the center. The rectifiers, light relays, terminals, fuse blocks and fuses are mounted in the side of the case next to the line. The side of the mechanism case next to the track houses the track and signal control relays, terminals, signal lighting circuits and variable track resistances. The signals on the opposite side of the track from the pole line have no mechanism cases.

No trunking is used on the installation as all connections from battery well to signals, across the track between signals and track connections are made with No. 8, two-wire Parkway cable. Aldoseals are used at the signals located on the opposite side of the track from the pole line for the termination of the parkway cable. The light wires are then carried from the Aldoseals up to the lamps in the signals.

All starting signals (or stop and stay signals) are permanently lighted and the approach lighting scheme is used on



Track Diagram Showing the Location of Signals, Tunnels and Other Characteristics

board, is cared for by roundhouse attendants. The generator delivers approximately 5 amp. to the line, which is sufficient to operate the entire signal system, and also provide for all losses in line and transformers. The power is generated at 115 volts and is stepped up to 220 volts through a transformer, located just outside the roundhouse.

A signal department power line, approximately one-quarter mile long, was constructed from the roundhouse to the Western Union main lead. From this point on, the power and

all intermediate signals. Valley light relays are used at all permanently lighted signals with transformers having a ratio of 220 to 8 volts, there being 6 in all. The 220-volt circuit is carried direct to the mechanism case and attached to the transformer at these locations.

Four cells of Exide Type KXH7, 80 a.h. storage batteries are used for the signals and one cell is employed on the track circuits. These cells are housed in Massey circular battery boxes. The Parkway cable is taken in the trunking

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entrances and terminated on a terminal board inside the battery box and the trunking entrance is then cemented up. No variable track resistances are located in these boxes, but they are placed in the mechanism cases where they are more readily accessible.

Where relay and track feeds are located, a cable post with a four-way relay box is used for housing the rectifiers. There are no relayed cuts in the tunnels. Copper-clad bond wires and duplex channel pins are used throughout on the track circuits. The terminal boxes for the boot-leg connections are mounted on wood stakes and contain two R. S. A. terminals to which the Parkway cable is terminated; these boxes are filled with a sealing compound after the connections are made. The Parkway cable for the track or signal connections requires no trunking which makes it easier for section gangs to replace or tamp ties or do other work at these locations.

#### Switch and Station Indicators

The switch indicators are of the 500-ohm, push button, semaphore type. Light indicators, however, are used for the information of the operators and are located in the stations at Wendover and Guernsey. These indicators are arranged so that they are controlled by strap keys on the operators desks. It is necessary for the operators to push the keys, if the indicators light up it signifies that a train is approaching. The switch boxes throughout the territory are equipped with a self-centering device so that if the connecting rod should be broken or other parts become deranged, the contacts shunt the track circuit, thus putting the signals governed by that particular track circuit at danger.

The engineering details of this installation were worked out under the direction of J. B. Latimer, signal engineer, and the installation was made by railroad company forces under the direct supervision of W. F. Zane, assistant signal engineer.

## Railway Development Meets Association at Savannah

**D**ISCUSSION of the broad general principles underlying railway development work, rather than of the technical problems, marked the sixteenth annual meeting of the American Railway Development Association, which was held in Savannah, Ga., May 14, 15 and 16. The attendance was large and enthusiastic, and besides the general sessions there were sectional meetings of the three principal groups, the agricultural, the industrial, and the public relations.

The Atlantic Coast Line, the Central of Georgia and the Seaboard Air Line acted as hosts and provided an entertainment program for the delegates and the many lady visitors. At the opening business session eight new members were elected and the roll call showed the death of three during the past year: D. H. Hagerman (P. R. R.), Jesse M. Jones (S. A. L.), and C. L. Smith (O.-W. R. R. & N.).

The policy of the national government toward reclamation was outlined by Honorable William B. Bankhead, member of congress from Alabama. Mr. Bankhead pointed out the opportunities for service of railway development men in this connection.

The state of public sentiment toward the railroads was the subject of interesting reports by D. E. Willard (Great Northern), J. L. Cobbs, Jr. (Atlantic Coast Line), and R. S. Henry (N. C. & St. L.). The summing up of these surveys by public relations specialists indicated that the people believe today that railway service is excellent and are disposed to give full credit to transportation for efficient operation. It is the thought of the investigators, however,

that certain matters need to be explained more clearly to the public. Chief among these is the difficulty of railway financing. There is apparently a general impression that the railroads are making plenty of money, and a lack of sympathy and of an understanding of the necessity for the firm establishment of railway credit as a prerequisite to the expansion needed to keep pace with the country's progress. There is also a widespread demand for freight rate reduction, particularly on agricultural products, and the speakers had found a general discontent at the Pullman surcharge.

L. A. Downs, president of the Central of Georgia, was the principal speaker at the annual dinner on Thursday evening. His own experience in railroading had been mostly in the operating department, but he was now ready to list the development department as one of the essential branches of the organization. He stressed the need of intelligent and scientific methods of procedure in development work, and suggested that an alert development department, with experts versed in the knowledge of industry, agriculture and realty, would prevent costly errors of judgment on the part of executives. New traffic must be developed, to justify the mounting cost of operation and increased taxation, and the development agent can assist in solving the traffic problems that come before the executives. Illustrating the general principles laid down he referred to the peach industry as an example of intelligent co-operation, in which the Central had led; the researches and tests which had been made to prove the availability of Georgia clay for use in ceramic and other industries, and the test pastures of the Central's agricultural department. President Downs urged the development men to give attention to the creation and maintenance of public good will. The legislative situation at Washington calls for the best efforts of all transportation men.

The topic of Dr. Andrew M. Soule, president of the Georgia State College of Agriculture, was "Relations between railroad agricultural men and other forces working for better agriculture." He had found that a closer bond of sympathy and co-operation was continually being developed between these two great representative building agencies.

B. Mifflin Hood, of Atlanta, a manufacturer of brick and tile, spoke of "Research as a factor in agricultural and industrial development." He stressed the need of a scientific study of opportunity. He inclined to the belief that manpower was the most important factor in development, and stated that the educated man with vision and knowledge could bring about great progress.

The methods of city commercial organizations for promoting industries, the development of the poultry industry, the operation of agricultural demonstration trains, the problems of nation-wide co-operative marketing, the place of the railway magazine in public relations work, and the co-operative marketing of farm products were the principal subjects discussed in the general sessions.

San Antonio, Texas, was selected as the place for the next meeting, which will be on Wednesday, May 13, 1925. J. F. Jackson, General Agricultural Agent of the Central of Georgia, who has been acting president since the retirement from railroad work of Mr. Fox, of the Northern Pacific, was chosen president for the coming year. A. Leckie, Industrial Agent of the Kansas City Southern, Kansas City, Mo., was made first vice-president, and W. H. Hill, Agricultural Agent of the New York Central Lines, Chicago, was promoted from the secretaryship to the second vice-presidency. A. L. Moorshead, Industrial Engineer of the Erie, New York City, was chosen secretary-treasurer.

THE NEW YORK CENTRAL is to run a special train from Chicago for the members of the American Association of Railroad Superintendents going to their convention which will be held at Buffalo on June 18-20. The train will leave Chicago about 8:30 the morning of June 17.